

4112

COMPUTER DISPLAY TERMINAL

*Please Check for
CHANGE INFORMATION
at the Rear of this Manual*

WARNING

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

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MANUAL REVISION STATUS

PRODUCT: 4112 COMPUTER DISPLAY TERMINAL

This manual supports the following versions of this product: Serial Numbers B010100 and up.

REV DATE	DESCRIPTION
SEPT 1982	Original Issue; replaces 061-2487-00.

CONTENTS

Section 1	INTRODUCTION	Page
	Using This Manual.....	1-1
	Controls and Connectors Summary.....	1-2
	Internal Configuration.....	1-3
	Accessories.....	1-5
	Standard Accessories.....	1-5
	Optional Accessories.....	1-5
Section 2	INSTALLATION	
	Unpacking the Terminal.....	2-1
	Site Selection.....	2-2
	Installation Procedures.....	2-4
	Checking for Correctly Installed Options and Proper Operating Voltage.....	2-4
	Applying Power.....	2-4
	Testing the Terminal (Self-Test).....	2-4
	Connecting to a Host Computer.....	2-6
	Direct Connection.....	2-6
	Telephone Line Connection.....	2-6
	Testing Communications.....	2-7
	Repackaging the Terminal.....	2-8
Section 3	STRAP INFORMATION	
	Processor Board Straps.....	3-1
	Keyboard Straps.....	3-2
	RAM/ROM and RAM Controller Board Straps.....	3-2
	Video Controller Board Straps.....	3-2
	Vector Generator Board Straps.....	3-4
	Raster Memory Board Straps.....	3-4
	Dual Plane Raster Memory Board Straps.....	3-4
	External Video Board Straps.....	3-4
Section 4	ADJUSTMENTS (Short Form).....	4-1

Section 5	TROUBLESHOOTING AND SELF-TEST	
	Introduction to Self-Test	5-1
	Parts of Self-Test	5-1
	Power-Up	5-1
	Main Self-Test	5-2
	Adjustment Routine	5-2
	7x System Errors Detector	5-2
	Control Flow of Self-Test	5-2
	Self-Test Firmware Jump Tables	5-5
	How to Run Self-Test	5-5
	Self-Test Error Messages	5-6
	Errors Directory	5-6
	Non-Option Error Messages	5-6
	Keyboard Check and Lights	5-7
	Processor Check	5-10
	Communications and Bus Checks	5-14
	Memory Tests	5-17
	Display Bus Checks	5-23
	System Level Errors (7x)	5-25
	4112 Option Tests and Error Messages	5-27
	3PPI Board Tests	5-27
	Option 42 Self-Test Error Messages	5-29
	Tablet Self-Test	5-37
	Adjustment Self-Test	5-40
	The General Menu	5-40
	4112 Display Adjustment Menu	5-41
	Processor Board Adjustment Menu/Procedure	5-41
	CMOS-Reset	5-41
	Keyboard	5-42
	Host Port	5-42
	Disk Option Adjustment Menu/Procedure	5-43
	3PPI Adjustment Menu/Procedure	5-43
	Tablet Adjustment Menu/Procedure	5-44
Section 6	ELECTRICAL PARTS LIST	
Section 7	DIAGRAMS	
Section 8	SCHEMATICS	
Section 9	MECHANICAL PARTS LIST	
Appendix A	SIGNALS LIST	
Appendix B	ASCII CODE AND KEYCODE CHARTS	

ILLUSTRATIONS

Figure	Description	Page
1-1	The 4112 Computer Display Terminal	ix
1-2	Front and Rear Panel Features	1-2
1-3	4112 Internal Layout	1-3
1-4	4112 Mother Board	1-4
2-1	4112 Physical Dimensions	2-3
2-2	SELF TEST and MASTER RESET Buttons and Rear Panel Connectors	2-5
2-3	Keyboard Key Codes	2-7
2-4	Repackaging Diagram	2-9
3-1	Strapping RAM Controller Board Base Address	3-3
5-1	Self-Test Functional Diagram	5-1
5-2	Self-Test Program Block Diagram	5-3
5-3	Pointer and Jump Table Diagram	5-5
5-4	RAM/ROM Board ROM Locations	5-8
5-5	Processor Board ROM Locations	5-12
5-6	Status Byte	5-17
5-7A	Self-Test Flow Chart	5-45
5-7B	Self-Test Flow Chart	5-47
5-7C	Self-Test Flow Chart	5-49
5-7D	Self-Test Flow Chart	5-51
5-7E	Self-Test Flow Chart	5-53
5-7F	Self-Test Flow Chart	5-55
5-7G	Self-Test Flow Chart	5-57
5-7H	3PPI Self-Test Flow Chart	5-59
5-7I	Disk Self-Test Flow Chart	5-61
5-7J	Disk Self-Test Flow Chart	5-63
5-7K	Tablet Self-Test Flow Chart	5-65

TABLES

Number	Description	Page
3-1	Processor Board Strap Settings	3-1
3-2	Keyboard Language Option Straps	3-2
3-3	Video Controller Strap Settings	3-2
3-4	External Video Straps	3-4
4-1	Display Module Adjustments	4-1
5-1	Power-Up/Self-Test Sequence	5-4
5-2	Self-Test Errors Directory	5-7
5-3	Keyboard/Processor Board Errors	5-9
5-4	Processor Board Errors	5-10
5-5	RAM/Bus and Host Port Errors	5-14
5-6	Hex-to-Decimal Equivalents	5-17
5-7	System/Option ROM Errors	5-18
5-8	RAM Test Errors	5-20
5-9	CMOS Memory Errors	5-22
5-10	Display Bus/Board and System Errors	5-23
5-11	System Level Errors (7x Codes)	5-25
5-12	3PPI Errors	5-27
5-13	Disk Option Errors	5-29
5-14	Tablet Error Messages	5-37
5-15	Adjustment Control Keys	5-40
A-1	4112 Signal List	A-1
B-1	ASCII Code Chart	B-1
B-2	Characters used in < Char> Parameters	B-2
B-3	Characters used in < Int> and < Int+ > Parameters	B-3
B-4	Characters used in < Int-Report> Parameters	B-4
B-5	Characters used in < XY> Parameters	B-5
B-6	Characters used in < XY-Report> Parameters	B-6
B-7	United Kingdom Character Set	B-7
B-8	Swedish Character Set	B-8
B-9	Danish/Norwegian Character Set	B-9
B-10	APL Character Set	B-10

OPERATORS SAFETY SUMMARY

This general safety information is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear in this summary.

TERMS

IN THIS MANUAL

CAUTION statements identify conditions or practices that can result in damage to the equipment or other property.

WARNING statements identify conditions or practices that can result in personal injury or loss of life.


AS MARKED ON EQUIPMENT

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

SYMBOLS


IN THIS MANUAL


 This symbol indicates where applicable cautionary or other information is to be found.

AS MARKED ON EQUIPMENT

 **DANGER** high voltage.

 Protective ground (earth) terminal.

 **ATTENTION**—refer to manual.

 Refer to manual.

POWER SOURCE

This product is designed to operate from a power source that does not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

GROUNDING THE PRODUCT

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the power input or output terminals. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

DANGER ARISING FROM LOSS OF GROUND

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulating) can render an electric shock.

USE THE PROPER POWER CORD

Use only the power cord and connector specified for your product.

Use only a power cord that is in good condition.

Refer cord and connector changes to qualified service personnel.

OPERATOR'S SAFETY SUMMARY

USE THE PROPER FUSE

To avoid fire hazard, use only the fuse specified in the parts list for your product, and which is identical in type, voltage rating, and current rating.

Refer fuse replacement to qualified service personnel.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES

To avoid explosion, do not operate this product in an atmosphere of explosive gases unless it has been specifically certified for such operation.

DO NOT REMOVE COVERS OR PANELS

To avoid personal injury, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed.

DO NOT OPERATE PLUG-IN UNIT WITHOUT COVERS

To avoid personal injury, do not operate this product without covers or panels installed. Do not apply power to the plug-in via a plug-in extender.

SERVICE SAFETY SUMMARY

FOR QUALIFIED SERVICE PERSONNEL ONLY

Refer also to the preceding Operators Safety Summary.

DO NOT SERVICE ALONE

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

USE CARE WHEN SERVICING WITH POWER ON

Dangerous voltages may exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.

Disconnect power before removing the power supply shield, soldering, or replacing components.

DO NOT WEAR JEWELRY

Remove jewelry prior to servicing. Rings, necklaces, and other metallic objects could come into contact with dangerous voltages and currents.

X-RADIATION

X-ray emission generated within this instrument has been sufficiently shielded. Do not modify or otherwise alter the high voltage circuitry or the CRT enclosure.

POWER SOURCE

This product is intended to operate from a power source that will not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

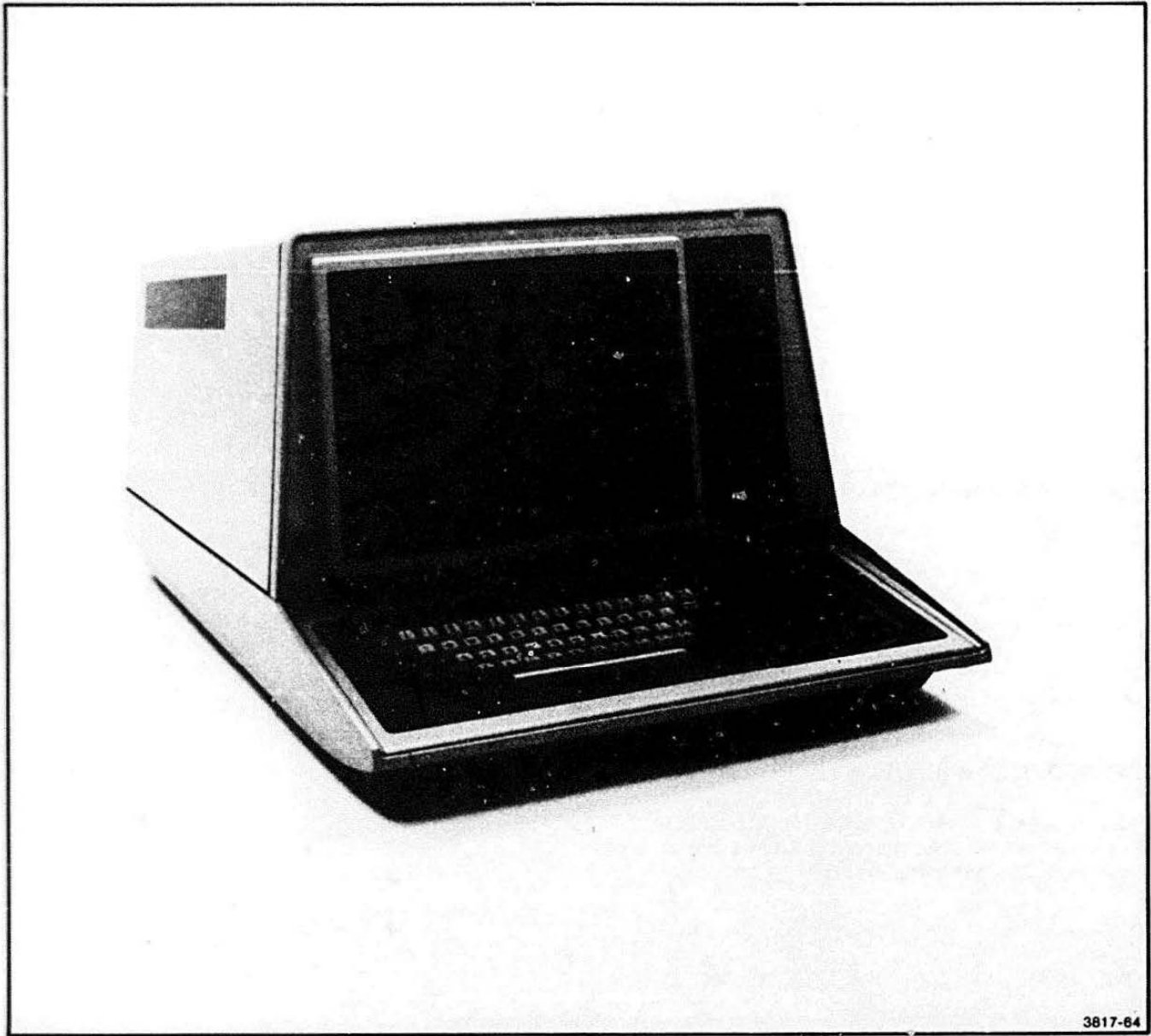


Figure 1-1. The 4112 Computer Display Terminal.

Section 1

INTRODUCTION

USING THIS MANUAL

This is the second volume of a two volume service manual for the TEKTRONIX 4112 Computer Display terminal. This volume contains primarily: schematics and diagrams, and reference information. This volume is intended to be used as an on-site service tool and therefore contains abbreviated forms of:

- Adjustment procedures
- Error message tables
- Strapping information
- Installation information

The installation section can be used to verify that a 4112 terminal is installed properly and is connected to its host system via the system data path. The strapping diagrams will help to verify that the terminal is installed and set up properly for its intended use. Then trouble shooting can proceed while referring to the Self-Test error message tables, and adjustment procedures (where necessary). If a fault occurs that requires examination of circuit board components, refer to the schematic diagrams and component location photos.

Volume 1 contains detailed theory of operation and operating information if an in-depth examination of terminal operation is required.

The Low Voltage Power Supply (620-0295-00) in the 4112 terminal is also used in other Tektronix products and has a separate service manual.

The only options described in this manual are the memory options and those other options that are used only in the 4112 terminal. All other options to the 4110 Series terminals (disk option, tablet interface, 3PPI, etc.) have their own service manuals. See Volume 1 of this manual for a complete list of options.

CONTROLS AND CONNECTORS SUMMARY

Figure 1-2 shows the controls and connectors located on the front and rear of the terminal. The indicators on this terminal are visual and audible:

- Eight indicator LED lights — where initial error messages are displayed
- Bell — rings during a Power-Up error, or during Self-Test error (see *Self-Test*, Appendix B)

Front panel controls for the standard terminal are:

- Power switch
- Intensity control
- Alphanumeric keyset
- Programmable user-defined Function Keys
- Predefined Function Keys (DIALOG/CLEAR, SETUP, LOCAL/CANCEL, and HARD COPY)
- Display Control Keys (ZOOM/NORMAL, NEXT VIEW/BORDER, PAN/OVERVIEW, and VIEW/RESTORE)
- Thumbwheels

See Section 2 (Volume 1), *Controls and Functions*, for a description of each of these controls.

Rear panel controls and connectors:

- MASTER RESET switch
- SELF TEST switch
- Power connector — accepts 110VAC, 60 Hz
- RS-232 connector — to modem and host data path
- Fuse holder — accepts 6.25A Slow Blo, size 3AG

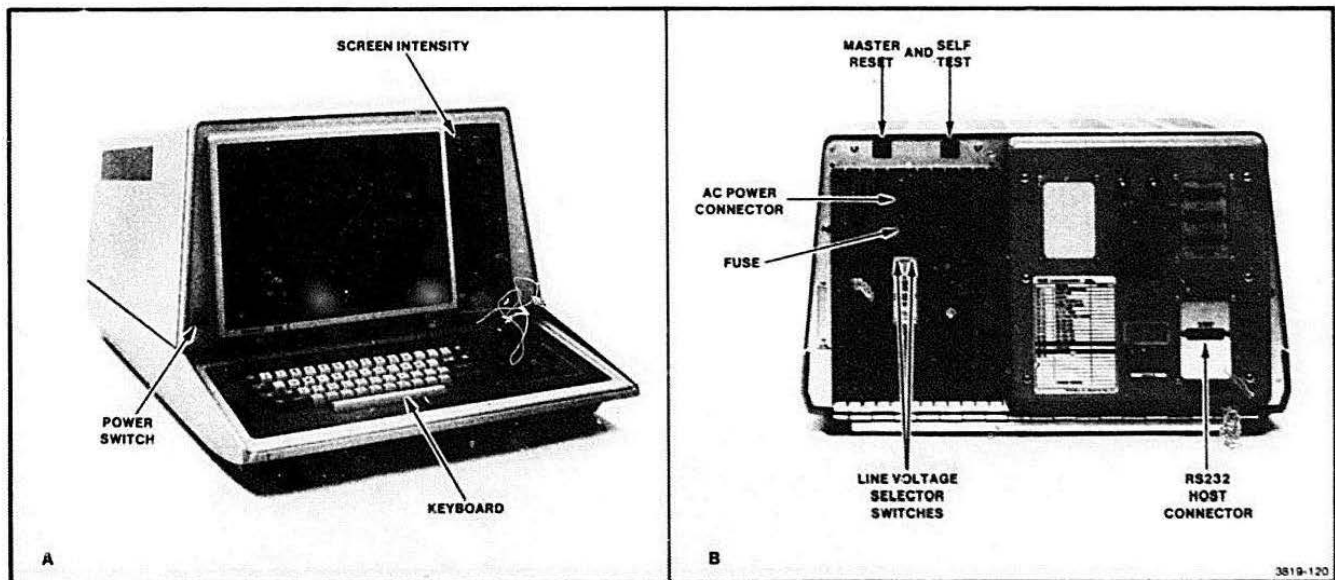


Figure 1-2. Front and Rear Panel Features.

INTERNAL CONFIGURATION

The 4112 consists of several physical modules that are depicted in Figure 1-3:

- Display Module
- Keyboard Assembly
- Disk Drive Unit (optional)
- Low Voltage Power Supply
- Card Cage

The Card Cage and Power Supply are mounted together on a hinge, and may be tilted back away from the Display Module for service access. The Card Cage contains a single motherboard that is electrically divided between the so-called "Processor Bus" and the "Display Bus." Many of the signals are common to both busses.

NOTE

The 4112 Processor Bus is identical to the 4114's Processor Bus. The 4112's raster Display Bus is somewhat different than the corresponding DVST Display Bus in the 4114.

Figure 1-4 shows the recommended arrangement of boards in the Card Cage for a fully configured 4112. If the Disk Controller board is not present, the Processor occupies slot 7 instead. (All boards are to be arranged to avoid open slots between boards. Empty option slots at the left end of the Processor Bus are OK. When the External Video and Dual Plane Raster Memory boards are not present, the adjacent boards are shifted to the left, thus leaving no empty slots.

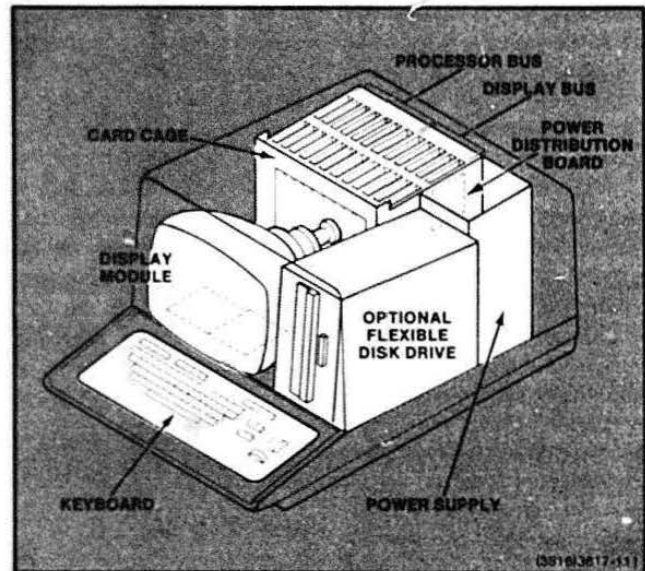


Figure 1-3. 4112 Internal Layout.

INTRODUCTION

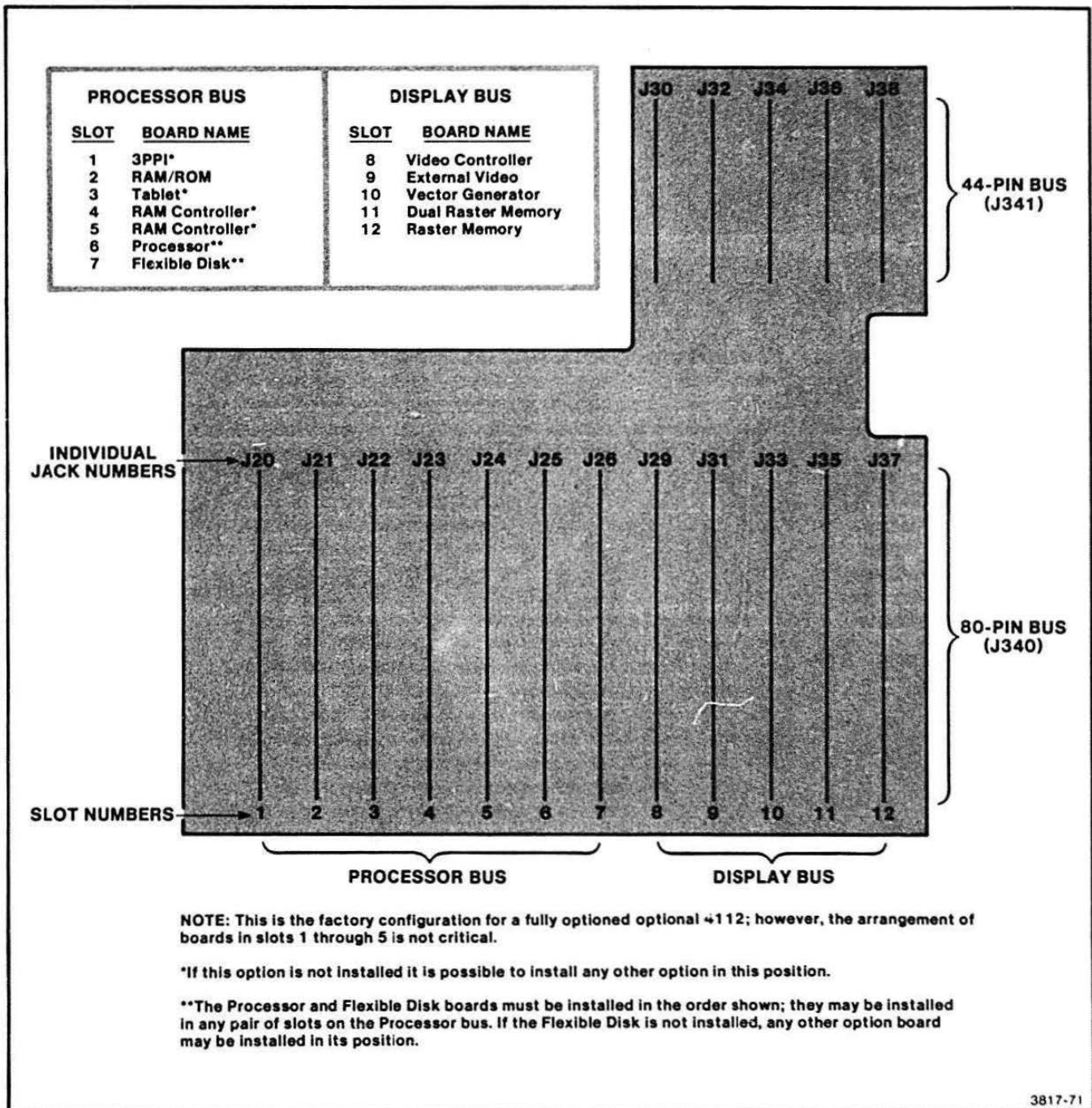


Figure 1-4. 4112 Motherboard.

ACCESSORIES

The following list of accessories is taken from the mechanical parts lists where part numbers are listed for each item. This list is divided into two parts: the standard 4112 accessories, and those accessories that may be ordered separately and in addition to the standard accessories.

STANDARD ACCESSORIES

- *4112 Introduction Brochure*
- *4112 Operator's Manual*
- *Power Cord Set*
- *Host Port RS-232 cable*
- *Eight re-legendable key caps*
- *Six function-key overlays*
- *4112 Computer Display Terminal Host Programmer's Manual*
- *4110 Series Command Reference Manual*

OPTIONAL ACCESSORIES

- *Logic Extender Board*
- *Host Port Loop-back Connector*
- *Current Loop Interface Loop-back Connector*
- *Host Path Extender Cable*
- *Re-legendable key caps*
- *Function-key overlays*
- *4112 Service Manual, Volume 1*
- *4112 Service Manual, Volume 2*
- *620-0295-00 Low Voltage Power Supply Service Manual*
- *4110 Series Option 10 (Three Port Peripheral Interface) Service Manual*
- *4110 Series F13/14 (Graphics Tablet) Service Manual*
- *11" x 11" Precision Polyester Grid, for Option 13*
- *30" x 40" Precision Polyester Grid, for Option 14*
- *4110 Series F42/43 (Flexible Disk Drive) Service Manual*
- *119-0977-01/03 Flexible Disk Drive Unit Instruction Manual*
- *Package of ten diskettes*
- *Shugart Drive Unit Alignment Diskette*

Section 2

INSTALLATION

This section covers unpacking and installing the 4112 terminal. It also provides repackaging instruction for reshipment of the terminal.

Installation consists of unpacking the terminal, checking for correct options, checking operating voltage and fuse selection, applying power, connecting the terminal to a host computer, and testing communication between the host computer and the terminal.

The terminal is preassembled and requires no assembly for initial installation. If new options are to be installed, disassembly of the terminal may be required. **THIS SHOULD BE DONE BY QUALIFIED SERVICE PERSONNEL ONLY.** The steps required for installation are outlined following Unpacking Instructions and Site Selection.

UNPACKING THE TERMINAL

Remove the 4112 from the shipping carton and inspect for obvious damage. **RETAIN THE PACKING MATERIALS** in case shipping damage requires repackaging for repair; see Repackaging Instructions at the end of this section. See that the enclosed packing list corresponds with the included standard accessories and ordered optional accessories.

Standard accessories included with the 4112 are:

- *4112 Operator's Manual*
- Power cord set
- Host Port RS-232 cable
- Eight relegendable key caps
- Six function key overlays

Optional accessories available are:

- Logic Extender Board
- Re-legendable key caps
- Function key overlays
- *4112 Computer Display Terminal Host Programmer's Manual*
- *4110 Series Command Reference Manual*
- *Firmware Access Manual*
- *4112 Service Manual (Volume 1)*
- *4112 Service Manual (Volume 2)*
- *4110 Series Option 10 Three Port Peripheral Interface (3PPI) Manual*
- *4110 Series Option 13/14 Graphic Tablets Manual*
- *4110 Series Option 42/43 Flexible Disk Drives Manual*
- *119-0977-00 Flexible Disk Drive Instruction Manual*

SITE SELECTION

In order to determine the optimum location for the terminal, you need to understand clearly how it functions and what it interfaces to. The 4112 Computer Display Terminal interfaces between the operator and a host computer by allowing inputs through a keyboard and then providing a display of computer output data (alphanumeric and/or graphic). The 4112 also contains local memory (up to 512 Kbytes), local disk drive capability (with Option 42 installed) and local graphic capability. In addition, the terminal can relay bi-directional data through peripheral devices and a computer. An interface unit must be installed and connected to the computer — either directly (direct line) or through a modem (modulator-demodulator) — to permit information exchange. The terminal needs to be located near the modem, TIA (terminal interface adapter), or direct line; whichever is used.

If a hard copy unit is to be connected (TEKTRONIX 4632 or 4643), consult the manuals on the hard copy unit before connecting it; also, keep the interfacing cables as short as possible.

Once the Terminal is unpacked, place it on a stable desktop or the place it is to be used. Figure 2-1 shows the dimensions of the 4112. This figure can be used as an aid in determining how much space is needed for the terminal.

CAUTION

Adequate clearance should be left on all sides of the heat sink (adequate clearance is about 4-6 inches) on the rear of the terminal. Air temperature measured 1 inch (2.54 cm) from the rear heatsink should not exceed + 40° C during operation of the terminal.

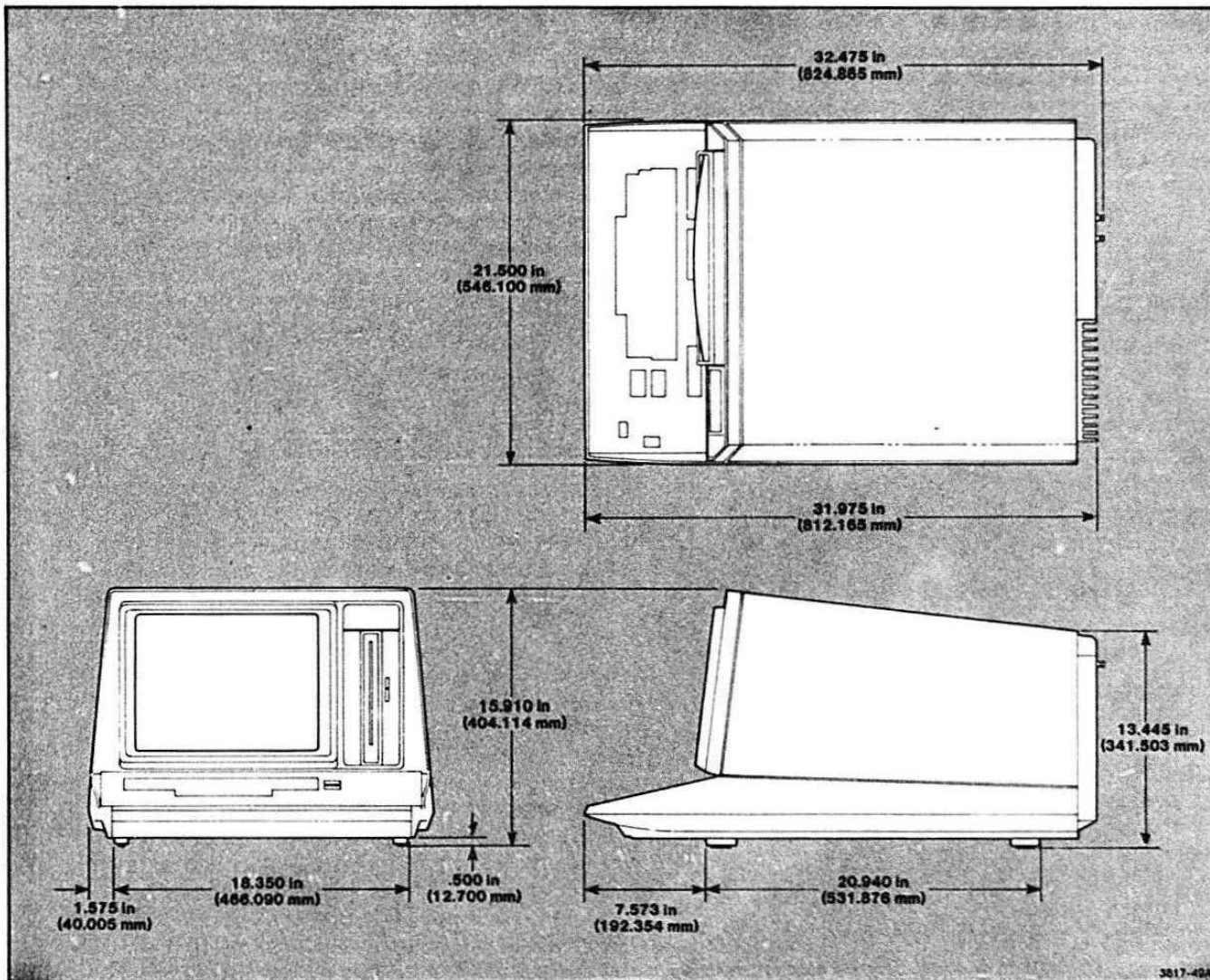


Figure 2-1. 4112 Dimensions.

INSTALLATION PROCEDURES

Installation of the terminal does not require accessing any internal parts. Only qualified service technicians should open the terminal's cover; in such cases all cautions and warnings must be observed.

WARNING

Dangerous voltages exist within the terminal. Normal electrical precautions should be observed whenever working inside the terminal.

CHECKING FOR CORRECTLY INSTALLED OPTIONS AND PROPER OPERATING VOLTAGE

Once the terminal is on a stable work area, verify that the options installed are the options ordered. A simple verification can be made by looking at the rear panel of the instrument. On the rear panel, there is a sticker containing a list of the options installed in the terminal.

At the same time the options are checked, the operating voltage should also be checked. This can be simply done by checking the yellow tab at the rear of the terminal. Figure 2-2 shows both the yellow tab and the option sticker.

CAUTION

If the terminal is not set for the proper operating voltage, and the terminal is connected to a voltage different than what it is set for, serious damage to the terminal could result.

CAUTION

Installation of new options and changing the operating voltages for the 4112 should be done by qualified service personnel only. Procedures for changing the operating voltage are located in Volume 1, Appendix D (Option Installation Procedures.) The procedures for installing other options are located in the manuals for those options.

APPLYING POWER

Power is applied to the 4112 by plugging the female end of the power cord into the AC power socket. The corresponding male end of the same cord can then be plugged into the AC power outlet. The 4112 can then be turned on by pressing the power switch located near the lower lefthand corner of the terminal's display screen. After the power switch is turned on, a cursor should appear in the upper left corner of the screen.

TESTING THE TERMINAL (SELF-TEST)

NOTE

More about Self-Test can be found in Section 10 (Vol. 1) or Section 5 (Vol. 2) of this service manual. If the terminal fails to pass one of the parts of Self-Test, a failure code will stay lit on the keyboard lights. To decode the failure, consult Section 5. The following procedures are only for verification of correct operation of the terminal. A more complete performance verification procedure is in Section 8 of Volume 1.

When turning on the terminal in the manner above, the terminal goes through a Power-Up (Self-Test) sequence. This routine tests about 30% of the terminal circuitry. If an error is found during this power up sequence, an error message will be sent in the form of a Hexadecimal code displayed on the LED's on the keyboard.

For first time operation, a more detailed version of Self-Test should be run. A brief outline of how to perform this test follows. Again, there is a detailed section on Self-Test and Self-Test failure codes in Section 5 (Error Codes) of this manual (Vol. 2):

1. Apply power to the terminal.
2. Press the SELF TEST button (located on the rear of the terminal) and hold it down.
3. Press the MASTER RESET button (located next to the SELF TEST button) and release it.

4. The Keyboard LED lights will begin to cycle. When this happens, release the SELF-TEST button.
5. The keyboard lights will cycle twice in the course of this Self-Test. If there is an error, the LED lights will remain lit in a Hexadecimal binary error code. If there is no error, after cycling twice, the bell will sound and the CAPS key light will blink.
6. Once the CAPS key light begins to blink, press and hold the CONTROL and C keys down at the same

time. This displays the General Menu on the screen as follows:

```

411X Menu
--
f1 4112 Display
f2 Processor Board
f3 Disk
f4 3PPI
f5 Tablet
--
Selection
*
```

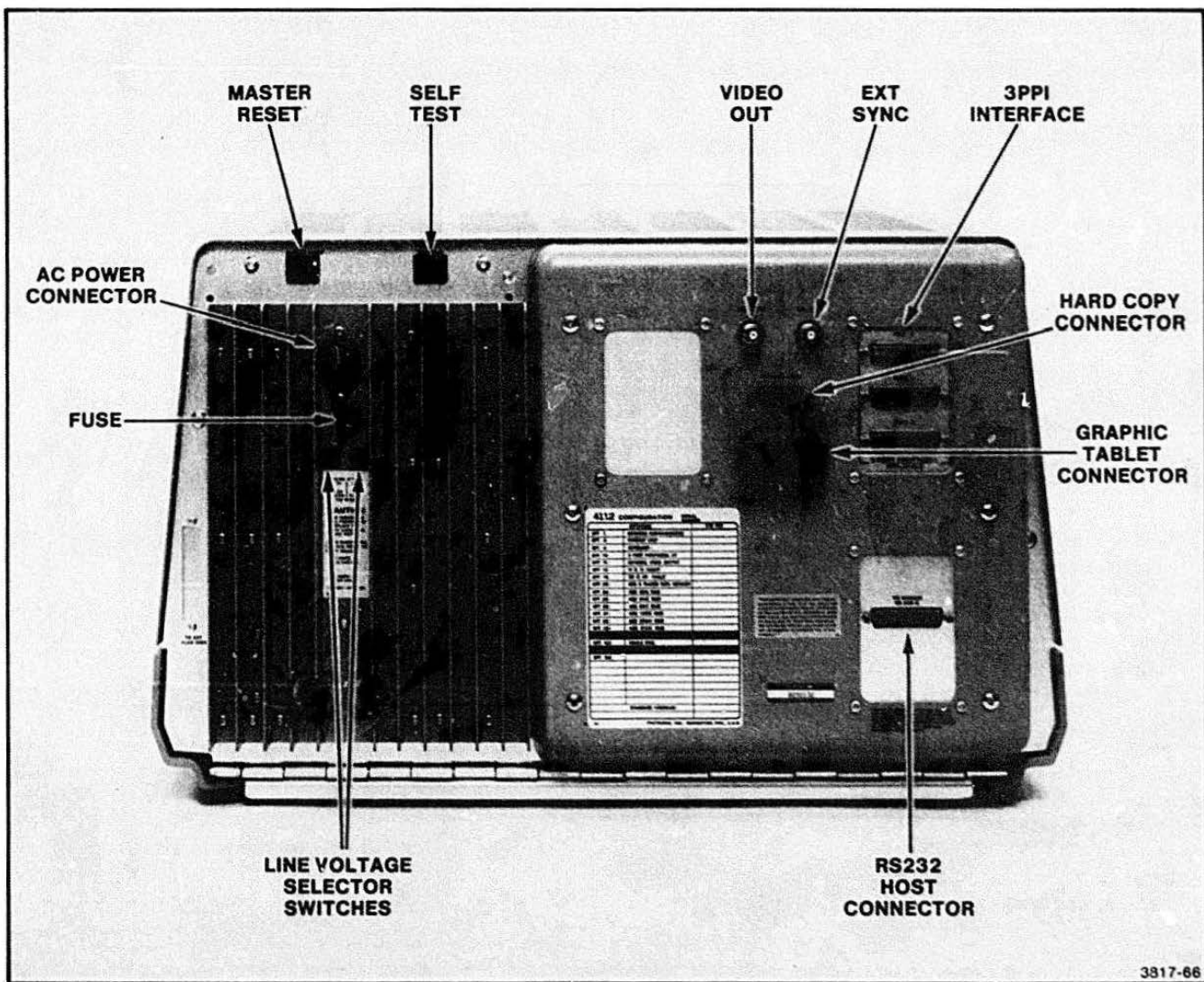


Figure 2-2. SELF TEST and MASTER RESET Buttons and Rear Panel Connectors.

INSTALLATION

7. Press F1 function key. This places a display test menu on the screen. Press each of the following keys in order, watching for the following patterns. Once the pattern has appeared, press the next key.

F1 — This will display a grid pattern.
F2 — This will display a series of gray shades written over the grid pattern.
F3 — This will display a "white" screen.
F4 — This will display a series of small dots, covering the screen.

8. After looking at all patterns, press the CONTROL and C keys at the same time. This displays the General Menu again. Now press function key F2 and observe the following submenu.

```
Processor Board Menu
--
f1 CMOS-Reset
f2 Keyboard
f3 Host Port
--
Selection
*
```

9. Now press F2 again. This procedure can be used to verify that all keyboard keys are functioning properly. When a key is pressed, a unique 2-digit hexadecimal character is printed on the screen. When the key is released, a different 2-digit character is displayed. These codes are unique for each key stroke and may be used to verify the functioning of each key. Compare the displayed codes for each key with the corresponding codes in Figure 2-3.
10. After checking any or all keys, press the CONTROL and E keys together. The screen will blink twice and the cursor will again appear in the upper lefthand corner of the screen.

Upon completion of steps 1 through 10, 70% of the terminal circuitry has been tested. Proper terminal operation has been verified and the terminal is now ready to be connected to a host computer.

CONNECTING TO A HOST COMPUTER

The two basic ways of connecting the terminal to a computer are a direct connection, and a telephone line connection. A direct connection is used when the terminal and the computer are located close to each other. If a direct connection is to be used, Option 2, the Current Loop Interface, must be installed. With Option 2 installed, the direct method can be used without any additional equipment. A telephone line connection can be made regardless of the distance between the terminal and the computer.

Direct Connection

When the 4112 has the current loop interface (Option 2) installed, a direct connection can be made to the host computer. Connect the terminal plug to the interface jack. The plug on the other end of the interface cable can then be inserted into the modem jack at the computer.

Telephone Line Connection

A modulator-demodulator ("modem") is required to establish a telephone line connection. There are many brands and models of specialized modems available; the type required depends upon the specific needs of the installation.

A host-port RS-232 cable is included with the 4112 as a standard accessory. To connect to a modem, connect one end of the RS-232 cable to the plug on the rear of the 4112 designated "To Modem". Connect the other end of the cable to the modem to be used.

Once the terminal is connected to the modem, the standard procedure for connecting to the computer is as follows:

1. Power up the equipment.
2. Dial the number of the computer installation.
3. When the computer responds with an audible tone, place the telephone headset on the cradle provided in the modem; or push the button marked DATA and hang up the headset; or perform such other function as required by the modem in use.

- Perform the sign-on procedure as required by the particular computer installation.

system, the communication lines between the host computer and the terminal should now be open. The user can now "talk" to the computer. The user should try a few of the basic system commands to ensure that no communication problems exist between the terminal and the host computer.

TESTING COMMUNICATIONS

Once the terminal has been connected to the computer (by either a direct line or telephone modem), perform the sign-on procedure as required by the computer system in use. Once the user has "signed-on" to the

Testing for system communications provides the final verification of proper operation. The 4112 is now ready for daily customer use.

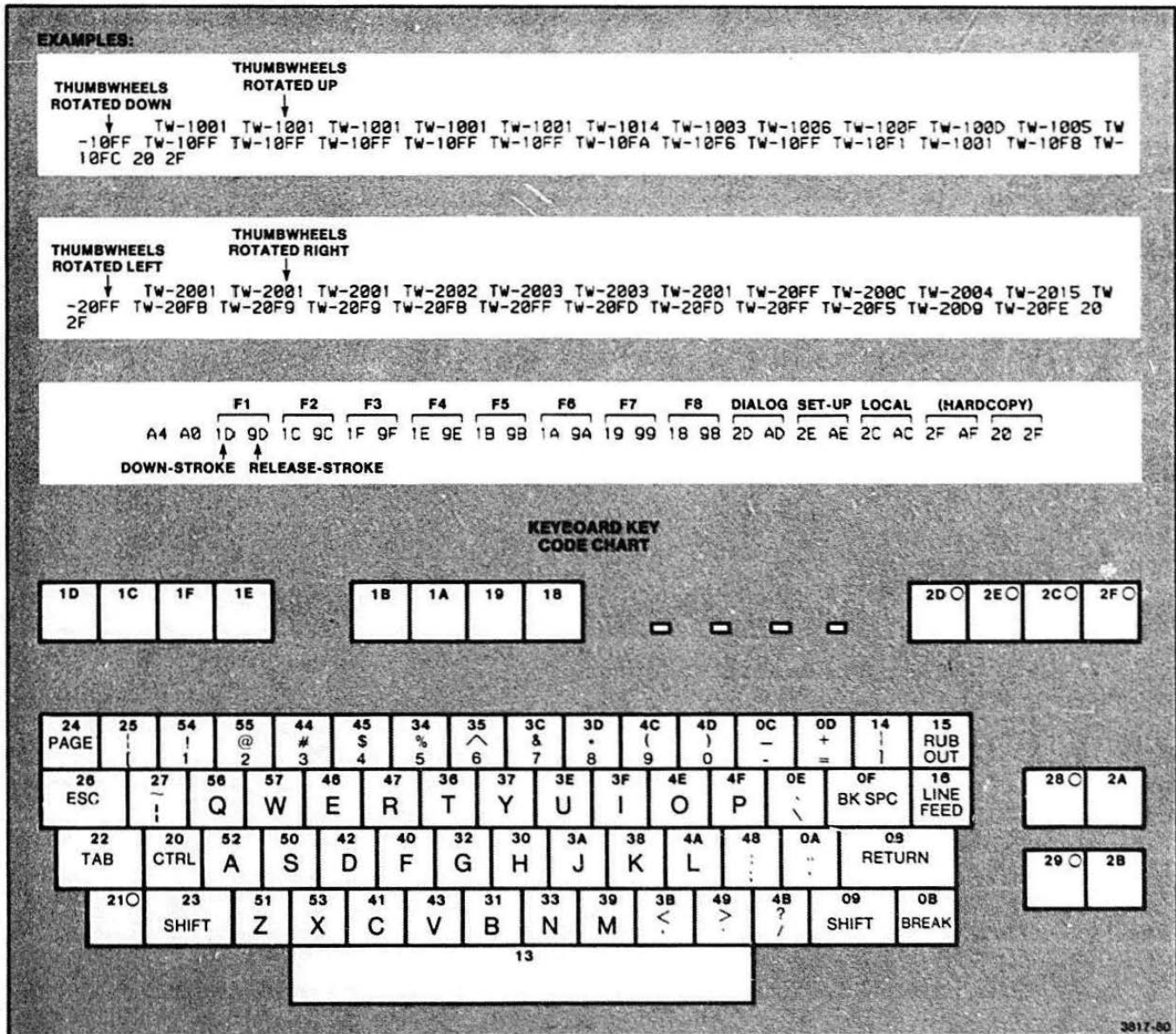


Figure 2-3. Keyboard Key Codes

REPACKAGING THE TERMINAL

In the event that the 4112 needs to be shipped, for servicing or to be used in a different location, follow this repackaging procedure. Study Figure 2-4 along with the procedure.

1. Set up corrugated carton and seal bottom flaps with Kraft 3 inch Reinforced Box Sealing Tape.
2. Place Bottom Pad (D) in the bottom of the Outer Carton (E).
3. Place small foam block in slot of terminal's disk drive unit.
4. Place 4112 in Bottom Pad so that the front of the keyboard is as far up into the pad as possible. (Front edge of terminal should but up against foam end of pad.)
5. Place the "L" shaped Top Pad (C) so that it fits securely in back of and on top of the 4112. See Figure 2-4.
6. Arrange "scored pads" (A) as per Figure 2-4 and slide them into Inner Box (B).
7. Place all necessary manuals and accessories in Inner Box. Ship only the items that are needed at the destination.
8. If the 4112 contains Option 13 or 14, and the Tablet Controller is to be shipped, place the Controller unit in a poly bag. Place foam pad, that came with Tablet Unit, around the Controller and secure it in the Inner Box. (Cut off excess foam.)

NOTE

This procedure is not referring to the Tablet Controller Board inside the terminal.

9. Seal top flaps of Outer Carton with 3 inch Kraft Tape.
10. Mark carton with: model number, serial number, and destination as required.

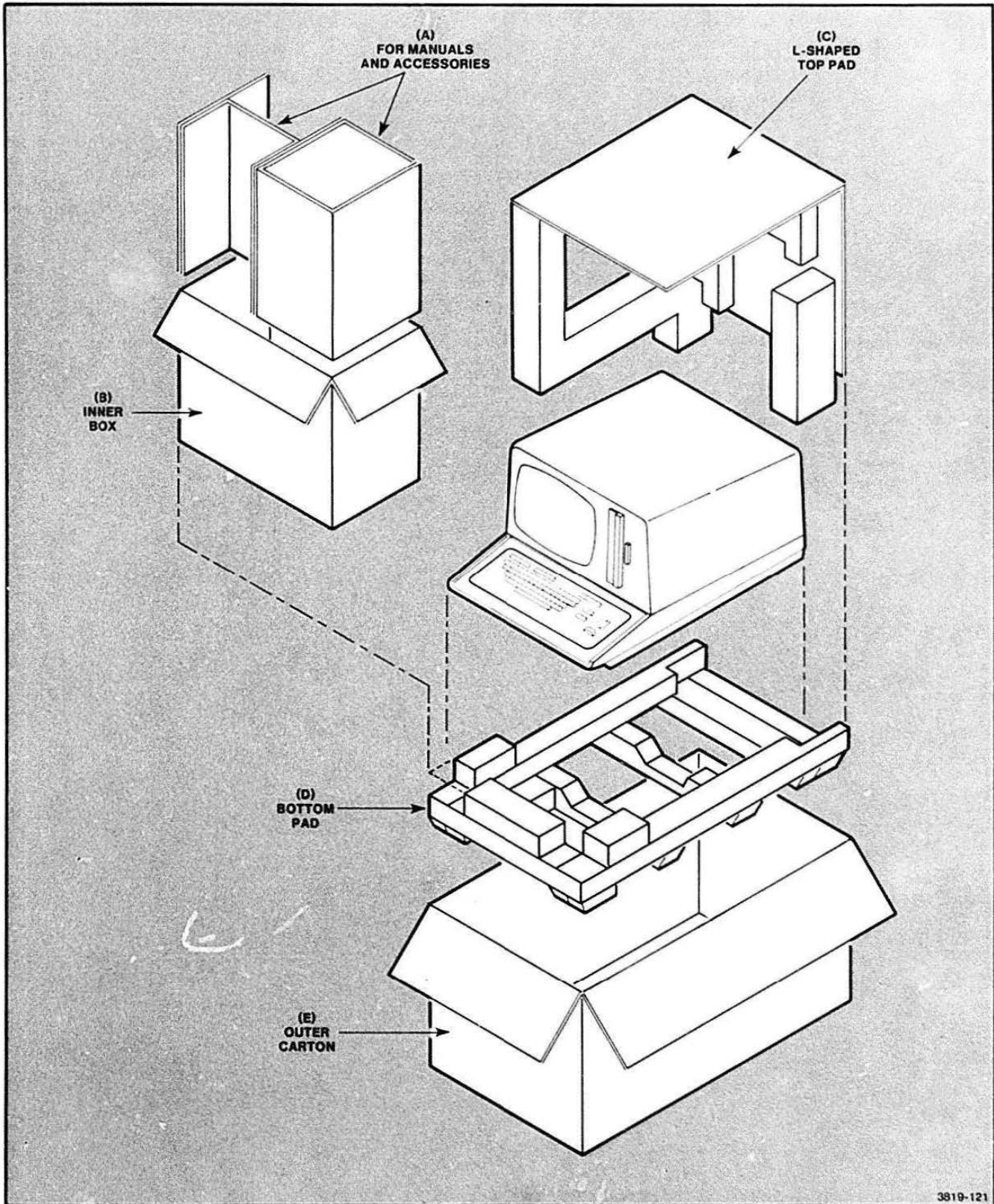


Figure 2-4. Repackaging Diagram

Section 3

STRAP INFORMATION

The 4112 terminal has straps on the various circuit boards, which provide flexibility in its operating parameters. There are two kinds of straps: cut straps, and jumper straps. In cases where the terminal was designed to function one way, but provisions were made for future design enhancements, cut straps are often used. Jumper straps are used for most strap options, which allows more than one kind of chip to be used in a given socket, or a change in timing or other operating parameters.

This summary gives the strap settings for each standard circuit board/module in the 4112. Also the disk option's recommended strap settings are given, because most terminals include this option.

PROCESSOR BOARD STRAPS

Several cut and jumper straps are provided on the Processor Board. Straps labeled "Jxxx" have square pins with movable jumpers. Straps labeled "Wxxx" are cut straps; they consist of circuit traces on layer 1 of the circuit board (and no square pins). Table 3-1 lists these strap settings.

Table 3-1
PROCESSOR BOARD STRAP SETTINGS

Strap Label	Definition
ROM Logic Straps: ROM Size Strap (W126)	Select either 16K bit or 32K bit ROMs, or disable all Processor Board ROMs.
ROM Wait States (W475)	Normally strapped for ONE wait state. If all the ROMs on the Processor Board are fast enough, this strap may be changed to indicate ZERO wait states.
ROM Type Straps (J226, J236, J426, J427)	There is one set of straps for each two-ROM bank of ROMs. These straps configure the board for the pin-out of the ROM being used.
BLCK Source: (W455, W456)	Normally strapped to "on-board." If more than one Processor Board is used in the system, only one should be strapped to "on-board;" all others should be strapped to "off-board."
Interrupt Level Straps: (W470)	The Processor can generate three different interrupts to the 8086 bus. These straps define the interrupt priority levels of the three different interrupts. Normally, the "host port receiver interrupts" are set to interrupt level 0, "keyboard interrupts" set to level 4, and "host port transmitter" are set to interrupt level 5.
Bus Timeout Enable: (W561)	This strap prevents the Processor Board from driving ACK1-0 on a bus timeout. It is used for multi-processor board systems.
Test 1 and Test 2 (J150 and J125)	Tests 1 and 2 disable clocks on the Processor Board for ATE (automated test equipment) testing.
RS-232-C/RS-232-A: (J522)	This is normally set for RS-232-C. When re-strapped for RS-232-A, the SRTS (Secondary Request To Send) signal is sent to pin 11 of the 25-pin RS-232 connector, rather than to pin 19.

STRAP INFORMATION

KEYBOARD STRAPS

The 4112 keyboard circuit board has a set of cut-straps that allows the firmware to interpret key strokes according to languages other than English. This strap consists of four individual cut-straps labeled W1 through W4. The combinations of these straps are read as one hexadecimal number which corresponds to certain keyboard options; see Table 3-2.

Table 3-2
KEYBOARD LANGUAGE OPTION STRAPS

Language	Option Number	Open Cut-Strap ^a	Hex Code
Standard	—	none	00
United Kingdom	4A	E4	08
Swedish	4C	E2	02
APL	4E	E1	01
Danish/Norwegian	4F	E2 & E3	06

^a These straps are labeled E1 - E4 on the circuit board, but are labeled W1 - W4 on the schematic sheet (A3-1).

RAM/ROM AND RAM BOARD CONTROLLER STRAPS

To install optional RAM memory, one or more RAM Controller Boards must be installed in the card-cage. Each RAM Controller Board has sockets for four RAM Array Boards. The RAM Array Boards contain 32K bank of memory. Since two RAM Controller Boards can be installed in a 4112, it is necessary to specify the starting address of the four RAM banks on each Controller board.

Strap J165 sets the Base Address for all memory on the board. Set the strap to "1," for the RAM Controller nearest the processor. Set the strap on the other RAM Controller boards to "2", "3", "4", etc. as they are placed in order farther away from the Processor board. Strap J165 allows strapping for a maximum of 6 RAM Controller boards. Figure 3-1 shows the location of these straps.

VIDEO CONTROLLER BOARD STRAPS

The 4112's Video Controller Board has eleven straps. Most of these straps are used only during manufacturing testing. Only three of these straps are of interest here; they are J551, J310, and J501.

Table 3-3
VIDEO CONTROLLER STRAP SETTINGS

Strap	Position	Function
J551	RIGHT (on board) = UP (schematic)	Generates 60 Hz 525 line video.
	LEFT Normally set to RIGHT (60Hz)	Generates 50 Hz 625 line video.
J310	UP (on board) = DOWN (schematic)	Generates timing for 2118 type RAMs.
	DOWN Normally set to UP (2118s)	Generates timing for 4116 type RAMs.
J501	ON	The Video Controller cannot request the memory cycles required to refresh the screen.
	OFF Normally OFF	Normal Operation. This strap makes the image more stable during testing and is only used to debug the Vector Generator.
J55 J56 J201 J245 J260 J361 J563 J650		Used for manufacturing test only.

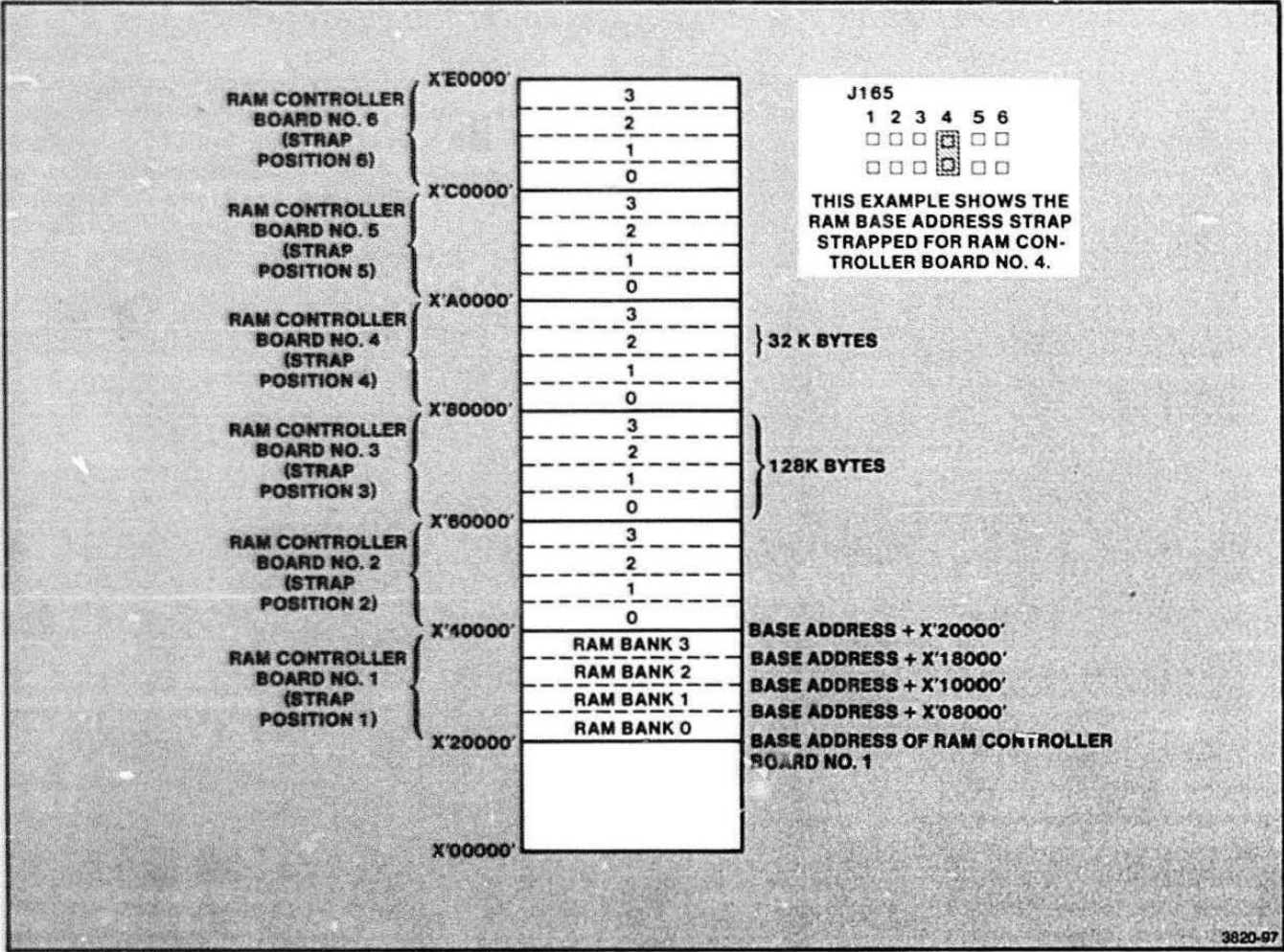


Figure 3-1. Strapping RAM Controller Board Base Address.

STRAP INFORMATION

VECTOR GENERATOR BOARD STRAPS

Strap, W190, may be installed to restrict microcode address space to 256 words when 74S471 type ROMs are used, instead of 74S472.

RASTER MEMORY BOARD STRAPS

There are two zero ohm resistors for selecting which type of RAM chip is being used. One position is labeled "3S" for three power supply RAMs (4116-1). The second position is labeled "1S" for single power supply RAMs (2118-4).

DUAL PLANE RASTER MEMORY BOARD STRAPS

Jumper Straps:

1. There is a strap on each PDAT signal to disable its input.
2. There is a strap on each Video output to disable its output.

EXTERNAL VIDEO BOARD STRAPS

Option 11 (External Video) produces a standard replaced video signal. The External Video Board contains these straps:

Table 3-4
EXTERNAL VIDEO STRAPS

Jack	Position	Explanation		
J25	IN	75 ohm termination		
	OUT			
		Video Levels		
		White Ref.	Blank	Sync Tips
J145	RS 170	1 V	0 V	-0.4 V
	RS330	0.714 V	0 V	-0.286 V
J511	IN	50 Hz aspect ratio correction is set to OUT only if a 4612 Hard Copy Unit is used while in the 50 Hz mode; only the 4512 aspect ratio is critical. If strap is set to OUT, in 50 Hz mode, external monitors will have an incorrect aspect ratio if adjusted to standard 50 Hz video specs.		
	OUT			

Section 4

ADJUSTMENTS (SHORT FORM)

Volume 1, Section 9, of this manual contains the detailed adjustment procedures. That section lists the equipment needed to perform and check these adjustments on the Display Module. This is an abbreviated

procedure for quick field reference. This assumes a familiarity with the detailed procedure in Volume 1. Certain of these procedures use the Function Keys programmed by running Self-Test.

Table 4-1
DISPLAY MODULE ADJUSTMENTS

Adjustment (Name and Setup)	Check	Adjust
1. Horiz Oscillator: a. Remove J586 c. Replace J586	b. Frequency at T741 Pin 2	R781 for 31.5KHz \pm 50Hz
2. Null High Voltage Compensation:	Voltage on TP141 (use scope and x10 probe.)	C332 to min V level (null to 2V p-p)
3. DC Level: a. Self-Test Key F1 (grid pattern)	b. Z-axis cathode signal c. Voltage on J588 Pin 2 = 54 VDC	INTENSITY control for max contrast R381 for + 54 VDC at black level
4. Focus: a. Self Test Key F4 (resolution pattern)	b. Dynamic focus c. Static focus d. Uniform focus overall	L535 to focus center of both sides of screen R250 to focus center of screen L535 and R250 again
5. Picture Centering: a. Self-Test Key F1 (grid pattern)	b. Level picture c. Voltage on J591 Pin 1 d. Uniform horiz spacing e. Uniform vertical spacing f. Vertical size g. Grid pattern centered	Rotate yoke R723 for + 47 VDC L721 for H. linearity R194 for V. linearity R179, lines = grid ptn. Centering magnet rings
6. Final Linearity and Size:	a. Equal vertical spacing b. Horizontal size c. Vertical size d. Vertical linearity e. Horizontal linearity	L721 adjust R723 adjust R179 adjust R194 adjust Centering rings

ADJUSTMENTS

Table 4-1 (cont.)
DISPLAY MODULE ADJUSTMENTS

Adjustment (Name and Setup)	Check	Adjust
7. Gray Scale Tracking: a. Self-Test Key F3 (white pattern)	b. 0 ft-lambert intensity c. No background raster d. Black level voltage on J588 Pin 2 to + 54VDC e. 44 ft-lambert at center of screen	INTENSITY control VG2 pot (R510) R380 BRITE pot (R580)
8. Gray Levels Check: Self-Test Key F2 (shade pattern)	Eight distinct gray levels	
9. Horiz Oscillator Adjustment:	a. 100 V p-p on T741 Pin 2 b. 31.30 KHz on T741 Pin 2	H OSC pot (R781)
10. H.V. Ripple Check	Less than 40 V p-p on the H.V. Anode button	
11. H.V. Level Check:	15.2 - 16.8 KV on th H.V. Anode button	

Section 5

SELF-TEST DIAGNOSTIC PROGRAM

INTRODUCTION TO SELF-TEST

The primary troubleshooting aid for the 4112 is the Self-Test diagnostic program. This program resides in firmware and is arranged so it checks most of the hardware (see NOTE), starting with the initial error reporting mechanism (keyboard LEDs). Self-Test does not depend on any portion of the hardware until it has tested it; it may then use such hardware to aid in other tests.

NOTE

The main Self-Test program does not test the Power Supply or Display Module. Power Supply problems are relatively easy to isolate. Read the paragraph on Power Supply problems, in Section 10, Volume 1.

The Display Module is not checked automatically during the main Self-Test. However, you may verify the operation of its basic parts by running the Adjustment part of Self-Test (press function key F1). The four screen-adjustment patterns may be used to determine what part of the Display Module is malfunctioning.

PARTS OF SELF-TEST

There are three separate parts of the Self-Test program: the main Self-Test program, Power-Up, and Adjustment Self-Test. An additional diagnostic, System Errors Detector, is not really a part of Self-Test but is described in this section also. Figure 5-1 shows how these diagnostics are related to the main Self-Test firmware.

Power-Up

A subset of Self-Test is the Power-Up sequence. This diagnostic cannot be called directly by the user, but runs automatically each time the terminal is turned on. It performs a quick check of the various hardware modules. The *4112 Operator's Manual* describes the error messages that may appear during the Power-Up sequence. For detailed diagnostic examination of terminal hardware, use Self-Test. Self-Test will perform additional tests as well as repeating the same tests that were done during the Power-Up sequence.

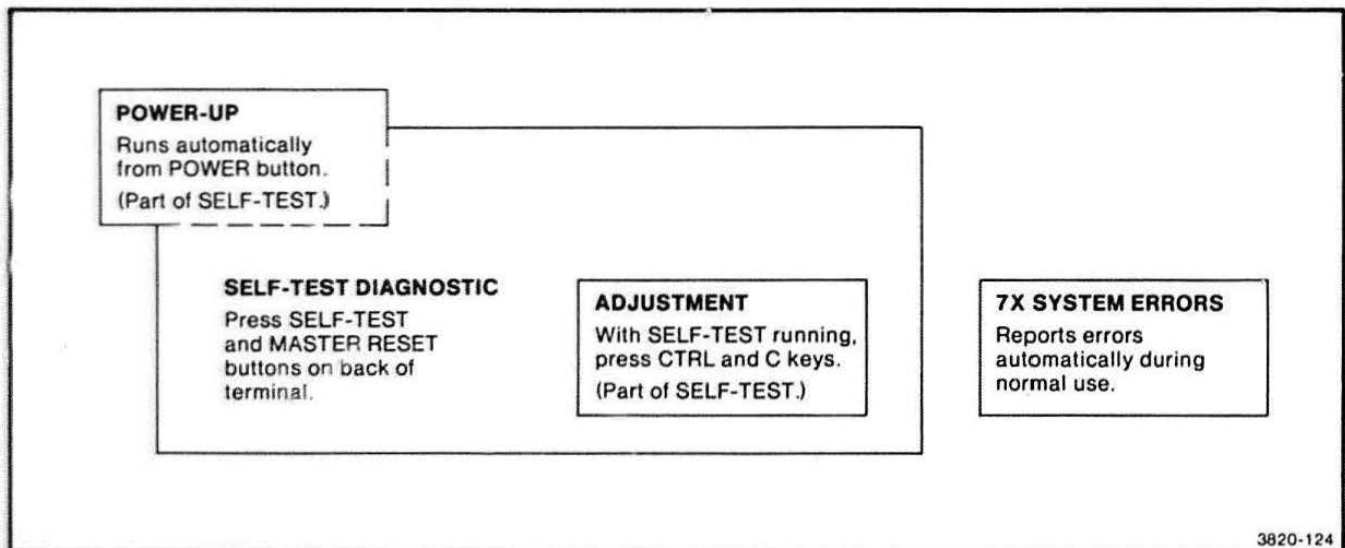


Figure 5-1. Self-Test Functional Diagram.

SELF-TEST

Main Self-Test

The main part of Self-Test is that portion which runs when the SELF TEST and MASTER RESET buttons are pressed. This routine repeats the Power-Up sequence and then goes on to thoroughly test the entire terminal hardware, including any options that may be installed.

Adjustment Routine

The Adjustment part of Self-Test is used primarily for making adjustments and performance checks. However, this routine may also be used as a diagnostic tool, particularly on certain options such as the 3PPI. This routine is accessed from inside Self-Test by pressing the CTRL and C keys together. Detailed instructions about this part of Self-Test are located at the end of this section.

7x System Errors Detector

This error-detecting firmware contains routines that catch system level or operator-induced errors at the time they occur, not just during Self-Test. These error-reporting routines are in ROM and have the same general syntax as the Self-Test error messages, but this error reporting device runs separately and independently of Self-Test. This allows it to report such errors spontaneously at the time a problem appears. The error codes that come under this category are listed and described in Table 5-1. If an error is reported that seems to be related to a hardware malfunction, run Self-Test to verify and locate it.

CONTROL FLOW OF SELF-TEST

Figure 5-2 shows the order in which the various hardware modules are tested. The three areas "flagged" with a 0 must function for Self-Test to run. After these three areas are verified as functional, the keyboard lights and keys are tested (1 on Figure 5-2). Then areas 2 through 9 are tested in that order.

Figure 5-7 (on the pull-out at the end of this section) shows the detailed logical flow of Self-Test. This is the order in which the diagnostic checks are made when Self-Test is initialized. This figure does not include any submessages. The flow chart shows a left-to-right flow across each page, as each test is checked and passed. When a negative response to a test occurs, the resulting checks and error report is indicated by the downward flow from that point. If the error is not fatal, the flow may loop up to the main path again, allowing Self-Test to continue running.

As stated earlier, a subset of Self-Test is the Power-Up sequence. This sequence checks approximately 60% of the 4112 circuitry and is performed every time that the 4112 is turned on.

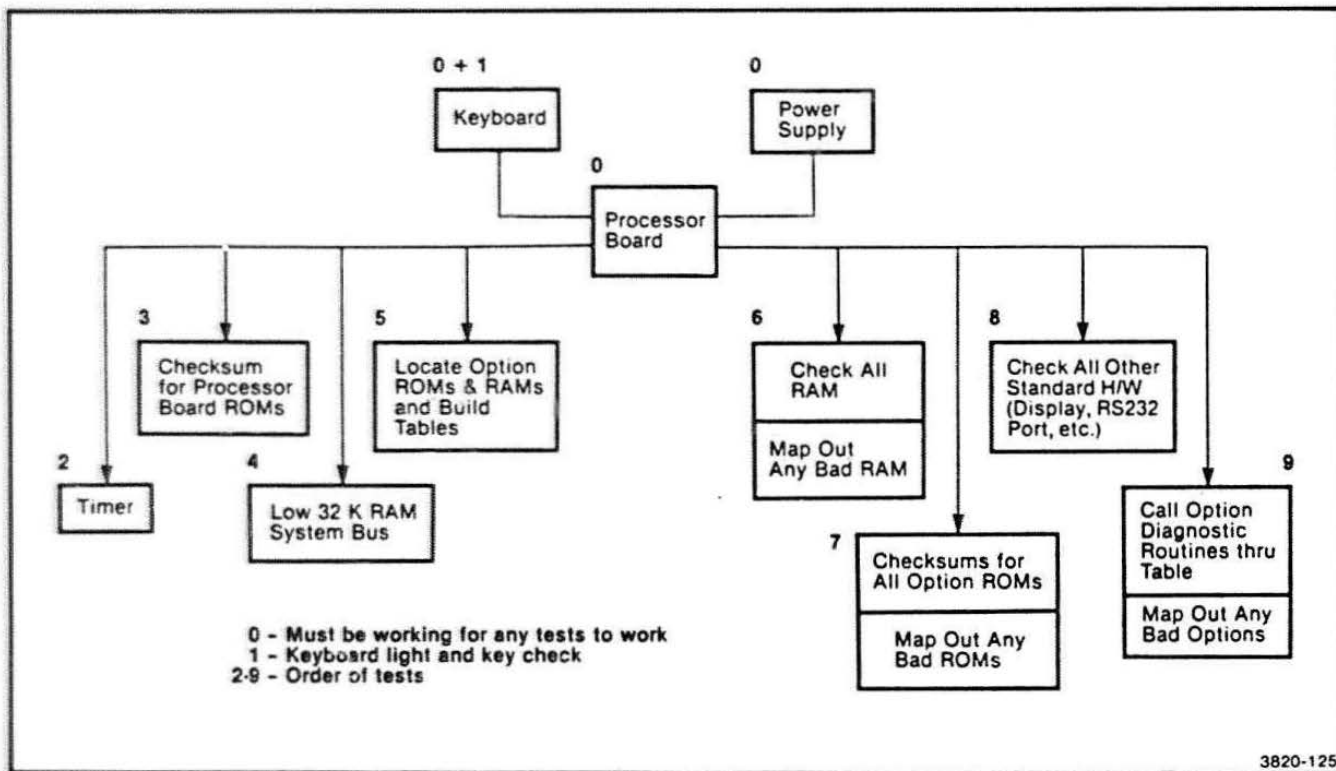


Figure 5-2. Self-Test Program Block Diagram.

SELF-TEST

In Table 5-1, the diagnostic checks that are performed during the Power-Up routine are marked by the letters PUP. When the full version of Self-Test is run, all the tests are performed, including a repeat of the Power-Up checks. This table only contains the tests executed by a standard 4112 terminal. The firmware used to check the options (such as the disk drive or Tablet Interface board) are contained on those optional boards.

NOTE

The light codes: FD (1111 1101), CF (1100 1111), and BB (1011 1011) represent subtests, and are not included in Table 5-1 even though they are listed in the tables that follow. These subordinate tests are not part of the main Self-Test path. Each is run only after its main test finds a fault. For a definition of these codes, see Tables 5-3 through 5-14.

**Table 5-1
POWER-UP/SELF-TEST SEQUENCE**

Error Code Hex/Binary	Explanation	When Executed ^a
FE 1111 1110	Light checking routine	SLF
FC 1111 1100	Keyboard key check	SLF
EF 1110 1111	Timer check	SLF/PUP
EE 1110 1110	Timer set up routine	SLF/PUP
EC 1110 1100	Standard system ROM check	SLF/PUP
DF 1101 1111	Lowest 32K bus address check	SLF/PUP
BF 1011 1111	Lowest 32K RAM walking ones check	SLF
BE 1011 1110	Lowest 32K RAM walking zeros check	SLF
BD 1011 1101	Lowest 32K RAM all ones check	SLF/PUP

**Table 5-1 (cont.)
POWER-UP/SELF-TEST SEQUENCE**

Error Code Hex/Binary	Explanation	When Executed ^a
BC 1011 1100	Lowest 32K RAM all zeros check	SLF/PUP
B5 1011 0101	RAM stack building	SLF/PUP
BA 1011 1010	RAM/ROM memory tables building	SLF/PUP
DE 1101 1110	High address bus check	SLF/PUP
B9 1011 1001	Upper RAM walking ones check	SLF
B8 1011 1000	Upper RAM walking zeros check	SLF
B7 1011 0111	Upper RAM all ones check	SLF/PUP
B6 1011 0110	Upper RAM all zeros check	SLF/PUP
B4 1011 0100	System vector table expansion	SLF/PUP
FA 1111 1010	Keyboard identification set	SLF/PUP
CE 1101 1110	Processor ROM check	SLF/PUP
8F 1000 1111	Video Controller test	SLF/PUP
8E 1000 1110	Raster memory test	SLF
8D 1000 1101	Vector Generator test	SLF/PUP
8C 1000 1100	Raster memory address test	SLF/PUP
AF 1010 1111	CMOS and ROM to RAM load	SLF/PUP
EB 1110 1011	Interrupt checker	SLF/PUP
DD 1101 1101	Host port register checker	SLF/PUP
DC 1101 1100	Host port baud/character checker	SLF
CD 1100 1101	Option numbers checker	SLF/PUP
CC 1100 1100	Version compatibility checker	SLF/PUP

^a SLF means the test is performed during Self-Test.
PUP means the test is performed during the Power-Up routine.

SELF-TEST FIRMWARE JUMP TABLES

To further aid in understanding how Self-Test works, refer to the ROM Header-Pointer diagram (Figure 5-3). This diagram shows how Self-Test is arranged around a jump-table system. This arrangement allows code updates and additions/deletions of option code sections to be mapped in or out easily.

HOW TO RUN SELF-TEST

Start Self-Test running by pressing the MASTER RESET and SELF TEST buttons. Press and hold MASTER RESET and SELF TEST; then release the MASTER RESET button first. After the Keyboard LEDs begin to "cycle," release the SELF TEST button also.

The test begins by turning on all the keyboard lights ("CAPS LOCK" key, four function key LEDs, and four indicator LEDs). The CAPS LOCK key light should turn off immediately (while the other eight LEDs remain lit). If the CAPS LOCK key light remains lit, there is a major malfunction in the processor.

While Self-Test is running, the eight keyboard lights blink through the codes for the various tests. When a fatal error occurs during a particular test, its identifying light pattern comes on blinking, and the bell rings three times. These light patterns are displayed on the eight indicator LEDs, across the top of the keyboard¹. These light patterns indicate the binary equivalent of a hexadecimal code assigned to each major set of tests. The error message tables (in this section) list and define these error codes. The tables give an explanation for each error condition and suggest which piece of circuitry malfunctioned. After the major error codes have been displayed, most problems can be narrowed down through the use of submessages. Submessages are displayed by first noting the major error codes, pressing RETURN, and noting the next set of lights displayed as the submessage. In some instances, there may be up to three levels of submessages.

¹ The eight LEDs extend from the KYBD LOCK light to the HARD COPY key light.

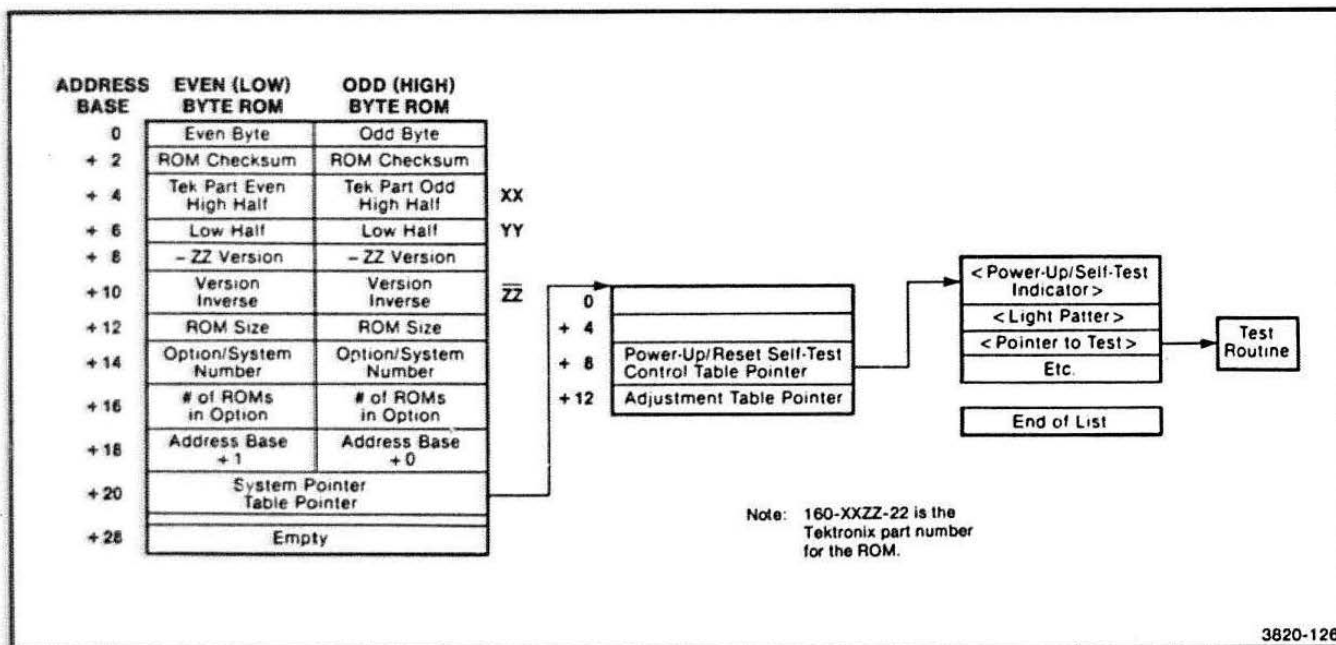


Figure 5-3. The ROM Header Contains a Chain of Pointers to Testing and Adjustment Routines That Are Executed via Jump Tables.

SELF-TEST

After the display has been checked, most error messages are printed on the display screen. Such screen-displayed error messages first print the name of the test or the hardware module being tested. Then a submessage, on the next line, tells which part of the test failed.

Suppose Self-Test finds a major hardware problem that prevents the test from running to completion. This is indicated by the light code for this test (where the problem was found) remaining lit indefinitely. This type of problem is highly unlikely, but could be caused by a bad ROM. Read the error code on the lights and use this to help determine where the test has aborted.

During the Delay Memory check (associated with Table 5-8, RAM Tests) there is a 14 second wait for each 32K of RAM being tested. In a fully loaded instrument (one with all RAM options installed), this test can take up to four minutes to run. Do not be surprised about this delay; it does not mean that Self-Test is "hung." If you wish to override this lengthy test, enter CONTROL D during the keyboard check and Self-Test will skip over this test.

SELF-TEST ERROR MESSAGES

This part of the section lists and describes the Self-Test error codes. In the following discussion, tests are grouped in modules according to the hardware being tested. Under each heading (test module name) is a short general description of the test and hardware it checks. Each table of error messages defines those messages that may appear while that test is running. To determine which piece of circuitry malfunctioned, read the list of active circuits for each test. Since many circuits are used in several tests, eliminate as "good" those circuits that passed all previous tests. These tables are grouped together for referencing convenience rather than the order in which the tests occur. Tables start with the error code FE (1111 1110) and are listed in descending order of the binary codes. Table 5-2 shows this order.

ERRORS DIRECTORY

Table 5-2 is a reference that shows which table to consult when any given error message is displayed. The Hex codes, in the center column, correspond to the light codes (displayed in binary on the LEDs) for each test category.

NON-OPTION ERROR MESSAGES

This part of the section lists the error messages that correspond to the main 4112 hardware. The error codes for the options are listed later in this section.

Table 5-2
SELF-TEST ERRORS DIRECTORY

Test Module	Hex Code ^a	Table Number
KEYBOARD/PROCESSOR	Fx	5-3
PROCESSOR BOARD	Ex	5-4
RAM/BUS HOST PORT	Dx	5-5
SYSTEM OPTION ROMS	Cx	5-7
RAM TEST	Bx	5-8
CMOS MEMORY	Ax	5-9
DISPLAY BUS AND BOARD CHECKS	8x	5-10
SYSTEM (7x) ERROR MESSAGES ^b	7x	5-11
SELF-TEST OPTION ERRORS DIRECTORY		
3PPI (OPTION 10)	6x	5-12
DISK (OPTION 42)	5x	5-13
TABLET (OPTION 13/14)	4x	5-14

^a Indicates this digit will change within the table.

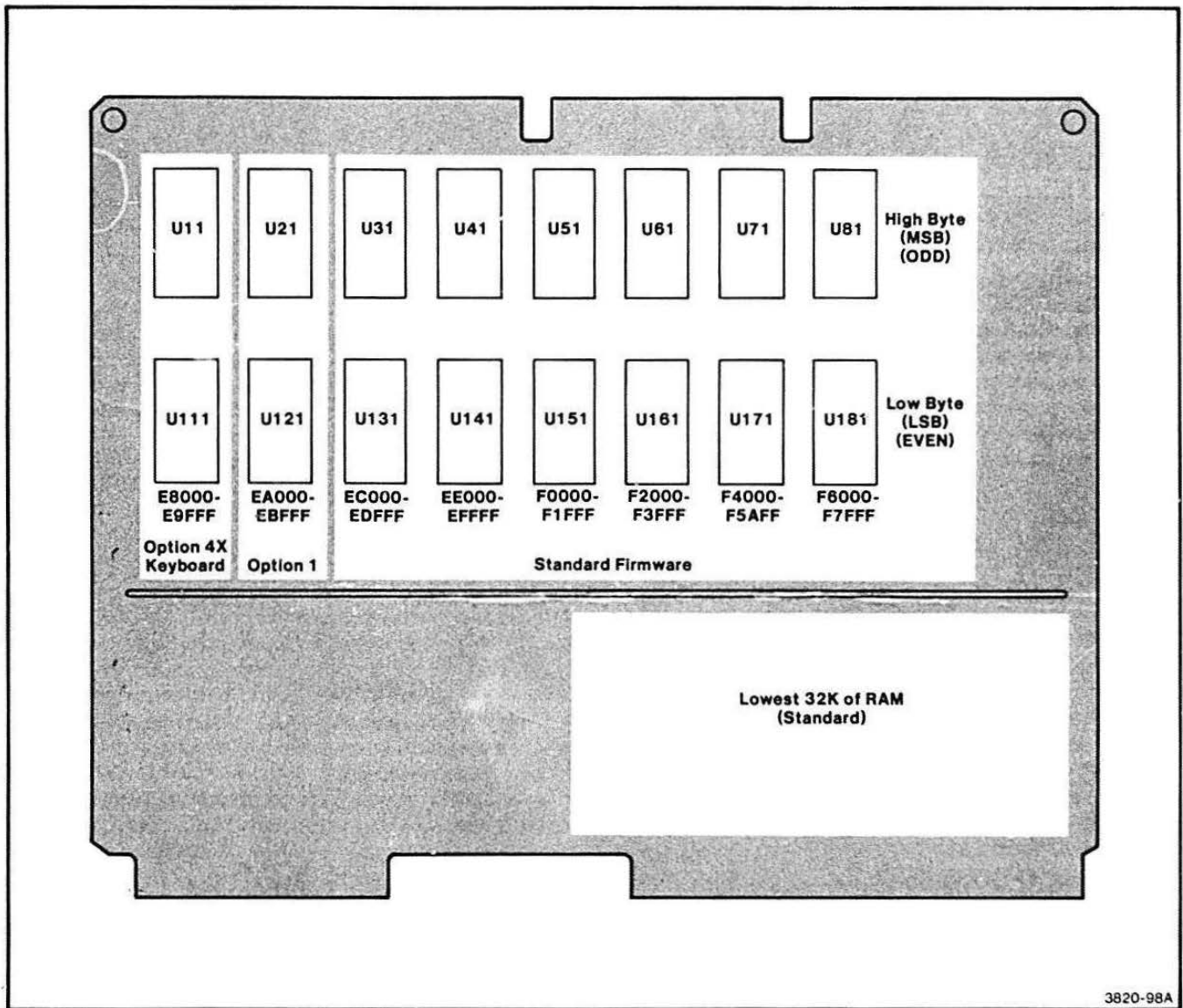
^b The 7x error codes are not part of Self-Test but are rather error codes that are generated if a problem occurs during normal use of the terminal. Self-Test does not have to be initialized in order to receive these error messages.

Keyboard Check and Lights (F)

When Self-Test starts, the indicator LEDs will show FF (1111 1111). As the test continues the light patterns approach 00.

During the keyboard lights check, each light is slowly turned on and off in a sequential loop. The loop begins at the keypad, goes across the eight LEDs (right to left), and down to the CAPS key light. This circling light pattern is then repeated quickly.

At the beginning of the keyboard keys' test, the 4112 rings the bell once, and the CAPS key light starts blinking. This prompts the user to press a key (any key) after waiting a few seconds. When the bell rings and the CAPS key blinks, the test is supposed to stop and wait for a key stroke. If the test proceeds without you pressing a key, this means spurious key strokes are being generated. This type of problem could be caused by dirt or corrosion in the keyboard, or a poor connection in the keyboard-to-processor board ribbon cable. If the test waits for a key entry, then press a key, allowing the tests to continue. If you wait too long before pressing a key, the test will "time out" and continue (this usually takes about 20 seconds). Figure 5-4 shows the locations of the keyboard ROMs.



3820-98A

Figure 5-4. RAM/ROM Board ROM Locations.

Table 5-3
KEYBOARD/PROCESSOR BOARD ERRORS

ERROR CODE		EXPLANATION
Binary	Hex	
1111 1110	FE	Error at beginning of keyboard lights test. (Circling lights test happens here.)
1111 1101	FD	Error at end of keyboard lights test.
1111 1100	FC	Error during keyboard keys test.
1111 1010	FA	Error while loading Keyboard Identification Code.

Submessage: (printed on screen)

"Keybrd -ID XX"

XX is the option number of the keyboard attached (example: a Swedish keyboard is Option 4C). This test then checks the validity of that Option number against the ROM Option number installed, and displays this message if the wrong ROMs or no ROMs (for the option) are present. See Figure 5-4 for the location of the keyboard ROMs.

"Keybrd -ID fail"

The identification test will fail when the 4112 cannot reset the keyboard and read the keyboard option number. This may be caused by a broken or loose connection.

CIRCUITS USED: Look for problems on Keyboard, Keyboard interface on the Processor Board, and keyboard ribbon cable and connectors.

SELF-TEST

Processor Check (E)

At this time, Self-Test does a more thorough test of Processor board and Keyboard functions. The process-

sor and its related hardware are systematically exercised. Figure 5-5 shows the Processor board ROM locations.

Table 5-4
PROCESSOR BOARD ERRORS

ERROR CODE Binary / Hex	EXPLANATION
1110 1111 EF	Error detected during Timer test. (a) Submessage: Bell; press RETURN, read light code. The submessage for the timer test will consist of the following parts: The highest four bits will be one of two codes, the lower four bits will be one of two possible codes. These codes are listed below.
0001 ----	Failed static test; tests timers' outputs for high/low values.
0010 ----	Failed dynamic test; tests timers for correct count vs. processor execution.
---- 0000	Failure in Timer 0 (I/O address 00E1).
---- 0001	Failure in Timer 1 (" " 00E3).

NOTE: Timer 2 cannot be tested at this point. It is checked later during the host port check.

Table 5-4 (cont.)
PROCESSOR BOARD ERRORS

ERROR CODE		EXPLANATION
Binary	Hex	
1110 1110	EE	Failure during timer initialization.
1110 1100	EC	Error during standard ROM checksum test.
(a) Submessage 1: Bell; press RETURN, read light code.		
X X		Address of ROM problem in Hex XX000.
nnnn nnnn		(i.e., 1111 1110 = FE --> Address where problem found is FE000 'X'. This is first ROM pair on the Processor Board.) See Figure 5-5 for the location of the Processor board ROMs.
(a) Submessage 2: Bell, press RETURN again, read light code.		
This submessage consists of two parts, with the highest four bits consisting of one of three codes, and the lowest four bits of the message consisting of one of three possible codes. These codes are seen below.		
0001 ----		ROM(s) not present.
0010 ----		ROM(s) checksum error.
0011 ----		Standard ROMs position check.
---- 0000		xxxxxxxxxxxxxxxxxxxxxxxxxxxx
---- 0001		Problem isolated to high ROM of pair.
---- 0010		Problem isolated to low ROM of pair.
---- 0011		Problem found in both ROMs of pair.

(a) Submessages are obtained in the following manner: When an error is noted, the bell will ring before each submessage. After noting the error bits (read from the keyboard LEDs), press RETURN, then read the submessage as the next set of lights displayed.

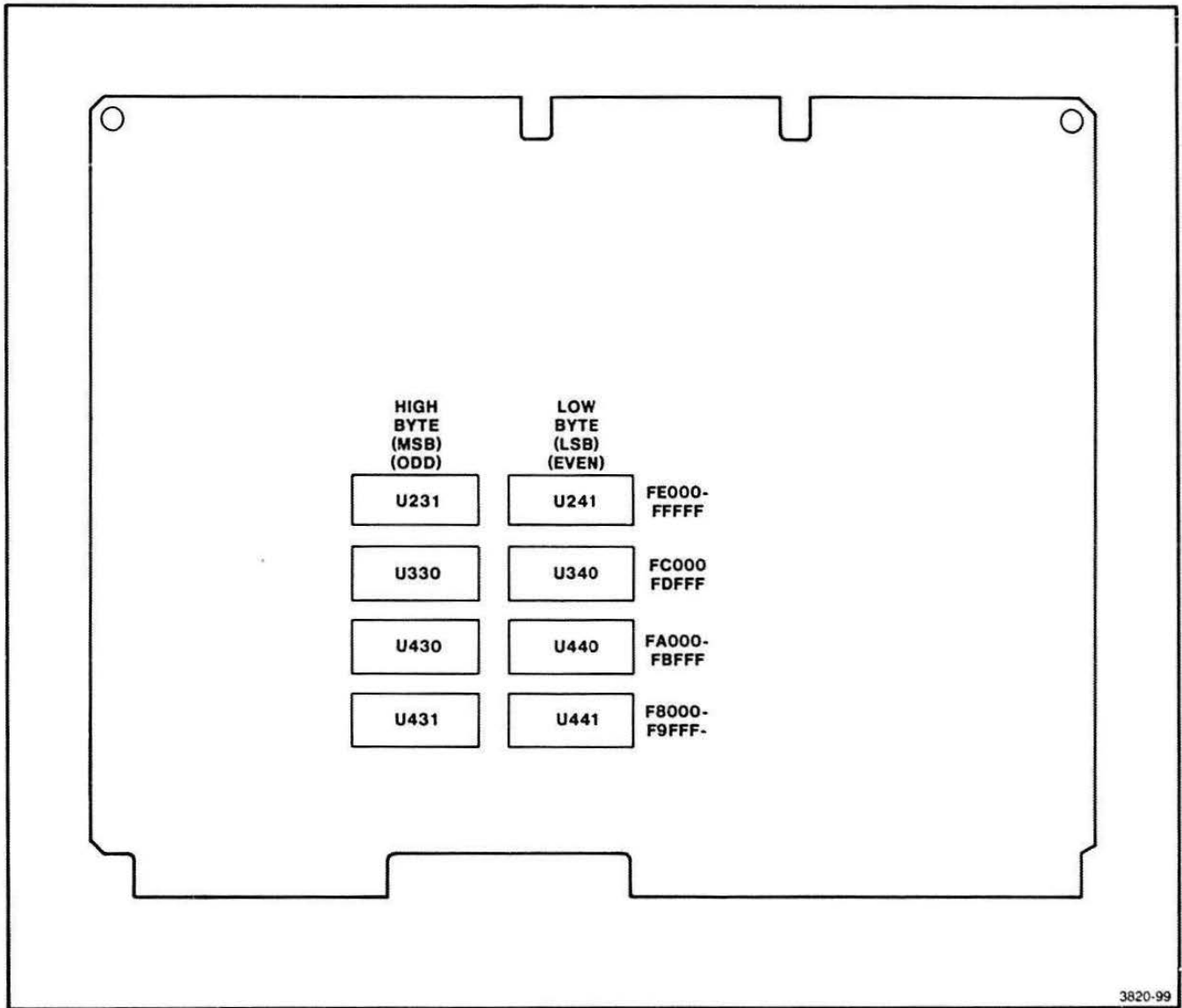


Figure 5-5. Processor Board ROM Locations.

Table 5-4 (cont.)
PROCESSOR BOARD ERRORS

ERROR CODE Binary / Hex	EXPLANATION
1110 1011 EB	Error detected in Interrupt Handler Check
	Submessages: (printed on screen)
Interrupts-Static Error: XX	Bits that cannot be set in Interrupt Register (I/O base address 00EA).
Interrupts-Dynamic Address: XX	Level 5 interrupt performed. Failed to (b) reach interrupt vector address: XX + (4 x 5).
Interrupts-Div by 0 Address: XX	A divide by 0 instruction was performed, but did not vector through location 0. XX equals base interrupt address. (c)
----- CIRCUITS USED: Interrupts circuit block on Processor Board. -----	

(b) Level five is the easiest level of interrupt to force (hence x5). Each time an increment of a level is made, it moves up four bytes in memory (hence the 4). XX equals the base interrupt address.

(c) This message with XxE00 most likely implies an earlier version of a 8086 processor chip not acceptable for Processor board operation.

SELF-TEST

NOTE

If either T1 or T2 inputs to the interrupt chip are stuck at a TTL low, Self-Test cannot detect this condition. Also, if an "interrupt level" output (from the interrupt chip) is stuck at a TTL low, Self-Test cannot detect this condition, either. If the interrupt chip seems to be causing a problem, examine the outputs with an oscilloscope, or replace the Processor board.

Communications and Bus Checks (D)

This set of tests examine the operation of the main terminal bus and the host I/O port. This is accomplished by writing to low RAM (located between 0000 and 7FFF) its own address as data. It then reads this address back, using the comparison as a bus check. This assumes RAMs are good.

Table 5-5
RAM/BUS AND HOST PORT ERRORS

ERROR CODE Binary / Hex	EXPLANATION
1101 1111 DF	Problems with low bits of main terminal bus or addressing via this bus.
(a) Submessage 1: Bell, press RETURN, read light code.	
X X nnnn nnnn	XX indicates the base address of the RAM that caused the bus problem: XX000 'X'. (i.e., 00 = 00000 and 20 = 20000.)
(a) Submessage 2: Second Bell, press RETURN, read light code.	
Y Y nnnn nnnn	YY is the Low data byte, showing which bits are in error. If these bits are all ones, address bit zero is likely to be bad.
(a) Submessage 3: Third Bell, press RETURN, read light code.	
Z Z nnnn nnnn	ZZ is the High data byte, showing which bits are in error. If these bits are all ones, byte high enable (BHEN) is probably bad.

NOTE: If YY and ZZ are all 1s, this indicates a time-out problem while attempting to access a RAM.	

(a) Submessages 1 to 3: Bell rings before each submessage; after noting the error bits, press RETURN, read submessages as the next set of lights displayed.

Table 5-5 (cont.)
RAM/BUS AND HOST PORT ERRORS

ERROR CODE		EXPLANATION
Binary	Hex	
1101 1110	DE	Problem with the high bits of the main bus or addressing via this bus. Here it is writing high RAM (between 8000 and highest address) its address as data; then reading it back.
1101 1101	DD	Error detected during host port I/O address check
Submessage: (printed on screen)		
"Host Port-Registers Expect: XX Receive: YY"		
This test checks the reset of the USART. After resetting USART, it reads the data at status I/O address: E2. It expects to read XX. If instead it receives YY (where XX not = YY) this means the test failed and the USART cannot be reset.		
"Host Port-Register Expect: XX-YY Receive: ZZ-AA		
The test checks USART Latch (I/O address EB), and USART Interrupt Request (" " EB).		
XX - Latch status expected; is 0 if no bits are in error.		
YY - Interrupt Request bits in error; is 0, if no bits are in error.		
ZZ - Latch Status bits in error.		
AA - Interrupt Request bits in error.		

Table 5-5 (cont.)
RAM/BUS AND HOST PORT ERRORS

ERROR CODE		EXPLANATION
Binary	Hex	
1101 1100	DC	Error detected during host port baud rate/ character check
Submessage: (printed on screen)		
"Host Port-Baud/Character Baud: XXXX Expect: YY-AA Receive: ZZ-BB"		
XXXX - Baud rate in hex (see Table 5-6). YY - character sent. AA - USART data status bits in error; expect 00 (I/O address E4). See Figure 5-6. ZZ - character received. BB - USART Data Status bits in error.		
CIRCUITS: All RAM locations 0000 to 7FFF and 8000 to top RAM address bus lines connecting Processor and RAM/ROM board.		

NOTE

Self-Test cannot check the following signals if they are tied to a TTL low: MWTC; PFAIL; BCLK; INT1; INT2; INT3; INT4; INT6; INT7; BREQ; and BGT.

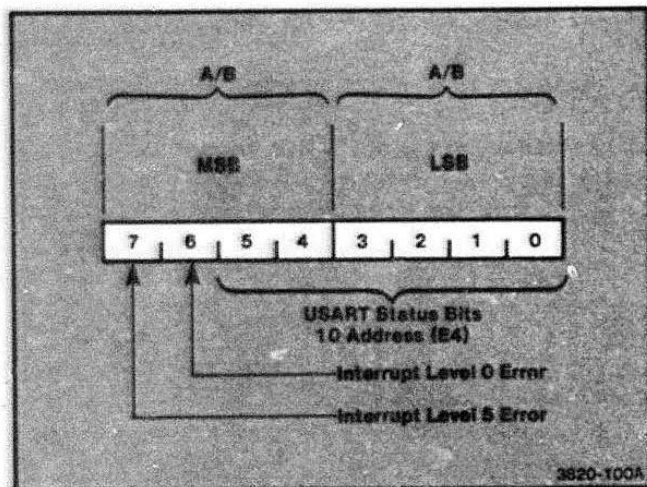


Figure 5-6. Status Byte.

The following table may be used to convert Hex numbers received into decimal numbers.

Table 5-6
HEX-TO-DECIMAL EQUIVALENTS

Hex Number	Decimal Number
12C	300
258	600
4B0	1200
708	1800
7D0	2000
960	2400
E10	3600
12C0	4800
1C20	7200
2580	9600
4B00	19200
9600	38400

Memory Tests:

ROM Check (C). This set of tests examines the operation of all ROMs on the RAM/ROM board and all option ROMs. The ROMs on the Processor board were tested along with the processor in previous tests. For the locations of the bad ROMs on the RAM/ROM board, refer back to Figure 5-4.

Table 5-7
SYSTEM/OPTION ROM ERRORS

ERROR CODE		EXPLANATION
Binary	Hex	
1100 1111	CF	Failure during ROM Map generation.
1100 1110	CE	Error found during ROM checksums test.
	Submessages:	Error messages are same as for main ROMs; see Table 5-4.
1100 1101	CD	ROMs found in wrong position (options only).
	Submessages: (Displayed on screen)	
	"ROM-Position	
	Address: XXXX Expect: YY-ZZ Receive: AA-BB"	
	ROM Set: CC-Fail	Address XXXX -- the base address of the ROM pair being checked. See NOTE 1, below.
		Expect YY-ZZ --
		1) YY is the ROM Set number (same as option number.
		2) ZZ indicates even or odd ROM of pair. (If ZZ is odd, then odd ROM is problem; if ZZ is even, then even ROM is problem).
		Receive AA-BB --
		found ROM Set number AA (instead of YY); BB (like ZZ) indicates odd vs. even of pair.
		ROM Set CC-Fail -- CC is option (ROM Set) number of ROM that failed.

NOTE 1: If FFFF, then Self-Test could not find the ROM pair indicated by "Expect: YY-ZZ".

Table 5-7 (cont.)
SYSTEM/OPTION ROM ERRORS

ERROR CODE		EXPLANATION	
Binary	Hex		
1100	1101	CD	(cont) ROMs in wrong position. Example> Address: 1600 Expect: 42-17 Receive: 42-15 ROM Set: 42-Fail Means -- that the base address of the ROM pair being checked is 16,000. 42 is the ROM set number expected (disk). 17 is base address + 1 (odd ROM of pair). If 16 is base address + 0 (even ROM " "). The test found 42-15 at the address; 42 was the ROM Set, and 15 means the odd ROM for location 14,000 was found there (instead of odd ROM for 16,000).
1100	1100	CC	ROM version compatibility problem Submessage: (printed on screen) "ROM-Version ROM Set: XX-VV Expect: YY-ZZ Receive: AA-BB ROM Set: CC-Fail" ROM Set used for reference is XX (see NOTE 2), and its version number is VV. "Expect YY-ZZ" refers to the expected ROM option name YY, and version number ZZ for the ROM Set being checked. "Receive AA-BB" reports the actual ROM name (AA) and version (BB) in same socket. Example> ROM Set: 00-05 Expect: 42-03 Receive: 42-01 Means -- The main system firmware (called 00) is version 5. It expects Option 42 ROMs with version 3 or higher to be installed. Instead, it finds Option 42 ROMs, with only version 1 firmware, installed. ROM Set: CC-Fail ROM failure -- CC is number of Option where version problem appeared. This ROM set is mapped out of the option.

CIRCUITS USED: RAM/ROM Board ROMs and circuits, and ROMs on option boards.

NOTE 2: XX is option number. System ROMs number is always 00.

SELF-TEST

RAM Check (B). This series of tests performs a systematic check of all system RAMs. Each set of tests are grouped, and each such group uses the same type of error reporting scheme (light codes). Refer back to Figure 5-3, which shows the physical location of the lowest 32K of RAM.

In the following tests, the RAM Memory Delay Check (BB) generates a light code which may remain lit for as much as 14 seconds while the test is running. This does not indicate an error. An error is indicated by a bell accompanied by a light code which stays on indefinitely. You may override the lengthy Delay Memory Check by entering CONTROL D during the keyboard check.

NOTE

In the following table, "Lowest 32K RAM" refers to the RAM from hexadecimal address 0000 to 7FFF, or the standard RAM of the 4112. "Upper RAM" refers to any extended RAM options installed in the 4112, starting at hexadecimal address 8000.

**Table 5-8
RAM TEST ERRORS**

ERROR CODE Binary / Hex	EXPLANATION
1011 1111 BF	Lowest 32K of RAM, walking ones check. (Here each bit is set and tested, in order from left to right, hence the "walking ones" term." This light code is accompanied by one of the following light code submessages.
(a) Submessage 1: Bell rings, press RETURN, read light code. X X nnnn nnnn	XX indicates the address of the RAM problem at XX000 'X'.
(a) Submessage 2: Second bell, press RETURN, read light code. Y Y nnnn nnnn	YY is the Low Data byte, showing which bits are in error.
(a) Submessage 3: Third bell, press RETURN, read light code. Z Z nnnn nnnn	ZZ is the High Data byte, showing which bits are in error.

Table 5-8 (cont.)
RAM TEST ERRORS

ERROR CODE		Hex		(b)	EXPLANATION
Binary					
1011	1110	BE	-----	(b)	Error in "walking zeroes check;" lowest 32K RAM.
1011	1101	BD	-----	(b)	Error in "all ones check;" lowest 32K RAM.
1011	1100	BC	-----	(b)	Error in "init (zero check);" lowest 32K RAM..
1011	1011	BB	-----	(b)	Error in "RAM memory delay check." During the RAM memory delay check, data is held for 14 seconds and then rechecked. The light code will remain lit for this time.
1011	1010	BA	-----		"RAM Memory Map Generation" error. This test checks for RAM and the absence of RAM and generates a corresponding memory map.
1011	1001	B9	-----	(b)	Error in "walking ones check;" upper RAM.
1011	1000	B8	-----	(b)	Error in "walking zeroes check;" upper RAM.
1011	0111	B7	-----	(b)	Error in "all ones check;" upper RAM.
1011	0110	B6	-----	(b)	Error in "init (zero check);" upper RAM.
1011	0101	B5	-----		Error during RAM stack building.
1011	0100	B4	-----		Error in operating system vector table (lowest 32K of RAM)

(a) Submessages are obtained in the following manner: when an error is noted, the bell will ring. After noting the error bits (read from the Keyboard LEDs), press RETURN, then read the submessage as the next set of lights displayed.

(b) If one of these messages is displayed as an error (the bell rings), the three submessages earlier in the table will have to be read in order to locate the problem.

SELF-TEST

CMOS Check (AF). When a CMOS memory error is detected, the LEDs will show the "AF" pattern (1010 1111), and a message is written on the display screen. The only time a full CMOS check is performed is during the adjustment procedure. See Processor board menu.

NOTE

The following CMOS error messages report a change in default parameters. This may be caused by either changing EPROMs, or by a CMOS battery/circuit failure.

Table 5-9
CMOS MEMORY ERRORS

ERROR CODE Binary / Hex	EXPLANATION
1010 1111 AF	CMOS check
Submessage: (printed on screen)	
"Cmos-Error"	
I/O Address: XXXX Expect: YY41 Receive: ZZZZ	
	XXXX = Address of problem. If it is addressing correctly, the address will read FFFE.
	YY41 = YY is the system version number (taken from EPROM) and 41 indicates 4110 series product.
	ZZZZ = this is what is actually read, instead of YY41.
"Cmos-Checksum"	Checksum error detected.
"Setup Default-Reset"	CMOS parameters have been updated. This is the same as the Power-up message.

Display Bus Checks (8)

Memory, and Display Controller. This set of tests does not exercise or check the Display Module.

The Self-Test program tests the three principle circuit boards in the Display Bus: Vector Generator, Raster

Table 5-10
DISPLAY BUS/BOARD AND SYSTEM ERRORS

ERROR CODE		EXPLANATION
Binary	Hex	
1000 1111	8F	4112 Video Controller tests: Submessage: Bell, press RETURN, read light code.
0000 0001		Bad vertical interrupt.
0000 0010		Video Controller not present.
0000 0011		No vertical interval interrupt.
0000 0100		Vertical interval too short.
0000 0101		Vertical interval too long.
0000 0110		Vector Generator ready, but interrupt never flagged.
0001 0001		Vector Generator problem.
1000 1110	8E	4112 Raster Memory tests: Submessage: Bell, press RETURN, read light code.
0000 0001		Raster Memory fault.
0000 0010		No RND flag, test hung.
0001 0001		Vector Generator problem.
1010	—	Standard plane (2) errors check, and option plane presence check.
—	0000	Status I/O port error.
—	0001	Non-memory error on plane. (Example: Addressable Latch.)
—	0010	Dual Plane Status I/O Port errors.
1001	—	(a) Error detected on Memory Plane 1.
1000	—	(a) Error detected on Memory Plane 0.
—	0000	Status I/O Port error.
—	0001	Non-memory error on this plane.

(a) Error is on optional Dual Plane memory board.

Table 5-10 (cont.)
 DISPLAY BUS/BOARD AND SYSTEM ERRORS

1000 1101 8D

4112 Vector Generator tests:

Submessage: Bell, press RETURN, read light code.

0000 0001
 0001 0001

Bad Vector Generator register.
 Vector Generator board not working.

1000 1100 8C

Raster Memory Addressing Tests:

Submessage: Bell, press RETURN, read light code.

0000 0001
 0001 0001

Raster Memory Address Fault
 Vector Generator board not working.

CIRCUITS: Replace Video Controller, Vector Generator, or Raster Memory boards, as indicated above. Check bus and cable connections first.

SYSTEM LEVEL ERRORS (7X)

These error messages prompt the user whenever the specified problem occurs. These error codes may appear at any time: NOT just during Self-Test. When

such an error message appears, run Self-Test to locate any defective circuitry that may be involved. Most of these errors involve improper use of the terminal and are referred to as "system level" errors, rather than hardware errors.

Table 5-11
SYSTEM LEVEL ERRORS (7x Codes)

ERROR CODE Binary - Hex	EXPLANATION
0111 1111 7F	CMOS memory lacking Could not get enough memory for system initialization. Try resetting CMOS parameters.
0111 111 7E	No monitor level procedure. A monitor procedure was called from an interrupt service routine (ISR). This error should only happen when a file is downloaded containing software ISRs.
0111 1101 7D	System data structures scrambled- RAM data lost. Try resetting the terminal or checking any routines created in the terminal or loaded into the terminal that may be writing into the wrong area.

SELF-TEST

Table 5-11 (cont)
SYSTEM LEVEL ERRORS (7x Codes)

ERROR CODE Binary - Hex	EXPLANATION
0111 1100 7C	Unexpected or illegal interrupt. If this error code is generated, it is suggested that Self-Test be run to pinpoint the interrupt failure area. Note: could spurious interrupt have been generated by operator?
0111 1011 7B	Error Handler could not set dynamic memory for an error message. Check the user allocation of RAM through the STA MEM (status memory) command for available memory.

**4112 OPTION TESTS
AND ERROR MESSAGES**

Self-Test also checks three options that can be installed in the 4112. Option 42 (disk drive) requires a Disk Controller board. This circuit board contains ROMs that allow it to test itself when Self-Test is run. Likewise, the 3PPI board and Tablet Interface board (Options 10 and 13/14 respectively) also contain ROMs that allow these circuit boards to test themselves during Self-Test. Options 24 through 29 (extended RAM options) are also checked during Self-Test, but by the normal firmware, and not by firmware in ROMs on the optional RAM boards. RAM in addresses above the standard 32K bytes is called "Upper RAM" in the RAM test description (located earlier in this section).

Error messages for the 3PPI board, Disk Controller board, and Tablet Interface board are the same for both the 4114 and 4112 terminals, since these boards fit in both terminals.

3PPI Board Tests

These error codes may appear while running Self-Test, only if the 3PPI Option is installed and the host port cables are in use. For a 3PPI cable testing procedure, go to the "3PPI Adjustment Menu/Procedure" at the end of this section.

**Table 5-12
3PPI ERRORS**

ERROR CODE Binary / Hex	EXPLANATION
0110 1111 6F	Error detected during Register check.
	Submessage:(printed on screen)
	I/O Address: FBnn Expect WW-XX
	Receive: YY-ZZ
	Explanation: The information reported by this error code is interpreted as follows: nn = register in error WW = expected data YY = actual data ZZ = actual interrupt

Table 5-12 (cont)
3PPI ERRORS

ERROR CODE Binary / Hex	EXPLANATION
0110 1110 6E	Error detected during 3PPI Character check.
Submessage (printed on screen):	
3PPI Baud/Character Baud: nnnn Expect: WW-XX Receive: YY-ZZ	
Explanation: nnnn = Baud rate (Hex). WW, XX, YY, ZZ are explained under the 6F error message.	
The following error messages may also appear on the screen.	
3PPI Baud/Character Baud: nnnn Expect: 00-02 Receive: 00-FF	This means that no character data is received.
3PPI Baud/Character Baud: nnnn Expect: FF-00 Receive: nn-00	This means that there is a data transmission error where nn was was the character sent.

The Character check test uses internal loop-back testing. There is no interaction between this test and external equipment. The equipment operates at either the preset system rate or 1200 baud, whichever is higher.

NOTE

Refer to Table 5-6 earlier in this section when converting the displayed hexadecimal numbers into decimal numbers.

Option 42 Self-Test Error Messages

NOTE

Start the program running in the same manner as for normal Self-Test. (Press the SELF TEST and MASTER RESET keys in the proper succession.)

Do NOT insert or remove a disk while Self-Test is running as this will generate false interrupts.

Table 5-13
DISK OPTION ERRORS

ERROR CODE Binary / Hex	EXPLANATION
0101 1111 5F	Board Status Register Check
<p>This test validates the operation of the hardware comprising the Board Status Register (at X'FC00'). Each Read/Write bit in the register is set (set=0) and tested; it is again reset and tested.</p>	
<p>Submessage: (printed on screen)</p>	
"Disk - Board Status Register"	These tests check each bit in the BSR (Board Status Register).
(a) "Disk - ADR19-1 not = 0"	Wrote a 0 to ADR19 (D3 of FC01) and read back a 1.
(a) "Disk - ADR19-1 not = 1"	Wrote a 1 to ADR19, but read back a 0
(a) "Disk - ADR19-1 not reset, =1"	Wrote a 0 to reset ADR19, but read a 1.
"Disk - INTE-0 not working"	Did not read back what was written at D6.
"Disk - BUSW-0 not working"	Did not read back what was written at D5.
"Disk - HDL3-0 not working"	Did not read back what was written at D3.
<p>(a) These submessages check the ADR19 Address Counter.</p>	

Table 5-13 (cont)
DISK OPTION ERRORS

ERROR CODE Binary / Hex	EXPLANATION
"Disk - HDL2-0 not working"	Did not read back what was written at D2.
"Disk - HDL1-0 not working"	Did not read back what was written at D1.
"Disk - HDL0-0 not working"	Did not read back what was written at D0.

Circuits used: Address Decode, Input Data Buffer, and Board Status Register.

0101 1110 5E Initialize and check Disk Controller

The FDC is put into its command phase (regardless of its present state) via a series of command reads and writes. The following bits are tested for correct state:

- Under X'FC00' -- D7 (EOC-1)
- Under X'FC08' -- D7 (RQM-1) and D6 (DIO-1).

A SPECIFY command is then issued by the processor.

Submessages: (printed on screen)

- "Disk - Controller Protocol"
- "EOC-0 is 0 after init" FDC generates an unexpected interrupt, bit is in wrong state after initialization.
- "Disk - DIO-1 is 0 - Write required" FDC required a write to it, while processor expects to read from it.

Table 5-13 (cont.)
DISK OPTION ERRORS

ERROR CODE Binary / Hex	EXPLANATION
"Disk - DIO-1 is 1 - Read required"	FDC requires a read from it, but processor expects to write to it.
"Disk - DIO-1 is 1 after init"	Bit D6 is in wrong state after initialization.
"Disk - RQM-1 remains 0"	FDC never sends RQM-1 (fails in 1000 tries).
"Disk - Cannot restore Protocol"	Runs initialization sequence, but cannot put FDC into a known state. (Processor has no idea what FDC is doing).
----- Circuits used: FDC, Board Status, Control Strobes, Data MUX, and Address Decode. -----	
0101 1101 5D	Drive present check
The processor issues a SENSE DRIVE 0 STATUS (SDS) command. Drive 0 should be present. The D7 (RQM-1) and D6 (DIO-1) are tested for correct states before and during the command.	
Submessage: (printed on screen)	
"Disk- F0: not present"	Drive 0 should always be present. This message means the FDC or Disk Drive control cannot find drive unit 0.
----- Circuits used: FDC's disk control I/F, and Disk Drive Control circuits. -----	

Table 5-13 (cont.)
DISK OPTION ERRORS

ERROR CODE Binary / Hex	EXPLANATION
0101 1100 5C	Intersystem Interrupt check
<p>The following procedure is used to generate an interrupt: The heads are unloaded (should already be unloaded from last test), and the processor issues a RECAL DRIVE 0 command. Recal is executed, but the head does not move. The FDC does not know that the heads were unloaded, so it generates an interrupt. An error is also reported, unless head was already at Track 0.</p> <p>The processor then issues the SENSE INTERRUPT STATUS (SIS) command to read the results of the RECAL command. The results of the SIS command are checked as well as RQM-1 and DIO-1.</p> <p>Submessages: (printed on screen)</p> <p>"Disk - Intersystem Interrupt Check"</p> <p>"Disk -Bad FC00 init" Board Status Register contains error (different state than expected).</p> <p>"Disk -Bad FC08 init" FDC status register contains an error (different state than expected).</p> <p>"Disk -Bad FC00 RECAL-1 status" Error in Board Status Register (BSR) after first byte of RECAL command written.</p> <p>"Disk -Bad FC08 RECAL-1 status" Error in FDC after first RECAL byte written.</p> <p>"Disk -Bad FC00 RECAL-2 status" Error in BSR after second RECAL byte written.</p> <p>"Disk -Bad FC08 RECAL-2 status" Error in FDC after second RECAL byte written.</p> <p>"Disk -Level 7 interrupt not present" Expected interrupt not present.</p>	

Table 5-13 (cont.)
DISK OPTION ERRORS

ERROR CODE Binary / Hex	EXPLANATION
"Disk -Bad FC00 SIS status"	Error in BSR after Sense Interrupt status byte written.
"Disk -Bad FC08 SIS status"	Error in FDC after Sense Interrupt status byte written.
"Disk -ST0 data error"	Error in ST0, read at FDC.
"Disk -Bad FC00 ST0 status"	Error in BSR after ST0 status byte read.
"Disk -Bad FC08 ST0 status"	Error in FDC after ST0 status byte read.
"Disk -Track error"	Error in track number (PCN), read at FDC.
"Disk -Bad FC00 Track status"	Error in BSR after track number read.
"Disk -Bad FC08 Track status"	Error in FDC after track number read.
"Disk -Level 7 interrupt still present"	Interrupt still present.
Circuits used: Address Decode, Board Status, Control Strokes, Data MUX, and FDC.	

Table 5-13 (cont.)
DISK OPTION ERRORS

ERROR CODE Binary / Hex	EXPLANATION
0101 1011 5B	DMA Operation check
Submessage: (printed on screen)	
"Disk - DMA transfer failed"	Data ('80') not found at current DMA address (RAM only).

Circuits: DMA State Machine, Data MUX, Control Strokes, Address Decode, Address Counters, Input Data Buffers, and Board Status blocks.

0101 1010 5A DMA addressing check

Both this test and the previous test must be completed before the DMA State Machine and the DMA Address Counters are fully tested; the testing of one requires the operation of the other.

The DMA Address Counters are write only. The only way to look at these counters is to examine the most significant bit (MSB), which is at D4 of the Board Status Register (X'FC00').

The twenty bit counters are subdivided into three groups: High Nibble (FC01), Middle Byte (FC02), and Low Byte (FC03). Each group is tested individually in the following manner.

Table 5-13 (cont.)
DISK OPTION ERRORS

ERROR CODE Binary / Hex	EXPLANATION
----------------------------	-------------

-- HIGH NIBBLE TEST --

Test high nibble first because all bits must ripple through the high nibble while testing the middle and low bytes.

STEP SET-UP

1. Load High Nibble with 0.
2. Does D4 = 0 ? See NOTE.

TEST

3. Load Middle Byte and Low Byte with X'FF.'
4. Step DMA.
5. Does D4 = 0 ?

TEST

6. Repeat steps 3 through 5 eight times.
7. On eighth time, does D4 = 1 ?
8. Repeat another eight times. (D4 should = 1 for these eight.)
9. On sixteenth time, does D4 = 0 ?

NOTE: If D equals 1, an error message is reported. All "D=N?" steps will cause an error unless the number is as expected. Error messages are in the accompanying tables.

DMA Address Check (continued)

-- MIDDLE BYTE TEST --

STEP SET-UP

10. Load High Nibble with 7.
11. Does D4 = 0 ?
12. Load Middle Byte X'FF.'

TEST

13. Load Low Byte with X'FF.'
14. Step DMA.
15. Does D4 = 0 ?
16. Reload Low Byte with X'FF' (leave Middle Byte since we are testing it).
17. Repeat steps 13 through 15; on 256th does D4 = 1? (Does High Nibble equal eight?).

Circuits used: FDC, Board Status, Control Strokes, Data MUX, and Address Decode.

Table 5-13 (cont.)
DISK OPTION ERRORS

ERROR CODE Binary / Hex	EXPLANATION
----------------------------	-------------

SET-UP

- 18. Reload High Nibble with F.
- 19. Does D4 = 1 ?

TEST

- 20. Reload Low Byte with X'FF,' and Step DMA.
- 21. Repeat step 19 twohundred fiftysix times.
- 22. On 256th time does D4 = 0 ? (High Nibble = 0)

-- LOW BYTE TEST --

Same procedure as Middle Byte test except the Low Byte and Middle Byte are reversed.

Error Messages for DMA Address Counters

Submessages (printed on screen):

"Disk - DMA Address Counters
- ADR19-1 Error

"Early 0-1 @ FC01"	Error detected at steps 2 or 5 (Counter reached 8 too soon)
"No 0-1 @ FC01"	Error detected at step 7.
"Early 1-0 @ FC01"	Error detected at step 8.
"No 1-0 @ FC01"	Error detected at step 9.
"Early 0-1 @ FC02"	Error detected at steps 11 or 15.
"No 0-1 @ FC02"	Error detected at step 17.
"Early 1-0 @ FC02"	Error detected at step 19.
"No 1-0 @ FC02"	Error detected at step 22.
"Early 0-1 @ FC03"	Same explanation as for FC02 messages, above, except substitute FC03 for FC02 in explanation of Middle Byte tests.
"No 0-1 @ FC03"	
"Early 1-0 @ FC03"	
"No 1-0 @ FC03"	

These tests check the clocking and carries of one counter to the next.

Circuits used: Same circuit blocks as used in DMA Operation Check, except Data MUX not used.

Tablet Self-Test Error Codes

The light codes for the tablet indicate the tablet failed to complete a Self-Test sequence. In this case, the operation of the Tablet Controller board should be investigated.

During the tablet test, error messages are printed on the terminal screen for each test that failed. These submessages are accompanied by one of the light codes listed in Table 5-14.

A "soft error" will allow the tablet to be used. However, it tells the operator that a problem exists.

A "fatal error" removes the tablet from the interrupt routine of the terminal. The tablet can not be used until the problem is corrected and the error is cleared.

Table 5-14
TABLET ERROR MESSAGES

ERROR CODE Binary / Hex	EXPLANATION
0100 1111 4F	Board Communications check error.
	Submessage: (printed on screen)
	"Tablet -Board I/O Timeout"
	May appear during either the Power-Up sequence or Self-Test. It indicates that the terminal firmware is unable to communicate with the Tablet Controller board, and that a processor timeout occurred when communication was attempted. This is a FATAL error.
0100 1110 4E	Data Register bit check error.
	Submessage: (printed on screen)"
	"Tablet -Data Register Bit Error"
	Each individual bit of the data register is tested for set and reset. Message indicates at least one bit is not acting properly. This is a SOFT error.

Table 5-14 (cont.)
TABLET ERROR MESSAGES

ERROR CODE		EXPLANATION	
Binary	Hex		
0100	1101	4D	Data Register count check error
<p>Submessage: (printed on screen) - Only one of the following submessages will accompany the light code:</p> <p>"Tablet -Data Register Counting Error (Low)"</p> <p>Indicates that the data register was incapable of counting from 0 to 31 by one. This is a SOFT error.</p> <p>"Tablet -Data Register Counting Error (High)"</p> <p>Indicates that the data register was incapable of counting from 0 to 65539 by 29. This is a SOFT error.</p>			
0100	1100	4C	Digitization check error.
<p>Submessage: (printed on screen) - Only one of the following submessages will accompany the light code:</p> <p>"Tablet -Digitization Timeout Error"</p> <p>A start digitization command was given to the tablet and one of the FIRE pulses was not returned within 0.5 seconds. This is a SOFT error.</p> <p>"Tablet -Digitization Firing Sequence Error"</p> <p>The status bits, indicating which data firing (X1, X2, Y1, Y2) is present, were out of sequence. This is a SOFT error.</p>			

Table 5-14 (cont.)
TABLET ERROR MESSAGES

ERROR CODE Binary / Hex	EXPLANATION
"Tablet -Erroneous Interrupting Indication"	The tablet status indicates that it is trying to interrupt the processor when it should not. This is a SOFT error.
"Tablet -failed To Interrupt"	Indicates the tablet status is not trying to interrupt the processor when it should. This is a SOFT error.
"Tablet -Data Register Counting Error (Digitization)"	The data register failed to count at all during a start digitization. This is a SOFT error.

ADJUSTMENT SELF-TEST

Adjustment Self-Test is the third diagnostic program that can be used to check the terminal. Adjustment Self-Test is started in the same manner as the main Self-Test (the second part of the functional check). A procedure and some guidelines for Adjustment Self-Test are outlined as follows:

1. Start Adjustment Self-Test running by pressing and holding the SELF TEST and MASTER RESET buttons.
2. Release the MASTER RESET button, first.
3. After the keyboard lights begin to "cycle," then release the SELF TEST button.
4. The keyboard LEDs will all turn on, and then off, and then cycle twice. This is the same as during main Self-Test.
5. After the keyboard lights finish "cycling," the keyboard bell will ring once. Then press the CTRL and C keys at the same time.
6. After CONTROL C has been pressed, the terminal will pause for a few seconds and then display a general menu on the screen. The terminal is now in the Adjustment part of Self-Test.
7. The general menu tells which key to press to check any specified part of the terminal. These keys are always one of the eight "function keys" across the upper-left part of the keyboard.
8. When one of these keys (designated by the menu) is pressed, a second menu (submenu) will be displayed.

Table 5-15
ADJUSTMENT CONTROL KEYS

Key	Action
CONTROL C	Displays (returns to) the general Self-Test menu.
CONTROL D	Displays the current menu.
CONTROL E	Exits from the current routine.
SPACE BAR	Repeats the current pattern/test.
Shifted Keys	A second function for specified key. The letters "Sh" in front of the key designation on the menu, means press the SHIFT key along with the designated key.

THE GENERAL MENU

The General Menu appears on the screen immediately after entering the Adjustment part of Self-Test. This general menu is common for all 4110 series terminals. An example of the general menu is shown below.

```

411X Menu
--
f1 4112 Display
f2 Processor Board
f3 Disk
f4 3PPI
f5 Tablet
--
Selection
*
```

The Disk, 3PPI, and Tablet functions only appear if that option is installed. The options may change key designations depending on which options are installed. For instance, if no disk options were installed, but the tablet and 3PPI options were, the 3PPI option would be selected by F3, and the tablet options would be selected by F4. Adjustment Self-Test for the tablet is used only in adjusting the tablet when Options 13 or 14 are installed. It is not used in this function check procedure.

During Adjustment Self-Test, pressing CONTROL C will always cause this menu to be printed on the screen.

4112 DISPLAY ADJUSTMENT MENU

After the general menu is obtained, select the display menu by pressing F1. This key is in the upper-left corner of the keyboard. After the 4112 Display Menu is selected, the following will appear on the screen:

```

4112 Display Menu
--
f1 Grid
f2 Gray Scale
f3 White Screen
f4 Dot Pattern
--
Selection
*
```

These patterns can be used during the functional check to ensure that all display parameters are functioning properly.

1. Press function key, F3 —
Observe a uniform white screen. Adjust the Intensity Control, as needed, to obtain a bright (white) screen. This control is located next to the upper-right corner of the display screen, above the optional disk drive unit. (This pattern is used later to calibrate the internal brightness adjustment.)
2. Press function key, F1 —
Observe grid pattern, and verify that it is properly positioned (centered) on the screen.
3. Press function key, F2 —
Observe in this pattern eight distinct levels of gray (from black to and including white).
4. Press function key, F4 —
Observe full screen dot pattern. All dots must be visible as uniform dots. Verify uniform focus over the entire screen.
5. Press CTRL C to return to the General Menu.

PROCESSOR BOARD ADJUSTMENT MENU/PROCEDURE

With the General Menu displayed on the screen, select the Processor Board menu by pressing F2. After F2 is pressed, the Processor Board menu is displayed. The Processor Board menu looks like this:

```

Processor Board Menu
--
f1 CMOS-Reset
f2 Keyboard
f3 Host Port
--
Selection
*
```

Working from the Processor Board menu, perform the following tests.

CMOS-Reset, Function Key F1.

CMOS-Reset is used to restore the factory default settings of all the CMOS parameters. From the Processor Board menu, press F1 function key. This action prints the following message on the display:

```

*f1
CMOS-Reset
Selection
*
```

This message means that the terminal's operating parameters have been restored to their factory default settings.

SELF-TEST

Keyboard, Function Key F2.

Pressing the F2 key causes every key on the keyboard to display two 2-digit hexadecimal numbers. These numbers represent the 8-bit codes that the Processor Board generates for each downstroke and upstroke of a key. Each key has its own distinct hexadecimal code, and each down-stroke code is different than the corresponding up-stroke code. The first number of the up-stroke code is always eight more than the first number of the down-stroke code. The second character in the code is the same for both the down-stroke and the up-stroke of the key. This routine will verify that each key is operating properly. Figure 2-3 (Keyboard Key Codes) shows the keyboard key codes.

Now return to the Processor Board menu by pressing CTRL D.

Host Port Check, Function Key F3.

The Host Port routine checks the validity of the output port of the terminal. Enter the Host Port routine by pressing F3. Once this is done, the screen displays the following message:

```
Host Port
Attach Loopback
Press SpcBar
```

Connect the special loopback connector from the output port back to the input port. These connections are located on the rear panel of the terminal. See Accessories List for the Loopback Connector part number.

After the cable is connected, press the SPACE BAR. This starts the routine that sends signals representing characters 7F through 00 (at baud rates 9600 through 300). When this string of signals is sent and received properly, the screen indicates it by printing "Complete." This message means the terminal is ready to go on to the next test.

If there is an error during the Host Port routine, the following submessage will appear on the screen:

```
"Host Port-Baud/Character
Baud: XXXX Expect: YY-AA Receive: ZZ-BB"
```

This means:

XXXX	is the baud rate in hexadecimal.
YY	is the signal sent (for example: 7F).
AA	are the expected bits in error, this should always read 00.
ZZ	is the signal received.
BB	are the bits in error.

After this Host Port check is complete, return to the general menu by pressing CONTROL C. If there are no options installed, this completes the functional check of the terminal. If there are options installed, select each option listed in the general menu and perform the following checks for that option.

NOTE

Only the disk and 3PPI options may be functionally checked using Adjustment Self-Test. The tablet menu is used for alignment purposes of the Graphic Tablet only (which is external to the terminal). The electronics for the tablet that reside in the terminal (Tablet Controller Board) were checked during main Self-Test. An alignment procedure for the graphic tablet using Adjustment Self-Test is contained in the 4110 Series F13/14 Graphic Tablet Instruction Manual.

DISK OPTION ADJUSTMENT MENU/PROCEDURE

The Disk Menu may be obtained from the general menu by pressing F3. The Disk Menu is an optional menu and will only appear if Option 42 is installed. As Self-Test checks the circuitry on the Disk Controller board, this routine checks the drive unit, also. This menu is useful for drive unit head alignment. For this purpose a special alignment diskette (not used in this functional check) is required.

NOTE

The following is only a functional check and not an alignment procedure. This check only ensures that no error messages are received and that the drive unit is functioning. An alignment procedure for the disk drives is located in the "4110 Series F42/43 Disk Options Service Manual," and the "Flexible Disk Drive Instruction Manual."

This is an example of the Disk Menu (items are self explanatory):

```

Disk Menu
--
f1 No Operation
f2 Step Up One Track
f3 Step Down One Track
f4 Seek Track 0
f5 Seek Track 1
f6 Seek Track 38
f7 Seek Track 75
f8 Seek Track 76
Sh f1 Load Head
Sh f2 Unload Head
Sh f3 Arms Write Mode
Sh f4 Writes Track 76 With a 2F Pattern
Sh f5 Select_Your Own Track
Sh f6 Change Device (Drive Unit) Address
Sh f7 Auto Load And Unload The Head On
      Track 0
--
Selection
*
```

With the disk option installed, properly insert a disk in the drive unit before starting this test. Then make sure the WRITE PROTECT switch is set to the off position (the light is not lit).

CAUTION

It is best to perform this part of the functional check using a disk free of data. Performing this test may cause some data to be written on the disk. With the write protect switch off, it is possible to write over existing data. Therefore, it is best to use a new disk or one that contains unwanted data.

Press each of the disk menu keys in succession. No error messages should be received on any of the tests, and the head should move to the selected area on the disk. After running through the head movements (in the menu), press CTRL C to return to the general menu.

NOTE

This is merely a check of the disk drive unit to ensure that no error messages are received and that the drive unit is operational. For a full alignment procedure of the drive unit, see the "4110 Series F42/43 Disk Options Service Manual."

3PPI ADJUSTMENT MENU/PROCEDURE

The key designations, to select the 3PPI option from the general menu, will depend on the options installed. If no disk or tablet options are installed, the F3 key selects the 3PPI Menu from the general menu. An example of this menu follows:

```

3PPI Menu
--
f1 3PPI Ports
--
Selection
*
```

SELF-TEST

This routine is designed to check the cables to the designated peripheral port. To start this test, press F1. The following message will appear on the screen:

```
*f1
Select Port (0, 1 or 2)
*
Attach Host Port Cable to Selected
3PPI Port and Press Spacebar
*
```

Connect the terminal host-port RS-232C cable to the 3PPI-port to be tested. Connect the other end of the cable to the terminal's MODEM connection. Then type the number of the port to be tested (0, 1, or 2) followed by pressing SPACEBAR.

If there are no errors, the following message will appear on the screen; then the next port may be tested. If an error occurs, consult the 3PPI errors description in Table 5-12.

```
Test in Progress
Procedure Complete
Select Port (0, 1, or 2)
*
```

This completes the 3PPI "Adjustment" procedure and messages.

TABLET ADJUSTMENT MENU/PROCEDURE

When the Tablet is selected from the general menu (part of Adjustment Self-Test), the following tablet message will appear on the screen:

```
Tablet Menu
--
f1 Tablet Timing Adjustment
--
Selection
*
```

At this time, the interconnect cable must be connected between the Graphic Tablet and the 4112 graphic tablet port. After this is done, the F1 key may be pressed.

The following submessages can be used to aid in adjusting the surface accuracy of the tablet. For more information on tablet adjustments, consult the Option F13/14 Graphics Tablet Instruction Manual. These submessages appear while running the Adjustment part of Self-Test only.

Submessages: (printed on screen)

Warning: - Tablet Firing Sequence Error -

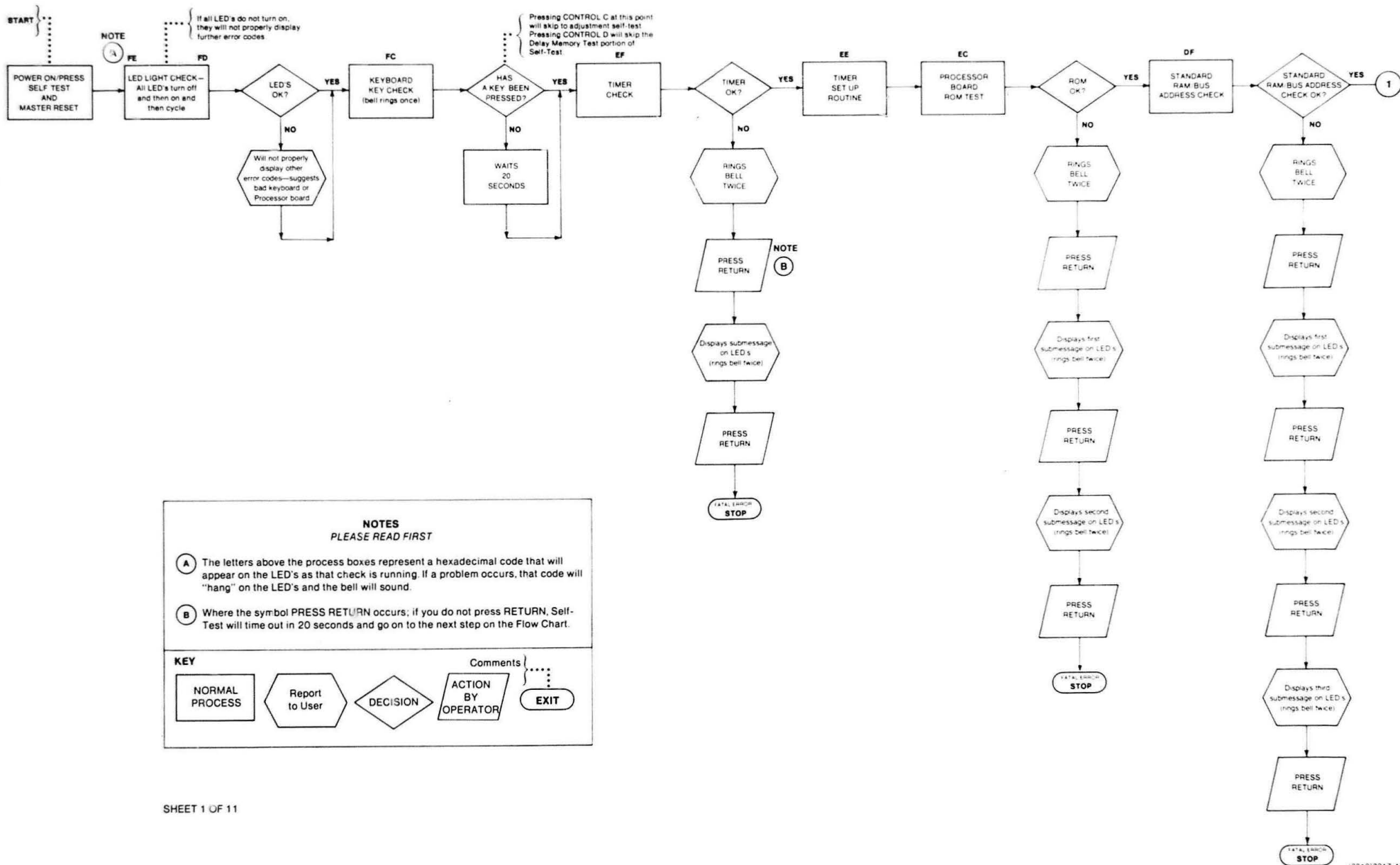
The status bits, that indicate which data firing (X1, X2, Y1, Y2) is being received, are out of sequence. This is a warning only; the routine will proceed normally. This message can indicate a problem on any of the circuit boards associated with the tablet.

X = NNN.NNN, Y = NNN.NNN,
Button = N (Using a Cursor Pen)

This is the standard message. It is displayed whenever the Z-axis switch is pressed while in presence. It displays X and Y in inches from the margin, the button number pressed (0 for stylus; Z, 1, 2, 3 for a cursor). It also indicates whether a pen (stylus) or cursor is in use.

X Timing Straps = NNNNNNNN,
Y Timing Straps = NNNNNNNN

This message is printed whenever a Z-axis switch is pressed with the stylus out of presence. It is a binary readout of the timing strap settings. A comparison of this readout with the actual strap settings will verify the proper operation of the timing straps.



NOTES
PLEASE READ FIRST

A The letters above the process boxes represent a hexadecimal code that will appear on the LED's as that check is running. If a problem occurs, that code will "hang" on the LED's and the bell will sound.

B Where the symbol PRESS RETURN occurs, if you do not press RETURN, Self-Test will time out in 20 seconds and go on to the next step on the Flow Chart.

KEY

NORMAL PROCESS	Report to User	DECISION	ACTION BY OPERATOR	Comments	EXIT
----------------	----------------	----------	--------------------	----------	------

SHEET 1 OF 11

Figure 5-7A. 4112 Self-Test Flow Chart.

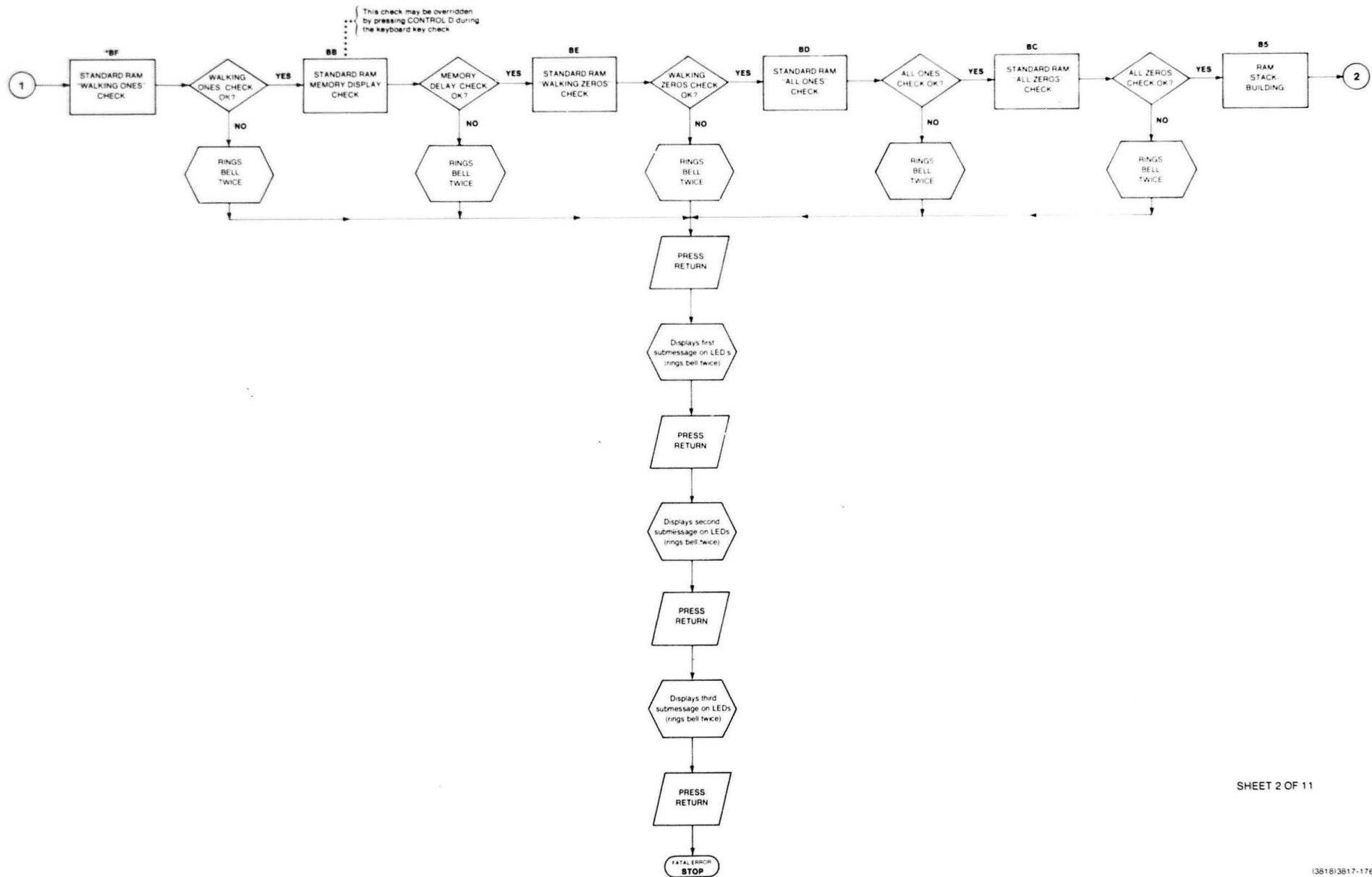


Figure 5-7B. 4112 Self-Test Flow Chart.

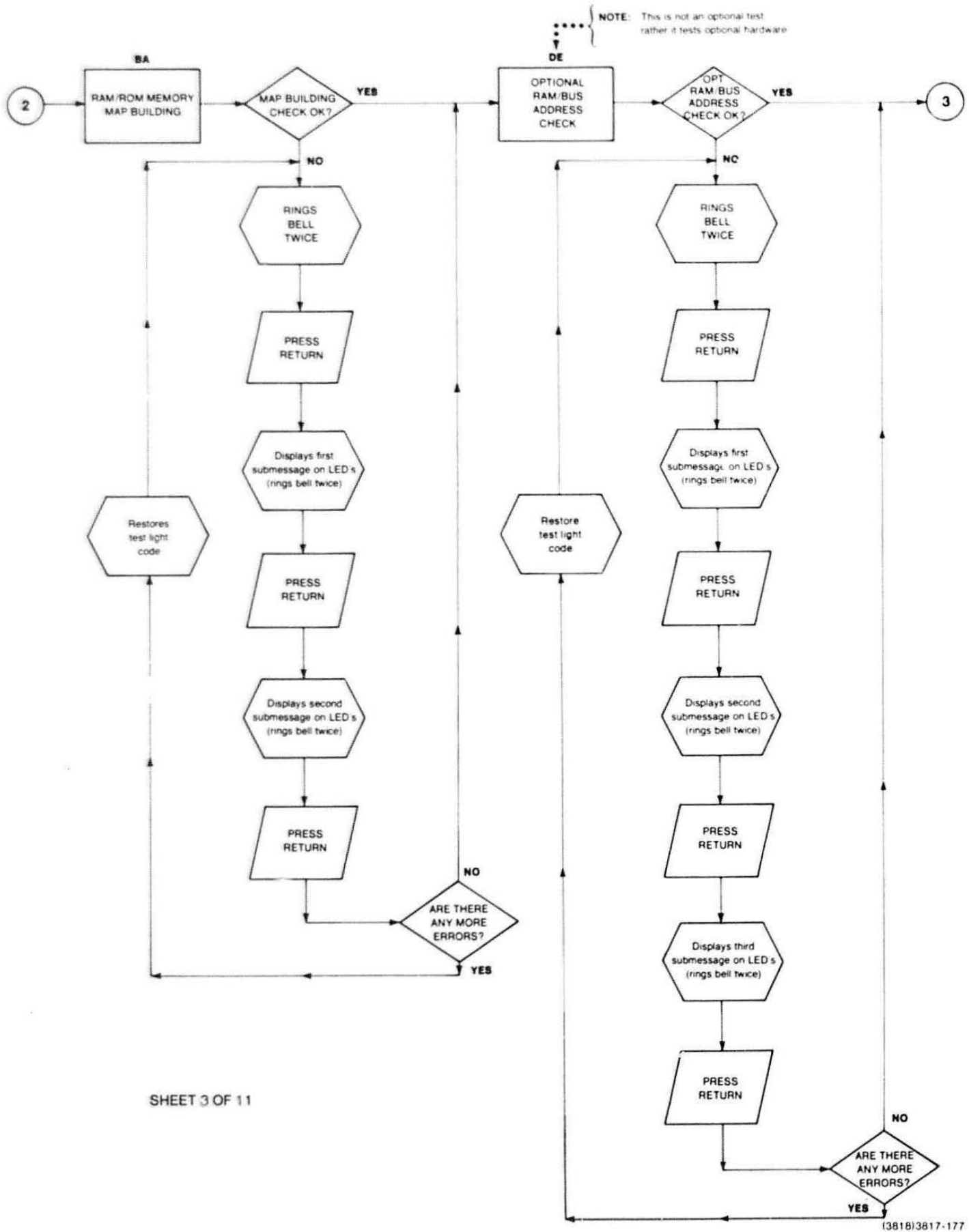
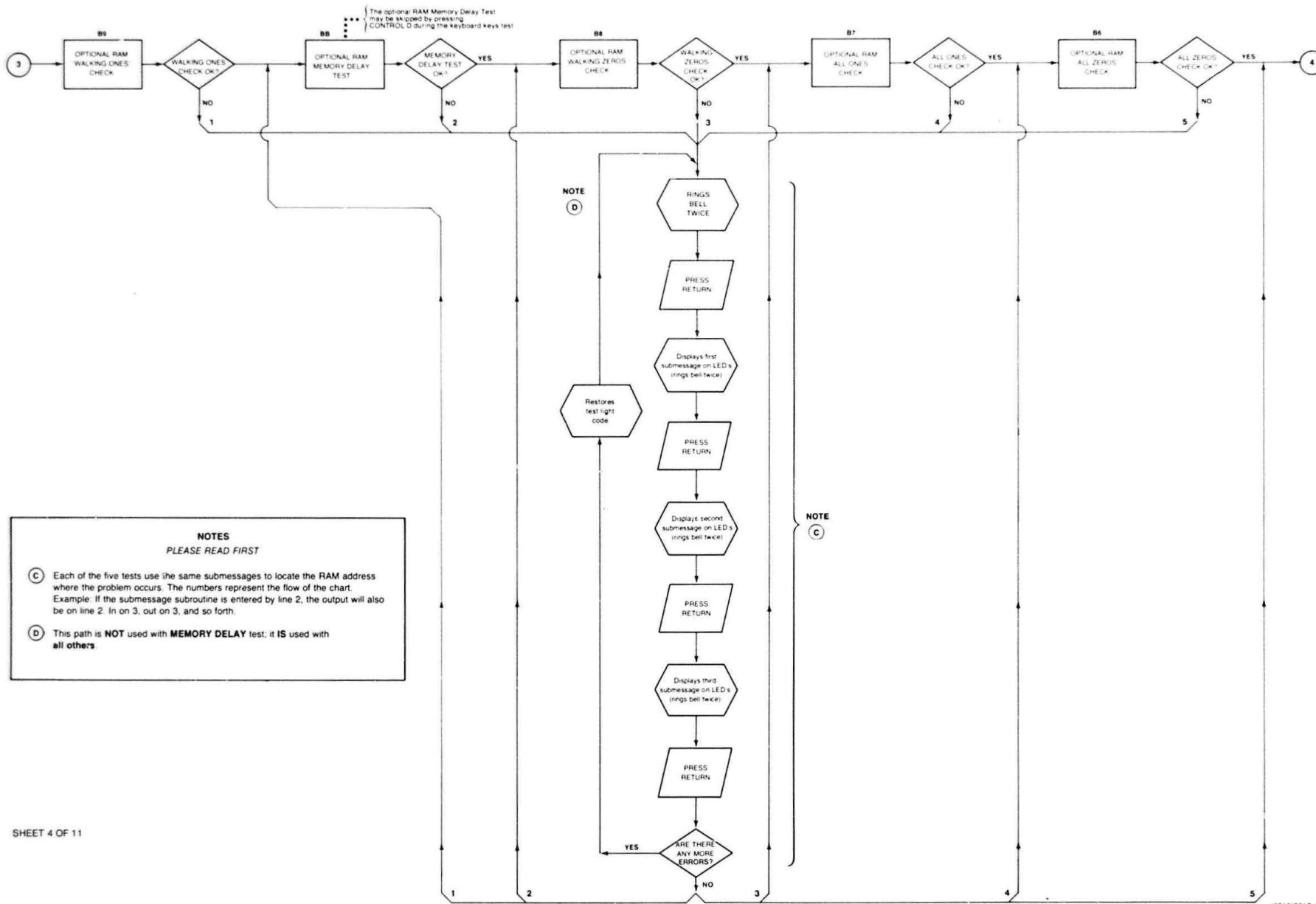


Figure 5-7C. 4112 Self-Test Flow Chart.



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Figure 5-7D. 4112 Self-Test Flow Chart.

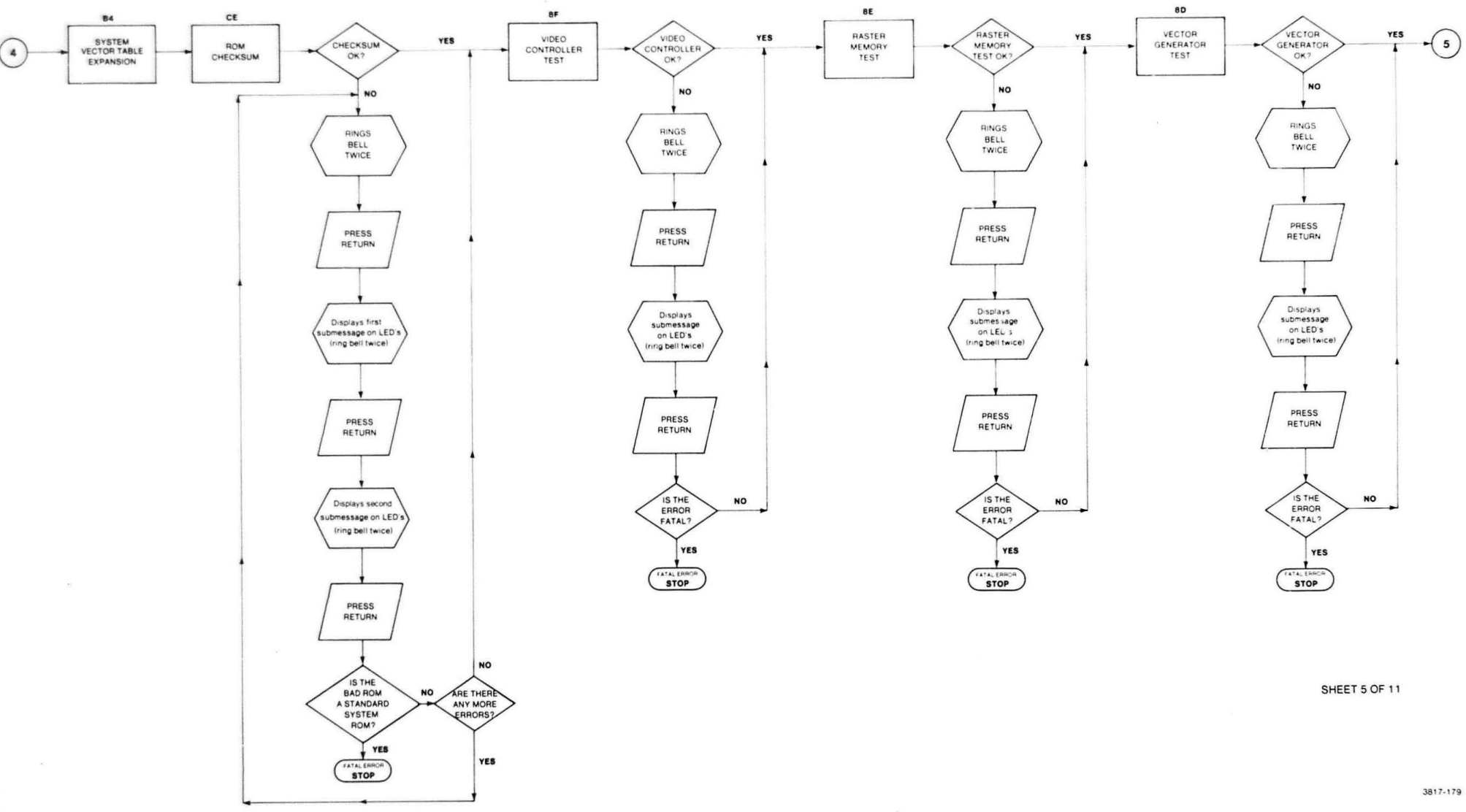
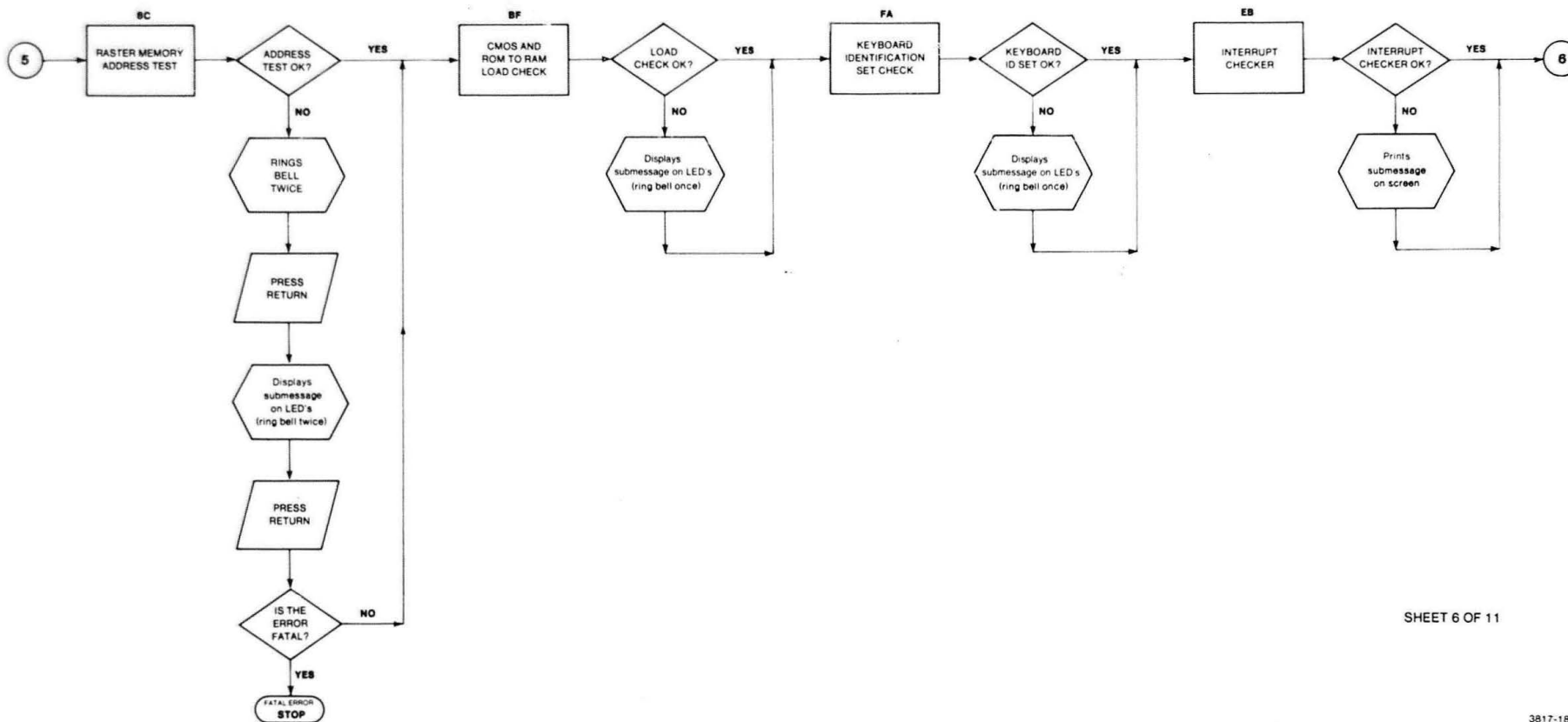


Figure 5-7E. 4112 Self-Test Flow Chart.

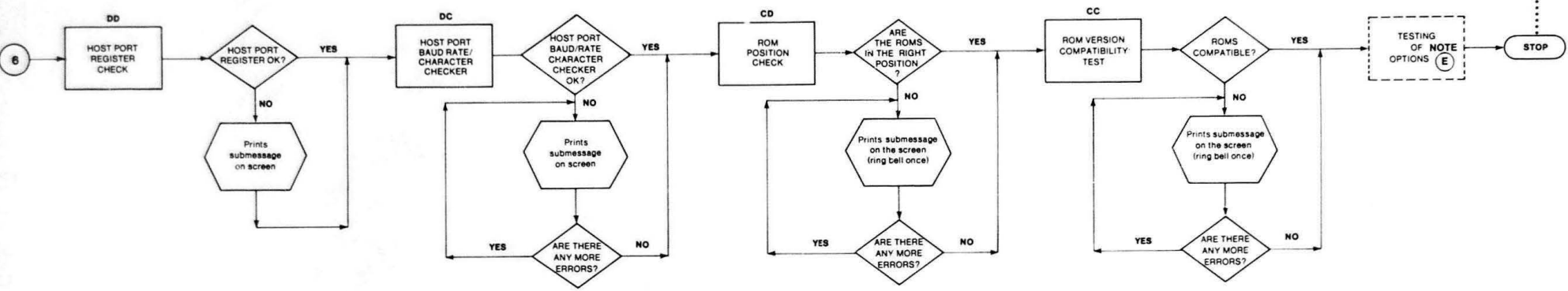


SHEET 6 OF 11

3817-180

Figure 5-7F. 4112 Self-Test Flow Chart.

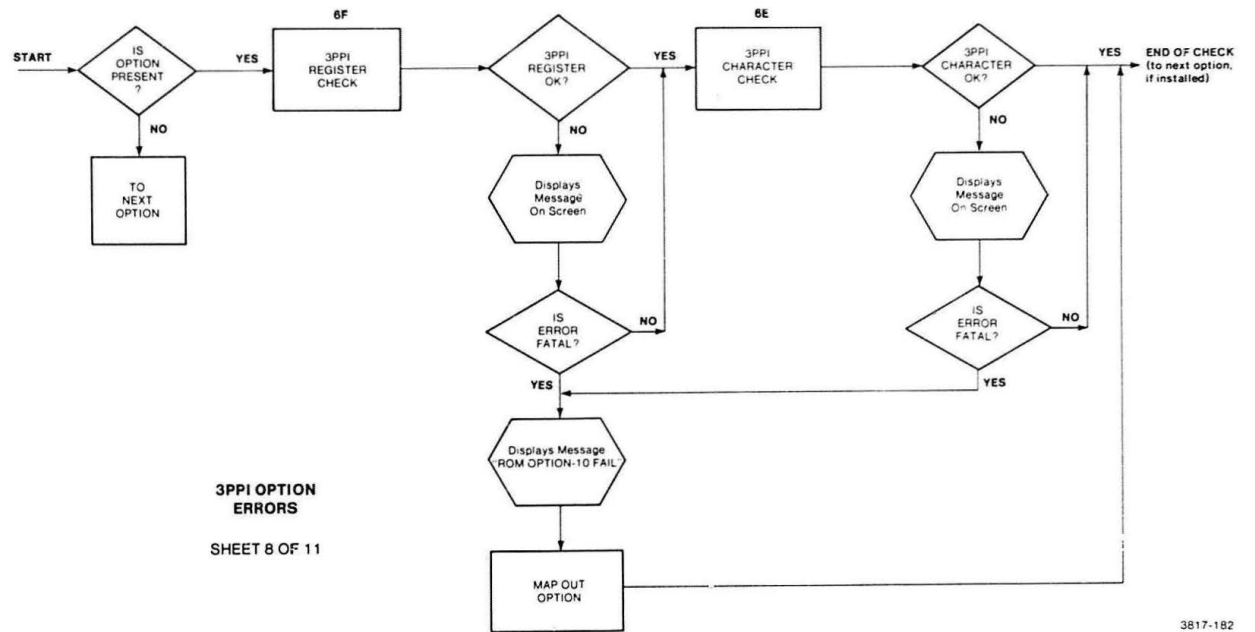
This completes Self-Test.
The terminal is now ready
to be used.



NOTE
PLEASE READ FIRST

E If any options are installed in the terminal, they will be tested at this point (except RAM options, which were tested earlier). The option boards tested include the Disk Controller board, 3 PPI board, and Tablet Controller board. Tests on these boards are performed in descending sequence of the hexadecimal error codes.

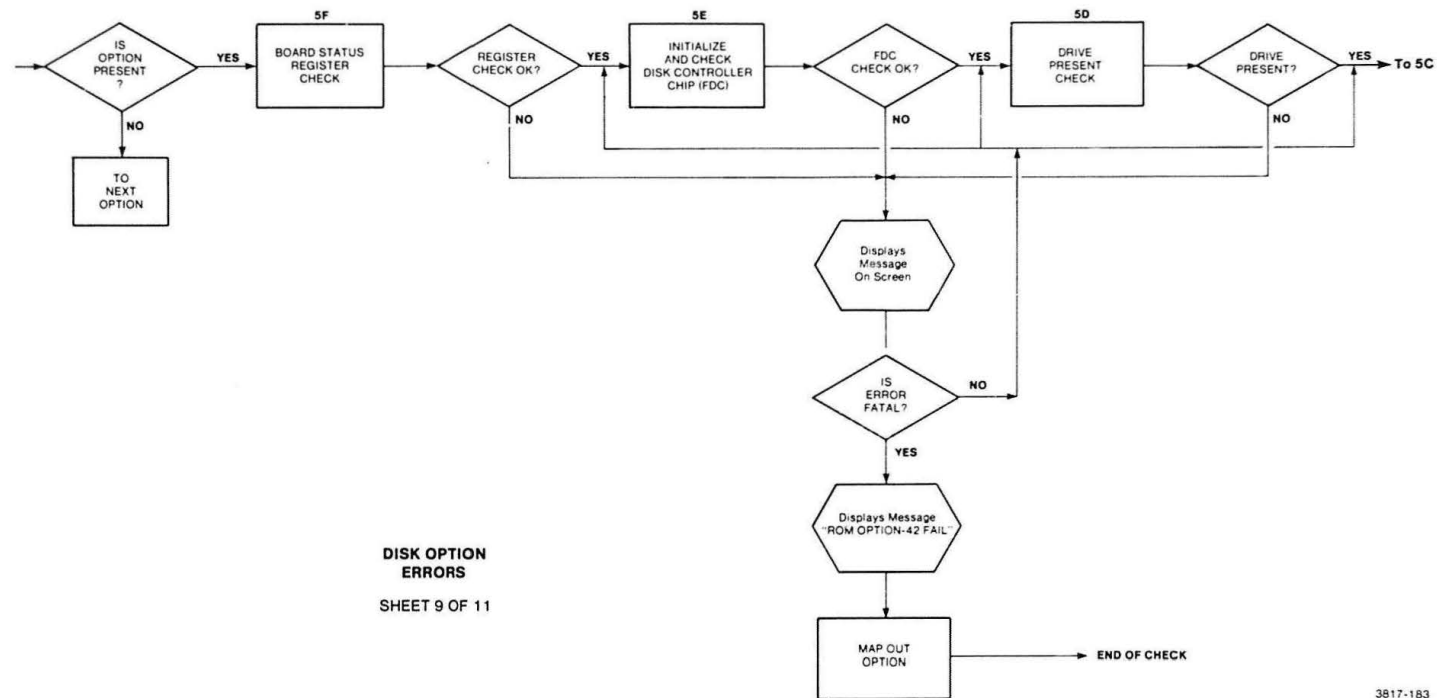
Figure 5-7G. 4112 Self-Test Flow Chart.



3PPI OPTION
ERRORS
SHEET 8 OF 11

Figure 5-7H. 3PPI Self-Test Flow Chart.

3817-182



**DISK OPTION
ERRORS**
SHEET 9 OF 11

Figure 5-71. Disk Self-Test Flow Chart.

3817-183

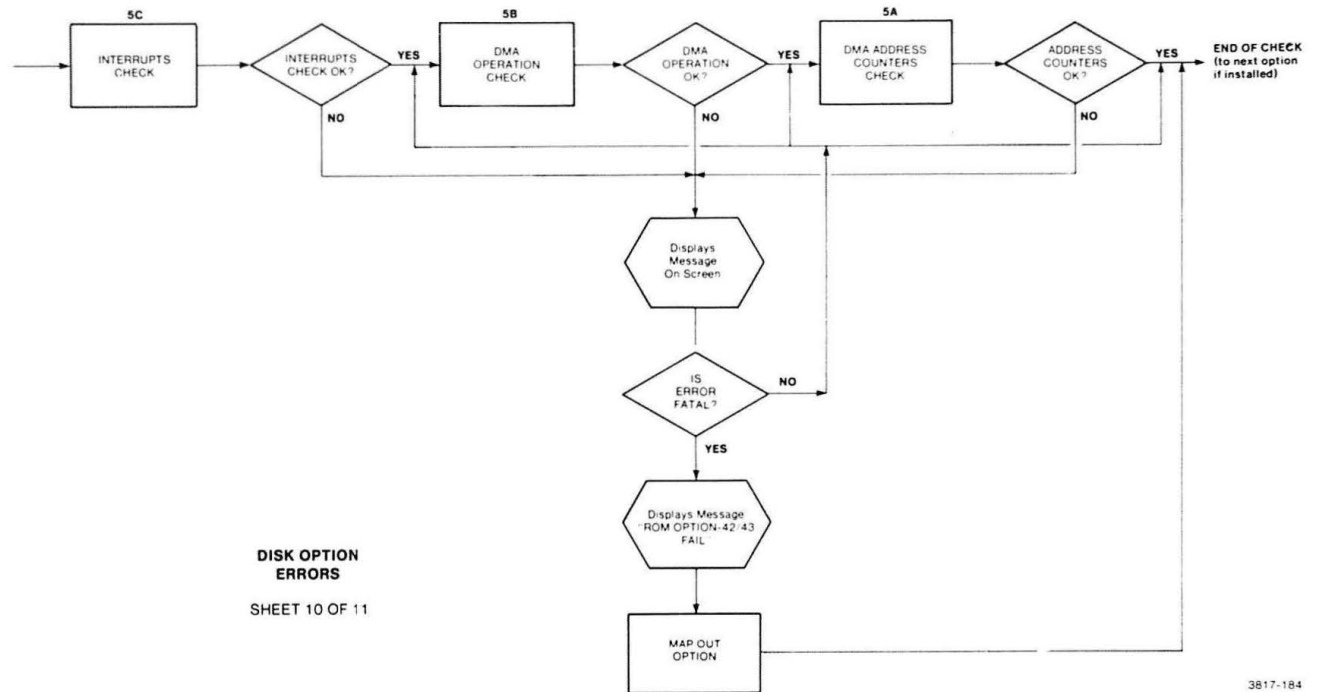


Figure 5-7J. Disk Self-Test Flow Chart.

3817-184

DISK SELF-TEST
FIGURE 5-7J

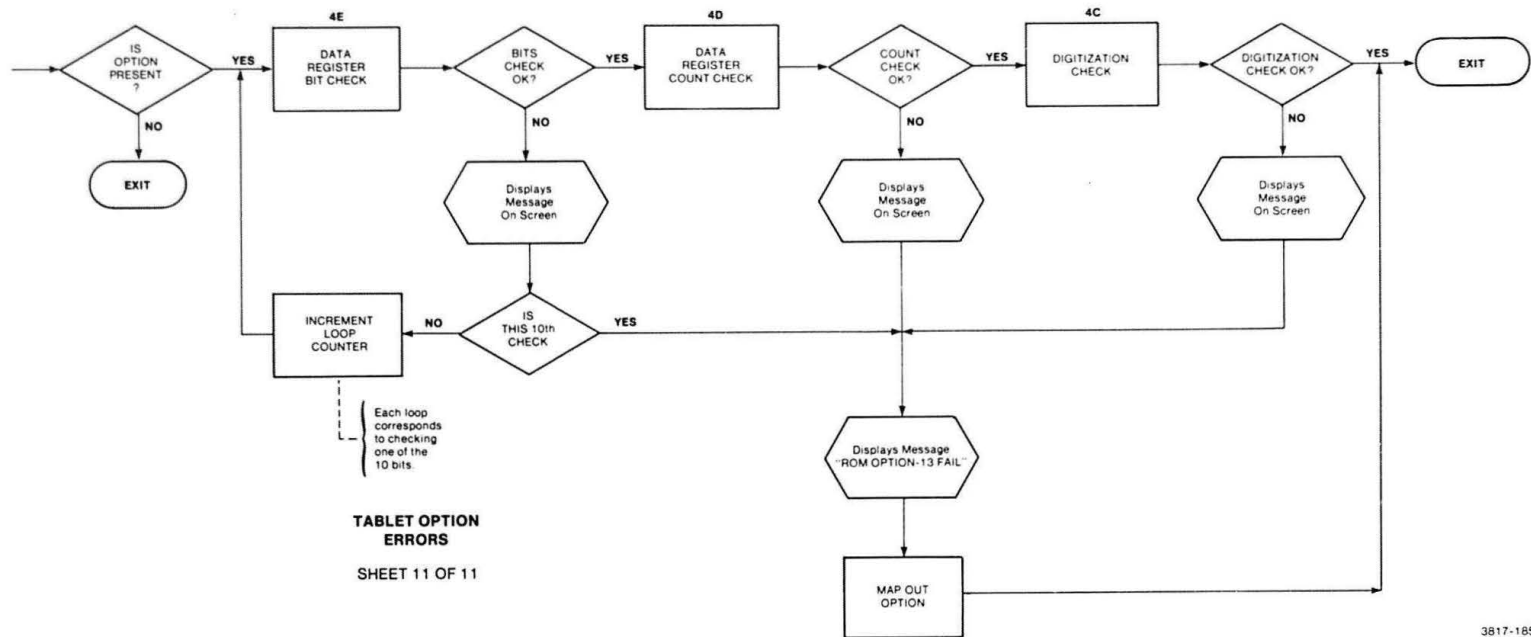


Figure 5-7K. Tablet Self-Test Flow Chart.

3817-185

Section 6

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

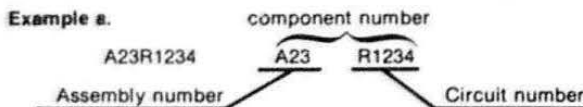
The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

ABBREVIATIONS

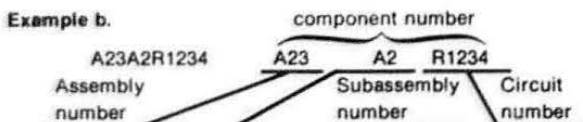
Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:



Read: Resistor 1234 of Assembly 23



Read: Resistor 1234 of Subassembly 2 of Assembly 23

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

REPLACEABLE ELECTRICAL PARTS

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
00010	AMPEREX ELECTRONIC CORP. C/O WESTERN TECHNICAL SALES	2271 N.E. CORNELL RD. P O BOX 3608	HILLSBORO, ORE 97123 HARRISBURG, PA 17105
00779	AMP, INC.	P O BOX 128	PICKENS, SC 29671
00853	SANGAMO ELECTRIC CO., S. CAROLINA DIV.	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
01121	ALLEN-BRADLEY COMPANY	F O BOX 5012, 13500 N CENTRAL EXPRESSWAY	DALLAS, TX 75222
01295	TEXAS INSTRUMENTS, INC., SEMICONDUCTOR GROUP	2800 WEST BROADWAY	COUNCIL BLUFFS, IN 51501
01807	PETERSEN RADIO COMPANY, INC.	1102 SILVER LAKE RD.	CARY, IL 60013
02113	COILCRAFT INC.	ROUTE 202	SOMERVILLE, NY 08876
02735	RCA CORPORATION, SOLID STATE DIVISION	ELECTRONICS PARK	SYRACUSE, NY 13201
03508	GENERAL ELECTRIC COMPANY, SEMI-CONDUCTOR PRODUCTS DEPARTMENT	P O BOX 867, 19TH AVE. SOUTH	MYRTLE BEACH, SC 29577
04222	AVX CERAMICS, DIVISION OF AVX CORP.	5005 E MCDOWELL RD, PO BOX 20923	PHOENIX, AZ 85036
04713	MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.	21001 NORDHOFF STREET	CHATSWORTH, CA 91311
05574	VIKING INDUSTRIES, INC.		
07263	FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP.	464 ELLIS STREET	MOUNTAIN VIEW, CA 94042
07716	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, BURLINGTON DIV.	2850 MT. PLEASANT 103 MORSE STREET	BURLINGTON, IA 52601 WATERTOWN, MA 02172
09353	C AND K COMPONENTS, INC.	406 PARR RD.	BERNE, IN 46711
11236	CTS OF BERNE, INC.	LOWER WASHINGTON STREET	DOVER, NH 03820
12697	CLAROSTAT MFG. CO., INC.	580 PLEASANT STREET	WATERTOWN, MA 02172
12969	UNITRODE CORPORATION	P O BOX 913	SHAWNEE MISSION, KS 66201
13571	ELECTRONIC RESEARCH CO.	652 MITCHELL RD.	NEWBURY PARK, CA 91320
14099	SEMTECH CORP.	1601 OLYMPIC BLVD.	SANTA MONICA, CA 90404
14193	CAL-R, INC.	3301 ELECTRONICS WAY P O BOX 3049	WEST PALM BEACH, FL 33402 SANTA ANA, CA 92704
14433	ITT SEMICONDUCTORS	2830 E FAIRVIEW ST. 1710 S. DEL MAR AVE.	SAN GABRIEL, CA 91776
14552	MICRO SEMICONDUCTOR CORP.		
14752	ELECTRO CUBE INC.	P.O. BOX 168, 500 BROADWAY	LAWRENCE, MA 01841
15238	ITT SEMICONDUCTORS, A DIVISION OF INTER NATIONAL TELEPHONE AND TELEGRAPH CORP.	63 FOUNTAIN ST. 811 E. ARQUES	FRAMINGHAM, MA 01701 SUNNYVALE, CA 94086
15801	FENWAL ELECTRONICS, DIV. OF KIDDE WALTER AND CO., INC.	900 FOLLIN LANE, SE YOUK EXPRESSWAY	VIENNA, VA 22180 NEW CUMBERLAND, PA 17070
18324	SIGNETICS CORP.	550 HIGH STREET	BRADFORD, PA 16701
19396	ILLINOIS TOOL WORKS, INC. PAKTRON DIV.	2900 SEMICONDUCTOR DR.	SANTA CLARA, CA 95051
22526	BERG ELECTRONICS, INC.	8081 WALLACE ROAD	EDEN PRAIRIE, MN 55343
24546	CORNING GLASS WORKS, ELECTRONIC COMPONENTS DIVISION	10900 N. TANTAU AVE. 1200 COLUMBIA AVE.	CUPERTINO, CA 95014 RIVERSIDE, CA 92507
27014	NATIONAL SEMICONDUCTOR CORP.	2303 W 8TH STREET	LOVELAND, CO 80537
31918	IEE/SHADLOW INC.	901 THOMPSON PL.	SUNNYVALE, CA 94086
32293	INTERSIL, INC.	3065 BOWERS AVE.	SANTA CLARA, CA 95051
32997	BOURNS, INC., TRIMPOT PRODUCTS DIV.	526 INDUSTRIAL WAY WEST	EATONTOWN, NJ 07724
33096	COLORADO CRYSTAL CORPORATION	7485 AVENUE 304	VISALIA, CA 93277
34335	ADVANCED MICRO DEVICES	134 FULTON AVENUE	GARDEN CITY PARK, NY 11040
34649	INTEL CORP.	SPOKANE INDUSTRIAL PK., F. O. BOX 14687	SPOKANE, WA 99214
50558	ELECTRONIC CONCEPTS, INC.	1 PANASONIC WAY	SECAUCUS, NJ 07094
52306	HIGH VOLTAGE DEVICES, INC.	PO BOX 85, OFF ROUTE 45	SPRING MILLS, PA 16875
52769	SPRAGUE GOODMAN ELEC., INC.	6435 N PROESEL AVENUE	CHICAGO, IL 60645
52833	KEYTRONIC CORP., OCR DIV.	2777 EAGANDALE BLVD	EAGAN, MN 55121
54473	MATSUSHITA ELECTRIC, CORP. OF AMERICA	87 MARSHALL ST.	NORTH ADAMS, MA 01247
55210	GETTIG ENG. AND MFG. COMPANY	2155 N FORBES BLVD	TUCSON, AZ 85705
55680	NICHICON/AMERICA/CORP.		
55857	GOULD INC. PORTABLE BATTERY DIV.	2536 W. UNIVERSITY ST.	ST. LOUIS, MO 63107
56289	SPRAGUE ELECTRIC CO.	3101 PRATT BLVD.	CHICAGO, IL 60645
59660	TUSONIX INC.	644 W. 12TH ST.	ERIE, PA 16512
71400	BUSSMAN MFG., DIVISION OF MCGRAW- EDISON CO.	2500 HARBOR BLVD.	FULLERTON, CA 92634
71482	CLARE, C. F., AND CO.		
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	401 N. BROAD ST.	PHILADELPHIA, PA 19108
73138	BECKMAN INSTRUMENTS, INC., HELIPOT DIV.	800 E. NORTHWEST HWY P O BOX 500	DES PLAINES, IL 60016 BEAVERTON, OR 97077
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION		
75915	LITTELFUSE, INC.		
80009	TEKTRONIX, INC.		

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
82877	ROTRON, INC.	7-9 HASBROUCK LANE	WOODSTOCK, NY 12498
90201	MALLORY CAPACITOR CO., DIV. OF P. R. MALLORY AND CO., INC.	3029 E. WASHINGTON STREET P. O. BOX 372	INDIANAPOLIS, IN 46206
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68600
91836	KINGS ELECTRONICS CO., INC.	40 MARBLEDALE ROAD	TUCKAHOE, NY 10707

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
ASSEMBLIES						
A1	670-6471-00	B010100	B010219	CKT BOARD ASSY:MAIN MOTHER	80009	670-6471-00
A1	670-6471-01	B010220	B020899	CKT BOARD ASSY:MAIN MOTHER	80009	670-6471-01
A1	670-6471-02	B020900		CKT BOARD ASSY:MAIN MOTHER	80009	670-6471-02
A2	672-0951-00	B010100	B019999	CKT BOARD ASSY:PROCESSOR	80009	672-0951-00
A2	672-0951-01	B020000		CKT BOARD ASSY:PROCESSOR	80009	672-0951-01
A2A1	670-6496-XX			(NOT REPLACEABLE SEE A2)		
A3	119-1400-00			KEYBOARD,CMPTR: (STANDARD,OPTION 4A ONLY)	80009	119-1400-00
A3	119-1402-00			KEYBOARD,CMPTR:SWEDISH (OPTION 4C,4F ONLY)	80009	119-1402-00
A3	119-1401-00			KEYBOARD,CMPTR:APL (OPTION 4E ONLY)	80009	119-1401-00
A4	672-0952-00	B010100	B010169	CKT BOARD ASSY:RAM/ROM	80009	672-0952-00
A4	672-0952-01	B010170	B010179	CKT BOARD ASSY:RAM/ROM	80009	672-0952-01
A4	672-0952-02	B010180		CKT BOARD ASSY:RAM/ROM	80009	672-0952-00
A4A1	670-6940-XX			(NOT REPLACEABLE SEE A4)		
A5	670-6670-00			CKT BOARD ASSY:RAM ARRAY	80009	670-6670-00
A6	670-6669-00	B010100	B010169	CKT BOARD ASSY:RAM CONTROLLER	80009	670-6669-00
A6	670-6669-01	B010170	B010439	CKT BOARD ASSY:RAM CONTROLLER	80009	670-6669-01
A6	670-6669-02	B010440		CKT BOARD ASSY:RAM CONTROLLER	80009	670-6669-02
A7	670-6475-01	B010100	B010795	CKT BOARD ASSY:VIDEO CONTROLLER	80009	670-6475-01
A7	670-6475-02	B010796		CKT BOARD ASSY:VIDEO CONTROLLER	80009	670-6475-02
A7	672-1004-01	B010100	B010795	CKT BOARD ASSY:VIDEO CONTROLLER	80009	672-1004-01
A7	672-1004-02	B010796		CKT BOARD ASSY:VIDEO CONTROLLER (OPTION A1,A2,A3 ONLY)	80009	672-1004-02
A8	670-6474-00	B010100	B010764	CKT BOARD ASSY:VECTOR GENERATOR	80009	670-6474-00
A8	670-6474-01	B010765		CKT BOARD ASSY:VECTOR GENERATOR	80009	670-6474-01
A9	670-6473-00	B010100	B010594	CKT BOARD ASSY:RASTER MEMORY PLANE	80009	670-6473-00
A9	670-6473-01	B010595		CKT BOARD ASSY:RASTER MEMORY PLANE	80009	670-6473-01
A10	670-6476-01			CKT BOARD ASSY:DUAL RASTER MEMORY PLANE (OPTION 20 ONLY)	80009	670-6476-01
A11	670-5291-XX			(NOT REPLACEABLE,USE 067-1005-00)		
A12	670-6479-02	B010100	B010169	CKT BOARD ASSY:DEFLECTION	80009	670-6479-02
A12	670-6479-03	B010170	B010399	CKT BOARD ASSY:DEFLECTION	80009	670-6479-03
A12	670-6479-04	B010400		CKT BOARD ASSY:DEFLECTION	80009	670-6479-01
A13	670-6478-00	B010100	B010214	CKT BOARD ASSY:HIGH VOLTAGE	80009	670-6478-00
A13	670-6478-01	B010215		CKT BOARD ASSY:HIGH VOLTAGE	80009	670-6478-01
A14	670-6811-00			CKT BOARD ASSY:POWER SUPPLY DISTRIBUTION	80009	670-6811-00
A15	670-6803-00			CKT BOARD ASSY:EXT VIDEO (OPTION 11 ONLY)	80009	670-6803-00

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff	Discont	Name & Description	Mfr Code	Mfr Part Number
A1 MAIN BOARD						
A1	670-6471-00	B010100	B010219	CKT BOARD ASSY:MAIN MOTHER	80009	670-6471-00
A1	670-6471-01	B010220	B020899	CKT BOARD ASSY:MAIN MOTHER	80009	670-6471-01
A1	670-6471-02	B020900		CKT BOARD ASSY:MAIN MOTHER	80009	670-6471-02
A1C2	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C3	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C4	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C5	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C6	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C7	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C10	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C11	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C12	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1C13	283-0421-00			CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A1CR13	152-0066-01			SEMICONV DEVICE: SILICON,400V,1A	15238	LG4012
A1F20	159-0194-00	XB020900		FUSE,WIRE LEAD:5A,125V,0.125SEC	75915	256-005
A1F21	159-0194-00	XB020900		FUSE,WIRE LEAD:5A,125V,0.125SEC	75915	256-005
A1F22	159-0194-00	XB020900		FUSE,WIRE LEAD:5A,125V,0.125SEC	75915	256-005
A1F23	159-0194-00	XB020900		FUSE,WIRE LEAD:5A,125V,0.125SEC	75915	256-005
A1F24	159-0194-00	XB020900		FUSE,WIRE LEAD:5A,125V,0.125SEC	75915	256-005
A1F25	159-0194-00	XB020900		FUSE,WIRE LEAD:5A,125V,0.125SEC	75915	256-005
A1F26	159-0194-00	XB020900		FUSE,WIRE LEAD:5A,125V,0.125SEC	75915	256-005
A1F42	159-0194-00	XB020900		FUSE,WIRE LEAD:5A,125V,0.125SEC	75915	256-005
A1J20	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J20	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J21	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J21	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J22	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J22	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J23	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J23	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J24	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J24	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J25	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J25	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J26	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J26	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J27	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ (QUANTITY OF 6)	22526	48283-029
A1J28	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ (QUANTITY OF 4)	22526	48283-029
A1J29	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J29	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J30	131-2282-00			CONN,RCPT,ELEC:EDGE CARD,22/44 CONT	00779	2-530662-5
A1J31	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J31	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J32	131-2282-00			CONN,RCPT,ELEC:EDGE CARD,22/44 CONT	00779	2-530662-5
A1J33	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J33	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J34	131-2282-00			CONN,RCPT,ELEC:EDGE CARD,22/44 CONT	00779	2-530662-5
A1J35	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J35	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J36	131-2282-00			CONN,RCPT,ELEC:EDGE CARD,22/44 CONT	00779	2-530662-5
A1J37	131-2279-00	B010100	B010219	CONN,RCPT,ELEC:CKT BD,40/80,FEMALE	00779	3-530662-0
A1J37	131-2059-01	B010220		CONN,RCPT,ELEC:CKT BD,40/80 FEM W/O EARS	00779	3-530671-0
A1J38	131-2282-00			CONN,RCPT,ELEC:EDGE CARD,22/44 CONT	00779	2-530662-5

REPLACEABLE ELECTRICAL PARTS

A1 MAIN BOARD (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A1J40	131-2427-00		TERM,QIK DISC:CKT BD,BRASS	00779	G2409-1
A1J41	131-2427-00		TERM,QIK DISC:CKT BD,BRASS	00779	G2409-1
A1J45	131-2427-00		TERM,QIK DISC:CKT BD,BRASS	00779	G2409-1
A1J46	131-2427-00		TERM,QIK DISC:CKT BD,BRASS	00779	G2409-1
A1R1	315-0471-00		RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A1R2	315-0471-00		RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A1R3	307-0596-00		RES NTWK,FXD FI:7,2.2K OHM,2%,1.0W	91637	MSP08A01222G
A1R4	307-0596-00		RES NTWK,FXD FI:7,2.2K OHM,2%,1.0W	91637	MSP08A01222G
A1R5	307-0596-00		RES NTWK,FXD FI:7,2.2K OHM,2%,1.0W	91637	MSP08A01222G
A1R6	307-0541-00		RES,NTWK,THK FI:(7)1K OHM,10%,1W	91637	MSP08A01-102G
A1R7	307-0675-00		RES NTWK,FXD FI:9,1K OHM,2%,1.25W	01121	210A102
A1R8	315-0181-00		RES.,FXD,CMPSN:180 OHM,5%,0.25W	01121	CB1815
A1R9	315-0331-00		RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A1R10	307-0541-00		RES,NTWK,THK FI:(7)1K OHM,10%,1W	91637	MSP08A01-102G
A1R11	307-0596-00		RES NTWK,FXD FI:7,2.2K OHM,2%,1.0W	91637	MSP08A01222G
A1R12	307-0596-00		RES NTWK,FXD FI:7,2.2K OHM,2%,1.0W	91637	MSP08A01222G
A1R13	307-0596-00		RES NTWK,FXD FI:7,2.2K OHM,2%,1.0W	91637	MSP08A01222G
A1R14	307-0675-00		RES NTWK,FXD FI:9,1K OHM,2%,1.25W	01121	210A102
A1TP1	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
A1U1	156-1252-00		MICROCIRCUIT,DI:8/3 LINE PRIORITY ENCODER	80009	156-1252-00
A1U2	156-0469-02		MICROCIRCUIT,DI:3/8 LINE DCDR	01295	SN74LS138NP3

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscnt	Name & Description	Mfr Code	Mfr Part Number
A2 PROCESSOR					
A2	672-0951-00	B010100 B019999	CKT BOARD ASSY:PROCESSOR	80009	672-0951-00
A2	672-0951-00	B020000	CKT BOARD ASSY:PROCESSOR	80009	672-0951-00
A2A1	670-6496-XX		(NOT REPLACEABLE SEE A2)		
A2BT10	146-0040-00		BATTERY, STORAGE:2.4V, 70MAH, AAA CELL	55857	MS0702405333-002
A2C11	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C31	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C75	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C135	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C155	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C156	281-0797-00		CAP., FXD, CER DI:15PF, 10%, 100V	72982	8035D9AADCOG150K
A2C170	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C202	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C216	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C231	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C270	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C355	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C360	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C365	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C401	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C455	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C501	283-0422-00		CAP., FXD, CER DI:0.047UF, +80-20%, 50V	04222	DG015E473Z
A2C502	283-0422-00		CAP., FXD, CER DI:0.047UF, +80-20%, 50V	04222	DG015E473Z
A2C503	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C504	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C505	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C511	283-0422-00		CAP., FXD, CER DI:0.047UF, +80-20%, 50V	04222	DG015E473Z
A2C512	283-0422-00		CAP., FXD, CER DI:0.047UF, +80-20%, 50V	04222	DG015E473Z
A2C513	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C514	283-0422-00		CAP., FXD, CER DI:0.047UF, +80-20%, 50V	04222	DG015E473Z
A2C525	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C526	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C536	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C541	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C551	290-0745-00		CAP., FXD, ELCTLT:22UF, +50-10%, 25V	56289	502D225
A2C555	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C560	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C565	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C570	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C575	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2C576	283-0421-00		CAP., FXD, CER DI:0.1UF, +80-20%, 50V	04222	DG015E104Z
A2CR9	152-0141-02		SEMICONV DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A2CR10	152-0141-02		SEMICONV DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A2CR11	152-0141-02		SEMICONV DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A2CR525	152-0141-02		SEMICONV DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A2CR526	152-0141-02		SEMICONV DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A2J125	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A2J150	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A2J226	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 5)	22526	47357
A2J326	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 5)	22526	47357
A2J426	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 5)	22526	47357

REPLACEABLE ELECTRICAL PARTS

A2 PROCESSOR (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A2J427	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 5)	22526	47357
A2J522	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 3)	22526	47357
A2R9	315-0271-00		RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
A2R11	315-0271-00		RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
A2R12	315-0751-00		RES.,FXD,CMPSN:750 OHM,5%,0.25W	01121	CB7515
A2R13	315-0751-00		RES.,FXD,CMPSN:750 OHM,5%,0.25W	01121	CB7515
A2R31	307-0502-00		RES NTWK,FXD,FI:(9) 1.8K OHM,20%,0.125W	91637	MSP10A01-182M
A2R55	307-0650-00		RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	32997	4310R-101-272
A2R175	315-0272-00		RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A2R216	307-0637-00		RES NTWK,FXD,FI:5,2K OHM,2%,0.125W	01121	206A202
A2R250	307-0650-00		RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	32997	4310R-101-272
A2R350	307-0650-00		RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	32997	4310R-101-272
A2R440	307-0446-00		RES,NTWK,FXD FI:10K OHM,20%,(9) RES	91637	MSP10A01-103M
A2R525	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A2R526	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A2R550	307-0446-00		RES,NTWK,FXD FI:10K OHM,20%,(9) RES	91637	MSP10A01-103M
A2U25	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3STATE OUT	01295	SN74LS244NP3
A2U35	160-0843-00		MICROCIRCUIT,DI:MICROCOMPUTER,PRGM & SCRNI	80009	160-0843-00
A2U45	156-1416-00		MICROCIRCUIT,DI:16 BIT UP,SCREENED	34649	D8086
A2U065	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A2U070	156-0473-02		MICROCIRCUIT,DI:DUAL 5-INP NAND GATE,SCRNI	27014	DM8092N/A+
A2U75	156-0479-02		MICROCIRCUIT,DI:QUAD 2-INP ORGATE	01295	SN74LS32NP3
A2U101	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A2U115	156-0041-05		MICROCIRCUIT,DI:DUAL D-TYPE FF,BURN-IN	01295	SN7474
A2U125	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A2U130	156-0469-02		MICROCIRCUIT,DI:3/8 LINE DCDR	01295	SN74LS138NP3
A2U135	156-0140-02		MICROCIRCUIT,DI:HEX BUFFERS W/OC HV OUT	27014	DM8017NA+/JA+
A2U140	156-0985-01		MICROCIRCUIT,DI:DUAL 5 INPUT NOR GATE,SCRNI	04713	SN74LS260
A2U145	156-0478-02		MICROCIRCUIT,DI:DUAL 4 INP & GATE,BURN-IN	01295	SN74LS21N73
A2U150	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A2U155	156-1428-01		MICROCIRCUIT,DI:CLOCK GENERATOR & DRVR	34649	D8284
A2U165	156-0694-02		MICROCIRCUIT,DI:DCDR/3 LINE TO 8 LINE,SCRNI	07263	74S138DCQR
A2U170	156-0481-02		MICROCIRCUIT,DI:TRIPLE 3 INP & GATE	27014	DM74LS11NA+
A2U175	156-1059-01		MICROCIRCUIT,DI:DUAL J-K EDGETRIGGERED	01295	SN74LS109A
A2U201	156-0478-02		MICROCIRCUIT,DI:DUAL 4 INP & GATE,BURN-IN	01295	SN74LS21NP3
A2U202	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A2U215	156-0383-02		MICROCIRCUIT,DI:QUAD 2-INP NOR GATE	01295	SN74LS02
A2U216	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A2U225	156-0383-02		MICROCIRCUIT,DI:QUAD 2-INP NOR GATE	01295	SN74LS02
A2U226	156-0865-02		MICROCIRCUIT,DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS273NP3
A2U230	156-1036-01		MICROCIRCUIT,DI:PRGM INTERVALTIMER	34649	QD8253
A2U231	160-1005-01	B010100 B019999	MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-1005-01
A2U231	160-1005-02	B020000	MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-1005-02
A2U235	156-1172-01		MICROCIRCUIT,DI:DUAL 4 BIT CNTR,BURN IN	01295	SN74LS393
A2U240	156-0392-03		MICROCIRCUIT,DI:QUAD LATCH W/CLEAR	01295	SN74S175NP3
A2U241	160-1004-01	B010100 B019999	MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-1004-01
A2U241	160-1004-01	B020000	MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-1004-01
A2U245	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A2U250	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A2U255	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A2U260	156-0465-02		MICROCIRCUIT,DI:8 INP NAND GATE	01295	SN74LS30NP3
A2U265	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A2U270	156-0386-02		MICROCIRCUIT,DI:TRIPLE 3-INPUT NAND GATE	01295	SN74LS10
A2U275	156-1258-01		MICROCIRCUIT,DI:DUAL J-K NEG-EDGE TRIG FF	01295	SN74LS112
A2U301	156-1460-00		MICROCIRCUIT,DI:ENHANCED PRGMCOMM INTFC	18324	2661-21/CP2752

REPLACEABLE ELECTRICAL PARTS

A2 PROCESSOR (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A2U325	156-0467-02		MICROCIRCUIT,DI:QUAD 2-INP NAND BFR,SCRN	01295	SN74LS38
A2U330	160-1003-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM	80009	160-1003-01
A2U340	160-1002-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM	80009	160-1002-01
A2U350	156-1111-02		MICROCIRCUIT,DI:OCTAL BUS TRANSCEIVERS	01295	SN74LS245JP3
A2U355	156-0118-03		MICROCIRCUIT,DI:1 DUAL J-K FF,BURN-IN	01295	SN74S112JP3
A2U360	156-0690-03		MICROCIRCUIT,DI:QUAD 2 INP NOR GATE,BURN IN	01295	SN74S02
A2U365	156-0722-02		MICROCIRCUIT,DI:TPL 3-INPUT POS NAND GATE	04713	SN74LS12NDS
A2U370	156-1204-01		MICROCIRCUIT,DI:INTERRUPT CONTROLLER,SCRN	34649	QD8259A
A2U401	156-0391-02		MICROCIRCUIT,DI:HEX LATCH W/CLEAR	01295	SN74LS174
A2U415	156-0845-02		MICROCIRCUIT,DI:6 BIT COMPARATOR,BURN-IN	80009	156-0845-02
A2U425	156-0720-02		MICROCIRCUIT,DI:HEX DRVR,4 TO2 LINE	01295	SN74LS368
A2U430	160-1001-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM	80009	160-1001-01
A2U431	160-0999-01		MICROCIRCUIT,DI:4096 X 8 EPROM	80009	160-0999-01
A2U440	160-1000-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM	80009	160-1000-01
A2U441	160-0998-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0998-01
A2U450	156-1111-02		MICROCIRCUIT,DI:OCTAL BUS TRANSCEIVERS	01295	SN74LS245JP3
A2U455	156-0419-02		MICROCIRCUIT,DI:DUAL 4 INP NAND LINE DRVR	07263	74S140
A2U460	156-0955-02		MICROCIRCUIT,DI:OCTAL BFR W/3STATE OUT	04713	SN74LS241
A2U465	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A2U470	156-0140-02		MICROCIRCUIT,DI:HEX BUFFERS W/OC HV OUT	27014	DM8017NA+/JA+
A2U475	156-0473-02		MICROCIRCUIT,DI:DUAL 5-INP NAND GATE,SCRN	27014	DM8092N/A+
A2U501	156-0878-01		MICROCIRCUIT,DI:QUAD LINE RCVR,SCRN	80009	156-0878-01
A2U515	156-0878-01		MICROCIRCUIT,DI:QUAD LINE RCVR,SCRN	80009	156-0878-01
A2U525	156-0879-01		MICROCIRCUIT,DI:QUAD LINE DRIVER,SCRN	80009	156-0879-01
A2U530	156-0479-02		MICROCIRCUIT,DI:QUAD 2-INP ORGATE	01295	SN74LS32NP3
A2U541	156-0887-01		MICROCIRCUIT,DI:256 X 4 SRAM,SCRN	80009	156-0887-01
A2U550	156-1111-02		MICROCIRCUIT,DI:OCTAL BUS TRANSCEIVERS	01295	SN74LS245JP3
A2U555	156-1111-02		MICROCIRCUIT,DI:OCTAL BUS TRANSCEIVERS	01295	SN74LS245JP3
A2U560	156-1427-01		MICROCIRCUIT,DI:BUS CONTROLLER,SCREENED	34649	QD8288
A2U565	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A2U570	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A2U575	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A2Y155	158-0135-00		XTAL UNIT,QTZ:14.7456 MHZ,0.01%,SERIES (XTAL UNIT REQUIRES FOAM ADHESIVE)	01807	OBD

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A3 KEYBOARD CMPTR					
A3	119-1400-00		KEYBOARD, CMPTR: (STANDARD, OPTION 4A ONLY)	80009	119-1400-00
A3	119-1402-00		KEYBOARD, CMPTR: SWEDISH (OPTION 4C, 4F ONLY)	80009	119-1402-00
A3	119-1401-00		KEYBOARD, CMPTR: APL (OPTION 4E ONLY)	80009	119-1401-00
A3C1	118-0964-00		CAP., FXD, ELCTLT: 10UF, 15V, TANTALUM	80009	118-0964-00
A3C2	118-0963-00		CAP., FXD, ELCTLT: 2.2UF, 16V, TANTALUM	80009	118-0963-00
A3C3	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C4	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C5	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C6	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C7	290-0512-00		CAP., FXD, ELCTLT: 22UF, 20%, 15V	56289	196D226X0015KA1
A3C8	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C9	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C10	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C11	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C12	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C13	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C14	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C15	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C16	118-0965-00		CAP., FXD, CER DI: 0.033UF, 100V	80009	118-0965-00
A3C18	118-0964-00		CAP., FXD, ELCTLT: 10UF, 15V, TANTALUM	80009	118-0964-00
A3C19	281-0759-00		CAP., FXD, CER DI: 22PF, 10%, 100V	72982	8035D9AADC1G220K
A3C20	281-0759-00		CAP., FXD, CER DI: 22PF, 10%, 100V	72982	8035D9AADC1G220K
A3C21	281-0759-00		CAP., FXD, CER DI: 22PF, 10%, 100V	72982	8035D9AADC1G220K
A3C22	281-0759-00		CAP., FXD, CER DI: 22PF, 10%, 100V	72982	8035D9AADC1G220K
A3C23	281-0759-00		CAP., FXD, CER DI: 22PF, 10%, 100V	72982	8035D9AADC1G220K
A3C24	281-0759-00		CAP., FXD, CER DI: 22PF, 10%, 100V	72982	8035D9AADC1G220K
A3C25	281-0759-00		CAP., FXD, CER DI: 22PF, 10%, 100V	72982	8035D9AADC1G220K
A3C26	281-0759-00		CAP., FXD, CER DI: 22PF, 10%, 100V	72982	8035D9AADC1G220K
A3C27	283-0111-00		CAP., FXD, CER DI: 0.1UF, 20%, 50V	72982	8121-N088Z5U104M
A3DS1	118-0966-00		LT EMITTING DIO: RED, 40MA MAX, 1.5V	52833	21-05053-00
A3DS2	118-0966-00		LT EMITTING DIO: RED, 40MA MAX, 1.5V	52833	21-05053-00
A3DS3	118-0966-00		LT EMITTING DIO: RED, 40MA MAX, 1.5V	52833	21-05053-00
A3DS4	118-0966-00		LT EMITTING DIO: RED, 40MA MAX, 1.5V	52833	21-05053-00
A3DS6	118-0967-00		LT EMITTING DIO: ORANGE, 630NM, 35MA MAX, 2.4V	52833	21-57152-00
A3DS7	118-0967-00		LT EMITTING DIO: ORANGE, 630NM, 35MA MAX, 2.4V	52833	21-57152-00
A3DS8	118-0967-00		LT EMITTING DIO: ORANGE, 630NM, 35MA MAX, 2.4V	52833	21-57152-00
A3DS9	118-0967-00		LT EMITTING DIO: ORANGE, 630NM, 35MA MAX, 2.4V	52833	21-57152-00
A3DS18	118-0967-00		LT EMITTING DIO: ORANGE, 630NM, 35MA MAX, 2.4V	52833	21-57152-00
A3DS19	118-0967-00		LT EMITTING DIO: ORANGE, 630NM, 35MA MAX, 2.4V	52833	21-57152-00
A3DS20	118-0967-00		LT EMITTING DIO: ORANGE, 630NM, 35MA MAX, 2.4V	52833	21-57152-00
A3Q1	151-0254-00		TRANSISTOR: SILICON, NPN	03508	X38L3118
A3Q2	151-0301-00		TRANSISTOR: SILICON, PNP	27014	2N2907A
A3Q3	151-0302-00		TRANSISTOR: SILICON, NPN	07263	S038487
A3R1	315-0224-00		RES., FXD, CMPSN: 220K OHM, 5%, 0.25W	01121	CB2245
A3R2	315-0563-00		RES., FXD, CMPSN: 56K OHM, 5%, 0.25W	01121	CB5635
A3R3	315-0222-00		RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W	01121	CB2225
A3R4	315-0222-00		RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W	01121	CB2225
A3R5	315-0183-00		RES., FXD, CMPSN: 18K OHM, 5%, 0.25W	01121	CB1835
A3R6	315-0223-00		RES., FXD, CMPSN: 22K OHM, 5%, 0.25W	01121	CB2235
A3R7	315-0200-00		RES., FXD, CMPSN: 20 OHM, 5%, 0.25W	01121	CB2005
A3R8	315-0820-00		RES., FXD, CMPSN: 82 OHM, 5%, 0.25W	01121	CB8205
A3R9	315-0682-00		RES., FXD, CMPSN: 6.8K OHM, 5%, 0.25W	01121	CB6825

REPLACEABLE ELECTRICAL PARTS

A3 KEYBOARD CMPTR (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A3R10	322-0184-00		RES.,FXD,FILM:806 OHM,1%,0.25W	75042	CEBT0-8060F
A3R11	315-0333-00		RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
A3R12	315-0820-00		RES.,FXD,CMPSN:82 OHM,5%,0.25W	01121	CB8205
A3R13	315-0820-00		RES.,FXD,CMPSN:82 OHM,5%,0.25W	01121	CB8205
A3R14	315-0332-00		RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A3R15	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A3R16	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R17	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A3R18	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R19	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A3R20	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R21	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A3R22	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R23	315-0100-00		RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A3R24	315-0100-00		RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A3R25	315-0332-00		RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A3R26	315-0332-00		RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A3R27	315-0332-00		RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A3R28	315-0332-00		RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A3R29	315-0820-00		RES.,FXD,CMPSN:82 OHM,5%,0.25W	01121	CB8205
A3RX1	307-0540-00		RES,NTWK,FXD,FI:(5) 1K OHM,10%,0.7W	01121	206A102
A3RX3	307-0792-00		RES NTWK,FXD,FI:7.82 OHM,2%,0.15W	11236	750-81-R82
A3U1	156-0402-00		MICROCIRCUIT,LI:TIMER	27014	LM555CN
A3U2	156-0645-02		MICROCIRCUIT,DI:HEX INV ST NAND GATES,SCRN	01295	SN74LS14
A3U3	156-0392-00		MICROCIRCUIT,DI:QUAD LATCH W/CLEAR	34335	SN74LS175N OR J
A3U4	118-0941-00		MICROCIRCUIT,LI:KYBD DETECTOR,CAPACITIVE	52833	22-00908-003
A3U5	118-0973-00		MICROCIRCUIT,DI:TTL,X-LINE DRIVER	52833	22-00950-003
A3U6	156-0153-02		MICROCIRCUIT,DI:HEX INVERTER BUFFER	27014	DM8006
A3U7	156-0874-00		MICROCIRCUIT,DI:8 BIT ADDRESSABLE LATCHES	80009	156-0874-00
A3U8	156-0874-00		MICROCIRCUIT,DI:8 BIT ADDRESSABLE LATCHES	80009	156-0874-00
A3U9	156-0153-02		MICROCIRCUIT,DI:HEX INVERTER BUFFER	27014	DM8006
A3U10	156-0961-00		MICROCIRCUIT,DI:QUAD 2-INP NAND ST	80009	156-0961-00
A3U11	156-0480-00		MICROCIRCUIT,DI:QUAD 2-INPUT AND GATE	01295	SN74LS08(N OR J)

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mir Part Number
A4 RAM/ROM					
A4	672-0952-00	B010100 B010169	CKT BOARD ASSY:RAM/ROM	80009	672-0952-00
A4	672-0952-01	B010170 B010179	CKT BOARD ASSY:RAM/ROM	80009	672-0952-01
A4	672-0952-02	B010180	CKT BOARD ASSY:RAM/ROM	80009	672-0952-00
A4A1	670-6940-XX		(NOT REPLACEABLE SEE A4)		
A4C11	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C21	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C31	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C41	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C51	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C61	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C71	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C81	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C95	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C111	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C121	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C131	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C141	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C151	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C161	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C171	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C181	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C353	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C360	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C365	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C373	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C379	281-0797-00		CAP.,FXD,CER DI:15PF,10%,100V	72982	8035D9AADCOG150K
A4C381	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C453	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C460	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C465	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C483	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C489	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C493	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C496	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A4C561	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A4CR490	152-0066-00		SEMICOND DEVICE:SILICON,400V,750MA	14433	LG4016
A4J121	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	-----		(QUANTITY OF 5)		
A4J122	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	-----		(QUANTITY OF 5)		
A4J123	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	-----		(QUANTITY OF 5)		
A4J124	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	-----		(QUANTITY OF 5)		
A4J125	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	-----		(QUANTITY OF 5)		
A4J126	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	-----		(QUANTITY OF 5)		
A4J127	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	-----		(QUANTITY OF 5)		
A4J128	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	-----		(QUANTITY OF 5)		
A4L380	108-0088-00		COIL,RF:FIXED,3.35UH	80009	108-0088-00
A4R91	307-0445-00		RES NTWK,FXD,FI:4.7K OHM,20%,(9) RES	91637	MSP10A01-472M
A4R191	307-0445-00		RES NTWK,FXD,FI:4.7K OHM,20%,(9) RES	91637	MSP10A01-472M

REPLACEABLE ELECTRICAL PARTS

A4 RAM/ROM (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A4R192	131-0566-00	XB010370	BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A4R193	131-0566-00	XB010370	BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A4R374	315-0470-00		RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A4R375	315-0470-00		RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A4R376	315-0821-00		RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
A4R378	315-0821-00		RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
A4R383	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A4R390	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R393	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R396	315-0132-00		RES.,FXD,CMPSN:1.3K OHM,5%,0.25W	01121	CB1325
A4R455	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A4R482	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A4R490	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R491	315-0331-00		RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A4U11	160-0983-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM (OPTION 4A,4C,4E,4F ONLY)	80009	160-0983-01
A4U21	160-0985-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM (OPTION 1 ONLY)	80009	160-0985-01
A4U31	160-0987-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM	80009	160-0987-01
A4U41	160-0989-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM	80009	160-0989-01
A4U51	160-0991-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0991-01
A4U61	160-0993-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0993-01
A4U71	160-0995-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0995-01
A4U81	160-0997-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0997-01
A4U95	156-0694-02		MICROCIRCUIT,DI:DCDR/3 LINE TO 8 LINE,SCRN	07263	74S138DCQR
A4U111	160-0982-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM (OPTION 4A,4C,4E,4F ONLY)	80009	160-0982-01
A4U121	160-0984-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM (OPTION 1 ONLY)	80009	160-0984-01
A4U131	160-0986-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM	80009	160-0986-01
A4U141	160-0988-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PRGM	80009	160-0988-01
A4U151	160-0990-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0990-01
A4U161	160-0992-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0992-01
A4U171	160-0994-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0994-01
A4U181	160-0996-01		MICROCIRCUIT,DI:4096 X 8 EPROM,PROGRAMMED	80009	160-0996-01
A4U194	156-0323-02	XB010170	MICROCIRCUIT,DI:HEX INVERTER,BURN-IN	01295	SN74S04
A4U195	156-0304-02		MICROCIRCUIT,DI:DUAL 4 INP NAND GATE	01295	SN74S20
A4U353	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A4U360	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A4U365	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A4U373	156-0739-02		MICROCIRCUIT,DI:QUAD 2 INP OR GATE,SCRN	01295	SN74S32
A4U381	156-0180-04		MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	01295	SN74S00NP3
A4U383	156-0323-02		MICROCIRCUIT,DI:HEX INVERTER,BURN-IN	01295	SN74S04
A4U389	156-0035-02		MICROCIRCUIT,DI:SGL 8 INPUT NAND GATE	27014	DM8030NA+/JA+
A4U393	156-0739-02		MICROCIRCUIT,DI:QUAD 2 INP OR GATE,SCRN	01295	SN74S32
A4U396	156-0707-03		MICROCIRCUIT,DI:QUAD 2 INP EXCL OR GATE	07263	74S86
A4U453	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A4U460	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A4U465	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A4U473	156-1442-00	B010100 B010369	MICROCIRCUIT,DI:DYNAMIC RAM CONT,SCRN	18324	D8202
A4U473	156-1599-00	B010370	MICROCIRCUIT,DI:STTL,DYNAMIC RAM CONTROLL	34649	D82024
A4U483	156-1179-01		MICROCIRCUIT,DI:OCTAL BFR,W/3 STATE OUT	01295	SN74S241 JP4
A4U489	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A4U493	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A4U496	156-1393-01		MICROCIRCUIT,DI:QUAD 2 INPUT NAND BFR,SCRN	01295	SN74S38
A4VR345	152-0195-00		SEMICONV DEVICE:ZENER,0.4W,5.1V,5%	04713	SZ11755
A4W129	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 3)	22526	47357

REPLACEABLE ELECTRICAL PARTS

A4 RAM/ROM (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A4W130	131-0608-00 -----		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A4W131	131-0608-00 -----		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A4Y380	158-0081-00 -----		XTAL UNIT,QTZ:22.008MHZ,+/-0.01% (XTAL UNIT REQUIRES FOAM ADHESIVE)	33096	PB3086

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A5 RAM ARRAY					
A5	670-6670-00		CKT BOARD ASSY:RAM ARRAY	80009	670-6670-00
A5C11	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C21	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C31	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C41	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C151	290-0748-00		CAP.,FXD,ELCTLT:10UF,+50-10%,20V	56289	500D149
A5C211	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C215	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C221	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C225	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C231	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C235	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C241	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C245	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C351	290-0748-00		CAP.,FXD,ELCTLT:10UF,+50-10%,20V	56289	500D149
A5C411	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C415	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C421	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C425	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C431	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C435	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C441	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5C445	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A5R15	131-0566-00		BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A5R25	131-0566-00		BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A5R45	131-0566-00		BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A5U111	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U115	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U121	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U125	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U131	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U135	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U141	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U145	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U311	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U315	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U321	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U325	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U331	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U335	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U341	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5U345	156-0968-02		MICROCIRCUIT,DI:16384 X 1 DYNAMIC RAM	80009	156-0968-02
A5W1	-----		(NOT A REPLACEABLE PART OF A5)		
A5W2	-----		(NOT A REPLACEABLE PART OF A5)		

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A6 RAM CONTROLLER					
A6	670-6669-00	B010100 B010169	CKT BOARD ASSY:RAM CONTROLLER	80009	670-6669-00
A6	670-6669-01	B010170 B010439	CKT BOARD ASSY:RAM CONTROLLER	80009	670-6669-01
A6	670-6669-02	B010440	CKT BOARD ASSY:RAM CONTROLLER	80009	670-6669-02
A6C151	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C256	281-0797-00		CAP.,FXD,CER DI:15PF,10%,100V	72982	8035D9AADC0G150K
A6C351	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C451	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C515	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C521	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C525	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C531	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C535	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C545	290-0745-00		CAP.,FXD,ELCLT:22UF,+50-10%,25V	56289	502D225
A6C561	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C565	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C571	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C575	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C581	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C585	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C591	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6C595	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A6CR596	152-0066-00		SEMICONV DEVICE:SILICON,400V,750MA	14433	LG4016
A6J165	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 12)	22526	47357
A6L261	108-0088-00		COIL,RF:FIXED,3.35UH	80009	108-0088-00
A6R348	315-0821-00		RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
A6R349	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R357	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R358	315-0821-00		RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
A6R516	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R522	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R523	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R524	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R526	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R527	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R532	315-0201-00		RES.,FXD,CMPSN:200 OHM,5%,0.25W	01121	CB2015
A6R533	315-0201-00		RES.,FXD,CMPSN:200 OHM,5%,0.25W	01121	CB2015
A6R536	315-0201-00		RES.,FXD,CMPSN:200 OHM,5%,0.25W	01121	CB2015
A6R537	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R538	131-0566-00	XB010440	BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A6R539	131-0566-00	XB010440	BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A6R551	315-0470-00		RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A6R552	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R553	315-0470-00		RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A6R598	315-0132-00		RES.,FXD,CMPSN:1.3K OHM,5%,0.25W	01121	CB1325
A6U151	156-0694-02		MICROCIRCUIT,DI:DCDR/3 LINE TO 8 LINE,SCRN	07263	74S138DCQR
A6U351	156-0180-04		MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	01295	SN74S00NP3
A6U451	156-1442-00	B010100 B010439	MICROCIRCUIT,DI:DYNAMIC RAM CONT,SCRN	18324	D8202
A6U451	156-1599-00	B010440	MICROCIRCUIT,DI:STTL,DYNAMIC RAM CONTROLL	34649	D82024
A6U515	156-0693-02		MICROCIRCUIT,DI:DECODER/DEMULTIPLEXER	27014	DM74S139
A6U521	156-0459-02		MICROCIRCUIT,DI:QUAD 2 INPUT & GATE,BURN	01295	SN74S08
A6U525	156-0739-02		MICROCIRCUIT,DI:QUAD 2 INP OR GATE,SCRN	01295	SN74S32
A6U531	156-1393-01		MICROCIRCUIT,DI:QUAD 2 INPUT NAND BFR,SCRN	01295	SN74S38
A6U535	156-0331-03	B010100 B010440X	MICROCIRCUIT,DI:DUAL D TYPE POS EDGE TRIG	80009	156-0331-03
A6U536	156-0323-02	XB010170 B010440X	MICROCIRCUIT,DI:HEX INVERTER,BURN-IN	01295	SN74S04

REPLACEABLE ELECTRICAL PARTS

A6 RAM CONTROLLER (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A6U561	156-0739-02		MICROCIRCUIT,DI:QUAD 2 INP OR GATE,SCRN	01295	SN74S32
A6U565	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A6U571	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A6U575	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A6U581	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A6U585	156-1179-01		MICROCIRCUIT,DI:OCTAL BFR,W/3 STATE OUT	01295	SN74S241 JP4
A6U591	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A6U595	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A6VR597	152-0195-00		SEMICOND DEVICE:ZENER,0.4W,5.1V,5%	04713	SZ11755
A6Y251	158-0081-00		XTAL UNIT,QTZ:22.008MHZ,+/-0.01%	33096	PB3086
	-----		(XTAL UNIT REQUIRES FOAM ADHESIVE)		

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A7 VIDEO CONTROLLER					
A7	670-6475-01	B010100 B010795	CKT BOARD ASSY:VIDEO CONTROLLER	80009	670-6475-01
A7	670-6475-02	B010796	CKT BOARD ASSY:VIDEO CONTROLLER	80009	670-6475-02
A7	672-1004-01	B010100 B010795	CKT BOARD ASSY:VIDEO CONTROLLER	80009	672-1004-01
A7	672-1004-02	B010796	CKT BOARD ASSY:VIDEO CONTROLLER (OPTION A1,A2,A3 ONLY)	80009	672-1004-02
A7C7	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C12	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C15	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C20	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C22	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C25	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C26	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C42	281-0812-00		CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A7C101	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C104	281-0811-00		CAP.,FXD,CER DI:10PF,10%,100V	72982	8035D2AADC1G100K
A7C114	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A7C117	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A7C152	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	56289	273C5
A7C154	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	56289	273C5
A7C156	281-0823-00		CAP.,FXD,CER DI:470PF,10%,50V	12969	CGB471KDN
A7C161	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C171	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C205	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C211	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C215	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C225	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C245	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C251	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C265	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C305	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C311	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C315	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C321	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C325	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C335	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C341	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C355	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C365	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C371	281-0823-00		CAP.,FXD,CER DI:470PF,10%,50V	12969	CGB471KDN
A7C405	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C411	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C415	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C421	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C425	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C505	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C511	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C515	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C521	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C522	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C525	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C535	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C541	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C545	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C565	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C571	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z

REPLACEABLE ELECTRICAL PARTS

A7 VIDEO CONTROLLER (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A7C605	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C608	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C609	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A7C611	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C615	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C620	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A7C641	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A7C642	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C645	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C648	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A7C649	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C665	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C671	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7C681	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A7C682	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A7CR321	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	01295	1N4152R
A7CR502	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	01295	1N4152R
A7J55	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A7J282	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 10)	22526	47357
A7J283	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 10)	22526	47357
A7J501	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A7L106	108-0182-00		COIL,RF:0.3UH	80009	108-0182-00
A7Q11	151-0188-00		TRANSISTOR:SILICON,PNP	04713	SPS6868K
A7Q13	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q15	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q17	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q19	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q21	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q23	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q26	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q27	151-0188-00		TRANSISTOR:SILICON,PNP	04713	SPS6868K
A7Q28	151-0188-00		TRANSISTOR:SILICON,PNP	04713	SPS6868K
A7Q29	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q30	151-0188-00		TRANSISTOR:SILICON,PNP	04713	SPS6868K
A7Q31	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q47	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A7Q621	151-0373-00		TRANSISTOR:SILICON,PNP	80009	151-0373-00
A7Q625	151-0188-00		TRANSISTOR:SILICON,PNP	04713	SPS6868K
A7R8	315-0200-00		RES.,FXD,CMPSN:20 OHM,5%,0.25W	01121	CB2005
A7R14	321-0147-00		RES.,FXD,FILM:332 OHM,1%,0.125W	91637	MFF1816G332R0F
A7R16	321-0222-00		RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A7R18	321-0198-00		RES.,FXD,FILM:1.13K OHM,1%,0.125W	91637	MFF1816G11300F
A7R20	321-0227-00		RES.,FXD,FILM:2.26K OHM,1%,0.125W	91637	MFF1816G22600F
A7R22	321-0140-00		RES.,FXD,FILM:280 OHM,1%,0.125W	91637	MFF1816G280R0F
A7R24	321-0169-00		RES.,FXD,FILM:562 OHM,1%,0.125W	91637	MFF1816G562R0F
A7R27	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A7R28	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A7R30	315-0101-00		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A7R34	315-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
A7R35	315-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
A7R41	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A7R45	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A7R51	315-0153-00		RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535

REPLACEABLE ELECTRICAL PARTS

A7 VIDEO CONTROLLER (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A7R52	315-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.25W	01121	CB1035
A7R102	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121	CB5105
A7R103	315-0512-00		RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W	01121	CB5125
A7R107	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121	CB5105
A7R114	323-0122-00		RES., FXD, FILM: 182 OHM, 1%, 0.50W	75042	CECT0-1820F
A7R115	321-0106-00		RES., FXD, FILM: 124 OHM, 1%, 0.125W	91637	MFF1816G124R0F
A7R116	307-0489-00		RES, NTWK, FXD, FI: 100 OHM, 20%, 1W	32997	4308R-101-101
A7R117	307-0486-00		RES, NTWK, THK FI: 100 OHM, 20%, 1.125W	91637	MSP10A01-101J
A7R128	315-0101-00		RES., FXD, CMPSN: 100 OHM, 5%, 0.25W	01121	CB1015
A7R151	315-0153-00		RES., FXD, CMPSN: 15K OHM, 5%, 0.25W	01121	CB1535
A7R153	315-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.25W	01121	CB1035
A7R155	315-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.25W	01121	CB1035
A7R165	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W	01121	CB1025
A7R212	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121	CB5105
A7R226	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W	01121	CB1025
A7R271	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W	01121	CB1025
A7R301	307-0486-00		RES, NTWK, THK FI: 100 OHM, 20%, 1.125W	91637	MSP10A01-101J
A7R321	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W	01121	CB4725
A7R361	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W	01121	CB1025
A7R371	315-0103-00		RES., FXD, CMPSN: 10K OHM, 5%, 0.25W	01121	CB1035
A7R401	307-0487-00		RES, NTWK, FXD, FI: 100 OHM, 20%, 0.50W	91637	CSP04E01-101J
A7R413	307-0486-00		RES, NTWK, THK FI: 100 OHM, 20%, 1.125W	91637	MSP10A01-101J
A7R431	307-0486-00		RES, NTWK, THK FI: 100 OHM, 20%, 1.125W	91637	MSP10A01-101J
A7R501	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W	01121	CB4725
A7R519	307-0486-00		RES, NTWK, THK FI: 100 OHM, 20%, 1.125W	91637	MSP10A01-101J
A7R525	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W	01121	CB1025
A7R545	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W	01121	CB1025
A7R609	307-0486-00		RES, NTWK, THK FI: 100 OHM, 20%, 1.125W	91637	MSP10A01-101J
A7R619	307-0487-00		RES, NTWK, FXD, FI: 100 OHM, 20%, 0.50W	91637	CSP04E01-101J
A7R629	321-0129-00		RES., FXD, FILM: 215 OHM, 1%, 0.125W	91637	MFF1816G215R0F
A7R631	308-0778-00		RES., FXD, WW: 3 OHM, 5%, 5W	91637	CW-5-3R000J
A7R633	308-0778-00		RES., FXD, WW: 3 OHM, 5%, 5W	91637	CW-5-3R000J
A7R665	315-0102-00		RES., FXD, CMPSN: 1K OHM, 5%, 0.25W	01121	CB1025
A7U111	156-0759-02		MICROCIRCUIT, DI: QUAD 2-INP OR GATE, SCRN	04713	SC22689P103
A7U117	156-0991-00		MICROCIRCUIT, LI: VOLTAGE REGULATOR	04713	MC78L05ACP
A7U121	156-0458-01		MICROCIRCUIT, DI: QUAD AND GATE2 INP, SCRN	04713	SC22689P104
A7U125	156-0368-03		MICROCIRCUIT, DI: TTL TO ECL QUAD TRANS	80009	156-0368-03
A7U141	156-0331-03		MICROCIRCUIT, DI: DUAL D TYPE POS EDGE TRIG	80009	156-0331-03
A7U145	156-0388-03		MICROCIRCUIT, DI: DUAL D FLIP-FLOP	07263	74LS74A
A7U155	156-0733-02		MICROCIRCUIT, DI: DUAL MONOSTABLE MV, SCRN	04713	SN74LS221N/J
A7U161	156-0383-02		MICROCIRCUIT, DI: QUAD 2-INP NOR GATE	01295	SN74LS02
A7U165	156-0180-04		MICROCIRCUIT, DI: QUAD 2-INPUT NAND GATE	01295	SN74S00NP3
A7U171	156-0985-01		MICROCIRCUIT, DI: DUAL 5 INPUT NOR GATE, SCRN	04713	SN74LS260
A7U205	156-0182-02		MICROCIRCUIT, DI: TRIPLE 2-3-2 INPUT GATE	80009	156-0182-02
A7U211	156-0688-01		MICROCIRCUIT, DI: DUAL J-K MASTER SLAVE FF	04713	SC22689L135
A7U213	156-0230-02		MICROCIRCUIT, DI: DUAL D-TYPE M/S, FF, SCRN	80009	156-0230-02
A7U215	156-0870-01		MICROCIRCUIT, DI: BCD DECADE CNTR, SCRN	07263	SL81658
A7U221	156-0458-01		MICROCIRCUIT, DI: QUAD AND GATE2 INP, SCRN	04713	SC22689P104
A7U225	156-0368-03		MICROCIRCUIT, DI: TTL TO ECL QUAD TRANS	80009	156-0368-03
A7U235	156-0784-02		MICROCIRCUIT, DI: SYNC 4 BIT BINARY COUNTER	27014	DM74LS163ANA+
A7U241	156-1198-01		MICROCIRCUIT, DI: SYNCHRONOUS 4BIT CNTR	01295	SN74S163J4
A7U245	156-0093-02		MICROCIRCUIT, DI: HEX INV BUFFER, BURN-IN	27014	DM8016
A7U251	156-0733-02		MICROCIRCUIT, DI: DUAL MONOSTABLE MV, SCRN	04713	SN74LS221N/J
A7U265	156-0388-03		MICROCIRCUIT, DI: DUAL D FLIP-FLGP	07263	74LS74A
A7U271	156-0424-02		MICROCIRCUIT, DI: QUAD 2 INP NOR BFR, SCRN	18324	N7433(NB OR FB)
A7U305	156-0759-02		MICROCIRCUIT, DI: QUAD 2-INP OR GATE, SCRN	04713	SC22689P103
A7U311	156-0458-01		MICROCIRCUIT, DI: QUAD AND GATE2 INP, SCRN	04713	SC22689P104

REPLACEABLE ELECTRICAL PARTS

A7 VIDEO CONTROLLER (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A7U315	156-0638-01		MICROCIRCUIT,DI:FOUR-BIT UNIV SHIFT RGTR	04713	MC10141
A7U321	156-0638-01		MICROCIRCUIT,DI:FOUR-BIT UNIV SHIFT RGTR	04713	MC10141
A7U325	156-0638-01		MICROCIRCUIT,DI:FOUR-BIT UNIV SHIFT RGTR	04713	MC10141
A7U335	156-0784-02		MICROCIRCUIT,DI:SYNC 4 BIT BINARY COUNTER	27014	DM74LS163ANA+
A7U341	156-1198-01		MICROCIRCUIT,DI:SYNCHRONOUS 4BIT CNTR	01295	SN74S163J4
A7U345	156-0388-03	B010100 B010795	MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A7U345	156-0331-03	B010796	MICROCIRCUIT,DI:DUAL D TYPE POS EDGE TRIG	80009	156-0331-03
A7U351	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A7U355	156-0784-02		MICROCIRCUIT,DI:SYNC 4 BIT BINARY COUNTER	27014	DM74LS163ANA+
A7U361	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A7U365	156-0479-02		MICROCIRCUIT,DI:QUAD 2-INP ORGATE	01295	SN74LS32NP3
A7U371	156-0451-02		MICROCIRCUIT,DI:QUAD 2-INP NOR BFR,SCRN	01295	SN74128
A7U405	156-0630-01		MICROCIRCUIT,DI:HEX INVERTER/BUFFER,SCRN	04713	SC22689P195
A7U411	156-0458-01		MICROCIRCUIT,DI:QUAD AND GATE2 INP,SCRN	04713	SC22689P104
A7U415	156-0230-02		MICROCIRCUIT,DI:DUAL D-TYPE M/S,FF,SCRN	80009	156-0230-02
A7U421	156-0759-02		MICROCIRCUIT,DI:QUAD 2-INP OR GATE,SCRN	04713	SC22689P103
A7U425	156-0920-01		MICROCIRCUIT,DI:BIN TO 1-8 DECODER,SCRN	04713	SC22689P1L161
A7U435	156-0784-02		MICROCIRCUIT,DI:SYNC 4 BIT BINARY COUNTER	27014	DM74LS163ANA+
A7U441	156-1198-01		MICROCIRCUIT,DI:SYNCHRONOUS 4BIT CNTR	01295	SN74S163J4
A7U445	156-0480-02		MICROCIRCUIT,DI:QUAD 2 INP & GATE	01295	SN74LS08NP3
A7U451	156-0392-02		MICROCIRCUIT,DI:QUAD LATCH,W/CLEAR	80009	156-0392-02
A7U455	156-1386-01		MICROCIRCUIT,DI:CRT VIDEO TIMER CONT,SCRN	01295	9927JP4
A7U465	156-0383-02		MICROCIRCUIT,DI:QUAD 2-INP NOR GATE	01295	SN74LS02
A7U471	156-0469-02		MICROCIRCUIT,DI:3/8 LINE DCDR	01295	SN74LS138NP3
A7U505	156-0182-02		MICROCIRCUIT,DI:TRIPLE 2-3-2 INPUT GATE	80009	156-0182-02
A7U511	156-0688-01		MICROCIRCUIT,DI:DUAL J-K MASTER SLAVE FF	04713	SC22689L135
A7U515	156-0230-02		MICROCIRCUIT,DI:DUAL D-TYPE M/S,FF,SCRN	80009	156-0230-02
A7U521	156-0688-01		MICROCIRCUIT,DI:DUAL J-K MASTER SLAVE FF	04713	SC22689L135
A7U525	156-0368-03		MICROCIRCUIT,DI:TTL TO ECL QUAD TRANS	80009	156-0368-03
A7U535	156-0865-02		MICROCIRCUIT,DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS273NP3
A7U541	156-0865-02		MICROCIRCUIT,DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS273NP3
A7U545	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A7U551	160-1075-00		MICROCIRCUIT,DI:32 X 8 PROM,PROGRAMMED	80009	160-1075-00
A7U561	156-0530-02		MICROCIRCUIT,DI:QUAD 2-INP MUX,SCRN	01295	SN74LS157P3
A7U565	156-0462-02		MICROCIRCUIT,DI:HEX INVERTER,SCREENED	01295	SN7414
A7U571	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A7U605	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A7U611	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A7U615	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A7U635	156-0391-02		MICROCIRCUIT,DI:HEX LATCH W/CLEAR	01295	SN74LS174
A7U641	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A7U645	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A7U651	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A7U655	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A7U661	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A7U665	156-0473-02		MICROCIRCUIT,DI:DUAL 5-INP NAND GATE,SCRN	27014	DM8092N/A+
A7U671	156-0985-01		MICROCIRCUIT,DI:DUAL 5 INPUT NOR GATE,SCRN	04713	SN74LS260
A7VR45	152-0278-00		SEMICONV DEVICE:ZENER,0.4W,3V,5%	04713	SZG35009K20
A7Y5	158-0240-00		CRYSTAL,UNIT:100.8 MHZ,0.01 SERIES	33096	PB5059
A7Y5	158-0106-00		XTAL UNIT,QTZ:100MHZ,+/-0.0025%,SERIES (OPTION A1,A2,A3 ONLY)	13571	TEK158-0106-00

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A8 VECTOR GENERATOR					
A8	670-6474-00	B010100 B010764	CKT BOARD ASSY:VECTOR GENERATOR	80009	670-6474-00
A8	670-6474-01	B010765	CKT BOARD ASSY:VECTOR GENERATOR	80009	670-6474-01
A8C10	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C20	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C30	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C40	283-0421-00*		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C70	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C75	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C80	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A9C105	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C140	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C175	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C210	283-0-21-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C215	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C230	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C240	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C260	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C270	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C275	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C310	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C315	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C325	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C335	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C375	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C385	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C415	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C420	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C430	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C440	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C460	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C465	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C480	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C490	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C505	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C520	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C530	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C540	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C555	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C560	283-0134-00		CAP.,FXD,CER DI:0.47UF,+80-20%,50V	72982	8131N087Z5U0474Z
A8C580	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C585	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A8C587	290-0745-00		CAP.,FXD,ELCLTLT:22UF,+50-10%,25V	56289	502D225
A8J353	131-1857-00		TERM. SET,PIN:36/0.025 SQ PIN,ON 0.1 CTRS	22526	65500136
A8J354	131-1857-00		TERM. SET,PIN:36/0.025 SQ PIN,ON 0.1 CTRS	22526	65500136
A8J355	131-1857-00		TERM. SET,PIN:36/0.025 SQ PIN,ON 0.1 CTRS	22526	65500136
A8J356	131-1857-00		TERM. SET,PIN:36/0.025 SQ PIN,ON 0.1 CTRS	22526	65500136
A8R1	307-0540-00		RES,NTWK,FXD,FI:(5) 1K OHM,10%,0.7W	01121	206A102
A8R30	315-0330-00		RES.,FXD,CMPSN:33 OHM,5%,0.25W	01121	CB3305
A8R85	315-0330-00		RES.,FXD,CMPSN:33 OHM,5%,0.25W	01121	CB3305
A8R185	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A8R187	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A8R189	315-0330-00		RES.,FXD,CMPSN:33 OHM,5%,0.25W	01121	CB3305
A8R255	315-0330-00		RES.,FXD,CMPSN:33 OHM,5%,0.25W	01121	CB3305
A8R587	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A8U10	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04

REPLACEABLE ELECTRICAL PARTS

AB VECTOR GENERATOR (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscnt	Name & Description	Mfr Code	Mfr Part Number
A8U15	156-0865-02		MICROCIRCUIT,DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS273NP3
A8U30	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A8U35	156-0679-01		MICROCIRCUIT,DI:4 BIT BINARY ADDER,BURN-IN	04713	SN74LS283NDS
A8U40	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A8U45	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U50	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U55	160-1042-00		MICROCIRCUIT,DI:512 X 8 PROM,PROGRAMMED	80009	160-1042-00
A8U60	156-0913-02		MICROCIRCUIT,DI:OCTAL D FF,BURN-IN	04713	SN74LS377NDS
A8U65	160-1041-00		MICROCIRCUIT,DI:512 X 8 PROM,PROGRAMMED	80009	160-1041-00
A8U70	160-1040-00		MICROCIRCUIT,DI:512 X 8 PROM,PROGRAMMED	80009	160-1040-00
A8U75	156-1209-01		MICROCIRCUIT,DI:MICROPROGRAM SEQ,SCRN	34335	AM2911ADCB
A8U80	156-1209-01		MICROCIRCUIT,DI:MICROPROGRAM SEQ,SCRN	34335	AM2911ADCB
A8U105	156-0679-01		MICROCIRCUIT,DI:4 BIT BINARY ADDER,BURN-IN	04713	SN74LS283NDS
A8U115	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A8U120	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A8U125	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A8U130	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A8U135	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A8U140	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A8U145	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U150	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U155	156-0913-02		MICROCIRCUIT,DI:OCTAL D FF,BURN-IN	04713	SN74LS377NDS
A8U160	156-0913-02		MICROCIRCUIT,DI:OCTAL D FF,BURN-IN	04713	SN74LS377NDS
A8U165	156-1046-02		MICROCIRCUIT,DI:OCTAL D TYPE EDGE TRIG FF	80009	156-1046-02
A8U170	156-1046-02		MICROCIRCUIT,DI:OCTAL D TYPE EDGE TRIG FF	80009	156-1046-02
A8U175	160-1043-00		MICROCIRCUIT,DI:32 X 8 PROM,PROGRAMMED	80009	160-1043-00
A8U180	156-1046-02		MICROCIRCUIT,DI:OCTAL D TYPE EDGE TRIG FF	80009	156-1046-02
A8U205	156-0865-02		MICROCIRCUIT,DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS273NP3
A8U210	156-0679-01		MICROCIRCUIT,DI:4 BIT BINARY ADDER,BURN-IN	04713	SN74LS283NDS
A8U215	156-0679-01		MICROCIRCUIT,DI:4 BIT BINARY ADDER,BURN-IN	04713	SN74LS283NDS
A8U220	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A8U225	156-0323-02		MICROCIRCUIT,DI:HEX INVERTER,BURN-IN	01295	SN74S04
A8U230	156-0479-02		MICROCIRCUIT,DI:QUAD 2-INP ORGATE	01295	SN74LS32NP3
A8U235	156-0386-02		MICROCIRCUIT,DI:TRIPLE 3-INPUT NAND GATE	01295	SN74LS10
A8U240	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A8U245	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A8U250	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U255	156-0392-03		MICROCIRCUIT,DI:QUAD LATCH W/CLEAR	01295	SN74S175NP3
A8U260	156-0480-02		MICROCIRCUIT,DI:QUAD 2 INP & GATE	01295	SN74LS08NP3
A8U265	156-0696-02		MICROCIRCUIT,DI:QUAD CMLM-OUTPUT & NAND	01295	SN74265J4
A8U270	156-0331-03		MICROCIRCUIT,DI:DUAL D TYPE POS EDGE TRIG	80009	156-0331-03
A8U275	156-0994-02		MICROCIRCUIT,DI:8 INPUT DATA SEL/MUX	01295	SN74LS151NP3
A8U280	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A8U285	156-0721-02		MICROCIRCUIT,DI:QUAD 2-IN NAND SCHMITT TRI	04713	SN74LS132NDS
A8U300	156-0975-02		MICROCIRCUIT,DI:UNIV SHIFT/STORAGE RGTR	01295	SN74LS299N3/J4
A8U305	156-0975-02		MICROCIRCUIT,DI:UNIV SHIFT/STORAGE RGTR	01295	SN74LS299N3/J4
A8U310	160-1047-00		MICROCIRCUIT,DI:256 X 4 PROM,PROGRAMMED	80009	160-1047-00
A8U315	160-1046-00		MICROCIRCUIT,DI:256 X 4 PROM,PROGRAMMED	80009	160-1046-00
A8U320	156-0957-01		MICROCIRCUIT,DI:SYN 4 BIT UP/DOWN BINARY	27014	DM74LS169
A8U325	156-0957-01		MICROCIRCUIT,DI:SYN 4 BIT UP/DOWN BINARY	27014	DM74LS169
A8U330	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A8U335	156-0718-03		MICROCIRCUIT,DI:TRIPLE 3-INP NOR GATE	01295	SN74LS27
A8U340	156-0479-02		MICROCIRCUIT,DI:QUAD 2-INP ORGATE	01295	SN74LS32NP3
A8U345	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U350	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U355	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U360	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB

REPLACEABLE ELECTRICAL PARTS

A8 VECTOR GENERATOR (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A8U365	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U370	156-0469-02		MICROCIRCUIT,DI:3/8 LINE DCDR	01295	SN74LS138NP3
A8U375	156-0469-02		MICROCIRCUIT,DI:3/8 LINE DCDR	01295	SN74LS138NP3
A8U380	156-0469-02		MICROCIRCUIT,DI:3/8 LINE DCDR	01295	SN74LS138NP3
A8U385	156-0392-03		MICROCIRCUIT,DI:QUAD LATCH W/CLEAR	01295	SN74S175NP3
A8U400	156-0975-02		MICROCIRCUIT,DI:UNIV SHIFT/STORAGE RGTR	01295	SN74LS299N3/J4
A8U405	156-0975-02		MICROCIRCUIT,DI:UNIV SHIFT/STORAGE RGTR	01295	SN74LS299N3/J4
A8U410	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A8U415	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A8U420	156-0480-02		MICROCIRCUIT,DI:QUAD 2 INP & GATE	01295	SN74LS08NP3
A8U425	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A8U430	156-0739-02		MICROCIRCUIT,DI:QUAD 2 INP OR GATE,SCRN	01295	SN74S32
A8U435	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A8U440	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A8U445	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A8U450	156-1371-00		MICROCIRCUIT,DI:SYN 4 BIT W/UP/DOWN CTR	04713	SN74LS168NDS
A8U455	156-1375-01		MICROCIRCUIT,DI:4 BIT BIN UP-DOWN CNTR	34335	AM25LS2569PCB
A8U460	156-0852-02		MICROCIRCUIT,DI:HEX DRVR W/3 STATE INP	80009	156-0852-02
A8U465	156-0852-02		MICROCIRCUIT,DI:HEX DRVR W/3 STATE INP	80009	156-0852-02
A8U470	156-0865-02		MICROCIRCUIT,DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS273NP3
A8U475	156-0865-02		MICROCIRCUIT,DI:OCTAL D-TYPE FF W/CLEAR	01295	SN74LS273NP3
A8U480	156-0480-02		MICROCIRCUIT,DI:QUAD 2 INP & GATE	01295	SN74LS08NP3
A8U485	156-0469-02		MICROCIRCUIT,DI:3/8 LINE DCDR	01295	SN74LS138NP3
A8U490	156-0985-01		MICROCIRCUIT,DI:DUAL 5 INPUT NOR GATE,SCRN	04713	SN74LS260
A8U505	156-0392-03		MICROCIRCUIT,DI:QUAD LATCH W/CLEAR	01295	SN74S175NP3
A8U510	156-0989-02		MICROCIRCUIT,DI:4 X 4 RGTR FILE,BURN-IN	04713	SN74LS670NDS
A8U515	156-0852-02		MICROCIRCUIT,DI:HEX DRVR W/3 STATE INP	80009	156-0852-02
A8U520	156-0392-03		MICROCIRCUIT,DI:QUAD LATCH W/CLEAR	01295	SN74S175NP3
A8U525	156-0392-03		MICROCIRCUIT,DI:QUAD LATCH W/CLEAR	01295	SN74S175NP3
A8U530	156-0989-02		MICROCIRCUIT,DI:4 X 4 RGTR FILE,BURN-IN	04713	SN74LS670NDS
A8U535	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A8U540	156-0989-02		MICROCIRCUIT,DI:4 X 4 RGTR FILE,BURN-IN	04713	SN74LS670NDS
A8U545	156-0720-02		MICROCIRCUIT,DI:HEX DRVR,4 TO2 LINE	01295	SN74LS368
A8U550	156-0956-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	01295	SN74LS244NP3
A8U555	156-0381-02		MICROCIRCUIT,DI:QUAD 2-INP EXCL OR GATE	01295	SN74LS86
A8U560	156-1111-02		MICROCIRCUIT,DI:OCTAL BUS TRANSCEIVERS	01295	SN74LS245JP3
A8U565	156-1111-02		MICROCIRCUIT,DI:OCTAL BUS TRANSCEIVERS	01295	SN74LS245JP3
A8U570	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A8U575	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A8U580	156-0383-02		MICROCIRCUIT,DI:QUAD 2-INP NOR GATE	01295	SN74LS02
A8U585	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A9 RASTER MEMORY PLANE						
A9	670-6473-00	B010100	B010594	CKT BOARD ASSY:RASTER MEMORY PLANE	80009	670-6473-00
A9	670-6473-01	B010595		CKT BOARD ASSY:RASTER MEMORY PLANE	80009	670-6473-01
A9C24	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C25	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C28	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C30	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C33	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C36	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C37	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C41	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C42	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C44	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C45	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C48	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C53	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C56	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C57	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C61	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C62	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C64	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C65	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C68	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C70	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C73	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C76	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C77	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C81	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C82	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C84	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C85	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C88	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C122	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A9C124	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A9C154	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A9C182	290-0745-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A9C209	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C225	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C241	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C251	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C255	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C263	283-0423-00			(FOR USE WITH 4116-2 RAMS ONLY) CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C273	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C281	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C311	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C315	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A9C323	283-0423-00			CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z

REPLACEABLE ELECTRICAL PARTS

A9 RASTER MEMORY PLANE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A9C331	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C335	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C343	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C353	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C361	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C365	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C383	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C411	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C415	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C423	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C431	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C433	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C441	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C451	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C455	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C465	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C475	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C509	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C510	290-0745-00		CAP., FXD, ELCTLT:22UF, +50-10%, 25V	56289	502D225
A9C532	290-0745-00		CAP., FXD, ELCTLT:22UF, +50-10%, 25V	56289	502D225
A9C533	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C553	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C555	290-0745-00		CAP., FXD, ELCTLT:22UF, +50-10%, 25V	56289	502D225
A9C573	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C584	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A9C585	290-0745-00		CAP., FXD, ELCTLT:22UF, +50-10%, 25V	56289	502D225
A9CR183	152-0141-02		SEMICONV DEVICE:SILICON, 30V, 150MA	01295	1N4152R
A9CR573	152-0066-00		SEMICONV DEVICE:SILICON, 400V, 750MA	14433	LG4016
A9CR586	152-0066-00		SEMICONV DEVICE:SILICON, 400V, 750MA	14433	LG4016
A9Q283	151-0190-00		TRANSISTOR:SILICON, NPN	07263	S032677
A9Q284	151-0190-00		TRANSISTOR:SILICON, NPN	07263	S032677
A9R21	315-0472-00		RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W	01121	CB4725
A9R119	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R120	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R124	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R125	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R132	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R133	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R134	315-0510-00		RES., FXD, CMPSN:51 OHM, 5%, 0.25W	01121	CB5105
A9R135	315-0510-00		RES., FXD, CMPSN:51 OHM, 5%, 0.25W	01121	CB5105
A9R136	315-0510-00		RES., FXD, CMPSN:51 OHM, 5%, 0.25W	01121	CB5105
A9R137	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R138	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R142	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R143	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R144	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R145	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R146	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R147	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R148	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R149	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R151	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R152	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R153	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305

REPLACEABLE ELECTRICAL PARTS

A9 RASTER MEMORY PLANE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A9R154	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R155	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R156	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R157	315-0430-00		RES., FXD, CMPSN:43 OHM, 5%, 0.25W	01121	CB4305
A9R158	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R159	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R165	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R166	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R175	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R176	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R182	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R183	315-0470-00		RES., FXD, CMPSN:47 OHM, 5%, 0.25W	01121	CB4705
A9R184	315-0102-00		RES., FXD, CMPSN:1K OHM, 5%, 0.25W	01121	CB1025
A9R185	315-0471-00		RES., FXD, CMPSN:470 OHM, 5%, 0.25W	01121	CB4715
A9R235	315-0102-00		RES., FXD, CMPSN:1K OHM, 5%, 0.25W	01121	CB1025
A9R236	315-0472-00		RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W	01121	CB4725
A9R237	315-0102-00		RES., FXD, CMPSN:1K OHM, 5%, 0.25W	01121	CB1025
A9R238	315-0102-00		RES., FXD, CMPSN:1K OHM, 5%, 0.25W	01121	CB1025
A9R242	315-0472-00		RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W	01121	CB4725
A9R243	315-0472-00		RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W	01121	CB4725
A9R282	315-0102-00		RES., FXD, CMPSN:1K OHM, 5%, 0.25W	01121	CB1025
A9R283	315-0102-00		RES., FXD, CMPSN:1K OHM, 5%, 0.25W	01121	CB1025
A9R306	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R312	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R313	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R314	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R315	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R316	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R317	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R318	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R319	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R321	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R324	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R325	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R326	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R351	315-0472-00		RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W	01121	CB4725
A9R352	315-0102-00		RES., FXD, CMPSN:1K OHM, 5%, 0.25W	01121	CB1025
A9R405	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R414	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R415	315-0472-00		RES., FXD, CMPSN:4.7K OHM, 5%, 0.25W	01121	CB4725
A9R416	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R417	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R418	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R419	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R420	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R425	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R426	315-0101-03		RES., FXD, CMPSN:100 OHM, 5%, 0.25W	01121	CB1015
A9R463	307-0445-00		RES NTWK, FXD, FI:4.7K OHM, 20%, (9) RES	91637	HSP10A01-472M
A9R484	131-0566-00		BUS CONDUCTOR:DUMMY RES, 2.375, 22 AWG	55210	L-2007-1
A9R484	131-0566-00		BUS CONDUCTOR:DUMMY RES, 2.375, 22 AWG (FOR USE WITH 4116-2 RAMS ONLY)	55210	L-2007-1
A9R485	131-0566-00		BUS CONDUCTOR:DUMMY RES, 2.375, 22 AWG	55210	L-2007-1
A9R485	131-0566-00		BUS CONDUCTOR:DUMMY RES, 2.375, 22 AWG (FOR USE WITH 4116-2 RAMS ONLY)	55210	L-2007-1
A9R486	131-0566-00		BUS CONDUCTOR:DUMMY RES, 2.375, 22 AWG	55210	L-2007-1
A9R487	131-0566-00		BUS CONDUCTOR:DUMMY RES, 2.375, 22 AWG	55210	L-2007-1
A9R513	307-0650-00		RES NTWK, FXD, FI:9, 2.7K OHM, 5%, 0.150W	32997	4310R-101-272

REPLACEABLE ELECTRICAL PARTS

A9 RASTER MEMORY PLANE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A9R514	307-0650-00		RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	32997	4310R-101-272
A9R567	307-0560-00		RES NTWK,FXD,FI:50 OHM TERMINATION	80009	307-0560-00
A9R569	307-0560-00		RES NTWK,FXD,FI:50 OHM TERMINATION	80009	307-0560-00
A9R576	307-0560-00		RES NTWK,FXD,FI:50 OHM TERMINATION	80009	307-0560-00
A9R586	315-0132-00		RES.,FXD,CMPSN:1.3K OHM,5%,0.25W (FOR USE WITH 4116-2 RAMS ONLY)	01121	CB1325
A9U23	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U25	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U31	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U33	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U35	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U41	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U43	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U45	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U51	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U53	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U55	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U61	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U63	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U65	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U71	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U73	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U75	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U81	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U83	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U85	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A9U123	156-1351-01		MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A9U125	156-0874-02		MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A9U131	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A9U133	156-1351-01		MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A9U141	156-1058-01		MICROCIRCUIT,DI:OCTAL ST BFR W/3 STATE OUT	01295	SN74S240JP4
A9U151	156-1351-01		MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A9U153	156-1351-01		MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A9U155	156-1351-01		MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A9U163	156-1351-01		MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A9U171	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A9U173	156-0874-02		MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A9U181	156-1351-01		MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A9U185	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A9U231	156-1376-00		MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A9U241	156-1376-00		MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A9U245	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A9U251	156-1481-00		MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22
A9U255	156-1376-00		MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A9U261	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A9U263	156-1481-00		MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22
A9U265	156-1376-00		MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A9U273	156-1481-00		MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22
A9U275	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A9U281	156-1376-00		MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A9U285	156-0874-02		MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A9U311	156-0230-02		MICROCIRCUIT,DI:DUAL D-TYPE M/S,FF,SCRN	80009	156-0230-02
A9U315	156-0633-00		MICROCIRCUIT,DI:HEX D MASTER SLAVE F-F	80009	156-0633-00
A9U323	156-0847-01		MICROCIRCUIT,DI:64 BIT REGISTER FILE,SCRN	04713	SCM22690L145
A9U331	156-0368-03		MICROCIRCUIT,DI:TTL TO ECL QUAD TRANS	80009	156-0368-03
A9U333	156-0874-02		MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A9U335	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374

REPLACEABLE ELECTRICAL PARTS

A9 RASTER MEMORY PLANE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A9U341	156-0129-02		MICROCIRCUIT,DI:QUAD 2-INP & GATE,BURN-IN	27014	DM8008
A9U343	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A9U351	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A9U353	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A9U355	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A9U361	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A9U363	156-0874-02		MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A9U365	156-0041-05		MICROCIRCUIT,DI:DUAL D-TYPE FF,BURN-IN	01295	SN7474
A9U383	156-0874-02		MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A9U411	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A9U415	156-0368-03		MICROCIRCUIT,DI:TTL TO ECL QUAD TRANS	80009	156-0368-03
A9U423	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A9U431	156-0368-03		MICROCIRCUIT,DI:TTL TO ECL QUAD TRANS	80009	156-0368-03
A9U433	156-0955-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	04713	SN74LS241
A9U435	156-0693-02		MICROCIRCUIT,DI:DECODER/DEMULTIPLEXER	27014	DM74S139
A9U441	156-0320-03		MICROCIRCUIT,DI:TRIPLE 3 INP NAND GATE	01295	SN74S11NP3
A9U443	156-0479-02		MICROCIRCUIT,DI:QUAD 2-INP ORGATE	01295	SN74LS32NP3
A9U451	156-0718-03		MICROCIRCUIT,DI:TRIPLE 3-INP NOR GATE	01295	SN74LS27
A9U453	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A9U455	156-0465-02		MICROCIRCUIT,DI:8 INP NAND GATE	01295	SN74LS30NP3
A9U461	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A9U465	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A9U471	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A9U475	156-0390-02		MICROCIRCUIT,DI:DUAL 4/2 LINEDCDR/DEMUX	01295	SN74LS155
A9U483	156-0955-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	04713	SN74LS241
A9VR585	152-0195-00		SEMICOND DEVICE:ZENER,0.4W,5.1V,5% (FOR USE WITH 4116-2 RAMS ONLY)	04713	SZ11755

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A10 OPT. RASTER MEMORY PLANE					
A10	670-6476-01		CKT BOARD ASSY:DUAL RASTER MEMORY PLANE (OPTION 20 ONLY)	80009	670-6476-01
A10C101	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C102	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A10C107	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C117	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C124	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C134	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C151	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C161	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C167	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C174	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C184	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C204	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C211	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C218	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C224	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C254	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C261	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C268	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C274	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C285	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A10C301	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A10C304	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C308	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C311	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C315	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C317	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C322	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C324	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C328	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C331	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C348	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A10C355	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C357	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C362	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C364	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C368	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C371	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C375	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C377	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C379	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C382	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C385	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A10C476	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C483	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C503	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C513	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C520	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C530	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C546	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C553	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C566	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C576	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z
A10C613	283-0423-00		CAP.,FXD,CER DI:0.22UF,+80-20%,50V	04222	DG015E224Z

REPLACEABLE ELECTRICAL PARTS

A10 OPT. RASTER MEMORY PLANE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscnt	Name & Description	Mfr Code	Mfr Part Number
A10C680	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C683	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C700	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C703	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C706	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C716	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C721	290-0745-00		CAP., FXD, ELCLT: 22UF, +50-10%, 25V	56289	502D225
A10C724	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C726	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C736	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C746	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C747	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C751	290-0745-00		CAP., FXD, ELCLT: 22UF, +50-10%, 25V	56289	502D225
A10C753	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C760	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C766	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10C773	283-0423-00		CAP., FXD, CER DI:0.22UF, +80-20%, 50V	04222	DG015E224Z
A10CP609	152-0141-02		SEMICOND DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A10J707	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A10J708	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A10J717	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A10J718	131-0608-00		TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A10Q615	151-0190-00		TRANSISTOR: SILICON, NPN	07263	S032677
A10Q616	151-0190-00		TRANSISTOR: SILICON, NPN	07263	S032677
A10R101	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R102	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R106	315-0472-00		RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W	01121	CB4725
A10R107	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R108	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R117	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R118	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R124	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R125	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R134	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R135	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R147	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R148	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R154	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R155	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R164	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R165	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R171	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R172	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R177	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R178	315-0470-00		RES., FXD, CMPSN: 47 OHM, 5%, 0.25W	01121	CB4705
A10R231	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121	CB5105
A10R232	315-0430-00		RES., FXD, CMPSN: 43 OHM, 5%, 0.25W	01121	CB4305
A10R241	315-0430-00		RES., FXD, CMPSN: 43 OHM, 5%, 0.25W	01121	CB4305
A10R242	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121	CB5105
A10R247	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121	CB5105
A10R248	315-0510-00		RES., FXD, CMPSN: 51 OHM, 5%, 0.25W	01121	CB5105
A10R333	315-0430-00		RES., FXD, CMPSN: 43 OHM, 5%, 0.25W	01121	CB4305
A10R334	315-0430-00		RES., FXD, CMPSN: 43 OHM, 5%, 0.25W	01121	CB4305

REPLACEABLE ELECTRICAL PARTS

A10 OPT. RASTER MEMORY PLANE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscnt	Name & Description	Mfr Code	Mfr Part Number
A10R335	315-0180-00		RES.,FXD,CMPSN:18 OHM,5%,0.25W	01121	CB1805
A10R336	315-0180-00		RES.,FXD,CMPSN:18 OHM,5%,0.25W	01121	CB1805
A10R337	315-0180-00		RES.,FXD,CMPSN:18 OHM,5%,0.25W	01121	CB1805
A10R338	315-0180-00		RES.,FXD,CMPSN:18 OHM,5%,0.25W	01121	CB1805
A10R339	315-0180-00		RES.,FXD,CMPSN:18 OHM,5%,0.25W	01121	CB1805
A10R340	315-0180-00		RES.,FXD,CMPSN:18 OHM,5%,0.25W	01121	CB1805
A10R341	315-0180-00		RES.,FXD,CMPSN:18 OHM,5%,0.25W	01121	CB1805
A10R472	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A10R607	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R608	315-0101-03		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A10R610	315-0101-03		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A10R611	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R612	315-0101-03		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A10R614	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R618	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R619	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R620	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R621	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R624	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A10R625	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A10R626	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A10R627	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A10R631	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R632	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R635	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R636	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A10R675	307-0445-00		RES NTWK,FXD,FI:4.7K OHM,20%,(9) RES	91637	MSP10A01-472M
A10R712	315-0101-03		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A10R785	131-0566-00		BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A10R786	131-0566-00		BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	55210	L-2007-1
A10U100	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U103	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U106	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U113	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U116	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U120	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U123	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U126	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U133	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U140	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U143	156-1058-01		MICROCIRCUIT,DI:OCTAL ST BFR W/3 STATE OUT	01295	SN74S240JP4
A10U146	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U150	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U153	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U160	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U163	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U166	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U170	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U173	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U176	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U183	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U300	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U303	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U306	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U310	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U313	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U316	156-1552-00		MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4

REPLACEABLE ELECTRICAL PARTS

A10 OPT. RASTER MEMORY PLANE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A10U320	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U323	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U326	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U330	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U343	156-1351-01			MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A10U346	156-1351-01			MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A10U353	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U356	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U360	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U363	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U366	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U370	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U373	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U376	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U380	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U383	156-1552-00			MICROCIRCUIT,DI:H MOS,16384 X 1 DRAM	34649	D2118-4
A10U400	156-1351-01			MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A10U403	156-0982-03			MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U406	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U410	156-0693-02			MICROCIRCUIT,DI:DECODER/DEMULIPLEXER	27014	DM74S139
A10U413	156-1351-01			MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A10U416	156-0982-03			MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U420	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U423	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U426	156-0982-03			MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U430	156-1351-01			MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A10U436	156-0382-02			MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A10U443	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U446	156-0982-03			MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U450	156-1351-01			MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A10U453	156-1065-01			MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A10U456	156-1481-00			MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22
A10U460	156-1481-00			MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22
A10U463	156-1065-01			MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A10U466	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U470	156-1351-01			MICROCIRCUIT,DI:QUAD 2 TO 1 LINE DATA,SCRN	27014	DM74S158
A10U476	156-0982-03			MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U480	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U483	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U503	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U510	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U513	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U516	156-0982-03			MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U520	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U523	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U530	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U543	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U546	156-0982-03			MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U550	156-0874-02			MICROCIRCUIT,DI:8 BIT ADDRESSABLE LCH	80009	156-0874-02
A10U553	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U560	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U566	156-1065-01			MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A10U570	156-0982-03			MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U576	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U580	156-1376-00			MICROCIRCUIT,DI:ARITH LOGIC UNIT/FCTN GEN	04713	SN74LS181
A10U600	156-1065-01			MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A10U603	156-1481-00			MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22

REPLACEABLE ELECTRICAL PARTS

A10 OPT. RASTER MEMORY PLANE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscnt	Name & Description	Mfr Code	Mfr Part Number
A10U606	156-1481-00		MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22
A10U613	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A10U680	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A10U683	156-0390-02		MICROCIRCUIT,DI:DUAL 4/2 LINEDCDR/DEMUX	01295	SN74LS155
A10U700	156-0479-02		MICROCIRCUIT,DI:QUAD 2-INP ORGATE	01295	SN74LS32NP3
A10U703	156-0480-02		MICROCIRCUIT,DI:QUAD 2 INP & GATE	01295	SN74LS08NP3
A10U706	156-0041-05		MICROCIRCUIT,DI:DUAL D-TYPE FF,BURN-IN	01295	SN7474
A10U710	156-0230-02		MICROCIRCUIT,DI:DUAL D-TYPE M/S,FF,SCRN	80009	156-0230-02
A10U713	156-0368-03		MICROCIRCUIT,DI:TTL TO ECL QUAD TRANS	80009	156-0368-03
A10U716	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A10U720	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A10U723	156-0320-03		MICROCIRCUIT,DI:TRIPLE 3 INP NAND GATE	01295	SN74S11NP3
A10U726	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A10U730	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A10U736	156-1481-00		MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22
A10U743	156-0955-02		MICROCIRCUIT,DI:OCTAL BFR W/3 STATE OUT	04713	SN74LS241
A10U746	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A10U750	156-1481-00		MICROCIRCUIT,DI:8-BIT REGISTER,SCRN	34335	AM25LS22
A10U753	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U756	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U760	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U763	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U766	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U770	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U773	156-0982-03		MICROCIRCUIT,DI:OCTAL-D-EDGE FF,SCRN	07263	74LS374
A10U776	156-0041-05		MICROCIRCUIT,DI:DUAL D-TYPE FF,BURN-IN	01295	SN7474
A10U780	156-0866-02		MICROCIRCUIT,DI:13 INP NAND GATES,SCRN	80009	156-0866-02
A10W679	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
A10W679	-----		(QUANTITY OF 3)		
A10W680	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
A10W680	-----		(QUANTITY OF 3)		
All LOGIC EXTENDER					
All	670-5291-XX		CKT BOARD ASSY:(NOT REPLACEABLE, USE 067-1005-00)		
A11J11	131-1346-00		CONNECTOR,RCPT,:40/80 DOUBLE ROW	05574	000201-5440
A11J12	131-1606-01		CONNECTOR,RCPT,:W/22-44 CONTACTS	80009	131-1606-01
A11TP1	214-0579-00		TERM,TEST POINT:BRS CD PL	80009	214-0579-00
A11TP80	214-0579-00		TERM,TEST POINT:BRS CD PL	80009	214-0579-00

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A12 DEFLECTION					
A12	670-6479-02	B010100 B010169	CKT BOARD ASSY:DEFLECTION	80009	670-6479-02
A12	670-6479-03	B010170 B010399	CKT BOARD ASSY:DEFLECTION	80009	670-6479-03
A12	670-6479-04	B010400	CKT BOARD ASSY:DEFLECTION	80009	670-6479-01
A12C121	290-0667-00		CAP.,FXD,ELCTLT:330UF,+75-10%,50V	56289	500D158
A12C123	290-0779-00		CAP.,FXD,ELCTLT:10UF,+50-10%,50VDC	56289	502D237
A12C141	281-0773-00		CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A12C145	290-0748-00		CAP.,FXD,ELCTLT:10UF,+50-10%,20V	56289	500D149
A12C161	281-0763-00	XB010170	CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A12C165	285-1130-00		CAP.,FXD,PLSTC:0.22UF,1%,100V	50558	MH12D224F
A12C171	290-0782-00		CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V	55680	35ULA4R7V-T
A12C175	290-0287-00		CAP.,FXD,ELCTLT:47UF,20%,25V	56289	150D475X0035B2
A12C185	285-1130-00		CAP.,FXD,PLSTC:0.22UF,1%,100V	50558	MH12D224F
A12C221	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	56289	273C5
A12C222	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	56289	273C5
A12C225	290-0768-00		CAP.,FXD,ELCTLT:10UF,+50-10%,100V	54473	ECE-A100V10L
A12C229	290-0768-00		CAP.,FXD,ELCTLT:10UF,+50-10%,100V	54473	ECE-A100V10L
A12C241	283-0625-00		CAP.,FXD,MICA D:220PF,1%,500V	00853	D105F221F0
A12C242	281-0812-00		CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A12C243	281-0814-00		CAP.,FXD,CER DI:100PF,10%,100V	04222	GC70-1-A101K
A12C311	285-1217-00		CAP.,FXD,PLSTC:1.33UF,5%,200V	14752	910D1C1334S
A12C351	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A12C391	281-0774-00		CAP.,FXD,CER DI:0.022UF,20%,100V	12969	CGE223MEZ
A12C447	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A12C453	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A12C472	281-0579-00		CAP.,FXD,CER DI:21PF,5%,500V	59660	301-050C0G0210J
A12C532	281-0783-00		CAP.,FXD,CER DI:0.1UF,20%,100V	72982	8045-D-25U104M
A12C544	283-0203-00		CAP.,FXD,CER DI:0.47UF,20%,50V	72982	8131M05825U0474M
A12C571	281-0773-00		CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A12C573	281-0773-00		CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A12C611	285-1090-00		CAP.,FXD,PLSTC:0.01UF,5%,1600V	19396	FP19-13951
A12C621	290-0768-00		CAP.,FXD,ELCTLT:10UF,+50-10%,100V	54473	ECE-A100V10L
A12C622	283-0150-00		CAP.,FXD,CER DI:650PF,5%,200V	59660	835-515B651J
A12C623	283-0346-00		CAP.,FXD,CER DI:0.47UF,+80-20%,100V	72982	8131-M100F474Z
A12C643	283-0150-00		CAP.,FXD,CER DI:650PF,5%,200V	59660	835-515B651J
A12C652	283-0167-00		CAP.,FXD,CER DI:0.1UF,10%,100V	72982	8131N145X5R0104K
A12C668	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A12C671	283-0100-00		CAP.,FXD,CER DI:0.0047UF,10%,200V	56289	273C3
A12C672	290-0183-00		CAP.,FXD,ELCTLT:1UF,10%,35V	90201	TAC105K035P02
A12C673	285-1224-00		CAP.,FXD,PLSTC:0.0033UF,1%,200V	14752	910D1C332F
A12C682	283-0677-00		CAP.,FXD,MICA D:82PF,1%,500V	00853	D155E820F0
A12C692	283-0680-00		CAP.,FXD,MICA D:330PF,1%,500V	00853	D155F331F0
A12C731	283-0194-00		CAP.,FXD,CER DI:4.7UF,20%,50V	56289	275C4
A12C775	281-0772-00	B010100 B010169	CAP.,FXD,CER DI:0.0047UF,10%,100V	04222	GC701C472K
A12C775	281-0788-00	B010170	CAP.,FXD,CER DI:470PF,10%,100V	72982	8005H9AADW5R471K
A12C776	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A12C781	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A12C794	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	56289	273C5
A12CR152	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	01295	1N4152R
A12CR182	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	01295	1N4152R
A12CR611	152-0706-00		SEMICONV DEVICE:RECT,SI,1000V,3A	80009	152-0706-00
A12CR621	152-0333-00		SEMICONV DEVICE:SILICON,55V,200MA	07263	FDH-6012
A12E425	119-1326-00		ARSR,ELEC SURGE:75V	71482	CG75
A12J581	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	46283-029
A12J582	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A12J583	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029

REPLACEABLE ELECTRICAL PARTS

A12 DEFLECTION (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A12J584	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A12J585	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A12J586	131-0608-00		TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
A12J588	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A12J589	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A12J590	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A12L431	114-0387-00		COIL,RF:VARIABLE,5.5-10UH	80009	114-0387-00
A12L521	108-1035-00	B010100 B010399	COIL,RF:FIXED,2NH	02113	A8120
A12L521	108-1135-00	B010400	COIL,RF:FIXED,7.5MH	80009	108-1135-00
A12L670	108-0146-00		COIL,RF:5UH	80009	108-0146-00
A12L721	114-0385-00		COIL,LINERITY:VARIABLE	02113	B8917
A12Q161	151-0136-03		TRANSISTOR:SILICON,NPN,SEL	80009	151-0136-03
A12Q175	151-0435-00		TRANSISTOR:SILICON,PNP	04713	SPS8335
A12Q271	151-0216-00		TRANSISTOR:SILICON,PNP	04713	SPS8803
A12Q275	151-0508-00		TRANSISTOR:UJT,5I,2N6027,TO-98	G3508	2N6027
A12Q331	151-0728-00		TRANSISTOR:SILICON,NPN	04713	SDS363
A12Q341	151-0451-00		TRANSISTOR:SILICON,NPN	04713	SRF503
A12Q544	151-0188-00		TRANSISTOR:SILICON,PNP	04713	SPS6868K
A12Q554	151-0188-00		TRANSISTOR:SILICON,PNP	04713	SPS6868K
A12Q721	151-0347-00		TRANSISTOR:SILICON,NPN	56289	2N5551
A12Q761	151-0311-01		TRANSISTOR:SILICON,NPN	04713	SJE908
A12R131	315-0471-00		RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A12R142	307-0052-00		RES.,FXD,CMPSN:3 OHM,5%,0.50W	01121	EB30G5
A12R143	307-0052-00		RES.,FXD,CMPSN:3 OHM,5%,0.50W	01121	EB30G5
A12R144	307-0057-00		RES.,FXD,CMPSN:5.1 OHM,5%,0.50W	01121	EB51G5
A12R152	315-0150-00		RES.,FXD,CMPSN:15 OHM,5%,0.25W	01121	CB1505
A12R153	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A12R154	315-0303-00		RES.,FXD,CMPSN:30K OHM,5%,0.25W	01121	CB3035
A12R155	303-0332-00		RES.,FXD,CMPSN:3.3K OHM,5%,1W	01121	GB3325
A12R163	315-0474-00		RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB4745
A12R164	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A12R171	301-0273-00		RES.,FXD,CMPSN:27K OHM,5%,0.50W	01121	EB2735
A12R173	301-0822-00		RES.,FXD,CMPSN:8.2K OHM,5%,0.50W	01121	EB8225
A12R176	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A12R179	311-1557-00		RES.,VAR,NONWIR:25K OHM,20%,0.50W	73138	91-79-0
A12R181	315-0561-00		RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
A12R182	315-0124-00		RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
A12R183	315-0203-00		RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
A12R194	311-1557-00		RES.,VAR,NONWIR:25K OHM,20%,0.50W	73138	91-79-0
A12R221	308-0223-00		RES.,FXD,WW:35 OHM,5%,3W	91637	RS2B-K35R00J
A12R226	315-0100-00		RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A12R241	315-0680-00		RES.,FXD,CMPSN:68 OHM,5%,0.25W	01121	CB6805
A12R242	315-0621-00		RES.,FXD,CMPSN:620 OHM,5%,0.25W	01121	CB6215
A12R243	321-0035-00		RES.,FXD,FILM:22.6 OHM,1%,0.125W	91637	CMF1/10216G22R60
A12R262	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A12R271	315-0104-00		RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A12R272	315-0821-00		RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
A12R273	315-0101-00		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A12R281	307-0103-00		RES.,FXD,CMPSN:2.7 OHM,5%,0.25W	01121	CB27G5
A12R282	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A12R325	308-0676-00		RES.,FXD,WW:750 OHM,1%,5W	91637	NS5B-B750ROF
A12R337	315-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
A12R353	321-0164-00		RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499ROF
A12R354	321-0164-00		RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499ROF
A12R371	321-0185-00		RES.,FXD,FILM:825 OHM,1%,0.125W	91637	MFF1816G825ROF
A12R381	311-1563-00		RES.,VAR,NONWIR:1K OHM,20%,0.50W	73138	91-85-0
A12R387	315-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505

REPLACEABLE ELECTRICAL PARTS

A12 DEFLECTION (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscnt	Name & Description	Mfr Code	Mfr Part Number
A12R443	315-0512-00		RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
A12R451	321-0164-00		RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499ROF
A12R452	321-0164-00		RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499ROF
A12R453	315-0470-00		RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A12R471	321-0114-00		RES.,FXD,FILM:150 OHM,1%,0.125W	91637	MFF1816G150ROF
A12R481	315-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
A12R482	315-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
A12R483	307-0104-00		RES.,FXD,CMPSN:3.3 OHM,5%,0.25W	01121	CB33G5
A12R511	301-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.50W	01121	EB4725
A12R533	308-0076-00		RES.,FXD,WW:300 OHM,5%,3W	14193	SA30300 OHM 5%
A12R551	301-0224-00		RES.,FXD,CMPSN:220K OHM,5%,0.50W	01121	EB2245
A12R552	321-0138-00		RES.,FXD,FILM:267 OHM,1%,0.125W	91637	MFF1816G267ROF
A12R553	321-0256-00		RES.,FXD,FILM:4.53K OHM,1%,0.125W	91637	MFF1816G45300F
A12R554	321-0169-00		RES.,FXD,FILM:562 OHM,1%,0.125W	91637	MFF1816G562ROF
A12R571	315-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
A12R572	315-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.25W	01121	CB7505
A12R574	321-0247-00		RES.,FXD,FILM:3.65K OHM,1%,0.125W	91637	MFF1816G36500F
A12R575	321-0293-00		RES.,FXD,FILM:11K OHM,1%,0.125W	91637	MFF1816G11001F
A12R580	311-1565-00		RES.,VAR,NONWIR:250 OHM,20%,0.50W	73138	91-87-0
A12R643	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A12R665	315-0472-00		RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A12R667	321-0230-00		RES.,FXD,FILM:2.43K OHM,1%,0.125W	91637	MFF1816G24300F
A12R669	315-0332-00	B010100 B010169	RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A12R669	315-0393-00	B010170	RES.,FXD,CMPSN:39K OHM,5%,0.25W	01121	CB3935
A12R693	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A12R694	321-0299-00		RES.,FXD,FILM:12.7K OHM,1%,0.125W	91637	MFF1816G12701F
A12R695	321-0272-00		RES.,FXD,FILM:6.65K OHM,1%,0.125W	91637	MFF1816G66500F
A12R720	321-0345-00		RES.,FXD,FILM:38.3K OHM,1%,0.125W	91637	MFF1816G38301F
A12R721	321-0228-00		RES.,FXD,FILM:2.32K OHM,1%,0.125W	91637	MFF1816G23200F
A12R722	315-0561-00		RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
A12R723	311-1560-00		RES.,VAR,NONWIR:5K OHM,20%,0.50W	73138	91-82-0
A12R730	301-0330-00		RES.,FXD,CMPSN:33 OHM,5%,0.50W	01121	EB3305
A12R731	301-0120-00		RES.,FXD,CMPSN:12 OHM,5%,0.50W	01121	05
A12R761	315-0302-00		RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	J25
A12R771	321-0233-00		RES.,FXD,FILM:2.61K OHM,1%,0.125W	91637	MFF1816G26100F
A12R773	315-0154-00		RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
A12R777	315-0511-00		RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
A12R781	311-1896-00		RES.,VAR,NONWIR:5K OHM,10%,0.50W	32997	3299W-1-502
A12R783	321-0631-00		RES.,FXD,FILM:12.5K OHM,1%,0.125W	91637	MFF1816G12501F
A12R784	315-0222-00		RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A12R785	321-0270-00		RES.,FXD,FILM:6.34K OHM,1%,0.125W	91637	MFF1816G63400F
A12RT553	307-0472-00		RES.,THERMAL:100K OHM,5% DISC	15801	JP51J5
A12T741	120-1340-00		TRANSFORMER,RF:DRIVER,POT CORE	80009	120-1340-00
A12U124	156-1262-00		MICROCIRCUIT,LI:VOLTAGE REGULATOR	27014	LM341P-15.0TB
A12U161	156-0400-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	04713	MC1436CC
A12U225	156-0991-00		MICROCIRCUIT,LI:VOLTAGE REGULATOR	04713	MC78L05ACP
A12U461	156-0130-00		MICROCIRCUIT,LI:MODULATOR/DEMODULATOR	80009	156-0130-00
A12U591	156-0651-00		MICROCIRCUIT,DI:8-BIT PRL-OUT,SER SHF RGTR	01295	SN74LS164N
A12U761	156-1147-00		MICROCIRCUIT,LI:TV HORIZ PROCESSOR	04713	MC1391P
A12U791	156-0733-00		MICROCIRCUIT,DI:DUAL MONOSTABLE MV	80009	156-0733-00
A12VR261	152-0278-00		SEMICONV DEVICE:ZENER,0.4W,3V,5%	04713	SZG35009K20
A12VR731	152-0461-00		SEMICONV DEVICE:ZENER,0.4W,6.2V,5%	04713	1N821

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A13 HIGH VOLTAGE					
A13	670-6478-00	B010100 B010214	CKT BOARD ASSY:HIGH VOLTAGE	80009	670-6478-00
A13	670-6478-01	B010215	CKT BOARD ASSY:HIGH VOLTAGE	80009	670-6478-01
A13C127	283-0594-00		CAP.,FXD,MICA D:0.001UF,1%,100V	00853	D151F102F0
A13C129	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A13C142	283-0680-00		CAP.,FXD,MICA D:330PF,1%,500V	00853	D155F331F0
A13C145	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A13C148	283-0197-00		CAP.,FXD,CER DI:470PF,5%,100V	72982	8121N075C0G0471J
A13C226	283-0594-00		CAP.,FXD,MICA D:0.001UF,1%,100V	00853	D151F102F0
A13C227	283-0665-00		CAP.,FXD,MICA D:190PF,1%,100V	00853	D151F19F0
A13C238	290-0743-00		CAP.,FXD,ELCTLT:100UF,+50-10%,16V	56289	500D146
A13C330	290-0517-00		CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
A13C331	290-0121-00		CAP.,FXD,ELCTLT:2UF,+75-10%,25V	56289	30D205G025BA9
A13C332	281-0125-00		CAP.,VAR,MICA D:90-400PF,175V	52769	GMC30900
A13C333	283-0668-00		CAP.,FXD,MICA D:184PF,1%,500V	00853	D155F1840F0
A13C340	290-0410-00		CAP.,FXD,ELCTLT:15UF,+50-10%,100V	56289	30D156F100DD4
A13C341	290-0755-00		CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A13C401	283-0280-00		CAP.,FXD,CER DI:2200PF,10%,2000V	59660	0818590Y5500222K
A13C415	283-0280-00		CAP.,FXD,CER DI:2200PF,10%,2000V	59660	0818590Y5500222K
A13C426	283-0000-00		CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
A13C439	281-0775-00		CAP.,FXD,CER DI:0.1UF,20%,50V	04222	SA205E104MAA
A13C536	285-1040-00		CAP.,FXD,PLSTC:0.0012UF,10%,4000V	56289	430P522
A13C544	283-0279-00		CAP.,FXD,CER DI:0.001UF,20%,3000V	59660	878-530 Y5S0102M
A13C545	285-1040-00		CAP.,FXD,PLSTC:0.0012UF,10%,4000V	56289	430P522
A13CR115	152-0771-00		SEMICONV DEVICE:HV MULTR,S1,4X	52306	CMX537E
A13CR141	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	01295	1N4152R
A13CR142	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	01295	1N4152R
A13CR240	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	01295	1N4152R
A13CR408	152-0429-00		SEMICONV DEVICE:SILICON,5000V,10MA	14099	SA3282
A13CR423	152-0414-00		SEMICONV DEVICE:SILICON,200V,0.75A	12969	UTR308
A13CR425	152-0170-00		SEMICONV DEVICE:SILICON,1500V,10UA	52306	CX342
A13J150	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ (QUANTITY OF 4)	22526	48283-029
A13L332	108-0336-00		COIL,RF:100UH	80009	108-0336-00
A13L535	114-0386-00		COIL,RF:VARIABLE,10-35MH	80009	114-0386-00
A13Q149	151-0302-00		TRANSISTOR:SILICON,NPN	07263	S038487
A13Q240	151-0224-00		TRANSISTOR:SILICON,NPN	07263	SA24850
A13Q241	151-0136-00		TRANSISTOR:SILICON,NPN	02735	35495
A13R128	321-1628-02		RES.,FXD,FILM:1.644M OHM,0.5%,0.125W	91637	HFF188D16443D
A13R131	321-0289-00		RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A13R136	321-0372-00		RES.,FXD,FILM:73.2K OHM,1%,0.125W	91637	MFF1816G73201F
A13R137	303-0682-00		RES.,FXD,CMPSN:6.8K OHM,5%,1W	01121	GB6825
A13R145	321-0346-00		RES.,FXD,FILM:39.2K OHM,1%,0.125W	91637	MFF1816G39201F
A13R147	315-0222-00		RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A13R148	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A13R228	308-0393-00		RES.,FXD,WW:1.6K OHM,5%,3W	91637	CW2B-16000J-T/R
A13R231	308-0245-00		RES.,FXD,WW:0.6 OHM,5%,2W	91637	CW2B30 0.6OHM 5%
A13R236	315-0681-00		RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
A13R243	315-0512-00		RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
A13R245	315-0473-00		RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A13R247	315-0474-00		RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB4745
A13R249	315-0474-00		RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB4745
A13R341	315-0101-00		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A13R345	308-0106-00		RES.,FXD,WW:1K OHM,5%,5W	14193	S A50
A13R401	301-0105-00		RES.,FXD,CMPSN:1M OHM,5%,0.50W	01121	EB1055
A13R416	301-0105-00		RES.,FXD,CMPSN:1M OHM,5%,0.50W	01121	EB1055

REPLACEABLE ELECTRICAL PARTS

A13, HIGH VOLTAGE (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A13R427	321-0431-00		RES.,FXD,FILM:301K OHM,1%,0.125W	91637	MFF1816G30102F
A13R428	321-0431-00		RES.,FXD,FILM:301K OHM,1%,0.125W	91637	MFF1816G30102F
A13R431	301-0335-00		RES.,FXD,CMPSN:3.3M OHM,5%,0.50W	01121	EB3355
A13R510	311-2094-00		RES.,VAR,NONWIR:TRMR,5M OHM,20%,1W	07716	UA-037
A13R520	311-2094-00		RES.,VAR,NONWIR:TRMR,5M OHM,20%,1W	07716	UA-037
A13T315	120-1341-00		XFMR,PWR,SDN&SU:HIGH VOLTAGE	80009	120-1341-00
A13TP135	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A13TP141	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A13TP435	131-0589-00		TERMINAL,PIN:0.46 L X 0.025 SQ	22526	48283-029
A13U138	156-1149-00		MICROCIRCUIT,LI:OPERATIONAL AMP,JFET INPUT	27014	LF351N
A13U141	156-1408-00		MICROCIRCUIT,LI:TIMER,LOW POWER	32293	ICM75551PA
A13U435	156-1207-00		MICROCIRCUIT,LI:VOLTAGE REGULATOR,-12V	04713	MC79L12ACC
A13VR135	152-0486-00		SEMICONV DEVICE:ZENER,0.25W,6.2V,5%	80009	152-0486-00
A13VR149	152-0405-00		SEMICONV DEVICE:ZENER,1W,15V,5%	80009	152-0405-00
A13VR331	152-0395-00		SEMICONV DEVICE:ZENER,0.4W,4.3V,5%	14552	TD332317
A13VR429	152-0680-00		SEMICONV DEVICE:ZENER,0.4W,19.3V,1%	80009	152-0680-00

A14 POWER SUPPLY DISTRIBUTION

A14	670-6811-00		CKT BOARD ASSY:POWER SUPPLY DISTRIBUTION	80009	670-6811-00
A14C501	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A14R501	307-0540-00		RES,NTWK,FXD,FI:(5) 1K OHM,10%,0.7W	01121	206A102
A14U501	156-0145-02		MICROCIRCUIT,DI:QUAD 2-INP NAND BFR	01295	SN7438

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A15 EXT VIDEO (OPTION 11)					
A15	670-6803-00		CKT BOARD ASSY:EXT VIDEO (OPTION 11 ONLY)	80009	670-6803-00
A15C11	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C15	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C27	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C31	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C35	281-0767-00		CAP.,FXD,CER DI:330PF,20%,100V	12969	CGB331MEX
A15C37	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C39	281-0772-00		CAP.,FXD,CER DI:0.0047UF,10%,100V	04222	GC701C472K
A15C40	281-0772-00		CAP.,FXD,CER DI:0.0047UF,10%,100V	04222	GC701C472K
A15C41	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C43	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C44	283-0051-00		CAP.,FXD,CER DI:0.0033UF,5%,100V	56289	273C12
A15C45	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C47	281-0772-00		CAP.,FXD,CER DI:0.0047UF,10%,100V	04222	GC701C472K
A15C50	290-0183-00		CAP.,FXD,ELCTLT:1UF,10%,35V	90201	TAC105K035P02
A15C53	290-0846-00		CAP.,FXD,ELCTLT:47UF,-10+75%,35 WVDC	54473	ECE-A35V47LU
A15C111	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C113	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C115	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C117	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C120	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C121	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C125	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C127	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C129	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C130	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C134	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C135	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C139	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C140	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C141	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C142	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C143	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C144	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C149	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C211	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C213	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C215	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C217	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C229	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C231	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C232	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C233	281-0811-00		CAP.,FXD,CER DI:10PF,10%,100V	72982	8035D2AADC1G100K
A15C235	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C237	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C238	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C240	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A15C241	290-0745-00		CAP.,FXD,ELCTLT:22UF,+50-10%,25V	56289	502D225
A15C315	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C321	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C325	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C331	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z
A15C335	281-0823-00		CAP.,FXD,CER DI:470PF,10%,50V	12969	CGB471KDN
A15C337	283-0421-00		CAP.,FXD,CER DI:0.1UF,+80-20%,50V	04222	DG015E104Z

REPLACEABLE ELECTRICAL PARTS

A15 EXT VIDEO (OPTION 11) (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A15C339	290-0782-00			CAP., FXD, ELCTLT: 4.7UF, +75-10%, 35V	55680	35ULA4R7V-T
A15C411	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C413	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C415	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C417	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C419	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C423	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C429	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C435	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C439	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C511	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C513	290-0745-00			CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	502D225
A15C515	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C525	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C527	290-0745-00			CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	502D225
A15C529	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C531	290-0745-00			CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	502D225
A15C533	283-0421-00			CAP., FXD, CER DI: 0.1UF, +80-20%, 50V	04222	DG015E104Z
A15C535	290-0745-00			CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	502D225
A15C550	290-0745-00			CAP., FXD, ELCTLT: 22UF, +50-10%, 25V	56289	502D225
A15CR27	152-0141-02			SEMICONV DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A15CR29	152-0141-02			SEMICONV DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A15CR339	152-0141-02			SEMICONV DEVICE: SILICON, 30V, 150MA	01295	1N4152R
A15J25	131-0608-00			TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 3)	22526	47357
A15J145	131-0608-00			TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 3)	22526	47357
A15J231	131-0608-00			TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A15J306	131-0608-00			TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 10)	22526	47357
A15J307	131-0589-00			TERMINAL, PIN: 0.46 L X 0.025 SQ (QUANTITY OF 2)	22526	48283-029
A15J308	131-0589-00			TERMINAL, PIN: 0.46 L X 0.025 SQ (QUANTITY OF 2)	22526	48283-029
A15J309	131-0589-00			TERMINAL, PIN: 0.46 L X 0.025 SQ (QUANTITY OF 2)	22526	48283-029
A15J310	131-0608-00			TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 10)	22526	47357
A15J335	131-0608-00			TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A15J339	131-0608-00			TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 2)	22526	47357
A15J511	131-0608-00			TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD (QUANTITY OF 3)	22526	47357
A15L233	108-0182-00			COIL, RF: 0.3UH	80009	108-C182-00
A15Q129	151-0190-00			TRANSISTOR: SILICON, NPN	07263	S032677
A15Q130	151-0188-00			TRANSISTOR: SILICON, PNP	04713	SPS6868K
A15Q131	151-0190-00			TRANSISTOR: SILICON, NPN	07263	S032677
A15Q132	151-0188-00			TRANSISTOR: SILICON, PNP	04713	SPS6868K
A15Q133	151-0188-00			TRANSISTOR: SILICON, PNP	04713	SPS6868K
A15Q134	151-0190-00			TRANSISTOR: SILICON, NPN	07263	S032677
A15Q135	151-0188-00			TRANSISTOR: SILICON, PNP	04713	SPS6868K
A15Q137	151-0190-00			TRANSISTOR: SILICON, NPN	07263	S032677
A15Q139	151-0190-00			TRANSISTOR: SILICON, NPN	07263	S032677
A15Q140	151-0190-00			TRANSISTOR: SILICON, NPN	07263	S032677
A15Q141	151-0190-00			TRANSISTOR: SILICON, NPN	07263	S032677

REPLACEABLE ELECTRICAL PARTS

A15 EXT VIDEO (OPTION 11) (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A15Q143	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A15Q145	151-0190-00		TRANSISTOR:SILICON,NPN	07263	S032677
A15R11	315-0331-03		RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A15R13	315-0221-03		RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
A15R15	315-0221-03		RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
A15R17	315-0331-03		RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A15R21	315-0221-03		RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
A15R23	315-0331-03		RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A15R25	315-0103-00		RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A15R27	301-0750-00		RES.,FXD,CMPSN:75 OHM,5%,0.50W	01121	EB7505
A15R29	321-0193-00		RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A15R30	321-0326-00		RES.,FXD,FILM:24.3K OHM,1%,0.125W	91637	MFF1816G24301F
A15R35	315-0102-00		RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A15R37	321-0306-00		RES.,FXD,FILM:15K OHM,1%,0.125W	91637	MFF1816G15001F
A15R39	321-0631-00		RES.,FXD,FILM:12.5K OHM,1%,0.125W	91637	MFF1816G12501F
A15R40	321-0239-00		RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	MFF1816G30100F
A15R41	321-0153-00		RES.,FXD,FILM:383 OHM,1%,0.125W	91637	MFF1816G383R0F
A15R43	321-0244-00		RES.,FXD,FILM:3.4K OHM,1%,0.125W	91637	MFF1816G34000F
A15R44	321-0222-00		RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A15R45	321-0243-00		RES.,FXD,FILM:3.32K OHM,1%,0.125W	91637	MFF1816G33200F
A15R47	321-0243-00		RES.,FXD,FILM:3.32K OHM,1%,0.125W	91637	MFF1816G33200F
A15R49	321-0402-00		RES.,FXD,FILM:150K OHM,1%,0.125W	24546	NA55D1503F
A15R50	321-0293-00		RES.,FXD,FILM:11K OHM,1%,0.125W	91637	MFF1816G11001F
A15R51	311-1339-00		RES.,VAR, NONWIR:5K OHM,10%,0.50W	73138	89-131-1
A15R53	321-0092-00		RES.,FXD,FILM:88.7 OHM,1%,0.125W	91637	MFF1816G88R70F
A15R55	321-0092-00		RES.,FXD,FILM:88.7 OHM,1%,0.125W	91637	MFF1816G88R70F
A15R115	307-0675-00		RES NTWK,FXD FI:9,1K OHM,2%,1.25W	01121	210A102
A15R129	321-0085-00		RES.,FXD,FILM:75 OHM,1%,0.125W	91637	MFF1816G75R00F
A15R130	321-0085-00		RES.,FXD,FILM:75 OHM,1%,0.125W	91637	MFF1816G75R00F
A15R131	321-0097-00		RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
A15R133	321-0097-00		RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
A15R134	321-0193-00		RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A15R135	321-0193-00		RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A15R137	315-0101-00		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A15R139	321-0030-00		RES.,FXD,FILM:20 OHM,1%,0.125W	91637	MFF1816G20R00F
A15R140	321-0147-00		RES.,FXD,FILM:332 OHM,1%,0.125W	91637	MFF1816G332R0F
A15R141	321-0222-00		RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A15R142	321-0140-00		RES.,FXD,FILM:280 OHM,1%,0.125W	91637	MFF1816G280R0F
A15R143	321-0169-00		RES.,FXD,FILM:562 OHM,1%,0.125W	91637	MFF1816G562R0F
A15R144	321-0198-00		RES.,FXD,FILM:1.13K OHM,1%,0.125W	91637	MFF1816G11300F
A15R145	321-0227-00		RES.,FXD,FILM:2.26K OHM,1%,0.125W	91637	MFF1816G22600F
A15R147	321-0106-00		RES.,FXD,FILM:124 OHM,1%,0.125W	91637	MFF1816G124R0F
A15R149	323-0122-00		RES.,FXD,FILM:182 OHM,1%,0.50W	75042	CECT0-1820F
A15R151	321-0085-00		RES.,FXD,FILM:75 OHM,1%,0.125W	91637	MFF1816G75R00F
A15R215	307-0675-00		RES NTWK,FXD FI:9,1K OHM,2%,1.25W	01121	210A102
A15R227	307-0488-00		RES,NTWK,FXD,FI:100 OHM,20%,0.75W	01121	206A101
A15R229	307-0488-00		RES,NTWK,FXD,FI:100 OHM,20%,0.75W	01121	206A101
A15R231	315-0510-00		RES.,FXD,CMPSN:51 OHM,5%,0.25W	01121	CB5105
A15R234	321-0261-00		RES.,FXD,FILM:5.11K OHM,1%,0.125W	91637	MFF1816G51100F
A15R235	315-0510-00		RES.,FXD,CMPSN:51 OHM,5%,0.25W	01121	CB5105
A15R315	307-0675-00		RES NTWK,FXD FI:9,1K OHM,2%,1.25W	01121	210A102
A15R339	321-0356-00		RES.,FXD,FILM:49.9K OHM,1%,0.125W	91637	MFF1816G49901F
A15R415	307-0675-00		RES NTWK,FXD FI:9,1K OHM,2%,1.25W	01121	210A102
A15R435	321-0345-00		RES.,FXD,FILM:38.3K OHM,1%,0.125W	91637	MFF1816G38301F
A15R513	307-0488-00		RES,NTWK,FXD,FI:100 OHM,20%,0.75W	01121	206A101
A15R515	315-0101-00		RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A15U11	156-0845-02		MICROCIRCUIT,DI:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A

REPLACEABLE ELECTRICAL PARTS

A15 EXT VIDEO (OPTION 11) (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A15U13	156-0844-02		MICROCIRCUIT,DI:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A
A15U15	156-0844-02		MICROCIRCUIT,DI:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A
A15U17	156-0320-03		MICROCIRCUIT,DI:TRIPLE 3 INP NAND GATE	01295	SN74S11NP3
A15U19	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A15U27	156-1126-01		MICROCIRCUIT,LI:VOLTAGE COMPARATOR,SEL	01295	LM311JG4
A15U35	156-0733-02		MICROCIRCUIT,DI:DUAL MONOSTABLE MV,SCRN	04713	SN74LS221N/J
A15U39	156-1147-00		MICROCIRCUIT,LI:TV HORIZ PROCESSOR	04713	MC1391P
A15U111	156-1046-02		MICROCIRCUIT,DI:OCTAL D TYPE EDGE TRIG FF	80009	156-1046-02
A15U113	156-0913-02		MICROCIRCUIT,DI:OCTAL D FF,BURN-IN	04713	SN74LS377NDS
A15U115	156-1171-00		MICROCIRCUIT,DI:64 X 9 RAM,W/OC OUT,SCRN	80009	156-1171-00
A15U117	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A15U119	156-0529-02		MICROCIRCUIT,DI:DATA SELECTOR,SCRN	01295	SN74LS257
A15U120	156-1313-00		MICROCIRCUIT,DI:8 BIT SHIFT REGISTER,SCRN	01295	SN741S166
A15U121	156-0529-02		MICROCIRCUIT,DI:DATA SELECTOR,SCRN	01295	SN74LS257
A15U123	156-0844-02		MICROCIRCUIT,DI:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A
A15U125	156-0948-02		MICROCIRCUIT,DI:QUAD D F-F,BURN-IN	01295	SN74S175J4
A15U127	156-0321-02		MICROCIRCUIT,DI:TRIPLE 3 INP NAND GATE	01295	SU74S10
A15U129	156-0588-01		MICROCIRCUIT,DI:DUAL J-K MASTER SLAVE FF	04713	SC22689L135
A15U211	156-1046-02		MICROCIRCUIT,DI:OCTAL D TYPE EDGE TRIG FF	80009	156-1046-02
A15U213	156-0913-02		MICROCIRCUIT,DI:OCTAL D FF,BURN-IN	04713	SN74LS377NDS
A15U215	156-1171-00		MICROCIRCUIT,DI:64 X 9 RAM,W/OC OUT,SCRN	80009	156-1171-00
A15U217	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A15U219	156-1313-00		MICROCIRCUIT,DI:8 BIT SHIFT REGISTER,SCRN	01295	SN741S166
A15U221	156-0844-02		MICROCIRCUIT,DI:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A
A15U223	156-1198-01		MICROCIRCUIT,DI:SYNCHRONOUS 4BIT CNTR	01295	SN74S163J4
A15U225	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A15U227	156-0230-02		MICROCIRCUIT,DI:DUAL D-TYPE M/S,FF,SCRN	80009	156-0230-02
A15U229	156-0230-02		MICROCIRCUIT,DI:DUAL D-TYPE M/S,FF,SCRN	80009	156-0230-02
A15U231	156-0205-02		MICROCIRCUIT,DI:QUAD 2-INP NOR GATE,SCRN	04713	SC22689L102
A15U235	156-0391-02		MICROCIRCUIT,DI:HEX LATCH W/CLEAR	01295	SN74LS174
A15U237	156-0368-03		MICROCIRCUIT,DI:TTL TO ECL QUAD TRANS	80009	156-0368-03
A15U239	156-0368-03		MICROCIRCUIT,DI:TTL TO ECL QUAD TRANS	80009	156-0368-03
A15U240	156-1150-01		MICROCIRCUIT,LI:VOLTAGE REGULATOR,NEGATIVE	80009	156-1150-01
A15U241	156-0991-01		MICROCIRCUIT,LI:VOLTAGE REGULATOR,SCRN	04713	MC78L05ACPD
A15U311	156-1046-02		MICROCIRCUIT,DI:OCTAL D TYPE EDGE TRIG FF	80009	156-1046-02
A15U313	156-0913-02		MICROCIRCUIT,DI:OCTAL D FF,BURN-IN	04713	SN74LS377NDS
A15U315	156-1171-00		MICROCIRCUIT,DI:64 X 9 RAM,W/OC OUT,SCRN	80009	156-1171-00
A15U317	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A15U319	156-1313-00		MICROCIRCUIT,DI:8 BIT SHIFT REGISTER,SCRN	01295	SN741S166
A15U321	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A15U323	156-0180-04		MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	01295	SN74S00NP3
A15U325	156-0690-03		MICROCIRCUIT,DI:QUAD 2 INP NOR GATE,BURN IN	01295	SN74S02
A15U327	156-0875-02		MICROCIRCUIT,DI:DUAL 2-W/2 INP AOI GATES	01295	SN74LS51
A15U329	156-0844-02		MICROCIRCUIT,DI:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A
A15U331	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A15U333	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A
A15U335	156-0172-02		MICROCIRCUIT,DI:DUAL RETRIG MONOSTABLE MV	01295	SN74123
A15U337	156-0480-02		MICROCIRCUIT,DI:QUAD 2 INP & GATE	01295	SN74LS08NP3
A15U339	156-1258-01		MICROCIRCUIT,DI:DUAL J-K NEG-EDGE TRIG FF	01295	SN74LS112
A15U340	156-0382-02		MICROCIRCUIT,DI:QUAD 2-INP NAND GATE	01295	SN74LS00
A15U411	156-1046-02		MICROCIRCUIT,DI:OCTAL D TYPE EDGE TRIG FF	80009	156-1046-02
A15U413	156-0913-02		MICROCIRCUIT,DI:OCTAL D FF,BURN-IN	04713	SN74LS377NDS
A15U415	156-1171-00		MICROCIRCUIT,DI:64 X 9 RAM,W/OC OUT,SCRN	80009	156-1171-00
A15U417	156-1065-01		MICROCIRCUIT,DI:OCTAL D TYPE TRANS LATCHES	34335	AM74LS373
A15U419	156-1313-00		MICROCIRCUIT,DI:8 BIT SHIFT REGISTER,SCRN	01295	SN741S166
A15U421	156-0331-03		MICROCIRCUIT,DI:DUAL D TYPE POS EDGE TRIG	80009	156-0331-03
A15U423	156-0388-03		MICROCIRCUIT,DI:DUAL D FLIP-FLOP	07263	74LS74A

REPLACEABLE ELECTRICAL PARTS

A15 EXT VIDEO (OPTION 11) (CONT)

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A15U425	156-0844-02		MICROCIRCUIT,DI:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A
A15U427	156-0844-02		MICROCIRCUIT,DI:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A
A15U429	156-0465-02		MICROCIRCUIT,DI:8 INP NAND GATE	01295	SN74LS30NP3
A15U431	156-0452-02		MICROCIRCUIT,DI:4-WIDE,2-INP AOI,SCREENED	07263	74LS54
A15U433	156-0331-03		MICROCIRCUIT,DI:DUAL D TYPE POS EDGE TRIG	80009	156-0331-03
A15U435	156-0629-01		MICROCIRCUIT,DI:30 MHZ PRESETTABLE BIN	01295	SN74LS197
A15U437	156-0690-03		MICROCIRCUIT,DI:QUAD 2 INP NOR GATE,BURN IN	01295	SN74S02
A15U439	156-0629-01		MICROCIRCUIT,DI:30 MHZ PRESETTABLE BIN	01295	SN74LS197
A15U511	156-0385-02		MICROCIRCUIT,DI:HEX INVERTER	01295	SN74LS04
A15U513	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A15U517	156-0638-01		MICROCIRCUIT,DI:FOUR-BIT UNIVSHIFT RGTR	04713	MC10141
A15U519	156-0316-04		MICROCIRCUIT,DI:QUAD ECL TO TTL TRANS	80009	156-0316-04
A15Y235	158-0106-00		XTAL UNIT,QTZ:100MHZ,+/-0.0025%,SERIES	13571	TEK158-0106-00

REPLACEABLE ELECTRICAL PARTS

Component No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
CHASSIS PARTS					
A9001	263-0073-01	B010100 B010169	SWITCH, ROTARY: OPTICAL, CURSOR	80009	263-0073-01
A9001	263-0073-02	B010170 B010399	SWITCH, ROTARY: OPTICAL, CURSOR	80009	263-0073-02
A9001	263-0073-03	B010400	SWITCH, ROTARY: OPTICAL, CURSOR	80009	263-0073-03
A9002	263-0073-01	B010100 B010169	SWITCH, ROTARY: OPTICAL, CURSOR	80009	263-0073-01
A9002	263-0073-02	B010170 B010399	SWITCH, ROTARY: OPTICAL, CURSOR	80009	263-0073-02
A9002	263-0073-03	B010400	SWITCH, ROTARY: OPTICAL, CURSOR	80009	263-0073-03
B1003	119-1438-00		FAN, CENTRIFUGAL: 115V, 16W, 2900RPM	82877	ROTRON BT2A1
B1004	119-1453-00		FAN ASSY:	80009	119-1453-00
F9001	-----		FOR MAIN POWER FUSE, SEE LV POWER SPLY MANUAL		
F1220	159-0015-00		FUSE, CARTRIDGE: 3AG, 3A, 250V, 0.65 SEC (OPTION A1, A2, A3 A4 ONLY)	71400	AGC 3
J5002	131-0274-00		CONNECTOR, RCPT, :BNC	91836	KC79-67
J5003	131-0274-00		CONNECTOR, RCPT, :BNC	91836	KC79-67
L1002	108-1020-01		COIL, TUBE DEFL: CRT YOKE W/CONNECTORS	80009	108-1020-01
LS1001	119-0962-00		LOUDSPEAKER, PM: 8 OHM, 3W, 2.047 DIA	54473	EAS-5PH04SC
Q1000	151-0623-00		TRANSISTOR: SILICON, NPN	01295	T1P52
Q1001	151-0497-00		TRANSISTOR: SILICON, NPN	01295	T1P47
Q1002	151-0679-00		TRANSISTOR: SILICON, NPN	04713	SJE362
Q1003	151-0462-00		TRANSISTOR: SILICON, PNP	04713	TIP30C
Q1004	151-0464-00		TRANSISTOR: SILICON, NPN	04713	SJE412
R5001	311-0702-00		RES., VAR, NONWIR: 250 OHM, 10%, 0.5W	12697	382-CM39823
RV1002	307-0638-00		RES, V SENSITIVE: 18V, 20%, 0.5W	03508	MOV-V182A1
RV1003	307-0638-00		RES, V SENSITIVE: 18V, 20%, 0.5W	03508	MOV-V182A1
S5001	260-2058-00		SWITCH, PUSH: DPDT, 1A, 25VDC	31918	601003
S5003	260-1970-00		SWITCH, PUSH: 0.4VA, 20V MAXIMUM	09353	8125J81E
S5004	260-1970-00		SWITCH, PUSH: 0.4VA, 20V MAXIMUM	09353	8125J81E
V5001	154-0831-00		ELECTRON TUBE: CRT, P45, RECTANGULAR	00010	0BD

Section 9

REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

- X000 Part first added at this serial number
- 00X Part removed after this serial number

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

- ```

1 2 3 4 5 Name & Description
Assembly and/or Component
Attaching parts for Assembly and/or Component
 * * * * *
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
 * * * * *
Parts of Detail Part
Attaching parts for Parts of Detail Part
 * * * * *

```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - \* - \* - indicates the end of attaching parts.

**Attaching parts must be purchased separately, unless otherwise specified.**

### ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

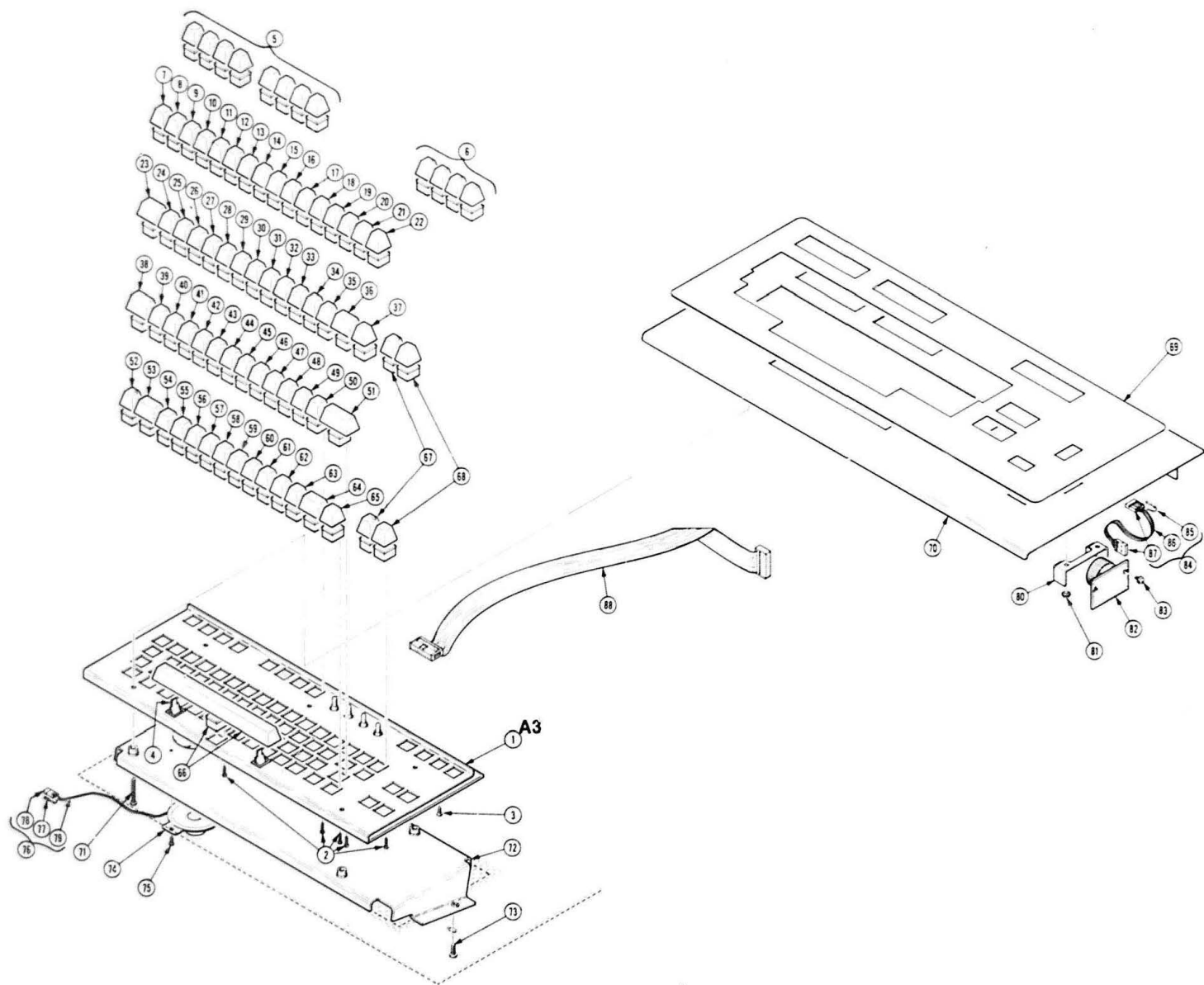
## ABBREVIATIONS

|       |                    |         |                       |          |                      |          |                 |
|-------|--------------------|---------|-----------------------|----------|----------------------|----------|-----------------|
| #     | INCH               | ELECTRN | ELECTRON              | IN       | INCH                 | SE       | SINGLE END      |
| ACTR  | NUMBER SIZE        | ELEC    | ELECTRICAL            | INCAND   | INCANDESCENT         | SECT     | SECTION         |
| ADPTR | ACTUATOR           | ELCTLT  | ELECTROLYTIC          | INSUL    | INSULATOR            | SEMICOND | SEMICONDUCTOR   |
| ALIGN | ADAPTER            | ELEM    | ELEMENT               | INTL     | INTERNAL             | SHLD     | SHIELD          |
| AL    | ALIGNMENT          | EPL     | ELECTRICAL PARTS LIST | LPHLDR   | LAMPHOLDER           | SHLDR    | SHOULDERED      |
| ASSEM | ALUMINUM           | EQPT    | EQUIPMENT             | MACH     | MACHINE              | SKT      | SOCKET          |
| ASSY  | ASSEMBLED          | EXT     | EXTERNAL              | MECH     | MECHANICAL           | SL       | SLIDE           |
| ATTEN | ASSEMBLY           | FIL     | FILLISTER HEAD        | MTG      | MOUNTING             | SLFLKG   | SELF-LOCKING    |
| AWG   | ATTENUATOR         | FLEX    | FLEXIBLE              | NIP      | NIPPLE               | SLVG     | SLEEVING        |
| BD    | AMERICAN WIRE GAGE | FLH     | FLAT HEAD             | NON WIRE | NOT WIRE WOUND       | SPR      | SPRING          |
| BRKT  | BOARD              | FLTR    | FILTER                | OBD      | ORDER BY DESCRIPTION | SQ       | SQUARE          |
| BRS   | BRACKET            | FR      | FRAME or FRONT        | OD       | OUTSIDE DIAMETER     | SST      | STAINLESS STEEL |
| BRZ   | BRASS              | FSTNR   | FASTENER              | OVH      | OVAL HEAD            | STL      | STEEL           |
| BSHG  | BRONZE             | FT      | FOOT                  | PH BRZ   | PHOSPHOR BRONZE      | SW       | SWITCH          |
| CAB   | BUSHING            | FXD     | FIXED                 | PL       | PLAIN or PLATE       | T        | TUBE            |
| CAP   | CABINET            | GSKT    | GASKET                | PLSTC    | PLASTIC              | TERM     | TERMINAL        |
| CER   | CAPACITOR          | HDL     | HANDLE                | PN       | PART NUMBER          | THD      | THREAD          |
| CHAS  | CERAMIC            | HEX     | HEXAGON               | PNH      | PAN HEAD             | THK      | THICK           |
| CKT   | CHASSIS            | HEX HD  | HEXAGONAL HEAD        | PWR      | POWER                | TNSN     | TENSION         |
| COMP  | CIRCUIT            | HEX SOC | HEXAGONAL SOCKET      | RCPPT    | RECEPTACLE           | TPG      | TAPPING         |
| CONN  | COMPOSITION        | HLCPS   | HELICAL COMPRESSION   | RES      | RESISTOR             | TRH      | TRUSS HEAD      |
| COV   | CONNECTOR          | HLEXT   | HELICAL EXTENSION     | RGD      | RIGID                | V        | VOLTAGE         |
| CPLG  | COVER              | HV      | HIGH VOLTAGE          | RLF      | RELIEF               | VAR      | VARIABLE        |
| CRT   | COUPLING           | IC      | INTEGRATED CIRCUIT    | RTNR     | RETAINER             | W/       | WITH            |
| DEG   | CATHODE RAY TUBE   | ID      | INSIDE DIAMETER       | SCH      | SOCKET HEAD          | WSHR     | WASHER          |
| DWR   | DEGREE             | IDNT    | IDENTIFICATION        | SCOPE    | OSCILLOSCOPE         | XFMR     | TRANSFORMER     |
|       | DRAWER             | IMPLR   | IMPELLER              | SCR      | SCREW                | XSTR     | TRANSISTOP      |

REPLACEABLE MECHANICAL PARTS

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code | Manufacturer                                                   | Address                                    | City, State, Zip           |
|-----------|----------------------------------------------------------------|--------------------------------------------|----------------------------|
| S3109     | FELLER ASA ADOLF AG.,<br>C/O PANEL COMPONENTS CORP.            | 355 TESCONI CIRCLE                         | SANTA ROSA, CA 95401       |
| 000CX     | N W SPRING AND MANUFACTURING COMPANY                           | 5525 ROSEWOOD STREET                       | LAKE OSWEGO, OR 97034      |
| 000EO     | ZEPHER ELECTRONIC SALES CORP.                                  | 647 INDUSTRY DRIVE                         | SEATTLE, WA 98188          |
| 000GY     | DEK INC.                                                       | 3480 SWENSEN AVE.                          | ST. CHARLES, IL 60174      |
| 000IL     | FRANK JACKSON CO.                                              | 4475 S.W. SCHOLLS FERRY RD.                | PORTLAND, ORE 97225        |
| 00779     | AMP, INC.                                                      | P O BOX 3608                               | HARRISBURG, PA 17105       |
| 01536     | CAMCAR DIV OF TEXTRON INC. SEMS<br>PRODUCTS UNIT               | 1818 CHRISTINA ST.                         | ROCKFORD, IL 61108         |
| 04919     | COMPONENT MANUFACTURING SERVICE, INC.                          | 1 COMPONENT PARK WEST                      | BRIDGEWATER, MA 02379      |
| 06383     | PANDUIT CORPORATION                                            | 17301 RIDGELAND                            | TINLEY PARK, IL 60477      |
| 06915     | RICHCO PLASTIC CO.                                             | 5825 N. TRIPP AVE.                         | CHICAGO, IL 60646          |
| 07829     | BODINE ELECTRIC CO.                                            | 2500 W BRADLEY PLACE                       | CHICAGO, IL 60618          |
| 08261     | SPECTRA-STRIP CORP.                                            | 7100 LAMPSON AVE.                          | GARDEN GROVE, CA 92642     |
| 09922     | BURNDY CORPORATION                                             | RICHARDS AVENUE                            | NORWALK, CT 06852          |
| 11897     | PLASTICLIDE MFG. CORPORATION                                   | P O BOX 867, 1757 STANFORD ST.             | SANTA MONICA, CA 90406     |
| 12327     | FREEWAY CORPORATION                                            | 9301 ALLEN DRIVE                           | CLEVELAND, OH 44125        |
| 13103     | THERMALLOY COMPANY, INC.                                       | 2021 W VALLEY VIEW LANE<br>P O BOX 34829   | DALLAS, TX 75234           |
| 22229     | SOLITRON DEVICES, INC.,<br>SEMICONDUCTOR GROUP                 | 8808 BALBOA AVENUE                         | SAN DIEGO OPERS, CA 92123  |
| 22526     | BERG ELECTRONICS, INC.                                         | YOUK EXPRESSWAY                            | NEW CUMBERLAND, PA 17070   |
| 27264     | MOLEX PRODUCTS CO.                                             | 5224 KATRINE AVE.                          | DOWNERS GROVE, IL 60515    |
| 51181     | KEYTRONICS INC.                                                | 707 NORTH ST.                              | ENDICOTT, NY 13760         |
| 52833     | KEYTRONIC CORP., OCR DIV.                                      | SPOKANE INDUSTRIAL PK.,<br>P. O. BOX 14687 | SPOKANE, WA 99214          |
| 54473     | MATSUSHITA ELECTRIC, CORP. OF AMERICA                          | 1 PANASONIC WAY                            | SECAUCUS, NJ 07094         |
| 59730     | THOMAS AND BETTS COMPANY                                       | 36 BUTLER ST.                              | ELIZABETH, NJ 07207        |
| 63069     | PHILIPS INDUSTRIES INC. LAU DIV                                | 4540 W 160TH ST                            | CLEVELAND, OHIO 44135      |
| 70903     | BELDEN CORP.                                                   | 2000 S BATAVIA AVENUE                      | GENEVA, IL 60134           |
| 71279     | CAMBRIDGE THERMIONIC CORP.                                     | 445 CONCORD AVE.                           | CAMBRIDGE, MA 02138        |
| 71468     | ITT CANNON ELECTRIC                                            | 666 E. DYER RD.                            | SANTA ANA, CA 92702        |
| 73743     | FISCHER SPECIAL MFG. CO.                                       | 446 MORGAN ST.                             | CINCINNATI, OH 45206       |
| 74861     | INDUSTRIAL CONDENSER CORP.                                     | 3243-65 NO CALIFORNIA AVE                  | CHICAGO, IL 60618          |
| 75915     | LITTELFUSE, INC.                                               | 800 E. NORTHWEST HWY                       | DES PLAINES, IL 60016      |
| 76381     | MINNESOTA MINING AND MFG. CO.                                  | JM CENTER                                  | ST. PAUL, MN 55101         |
| 77250     | PHEOLL MANUFACTURING CO., DIVISION<br>OF ALLIED PRODUCTS CORP. | 5700 W. ROOSEVELT RD.                      | CHICAGO, IL 60650          |
| 78189     | ILLINOIS TOOL WORKS, INC.<br>SHAKEPROOF DIVISION               | ST. CHARLES ROAD                           | ELGIN, IL 60120            |
| 79136     | WALDES, KOHINOOR, INC.                                         | 47-16 AUSTEL PLACE                         | LONG ISLAND CITY, NY 11101 |
| 80009     | TEKTRONIX, INC.                                                | P O BOX 500                                | BEAVERTON, OR 97077        |
| 80126     | PACIFIC ELECTRICORD CO.                                        | 747 W. REDONDO BEACH, P O BOX 10           | GARDENA, CA 90247          |
| 83385     | CENTRAL SCREW CO.                                              | 2530 CRESCENT DR.                          | BROADVIEW, IL 60153        |
| 85471     | BOYD, A. B., CO.                                               | 2527 GRANT AVENUE                          | SAN LEANDRO, CA 94579      |
| 86928     | SEASTROM MFG. COMPANY, INC.                                    | 701 SONORA AVENUE                          | GLENDALE, CA 91201         |
| 91836     | KINGS ELECTRONICS CO., INC.                                    | 40 MARBLEDALE ROAD                         | TUCKAHOE, NY 10707         |
| 93907     | TEXTRON INC. CAMCAR DIV                                        | 600 18TH AVE                               | ROCKFORD, IL 61101         |
| 95987     | WECKESSER CO., INC.                                            | 4444 WEST IRVING PARK RD.                  | CHICAGO, IL 60641          |



REPLACEABLE MECHANICAL PARTS

| Fig & Index No | Tektronix Part No | Serial/Model No Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                        | Mfr Code | Mfr Part Number  |
|----------------|-------------------|---------------------|--------|-----|---|---|---|---|---|-------------------------------------------|----------|------------------|
| 1-1            | -----             | -----               |        | 1   |   |   |   |   |   | KEYBOARD ASSEMBLY:(SEE A3 REPL)           |          |                  |
| -2             | -----             | -----               |        | -   |   |   |   |   |   | . SCREWS                                  |          |                  |
| -3             | -----             | -----               |        | -   |   |   |   |   |   | . SCREWS                                  |          |                  |
| -4             | 118-0968-00       |                     |        | 4   |   |   |   |   |   | . SPACER,LED:                             | 51181    | 47-C0198-007     |
| -5             | 366-1884-00       |                     |        | 8   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,BLANK           | 52833    | CZCZ01R110900000 |
|                | 260-2062-00       |                     |        | 8   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3241-00       |                     |        | 8   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-060     |
| -6             | 366-1942-00       |                     |        | 4   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,BLANK           | 52833    | CZRS92R110902043 |
|                | 260-2061-00       |                     |        | 4   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04005-001     |
|                | 214-3240-00       |                     |        | 4   |   |   |   |   |   | . SPRING,HLCPS:0.31 ID X 0.64 L           | 52833    | 45-00024-060     |
| -7             | 366-1883-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,RESET OVER PAGE | 52833    | CZWW01T1P5240701 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3241-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-060     |
| -8             | 366-1940-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,LEFT BRACE        | 52833    | CYBB01T110850802 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -9             | 366-1939-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,! OVER 1          | 52833    | CYBB01T137010801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -10            | 366-1938-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,@ OVER 2          | 52833    | CYBB01T137220801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -11            | 366-1937-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,# OVER 3          | 52833    | CYBB01T137030801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -12            | 366-1936-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,# OVER 4          | 52833    | CYBB01T137040801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -13            | 366-1889-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,% OVER 5          | 52833    | CYBB01T137050801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -14            | 366-1935-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,CARET OVER 6      | 52833    | CYBB01T136160801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -15            | 366-1934-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,& OVER 7          | 52833    | CYBB01T137270801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -16            | 366-1933-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,* OVER 8          | 52833    | CYBB01T137180801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -17            | 366-1932-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,( OVER 9          | 52833    | CYBB01T137290801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -18            | 366-1931-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,) OVER 0          | 52833    | CYBB01T137900801 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -19            | 366-1944-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,DASH OVER HYPHEN  | 52833    | CYBB01T110520802 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -20            | 366-1899-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,+ OVER =          | 52833    | CYBB01T111270802 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -21            | 366-1930-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,RIGHT BRACE .     | 52833    | CYBB01T110860802 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -22            | 366-1941-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,RUB OUT         | 52833    | CZWW01TR5591101  |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -23            | 366-1898-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,ESC             | 52833    | CZWW02S1E3890701 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |
| -24            | 366-1897-00       |                     |        | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,TILDE/BROKEN VERT | 52833    | CYBB01S121310802 |
|                | 260-2062-00       |                     |        | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE               | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |        | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L           | 52833    | 45-00021-015     |

# REPLACEABLE MECHANICAL PARTS

| Fig. &<br>Index<br>No. | Tektronix<br>Part No. | Serial/Model No. |        | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                      | Mfr<br>Code | Mfr Part Number  |
|------------------------|-----------------------|------------------|--------|-----|---|---|---|---|---|-----------------------------------------|-------------|------------------|
|                        |                       | Eff              | Dscont |     |   |   |   |   |   |                                         |             |                  |
| 1-25                   | 366-1929-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, Q             | 52833       | CYBB01S1Q0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -26                    | 366-1928-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, W             | 52833       | CYBB01S1W0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -27                    | 366-1927-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, E             | 52833       | CYBB01S1E0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -28                    | 366-1926-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, R             | 52833       | CYBB01S1R0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -29                    | 366-1925-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, T             | 52833       | CYBB01S1T0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -30                    | 366-1924-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, Y             | 52833       | CYBB01S1Y0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -31                    | 366-1918-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, U             | 52833       | CYBB01S1U0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -32                    | 366-1919-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, I             | 52833       | CYBB01S1I0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -33                    | 366-1920-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, O             | 52833       | CYBB01S1O0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -34                    | 366-1921-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, P             | 52833       | CYBB01S1P0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -35                    | 366-1896-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, SM BACK SLASH | 52833       | CYBB01S182860802 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -36                    | 366-1895-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: EARTH BROWN, BK SPC      | 52833       | CZWW02S187082105 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -37                    | 366-1894-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: EARTH BROWN, LINE FEED   | 52833       | CZWW01S114791101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -38                    | 366-1893-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: EARTH BROWN, TAB         | 52833       | CZWW02R1T5990701 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -39                    | 366-1892-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: EARTH BROWN, CTRL        | 52833       | CZWW01R1C3560701 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -40                    | 366-1922-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, A             | 52833       | CYBB01RIA0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -41                    | 366-1923-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, S             | 52833       | CYBB01R1S0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -42                    | 366-1914-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, D             | 52833       | CYBB01RID0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -43                    | 366-1915-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, F             | 52833       | CYBB03R1F0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -44                    | 366-1916-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, G             | 52833       | CYBB01R1G0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -45                    | 366-1917-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, H             | 52833       | CYBB01R1H0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |
| -46                    | 366-1911-00           |                  |        | 1   |   |   |   |   |   | . PUSH BUTTON: SMOKE TAN, J             | 52833       | CYBB03R1J0010101 |
|                        | 260-2062-00           |                  |        | 1   |   |   |   |   |   | . SW, CAPACITIVE: LOW PROFILE           | 52833       | 61-04001-001     |
|                        | 214-3337-00           |                  |        | 1   |   |   |   |   |   | . SPRING, HLCPS: 0.4 ID X 0.875 L       | 52833       | 45-00021-015     |

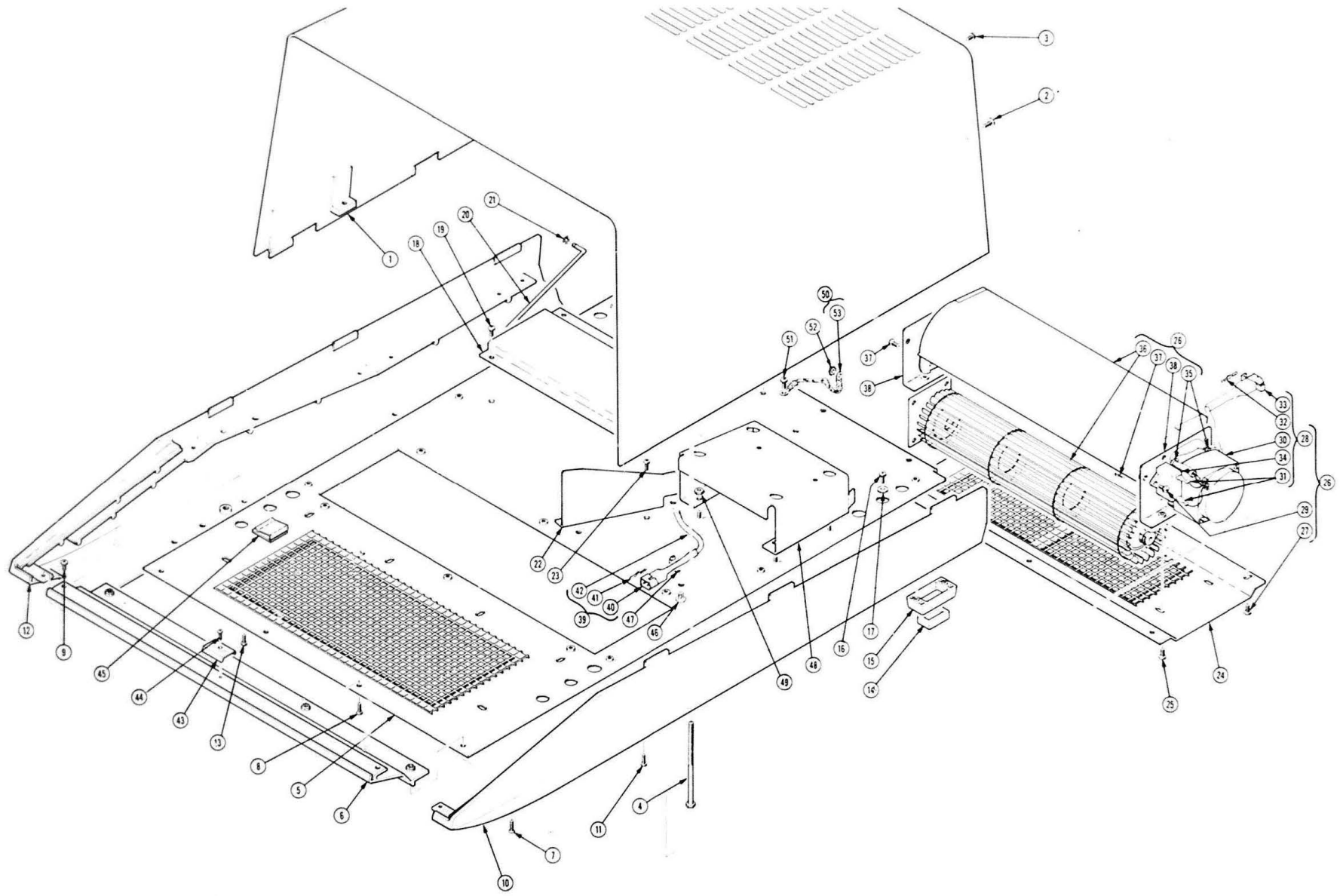


REPLACEABLE MECHANICAL PARTS

| Fig & Index No | Tektronix Part No | Serial/Model No Eff | Discont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                      | Mfr Code | Mfr Part Number  |
|----------------|-------------------|---------------------|---------|-----|---|---|---|---|---|-----------------------------------------|----------|------------------|
| 1-47           | 366-1912-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,K               | 52833    | CYBB01R1K0010101 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -48            | 366-1913-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:LT GRAY,L                 | 52833    | CYBB01R1L0010101 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -49            | 366-1891-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN, OVER;          | 52833    | CYBB01R111290802 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -50            | 366-1902-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN," OVER '        | 52833    | CYBB01R111300802 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -51            | 366-1890-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,RETURN        | 52833    | CZWW05R1R5510701 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -52            | 366-1888-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:EARTH BRN W/LED,CAPS LOCK | 52833    | CZTA0125C8946002 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3240-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.31 ID X 0.64 L         | 52833    | 45-00024-060     |
| -53            | 366-1887-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,SHIFT         | 52833    | CZWW02Q1S5770701 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -54            | 366-1901-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,Z               | 52833    | CYBB01Q1Z0010101 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -55            | 366-1903-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,X               | 52833    | CYBB01Q1X0010101 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -56            | 366-1904-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,C               | 52833    | CYBB01QC0010101  |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -57            | 366-1905-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,V               | 52833    | CYBB01Q1V0010101 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -58            | 366-1906-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,B               | 52833    | CYBB01Q1B0010101 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -59            | 366-1907-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,N               | 52833    | CYBB01Q1N0010101 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -60            | 366-1908-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,M               | 52833    | CYBB01Q1M0010101 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -61            | 366-1909-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,< OVER,         | 52833    | CYBB01Q110340802 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -62            | 366-1910-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,> OVER ,        | 52833    | CYBB01Q110350802 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -63            | 366-1886-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,? OVER SLASH    | 52833    | CYBB01Q118560802 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -64            | 366-1887-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,SHIFT         | 52833    | CZWW02Q1S5770701 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3337-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-015     |
| -65            | 366-1885-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,BREAK         | 52833    | CZWW01Q1B3310701 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3336-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.31 ID X 0.64 L         | 52833    | 4500021-090      |
| -66            | 366-1900-00       |                     |         | 1   |   |   |   |   |   | . PUSH BUTTON:SMOKE TAN,BLANK           | 52833    | CYCY12P110902602 |
|                | 260-2062-00       |                     |         | 1   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3338-00       |                     |         | 1   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 4500021-020      |
| -67            | 366-1942-00       |                     |         | 2   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,BLANK         | 52833    | CZRS92R110902043 |
|                | 260-2061-00       |                     |         | 2   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04005-001     |
|                | 214-3240-00       |                     |         | 2   |   |   |   |   |   | . SPRING,HLCPS:0.31 ID X 0.64 L         | 52833    | 45-00024-060     |
| -68            | 366-1884-00       |                     |         | 2   |   |   |   |   |   | . PUSH BUTTON:EARTH BROWN,BLANK         | 52833    | CZC201R110900000 |
|                | 260-2062-00       |                     |         | 2   |   |   |   |   |   | . SW,CAPACITIVE:LOW PROFILE             | 52833    | 61-04001-001     |
|                | 214-3241-00       |                     |         | 2   |   |   |   |   |   | . SPRING,HLCPS:0.4 ID X 0.875 L         | 52833    | 45-00021-060     |

# REPLACEABLE MECHANICAL PARTS

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                  | Mfr Code | Mfr Part Number |
|------------------|--------------------|----------------------|--------|-----|---|---|---|---|---|-----------------------------------------------------|----------|-----------------|
| 1-69             | 334-3975-01        |                      |        | 1   |   |   |   |   |   | OVERLAY, KYBD:                                      | 80009    | 334-3975-01     |
| -70              | 386-4561-02        |                      |        | 1   |   |   |   |   |   | PANEL, KEYBOARD:                                    | 80009    | 386-4561-02     |
|                  |                    |                      |        |     |   |   |   |   |   | (ATTACHING PARTS)                                   |          |                 |
| -71              | 211-0517-00        |                      |        | 5   |   |   |   |   |   | SCREW, MACHINE: 6-32 X 1 INCH, PNH, STL             | 83385    | OBD             |
|                  |                    |                      |        |     |   |   |   |   |   | -----*                                              |          |                 |
| -72              | 407-2804-00        |                      |        | 1   |   |   |   |   |   | BRACKET, KYBD: ALUMINUM                             | 80009    | 407-2804-00     |
|                  |                    |                      |        |     |   |   |   |   |   | (ATTACHING PARTS)                                   |          |                 |
| -73              | 211-0658-00        |                      |        | 2   |   |   |   |   |   | SCR, ASSEM WSHR: 6-32 X 0.312 L, PNH, STL           | 78189    | OBD             |
|                  |                    |                      |        |     |   |   |   |   |   | -----*                                              |          |                 |
| -74              | 119-0962-00        |                      |        | 1   |   |   |   |   |   | LOUDSPEAKER, PM: 8 OHM, 3W, 2.047 DIA               | 54473    | EAS-5PH04SC     |
|                  |                    |                      |        |     |   |   |   |   |   | (ATTACHING PARTS)                                   |          |                 |
| -75              | 213-0124-00        |                      |        | 2   |   |   |   |   |   | SCR, TPG, THD FOR: 6-20 X 0.250 INCH, PNH STL       | 83385    | OBD             |
|                  |                    |                      |        |     |   |   |   |   |   | -----*                                              |          |                 |
| -76              | 175-3219-00        |                      |        | 1   |   |   |   |   |   | CA ASSY, SP, ELEC: 2, 26 AWG, 6.0 L, RIBBON         | 80009    | 175-3219-00     |
| -77              | 131-0707-00        |                      |        | 2   |   |   |   |   |   | CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD         | 22526    | 47439           |
| -78              | 352-0169-00        |                      |        | 1   |   |   |   |   |   | HLDR, TERM CONN: 2 WIRE BLACK                       | 80009    | 352-0169-00     |
|                  | -----              |                      |        | -   |   |   |   |   |   | (A3P3)                                              |          |                 |
| -79              | 175-0825-00        |                      |        | AR  |   |   |   |   |   | WIRE, ELECTRICAL: 2 WIRE RIBBON                     | 80009    | 175-0825-00     |
| -80              | 407-2506-00        |                      |        | 2   |   |   |   |   |   | BRACKET, CMPNT: THUMBWHEEL, ALUMINUM                | 80009    | 407-2506-00     |
|                  |                    |                      |        |     |   |   |   |   |   | (ATTACHING PARTS)                                   |          |                 |
| -81              | 211-0033-00        |                      |        | 4   |   |   |   |   |   | SCR, ASSEM WSHR: 4-40 X 0.312 PNH, STL, CD PL       | 83385    | OBD             |
|                  |                    |                      |        |     |   |   |   |   |   | -----*                                              |          |                 |
| -82              | -----              |                      |        | 2   |   |   |   |   |   | SWITCH, ROTARY: (SEE A9001, A9002 REPL CHASS PARTS) |          |                 |
|                  |                    |                      |        |     |   |   |   |   |   | (ATTACHING PARTS)                                   |          |                 |
| -83              | 210-0457-00        |                      |        | 4   |   |   |   |   |   | NUT, PL, ASSEM WA: 6-32 X 0.312, STL CD PL          | 83385    | OBD             |
|                  |                    |                      |        |     |   |   |   |   |   | -----*                                              |          |                 |
| -84              | 175-3223-00        |                      |        | 2   |   |   |   |   |   | CA ASSY, SP, ELEC: 4, 26 AWG, 4.0 L, RIBBON         | 80009    | 175-3223-00     |
| -85              | 131-0707-00        |                      |        | 16  |   |   |   |   |   | CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD         | 22526    | 47439           |
| -86              | 175-0827-00        |                      |        | AR  |   |   |   |   |   | CABLE, SP, ELEC: 4, 26 AWG, STRD, PVC JKT, RBN      | 08261    | SS04267(1061)OC |
| -87              | 352-0162-00        |                      |        | 4   |   |   |   |   |   | HLDR, TERM CONN: 4 WIRE BLACK                       | 80009    | 352-0162-00     |
|                  | -----              |                      |        | -   |   |   |   |   |   | (A3P1, A3P2, THUMB WHEELS)                          |          |                 |
| -88              | 175-3683-00        |                      |        | 1   |   |   |   |   |   | CA ASSY, SP, ELEC: 20, 28 AWG, 44.0 L, RIBBON       | 000E0    | ZCA-08221       |
|                  | -----              |                      |        | -   |   |   |   |   |   | (A3J4, A13A1J103)                                   |          |                 |



REPLACEABLE MECHANICAL PARTS

| Fig & Index No | Tektronix Part No | Serial/Model No Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                      | Mfr Code | Mfr Part Number |
|----------------|-------------------|---------------------|--------|-----|---|---|---|---|---|---------------------------------------------------------|----------|-----------------|
| 2-1            | 390-0740-02       |                     |        | 1   |   |   |   |   |   | CABINET TOP:W/BACKET<br>(ATTACHING PARTS)               | 80009    | 390-0740-02     |
| -2             | 212-0039-00       |                     |        | 2   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.375 INCH,TRH STL                 | 83385    | OBD             |
| -3             | 212-0145-00       |                     |        | 4   |   |   |   |   |   | SCR,ASSEM WASH:8-32 X 0.375,PNH STL CD PL               | 93907    | OBD             |
| -4             | 212-0545-00       |                     |        | 2   |   |   |   |   |   | SCREW,MACHINE:10-32 X 4.0,HEX HD,STL CD PL              | 83385    | OBD             |
| -5             | 390-0803-02       |                     |        | 1   |   |   |   |   |   | CABINET BOTTOM:                                         | 80009    | 390-0803-00     |
| -6             | 426-1700-01       |                     |        | 1   |   |   |   |   |   | FRAME SECT,CAB:FRONT,ALUMINUM<br>(ATTACHING PARTS)      | 80009    | 426-1700-01     |
| -7             | 211-0512-00       |                     |        | 2   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.50" 100 DEG,FLH STL              | 83385    | OBD             |
| -8             | 211-0510-00       |                     |        | 2   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL                | 83385    | OBD             |
| -9             | 212-0004-00       |                     |        | 2   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.312 INCH,PNH STL                 | 83385    | OBD             |
| -10            | 390-0699-01       |                     |        | 1   |   |   |   |   |   | CAB. SIDE,CALC:RIGHT,FINISHED<br>(ATTACHING PARTS)      | 80009    | 390-0699-01     |
| -11            | 211-0510-00       |                     |        | 3   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL                | 83385    | OBD             |
| -12            | 390-0700-01       |                     |        | 1   |   |   |   |   |   | CAB. ,SIDE,CALC:LEFT,FINISHED<br>(ATTACHING PARTS)      | 80009    | 390-0700-01     |
| -13            | 211-0510-00       |                     |        | 3   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL                | 83385    | OBD             |
| -14            | 348-0177-00       |                     |        | 4   |   |   |   |   |   | PAD,CABINET FT:1.25 W X 0.50 INCH H                     | 80009    | 348-0177-00     |
| -15            | 348-0178-00       |                     |        | 4   |   |   |   |   |   | BUMPER,PLASTIC:2.0 W X 0.40 INCH H<br>(ATTACHING PARTS) | 80009    | 348-0178-00     |
| -16            | 213-0104-00       |                     |        | 8   |   |   |   |   |   | SCR,TPG,THD FOR:6-20 X 0.375 INCH,TRH STL               | 83385    | OBD             |
| -17            | 210-0803-00       |                     |        | 8   |   |   |   |   |   | WASHER,FLAT:0.15 ID X 0.032 THK,STL CD PL               | 12327    | OBD             |
| -18            | 386-4669-00       |                     |        | 1   |   |   |   |   |   | SPRT,CARD CAGE:ALUMINUM<br>(ATTACHING PARTS)            | 80009    | 386-4669-00     |
| -19            | 212-0023-00       |                     |        | 4   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.375,PNH,STL CD PL                | 83385    | OBD             |
| -20            | 348-0713-00       |                     |        | 1   |   |   |   |   |   | FLIP-STAND,CARD:STAINLESS STEEL<br>(ATTACHING PARTS)    | 80009    | 348-0713-00     |
| -21            | 354-0175-00       |                     |        | 2   |   |   |   |   |   | RING,RETAINING:TYPE EXT,U/O 0.188 ID SFT                | 79136    | 5133-18-M1      |
| -22            | 378-0193-00       |                     |        | 1   |   |   |   |   |   | BAFFLE,AIR:POWER SUPPLY<br>(ATTACHING PARTS)            | 80009    | 378-0193-00     |
| -23            | 211-0510-00       |                     |        | 2   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL                | 83385    | OBD             |
| -24            | 386-4755-00       |                     |        | 1   |   |   |   |   |   | STIFFENER,FAN:ALUMINUM<br>(ATTACHING PARTS)             | 80009    | 386-4755-00     |
| -25            | 212-0004-00       |                     |        | 4   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.312 INCH,PNH STL                 | 83385    | OBD             |
| -26            | -----             |                     |        | 1   |   |   |   |   |   | FAN ASSY:(SEE B1004 REPL)<br>(ATTACHING PARTS)          |          |                 |
| -27            | 212-0004-00       |                     |        | 6   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.312 INCH,PNH STL                 | 83385    | OBD             |
| -28            | 147-0057-01       |                     |        | 1   |   |   |   |   |   | . MOTOR,AC:<br>(ATTACHING PARTS)                        | 80009    | 147-0057-01     |
| -29            | 213-0801-00       |                     |        | 1   |   |   |   |   |   | . SCREW,TPG,TF:8-32 X 0.312,TAPTITE,PNH                 | 93907    | OBD             |
| -30            | 147-0057-00       |                     |        | -   |   |   |   |   |   | . MOTOR ASSY INCLUDES:                                  |          |                 |
| -31            | 131-2065-00       |                     |        | 1   |   |   |   |   |   | . . MOTOR,AC:115V,60HZ,1550 RPM                         | 07829    | 712-FJ-60007122 |
| -32            | 131-0948-00       |                     |        | 2   |   |   |   |   |   | . . TERM,QIK DISC:18-22 AWG,BRASS TIN PLATED            | 00779    | 2-520181-2      |
| -33            | 204-0826-00       |                     |        | 2   |   |   |   |   |   | . . CONTACT,ELEC:CONNECTOR,BRASS TIN PL                 | 27264    | 02-09-1103      |
| -34            | 118-1295-00       |                     |        | 1   |   |   |   |   |   | . . CONN BODY,RCPT:2 CONT,FEMALE                        | 27264    | 03-09-1021      |
| -35            | 343-0549-00       |                     |        | 1   |   |   |   |   |   | . . CAP.,FXD,PLSTC:1.3UF,10%,250V                       | 74861    | 15L774          |
| -36            | 369-0044-00       |                     |        | 2   |   |   |   |   |   | . STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG                | 59730    | TY100           |
| -37            | 213-0801-00       |                     |        | 1   |   |   |   |   |   | . FAN,CENTRIFUGAL:W/HOUSING<br>(ATTACHING PARTS)        | 63069    | 027601-01       |
| -38            | 407-2863-00       |                     |        | 8   |   |   |   |   |   | . SCREW,TPG,TF:8-32 X 0.312,TAPTITE,PNH                 | 93907    | OBD             |
| -39            | 175-4302-00       |                     |        | 2   |   |   |   |   |   | . BRACKET,FAN:ALUMINUM                                  | 80009    | 407-2863-00     |
| -40            | 204-0827-00       |                     |        | 1   |   |   |   |   |   | CA ASSY,SP,ELEC:2,18 AWG,36.0L                          | 80009    | 175-4302-00     |
| -41            | 131-0945-00       |                     |        | 2   |   |   |   |   |   | . CONN BODY,PLUG:2 CONT FEMALE                          | 27264    | 03-09-2022      |
| -42            | 175-2203-00       |                     |        | -   |   |   |   |   |   | . (PWR SPLY MODULE,TO CONNECTOR ON B1004)               |          |                 |
|                |                   |                     |        | 4   |   |   |   |   |   | . CONTACT,ELEC:CONNECTOR,BRASS TIN PL                   | 27264    | 02-09-2101      |
|                |                   |                     |        | 1   |   |   |   |   |   | . CABLE,SP,ELEC:2,18 AWG,W/VINYL JACKET                 | 80009    | 175-2203-00     |

# REPLACEABLE MECHANICAL PARTS

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                            | Mfr Code | Mfr Part Number |
|------------------|--------------------|-----------------------------|-----|---|---|---|---|---|---------------------------------------------------------------|----------|-----------------|
| 2-43             | 131-1846-00        |                             | 1   |   |   |   |   |   | CONTACT, ELEC:GROUNDING<br>(ATTACHING PARTS)                  | 80009    | 131-1846-00     |
| -44              | 213-0088-00        |                             | 1   |   |   |   |   |   | SCR,TPG,THD CTG:4-24 X 0.25 INCH,PNH STL<br>- - - * - - -     | 83385    | OBD             |
| -45              | 343-0775-00        |                             | 4   |   |   |   |   |   | CLIP,SPR TNSN:                                                | 76381    | 3484-1000       |
| -46              | 343-1005-00        |                             | 1   |   |   |   |   |   | RETAINER,CA TIE:0.25 OD HOLE,0.19 TIE ACCO                    | 59730    | TC 121          |
| -74              | 343-0549-00        |                             | 4   |   |   |   |   |   | STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG                        | 59730    | TY100           |
| -48              | 386-4497-00        |                             | 1   |   |   |   |   |   | SPRT,POWER SPLY:FLOPPY DISC,AL<br>(ATTACHING PARTS)           | 80009    | 386-4497-00     |
| -49              | 210-0458-00        |                             | 4   |   |   |   |   |   | NUT,PL,ASSEM WA:8-32 X 0.344 INCH,STL<br>- - - * - - -        | 83385    | OBD             |
| -50              | 195-2121-00        |                             | 2   |   |   |   |   |   | LEAD,ELECTRICAL:0.156 W,FLAT BRAID,3.0 L<br>(ATTACHING PARTS) | 80009    | 195-2121-00     |
| -51              | 212-0023-00        |                             | 2   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.375,PNH,STL CD PL                      | 83385    | OBD             |
| -52              | 210-0458-00        |                             | 2   |   |   |   |   |   | NUT,PL,ASSEM WA:8-32 X 0.344 INCH,STL<br>- - - * - - -        | 83385    | OBD             |
|                  | -----              |                             | -   |   |   |   |   |   | LEAD INCLUDES:                                                |          |                 |
| -53              | 210-0307-00        |                             | 4   |   |   |   |   |   | TERMINAL,LUG:RING,INS,16-14 AWG,#8                            | 09922    | BA14E-8         |

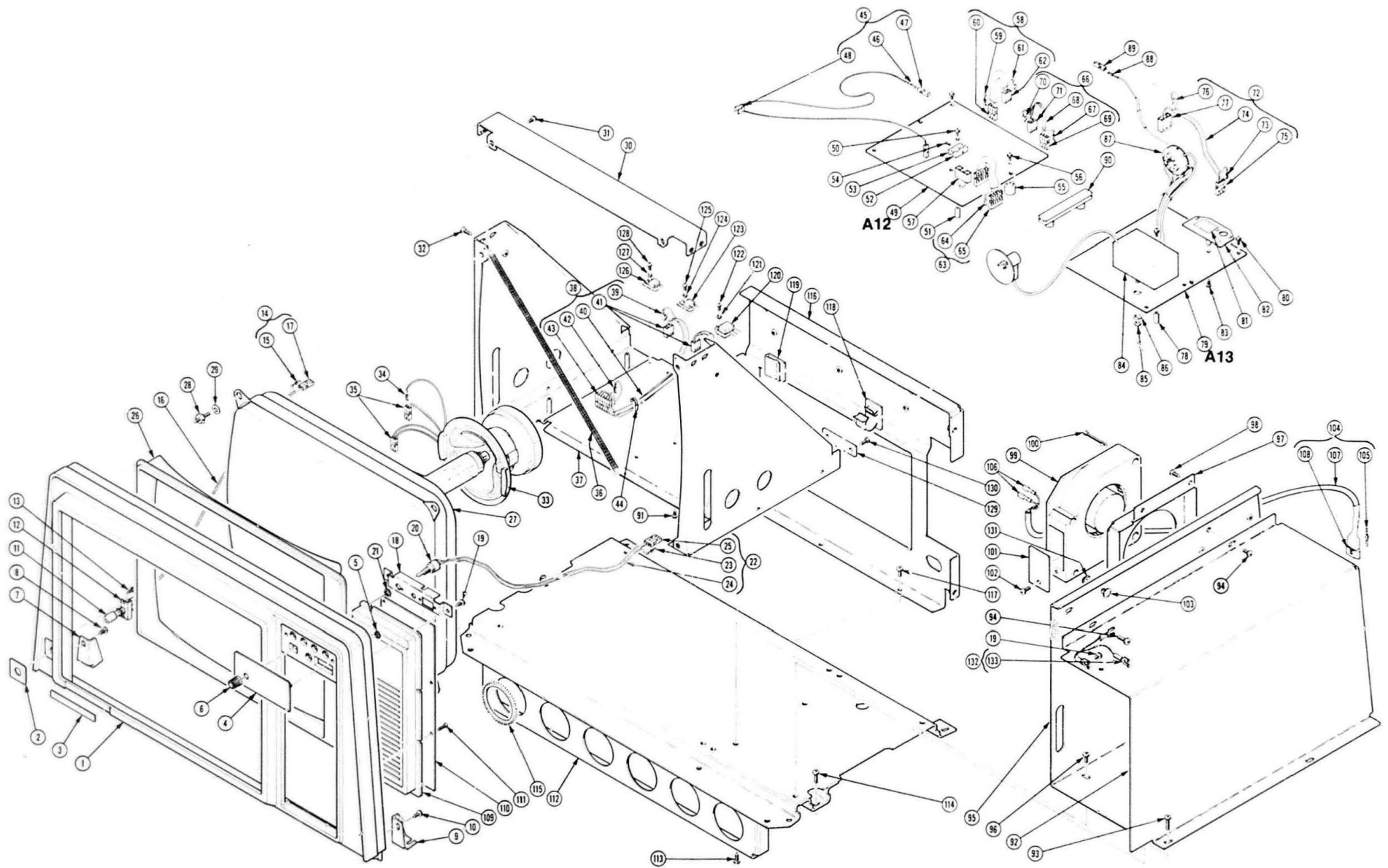


FIG. 3 CRT ASSEMBLY

REPLACEABLE MECHANICAL PARTS

| Fig & Index No | Tektronix Part No | Serial/Model No Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                               | Mfr Code | Mfr Part Number  |
|----------------|-------------------|---------------------|--------|-----|---|---|---|---|---|------------------------------------------------------------------|----------|------------------|
| 3-1            | 333-2688-01       |                     |        | 1   |   |   |   |   |   | PANEL, FRONT: DISPLAY                                            | 80009    | 333-2688-01      |
| -2             | 334-4060-01       |                     |        | 1   |   |   |   |   |   | PLATE, IDENT: MKD POWER ON/OFF                                   | 80009    | 334-4060-01      |
| -3             | 334-4095-01       |                     |        | 1   |   |   |   |   |   | MARKER, IDENT: MKD 4112                                          | 80009    | 334-4095-01      |
| -4             | 333-2767-01       |                     |        | 1   |   |   |   |   |   | PANEL, CONTROL: CRT<br>(ATTACHING PARTS)                         | 80009    | 333-2767-01      |
| -5             | 210-0457-00       |                     |        | 2   |   |   |   |   |   | NUT, PL, ASSEM WA: 6-32 X 0.312, STL CD PL<br>- - - * - - -      | 83385    | OBD              |
| -6             | 366-1023-11       |                     |        | 1   |   |   |   |   |   | KNOB: SLATE GY, 0.127 ID X 0.392 ODX 0.466H                      | 80009    | 366-1023-11      |
| -7             | 407-2677-00       |                     |        | 1   |   |   |   |   |   | BRACKET, MTG: CRT SCALE RETAINER, L, AL<br>(ATTACHING PARTS)     | 80009    | 407-2677-00      |
| -8             | 212-0023-00       |                     |        | 1   |   |   |   |   |   | SCREW, MACHINE: 8-32 X 0.375, PNH, STL CD PL<br>- - - * - - -    | 83385    | OBD              |
| -9             | 407-2675-00       |                     |        | 1   |   |   |   |   |   | BRACKET, MTG: CRT SCALE RTNR, R, AL<br>(ATTACHING PARTS)         | 80009    | 407-2675-00      |
| -10            | 212-0023-00       |                     |        | 1   |   |   |   |   |   | SCREW, MACHINE: 8-32 X 0.375, PNH, STL CD PL<br>- - - * - - -    | 83385    | OBD              |
| -11            | 366-1023-11       |                     |        | 1   |   |   |   |   |   | KNOB: SLATE GY, 0.127 ID X 0.392 ODX 0.466H                      | 80009    | 366-1023-11      |
| -12            | -----             |                     |        | 1   |   |   |   |   |   | POWER SWITCH: (SEE S5001 REPL)<br>(ATTACHING PARTS)              |          |                  |
| -13            | 211-0033-00       |                     |        | 2   |   |   |   |   |   | SCR, ASSEM WSHR: 4-40 X 0.312 PNH, STL, CD PL<br>- - - * - - -   | 83385    | OBD              |
| -14            | 175-3783-00       |                     |        | 1   |   |   |   |   |   | CA ASSY, SP, ELEC: 2, 22 AWG, 61.0L, RIBBON                      | 80009    | 175-3783-00      |
| -15            | 131-0621-00       |                     |        | 2   |   |   |   |   |   | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                    | 22526    | 46231            |
| -16            | 175-0863-00       |                     |        | AR  |   |   |   |   |   | . WIRE, ELECTRICAL: 2 WIRE RIBBON                                | 08261    | SS-0222-7(1061)  |
| -17            | 352-0198-00       |                     |        | 1   |   |   |   |   |   | . HLDR, TERM CONN: 2 WIRE BLACK                                  | 80009    | 352-0198-00      |
| -18            | 407-2694-00       |                     |        | 1   |   |   |   |   |   | . (POWER SWITCH CABLE)                                           |          |                  |
| -18            | 407-2694-00       |                     |        | 1   |   |   |   |   |   | BRACKET, SUPPORT: INST CONTROL, ALUMINUM<br>(ATTACHING PARTS)    | 80009    | 407-2694-00      |
| -19            | 212-0023-00       |                     |        | 2   |   |   |   |   |   | SCREW, MACHINE: 8-32 X 0.375, PNH, STL CD PL<br>- - - * - - -    | 83385    | OBD              |
| -20            | -----             |                     |        | 1   |   |   |   |   |   | RESISTOR, VARIABLE: (SEE R5001 REPL)<br>(ATTACHING PARTS)        |          |                  |
| -21            | 210-0562-00       |                     |        | 1   |   |   |   |   |   | NUT, PLAIN, HEX.: 0.25-40 X 0.312 INCH, BBS<br>- - - * - - -     | 73743    | 2X20224-402      |
| -22            | 175-3792-00       |                     |        | 1   |   |   |   |   |   | CA ASSY, SP, ELEC: 3, 22 AWG, 31.0L, RIBBON                      | 80009    | 175-3792-00      |
| -23            | 131-1810-00       |                     |        | 3   |   |   |   |   |   | . CONTACT, ELEC: FEMALE, FOR 0.025 SQ PIN                        | 00779    | 87124-1          |
| -24            | 175-0862-00       |                     |        | AR  |   |   |   |   |   | . WIRE, ELECTRICAL: 3 WIRE RIBBON                                | 08261    | SS-0322-1910610C |
| -25            | 352-0644-00       |                     |        | 1   |   |   |   |   |   | . HLDR, TERM CONN: 1 X 3, 01 CTR, LKG CLIP CONT<br>- . (A12P587) | 00779    | 87175-8          |
| -26            | 331-0472-01       |                     |        | 1   |   |   |   |   |   | MASK, CRT:                                                       | 80009    | 331-0472-01      |
| -27            | -----             |                     |        | 1   |   |   |   |   |   | ELECTRON TUBE: (SEE V5001 REPL)<br>(ATTACHING PARTS)             |          |                  |
| -28            | 212-0645-00       |                     |        | 4   |   |   |   |   |   | SCREW, MACHINE: 8-32 X 0.357 HEX AL, CRM CVR                     | 80009    | 212-0645-00      |
| -29            | 210-0805-00       |                     |        | 4   |   |   |   |   |   | WASHER, FLAT: 0.204 ID X 0.438 INCH OD, STL<br>- - - * - - -     | 12327    | OBD              |
| -30            | 407-2609-00       |                     |        | 1   |   |   |   |   |   | BRACKET, SUPPORT: UPPER, MASK<br>(ATTACHING PARTS)               | 80009    | 407-2609-00      |
| -31            | 212-0023-00       |                     |        | 2   |   |   |   |   |   | SCREW, MACHINE: 8-32 X 0.375, PNH, STL CD PL                     | 83385    | OBD              |
| -32            | 211-0658-00       |                     |        | 4   |   |   |   |   |   | SCR, ASSEM WSHR: 6-32 X 0.312 L, PNH, STL<br>- - - * - - -       | 78189    | OBD              |
| -33            | -----             |                     |        | 1   |   |   |   |   |   | COIL, TUBE DEFL: (SEE L1002 REPL)                                |          |                  |
| -34            | 131-0621-00       |                     |        | 4   |   |   |   |   |   | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                    | 22526    | 46231            |
| -35            | 352-0198-00       |                     |        | 2   |   |   |   |   |   | . HLDR, TERM CONN: 2 WIRE BLACK                                  | 80009    | 352-0198-00      |
| -36            | 214-3125-00       |                     |        | 1   |   |   |   |   |   | SPRING, HEXT: 0.25 OD X 6.437 L, SPR STL                         | 000CX    | OBD              |
| -37            | 386-4493-01       |                     |        | 1   |   |   |   |   |   | PLATE, BASE: CRT W/PANEL SUPPORTS                                | 80009    | 386-4493-01      |
| -38            | 198-4563-00       |                     |        | 1   |   |   |   |   |   | WIRE SET, ELEC:                                                  | 80009    | 198-4563-00      |
| -39            | 131-1815-00       |                     |        | 6   |   |   |   |   |   | . CONTACT, ELEC: 22-30 AWG, FEMALE, BRASS                        | 27264    | 08-56-0110       |
| -40            | 175-0862-00       |                     |        | AR  |   |   |   |   |   | . WIRE, ELECTRICAL: 3 WIRE RIBBON                                | 08261    | SS-0322-1910610C |
| -41            | 204-0678-00       |                     |        | 2   |   |   |   |   |   | . CONN BODY, PL, EL: FOR 3 FEMALE CONTACTS<br>- . (P1003, P1004) | 27264    | 10-17-2032       |
| -42            | 131-0621-00       |                     |        | 6   |   |   |   |   |   | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                    | 22526    | 46231            |
| -43            | 352-0202-00       |                     |        | 1   |   |   |   |   |   | . HLDR, TERM CONN: 6 WIRE BLACK<br>- . (A12P584)                 | 80009    | 352-0202-00      |
| -44            | 343-0213-00       |                     |        | 1   |   |   |   |   |   | CLAMP, LOOP: 0.2 ID, PLASTIC                                     | 80009    | 343-0213-00      |
| -45            | 198-4313-00       |                     |        | 1   |   |   |   |   |   | WIRE SET, ELEC:                                                  | 80009    | 198-4313-00      |

# REPLACEABLE MECHANICAL PARTS

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                           | Mfr Code | Mfr Part Number  |
|------------------|--------------------|-----------------------------|-----|---|---|---|---|---|----------------------------------------------|----------|------------------|
| 3-46             | 131-1810-00        |                             | 2   |   |   |   |   |   | . CONTACT,ELEC:FEMALE,FOR 0.025 SQ PIN       | 00779    | 87124-1          |
| -47              | 204-0675-00        |                             | 2   |   |   |   |   |   | . CONN BODY,PLUG:1 LKG CLIP POZ,0.025 SQ PIN | 00779    | 87175-2          |
|                  | -----              |                             |     |   |   |   |   |   | . (A12 "GND",A13 "GND")                      |          |                  |
| -48              | 344-0286-00        |                             | 1   |   |   |   |   |   | . CLIP,ELECTRICAL:FOR 3AG FUSE,BRS           | 75915    | 102074           |
| -49              | 361-0046-00        |                             | 2   |   |   |   |   |   | SPACER,POST:0.5 L W/4-40 THRU,ACETAL,0.25    | 80009    | 361-0046-00      |
| -50              | -----              |                             | 1   |   |   |   |   |   | CKT BOARD ASSY:DEFLECTION(SEE A12 REPL)      |          |                  |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)                            |          |                  |
| -51              | 211-0244-00        |                             | 3   |   |   |   |   |   | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL     | 78189    | OBD              |
|                  | -----              |                             |     |   |   |   |   |   | - DEFLECTION BOARD INCLUDES:                 |          |                  |
| -52              | 200-1153-01        |                             | 1   |   |   |   |   |   | . COV HALF,HT STA:XSTR,TO-18 & TO-78         | 80009    | 200-1153-01      |
| -53              | 200-1155-00        |                             | 1   |   |   |   |   |   | . COV HALF,HT STA:                           | 80009    | 200-1155-00      |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)                            |          |                  |
| -54              | 211-0112-00        |                             | 1   |   |   |   |   |   | . SCREW,MACHINE:2-56 X 0.375,FLH,100 DEG     | 83385    | OBD              |
|                  | -----              |                             |     |   |   |   |   |   | - - - * - - -                                |          |                  |
| -55              | 129-0876-00        |                             | 1   |   |   |   |   |   | . SPACER,POST:0.51 L W/4-40INT THD THRU      | 80009    | 129-0876-00      |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)                            |          |                  |
| -56              | 211-0244-00        |                             | 1   |   |   |   |   |   | . SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL   | 78189    | OBD              |
|                  | -----              |                             |     |   |   |   |   |   | - - - * - - -                                |          |                  |
| -57              | 214-2811-00        |                             | 2   |   |   |   |   |   | . HEAT,SINK,XSTR:TO-202 ALUMINUM             | 80009    | 214-2811-00      |
| -58              | 198-4481-00        |                             | 1   |   |   |   |   |   | WIRE SET,ELEC:                               | 80009    | 198-4481-00      |
| -59              | 131-0621-00        |                             | 3   |   |   |   |   |   | . CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD   | 22526    | 46231            |
| -60              | 352-0199-00        |                             | 1   |   |   |   |   |   | . CONN BODY,PL,EL:3 WIRE BLACK               | 80009    | 352-0199-00      |
|                  | -----              |                             |     |   |   |   |   |   | . (A12P500)                                  |          |                  |
| -61              | 131-1815-00        |                             | 3   |   |   |   |   |   | . CONTACT,ELEC:22-30 AWG,FEMALE,BRASS        | 27264    | 08-56-0110       |
| -62              | 204-0678-00        |                             | 1   |   |   |   |   |   | . CONN BODY,PL,EL:FOR 3 FEMALE CONTACTS      | 27264    | 10-17-2032       |
|                  | -----              |                             |     |   |   |   |   |   | . (P1002)                                    |          |                  |
| -63              | 198-4527-00        |                             | 1   |   |   |   |   |   | WIRE SET,ELEC:                               | 80009    | 198-4527-00      |
| -64              | 131-0621-00        |                             | 8   |   |   |   |   |   | . CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD   | 22526    | 46231            |
| -65              | 352-0201-00        |                             | 2   |   |   |   |   |   | . CONN BODY,PL,EL:5 WIRE BLACK               | 80009    | 352-0201-00      |
|                  | -----              |                             |     |   |   |   |   |   | . (A12P581,A13P150)                          |          |                  |
| -66              | 175-3328-00        |                             | 1   |   |   |   |   |   | CA ASSY,SP,ELEC:3,22 AWG,4.0 L,RIBBON        | 80009    | 175-3328-00      |
| -67              | 131-0631-00        |                             | 3   |   |   |   |   |   | . CONN,RCPT,ELEC:3MM TYPE FEMALE             | 22229    | 2992-6012        |
| -68              | 175-0862-00        |                             | AR  |   |   |   |   |   | . WIRE,ELECTRICAL:3 WIRE RIBBON              | 08261    | SS-0322-1910610C |
| -69              | 352-0199-00        |                             | 1   |   |   |   |   |   | . CONN BODY,PL,EL:3 WIRE BLACK               | 80009    | 352-0199-00      |
|                  | -----              |                             |     |   |   |   |   |   | . (A12P501)                                  |          |                  |
| -70              | 131-1815-00        |                             | 3   |   |   |   |   |   | . CONTACT,ELEC:22-30 AWG,FEMALE,BRASS        | 27264    | 08-56-0110       |
| -71              | 204-0678-00        |                             | 1   |   |   |   |   |   | . CONN BODY,PL,EL:FOR 3 FEMALE CONTACTS      | 27264    | 10-17-2032       |
|                  | -----              |                             |     |   |   |   |   |   | . (A12P1001)                                 |          |                  |
| -72              | 175-3327-00        |                             | 1   |   |   |   |   |   | CA ASSY,SP,ELEC:3,22 AWG,4.0 L,RIBBON        | 80009    | 175-3327-00      |
| -73              | 131-0621-00        |                             | 3   |   |   |   |   |   | . CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD   | 22526    | 46231            |
| -74              | 175-0862-00        |                             | AR  |   |   |   |   |   | . WIRE,ELECTRICAL:3 WIRE RIBBON              | 08261    | SS-0322-1910610C |
| -75              | 352-0199-00        |                             | 1   |   |   |   |   |   | . CONN BODY,PL,EL:3 WIRE BLACK               | 80009    | 352-0199-00      |
|                  | -----              |                             |     |   |   |   |   |   | . (A13 BOARD)                                |          |                  |
| -76              | 131-1790-00        |                             | 3   |   |   |   |   |   | . CONTACT,ELEC:18-24 AWG,FEMALE,BRASS        | 27264    | 08-56-0105       |
| -77              | 352-0463-00        |                             | 1   |   |   |   |   |   | . HLD,TERM.CONN:3 FEMALE,NYLON               | 27264    | 10-01-1034       |
|                  | -----              |                             |     |   |   |   |   |   | . (P1000)                                    |          |                  |
| -78              | 361-0046-00        |                             | 1   |   |   |   |   |   | SPACER,POST:0.5 L W/4-40 THRU,ACETAL,0.25    | 80009    | 361-0046-00      |
| -79              | -----              |                             | 1   |   |   |   |   |   | CKT BOARD ASSY:HIGH VOLTAGE(SEE A13 REPL)    |          |                  |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)                            |          |                  |
| -80              | 211-0244-00        |                             | 2   |   |   |   |   |   | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL     | 78189    | OBD              |
|                  | -----              |                             |     |   |   |   |   |   | - - - * - - -                                |          |                  |
|                  |                    |                             |     |   |   |   |   |   | - HIGH VOLTAGE BOARD INCLUDES:               |          |                  |
| -81              | 334-2363-00        |                             | 1   |   |   |   |   |   | . MARKER INDENT:WARNING,DANGER,HV            | 80009    | 334-2363-00      |
| -82              | 386-4509-00        |                             | 1   |   |   |   |   |   | . PLATE,VAR RES:ALUMINUM                     | 80009    | 386-4509-00      |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)                            |          |                  |
| -83              | 211-0244-00        |                             | 1   |   |   |   |   |   | . SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL   | 78189    | OBD              |
|                  | -----              |                             |     |   |   |   |   |   | - - - * - - -                                |          |                  |
| -84              | -----              |                             | 1   |   |   |   |   |   | . SEMICOND DEVICE:(SEE A13A115 REPL)         |          |                  |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)                            |          |                  |
| -85              | 210-0410-00        |                             | 1   |   |   |   |   |   | . NUT,PLAIN,HEX.:10-32 X 0.312 INCH,BRS      | 73743    | 2X20003-402      |
| -86              | 210-0010-00        |                             | 1   |   |   |   |   |   | . WASHER,LOCK:INT,0.20 ID X0.376" OD,STL     | 78189    | 1210-00-00-0541C |
|                  | -----              |                             |     |   |   |   |   |   | - - - * - - -                                |          |                  |
| -87              | 136-0762-00        |                             | 1   |   |   |   |   |   | . SKT,PL-IN ELEC:CRT,8 CONT                  | 80009    | 136-0762-00      |
| -88              | 131-0621-00        |                             | 1   |   |   |   |   |   | . . CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD | 22526    | 46231            |
| -89              | 352-0197-00        |                             | 1   |   |   |   |   |   | . . CONN BODY,PL,EL:1 WIRE BLACK             | 80009    | 352-0197-00      |

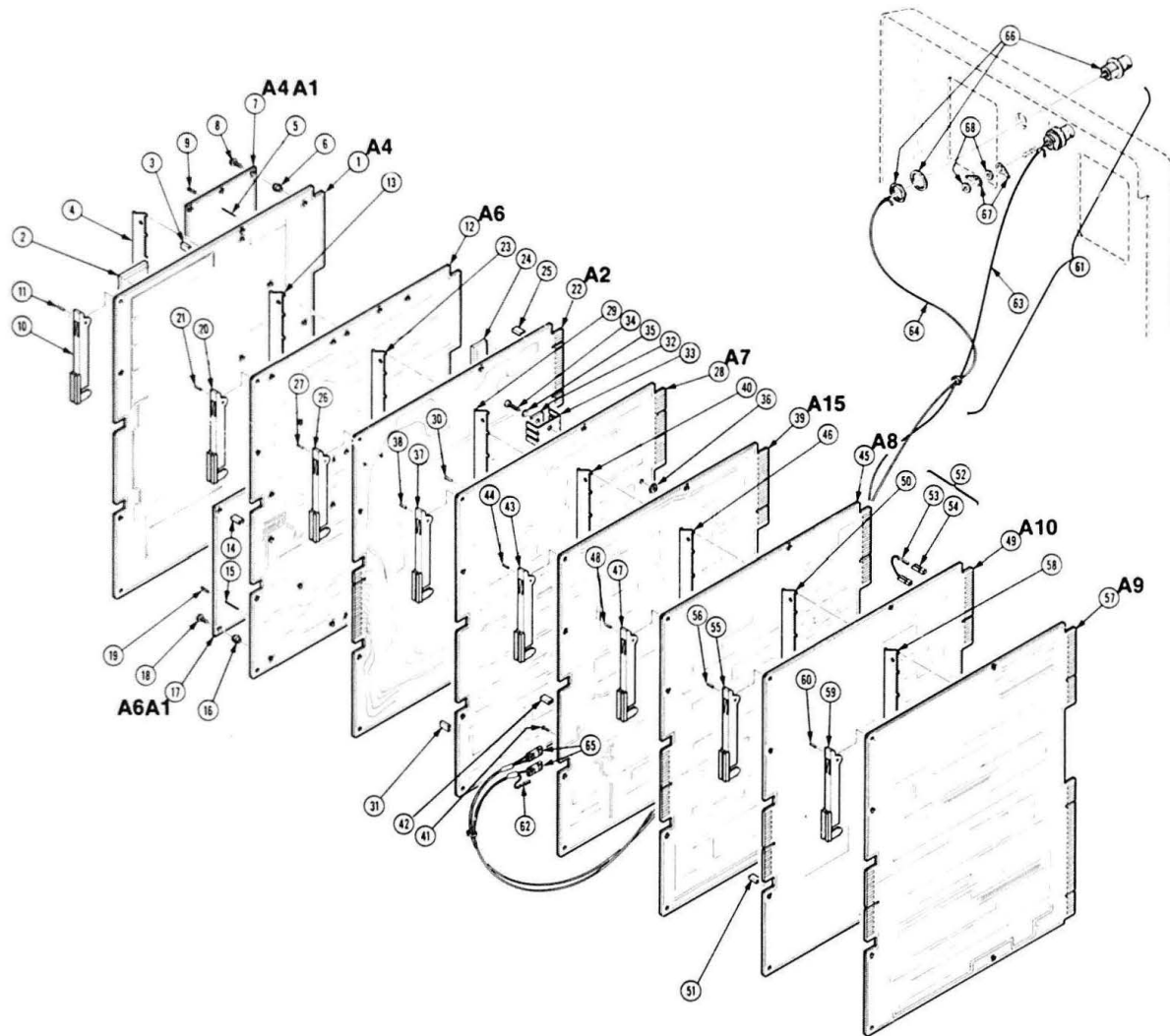


REPLACEABLE MECHANICAL PARTS

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Dscont  | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                                | Mfr Code | Mfr Part Number |
|------------------|--------------------|----------------------|---------|-----|---|---|---|---|---|-------------------------------------------------------------------|----------|-----------------|
| 3-90             | 343-0909-00        |                      |         | 1   |   |   |   |   |   | RETAINER,CKT BD:POLYAMIDE BLACK<br>(ATTACHING PARTS)              | 80009    | 343-0909-00     |
| -91              | 211-0244-00        |                      |         | 2   |   |   |   |   |   | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL<br>- - - * - - -         | 78189    | OBD             |
| -92              | 407-2695-00        |                      |         | 1   |   |   |   |   |   | BRKT,FAN DUCT:ALUMINUM<br>(ATTACHING PARTS)                       | 80009    | 407-2695-00     |
| -93              | 212-0008-00        |                      |         | 2   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.500 INCH,PNH STL                           | 83385    | OBD             |
| -94              | 212-0023-00        |                      |         | 6   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.375,PNH,STL CD PL<br>- - - * - - -         | 83385    | OBD             |
| -95              | 200-2592-00        |                      |         | 1   |   |   |   |   |   | COVER,HOUSING:FLOPPY DISC<br>(ATTACHING PARTS)                    | 80009    | 200-2592-00     |
| -96              | 212-0008-00        |                      |         | 2   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.500 INCH,PNH STL<br>- - - * - - -          | 83385    | OBD             |
| -97              | 361-1118-00        |                      |         | 1   |   |   |   |   |   | SPACER,FAN:ALUMINUM<br>(ATTACHING PARTS)                          | 80009    | 361-1118-00     |
| -98              | 212-0023-00        |                      |         | 4   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.375,PNH,STL CD PL<br>- - - * - - -         | 83385    | OBD             |
| -99              | -----              |                      |         | 1   |   |   |   |   |   | FAN CENTRIFUGAL:(SEE B1003 REPL)<br>(ATTACHING PARTS)             |          |                 |
| -100             | 211-0529-00        |                      |         | 3   |   |   |   |   |   | SCREW,MACHINE:6-32 X 1.25 INCHES,PNH STL<br>- - - * - - -         | 83385    | OBD             |
| -101             | 386-4764-00        |                      |         | 1   |   |   |   |   |   | PL,AIR DIFFUSER:1.9 X 1.2,ALUMINUM<br>(ATTACHING PARTS)           | 80009    | 386-4764-00     |
| -102             | 212-0023-00        |                      |         | 1   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.375,PNH,STL CD PL<br>- - - * - - -         | 83385    | OBD             |
| -103             | 343-1005-00        |                      |         | 2   |   |   |   |   |   | RETAINER,CA TIE:0.25 OD HOLE,0.19 TIE ACCO                        | 59730    | TC 121          |
| -104             | 175-3796-00        |                      |         | 1   |   |   |   |   |   | CA ASSY,SP,ELEC:2,18 AWG,36.0L                                    | 80009    | 175-3796-00     |
| -105             | 131-0945-00        |                      |         | 2   |   |   |   |   |   | . CONTACT,ELEC:CONNECTOR,BRASS TIN PL                             | 27264    | 02-09-2101      |
| -106             | 131-2436-00        |                      |         | 2   |   |   |   |   |   | . TERM,QIK DISC:18-22 AWG,FEMALE                                  | 00779    | 2-520083-2      |
| -107             | 175-2203-00        |                      |         | AR  |   |   |   |   |   | . CABLE,SP,ELEC:2,18 AWG,W/VINYL JACKET                           | 80009    | 175-2203-00     |
| -108             | 204-0827-00        |                      |         | 1   |   |   |   |   |   | . CONN BODY,PLUG:2 CONT FEMALE<br>- . (POWER SUPPLY MODULE,P1003) | 27264    | 03-09-2022      |
| -109             | 386-4608-01        |                      |         | 1   |   |   |   |   |   | PNL,VENTILATION:FRONT,PLASTIC                                     | 80009    | 386-4608-01     |
| -110             | 386-4696-00        |                      |         | 1   |   |   |   |   |   | PANEL,BLANK:VENTILATION,FRONT<br>(ATTACHING PARTS)                | 80009    | 386-4696-00     |
| -111             | 213-0838-00        |                      |         | 4   |   |   |   |   |   | SCREW,TPG,TR:4-20 X 0.5 L,PNH,STL,CD PL<br>- - - * - - -          | 01536    | OBD             |
| -112             | 441-1518-02        |                      |         | 1   |   |   |   |   |   | CHASSIS,DISPLAY:W/BRACKET & COVER<br>(ATTACHING PARTS)            | 80009    | 441-1518-02     |
| -113             | 212-0004-00        |                      |         | 4   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.312 INCH,PNH STL                           | 83385    | OBD             |
| -114             | 212-0008-00        |                      |         | 6   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.500 INCH,PNH STL<br>- - - * - - -          | 83385    | OBD             |
| -115             | 255-0334-00        | B010100              | B010299 | AR  |   |   |   |   |   | PLASTIC CHANNEL:12.75 X 0.175X 0.155,NYL                          | 11897    | 122-37-2500     |
|                  | 255-0619-00        | B010300              |         | AR  |   |   |   |   |   | PLASTIC CHANNEL:0.206 W X 0.22 H,NYLON                            | 06915    | SNGS-3          |
| -116             | 407-2662-00        |                      |         | 1   |   |   |   |   |   | BRACKET,SUPPORT:DISPLAY CHASSIS<br>(ATTACHING PARTS)              | 80009    | 407-2662-00     |
| -117             | 212-0023-00        |                      |         | 3   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.375,PNH,STL CD PL<br>- - - * - - -         | 83385    | OBD             |
| -118             | 343-0853-00        |                      |         | 1   |   |   |   |   |   | CLAMP,LOOP:0.5 DIA,NYLON                                          | 000CY    | 021-0500        |
| -119             | 343-0775-00        |                      |         | 1   |   |   |   |   |   | CLIP,SPR TNSN:                                                    | 76381    | 3484-1000       |
| -120             | -----              |                      |         | 1   |   |   |   |   |   | TRANSISTOR:(SEE Q1000 REPL)<br>(ATTACHING PARTS)                  |          |                 |
| -121             | 210-1291-00        |                      |         | 1   |   |   |   |   |   | WASHER,SHLDR:0.118 ID X 0.1 THK,PLSTC                             | 80009    | 210-1291-00     |
| -122             | 211-0097-00        |                      |         | 1   |   |   |   |   |   | SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL<br>- - - * - - -          | 83385    | OBD             |
| -123             | -----              |                      |         | 2   |   |   |   |   |   | TRANSISTOR:(SEE Q1001,Q1002 REPL)<br>(ATTACHING PARTS)            |          |                 |
| -124             | 210-1291-00        |                      |         | 2   |   |   |   |   |   | WASHER,SHLDR:0.118 ID X 0.1 THK,PLSTC                             | 80009    | 210-1291-00     |
| -125             | 211-0097-00        |                      |         | 2   |   |   |   |   |   | SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL<br>- - - * - - -          | 83385    | OBD             |
| -126             | -----              |                      |         | 2   |   |   |   |   |   | TRANSISTOR:(SEE Q1003,Q1004 REPL)<br>(ATTACHING PARTS)            |          |                 |
| -127             | 210-1291-00        |                      |         | 2   |   |   |   |   |   | WASHER,SHLDR:0.118 ID X 0.1 THK,PLSTC                             | 80009    | 210-1291-00     |
| -128             | 211-0097-00        |                      |         | 2   |   |   |   |   |   | SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL<br>- - - * - - -          | 83385    | OBD             |

# REPLACEABLE MECHANICAL PARTS

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                             | Mfr Code | Mfr Part Number |
|------------------|--------------------|----------------------|--------|-----|---|---|---|---|---|----------------------------------------------------------------|----------|-----------------|
| 3-129            | 343-0893-00        |                      |        | 1   |   |   |   |   |   | CLAMP, CABLE: 2.0 L, FIBER SHEET<br>(ATTACHING PARTS)          | 85471    | OBD             |
| -130             | 211-0510-00        |                      |        | 2   |   |   |   |   |   | SCREW, MACHINE: 6-32 X 0.375, PNH, STL, CD PL<br>- - - * - - - | 83385    | OBD             |
| -131             | 343-0549-00        |                      |        | 2   |   |   |   |   |   | STRAP, TIEDOWN: 0.091 W X 3.62 INCH LONG                       | 59730    | TY100           |
| -132             | 198-4483-00        |                      |        | 1   |   |   |   |   |   | WIRE SET, ELEC:                                                | 80009    | 198-4483-00     |
| -133             | 210-0308-00        |                      |        | 3   |   |   |   |   |   | TERMINAL, LUG: #6/8, FORK, SOLDERLESS, CU TIN                  | 09922    | BA16EZ-8M       |



REPLACEABLE MECHANICAL PARTS

| Fig & Index No | Tektronix Part No | Serial/Model No Eff | Dscont | Qty | 1 2 3 4 5 | Name & Description                                                                                   | Mfr Code | Mfr Part Number  |
|----------------|-------------------|---------------------|--------|-----|-----------|------------------------------------------------------------------------------------------------------|----------|------------------|
| 4-1            | -----             | -----               |        | 1   |           | CKT BOARD ASSY:RAM ROM(SEE A4 REPL)                                                                  |          |                  |
| -2             | 136-0751-00       |                     |        | 16  |           | . SKT,PL-IN ELEK:MICROCKT,24 PIN                                                                     | 09922    | D1LB24P108       |
| -3             | 131-0993-00       |                     |        | 16  |           | . BUS,CONDUCTOR:2 WIRE BLACK                                                                         | 00779    | 850100-01        |
| -4             | 124-0388-00       |                     |        | 2   |           | . BUS,CONDUCTOR:CIRCUIT BOARD,16 TAB                                                                 | 80009    | 124-0388-00      |
| -5             | 131-0787-00       |                     |        | 54  |           | . CONTACT,ELEC:0.64 INCH LONG                                                                        | 22526    | 47359            |
| -6             | 129-0317-00       |                     |        | 4   |           | . POST,ELEC-MECH:4-40 X 0.187 X 0.125 INCH L                                                         | 80009    | 129-0317-00      |
| -7             | -----             | -----               |        | 1   |           | . CKT BOARD ASSY:RAM ARRAY(SEE A5 REPL)<br>(ATTACHING PARTS)                                         |          |                  |
| -8             | 211-0033-00       |                     |        | 4   |           | . SCR,ASSEM WSHR:4-40 X 0.312 PNH,STL,CD PL<br>-----*-----                                           | 83385    | OBD              |
| -9             | 136-0263-04       |                     |        | 54  |           | . . SOCKET,PIN TERM:FOR 0.025 INCH SQUARE PIN                                                        | 22526    | 75377-001        |
| -10            | 105-0851-00       |                     |        | 2   |           | . EJECTOR,CKT BD:GRAY PLASTIC<br>(ATTACHING PARTS)                                                   | 80009    | 105-0851-00      |
| -11            | 214-1337-00       |                     |        | 2   |           | . PIN,SPRING:0.10 OD X 0.25 INCH L,STL<br>-----*-----                                                | 80009    | 214-1337-00      |
| -12            | -----             | -----               |        | 1   |           | CKT BOARD ASSY:RAM CONTROLLER(SEE A6 REPL)                                                           |          |                  |
| -13            | 124-0388-00       |                     |        | 1   |           | . BUS,CONDUCTOR:CIRCUIT BOARD,16 TAB                                                                 | 80009    | 124-0388-00      |
| -14            | 131-0993-00       |                     |        | 1   |           | . BUS,CONDUCTOR:2 WIRE BLACK                                                                         | 00779    | 850100-01        |
| -15            | 131-0787-00       |                     |        | 216 |           | . CONTACT,ELEC:0.64 INCH LONG                                                                        | 22526    | 47359            |
| -16            | 129-0317-00       |                     |        | 4   |           | . POST,ELEC-MECH:4-40 X 0.187 X 0.125 INCH L                                                         | 80009    | 129-0317-00      |
| -17            | -----             | -----               |        | 1   |           | . CKT BOARD ASSY:RAM ARRAY(SEE A5 REPL)<br>- . (QUANTITY DEPENDENT UPON OPTION)<br>(ATTACHING PARTS) |          |                  |
| -18            | 211-0033-00       |                     |        | 4   |           | . SCR,ASSEM WSHR:4-40 X 0.312 PNH,STL,CD PL<br>-----*-----                                           | 83385    | OBD              |
| -19            | 136-0263-04       |                     |        | 54  |           | . . SOCKET,PIN TERM:FOR 0.025 INCH SQUARE PIN                                                        | 22526    | 75377-001        |
| -20            | 105-0851-00       |                     |        | 2   |           | . EJECTOR,CKT BD:GRAY PLASTIC<br>(ATTACHING PARTS)                                                   | 80009    | 105-0851-00      |
| -21            | 214-1337-00       |                     |        | 2   |           | . PIN,SPRING:0.10 OD X 0.25 INCH L,STL<br>-----*-----                                                | 80009    | 214-1337-00      |
| -22            | -----             | -----               |        | 1   |           | CKT BOARD ASSY:PROCESSOR(SEE A2 REPL)                                                                |          |                  |
| -23            | 124-0388-00       |                     |        | 1   |           | . BUS,CONDUCTOR:CIRCUIT BOARD,16 TAB                                                                 | 80009    | 124-0388-00      |
| -24            | 136-0751-00       |                     |        | 8   |           | . SKT,PL-IN ELEK:MICROCKT,24 PIN                                                                     | 09922    | D1LB24P108       |
| -25            | 131-0993-00       |                     |        | 11  |           | . BUS,CONDUCTOR:2 WIRE BLACK                                                                         | 00779    | 850100-01        |
| -26            | 105-0851-00       |                     |        | 2   |           | . EJECTOR,CKT BD:GRAY PLASTIC<br>(ATTACHING PARTS)                                                   | 80009    | 105-0851-00      |
| -27            | 214-1337-00       |                     |        | 2   |           | . PIN,SPRING:0.10 OD X 0.25 INCH L,STL<br>-----*-----                                                | 80009    | 214-1337-00      |
| -28            | -----             | -----               |        | 1   |           | CKT BOARD ASSY:VIDEO CONTROLLER(SEE A7 REPL)                                                         |          |                  |
| -29            | 124-0388-00       |                     |        | 1   |           | . BUS,CONDUCTOR:CIRCUIT BOARD,16 TAB                                                                 | 80009    | 124-0388-00      |
| -30            | 136-0388-00       |                     |        | 2   |           | . SOCKET,PIN TERM:U/W 0.04 DIA PIN                                                                   | 71279    | 450-3704-01-0300 |
| -31            | 131-0993-00       |                     |        | 8   |           | . BUS,CONDUCTOR:2 WIRE BLACK                                                                         | 00779    | 850100-01        |
| -32            | -----             | -----               |        | 1   |           | . TRANSISTOR:(SEE Q621 REPL)                                                                         |          |                  |
| -33            | 214-1967-00       |                     |        | 1   |           | . HEAT SINK,DIODE:FINGER TYPE<br>(ATTACHING PARTS)                                                   | 13103    | 6107B-14         |
| -34            | 211-0198-00       |                     |        | 1   |           | . SCREW,MACHINE:4-40 X 0.438 PNH,STL,POZ                                                             | 77250    | OBD              |
| -35            | 210-1122-00       |                     |        | 1   |           | . WASHER,LOCK:0.12 ID,DISHED,0.025 THK                                                               | 86928    | OBD              |
| -36            | 210-0586-00       |                     |        | 1   |           | . NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL<br>-----*-----                                               | 83385    | OBD              |
| -37            | 105-0851-00       |                     |        | 2   |           | . EJECTOR,CKT BD:GRAY PLASTIC<br>(ATTACHING PARTS)                                                   | 80009    | 105-0851-00      |
| -38            | 214-1337-00       |                     |        | 2   |           | . PIN,SPRING:0.10 OD X 0.25 INCH L,STL<br>-----*-----                                                | 80009    | 214-1337-00      |
| -39            | -----             | -----               |        | 1   |           | CKT BOARD ASSY:EXTERNAL VIDEO(SEE A15 REPL)                                                          |          |                  |
| -40            | 124-0388-00       |                     |        | 1   |           | . BUS,CONDUCTOR:CIRCUIT BOARD,16 TAB                                                                 | 80009    | 124-0388-00      |
| -41            | 136-0388-00       |                     |        | 2   |           | . SOCKET,PIN TERM:U/W C.04 DIA PIN                                                                   | 71279    | 450-3704-01-0300 |
| -42            | 131-0993-00       |                     |        | 6   |           | . BUS,CONDUCTOR:2 WIRE BLACK                                                                         | 00779    | 850100-01        |
| -43            | 105-0851-00       |                     |        | 2   |           | . EJECTOR,CKT BD:GRAY PLASTIC<br>(ATTACHING PARTS)                                                   | 80009    | 105-0851-00      |
| -44            | 214-1337-00       |                     |        | 2   |           | . PIN,SPRING:0.10 OD X 0.25 INCH L,STL<br>-----*-----                                                | 80009    | 214-1337-00      |
| -45            | -----             | -----               |        | 1   |           | CKT BOARD ASSY:VECTOR GENERATOR(SEE A8 REPL)                                                         |          |                  |
| -46            | 124-0388-00       |                     |        | 6   |           | . BUS,CONDUCTOR:CIRCUIT BOARD,16 TAB                                                                 | 80009    | 124-0388-00      |

# REPLACEABLE MECHANICAL PARTS

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1                                                                                 | 2                                                               | 3 | 4 | 5 | Name & Description | Mfr Code | Mfr Part Number  |
|------------------|--------------------|-----------------------------|-----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------|---|---|---|--------------------|----------|------------------|
| 4-47             | 105-0851-00        |                             | 2   | .                                                                                 | EJECTOR,CKT BD:GRAY PLASTIC<br>(ATTACHING PARTS)                |   |   |   |                    | 80009    | 105-0851-00      |
| -48              | 214-1337-00        |                             | 2   | .                                                                                 | PIN,SPRING:0.10 OD X 0.25 INCH L,STL                            |   |   |   |                    | 80009    | 214-1337-00      |
| -49              | -----              |                             | 1   | CKT BOARD ASSY:OPT MEMORY PLANE(SEE A10 REPL)                                     |                                                                 |   |   |   |                    |          |                  |
| -50              | 124-0388-00        |                             | 2   | .                                                                                 | BUS,CONDUCTOR:CIRCUIT BOARD,16 TAB                              |   |   |   |                    | 80009    | 124-0388-00      |
| -51              | 131-0993-00        |                             | 2   | .                                                                                 | BUS,CONDUCTOR:2 WIRE BLACK                                      |   |   |   |                    | 00779    | 850100-01        |
| -52              | 131-1270-00        |                             | 4   | .                                                                                 | BUS,CONDUCTOR:                                                  |   |   |   |                    | 80009    | 131-1270-00      |
| -53              | 131-0707-00        |                             | 2   | .                                                                                 | CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD                        |   |   |   |                    | 22526    | 47439            |
| -54              | 352-0171-00        |                             | 2   | .                                                                                 | HLDR,TERM CONN:1 WIRE BLACK                                     |   |   |   |                    | 80009    | 352-0171-00      |
| -55              | 105-0851-00        |                             | 2   | .                                                                                 | EJECTOR,CKT BD:GRAY PLASTIC<br>(ATTACHING PARTS)                |   |   |   |                    | 80009    | 105-0851-00      |
| -56              | 214-1337-00        |                             | 2   | .                                                                                 | PIN,SPRING:0.10 OD X 0.25 INCH L,STL                            |   |   |   |                    | 80009    | 214-1337-00      |
| -57              | -----              |                             | 1   | CKT BD ASSY:STANDARD MEMORY PLANE(SEE A9 REPL)                                    |                                                                 |   |   |   |                    |          |                  |
| -58              | 124-0388-00        |                             | 2   | .                                                                                 | BUS,CONDUCTOR:CIRCUIT BOARD,16 TAB                              |   |   |   |                    | 80009    | 124-0388-00      |
| -59              | 105-0851-00        |                             | 2   | .                                                                                 | EJECTOR,CKT BD:GRAY PLASTIC<br>(ATTACHING PARTS)                |   |   |   |                    | 80009    | 105-0851-00      |
| -60              | 214-1337-00        |                             | 2   | .                                                                                 | PIN,SPRING:0.10 OD X 0.25 INCH L,STL                            |   |   |   |                    | 80009    | 214-1337-00      |
| -61              | 198-4482-00        |                             | 1   | WIRE SET,ELEC:<br>(OPTION 11 ONLY)                                                |                                                                 |   |   |   |                    | 80009    | 198-4482-00      |
| -62              | 131-1810-00        |                             | 4   | .                                                                                 | CONTACT,ELEC:FEMALE,FOR 0.025 SQ PIN                            |   |   |   |                    | 00779    | 87124-1          |
| -63              | 175-3886-00        |                             | 1   | .                                                                                 | CABLE ASSY,RF:75 OHM COAX,44.0 L,9-1                            |   |   |   |                    | 80009    | 175-3886-00      |
| -64              | 175-3887-00        |                             | 1   | .                                                                                 | CABLE ASSY,RF:75 OHM COAX,44.0 L,9-2                            |   |   |   |                    | 80009    | 175-3887-00      |
| -65              | 204-0739-00        |                             | 2   | .                                                                                 | CONN BODY,PLUG:2 CONTACTS,SGL ROW,LKG CLIP<br>(A15P308,A15P309) |   |   |   |                    | 00779    | 87175-6          |
| -66              | 131-0274-00        |                             | 2   | CONNECTOR,RCPT,:BNC<br>(OPTION 11 ONLY)<br>(J5002,J5003 REAR PANEL)               |                                                                 |   |   |   |                    | 91836    | KC79-67          |
| -67              | 210-0202-00        |                             | 2   | TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED<br>(OPTION 11 ONLY)<br>(ATTACHING PARTS) |                                                                 |   |   |   |                    | 78189    | 2104-06-00-2520N |
| -68              | 210-0407-00        |                             | 2   | NUT,PLAIN,HEX.:6-32 X 0.25 INCH,BRS<br>(OPTION 11 ONLY)                           |                                                                 |   |   |   |                    | 73743    | 3038-0228-402    |
| -69              | 343-0549-00        |                             | 3   | STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG<br>(OPTION 11 ONLY)                        |                                                                 |   |   |   |                    | 59730    | TY100            |

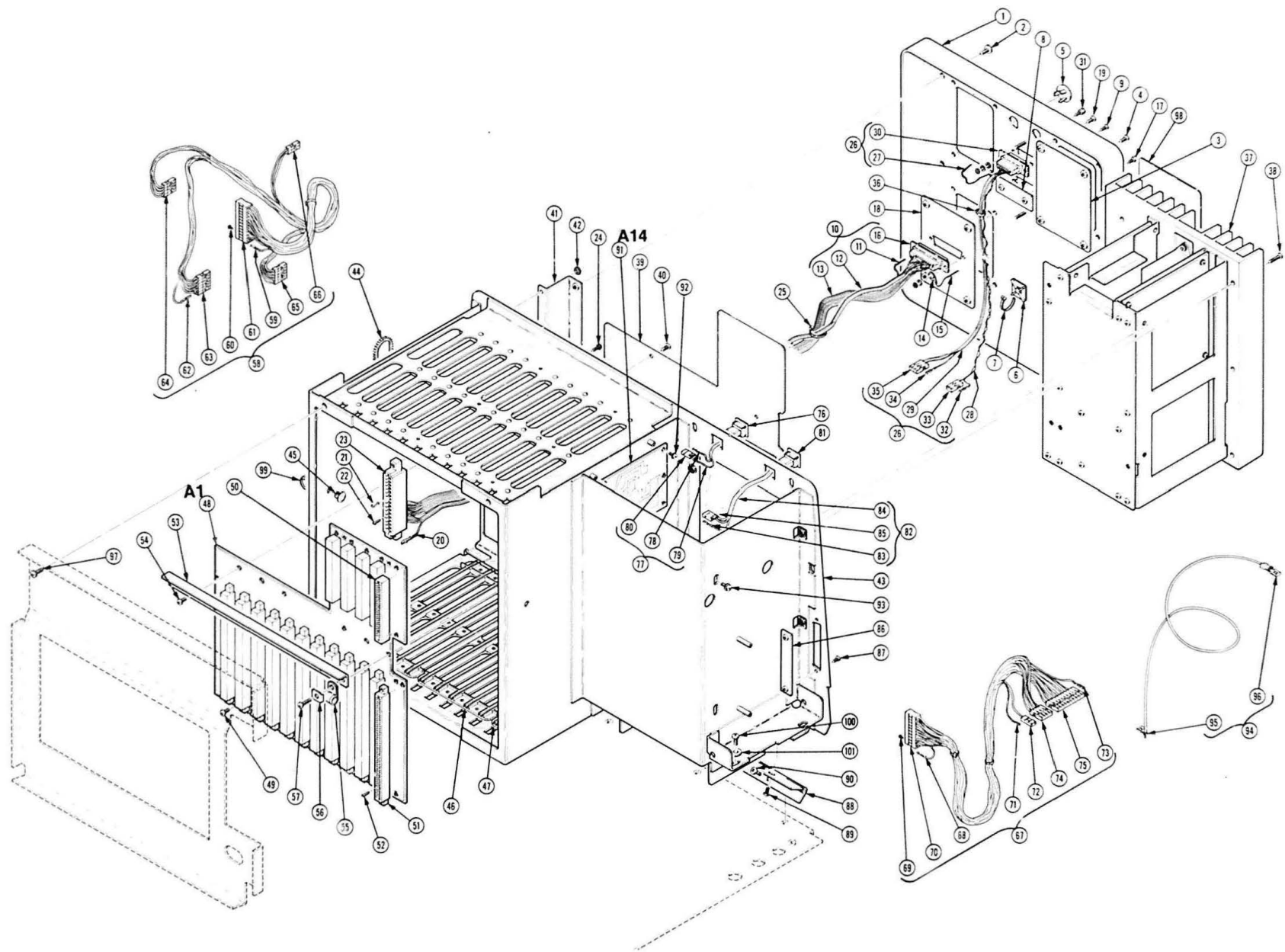


FIG. 5 REAR PANEL & CARD CAGE

REPLACEABLE MECHANICAL PARTS

| Fig & Index No | Tektronix Part No. | Serial/Model No. Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                                          | Mfr Code | Mfr Part Number  |
|----------------|--------------------|----------------------|--------|-----|---|---|---|---|---|-----------------------------------------------------------------------------|----------|------------------|
| 5-1            | 386-4557-02        |                      |        | 1   |   |   |   |   |   | PANEL, CONN MTG: CARD CAGE, COVER<br>(ATTACHING PARTS)                      | 80009    | 386-4557-02      |
| -2             | 212-0039-00        |                      |        | 6   |   |   |   |   |   | SCREW, MACHINE: 8-32 X 0.375 INCH, TRH STL<br>- - - * - - -                 | 83385    | OBD              |
| -3             | 200-1532-06        |                      |        | 2   |   |   |   |   |   | COVER, INTFC CAV: ALUMINUM<br>(ATTACHING PARTS)                             | 80009    | 200-1532-06      |
| -4             | 211-0507-00        |                      |        | 8   |   |   |   |   |   | SCREW, MACHINE: 6-32 X 0.312 INCH, PNH STL<br>- - - * - - -                 | 83385    | OBD              |
| -5             | 134-0067-01        |                      |        | 2   |   |   |   |   |   | BUTTON, PLUG: 0.5 HOLE, SMOKE TAN                                           | 80009    | 134-0067-01      |
| -6             | 352-0482-00        |                      |        | 1   |   |   |   |   |   | HOLDER, CA, TIE: 0.75 SQ, STICKY BACK, PLASTIC                              | 06383    | ABMM-A           |
| -7             | 343-0549-00        |                      |        | 1   |   |   |   |   |   | STRAP, TIEDOWN: 0.091 W X 3.62 INCH LONG                                    | 59730    | TY100            |
| -8             | 200-2558-00        |                      |        | 1   |   |   |   |   |   | COVER, HOLE: ALUMINUM<br>(ATTACHING PARTS)                                  | 80009    | 200-2558-00      |
| -9             | 211-0008-00        |                      |        | 2   |   |   |   |   |   | SCREW, MACHINE: 4-40 X 0.250, PNH, STL, CD PL<br>- - - * - - -              | 83385    | OBD              |
| -10            | 198-4423-00        |                      |        | 1   |   |   |   |   |   | WIRE SET, ELEC:<br>(ATTACHING PARTS)                                        | 80009    | 198-4423-00      |
| -11            | 131-0890-00        |                      |        | 2   |   |   |   |   |   | LOCK, CONNECTOR: 4-40 X 0.312 L<br>- - - * - - -                            | 71468    | D 20418-2        |
| -12            | 131-1279-00        |                      |        | 14  |   |   |   |   |   | . CONTACT, ELEC: MALE, 28-24 AWG WIRE, 0.040 DIA                            | 00779    | 205310-4         |
| -13            | 175-0827-00        |                      |        | AR  |   |   |   |   |   | . CABLE, SP, ELEC: 4, 26 AWG, STRD, PVC JKT, RBN                            | 08261    | SS04267(1061)0C  |
| -14            | 175-0833-00        |                      |        | AR  |   |   |   |   |   | . WIRE, ELECTRICAL: 10 WIRE RIBBON                                          | 08261    | SS-1026-7        |
| -15            | 210-0202-00        |                      |        | 1   |   |   |   |   |   | . TERMINAL, LUG: 0.146 ID, LOCKING, BRZ TINNED                              | 78189    | 2104-06-00-2520N |
| -16            | 131-1450-00        |                      |        | 1   |   |   |   |   |   | . CONTACT, ELEC: MALE, 24-30 AWG WIRE, 0.040 DIA                            | 00779    | 205202-6         |
| -17            | 131-1316-00        |                      |        | 1   |   |   |   |   |   | . CONNECTOR BODY, :25 MALE-CONT POSITIONS<br>- . (P50, REAR PANEL)          | 00779    | 208076-1         |
| -18            | 386-4610-00        |                      |        | 1   |   |   |   |   |   | . PLATE, CONN MTG: ALUMINUM<br>(ATTACHING PARTS)                            | 80009    | 386-4610-00      |
| -19            | 211-0507-00        |                      |        | 4   |   |   |   |   |   | . SCREW, MACHINE: 6-32 X 0.312 INCH, PNH STL<br>- - - * - - -               | 83385    | OBD              |
| -20            | 131-2161-01        |                      |        | 14  |   |   |   |   |   | . TERM, QIK DISC: 24-28 AWG, PHOSPHOR                                       | 00779    | 583616-2         |
| -21            | 214-3082-00        |                      |        | 4   |   |   |   |   |   | . SPRING, RTNG: CU BE, GOLD FASH OVER NP                                    | 00779    | 583691-3         |
| -22            | 214-3114-00        |                      |        | 2   |   |   |   |   |   | . KEY, CONN PLZN: CIRCUIT BD CONN                                           | 00779    | 530687-1         |
| -23            | 204-0877-00        |                      |        | 1   |   |   |   |   |   | . CONN BODY, RCPT: 22/44 CONTACT<br>- . (P102)<br>(ATTACHING PARTS)         | 00779    | 583891-9         |
| -24            | 211-0033-00        |                      |        | 2   |   |   |   |   |   | . SCR, ASSEM WSHR: 4-40 X 0.312 PNH, STL, CD PL<br>- - - * - - -            | 83385    | OBD              |
| -25            | 343-0549-00        |                      |        | 1   |   |   |   |   |   | . STRAP, TIEDOWN: 0.091 W X 3.62 INCH LONG                                  | 59730    | TY100            |
| -26            | 198-4408-00        |                      |        | 1   |   |   |   |   |   | WIRE SET, ELEC:<br>(ATTACHING PARTS)                                        | 80009    | 198-4408-00      |
| -27            | 131-0890-00        |                      |        | 2   |   |   |   |   |   | LOCK, CONNECTOR: 4-40 X 0.312 L<br>- - - * - - -                            | 71468    | D 20418-2        |
| -28            | 131-1279-01        |                      |        | 5   |   |   |   |   |   | . CONTACT, ELEC: FEMALE                                                     | 00779    | 66505-4          |
| -29            | 175-1975-00        |                      |        | 1   |   |   |   |   |   | . CABLE, SP, ELEC: 26 AWG TWISTED PAIR                                      | 80009    | 175-1975-00      |
| -30            | 175-0826-00        |                      |        | 1   |   |   |   |   |   | . WIRE, ELECTRICAL: 3 WIRE RIBBON                                           | 80009    | 175-0826-00      |
| -31            | 131-2011-00        |                      |        | 1   |   |   |   |   |   | . CONN, RCPT, ELEC: D SERIES, 15 FEMALE CONTACTS<br>- . (J5004, REAR PANEL) | 00779    | 205205-1         |
| -32            | 131-1810-00        |                      |        | 2   |   |   |   |   |   | . CONTACT, ELEC: FEMALE, FOR 0.025 SQ PIN                                   | 00779    | 87124-1          |
| -33            | 204-0739-00        |                      |        | 1   |   |   |   |   |   | . CONN BODY, PLUG: 2 CONTACTS, SGL ROW, LKG CLIP<br>- . (A7P287)            | 00779    | 87175-6          |
| -34            | 131-1810-00        |                      |        | 3   |   |   |   |   |   | . CONTACT, ELEC: FEMALE, FOR 0.025 SQ PIN                                   | 00779    | 87124-1          |
| -35            | 352-0644-00        |                      |        | 1   |   |   |   |   |   | . HLD, TERM CONN: 1 X 3, 01 CTR, LKG CLIP CONT<br>- . (A7P286)              | 00779    | 87175-8          |
| -36            | 343-0549-00        |                      |        | 4   |   |   |   |   |   | . STRAP, TIEDOWN: 0.091 W X 3.62 INCH LONG                                  | 59730    | TY100            |
| -37            | -----              |                      |        | 1   |   |   |   |   |   | POWER SUPPLY: LV (SEE LV POWER SUPPLY MANUAL)<br>(ATTACHING PARTS)          |          |                  |
| -38            | 211-0511-00        |                      |        | 6   |   |   |   |   |   | SCREW, MACHINE: 6-32 X 0.500, PNH, STL, CD PL<br>- - - * - - -              | 83385    | OBD              |
| -39            | 200-2648-00        |                      |        | 1   |   |   |   |   |   | COVER, CKT BOARD: MOTHER, POLYCARBONATE<br>(ATTACHING PARTS)                | 85471    | OBD              |
| -40            | 211-0507-00        |                      |        | 2   |   |   |   |   |   | SCREW, MACHINE: 6-32 X 0.312 INCH, PNH STL<br>- - - * - - -                 | 83385    | OBD              |
| -41            | 407-2732-00        |                      |        | 2   |   |   |   |   |   | BRACKET, ANGLE: PANEL, ALUMINUM<br>(ATTACHING PARTS)                        | 80009    | 407-2732-00      |
| -42            | 210-0457-00        |                      |        | 6   |   |   |   |   |   | NUT, PL, ASSEM WA: 6-32 X 0.312, STL CD PL<br>- - - * - - -                 | 83385    | OBD              |

# REPLACEABLE MECHANICAL PARTS

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Discont | Qty | 1 2 3 4 5 | Name & Description                                                   | Mfr Code | Mfr Part Number  |
|------------------|--------------------|----------------------|---------|-----|-----------|----------------------------------------------------------------------|----------|------------------|
| 5-43             | 386-4571-00        |                      |         | 1   |           | CAGE, CIRCUIT BD:                                                    | 80009    | 386-4571-00      |
| -44              | 255-0334-00        |                      |         | 2   |           | PLASTIC CHANNEL: 12.75 X 0.175X 0.155, NYL                           | 11897    | 122-37-2500      |
| -45              | 343-1005-00        |                      |         | 4   |           | RETAINER, CA TIE: 0.25 OD HOLE, 0.19 TIE ACCO                        | 59730    | TC 121           |
| -46              | 351-0591-00        |                      |         | 4   |           | GUIDE, CKT BD: POLYAMIDE, 7.6L                                       | 80009    | 351-0591-00      |
| -47              | 351-0591-04        |                      |         | 2   |           | GUIDE, CKT BD: POLYAMIDE, 7.6L                                       | 80009    | 351-0591-04      |
| -48              | -----              |                      |         | 1   |           | CKT BOARD ASSY: MOTHER BOARD (SEE A1 REPL)<br>(ATTACHING PARTS)      |          |                  |
| -49              | 211-0507-00        |                      |         | 6   |           | SCREW, MACHINE: 6-32 X 0.312 INCH, PNH STL<br>-----*-----            | 83385    | OBD              |
| -----            | -----              |                      |         | -   |           | MOTHER BOARD INCLUDES:                                               |          |                  |
| -50              | 131-2282-01        |                      |         | 5   |           | . CONN, RCPT, ELEC: EDGE CARD, 22/44 CONT, 0.125                     | 00779    | 2-530671-5       |
| -51              | 131-2279-00        | B010100              | B010219 | 12  |           | . CONN, RCPT, ELEC: CKT BD, 40/80, FEMALE                            | 00779    | 3-530662-0       |
|                  | 131-2059-01        | B010220              |         | 12  |           | . CONN, RCPT, ELEC: CKT BD, 40/80 FEM W/O EARS                       | 00779    | 3-530671-0       |
| -52              | 214-3114-00        |                      |         | 29  |           | . KEY, CONN PLZN: CIRCUIT BD CONN                                    | 00779    | 530687-1         |
| -53              | 386-4580-00        |                      |         | 1   |           | . STIF, CKT BD: ALUMINUM<br>(ATTACHING PARTS)                        | 80009    | 386-4580-00      |
| -54              | 211-0507-00        |                      |         | 2   |           | . SCREW, MACHINE: 6-32 X 0.312 INCH, PNH STL<br>-----*-----          | 83385    | OBD              |
| -55              | 343-0004-00        |                      |         | 2   |           | . CLAMP, LOOP: 0.312 INCH DIAMETER, PLSTC                            | 95987    | 5-16-6B          |
| -56              | 210-0863-00        |                      |         | 2   |           | . WSHR, LOOP CLAMP: 0.187 ID U/W 0.5 W CLP, STL<br>(ATTACHING PARTS) | 95987    | C191             |
| -57              | 211-0511-00        |                      |         | 2   |           | . SCREW, MACHINE: 6-32 X 0.500, PNH, STL, CD PL<br>-----*-----       | 83385    | OBD              |
| -58              | 175-4099-00        |                      |         | 1   |           | CA ASSY, SP, ELEC: 17, 22 AWG, 18.5 L, RIBBON                        | 27264    | OBD              |
| -59              | 131-0707-00        |                      |         | 17  |           | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                        | 22526    | 47439            |
| -60              | 134-0153-00        |                      |         | 2   |           | . KEY, PLZN CONN: MINI LATCH HSG                                     | 80009    | 134-0153-00      |
| -61              | 352-0436-00        |                      |         | 1   |           | . HLD, TERM, CONN: 2-10 FEMALE, 0.15 X 0.15 CTR<br>- . (A14P49)      | 22526    | 65057-022        |
| -62              | 131-0621-00        |                      |         | 17  |           | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                        | 22526    | 46231            |
| -63              | 352-0202-00        |                      |         | 1   |           | . HLD, TERM CONN: 6 WIRE BLACK<br>- . (A1P27)                        | 80009    | 352-0202-00      |
| -64              | 352-0201-00        |                      |         | 1   |           | . CONN BODY, PL, EL: 5 WIRE BLACK<br>- . (A1P28)                     | 80009    | 352-0201-00      |
| -65              | 352-0200-00        |                      |         | 1   |           | . HLD, TERM CONN: 4 WIRE BLACK<br>- . (A1P42)                        | 80009    | 352-0200-00      |
| -66              | 352-0198-00        |                      |         | 1   |           | . HLD, TERM CONN: 2 WIRE BLACK<br>- . (A1P44)                        | 80009    | 352-0198-00      |
| -67              | 175-4098-00        |                      |         | 1   |           | CA ASSY, SP, ELEC: 16, 22 AWG, 15.5 L, RIBBON                        | 27264    | OBD              |
| -68              | 131-0707-00        |                      |         | 16  |           | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                        | 22526    | 47439            |
| -69              | 134-0153-00        |                      |         | 2   |           | . KEY, PLZN CONN: MINI LATCH HSG                                     | 80009    | 134-0153-00      |
| -70              | 352-0436-00        |                      |         | 1   |           | . HLD, TERM, CONN: 2-10 FEMALE, 0.15 X 0.15 CTR<br>- . (A14P48)      | 22526    | 65057-022        |
| -71              | 131-0707-00        |                      |         | 2   |           | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                        | 22526    | 47439            |
| -72              | 352-0169-00        |                      |         | 1   |           | . HLD, TERM CONN: 2 WIRE BLACK<br>- . (P76, POWER SUPPLY MODULE)     | 80009    | 352-0169-00      |
| -73              | 131-0621-00        |                      |         | 14  |           | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                        | 22526    | 46231            |
| -74              | 352-0200-00        |                      |         | 1   |           | . HLD, TERM CONN: 4 WIRE BLACK<br>- . (P74, POWER SUPPLY MODULE)     | 80009    | 352-0200-00      |
| -75              | 352-0206-00        |                      |         | 1   |           | . HLD, TERM CONN: 10 WIRE BLACK<br>- . (P73, POWER SUPPLY MODULE)    | 80009    | 352-0206-00      |
| -76              | -----              |                      |         | 1   |           | SELF TEST SWITCH: (SEE S5004 REPL)                                   |          |                  |
| -77              | 175-4471-00        |                      |         | 1   |           | CA ASSY, SP, ELEC: 2, 22 AWG, 6.0 L, RIBBON                          | 80009    | 175-4471-00      |
| -78              | 131-0707-00        |                      |         | 2   |           | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                        | 22526    | 47439            |
| -79              | 175-0863-00        |                      |         | AR  |           | . WIRE, ELECTRICAL: 2 WIRE RIBBON                                    | 08261    | SS-0222-7(1061)  |
| -80              | 352-0169-00        |                      |         | 1   |           | . HLD, TERM CONN: 2 WIRE BLACK<br>- . (A14P51)                       | 80009    | 352-0169-00      |
| -81              | -----              |                      |         | 1   |           | MASTER RESET SWITCH: (SEE S5003 REPL)                                |          |                  |
| -82              | 175-3787-00        |                      |         | 1   |           | CA ASSY, SP, ELEC: 3, 22 AWG, 7.0 L, RIBBON                          | 80009    | 175-3787-00      |
| -83              | 131-0707-00        |                      |         | 3   |           | . CONNECTOR, TERM: 22-26 AWG, BRS& CU BE GOLD                        | 22526    | 47439            |
| -84              | 175-0862-00        |                      |         | AR  |           | . WIRE, ELECTRICAL: 3 WIRE RIBBON                                    | 08261    | SS-0322-1910610C |
| -85              | 352-0161-00        |                      |         | 1   |           | . HLD, TERM CONN: 3 WIRE, BLACK<br>- . (A14P52)                      | 80009    | 352-0161-00      |
| -86              | 200-2559-00        |                      |         | 1   |           | COVER, HOLE: ALUMINUM<br>(ATTACHING PARTS)                           | 80009    | 200-2559-00      |
| -87              | 211-0008-00        |                      |         | 2   |           | SCREW, MACHINE: 4-40 X 0.250, PNH, STL, CD PL<br>-----*-----         | 83385    | OBD              |



REPLACEABLE MECHANICAL PARTS

| Fig & Index No. | Tektronix Part No | Serial/Model No. Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                               | Mfr Code | Mfr Part Number |
|-----------------|-------------------|----------------------|--------|-----|---|---|---|---|---|------------------------------------------------------------------|----------|-----------------|
| 5-88            | 214-1844-08       |                      |        | 1   |   |   |   |   |   | HINGE,BUTT:CARD CAGE<br>(ATTACHING PARTS)                        | 80009    | 214-1844-08     |
| -89             | 211-0504-00       |                      |        | 5   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL                           | 83385    | OBD             |
| -90             | 211-0510-00       |                      |        | 4   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL                         | 83385    | OBD             |
| -91             | -----             |                      |        | 1   |   |   |   |   |   | CKT BOARD ASSY:PS DISTR BOARD(SEE A14 REPL)<br>(ATTACHING PARTS) |          |                 |
| -92             | 211-0033-00       |                      |        | 4   |   |   |   |   |   | SCR,ASSEM WSHR:4-40 X 0.312 PNH,STL,CD PL                        | 83385    | OBD             |
| -93             | 211-0658-00       |                      |        |     |   |   |   |   |   | PS DISTRIBUTION BOARD INCLUDES:                                  |          |                 |
| -94             | 195-1945-00       |                      |        | 2   |   |   |   |   |   | . SCR,ASSEM WSHR:6-32 X 0.312 L,PNH,STL                          | 78189    | OBD             |
|                 | 195-1947-00       |                      |        | 2   |   |   |   |   |   | . LEAD,ELECTRICAL:12 AWG,15.0 L,0-N                              | 80009    | 195-1945-00     |
| -95             | 131-2683-00       |                      |        | 2   |   |   |   |   |   | . LEAD,ELECTRICAL:12 AWG,15.0 L,2-N                              | 80009    | 195-1947-00     |
|                 | -----             |                      |        | 4   |   |   |   |   |   | . TERM,QIK DISC:16-12 AWG,0.25 X 0.032 THK                       | 00779    | 61188-1         |
| -96             | 131-1563-00       |                      |        |     |   |   |   |   |   | . (A1J40,A1J41,A1J45,A1J46)                                      |          |                 |
|                 | -----             |                      |        | 4   |   |   |   |   |   | . TERM,QIK DISC.:FEMALE ACCOM 0.25 X 0.037                       | 00779    | 61198-1         |
| -97             | 211-0510-00       |                      |        |     |   |   |   |   |   | . (POWER SUPPLY MODULE,+5V AND GND)                              |          |                 |
| -98             | 334-4072-01       |                      |        | 2   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL                         | 83385    | OBD             |
| -99             | 343-0549-00       |                      |        | 1   |   |   |   |   |   | MARKER,IDENT:MKD 4112 CONFIGURATION                              | 80009    | 334-4072-01     |
| -100            | 212-0023-00       |                      |        | 4   |   |   |   |   |   | STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG                           | 59730    | TY100           |
| -101            | 210-0858-00       |                      |        | 4   |   |   |   |   |   | SCREW,MACHINE:8-32 X 0.375,PNH,STL CD PL                         | 83385    | OBD             |
|                 |                   |                      |        | 4   |   |   |   |   |   | WASHER,FLAT:0.500 OD X 0.171 ID X 0.063 THK                      | 80009    | 210-0858-00     |

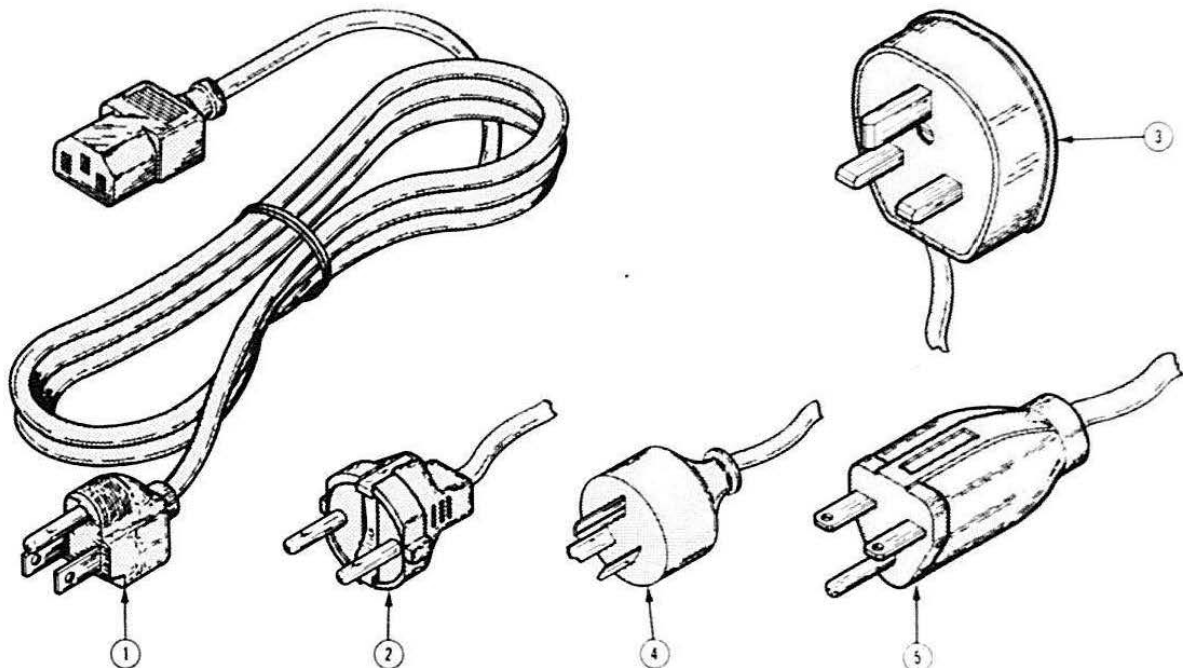


Fig. &  
Index  
No.

Tektronix  
Part No.

Serial/Model No.  
Eff Dscont

Qty 1 2 3 4 5

Name & Description

Mfr  
Code Mfr Part Number

STANDARD ACCESSORIES

|    |             |  |  |   |                                             |       |             |
|----|-------------|--|--|---|---------------------------------------------|-------|-------------|
| 6- | 012-0911-00 |  |  | 1 | CABLE, INTCON:144.0 L                       | 04919 | OBD         |
| -1 | 161-0123-00 |  |  | 1 | CABLE ASSY, PWR: 3, 16 AWG, 125V, 96.01     | 70903 | KH9028      |
|    | 161-0145-00 |  |  | 1 | CABLE ASSY, PWR: 3, 0.75MM SQ, 250V, 21.0 L | 70903 | OBD         |
| -2 | 161-0123-01 |  |  | 1 | CABLE ASSY, PWR: 3, 0.75MM SQ, 220V, 96.0 L | 80126 | OBD         |
|    | -----       |  |  | - | (OPTION A1 ONLY)                            |       |             |
| -3 | 161-0123-02 |  |  | 1 | CABLE ASSY, PWR: 3, 16 AWG, 240V, 96.0 L    | 80126 | OBD         |
|    | -----       |  |  | - | (OPTION A2 ONLY)                            |       |             |
| -4 | 161-0123-03 |  |  | 1 | CABLE ASSY, PWR: 3, 1MM SQ, 240V, 96.0 L    | S3109 | 1600        |
|    | -----       |  |  | - | (OPTION A3 ONLY)                            |       |             |
| -5 | 161-0123-04 |  |  | 1 | CABLE ASSY, PWR: 3, 1.0MM SQ, 240V, 96.0 L  | 80126 | OBD         |
|    | -----       |  |  | - | (OPTION A4 ONLY)                            |       |             |
|    | 070-3683-00 |  |  | 1 | MANUAL, TECH: OPERATORS                     | 80009 | 070-3683-00 |
|    | 334-3290-01 |  |  | 6 | OVERLAY, KYBD: BLANK                        | 80009 | 334-3290-01 |
|    | 366-1882-00 |  |  | 8 | PUSH BUTTON: EARTH BRN, 1 X1 RELEGENDABLE   | 80009 | 366-1882-00 |
|    | 061-2565-00 |  |  | 1 | MANUAL, TECH: REFERENCE, 4112               | 80009 | 061-2565-00 |

OPTIONAL ACCESSORIES

|  |             |  |  |   |                                           |       |             |
|--|-------------|--|--|---|-------------------------------------------|-------|-------------|
|  | 067-1004-00 |  |  | 1 | FIXTURE, CAL: ALIGN GUIDE FOR FLOPPY DISC | 80009 | 067-1004-00 |
|  | 067-1005-00 |  |  | 1 | FIXTURE, CAL: EXTENDER BOARD              | 80009 | 067-1005-00 |
|  | 067-1042-00 |  |  | 1 | FIXTURE, CAL: CURRENT LOOP LOOP BACK CONN | 80009 | 067-1042-00 |
|  | 067-1043-00 |  |  | 1 | FIXTURE, CAL: HOST PORT LOOP BACK CONN    | 80009 | 067-1043-00 |
|  | 016-0460-00 |  |  | 1 | GRID, TABLET: 20 X 20 LINES, 11.0 X 11.0  | 0001L | 55-5531SP   |
|  | 016-0461-00 |  |  | 1 | GRID, TABLET: 20 X 20 LINES, 30.0 X 40.0  | 0001L | 55-5541SP   |
|  | 070-3817-00 |  |  | 1 | MANUAL, TECH: SERVICE VOL. 01             | 80009 | 070-3817-00 |
|  | 070-3819-00 |  |  | 1 | MANUAL, TECH: SERVICE VOL. 02             | 80009 | 070-3819-00 |
|  | 070-3732-00 |  |  | 1 | MANUAL, TECH: SERVICE, L.V. PWR SUPPLY    | 80009 | 070-3732-00 |
|  | 119-1376-01 |  |  | 1 | FLEX DISKETTE: ONE SIDED, DBLDENSITY      | 80009 | 119-1376-01 |

OPTIONS

| OPT. | ORDER       | QTY | DESCRIPTION                                                           |
|------|-------------|-----|-----------------------------------------------------------------------|
| A1   |             |     | 220V EUROPEAN POWER                                                   |
| A2   |             |     | 240V U.K. POWER                                                       |
| A3   |             |     | 240V AUSTRALIAN POWER                                                 |
| A4   |             |     | 240V N. AMERICAN POWER                                                |
| 4A   | 020-0596-00 |     | UNITED KINGDOM                                                        |
| 4C   | 020-0598-00 |     | SWEDISH KEYBOARD                                                      |
| 4E   | 020-0604-00 |     | APL KEYBOARD                                                          |
| 4F   | 020-0602-00 |     | DANISH/NORWEGIAN KEYBOARD                                             |
| 02   | 021-0323-00 |     | INTERFACE:CURRENT LOOP                                                |
| 10   | 021-0313-00 |     | INTERFACE:THREE PORT PERIPHERAL                                       |
| 11   | 018-0169-00 |     | EXTERNAL VIDEO OUT 30HZ                                               |
| 01   | 020-0606-00 |     | EXTENDED COMM:INCL HALF DUPLEX, BLOCK<br>MODE AND DOWNLOADER          |
| 13   | 4112F13     |     | GRAPHIC TABLET:11 X 11 W/PEN,INCL CONTROLLER,<br>TABLET AND INTERFACE |
| 14   | 4112F14     |     | GRAPHIC TABLET:30 X 40 W/PEN,INCL CONTROLLER,<br>TABLET AND INTERFACE |
| 15   | 4112F15     |     | TABLET PEDESTAL:USE WITH OPTION 14                                    |
| 20   | 018-0166-00 |     | DISPLAY MEMORY:2 PLANED AND VIDEO BUS EXTENDER                        |
| 24   | 018-0159-00 | 1   | ADDED MEMORY:32K BYTES OF RAM                                         |
|      | 018-0160-00 | 1   |                                                                       |
| 25   | 018-0159-00 | 1   | ADDED MEMORY:64K BYTES OF RAM                                         |
|      | 018-0160-00 | 2   |                                                                       |
| 26   | 018-0159-00 | 1   | ADDED MEMORY:96K BYTES OF RAM                                         |
|      | 018-0160-00 | 3   |                                                                       |
| 27   | 018-0159-00 | 1   | ADDED MEMORY:128K BYTES OF RAM                                        |
|      | 018-0160-00 | 4   |                                                                       |
| 28   | 018-0159-00 | 2   | ADDED MEMORY:256K BYTES OF RAM                                        |
|      | 018-0160-00 | 8   |                                                                       |
| 29   | 018-0159-00 | 4   | ADDED MEMORY:512K BYTES OF RAM                                        |
|      | 018-0160-00 | 16  |                                                                       |
| 30   | 062-6362-00 |     | LOCAL EASY GRAPHING                                                   |
| 42   | 4112F42     |     | SINGLE FLEXIBLE DISK:W/CONTROLLER                                     |
| 52   |             |     | VOLTAGE CHANGE:SPECIFY VOLTAGE & HZ                                   |

# Section 7

## DIAGRAMS

### INTRODUCTION

This section lists the cabling, interconnect and block diagrams for the 4112. Some of these diagrams are included in the theory sections in Volume 1; they are repeated here for ease of referencing.

### CABLING DIAGRAMS

- 4112 Cabling Diagram (Right-Front View)
- 4112 Cabling Diagram (Left-Front View)
- 4112 Cabling Diagram (Rear View)
- 4112 Option 42 Cabling Diagram

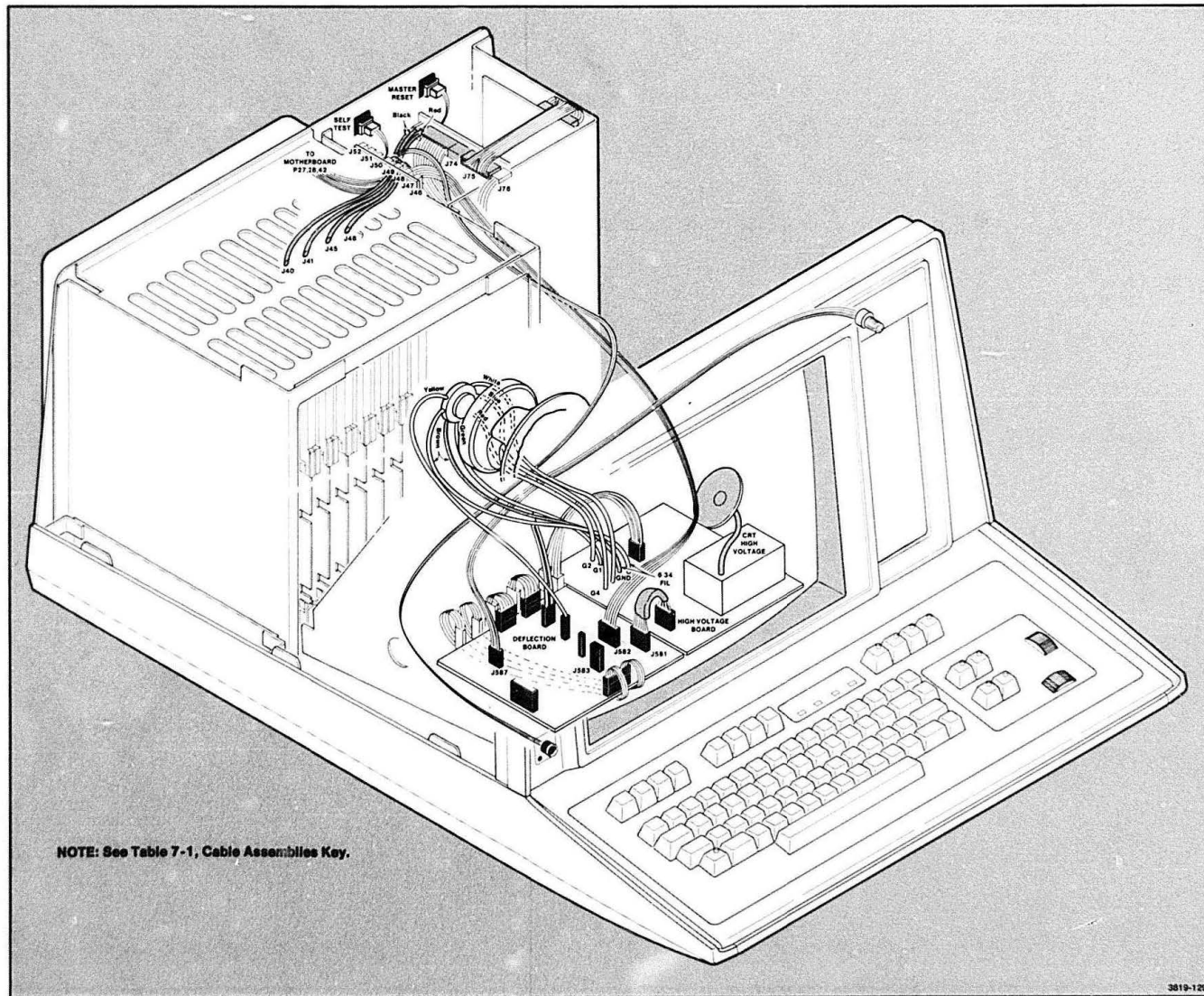
### INTERCONNECTS

- Motherboard Interconnect
- RAM Controller Interconnect
- Display Module Interconnect
- Power Supply Module Interconnect
- External Video Interconnect
- Current Loop I/F Interconnect
- 3PPI Interconnect
- Tablet Interconnect
- Flexible Disk Interconnect
- Shugart Module Interconnect

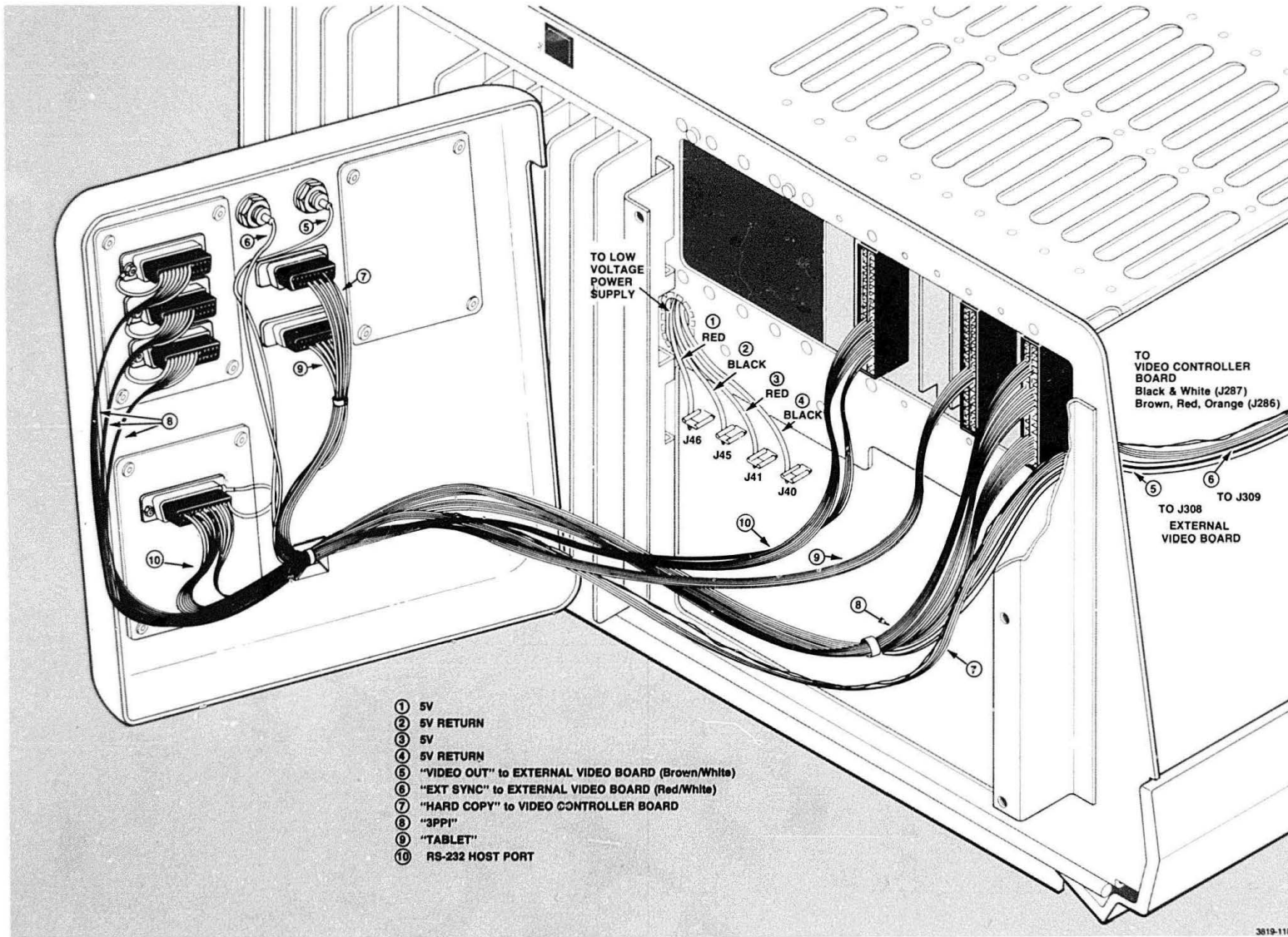
### BLOCK DIAGRAMS

- System Block Diagram
- Processor Board Simplified Block Diagram
- Processor Board Block Diagram
- Keyboard Block Diagram
- PAM/ROM Board Block Diagram
- RAM Controller Board Block Diagram
- Video Controller Board Block Diagram
- Vector Generator Board Block Diagram
- Raster Memory Board Block Diagram
- Display Module Block Diagram
- Low-Voltage Power Supply Module Block Diagram
- External Video Board Block Diagram





4112 Cabling Diagram (Left-Front View)



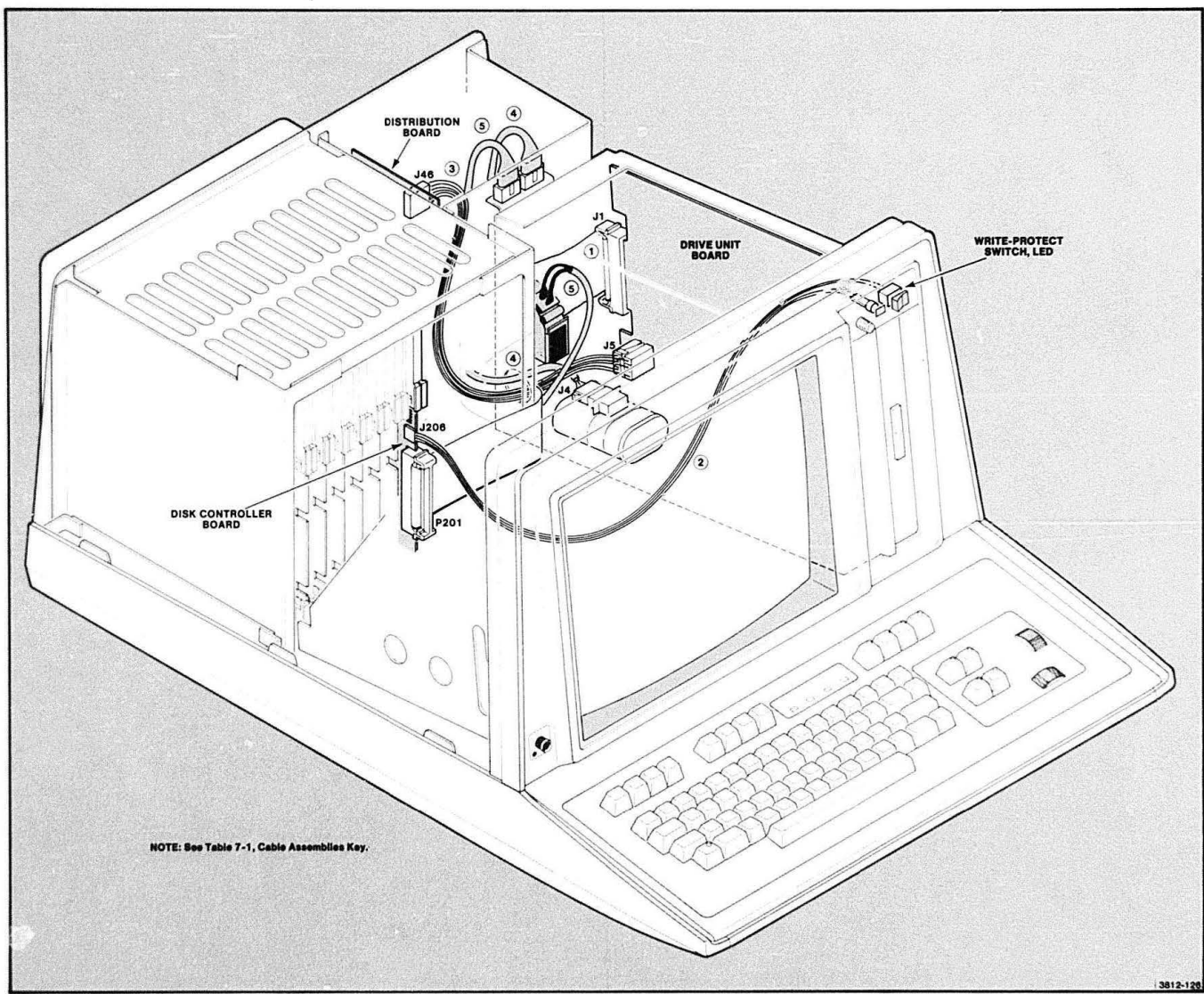
4112 Cabling Diagram (Rear View)

Table 7-1

4112 CABLE ASSEMBLIES KEY

| Cabling Diagram Code | Description                                                                                                                          | Part Number |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1                    | Drive Unit to Disk Controller Board Cable. 50-conductor flat cable.                                                                  | 175-3673-00 |
| 2                    | Write-Protect Switch & LED to Disk Controller Board. Four-conductor #22 ribbon cable.<br>Switch: brown, red.<br>LED: yellow, orange. | 175-3798-00 |
| 3                    | DC Distribution Board to Drive Unit. Six-conductor #22 ribbon cable.                                                                 | 175-3797-00 |
| 4                    | Drive Unit to Low Voltage Power Supply. Three-conductor #18 double-insulated.                                                        | 175-3799-00 |
| 5                    | Fan to Low Voltage Power Supply. Two-conductor #18 double-insulated.                                                                 | 175-2203-00 |

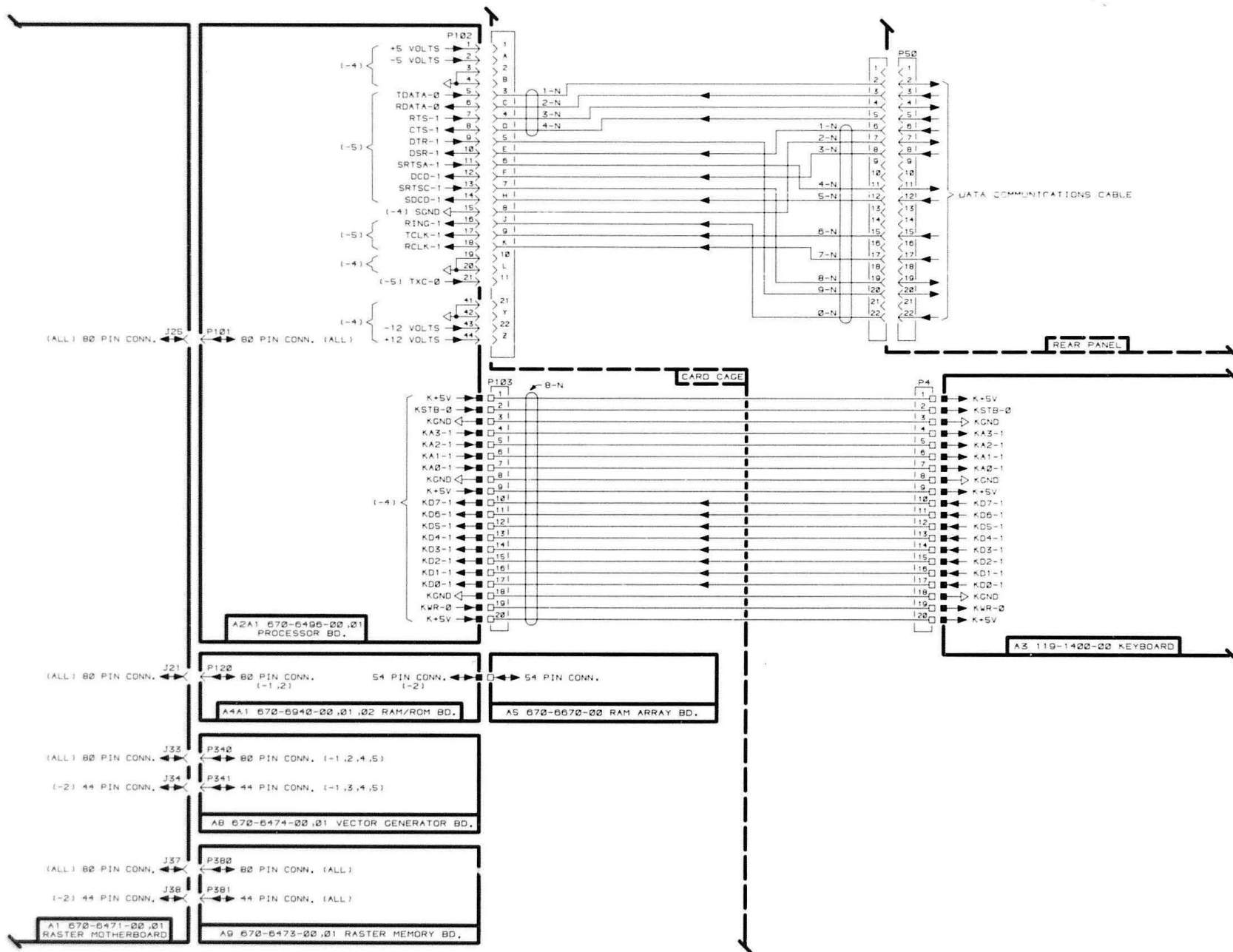


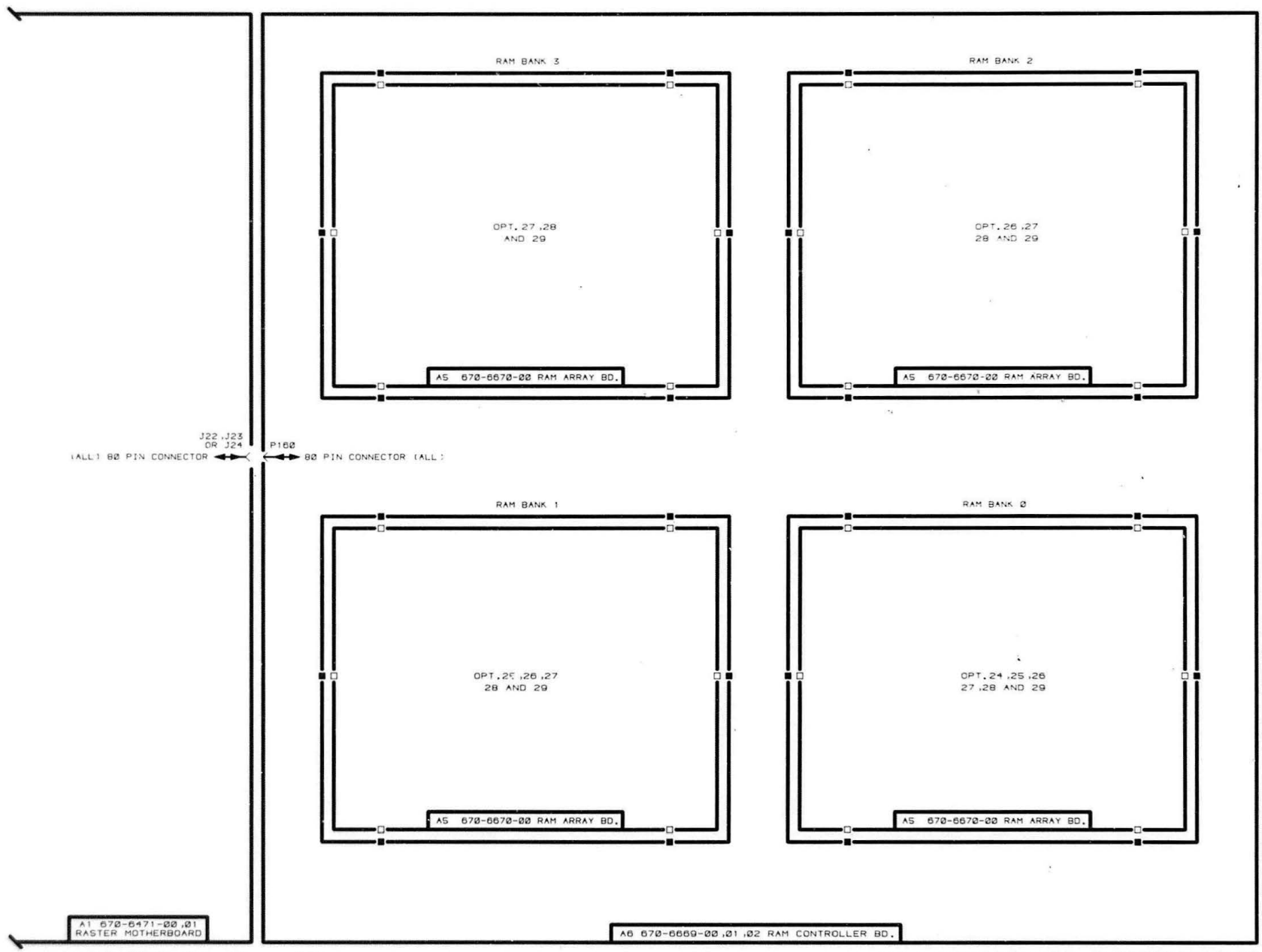


NOTE: See Table 7-1, Cable Assemblies Key.

3812-120

4112 Option 42 Cabling Diagram





4112 OPT. 24 thru 29

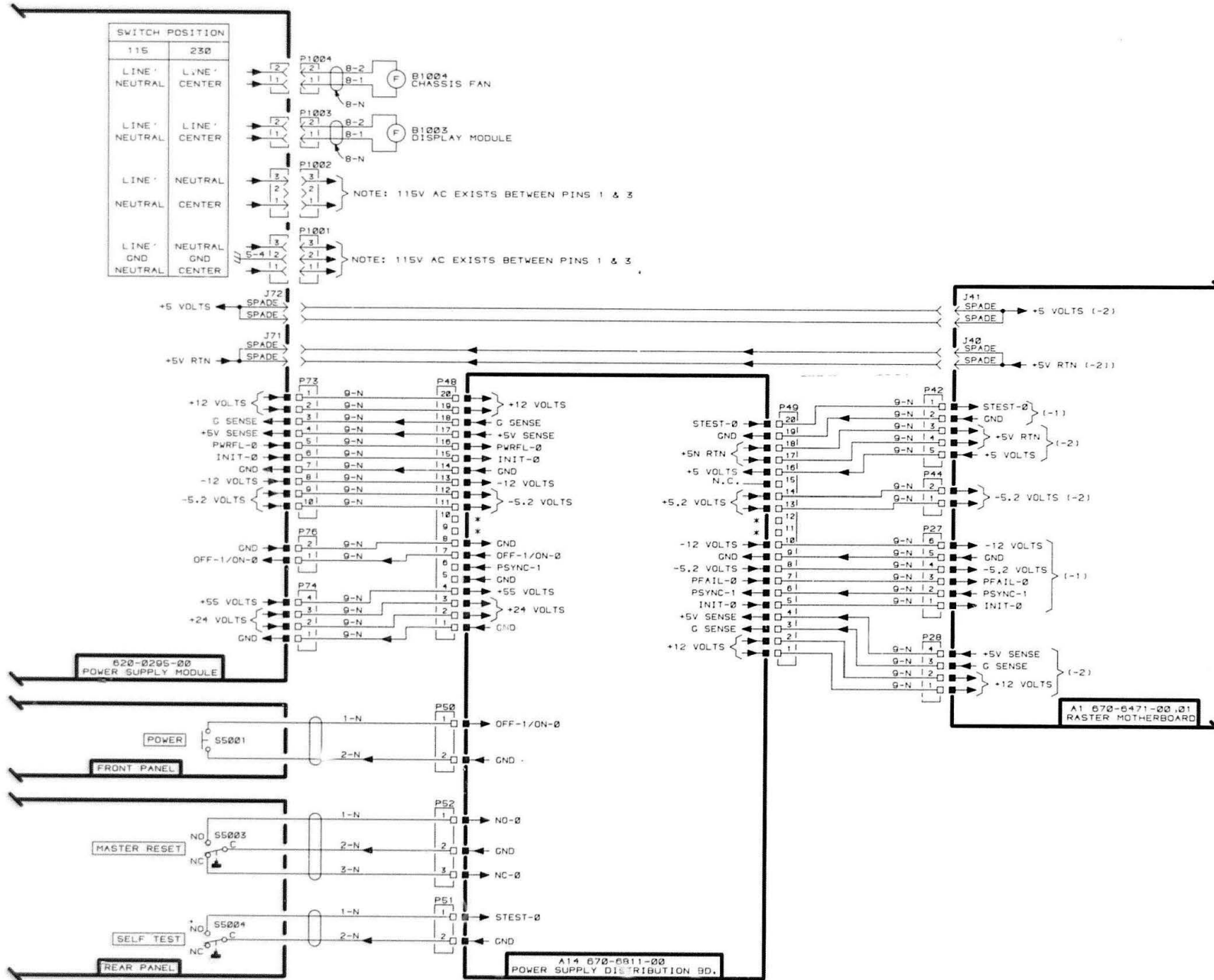
3819-14

RAM CONTROLLER INTERCONNECT

11 OF 13

RAM CONTROLLER INTERCONNECT





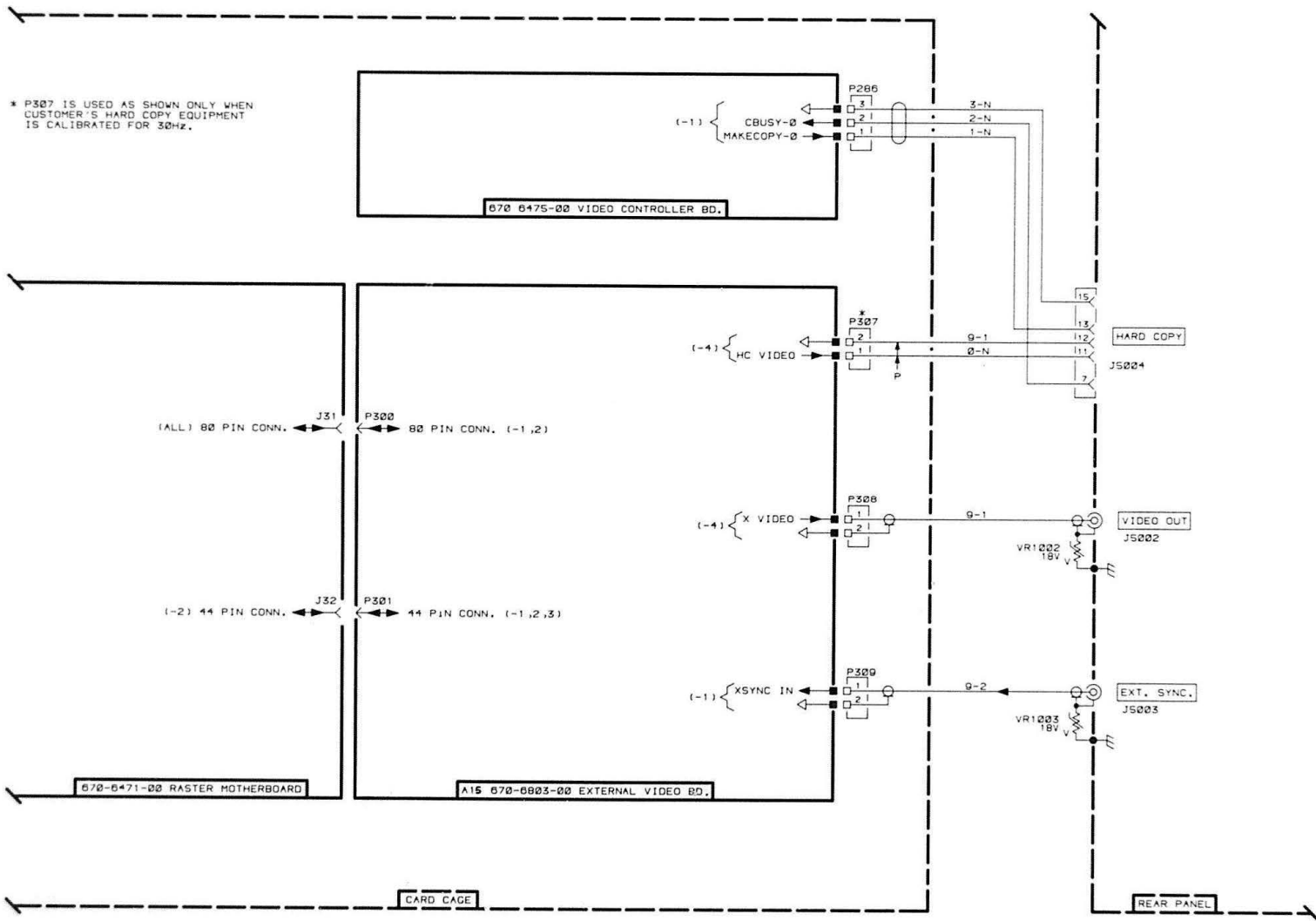
4112

\*P48-9 & -10 AND P49-11 & -12 ARE FILLED WITH CONNECTOR ORIENTATION PLUGS.

3810-45

POWER SUPPLY MODULE INTERCONNECT

(1 OF 1)



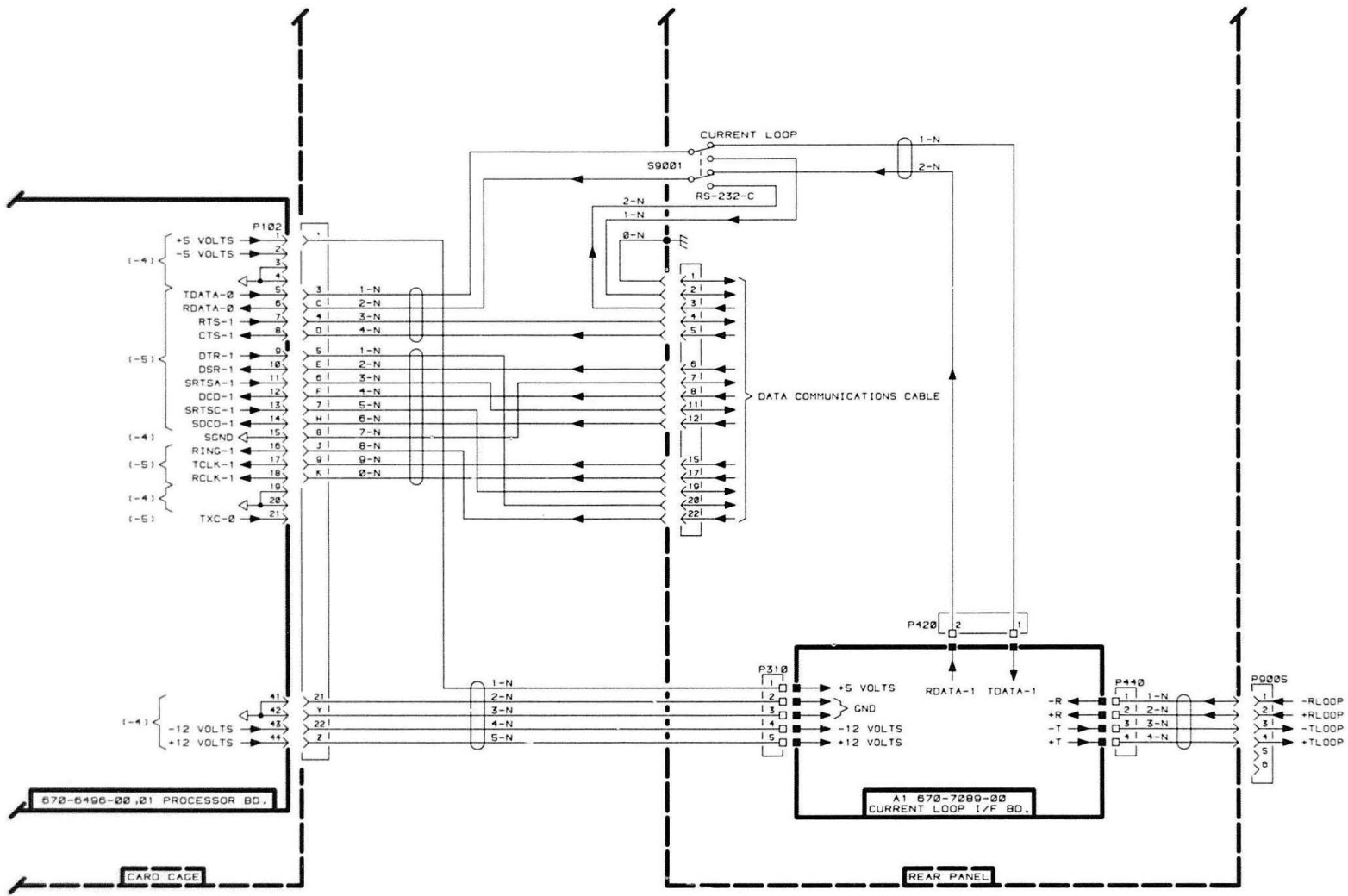
4112 OPT. 11

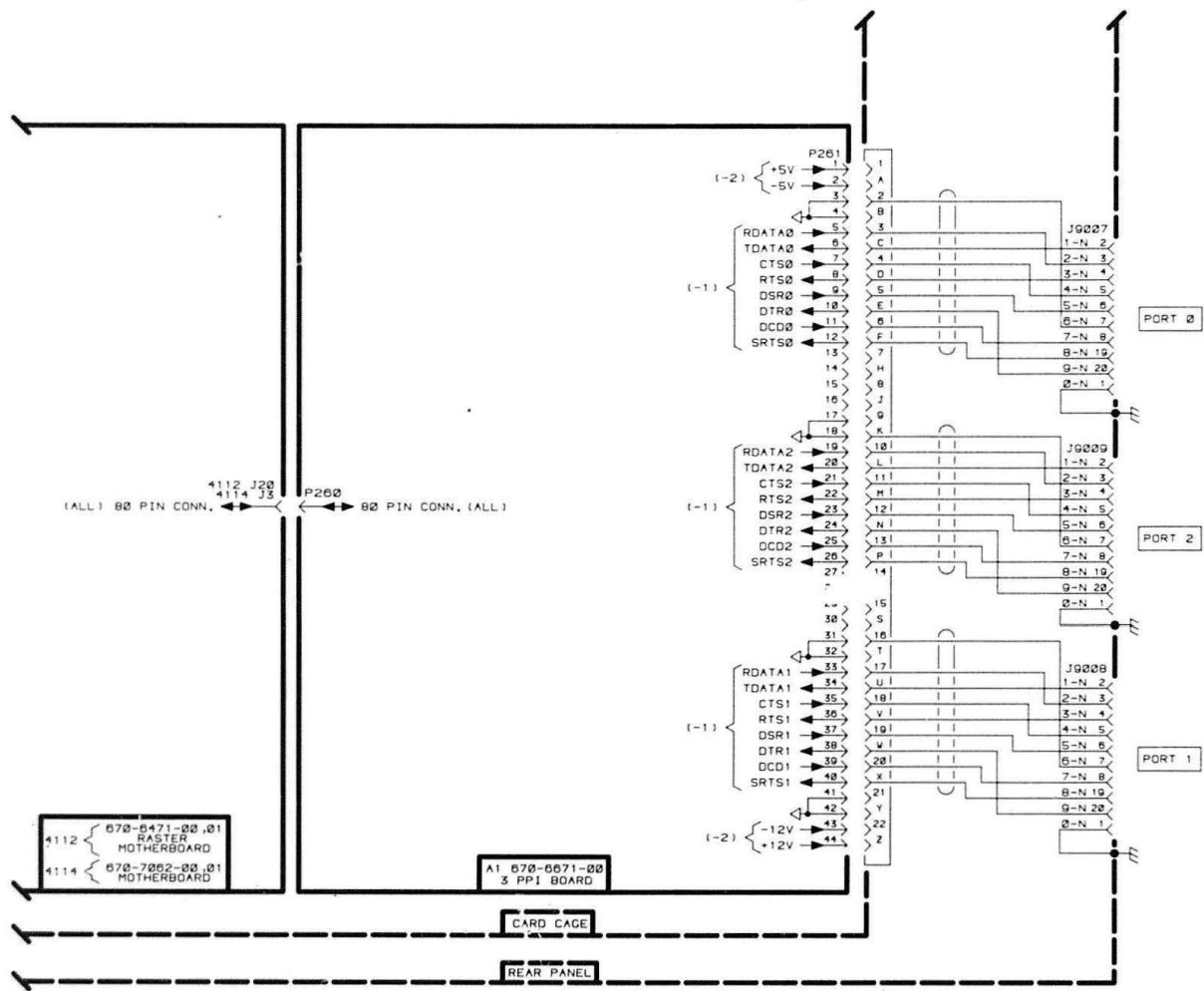
3819-126

EXTERNAL VIDEO INTERCONNECT

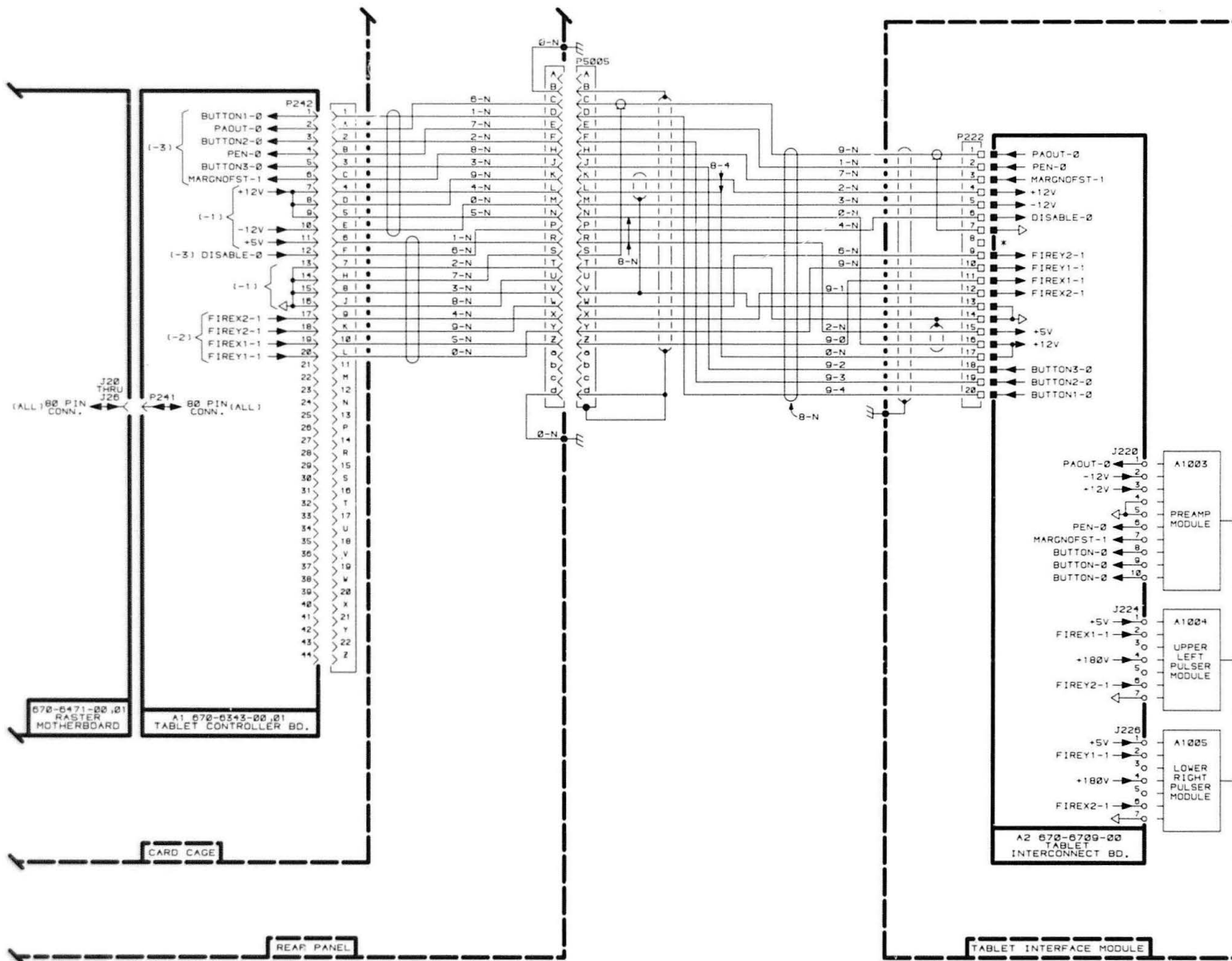
(1 OF 1)

EXTERNAL VIDEO (OPT. 11)  
INTERCONNECT









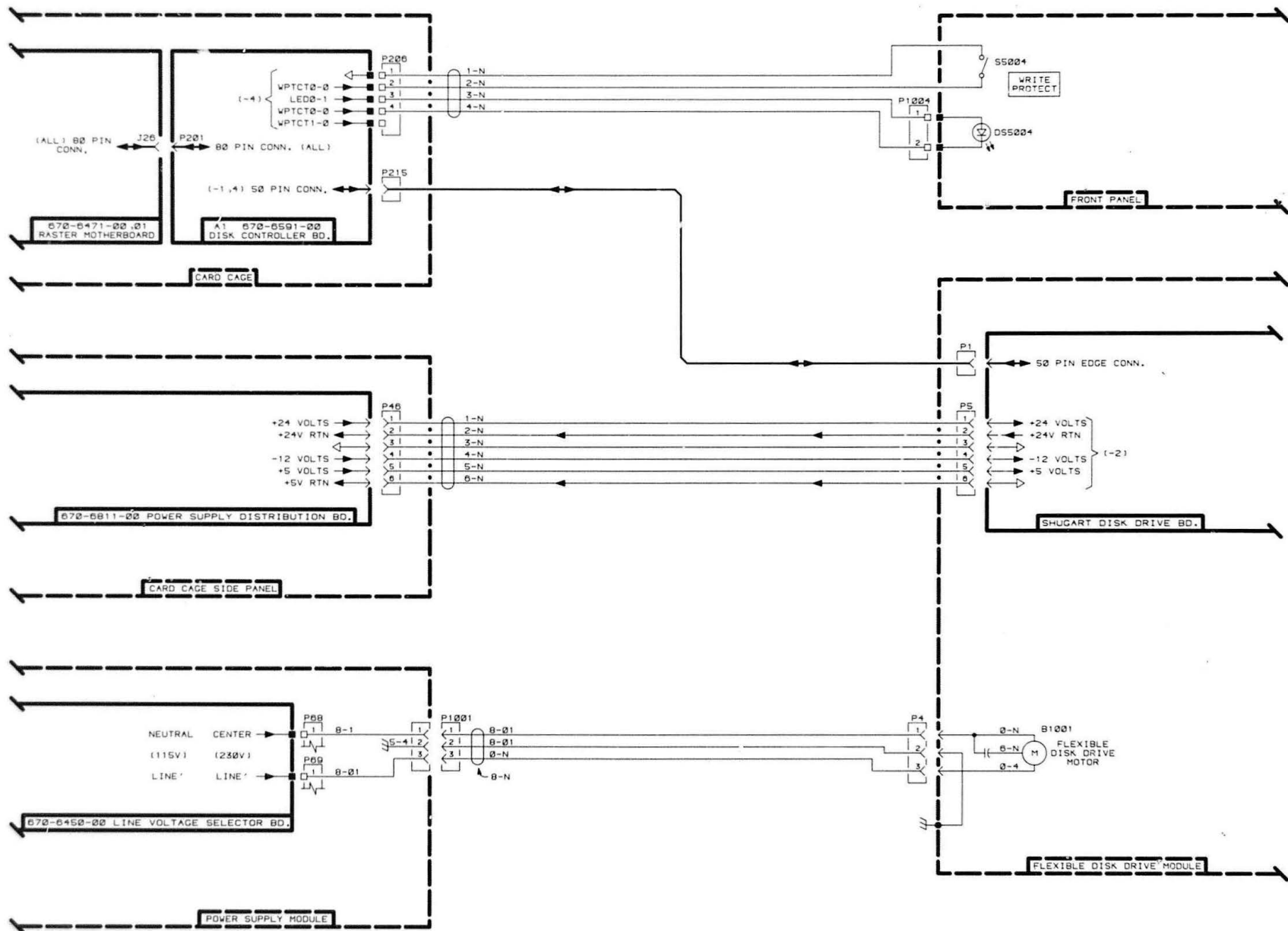
4112 OPT. 13/14

\* P222-B IS FILLED WITH A CONNECTOR ORIENTATION PLUG.

3814-1

TABLET INTERCONNECT

1 OF 1



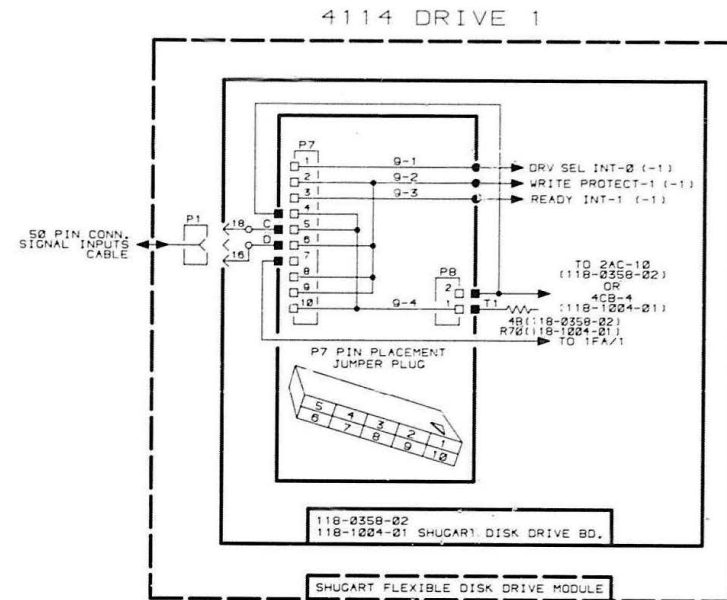
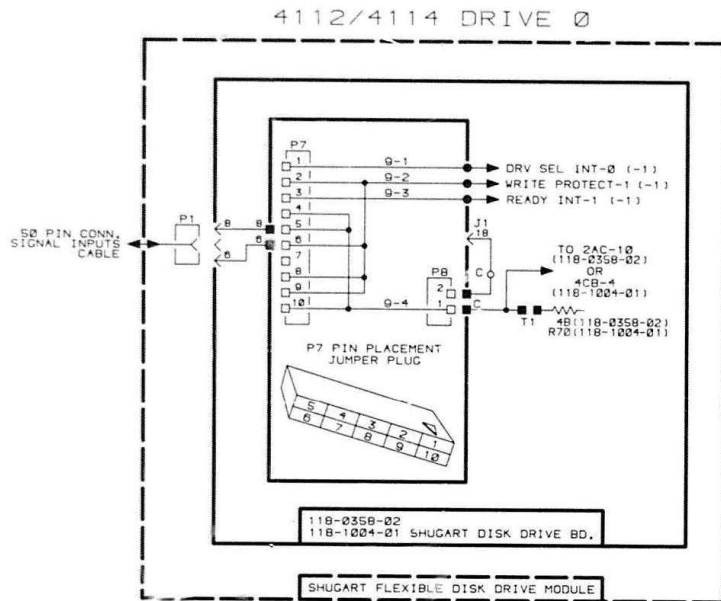
4112 OPT. 42

3812-1

FLEXIBLE DISK DRIVE INTERCONNECT

(1 OF 1)

FLEXIBLE DISK DRIVE (OPT. 42) INTERCONNECT



| P7, PB AND JUMPER POSITIONS |        |              |              |
|-----------------------------|--------|--------------|--------------|
| SQUARE PINS                 | 4112   | 4114 DRIVE 0 | 4114 DRIVE 1 |
| SPARES 6,8                  | P7-5,6 |              | N.C.         |
| T1                          | IN     |              | PB           |
| T2                          | IN     |              | IN           |
| T3,T4,T5,T6                 | IN     |              | OUT          |
| DS1                         | IN     |              | OUT          |
| DS2                         | OUT    |              | IN           |
| DS3,DS4                     | OUT    |              | OUT          |
| HL                          | IN     |              | IN           |
| DS                          | OUT    |              | OUT          |
| D                           | OUT    |              | P7-6,7       |
| A,X                         | IN     |              | IN           |
| B                           | OUT    |              | OUT          |
| C                           | PB     |              | P7-4,5       |
| Z                           |        | OUT          |              |
| Y                           |        | IN           |              |
| *L                          |        | OUT          |              |
| DC                          |        | IN           |              |
| 000                         |        | IN           |              |
| 001                         |        | OUT          |              |

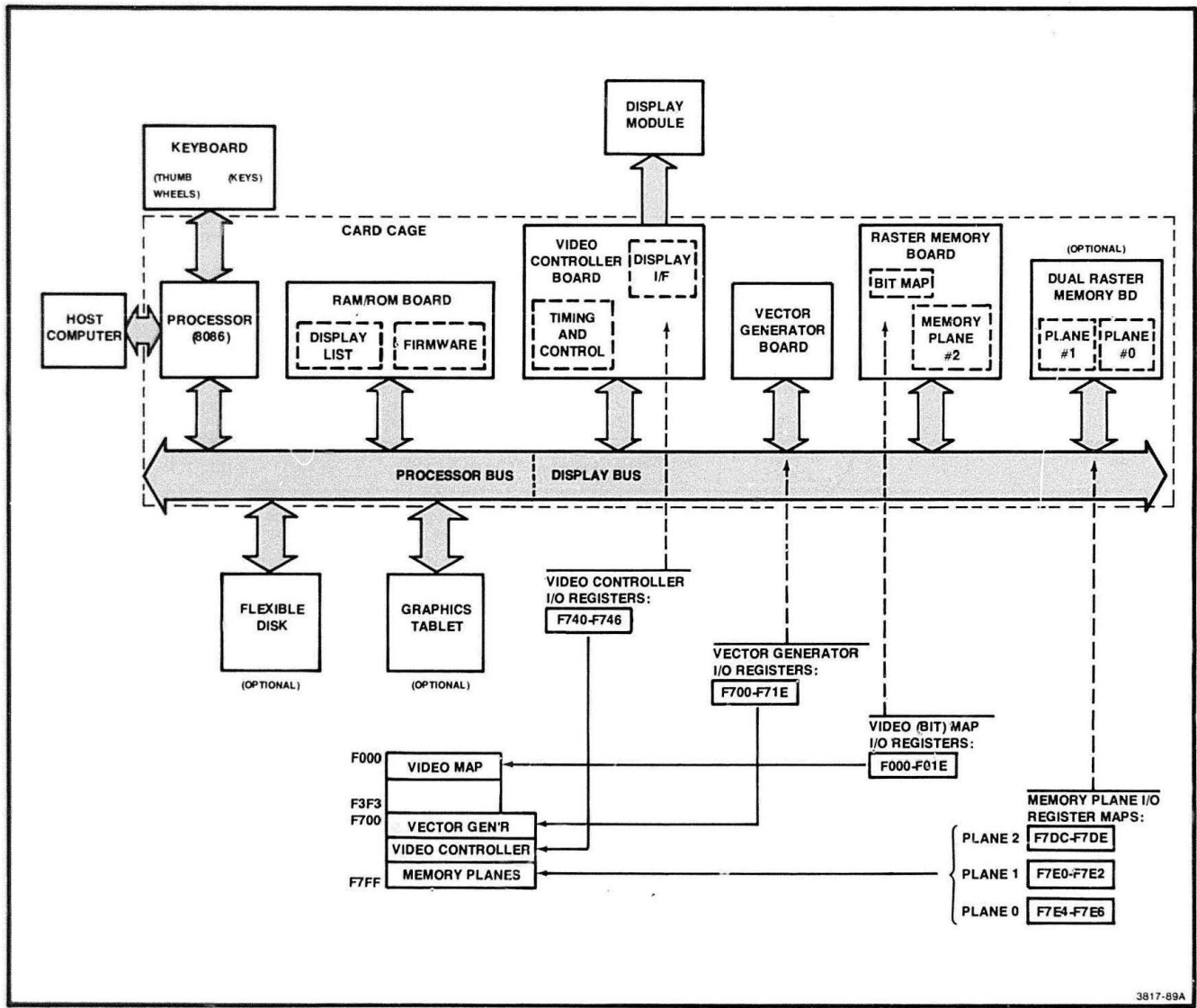
\* APPEARS ON ONLY 118-0358-02

119-0977-01/03  
(FOR USE WITH 4112/4114)

3812-B

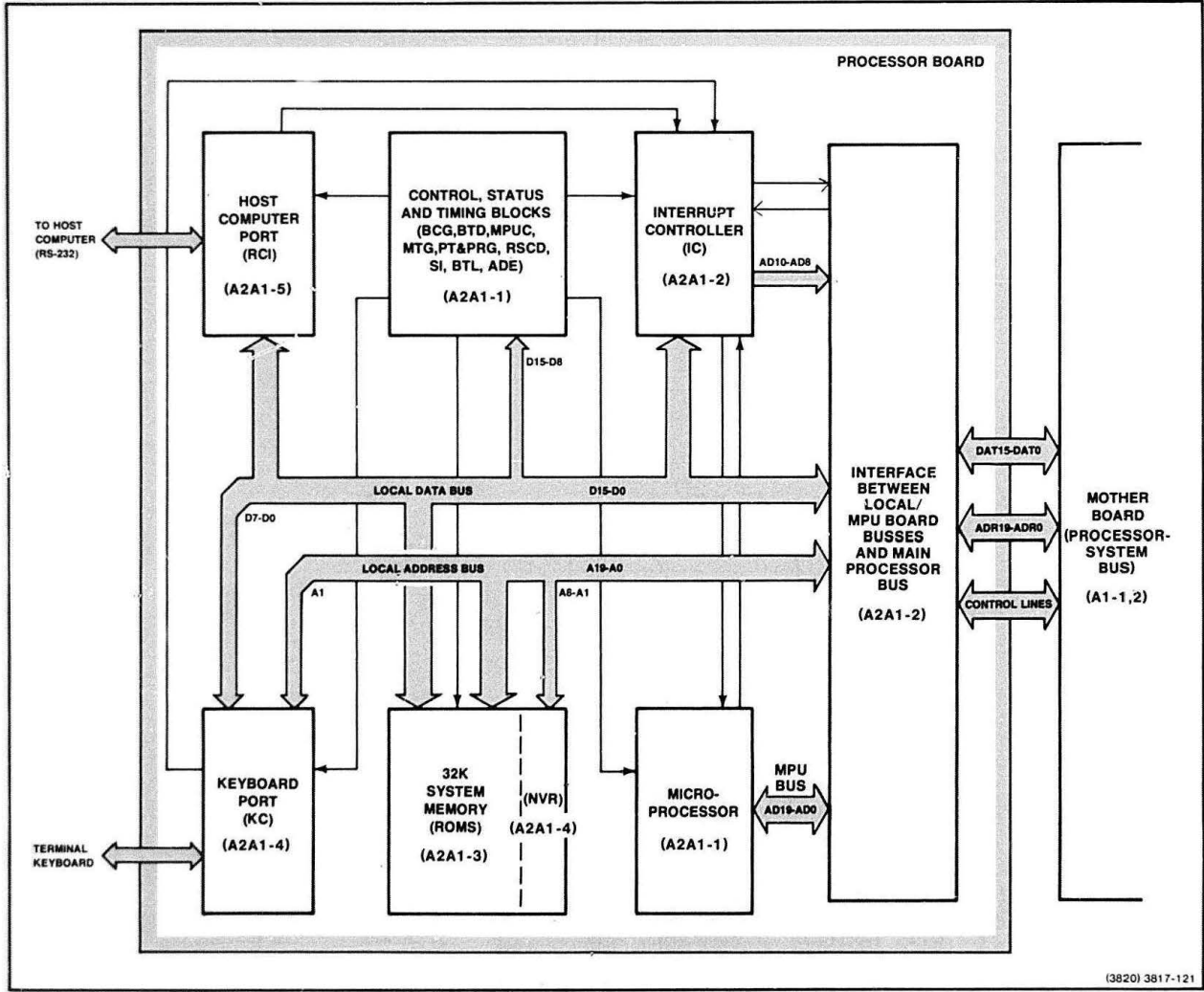
SHUGART MODULE INTERCONNECT

(1 OF 1)

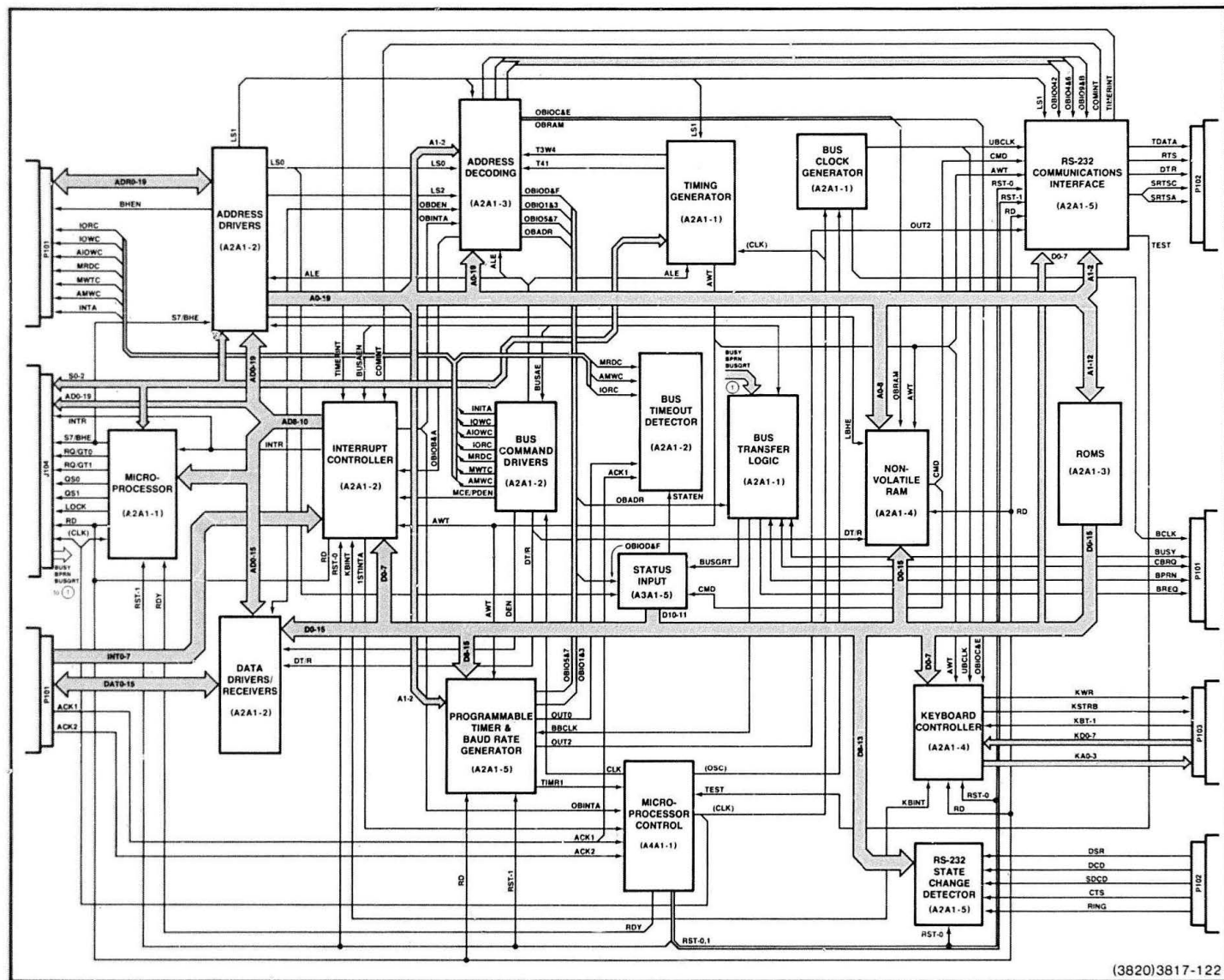


3817-89A

System Block Diagram.

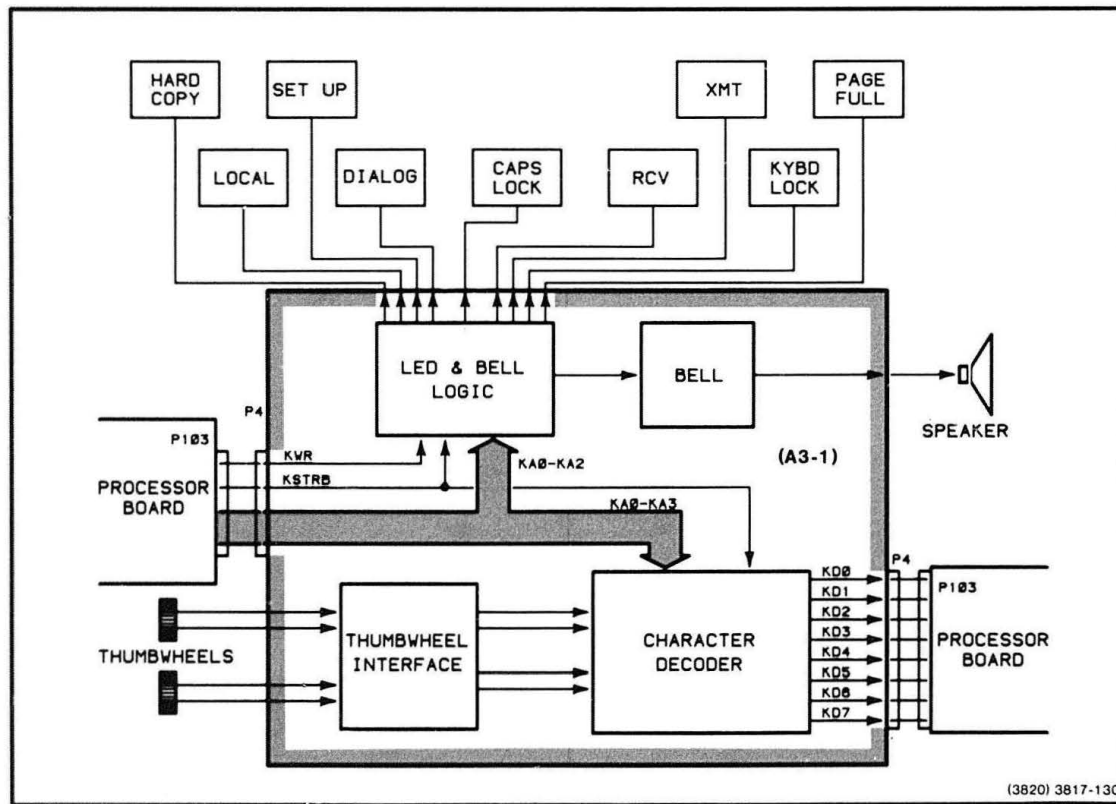


Processor Simplified Block Diagram.



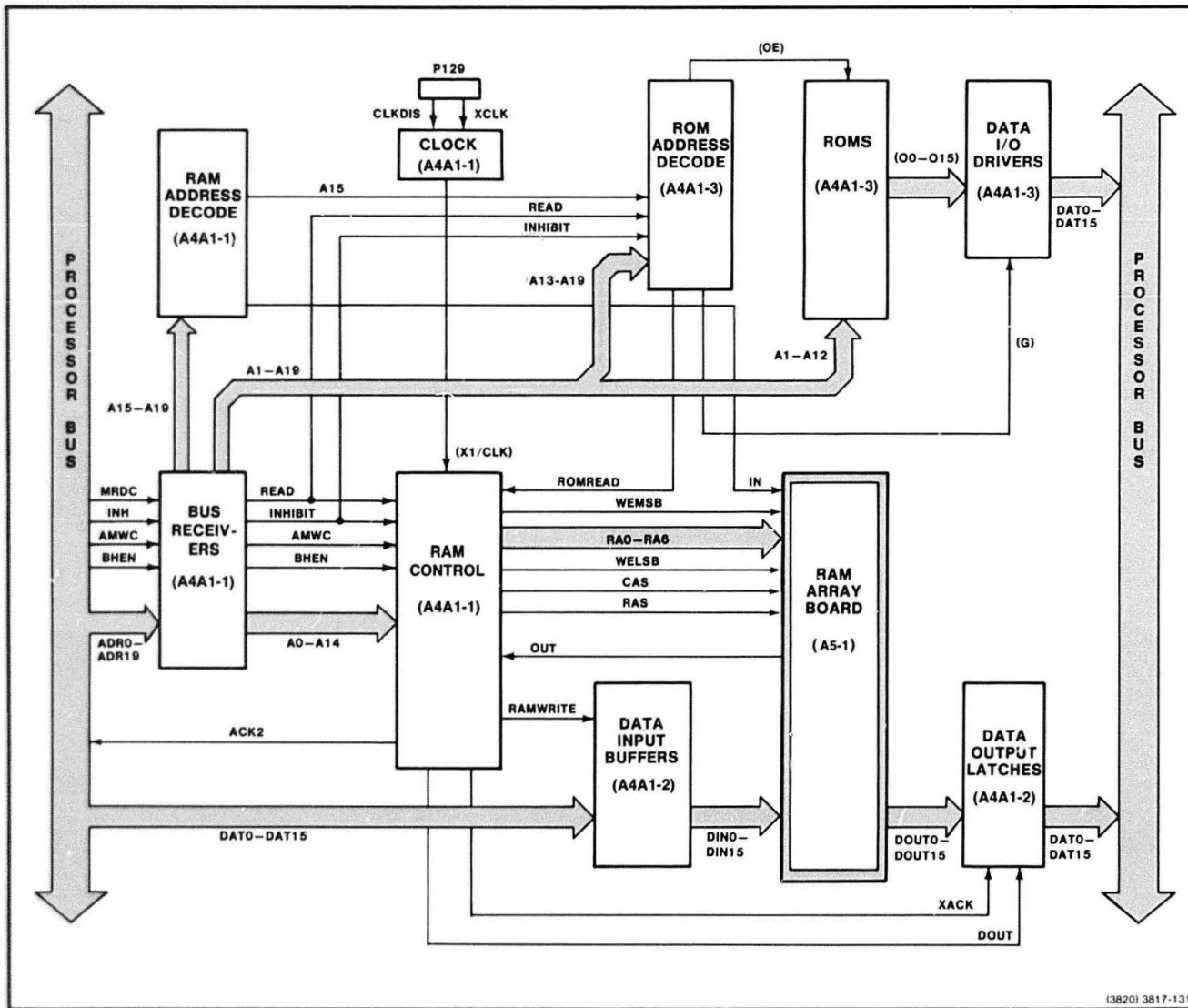
(3820)3817-122

Processor Block Diagram.



Keyboard Block Diagram.

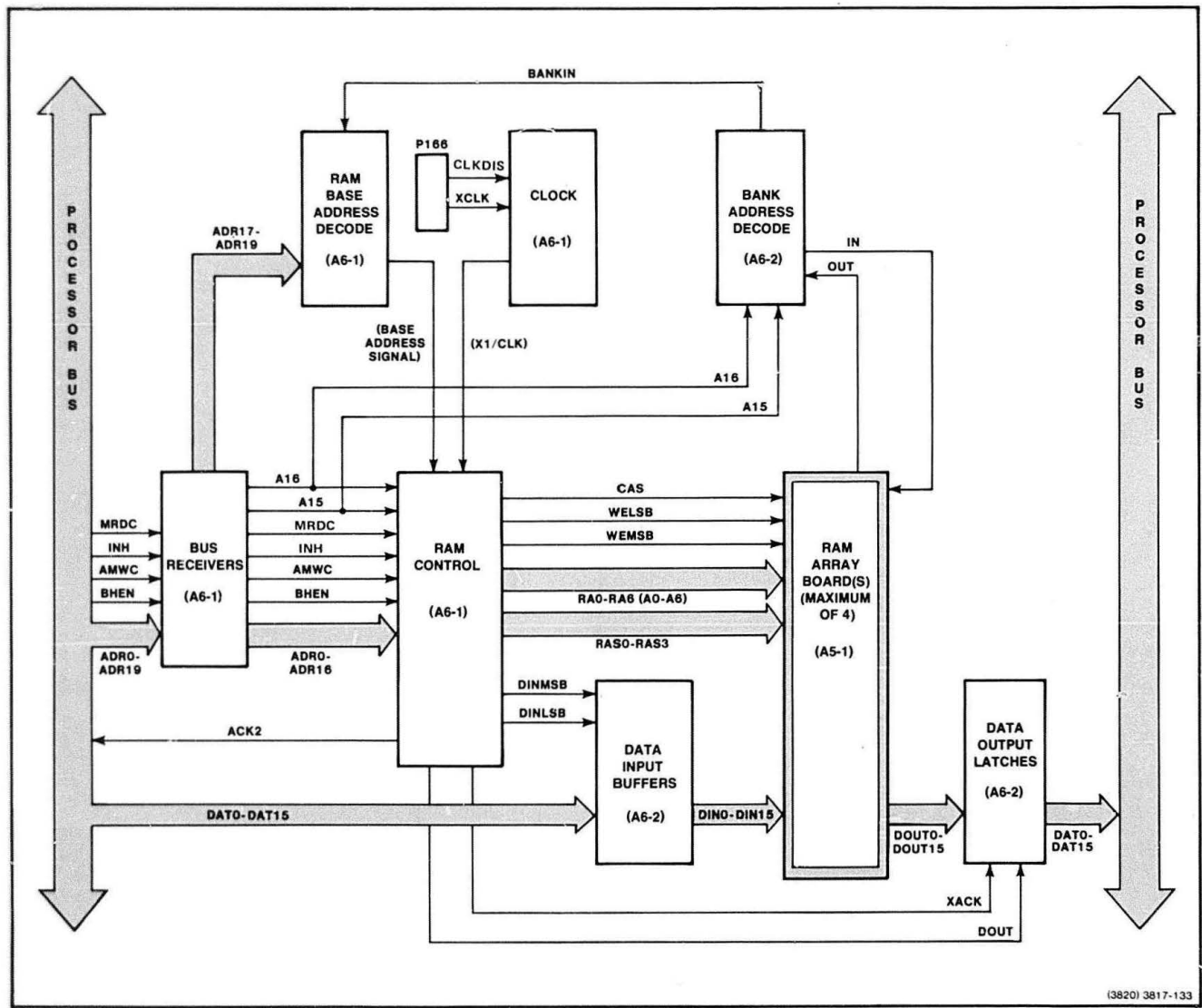
KEYBOARD  
BLOCK DIAGRAM



(3820) 3817-131

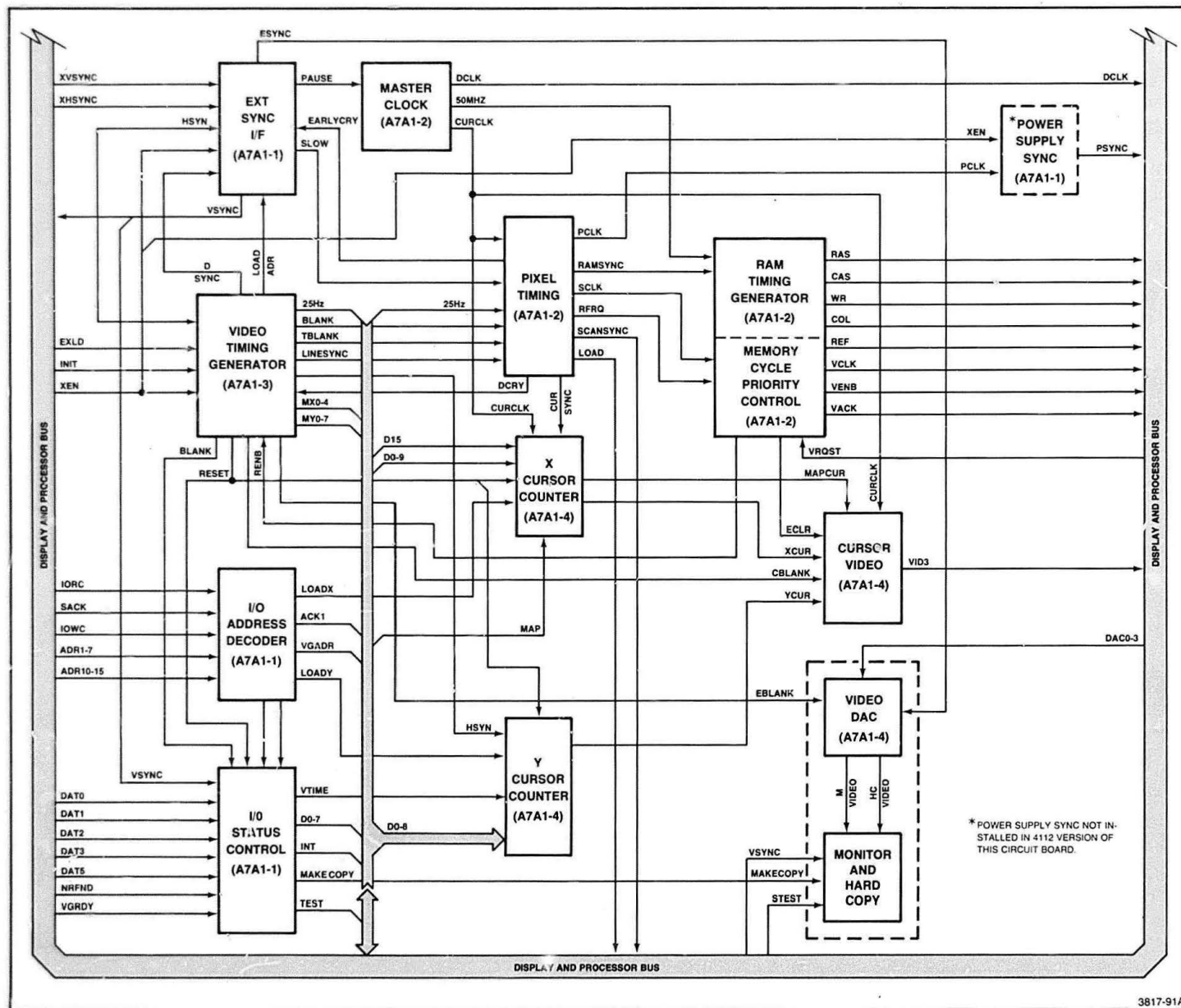
RAM/ROM Block Diagram.



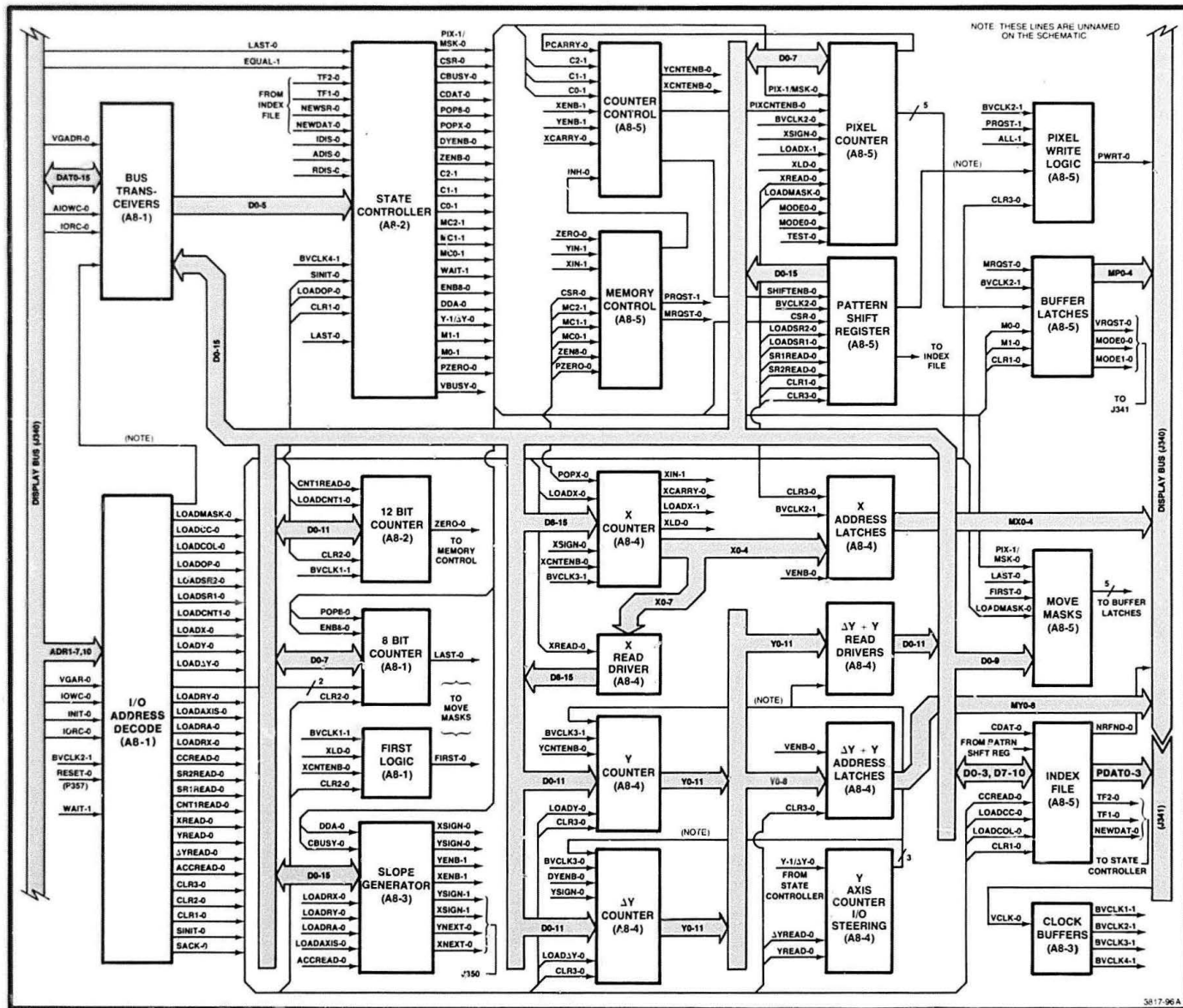


(3820) 3817-133

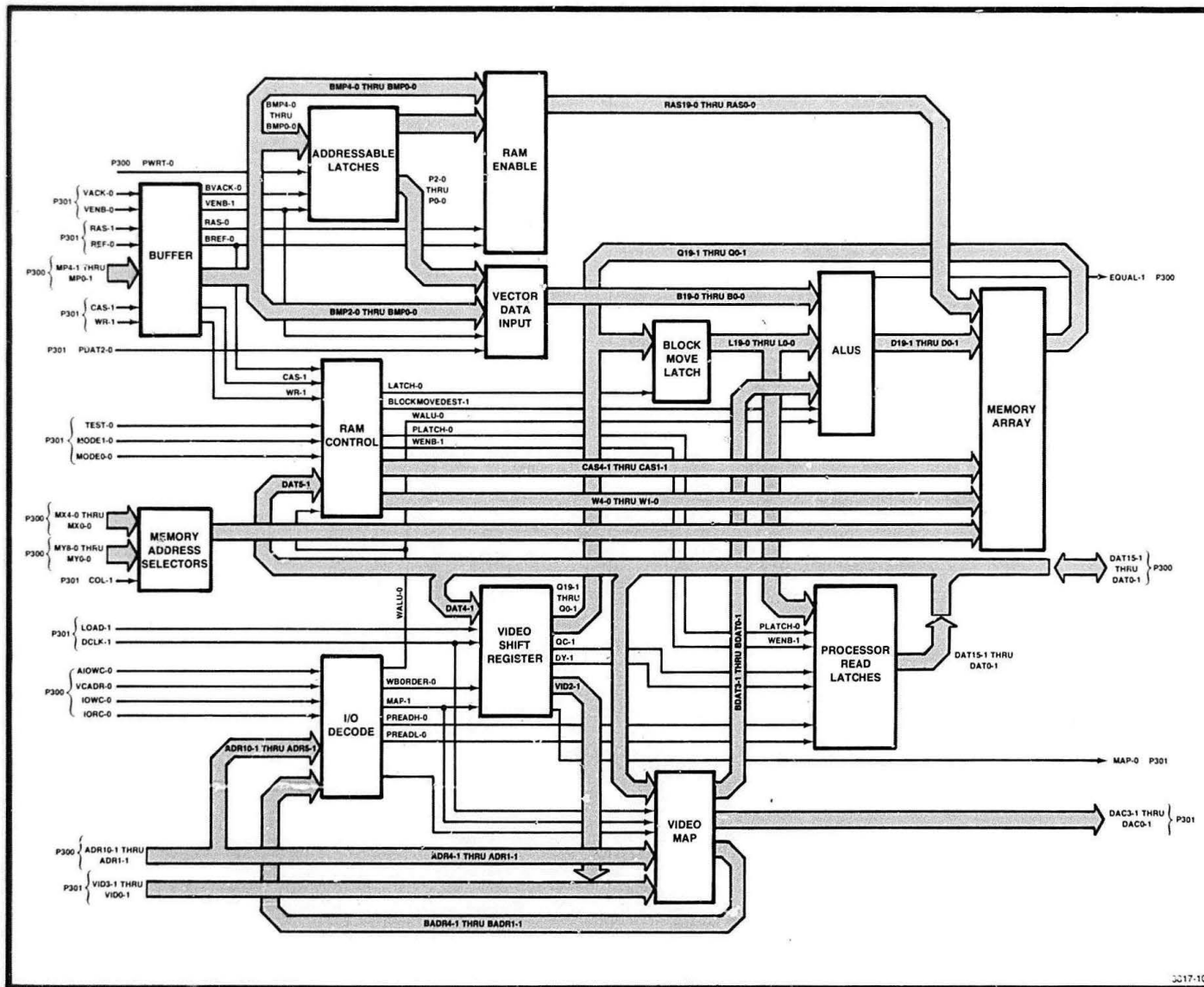
RAM Controller Block Diagram.



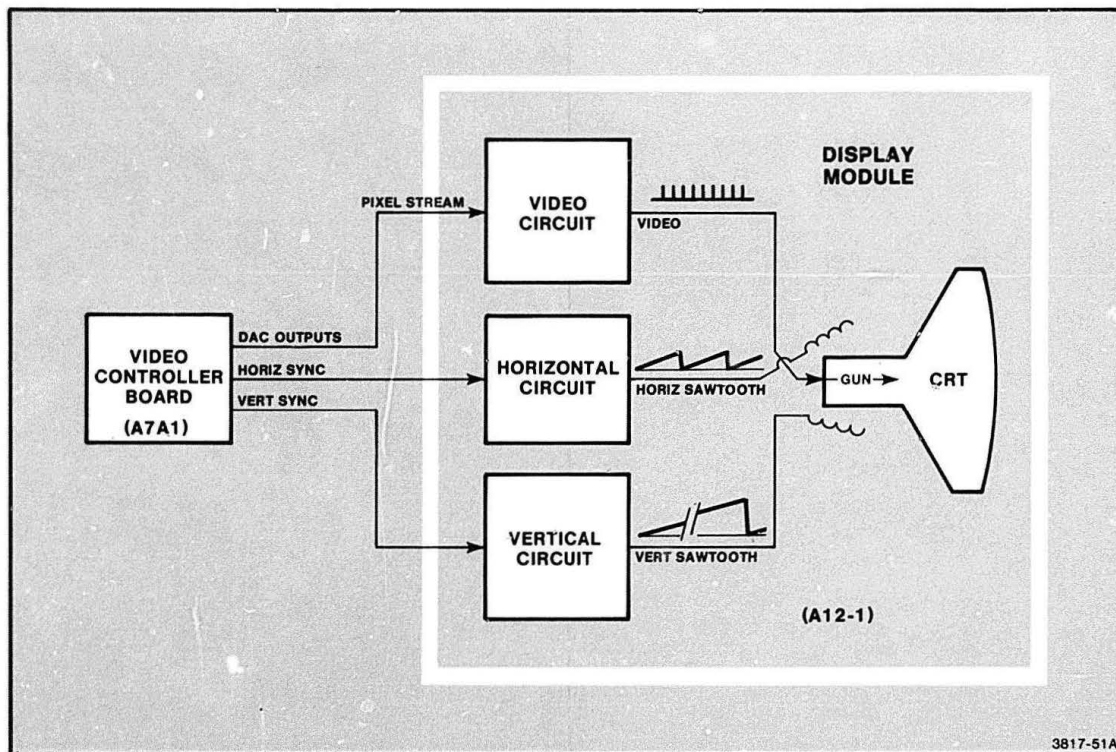
Video Controller Block Diagram.



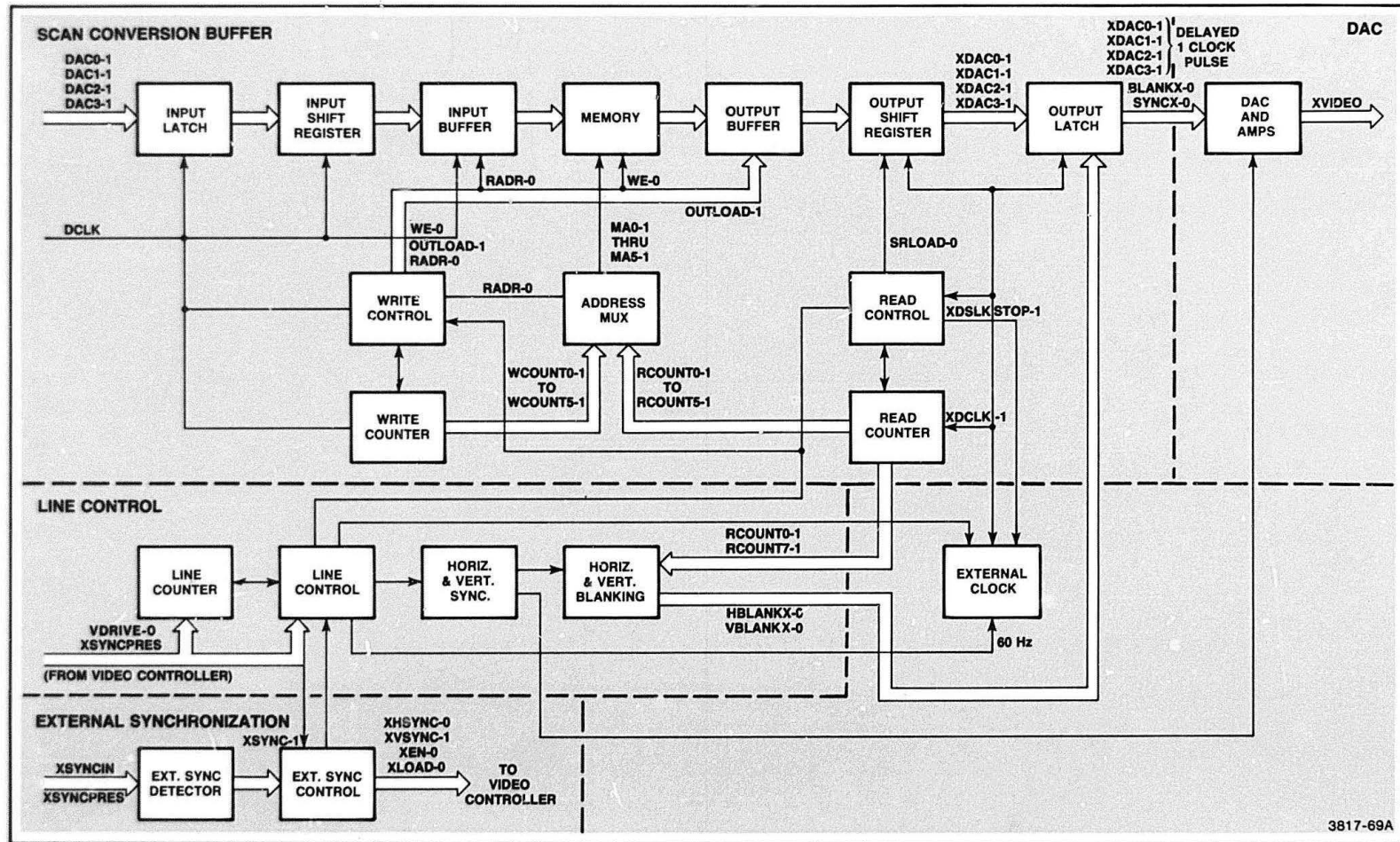
Vector Generator Block Diagram.



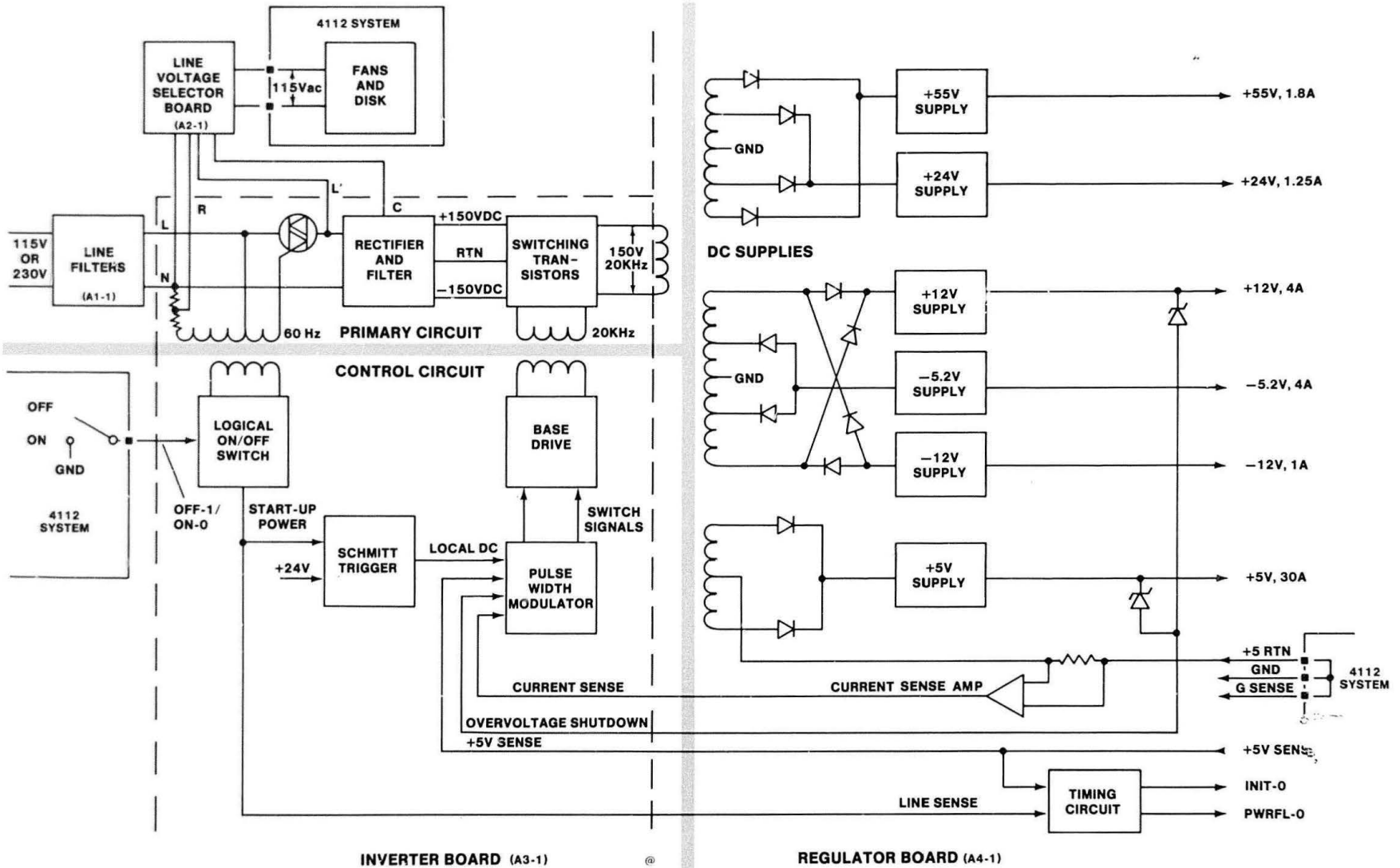
Raster Memory Block Diagram.



Display Module Block Diagram.



External Video Block Diagram.



**POWER SUPPLY BLOCK DIAGRAM**  
620-0295-00

Power Supply Block Diagram.

(3732)3819-127

# Section 8 SCHEMATICS

## Symbols and Reference Designators

Electrical components shown on the diagrams are in the following units unless noted otherwise

Capacitors = Values one or greater are in picofarads (pF)  
Values less than one are in microfarads ( $\mu$ F)

Resistors = Ohms ( $\Omega$ )

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

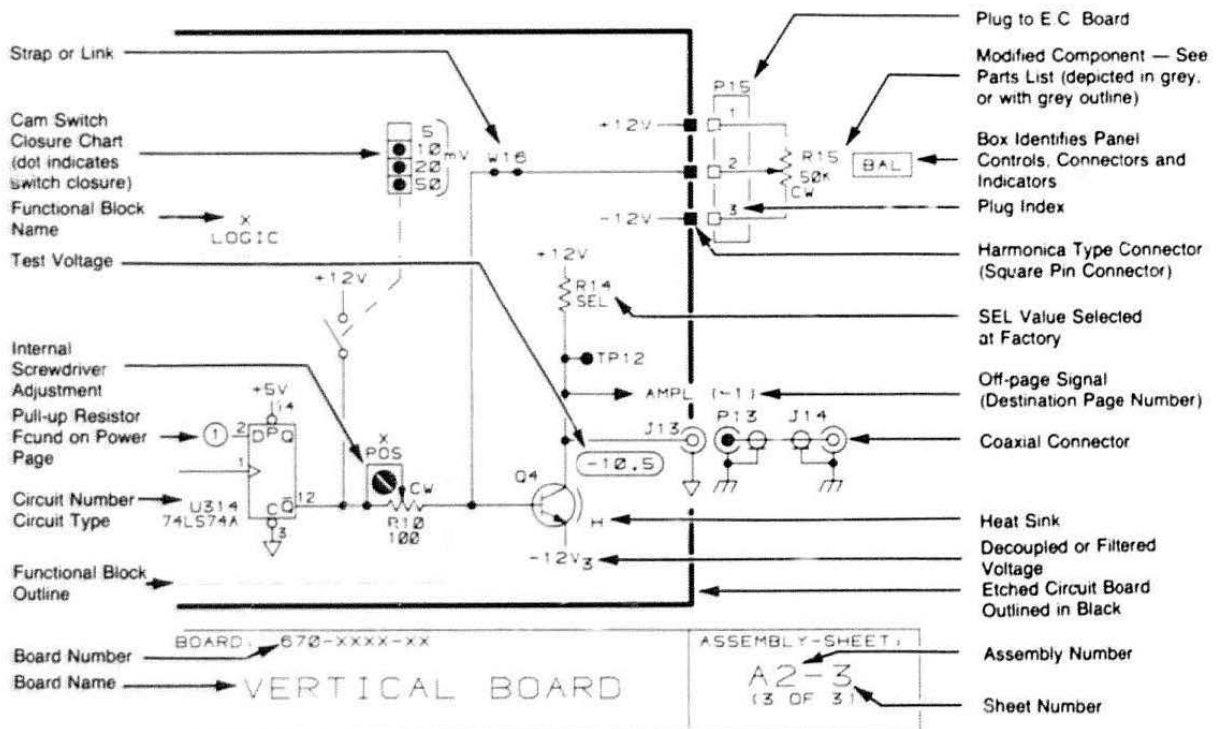
Abbreviations are based on ANSI Y1.1-1972. Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc., are

|              |                                                                                     |
|--------------|-------------------------------------------------------------------------------------|
| Y14.15, 1966 | Drawing Practices                                                                   |
| Y14.2, 1973  | Line Conventions and Lettering                                                      |
| Y10.5, 1968  | Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering |

The following prefix letters are used as reference designators to identify components or assemblies on the diagrams.

|    |                                                         |    |                                                          |    |                                                                   |
|----|---------------------------------------------------------|----|----------------------------------------------------------|----|-------------------------------------------------------------------|
| A  | Assembly, separable or repairable (circuit board, etc.) | H  | Heat dissipating device (heat sink, heat radiator, etc.) | S  | Switch or contactor                                               |
| AT | Attenuator, fixed or variable                           | HR | Heater                                                   | T  | Transformer                                                       |
| B  | Motor                                                   | HY | Hybrid circuit                                           | TC | Thermocouple                                                      |
| BT | Battery                                                 | J  | Connector, stationary portion                            | TP | Test point                                                        |
| C  | Capacitor, fixed or variable                            | K  | Relay                                                    | U  | Assembly inseparable or non-repairable (integrated circuit, etc.) |
| CB | Circuit breaker                                         | L  | Inductor, fixed or variable                              | V  | Electron tube                                                     |
| CR | Diode, signal or rectifier                              | M  | Meter                                                    | VR | Voltage regulator (zener diode, etc.)                             |
| DL | Delay line                                              | P  | Connector, movable portion                               | W  | Wirestrap or cable                                                |
| DS | Indicating device (lamp)                                | O  | Transistor or silicon-controlled rectifier               | Y  | Crystal                                                           |
| E  | Spark Gap, Ferrite bead                                 | R  | Resistor, fixed or variable                              | Z  | Phase shifter                                                     |
| F  | Fuse                                                    | RT | Thermistor                                               |    |                                                                   |
| FL | Filter                                                  |    |                                                          |    |                                                                   |

The following special symbols may appear on the diagrams:





## SCHEMATICS

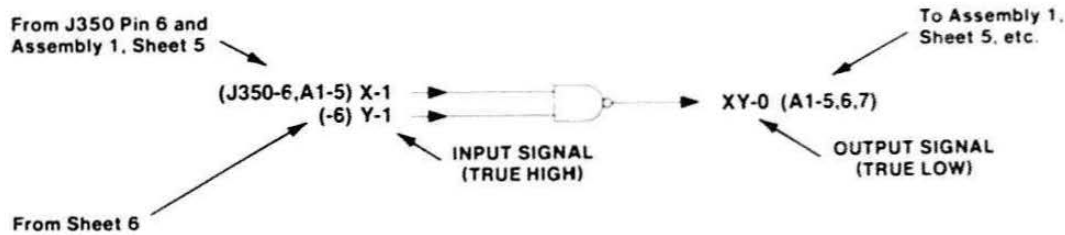
### 1. True High and True Low Signals

Signal names on the schematics are followed by -1 or a -0. A TRUE HIGH signal is indicated by -1, and a TRUE LOW signal is indicated by -0.

SIGNAL -1 = TRUE HIGH  
SIGNAL -0 = TRUE LOW

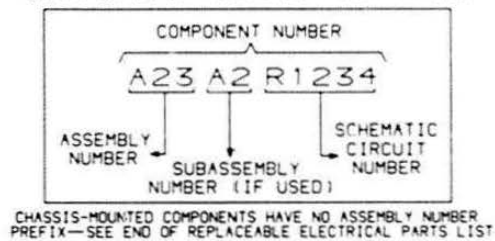
### 2. Cross-References

Schematic cross-references (from to information) are included on the schematics. The "from" reference only indicates the signal source and the "to" reference lists all loads where the signal is used. All from to information will be enclosed in parentheses.



### 3. Component Number Example

#### COMPONENT NUMBER EXAMPLE

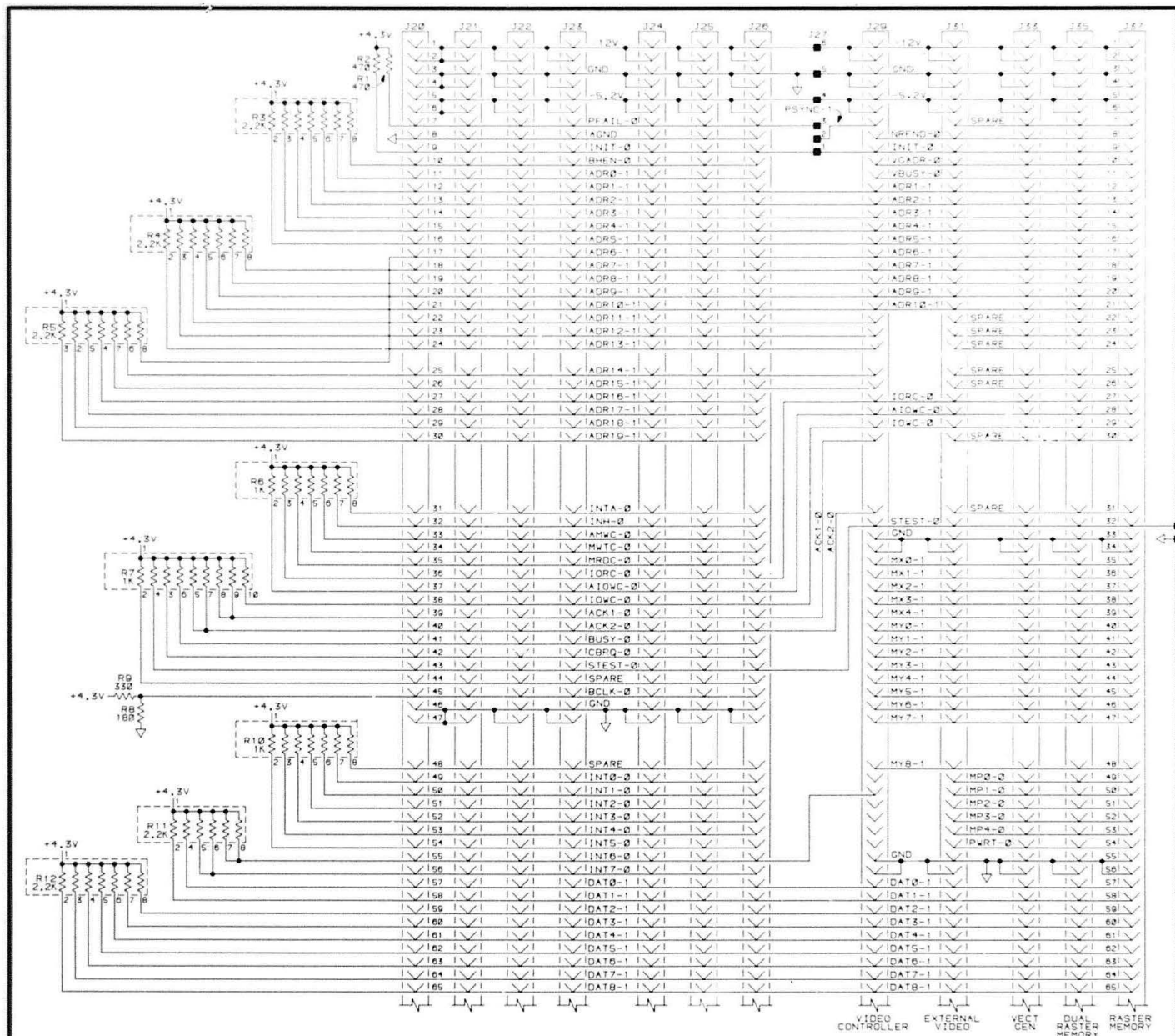


## 4112 SCHEMATICS INDEX

| Name                               | Assembly No./Sheet(s)   | Part Number(s)                                                    |
|------------------------------------|-------------------------|-------------------------------------------------------------------|
| Raster Motherboard                 | A1-1,-2                 | 670-6471-00,01                                                    |
| Processor                          | A2A1-1,-2,-3,-4,-5      | 672-0951-01,02<br>(670-6496-00)                                   |
| Keyboard                           | A3-1                    | 119-1400-00                                                       |
| RAM/ROM                            | A4A1-1,-1A,-2,-3        | 672-0952-00,01,02<br>(670-6940-00)                                |
| RAM Array                          | A5-1                    | 670-6670-00                                                       |
| RAM Controller                     | A6-1,-1A,-2             | 670-6669-00,01,02                                                 |
| Video Controller                   | A7A1-1,-2,-3,-4         | 672-1003-00<br>672-1004-00,01,02 (Opt. 48)<br>(670-6475-00,01,02) |
| Vector Generator                   | A8-1,-2,-3,-4,-5        | 670-6474-00,01                                                    |
| Raster Memory                      | A9-1,-2,-3,-4,-5        | 670-6473-00,01                                                    |
| Dual Raster Memory                 | A10-1,-2,-3,-4,-5,-6,-7 | 670-6476-01                                                       |
| 41XX Logic Extender                | A11-1,-2                | 670-5291-00                                                       |
| Deflection                         | A12-1                   | 670-6479-02,03,04                                                 |
| High Voltage                       | A13-1                   | 670-6478-00,01                                                    |
| Power Supply Distr.                | A14-1                   | 670-6811-00                                                       |
| VDE Line Filter <sup>a</sup>       | A1-1                    | 670-7248-00                                                       |
| Line Voltage Selector <sup>a</sup> | A2-1                    | 670-6450-00                                                       |
| Inverter <sup>a</sup>              | A3-1                    | 670-6430-00                                                       |
| Regulator <sup>a</sup>             | A4-1                    | 670-6429-00                                                       |
| External Video (Option 11)         | A15-1,-2,-3,-4          | 670-6803-00                                                       |

<sup>a</sup>Power Supply boards.





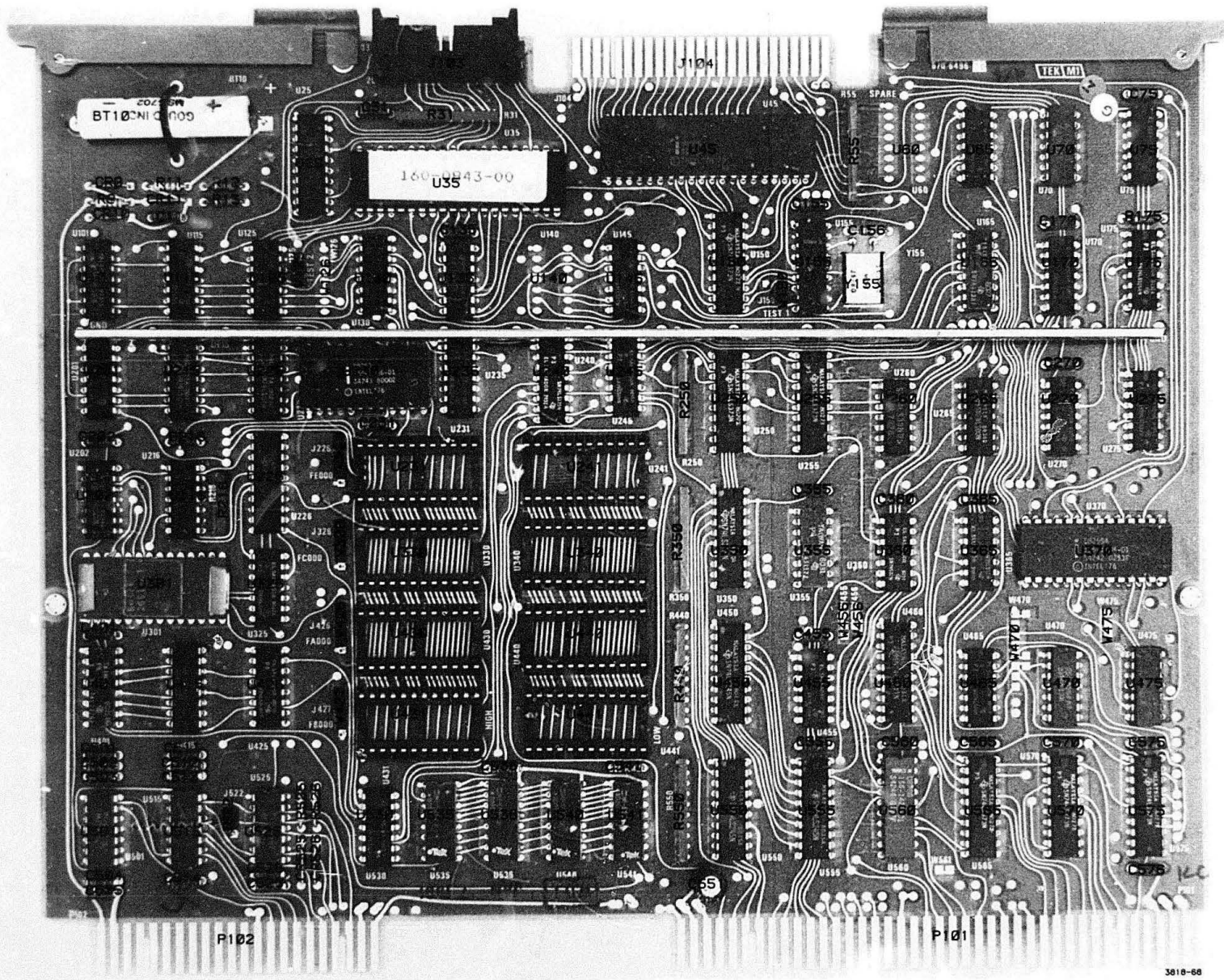
4112

3810-2

670-6471-00.01 RASTER MOTHERBOARD A1-1 (1 OF 2)

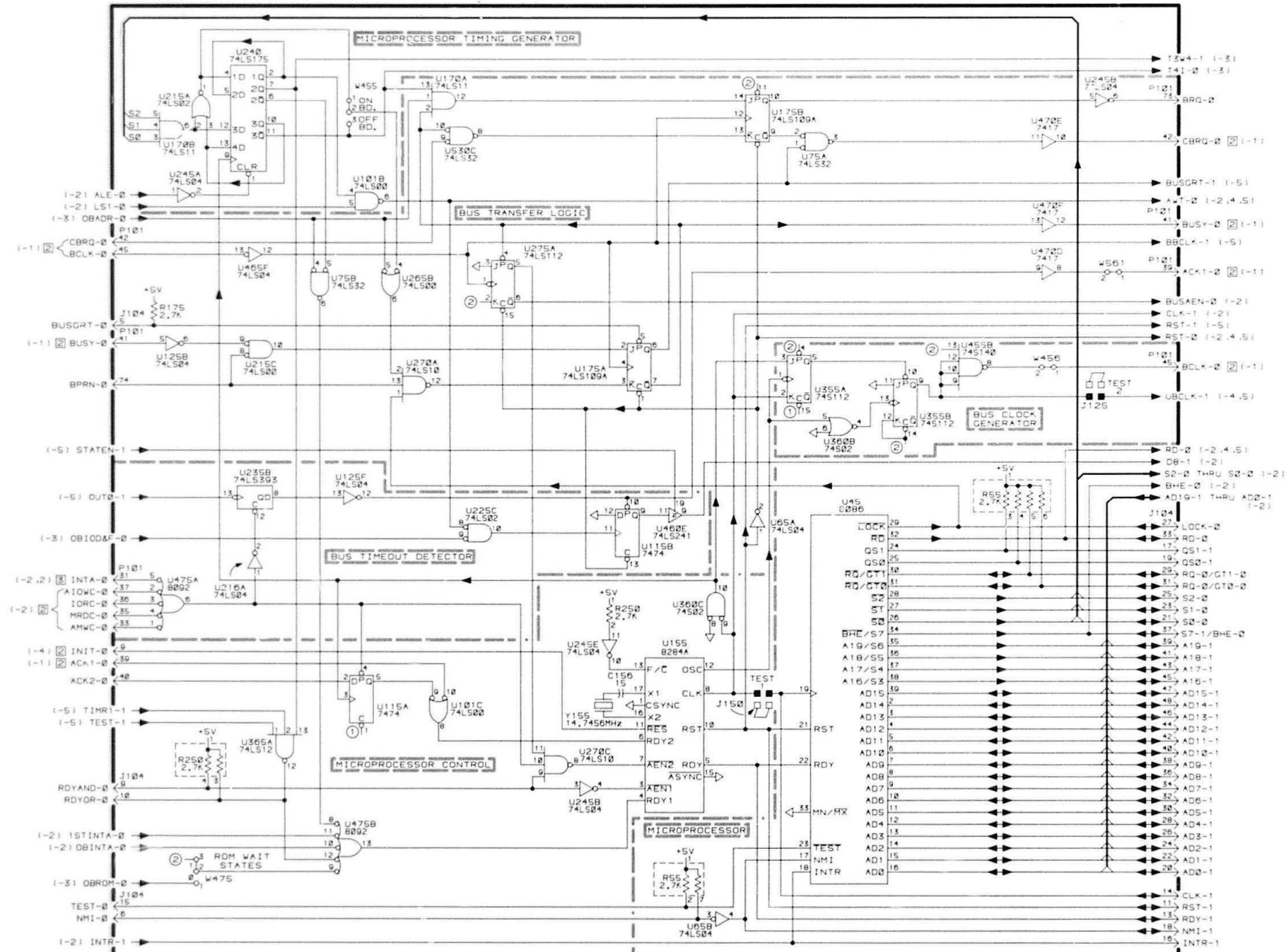
RASTER MOTHERBOARD A1-1  
 670-6471-00.01





Processor Board (672-0951-00) Component Locations.

3818-68

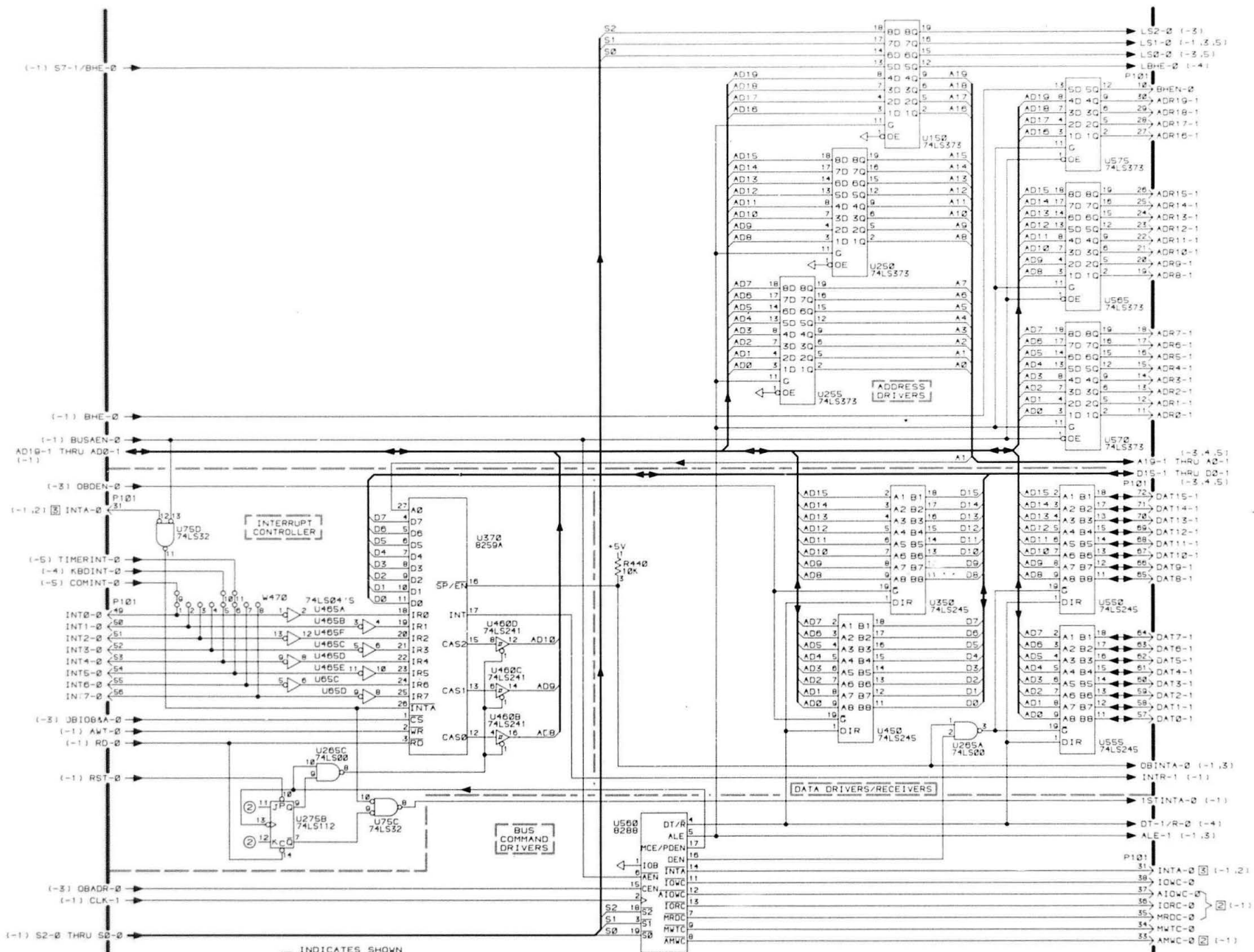


4112

INDICATES SHOWN MORE THAN ONCE AND WHERE (-)

3810-4

672-0951-01.02  
670-6490-00.01 PROCESSOR BD. A2A1-1  
(1 OF 5)



4112

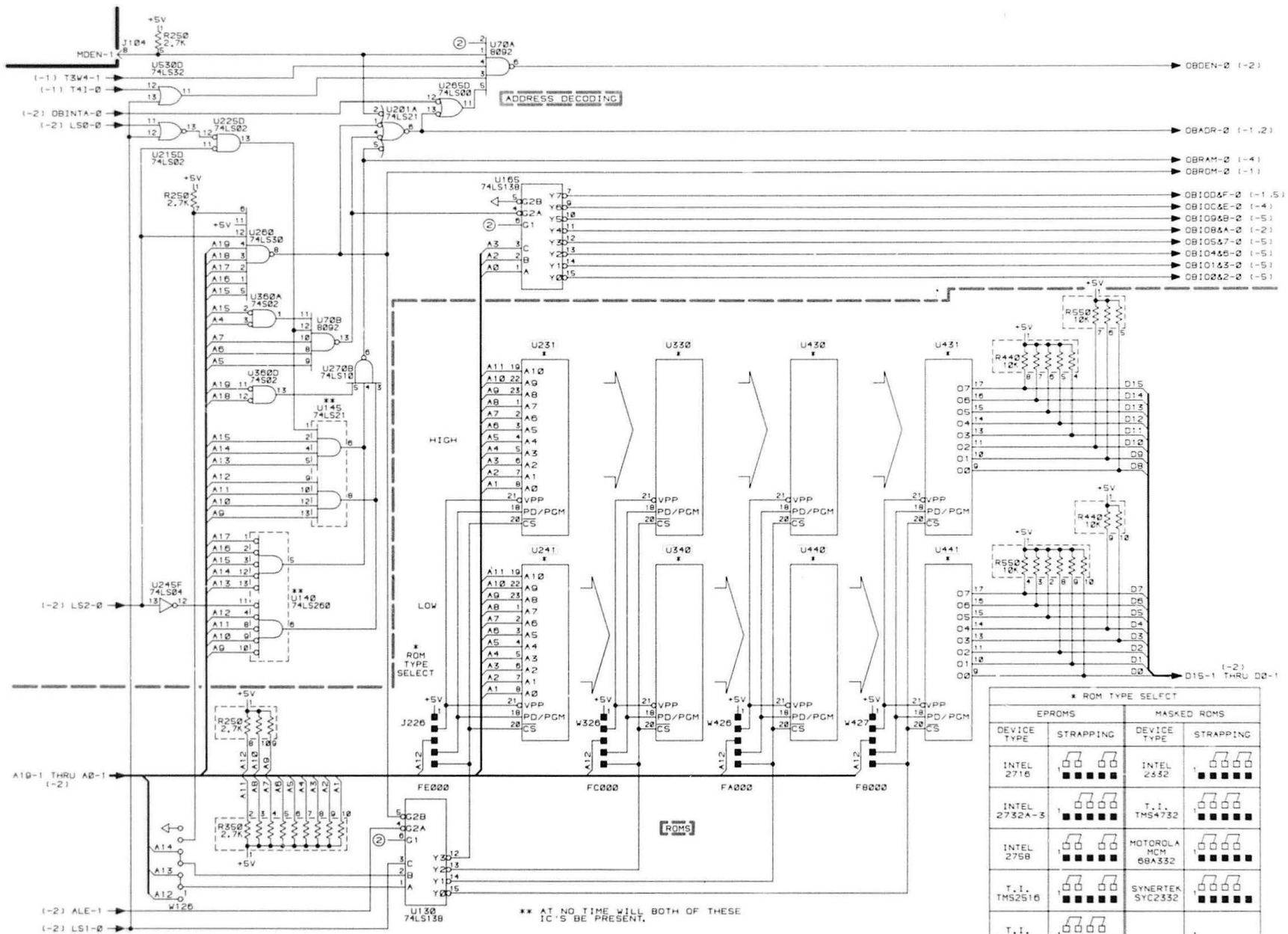
INDICATES SHOWN MORE THAN ONCE AND WHERE (-)

3819-5

672-0951-01,02 PROCESSOR BD. A2A1-2  
670-6406-00,01 (2 OF 5)

PROCESSOR 672-0951-01,02 A2A1-2





\*\* AT NO TIME WILL BOTH OF THESE IC'S BE PRESENT.

\* ROM TYPE SELECT

| EPROMS        |           | MASKED ROMS         |           |
|---------------|-----------|---------------------|-----------|
| DEVICE TYPE   | STRAPPING | DEVICE TYPE         | STRAPPING |
| INTEL 2716    |           | INTEL 2332          |           |
| INTEL 2732A-3 |           | T. I. TMS4732       |           |
| INTEL 2758    |           | MOTOROLA MCM 68A332 |           |
| T. I. TMS2516 |           | SYNERTEK SYC2332    |           |
| T. I. TMS2532 |           |                     |           |

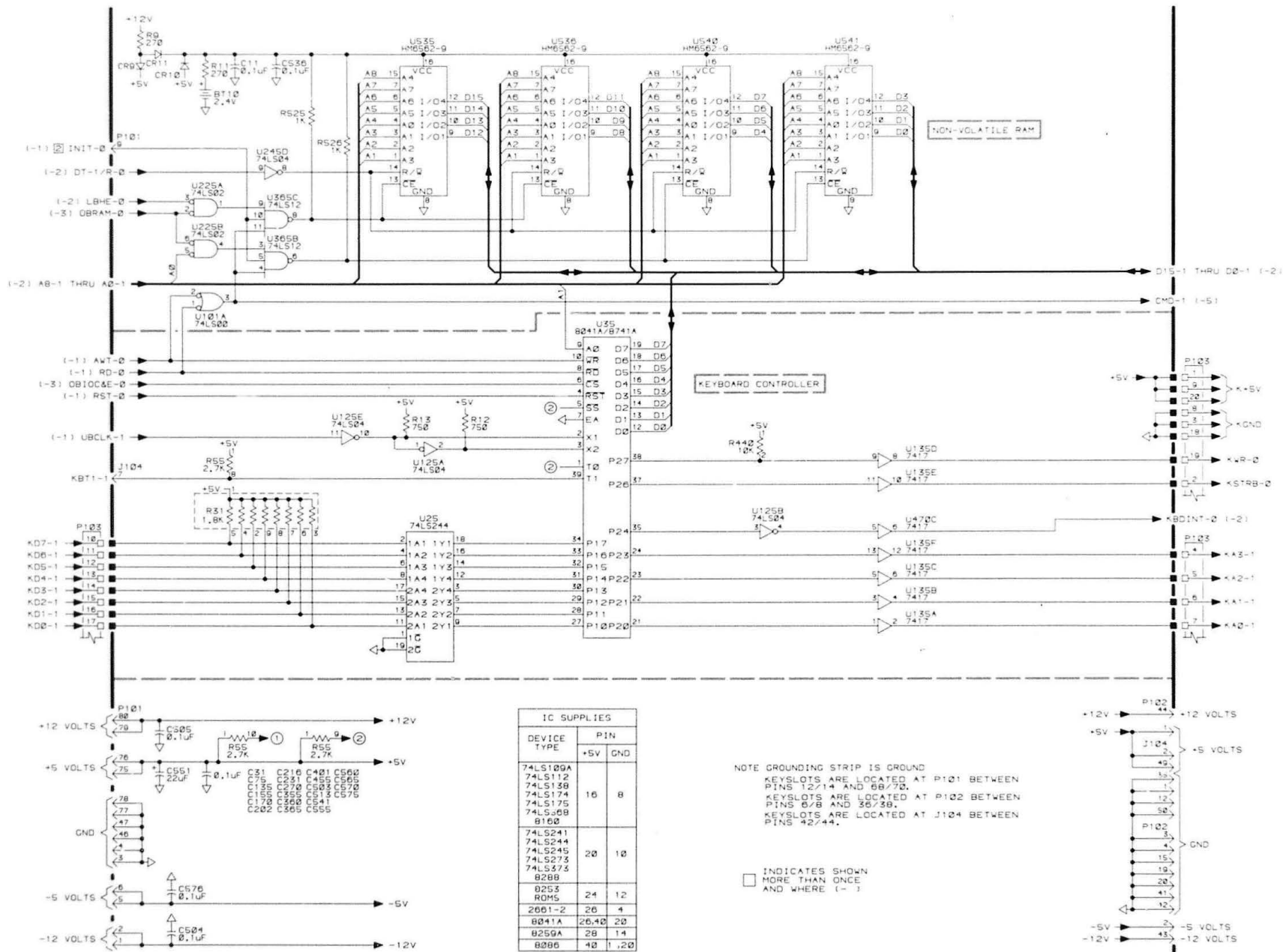
4112

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBERS. RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

3819-6

672-8951-01,02  
676-6498-00,01

PROCESSOR BD. A2A1-3  
(3 OF 5)



| IC SUPPLIES |       |      |
|-------------|-------|------|
| DEVICE TYPE | PIN   |      |
|             | +5V   | GND  |
| 74LS109A    |       |      |
| 74LS112     |       |      |
| 74LS138     |       |      |
| 74LS174     | 16    | 8    |
| 74LS175     |       |      |
| 74LS268     |       |      |
| 8160        |       |      |
| 74LS241     |       |      |
| 74LS244     | 20    | 10   |
| 74LS245     |       |      |
| 74LS273     |       |      |
| 74LS373     |       |      |
| 8288        |       |      |
| 8253 ROMS   | 24    | 12   |
| 2601-2      | 20    | 4    |
| 8041A       | 26,40 | 20   |
| 8259A       | 28    | 14   |
| 8086        | 40    | 1,20 |

NOTE GROUNDING STRIP IS GROUND  
 KEYSLOTS ARE LOCATED AT P101 BETWEEN PINS 12/14 AND 66/70.  
 KEYSLOTS ARE LOCATED AT P102 BETWEEN PINS 6/8 AND 36/38.  
 KEYSLOTS ARE LOCATED AT J104 BETWEEN PINS 42/44.

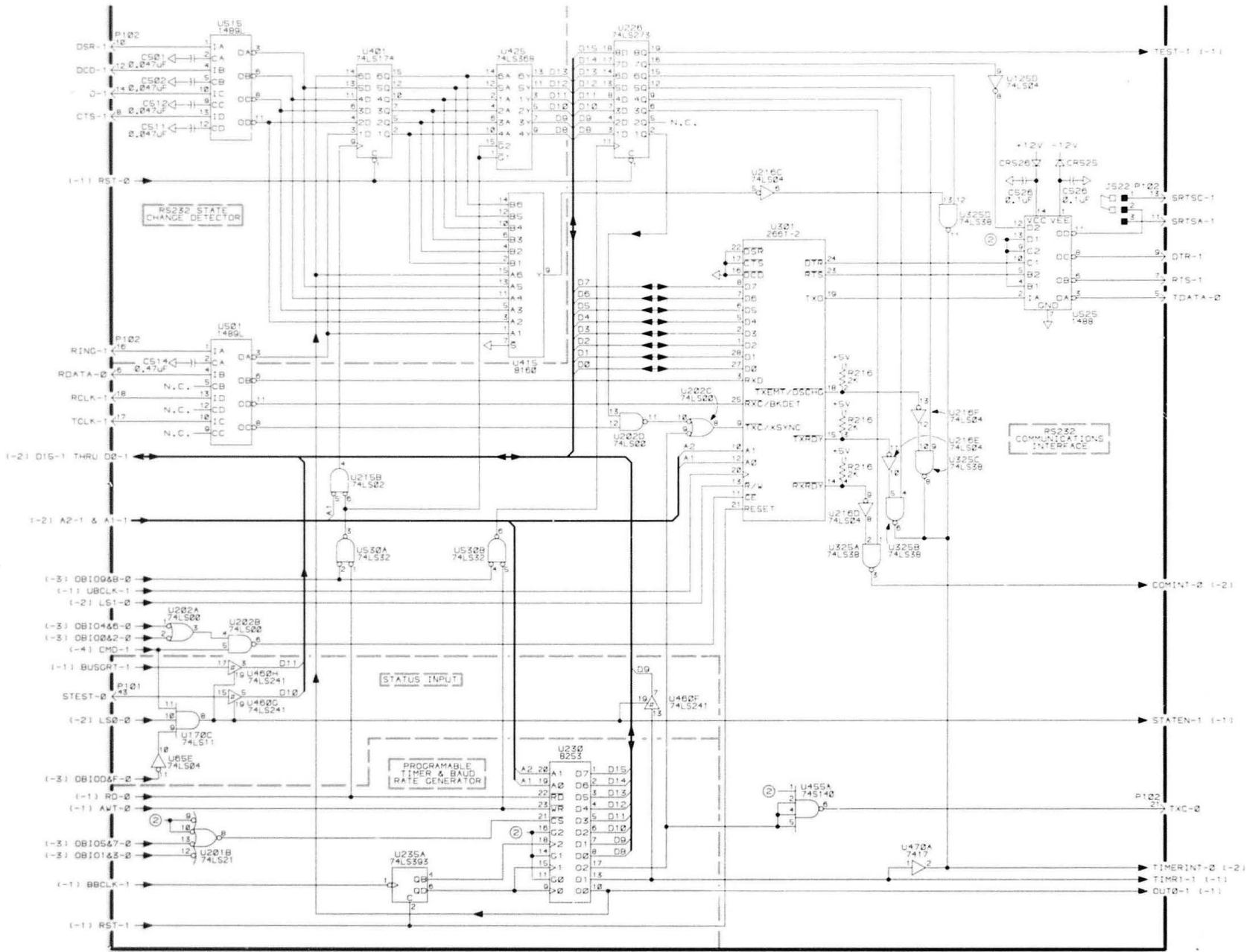
□ INDICATES SHOWN MORE THAN ONCE AND WHERE (-)

4112

3819-7

872-0951-01.02 PROCESSOR BD. A2A1-4 (4 OF 5)

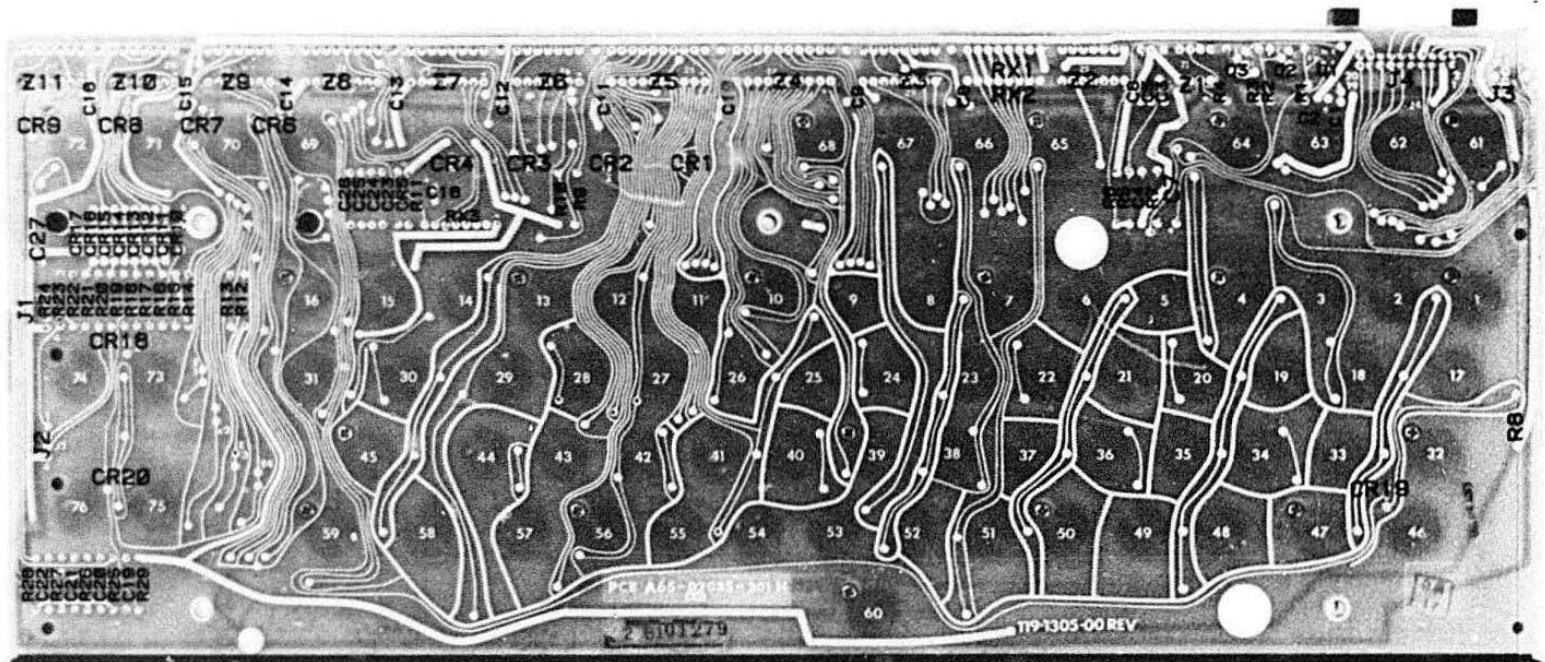
PROCESSOR 872-0951-01.02 A2A1-4



4112

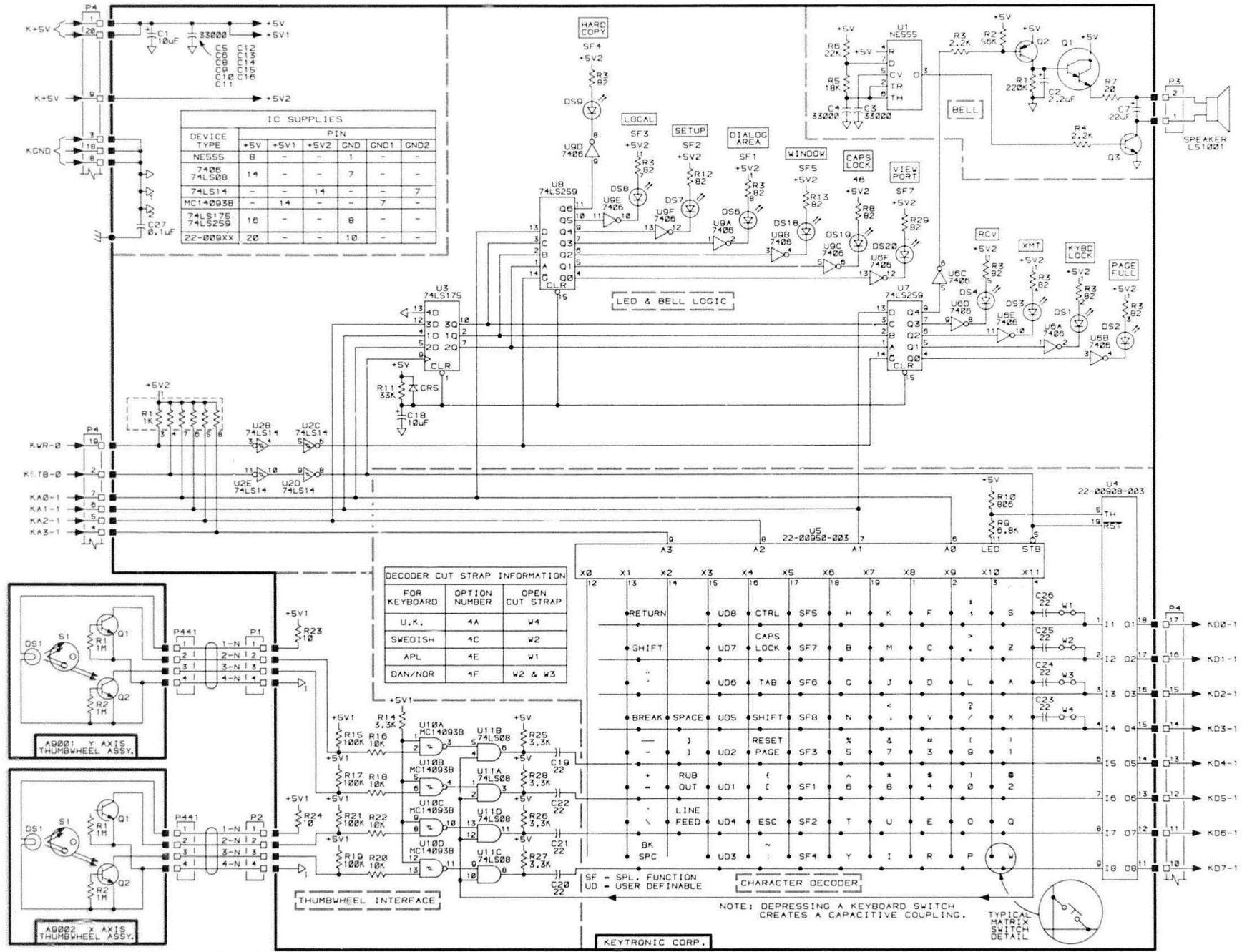
3819-B

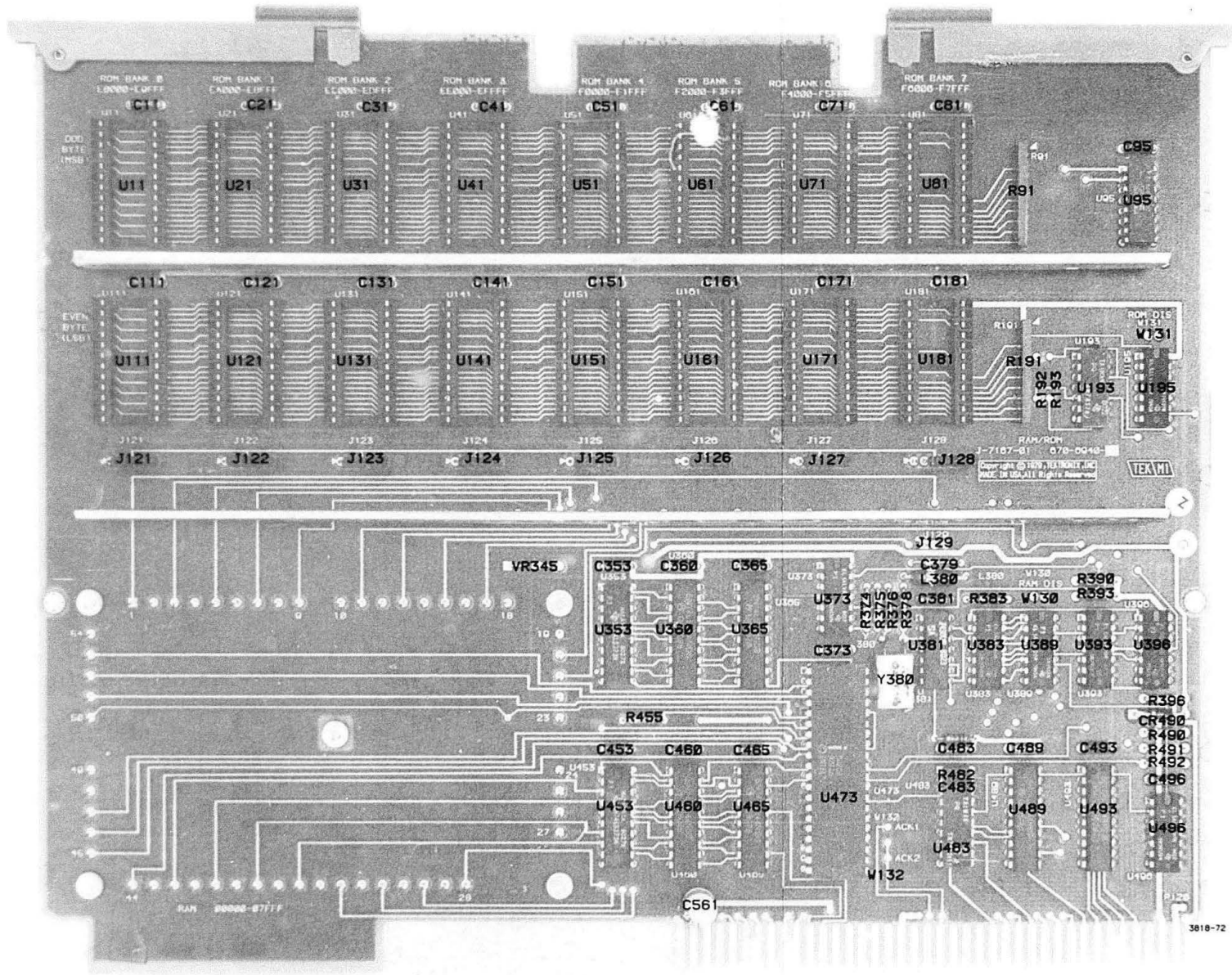
872-0951-01.02  
872-0951-00.01 PROCESSOR BD. A2A1-5  
(5 OF 5)

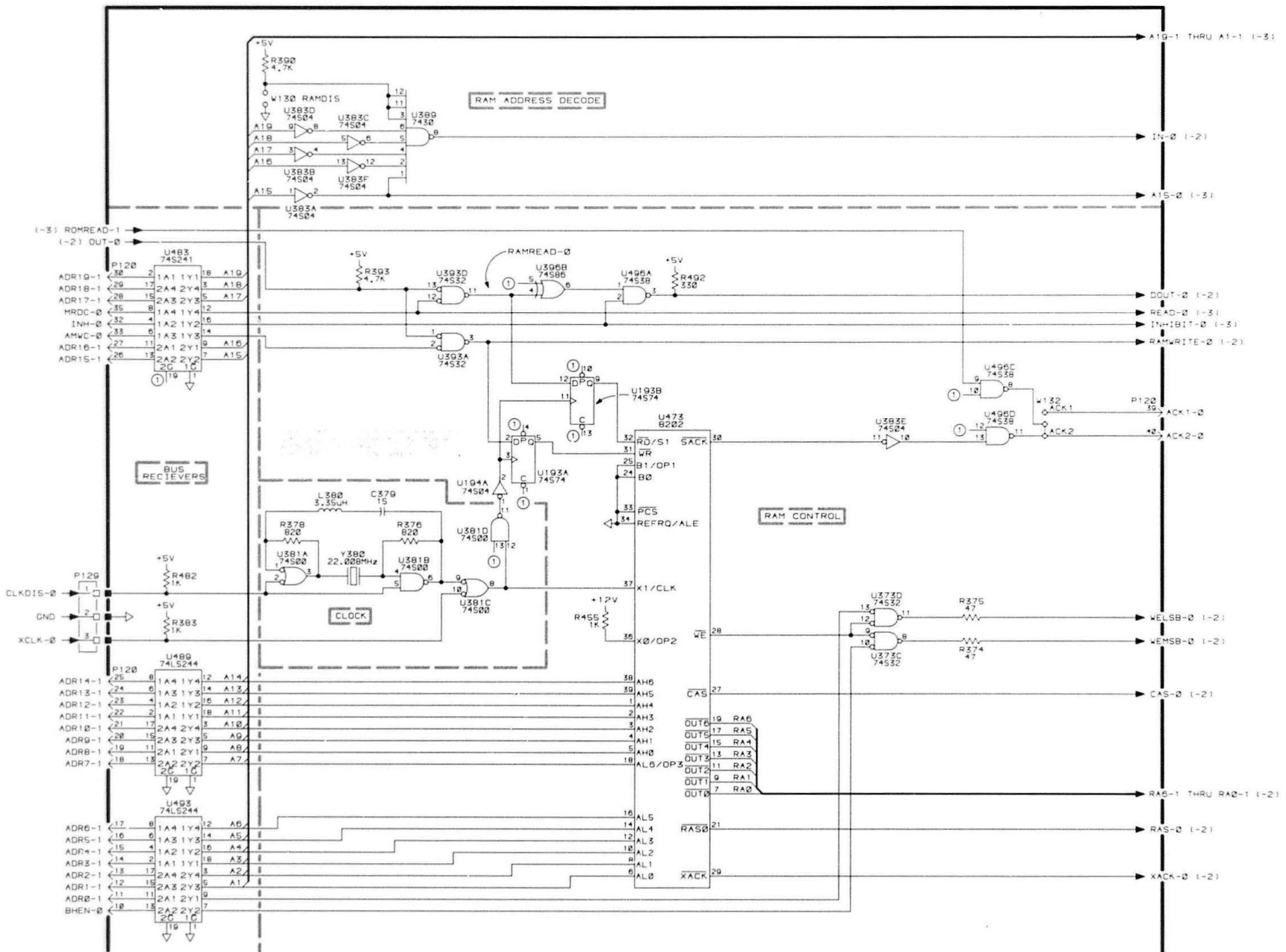


3818-71

Keyboard (119-1400-00) Component Locations.





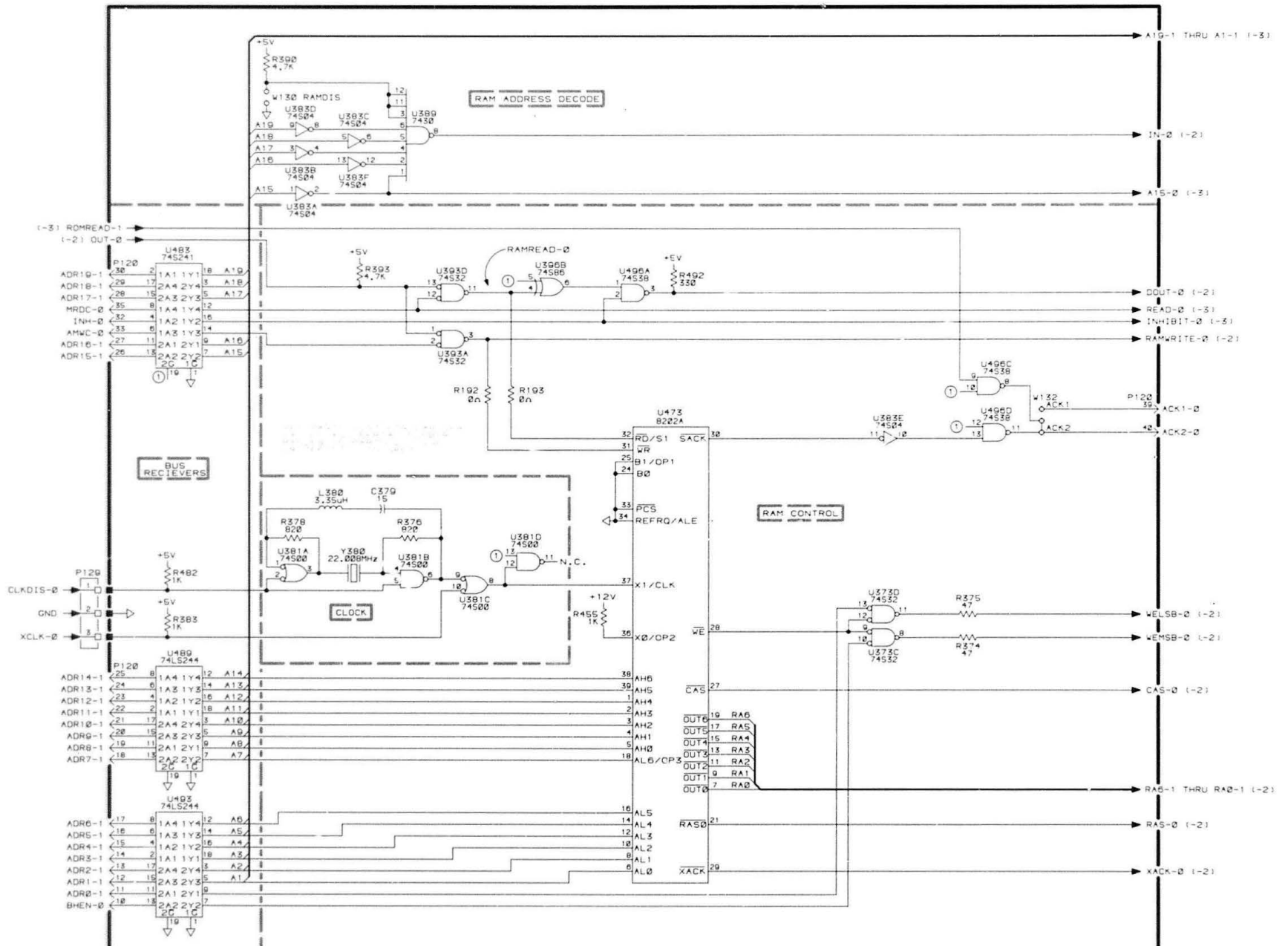


4112

5819-10

672-0952-00,01 RAM/ROM BD. A4A1-1  
 670-0940-00,01 (1 OF 3)

RAM/ROM  
 672-0952-00,01  
 A4A1-1



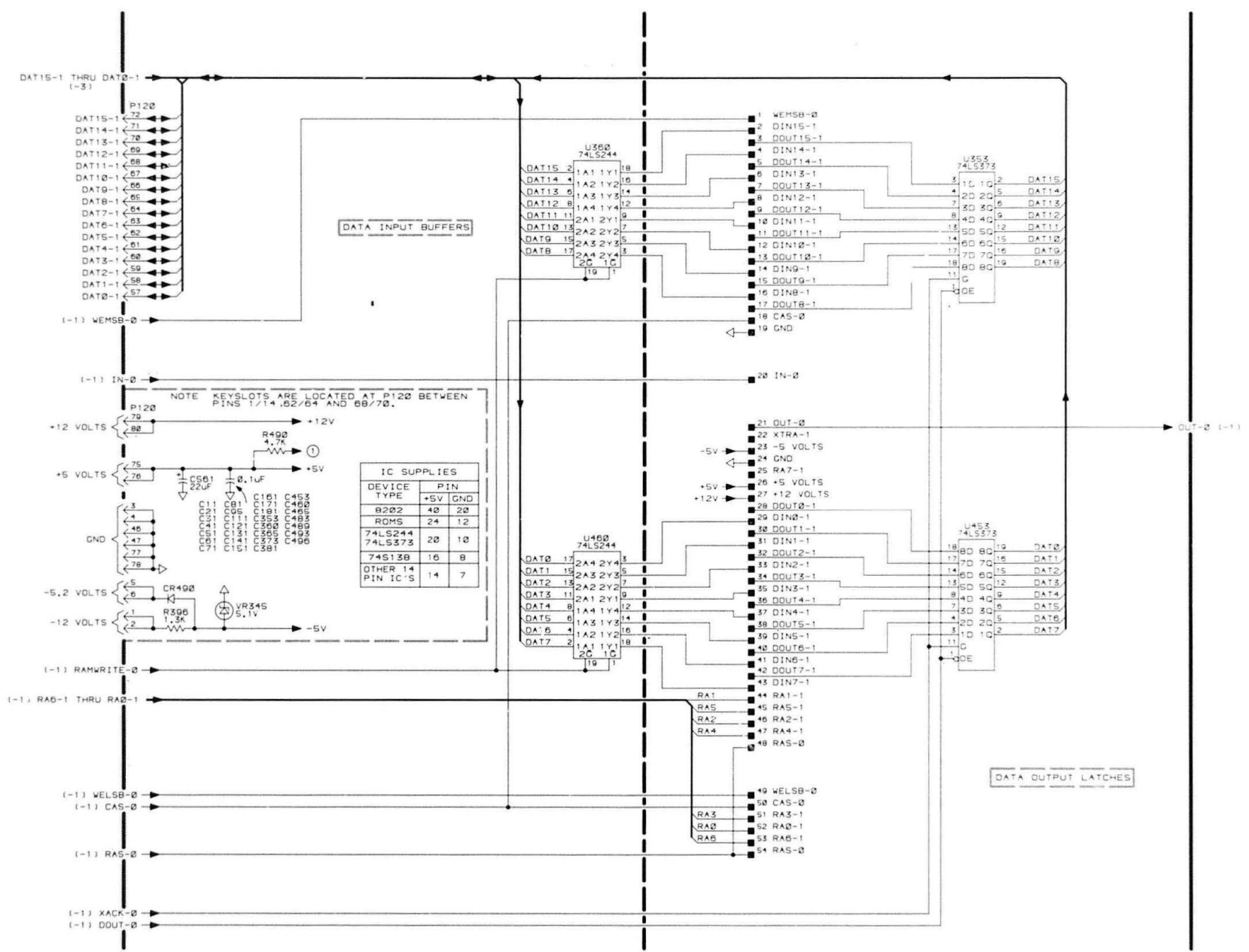
4112

3619-120

872-8952-02 RAM/ROM BD. A4A1-1A  
878-8946-02 (1 OF 3)

RAM/ROM  
872-8952-02  
A4A1-1A

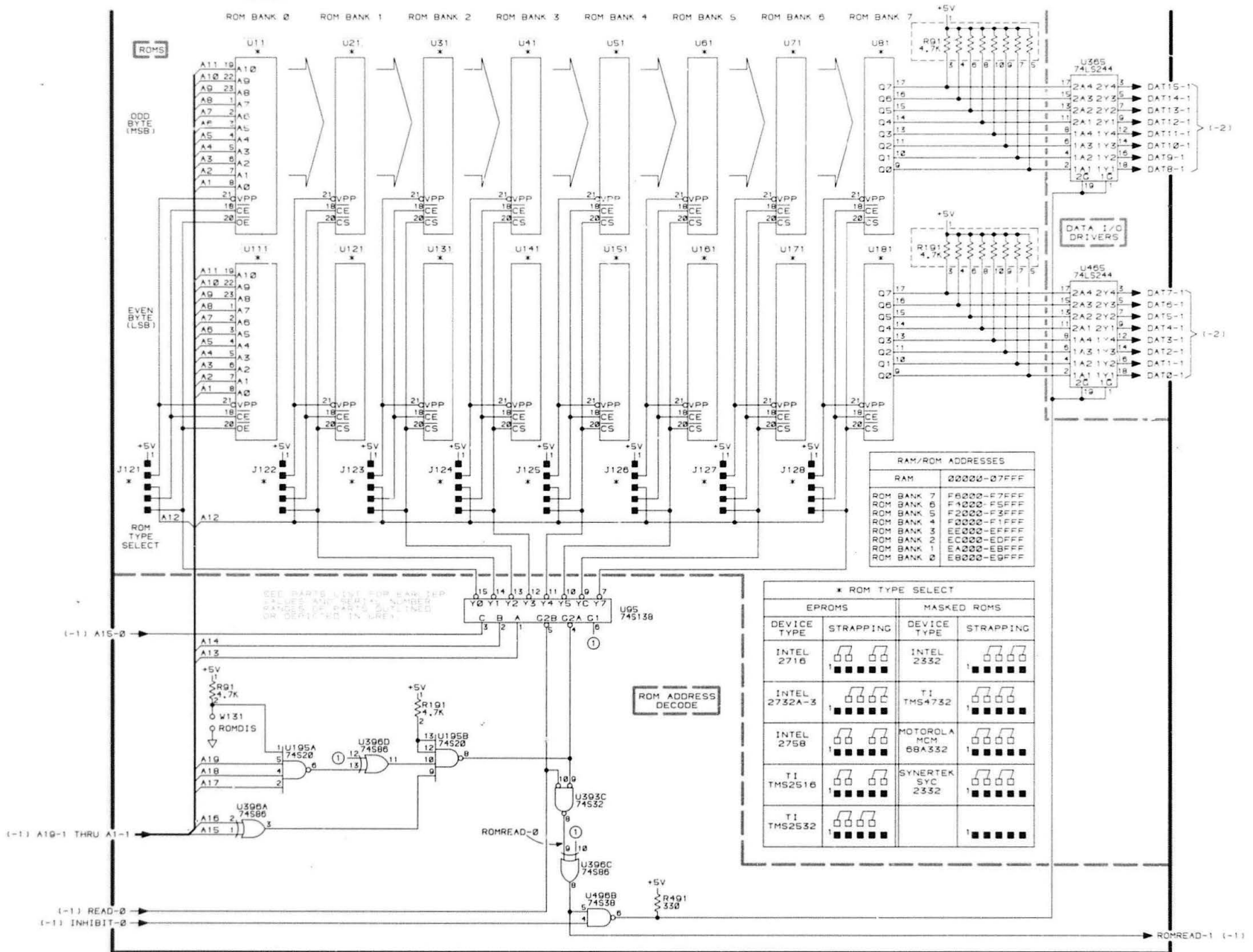


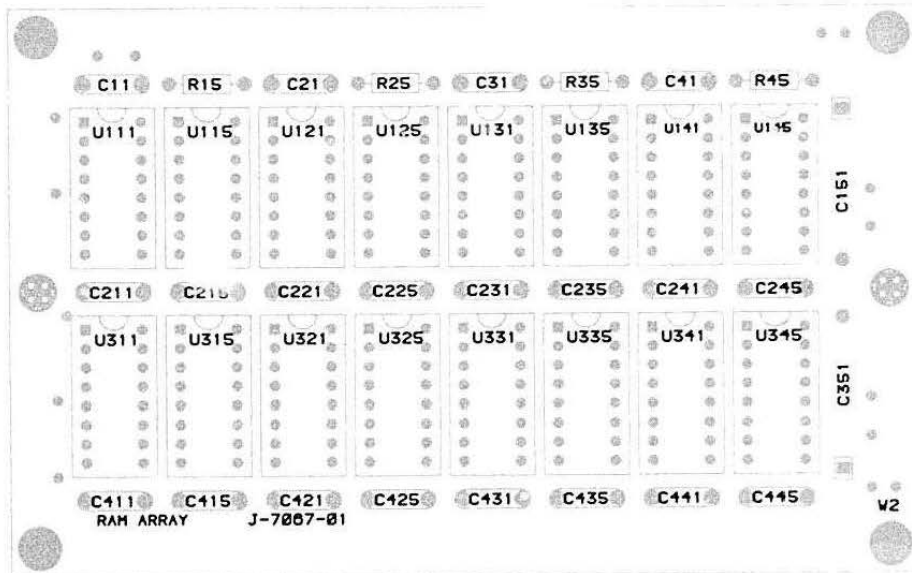


4112

3819-11

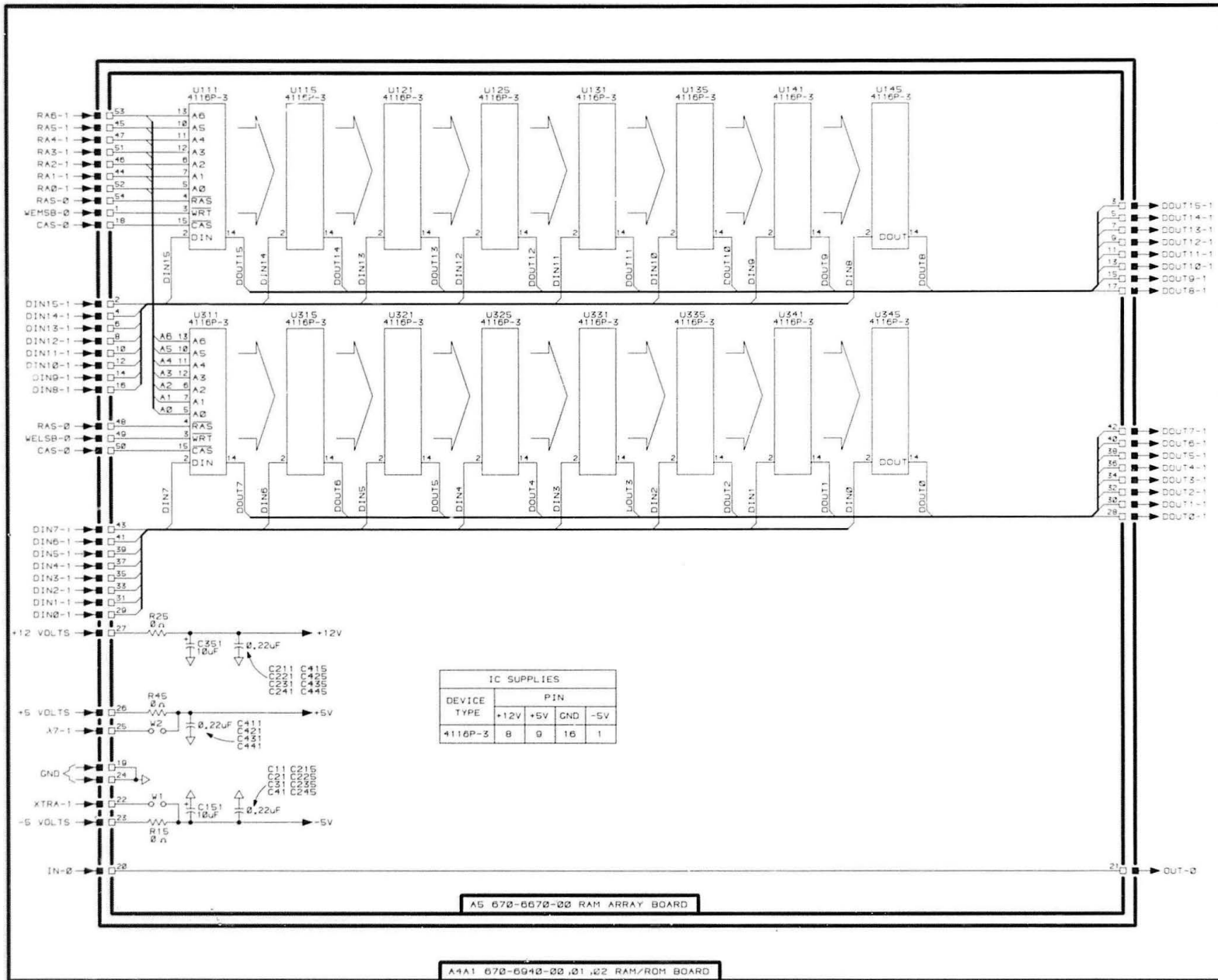
672-0952-00,01,02 RAM/ROM BD A4A1-2  
670-0940-00,01,02 12 OF 31

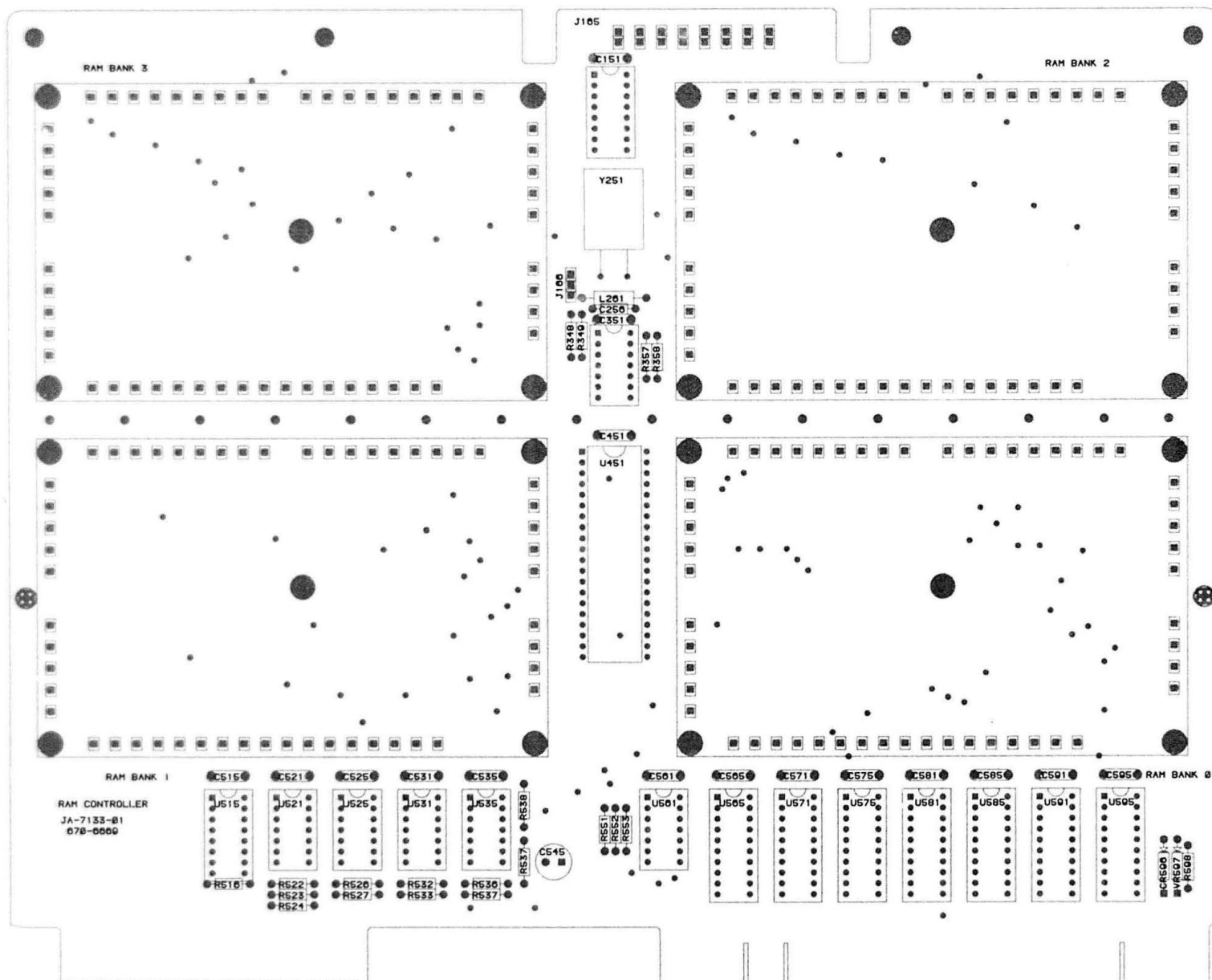




3818-94

RAM Array (670-6670-00) Component Locations.



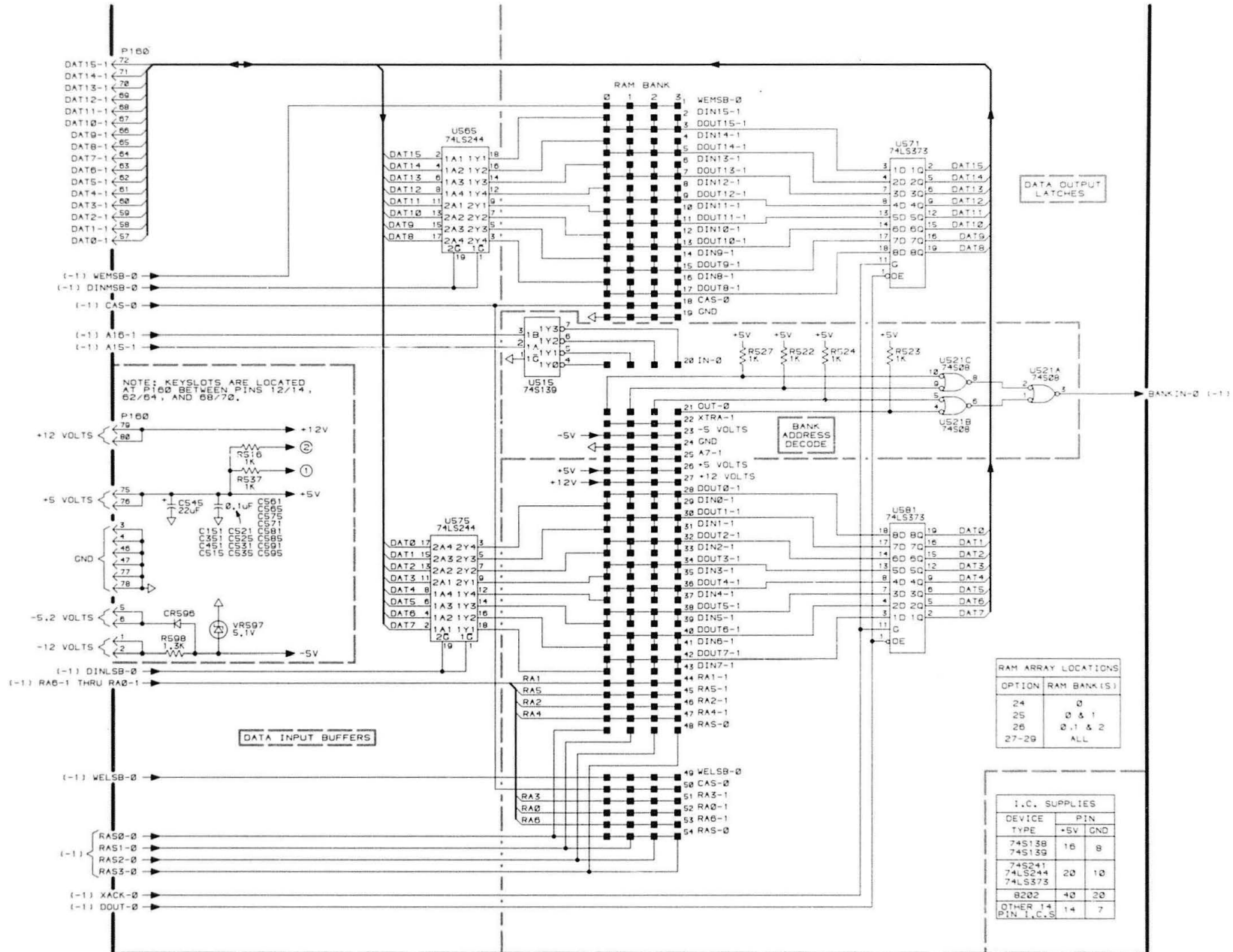


RAM Controller (670-6669-00,01) Component Locations.

3818-95





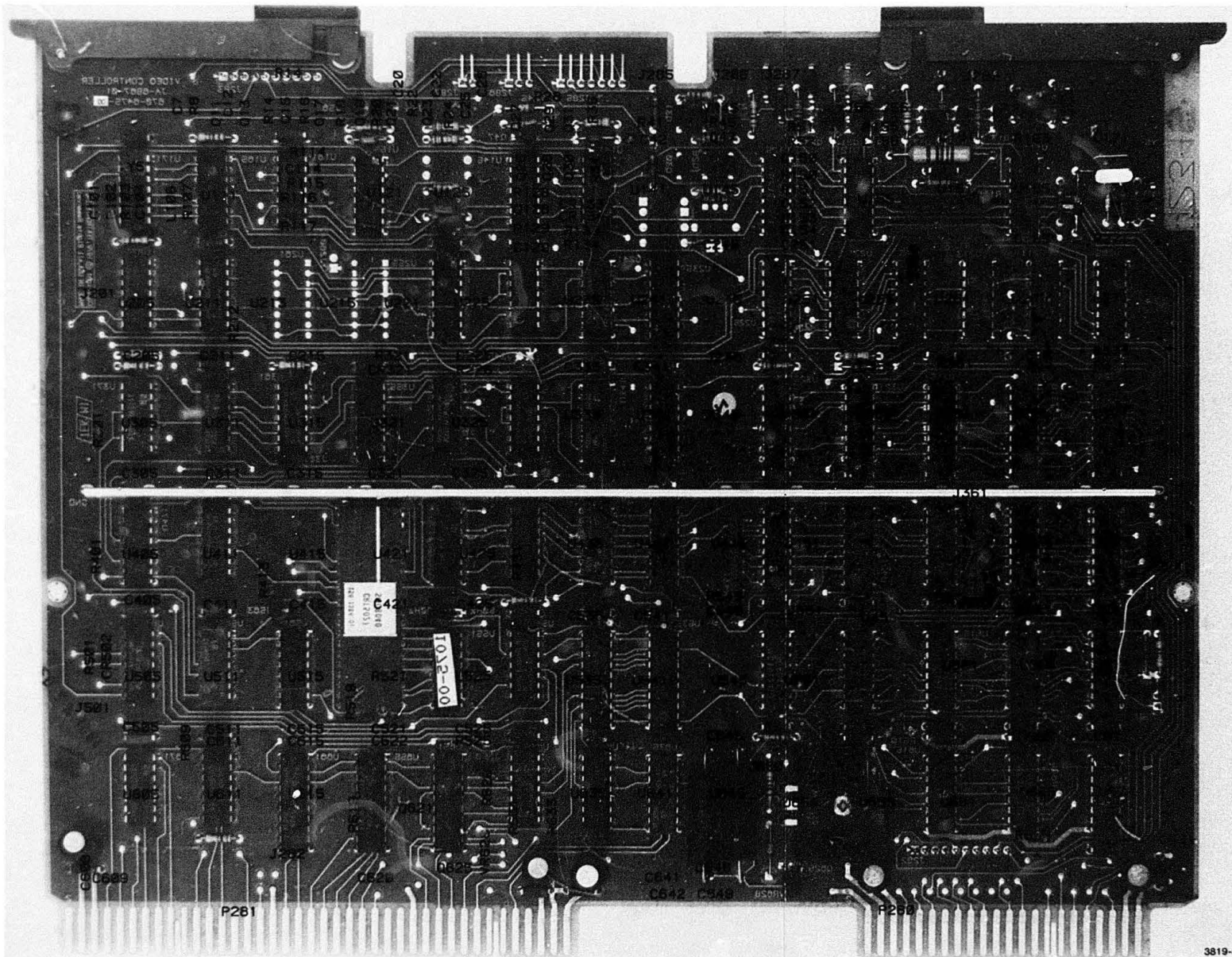


4112 OPT. 24 thru 29

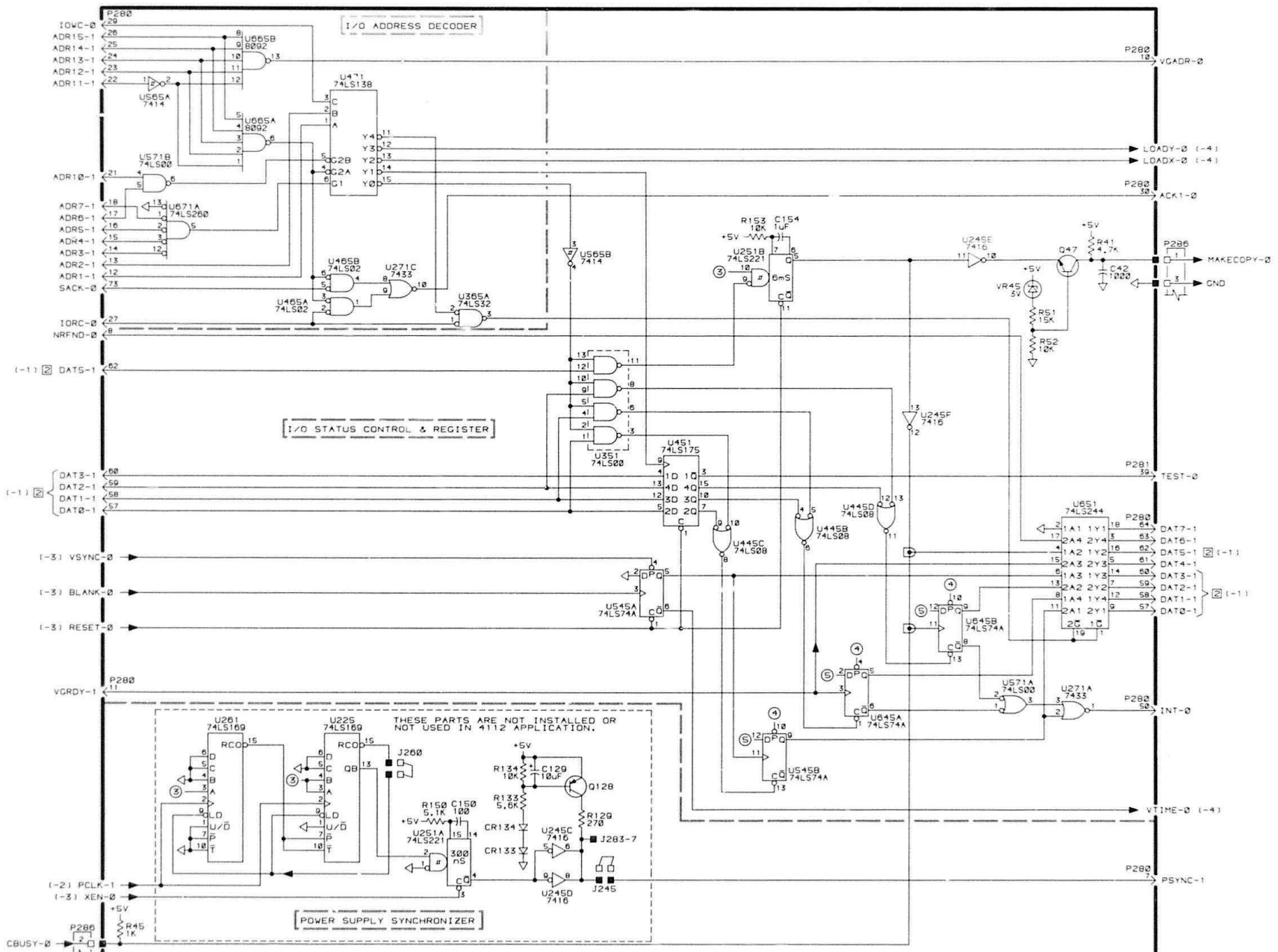
3819-16

670-6669-00, 01, 02 RAM CONTROLLER BD. A6-2 (2 OF 2)





Video Controller (670-1003-00, Standard; 672-1004-00, Option 48) Component Locations.



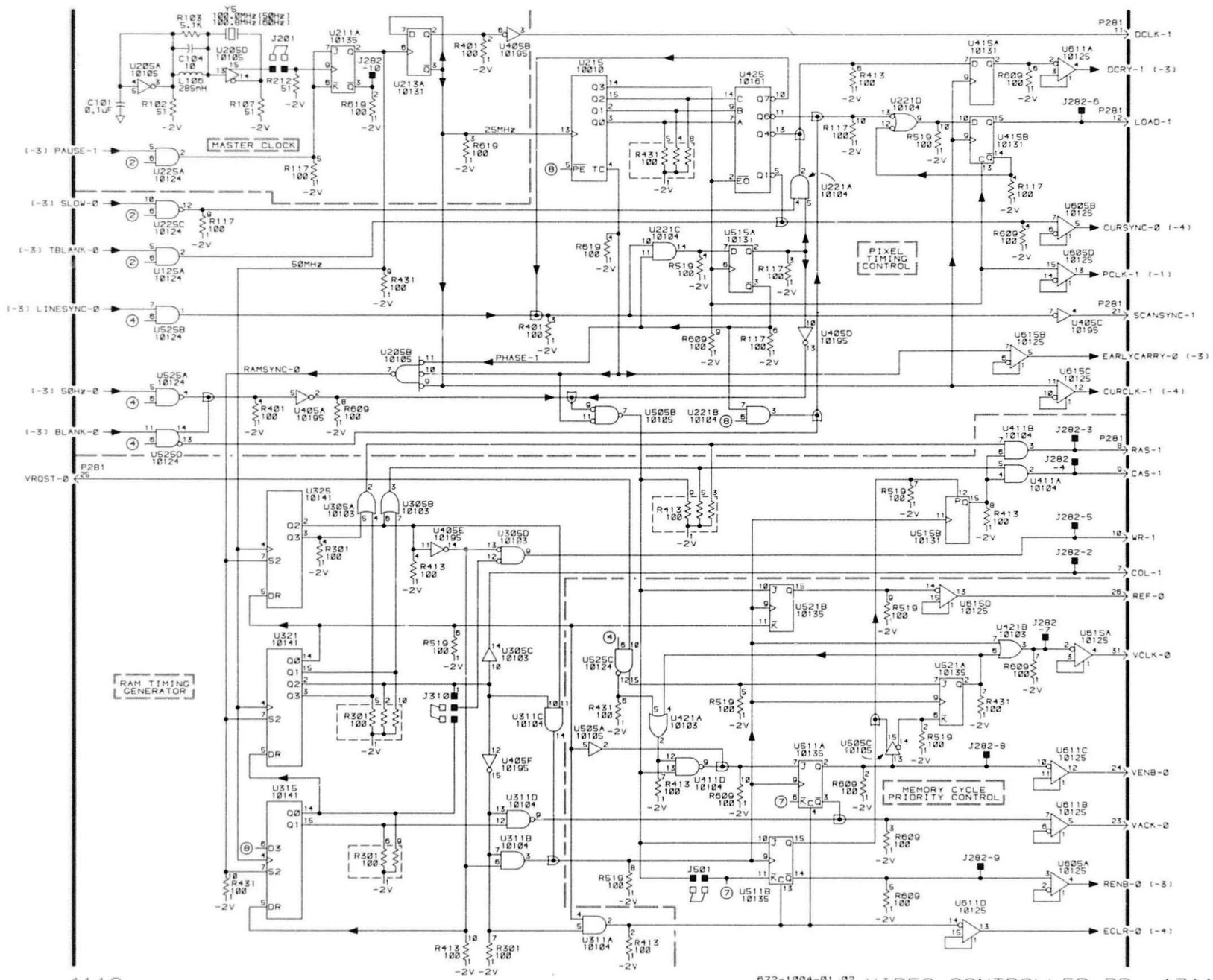
4112

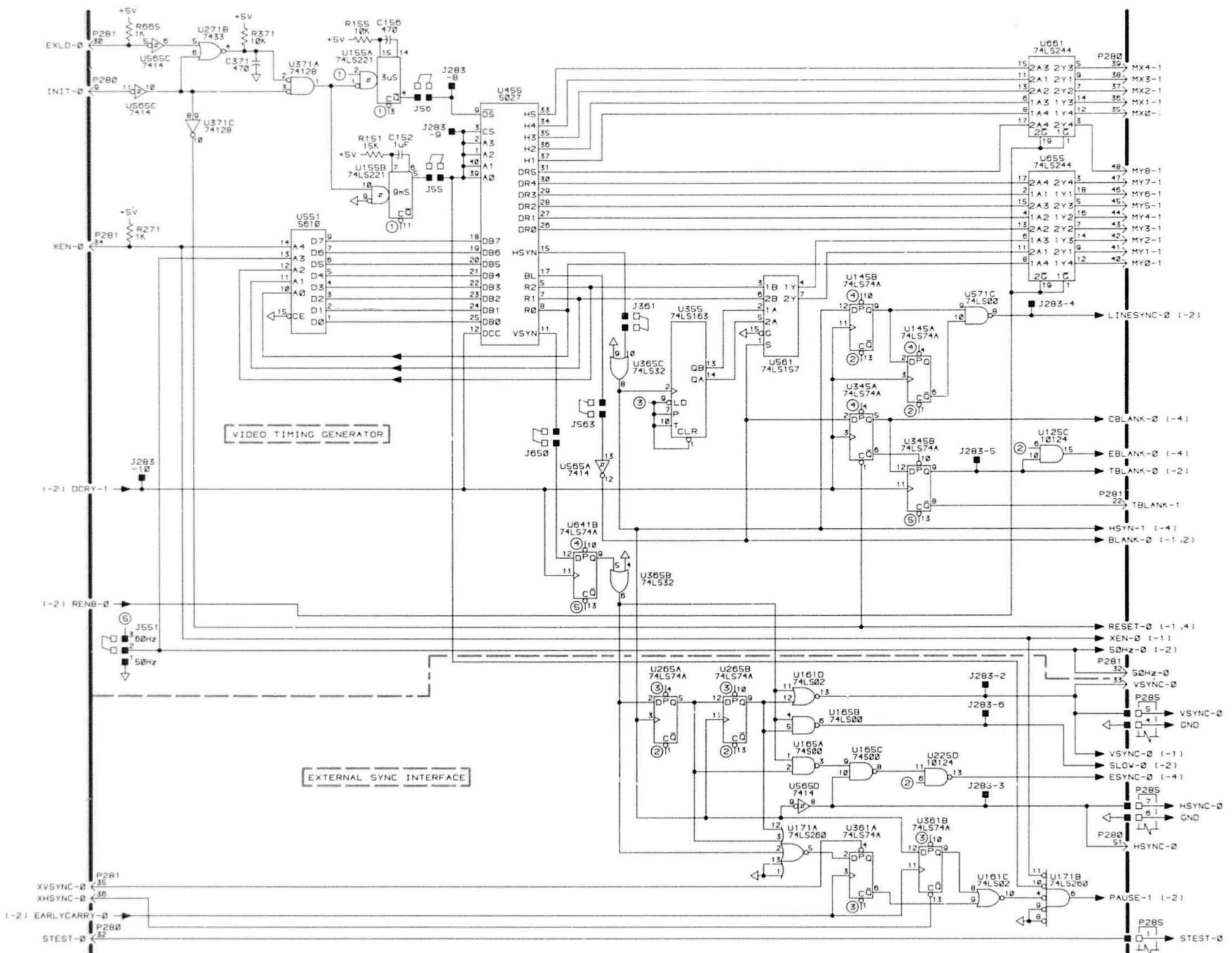
□ INDICATES SHOWN MORE THAN ONCE AND WHERE (-)

3819-17

672-1004-01.02 VIDEO CONTROLLER BD. A7A1-1 (1 OF 4)

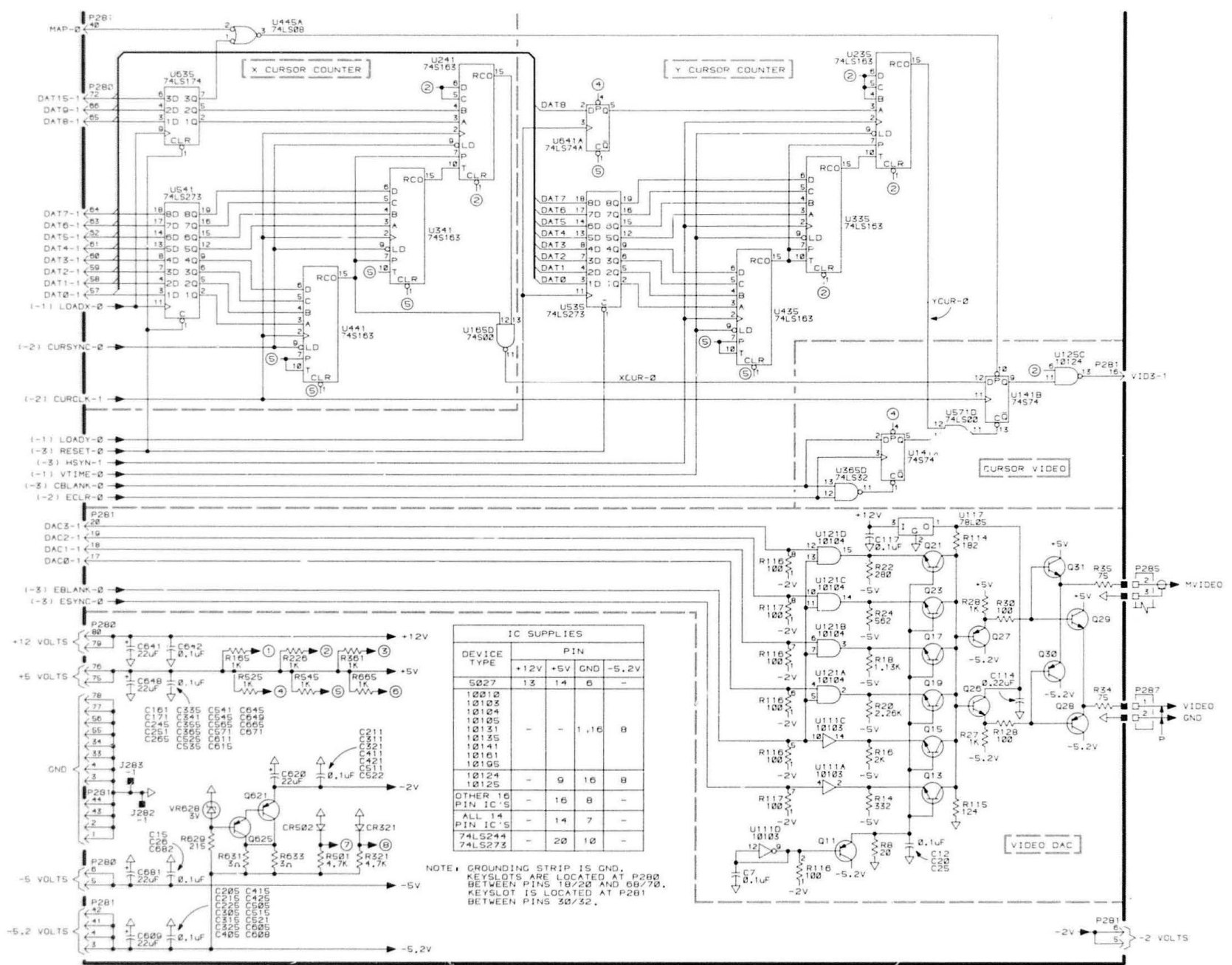
VIDEO CONTROLLER 672-1004-01.02 A7A1-1





4112

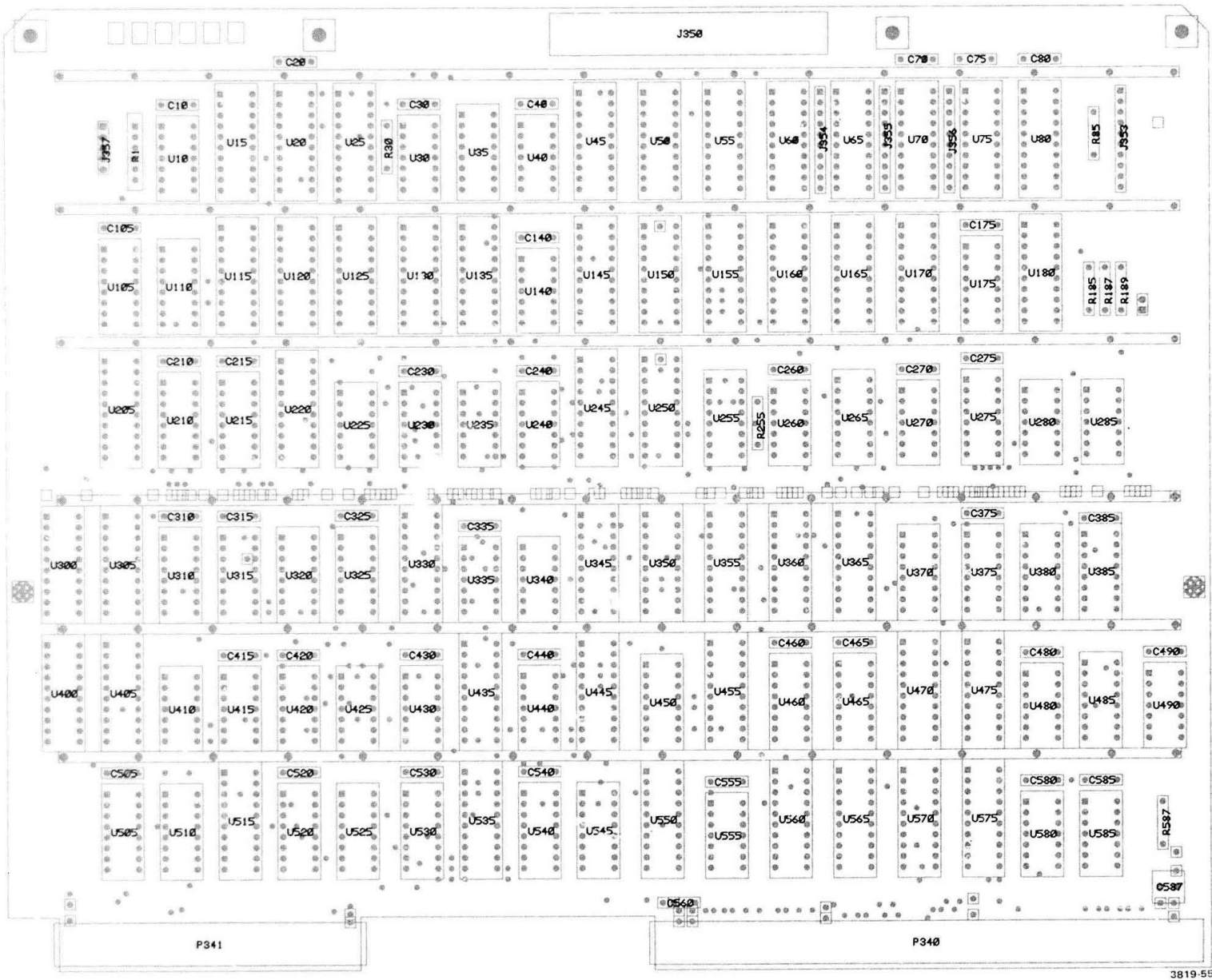
3819-19



4112

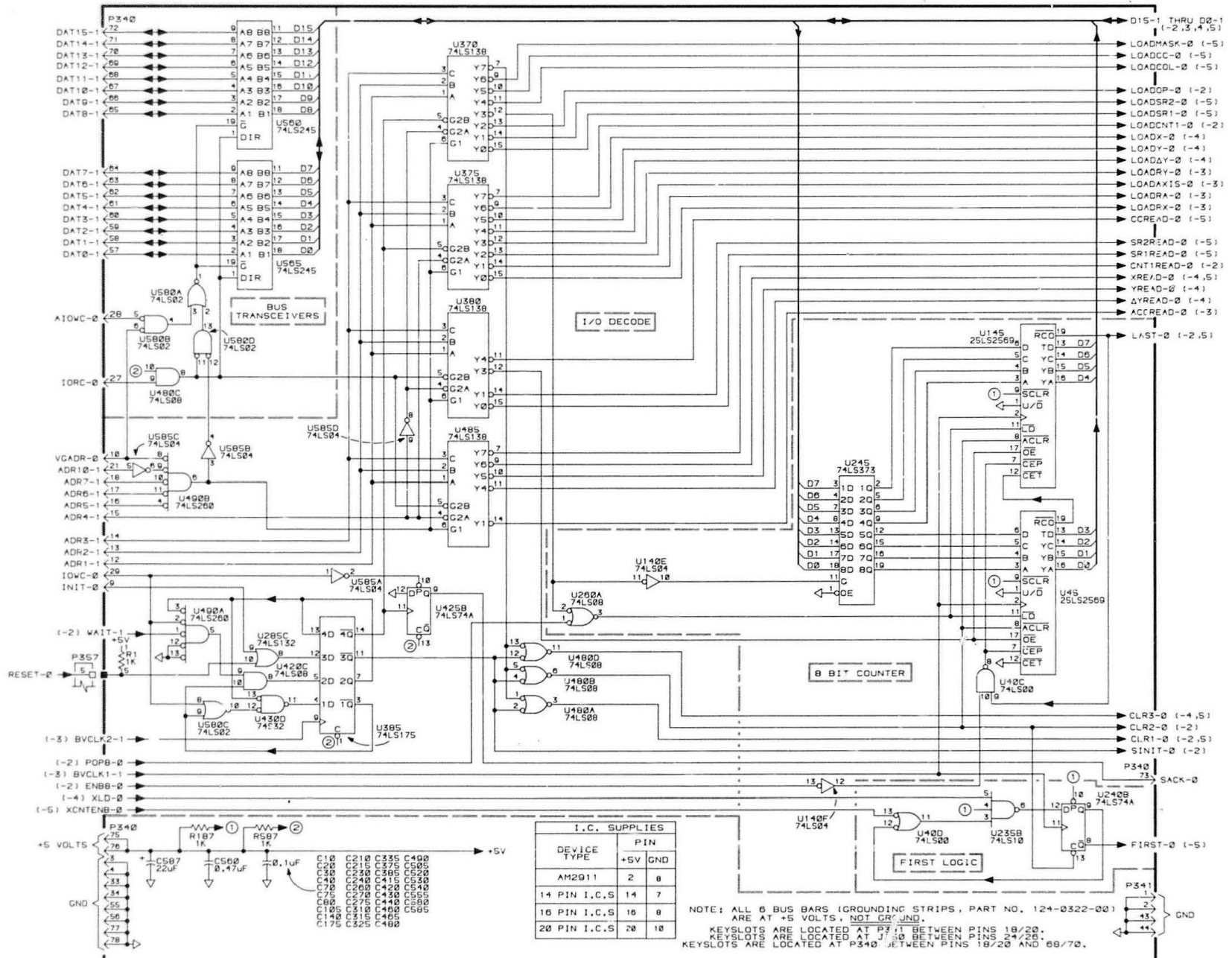
3819-20

672-1004-01.02  
670-6475-01.02 VIDEO CONTROLLER BD. A7A1-4  
(4 OF 4)



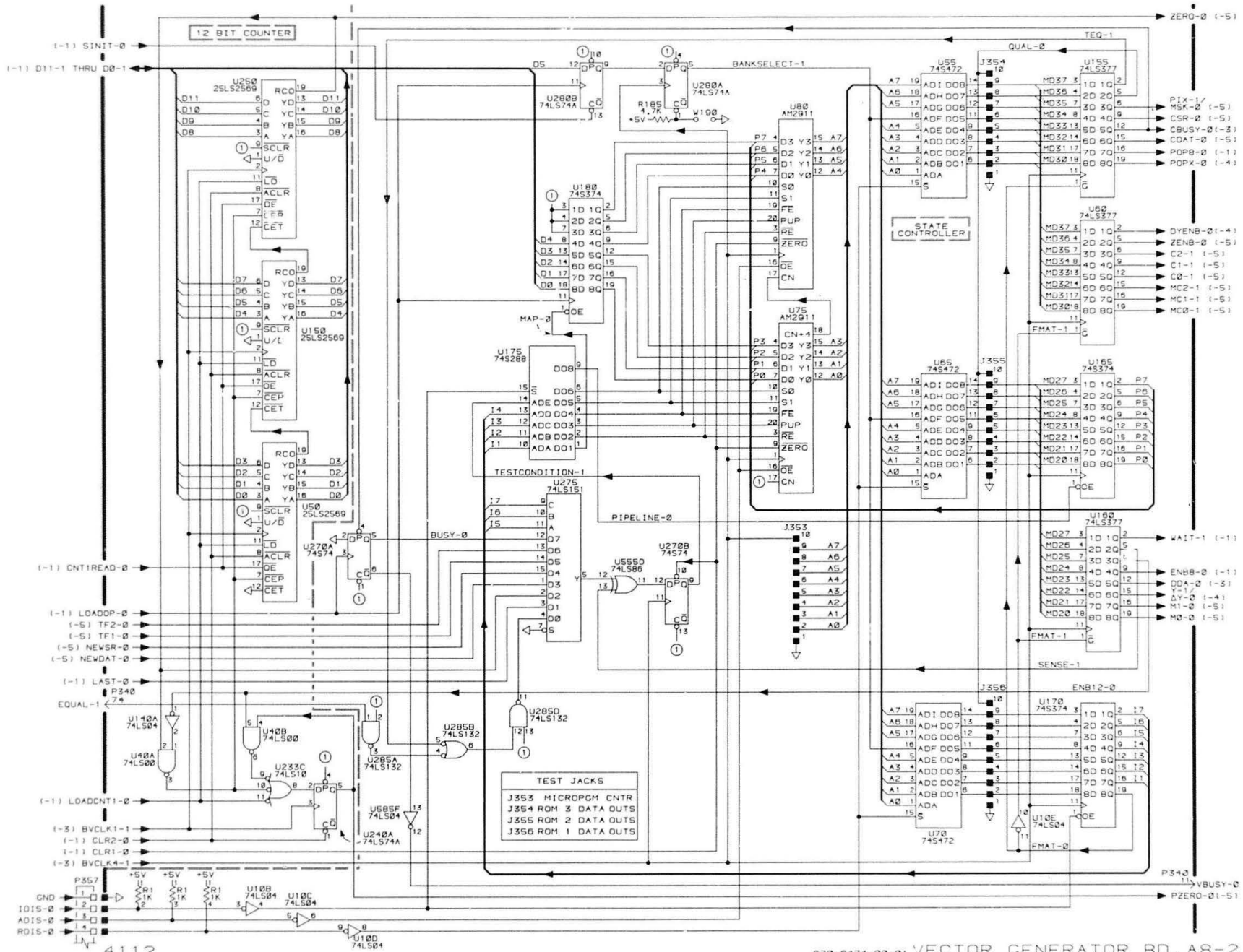
3819-55

Vector Generator (670-6474-00,01) Component Locations.



| I.C. SUPPLIES |     |     |
|---------------|-----|-----|
| DEVICE TYPE   | +5V | GND |
| AM2011        | 2   | 8   |
| 14 PIN I.C.S  | 14  | 7   |
| 16 PIN I.C.S  | 16  | 8   |
| 20 PIN I.C.S  | 20  | 10  |

NOTE: ALL 6 BUS BARS (GROUNDING STRIPS, PART NO. 124-0322-00) ARE AT +5 VOLTS, NOT GROUND.  
KEYSLOTS ARE LOCATED AT J7-10 BETWEEN PINS 24/25.  
KEYSLOTS ARE LOCATED AT P340 BETWEEN PINS 19/20 AND 69/70.



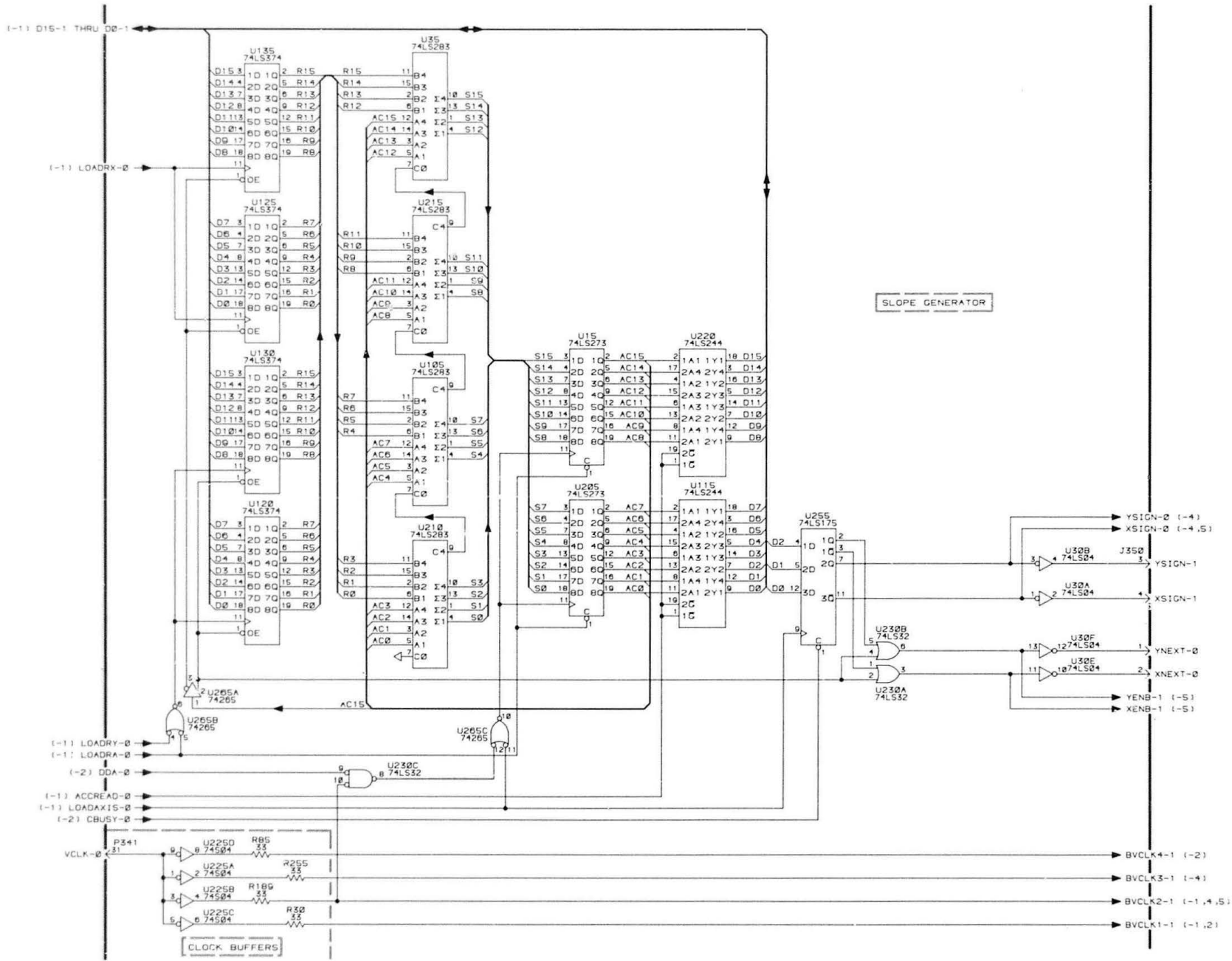
4112

3810-22

670-6474-00.01 VECTOR GENERATOR BD. A8-2 (2 OF 5)

VECTOR GENERATOR 670-6474-00.01 A8-2

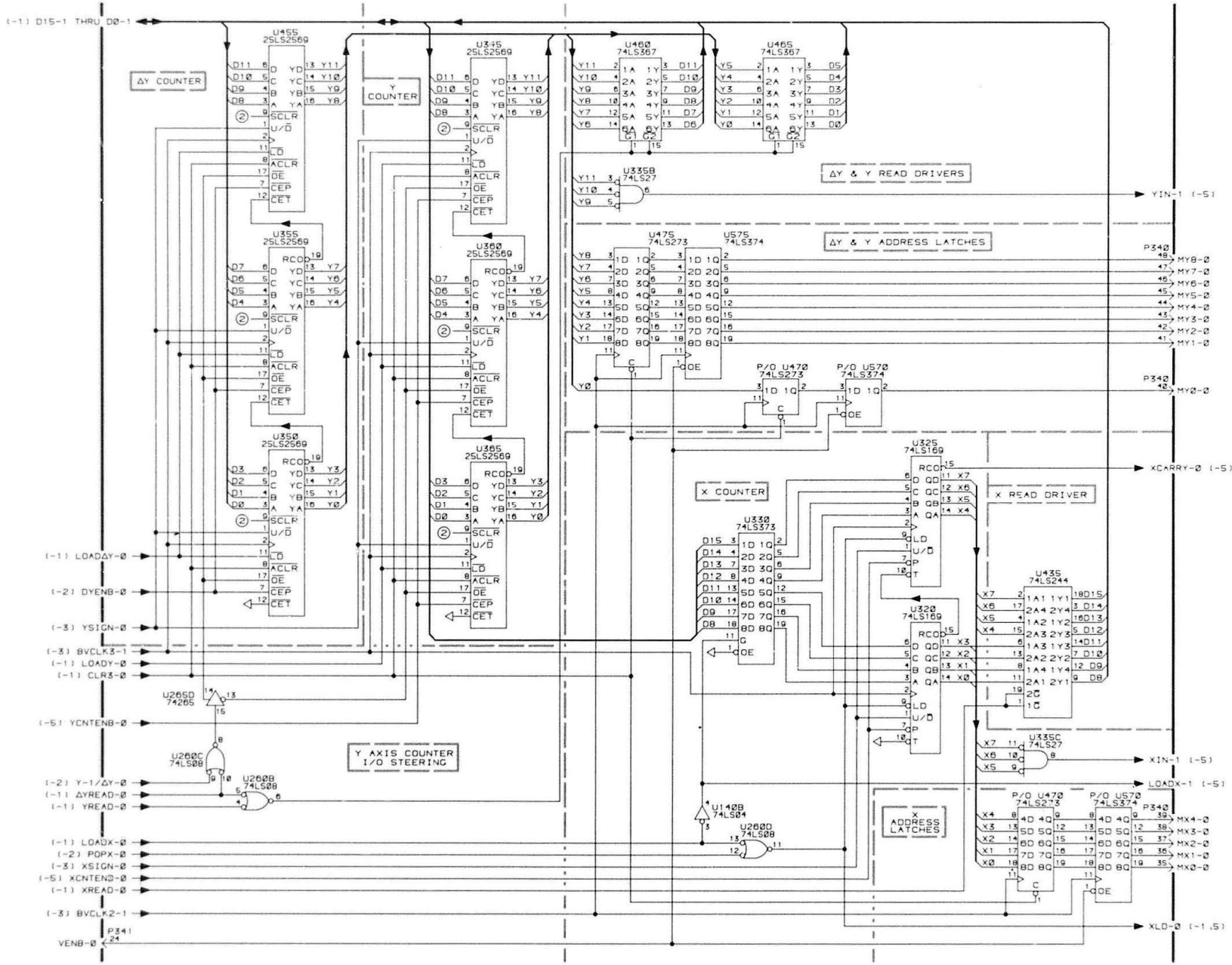


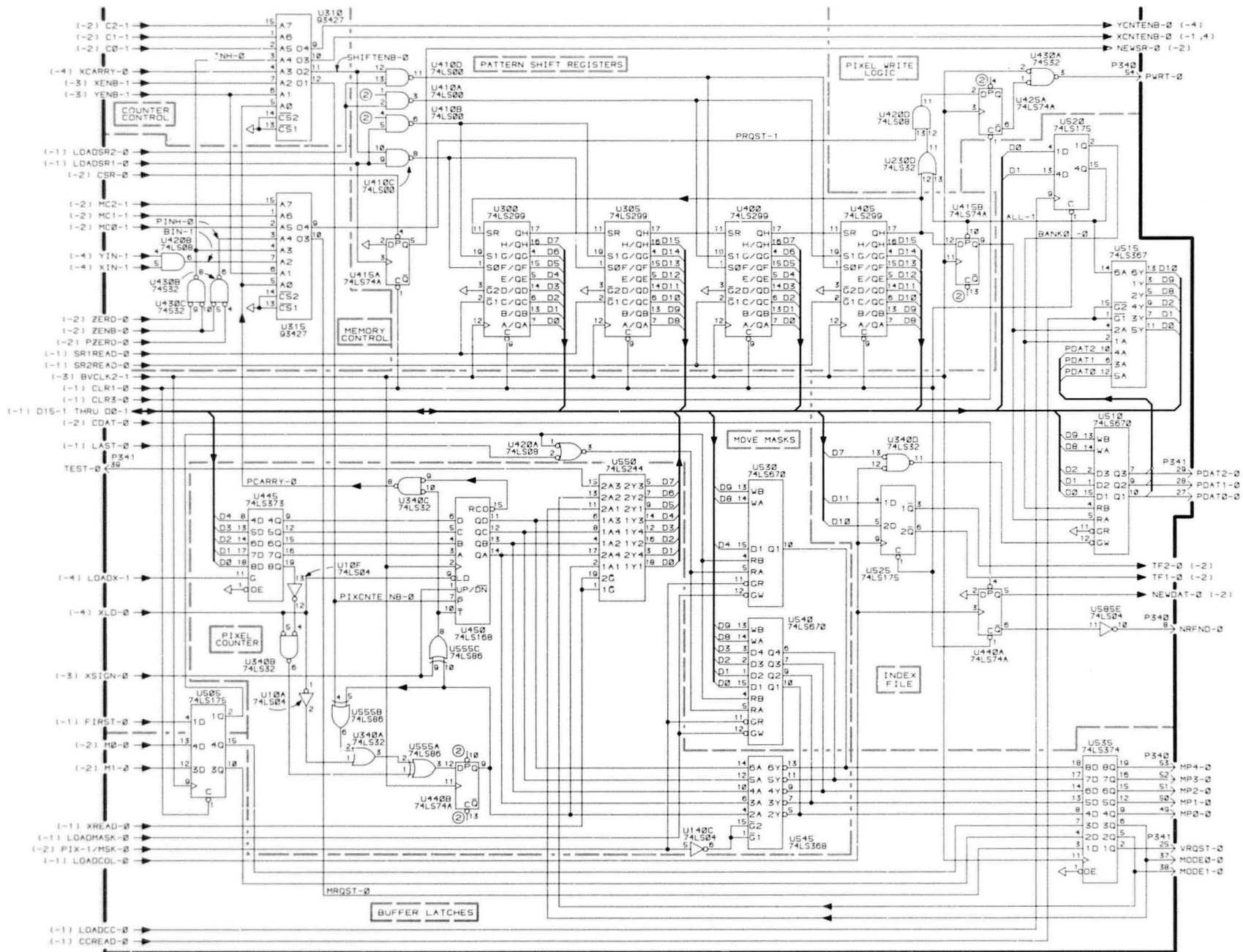


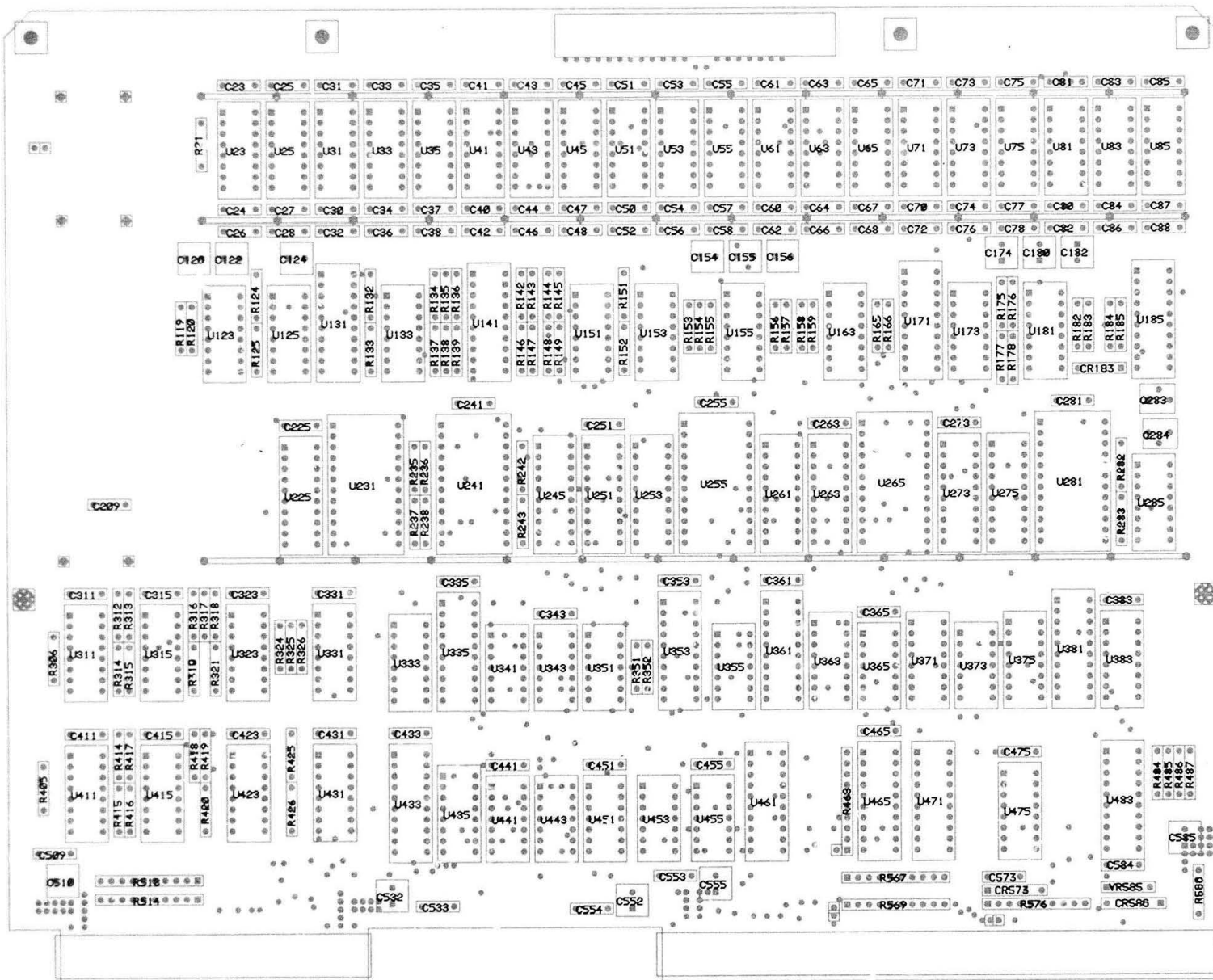
4112

3819-23

670-6474-00,01 VECTOR GENERATOR BD. A8-3  
(3 OF 5)

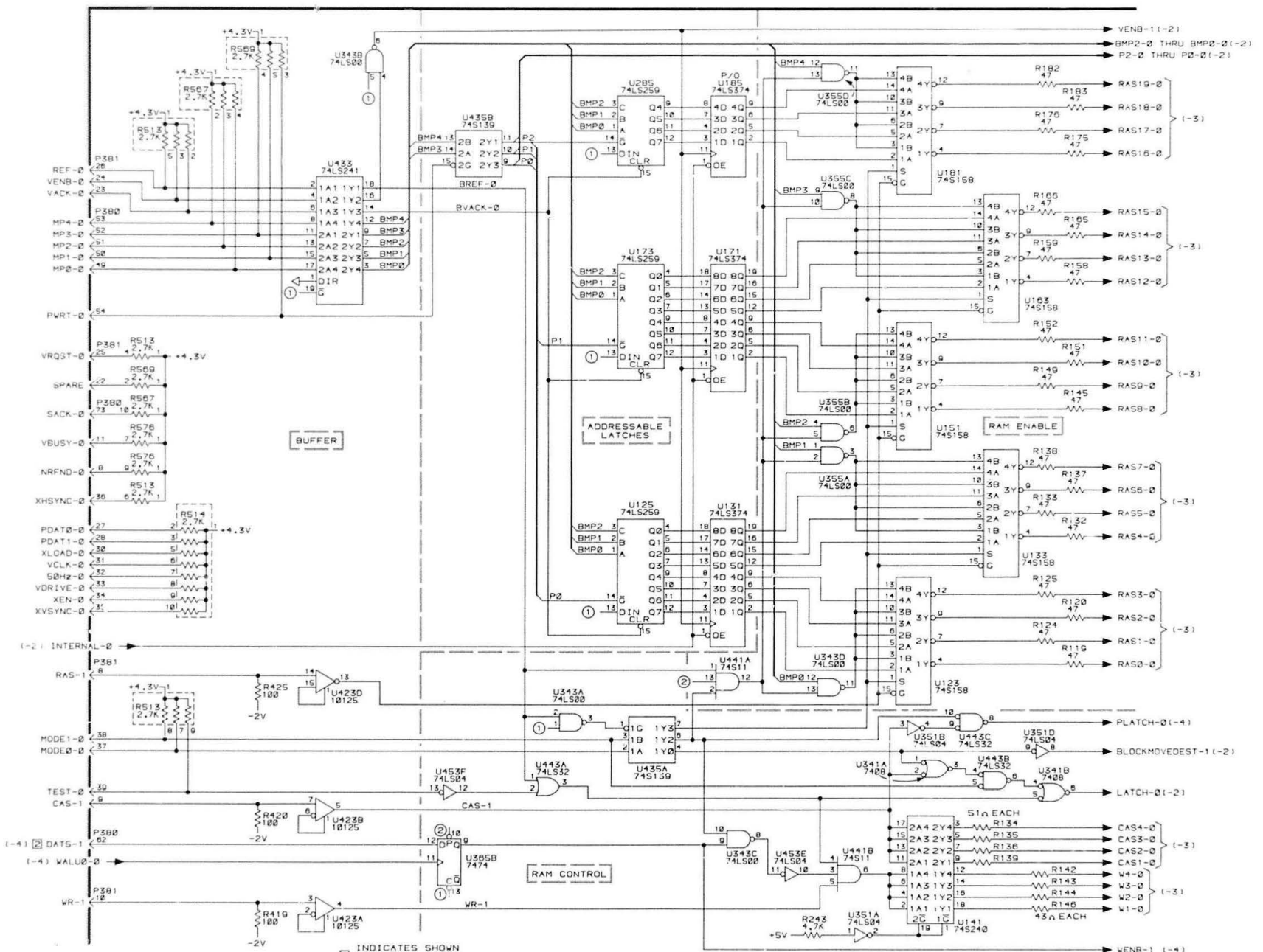






3819-53

Raster Memory Board (670-6473-00,01) Component Locations.



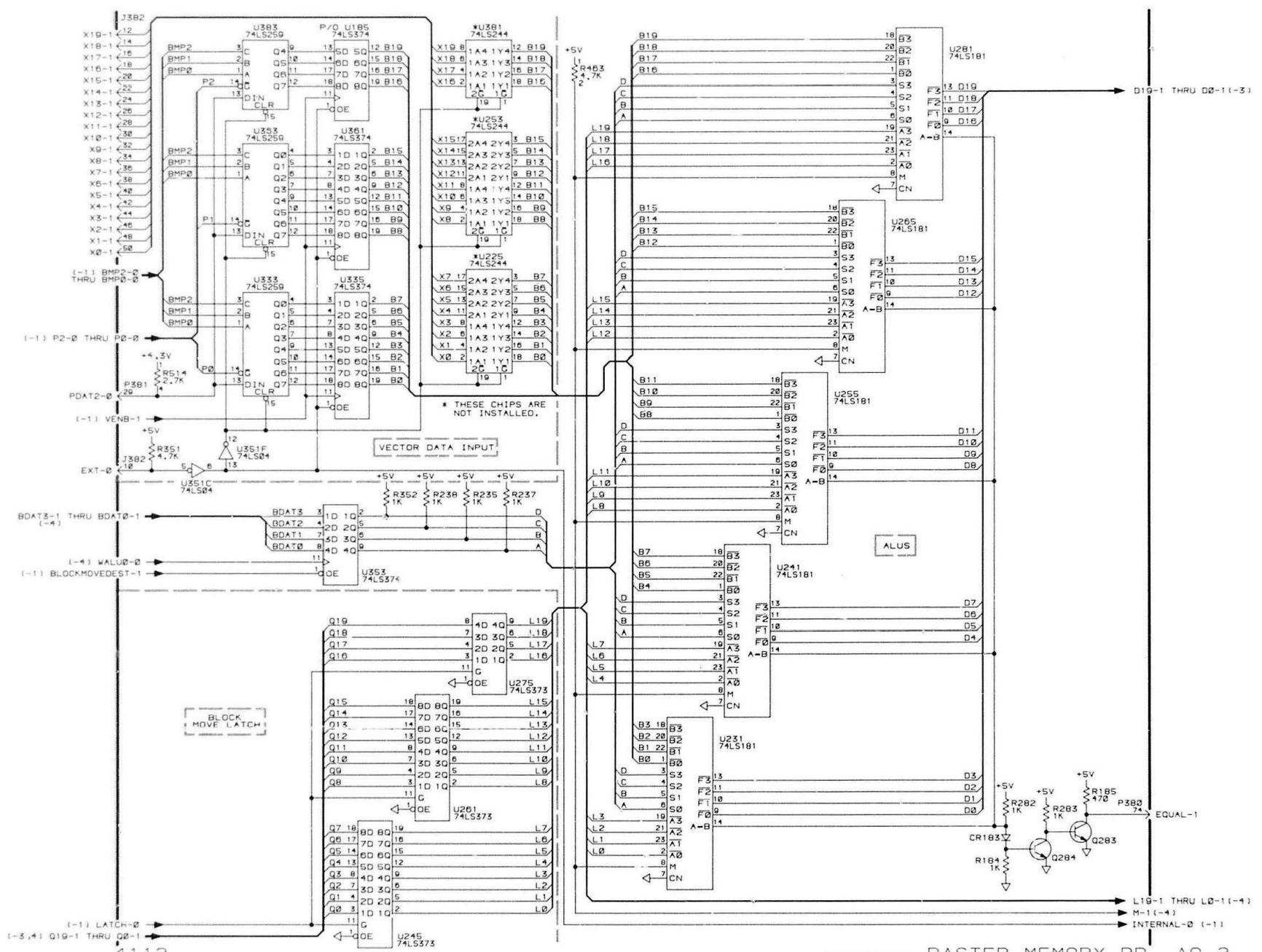
4112

□ INDICATES SHOWN MORE THAN ONCE AND WHERE

3010-26

670-6473-00,01 RASTER MEMORY BD. A9-1 (1 OF 5)

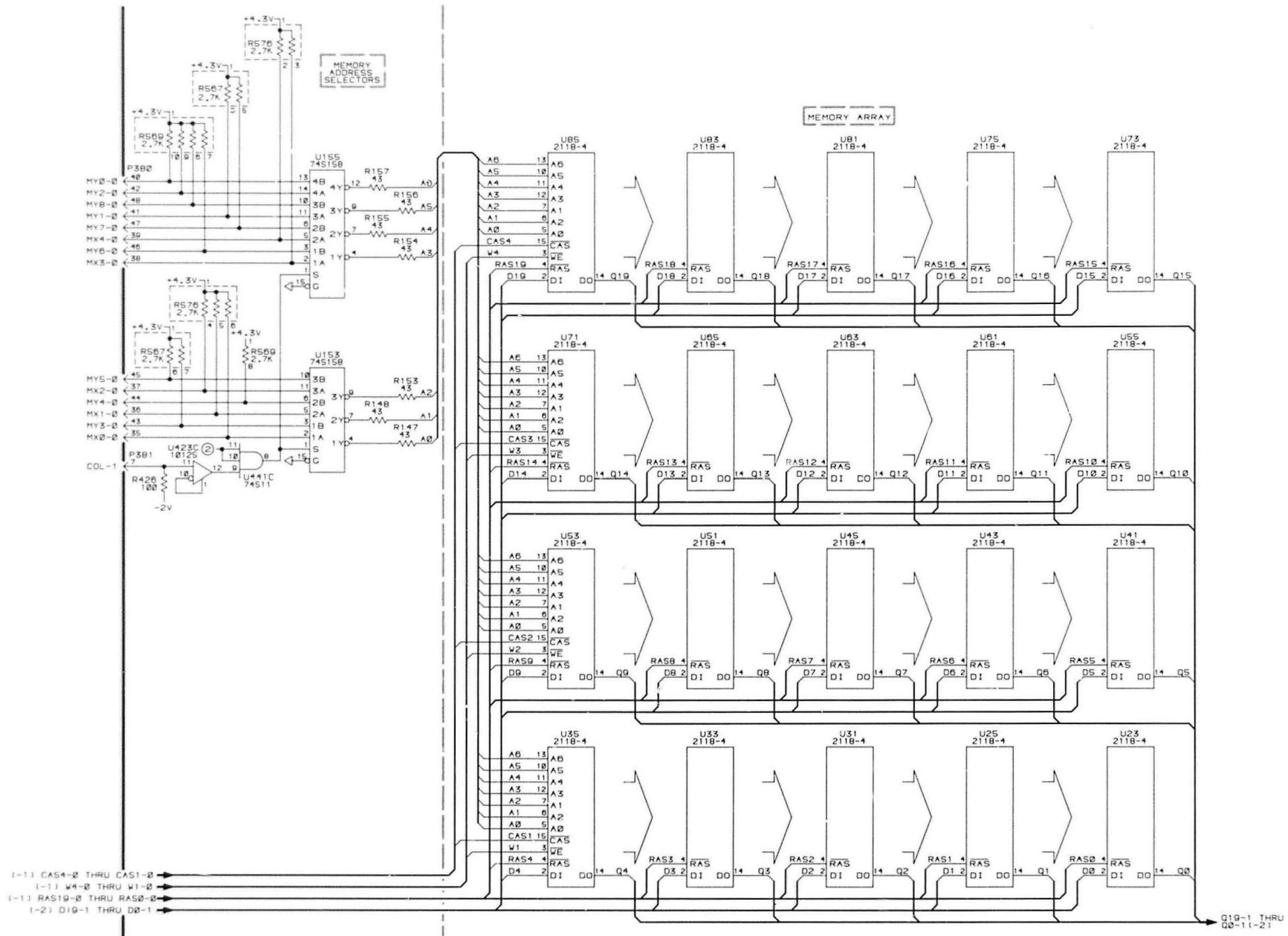
RASTER MEMORY 670-6473-00,01 A9-1



4112

3810-27

670-6473-00.01 RASTER MEMORY BD. A9-2  
(2 OF 5)

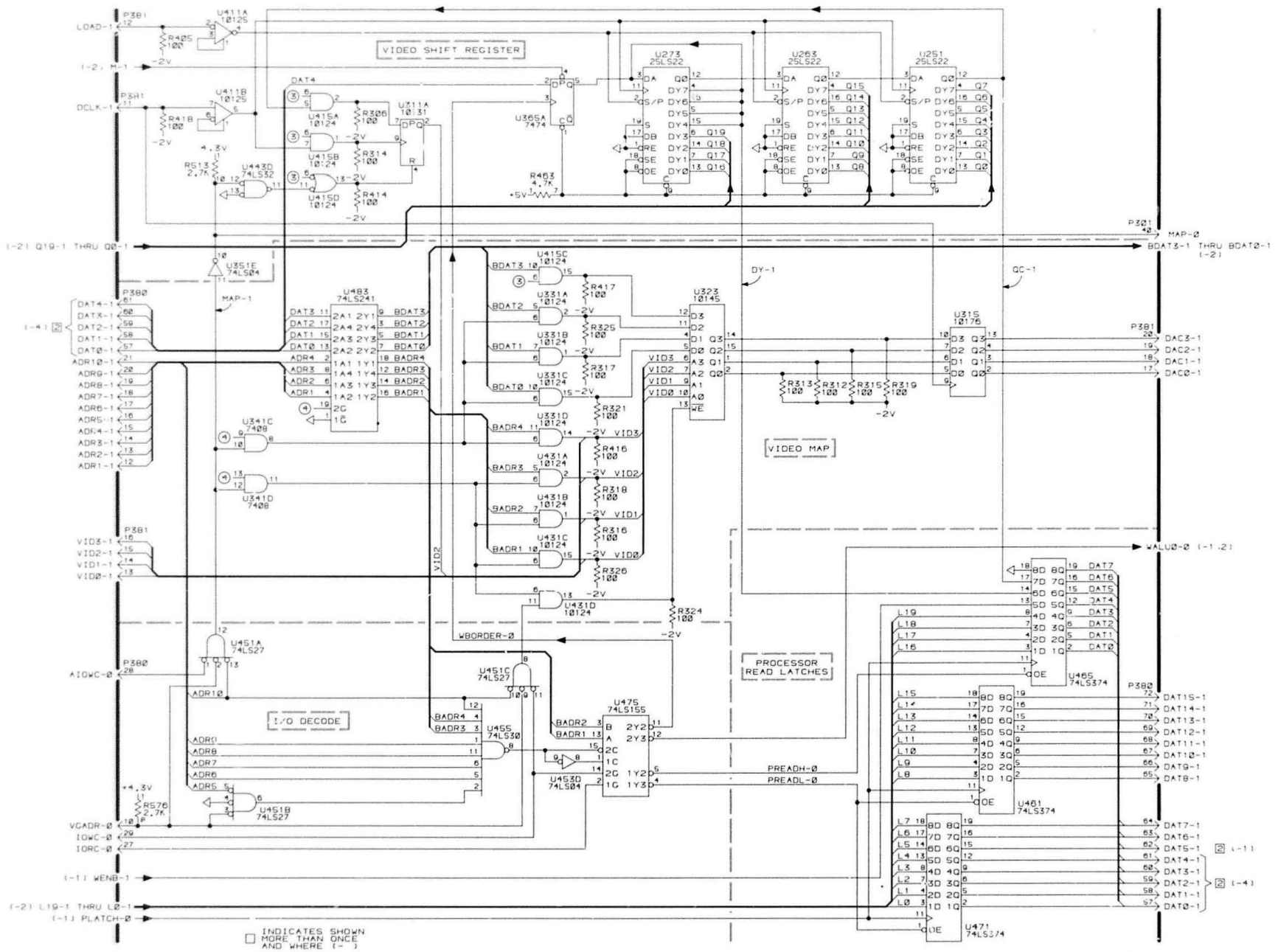


- I-1) CAS4-Q THRU CAS1-Q
- I-1) W4-Q THRU W1-Q
- I-1) RAS19-Q THRU RAS8-Q
- I-2) D19-Q THRU D8-Q

4112

3819-28

670-6473-00,01 RASTER MEMORY BD. A9-3  
(3 OF 5)



4112

3819-29

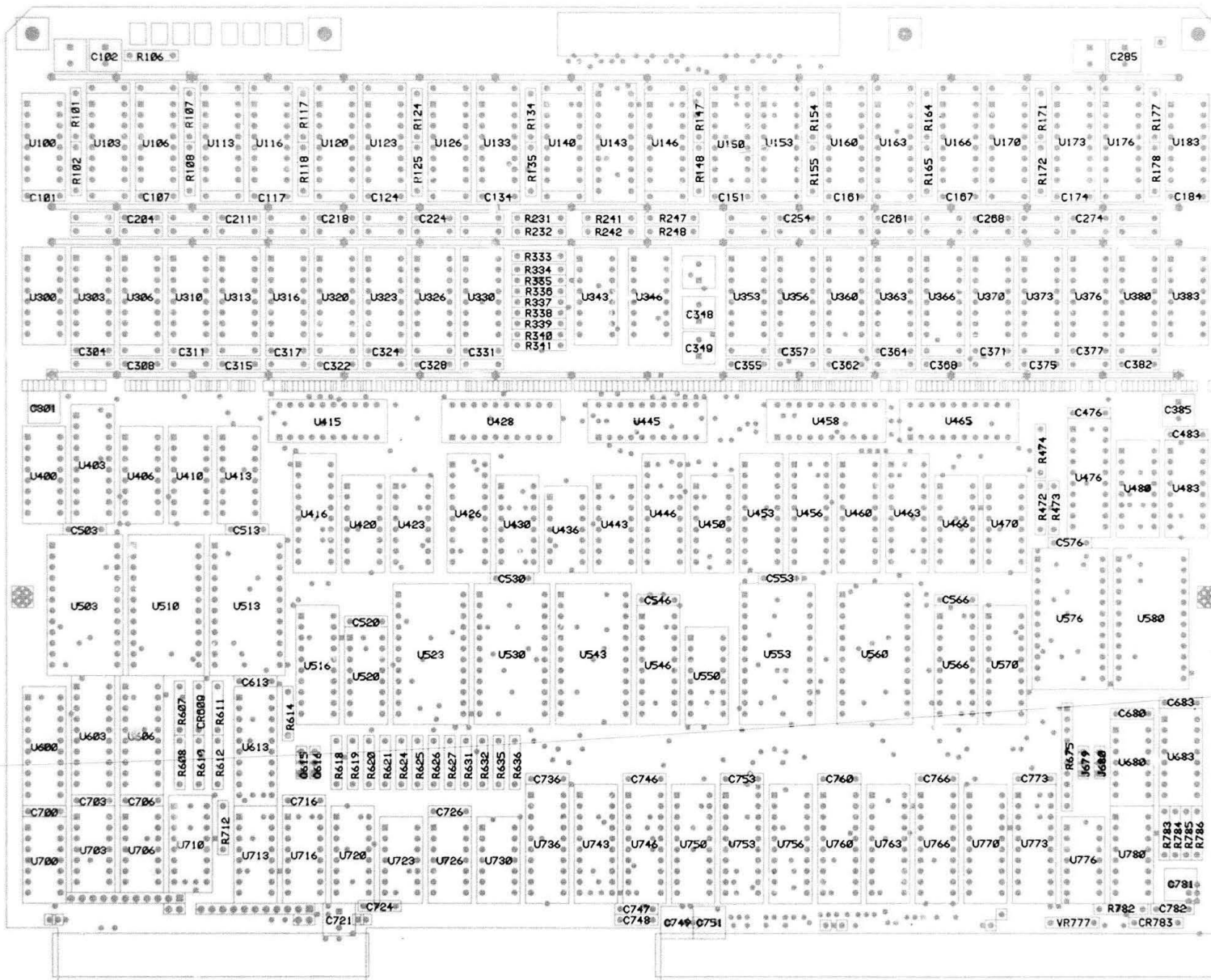
670-6473-00,01 RASTER MEMORY BD. A9-4 (4 OF 5)

RASTER MEMORY 670-6473-00,01 A9-4

□ INDICATES SHOWN MORE THAN ONCE AND WHERE 1-1



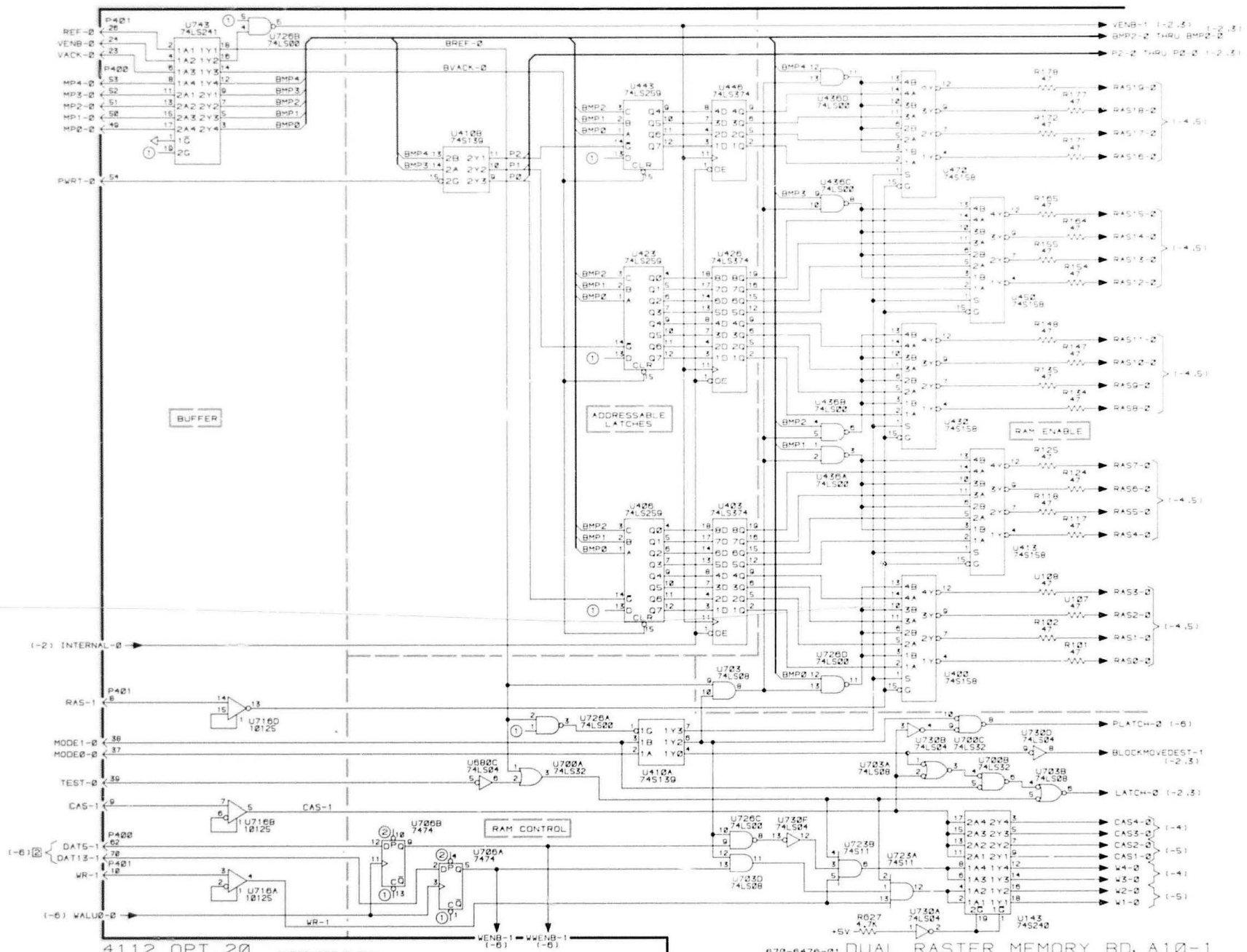




3819 54

Dual Raster Memory Board (870-8478-01) Component Locations.

DUAL RASTER MEMORY COMPONENT LOCATIONS

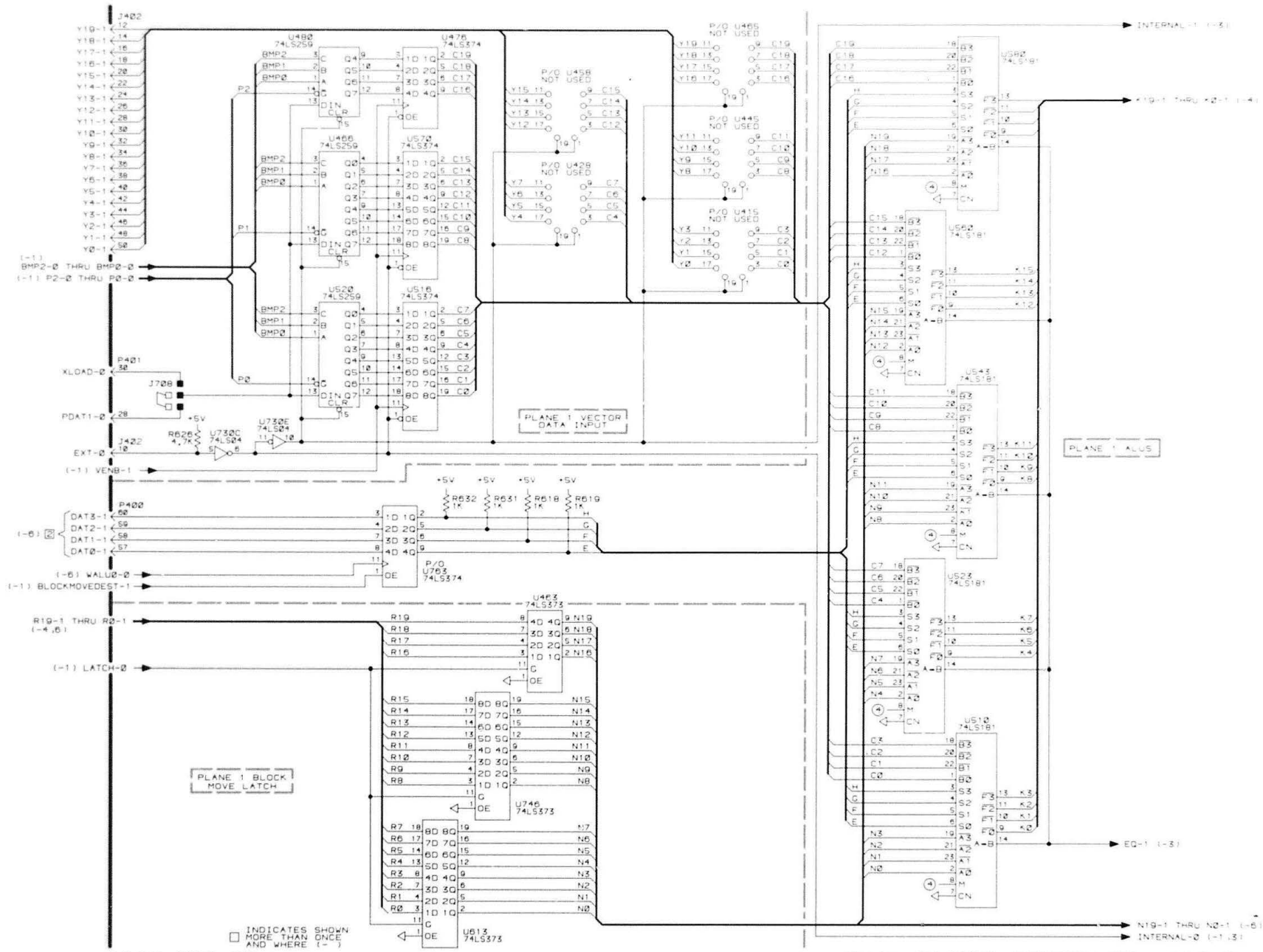


4112 OPT. 20

INDICATES SHOWN MORE THAN ONCE AND WHERE (-)

3810-31

670-6476-01 DUAL RASTER MEMORY BD. A10-1 (1 OF 7)



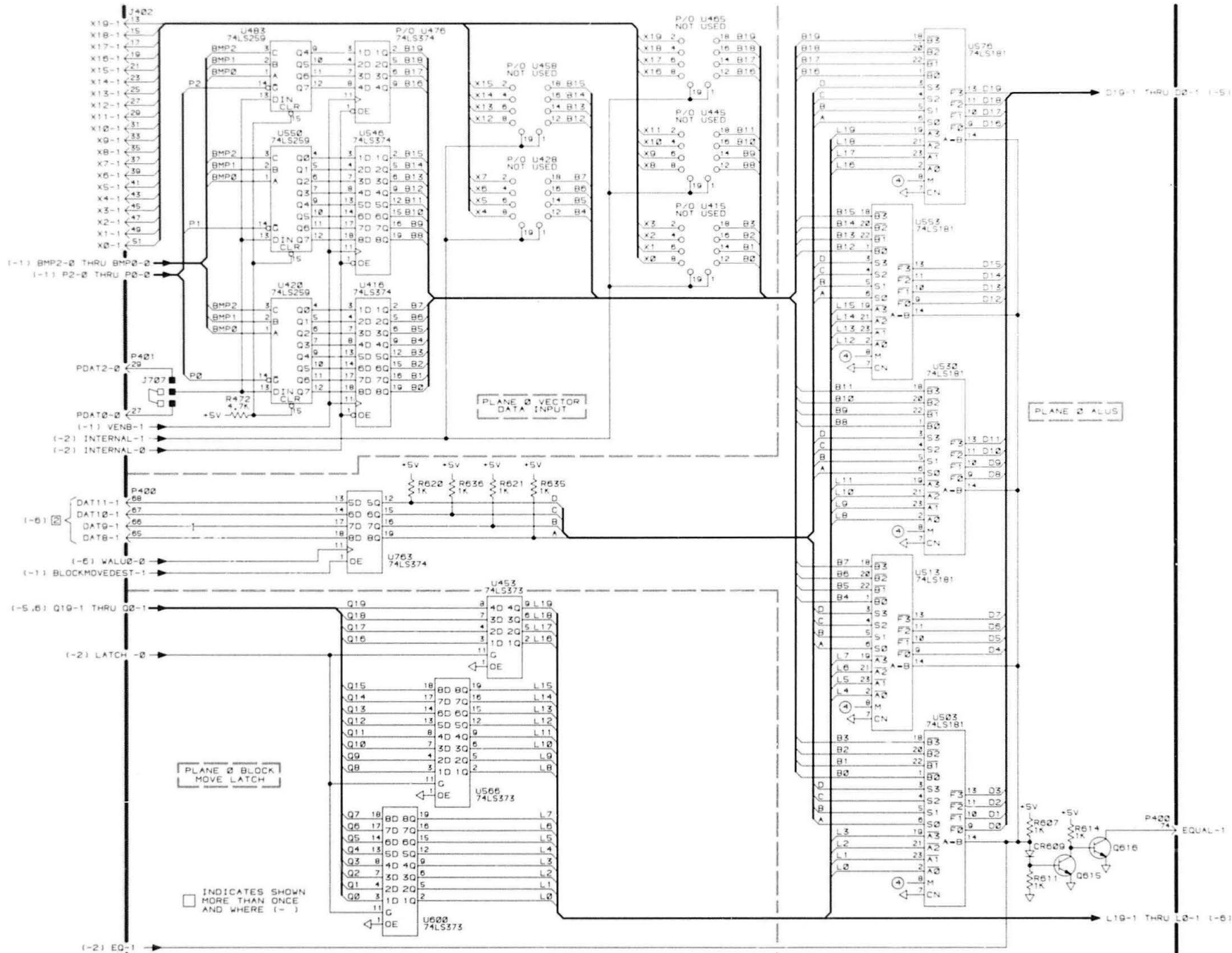
4112 OPT. 20

3819-32

670-6476-01 DUAL RASTER MEMORY BD. A10-2

12 OF 21

DUAL RASTER MEMORY A10-2 670-6476-01

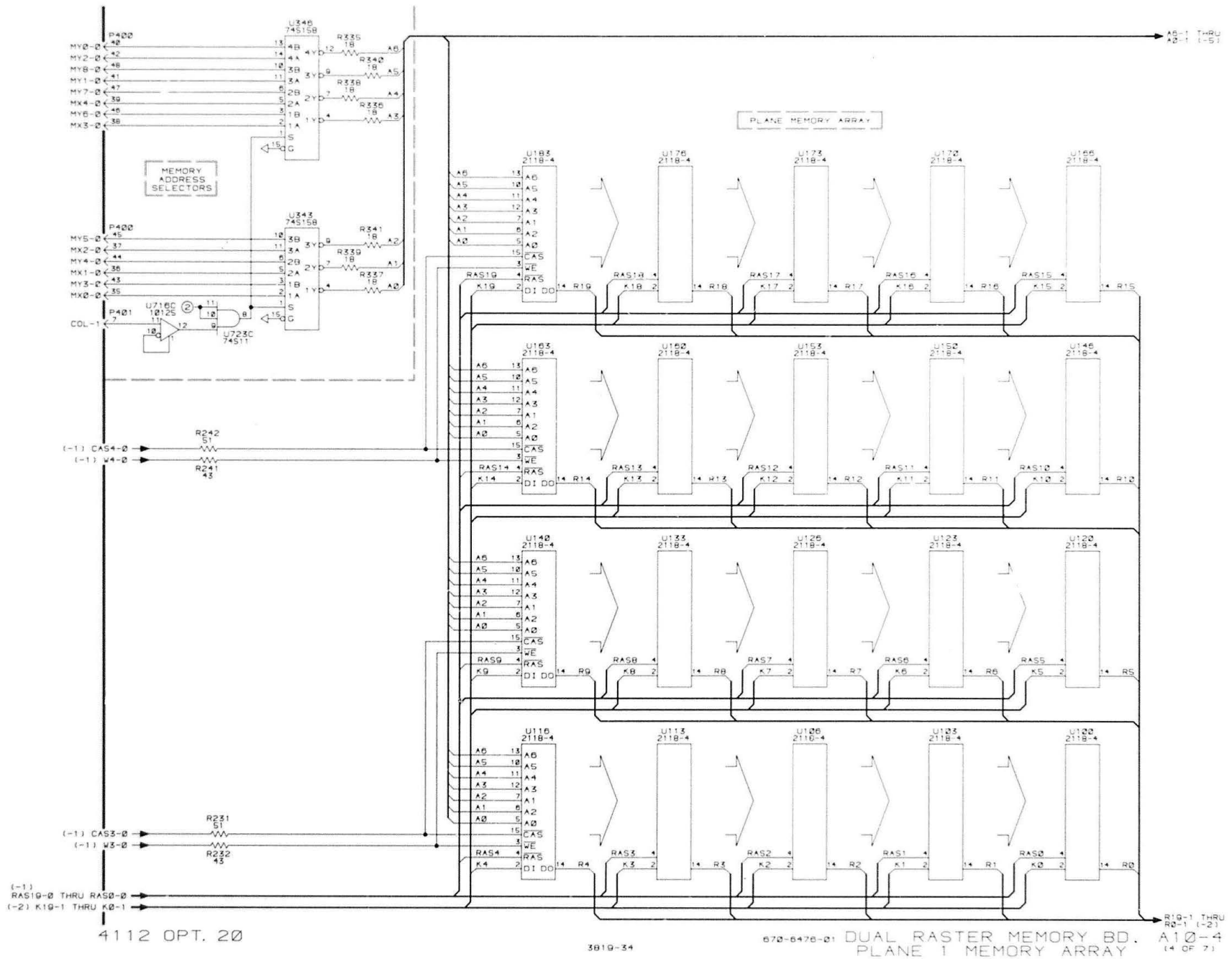


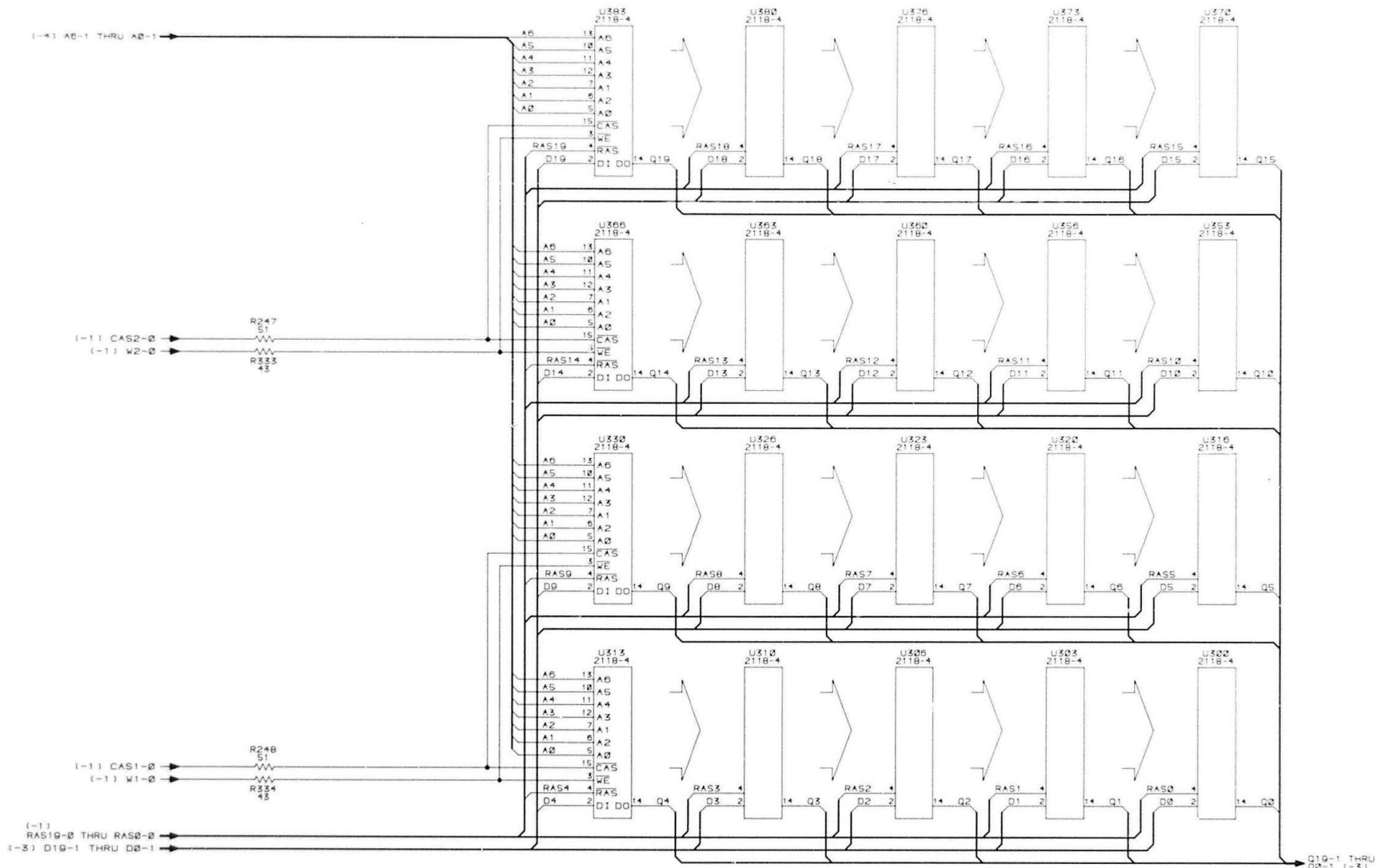
4112 OPT. 20

5810-53

670-6476-01 DUAL RASTER MEMORY BD. A10-3

(3 OF 7)



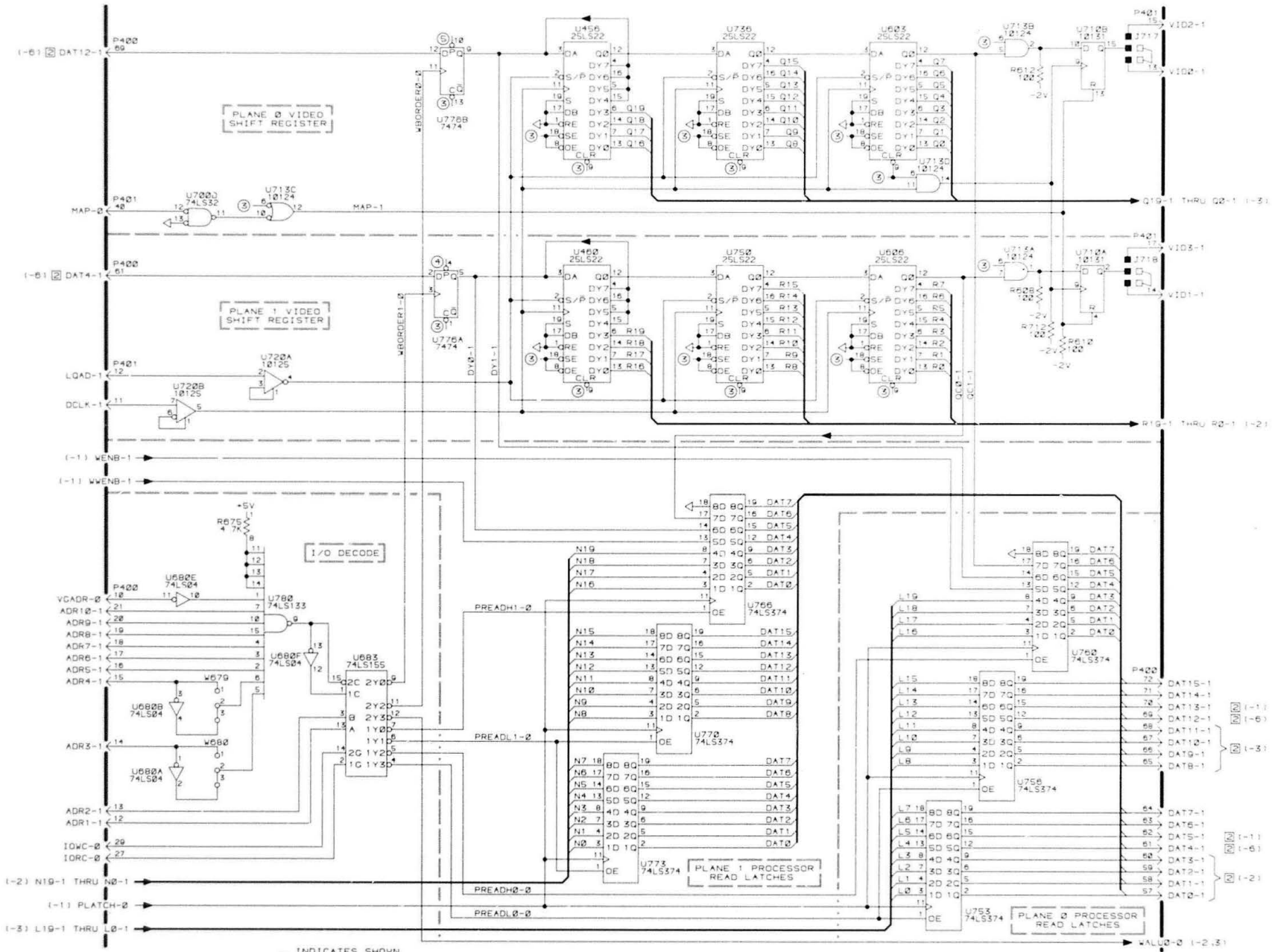


4112 OPT. 20

3819-35

670-6476-01 DUAL RASTER MEMORY BD. A10-5  
PLANE 01 MEMORY ARRAY (5 OF 7)

D19-1 THRU  
D0-1 (-3)



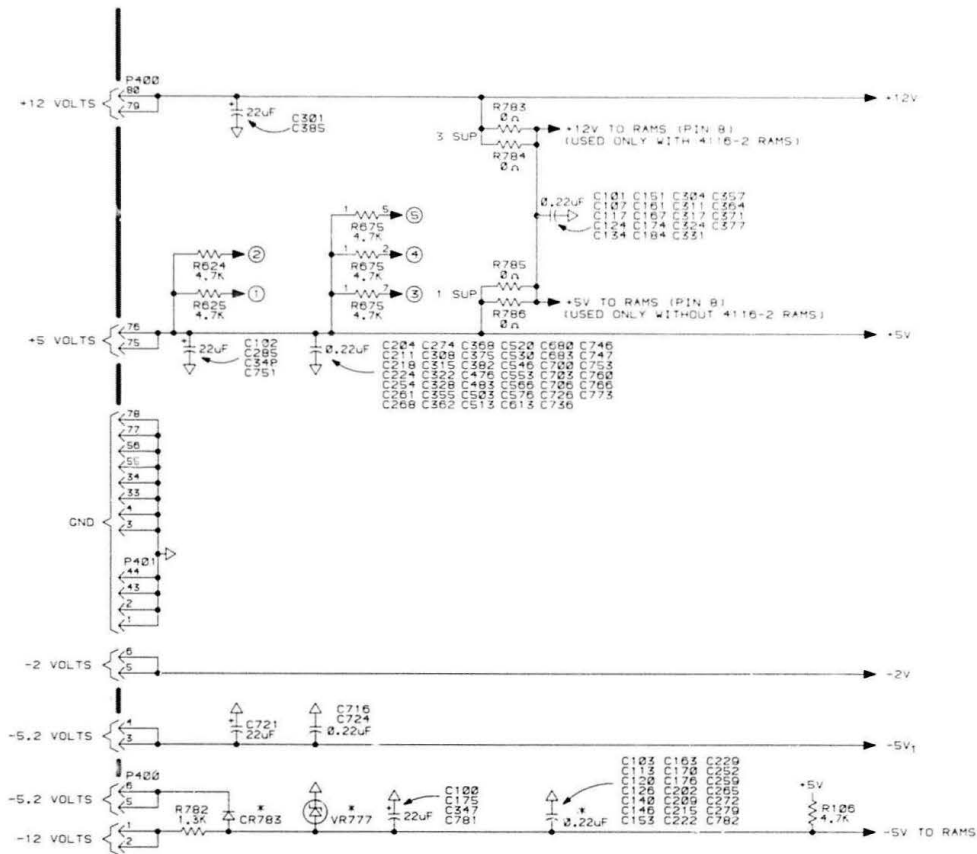
4112 OPT. 20

□ INDICATES SHOWN MORE THAN ONCE AND WHERE [ ]

3819-56

670-6476-01 DUAL RASTER MEMORY BD. A10-6 (6 OF 7)





| DEVICE TYPE       | PIN  |     |       |     |                  |
|-------------------|------|-----|-------|-----|------------------|
|                   | +12V | +5V | GND   | -5V | -5V <sub>1</sub> |
| 74LS139           |      |     |       |     |                  |
| 74LS155           |      |     |       |     |                  |
| 74S158            | -    | 16  | 8     | -   | -                |
| 74S166            |      |     |       |     |                  |
| 74S259            |      |     |       |     |                  |
| 74S242            |      |     |       |     |                  |
| 74S241            |      |     |       |     |                  |
| 74S244            | -    | 20  | 12    | -   | -                |
| 74S373            |      |     |       |     |                  |
| 74S374            |      |     |       |     |                  |
| 74LS181           | -    | 24  | 12    | -   | -                |
| 10124             | -    | 9   | 16    | -   | -                |
| 10125             | -    | 9   | 16    | -   | 8                |
| 10131             | -    | -   | 1, 16 | -   | -                |
| 2118-4            | 8    | 9   | 16    | 1   | -                |
| *4116-2           |      |     |       |     |                  |
| OTHER 14 PIN IC'S | -    | 14  | 7     | -   | -                |

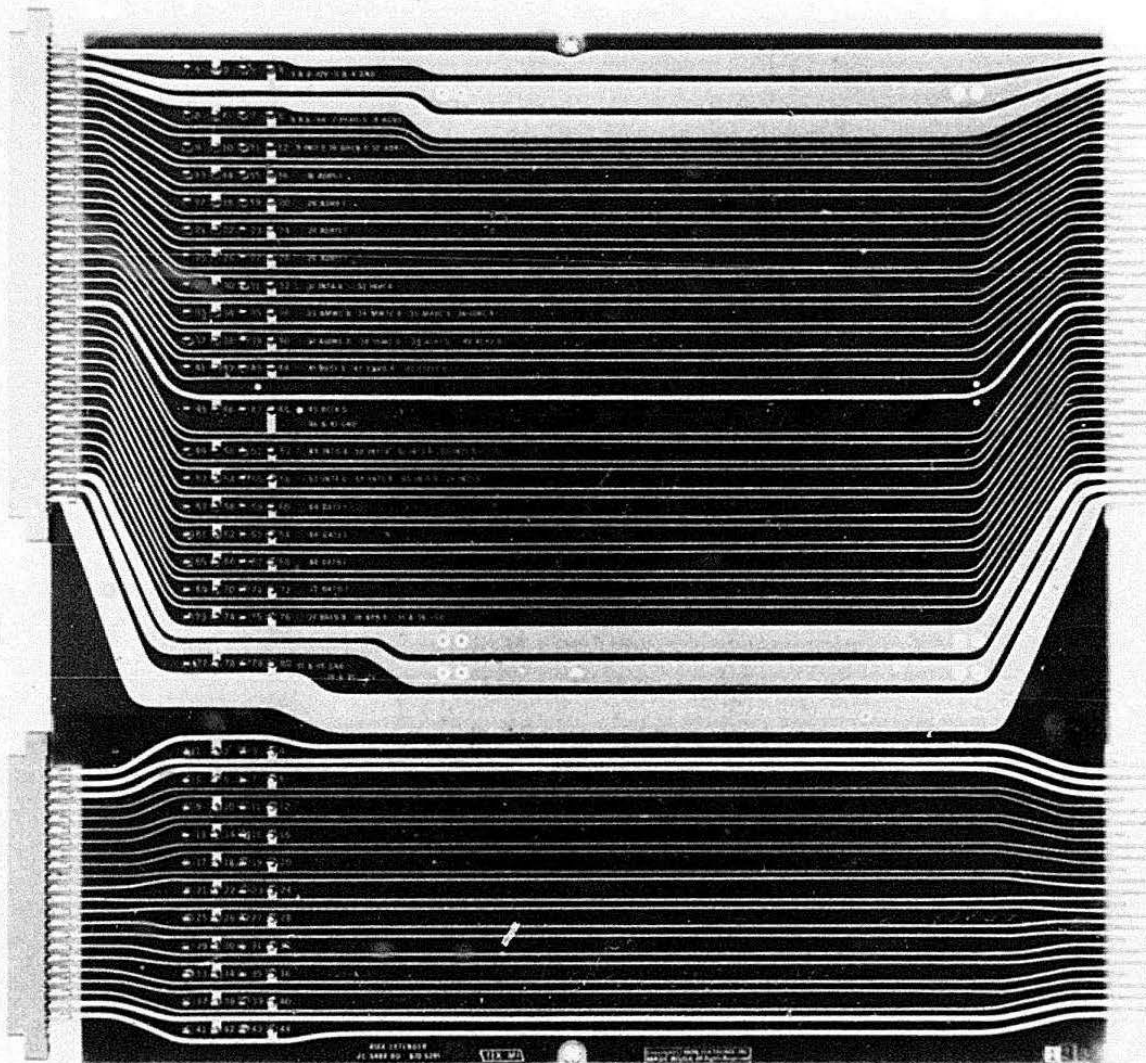
\* OPTIONAL CHIP TO 2118-4

- NOTES: 1. ALL 3 GROUNDING STRIPS ARE **NOT** AT GND.  
 TOP STRIP IS AT +5 VOLTS (+12 VOLTS WHEN 4116-2 RAMS ARE USED).  
 CENTER STRIP IS AT TTL HI VOLTS (+5 VOLTS WHEN 4116-2 RAMS ARE USED).  
 BOTTOM STRIP IS AT +5 VOLTS (+12 VOLTS WHEN 4116-2 RAMS ARE USED).
- \* 2. THESE COMPONENTS ARE USED ONLY WHEN 4116-2 RAMS ARE IN THE FOLLOWING LOCATIONS:
- |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|
| U100 | U120 | U140 | U160 | U300 | U310 | U353 | U370 |
| U103 | U123 | U150 | U170 | U303 | U320 | U356 | U373 |
| U106 | U126 | U153 | U173 | U306 | U323 | U359 | U376 |
| U113 | U133 | U160 | U176 | U310 | U326 | U363 | U380 |
| U116 | U140 | U163 | U183 | U313 | U330 | U366 | U383 |
3. KEYSLOTS ARE LOCATED AT P401 BETWEEN PINS 18/20.  
 KEYSLOTS ARE LOCATED AT P402 BETWEEN PINS 24/26.  
 KEYSLOTS ARE LOCATED AT P400 BETWEEN PINS 18/20 AND 68/70.

4112 OPT. 20

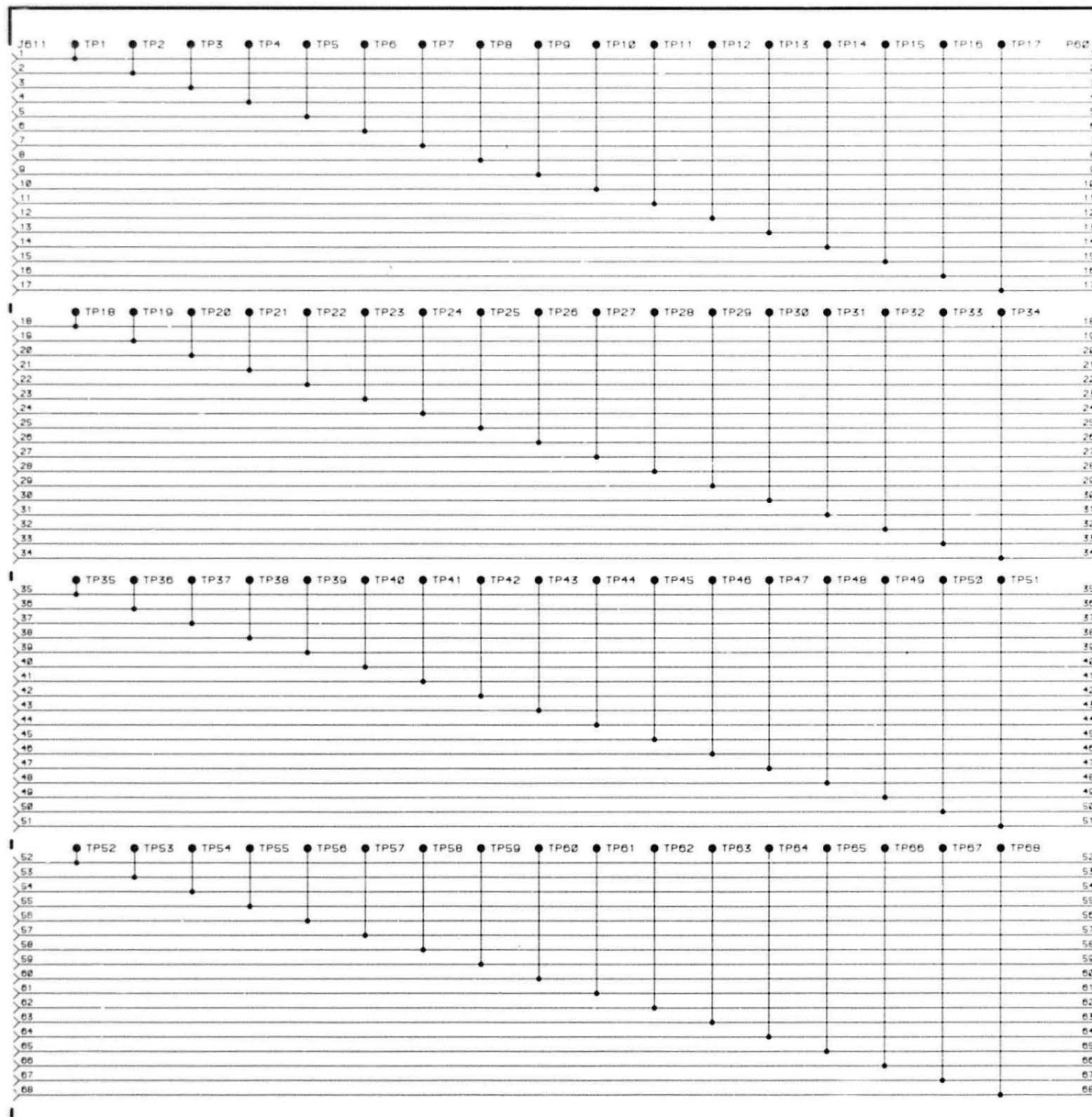
3819-37

670-6476-01 DUAL RASTER MEMORY BD. A10-7  
 POWER 17 OF 71



3818-75

41XX Logic Extender Board (670-5291-00) Component Locations.



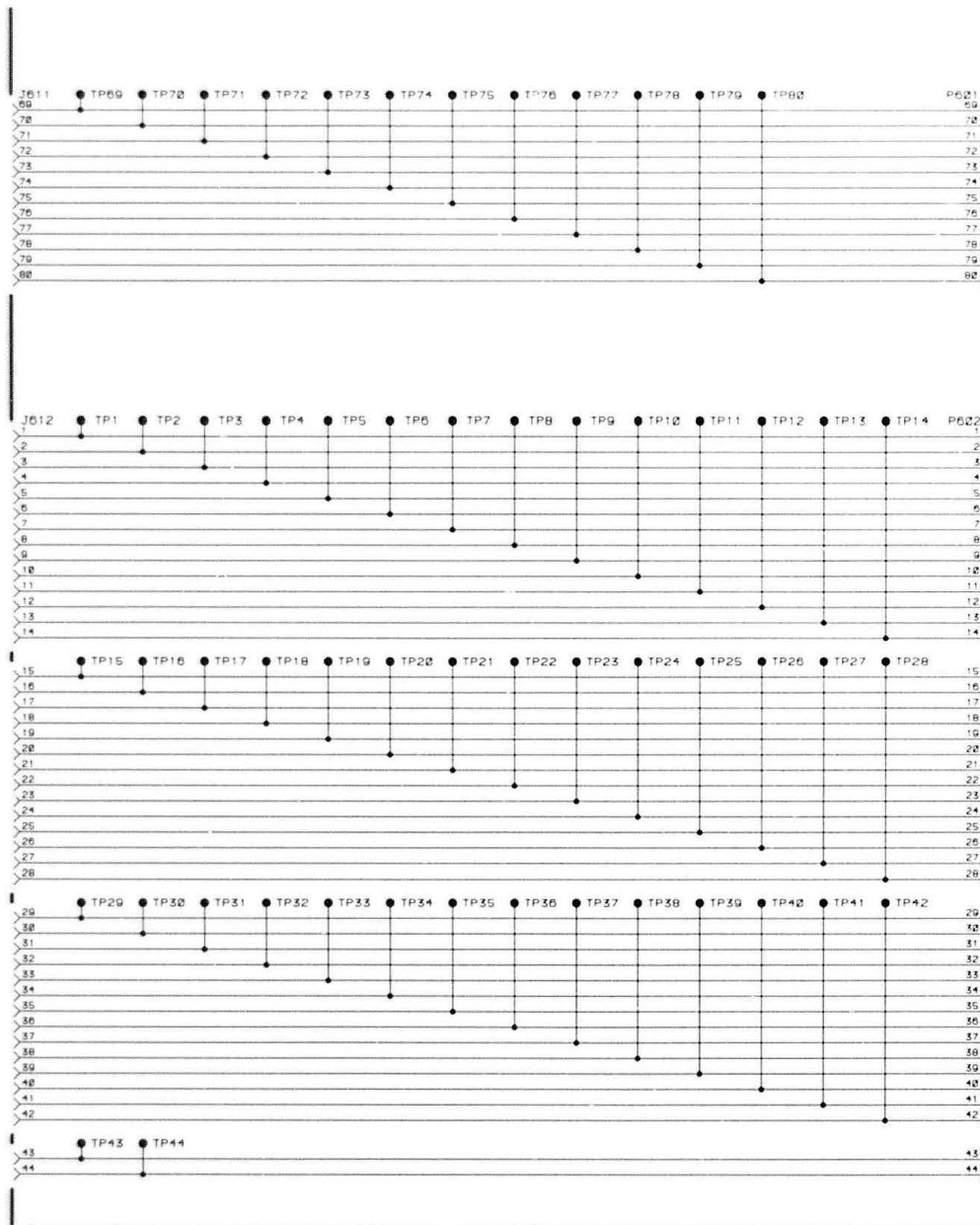
| J20 THRU J28 | J29        | J31, J33, J35 AND J37 |
|--------------|------------|-----------------------|
| -12 VOLTS    | -12 VOLTS  | -12 VOLTS             |
| -12 VOLTS    | -12 VOLTS  | -12 VOLTS             |
| GND          | GND        | GND                   |
| GND          | GND        | GND                   |
| -5.2 VOLTS   | -5.2 VOLTS | -5.2 VOLTS            |
| -5.2 VOLTS   | -5.2 VOLTS | -5.2 VOLTS            |
| PFALL-0      | PSYNC-1    | SPARE                 |
| AGND         | HRFND-0    | HRFND-0               |
| INIT-0       | INIT-0     | INIT-0                |
| BHEN-0       | VQADR-0    | VQADR-0               |
| ADR0-1       | VBUSY-0    | VBUSY-0               |
| ADR1-1       | ADR1-1     | ADR1-1                |
| ADR2-1       | ADR2-1     | ADR2-1                |
| ADR3-1       | ADR3-1     | ADR3-1                |
| ADR4-1       | ADR4-1     | ADR4-1                |
| ADR5-1       | ADR5-1     | ADR5-1                |
| ADR6-1       | ADR6-1     | ADR6-1                |
| ADR7-1       | ADR7-1     | ADR7-1                |
| ADR8-1       | ADR8-1     | ADR8-1                |
| ADR9-1       | ADR9-1     | ADR9-1                |
| ADR10-1      | ADR10-1    | ADR10-1               |
| ADR11-1      | ADR11-1    | SPARE                 |
| ADR12-1      | ADR12-1    | SPARE                 |
| ADR13-1      | ADR13-1    | SPARE                 |
| ADR14-1      | ADR14-1    | SPARE                 |
| ADR15-1      | ADR15-1    | SPARE                 |
| ADR16-1      | ICRC-0     | ICRC-0                |
| ADR17-1      | AIDWC-0    | AIDWC-0               |
| ADR18-1      | IDVC-0     | IDVC-0                |
| ADR19-1      | ACK1-0     | SPARE                 |
| INTA-0       | ACK2-0     | SPARE                 |
| INH-0        | STEST-0    | STEST-0               |
| MYC-0        | GND        | GND                   |
| MYTC-0       | GND        | GND                   |
| MROC-0       | MX0-1      | MX0-1                 |
| ICRC-0       | MX1-1      | MX1-1                 |
| AIDWC-0      | MX2-1      | MX2-1                 |
| IDVC-0       | MX3-1      | MX3-1                 |
| ACK1-0       | MX4-1      | MX4-1                 |
| ACK2-0       | MY0-1      | MY0-1                 |
| BUSY-0       | MY1-1      | MY1-1                 |
| CBRQ-0       | MY2-1      | MY2-1                 |
| STEST-0      | MY3-1      | MY3-1                 |
| SPARE        | MY4-1      | MY4-1                 |
| BCLK-0       | MY5-1      | MY5-1                 |
| GND          | MY6-1      | MY6-1                 |
| GND          | MY7-1      | MY7-1                 |
| SPARE        | MY8-1      | MY8-1                 |
| INT0-0       | N.C.       | MP0-0                 |
| INT1-0       | INT6-1     | MP1-0                 |
| INT2-0       | N.C.       | MP2-0                 |
| INT3-0       | N.C.       | MP3-0                 |
| INT4-0       | N.C.       | MP4-0                 |
| INT5-0       | N.C.       | MP4T-0                |
| INT6-0       | GND        | GND                   |
| INT7-0       | GND        | GND                   |
| DAT0-1       | DAT0-1     | DAT0-1                |
| DAT1-1       | DAT1-1     | DAT1-1                |
| DAT2-1       | DAT2-1     | DAT2-1                |
| DAT3-1       | DAT3-1     | DAT3-1                |
| DAT4-1       | DAT4-1     | DAT4-1                |
| DAT5-1       | DAT5-1     | DAT5-1                |
| DAT6-1       | DAT6-1     | DAT6-1                |
| DAT7-1       | DAT7-1     | DAT7-1                |
| DAT8-1       | DAT8-1     | DAT8-1                |
| DAT9-1       | DAT9-1     | DAT9-1                |
| DAT10-1      | DAT10-1    | DAT10-1               |
| DAT11-1      | DAT11-1    | DAT11-1               |

067-1005-00  
(FOR USE WITH 4112)

3819-38

670-5291-00 41XX LOGIC EXTENDER BD. A11-1

(1 OF 2)



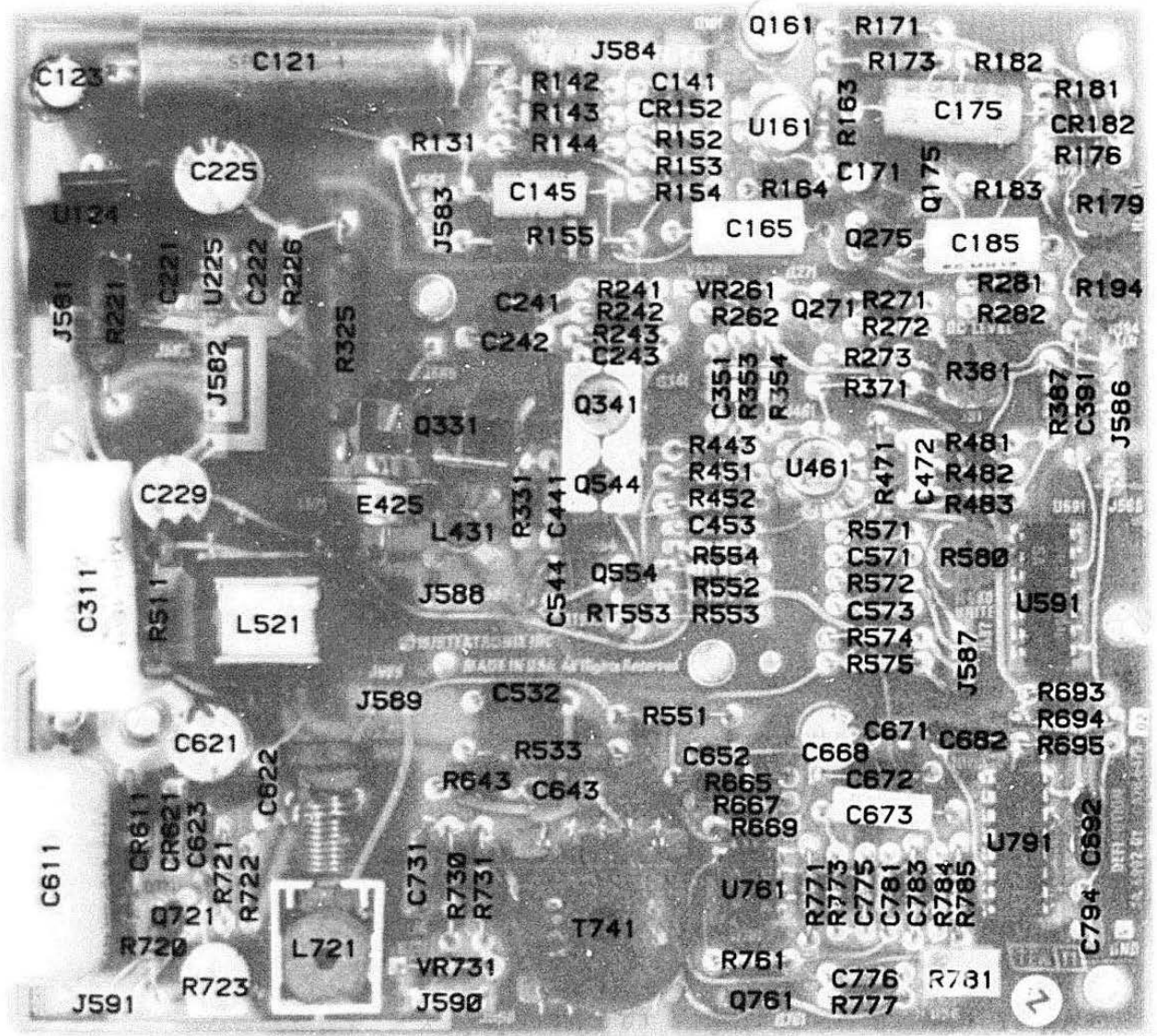
| J20 THRU J26 | J29       | J31, J33, J35 AND J37 |
|--------------|-----------|-----------------------|
| DAT12-1      | DAT12-1   | DAT12-1               |
| DAT13-1      | DAT13-1   | DAT13-1               |
| DAT14-1      | DAT14-1   | DAT14-1               |
| DAT15-1      | DAT15-1   | DAT15-1               |
| BREQ-0       | SACK-0    | SACK-0                |
| BPRN-0       | EQUAL-1   | EQUAL-1               |
| +5 VOLTS     | +5 VOLTS  | +5 VOLTS              |
| +5 VOLTS     | +5 VOLTS  | +5 VOLTS              |
| GND          | GND       | GND                   |
| GND          | GND       | GND                   |
| +12 VOLTS    | +12 VOLTS | +12 VOLTS             |
| +12 VOLTS    | +12 VOLTS | +12 VOLTS             |

| J50 AND J52 | J34, J36 AND J38 |
|-------------|------------------|
| GND         | GND              |
| GND         | GND              |
| -5.2 VOLTS  | -5.2 VOLTS       |
| -5.2 VOLTS  | -5.2 VOLTS       |
| -2 VOLTS    | -2 VOLTS         |
| -2 VOLTS    | -2 VOLTS         |
| COL-1       | COL-1            |
| RAS-1       | RAS-1            |
| CAS-1       | CAS-1            |
| WR-1        | WR-1             |
| DCLK-1      | DCLK-1           |
| LOAD-1      | LOAD-1           |
| VID0-1      | VID0-1           |
| VID1-1      | VID1-1           |
| VID2-1      | VID2-1           |
| VID3-1      | VID3-1           |
| DAC0-1      | DAC0-1           |
| DAC1-1      | DAC1-1           |
| DAC2-1      | DAC2-1           |
| DAC3-1      | DAC3-1           |
| SCANSYNC-1  | SPARE            |
| SPARE       | SPARE            |
| VACK-0      | VACK-0           |
| VENB-0      | VENB-0           |
| VRQST-0     | VRQST-0          |
| REF-0       | REF-0            |
| PDAT0-0     | PDAT0-0          |
| PDAT1-0     | PDAT1-0          |
| PDAT2-0     | PDAT2-0          |
| XLOAD-0     | XLOAD-0          |
| VCLK-0      | VCLK-0           |
| SPARE       | SPARE            |
| VDRIVE-0    | VDRIVE-0         |
| SPARE       | SPARE            |
| XVSYNC-0    | XVSYNC-0         |
| XHSYNC-0    | XHSYNC-0         |
| MODE0-0     | MODE0-0          |
| MODE1-0     | MODE1-0          |
| TEST-0      | TEST-0           |
| HAP-0       | HAP-0            |
| -5.2 VOLTS  | -5.2 VOLTS       |
| -5.2 VOLTS  | -5.2 VOLTS       |
| GND         | GND              |
| GND         | GND              |

067-1005-00  
(FOR USE WITH 4112)

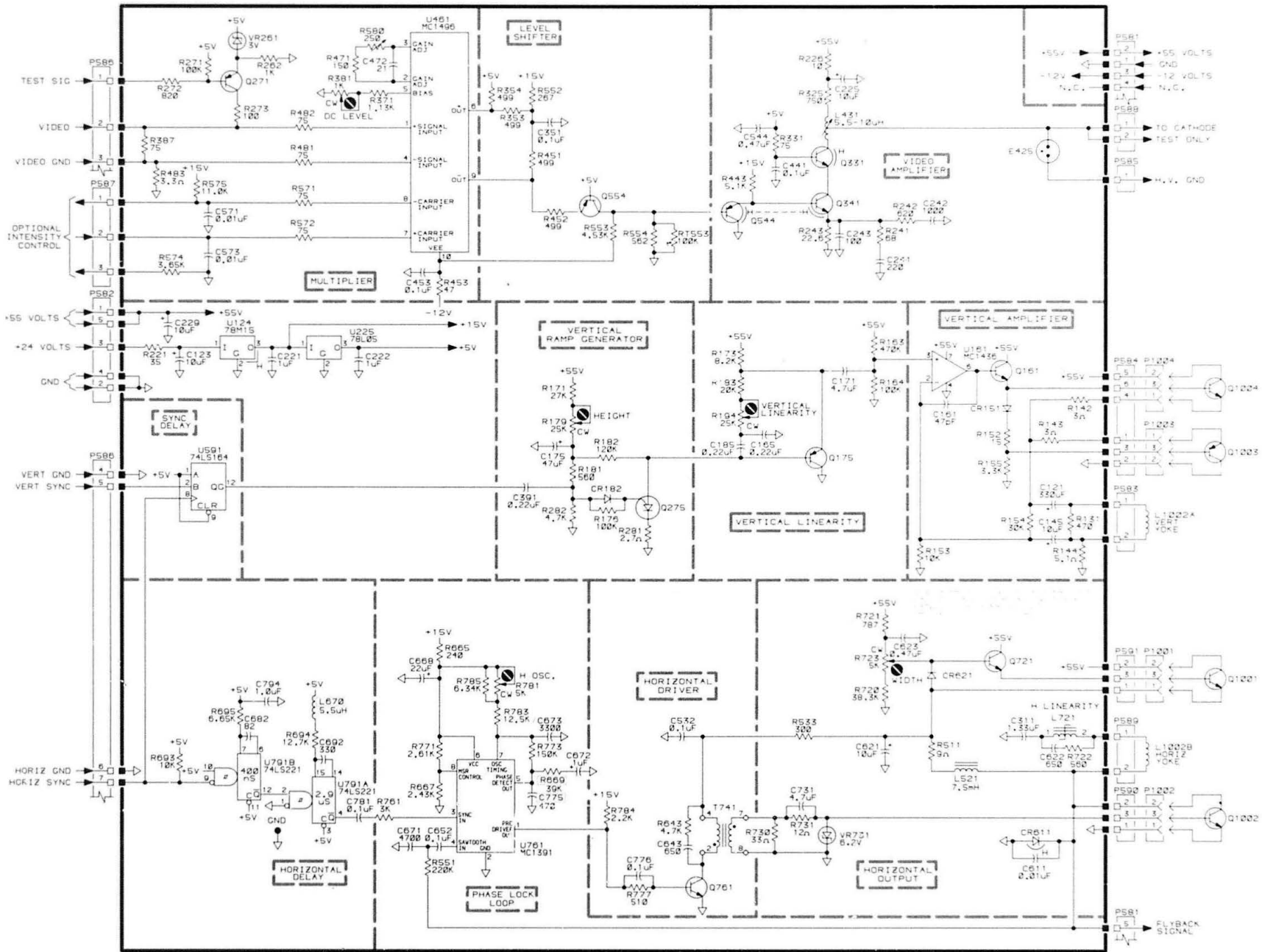
3810-30

070-5291-00 41XX LOGIC EXTENDER BD. A11-2  
12 OF 21



3819-56

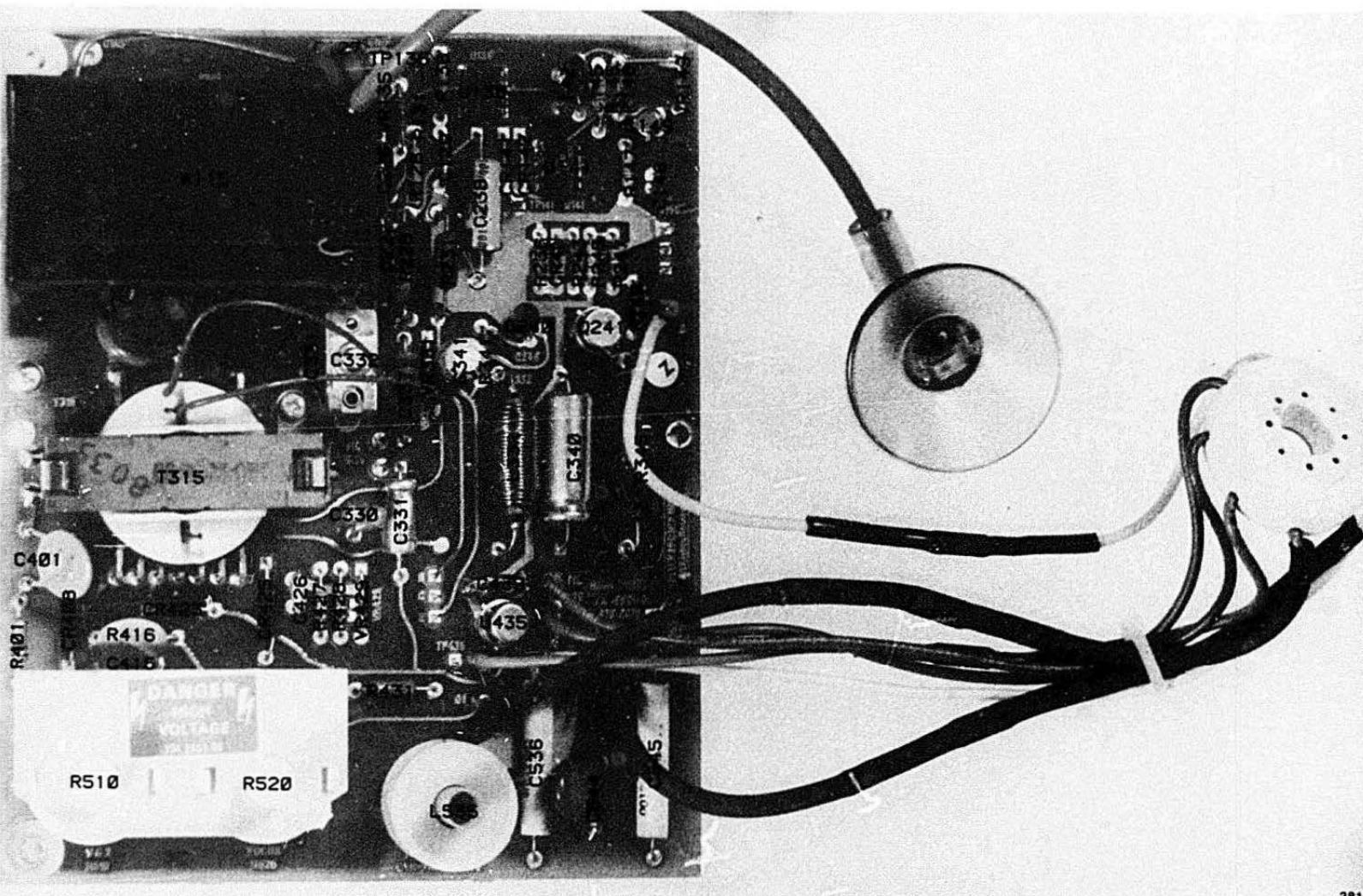
Deflection Board (670-6479-00,01,02,03) Component Locations.



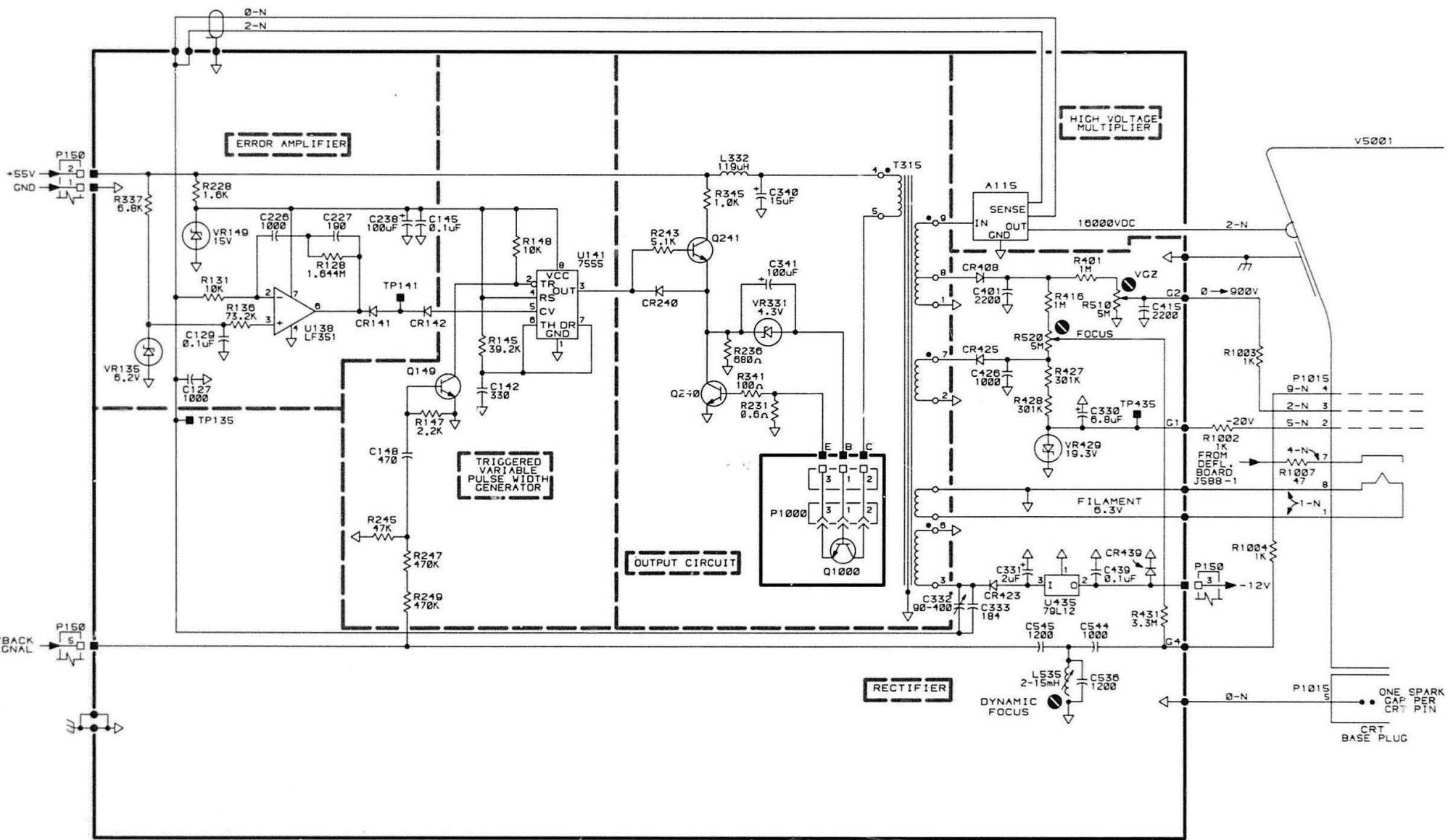
640-0523-00  
(FOR USE WITH 4112)

3819-41

670-6479-02,03,04 DEFLECTION BD. A12-1  
(1 OF 1)



High Voltage Board (670-6478-00,01) Component Locations.



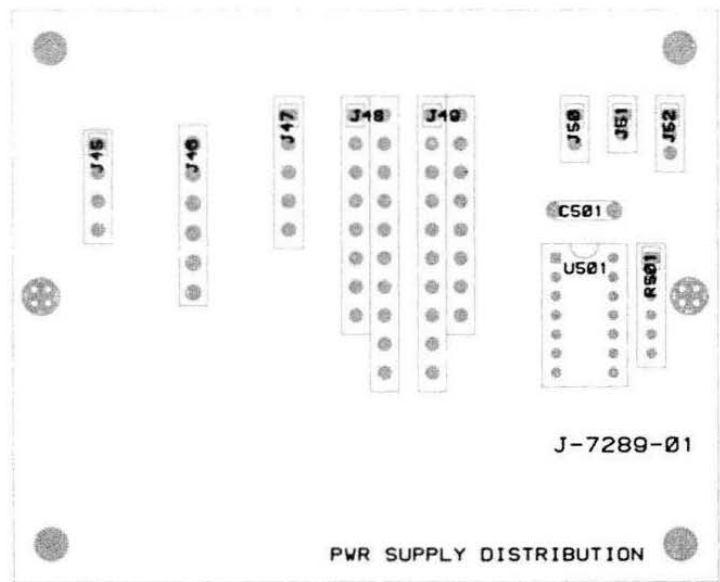
640-0523-00  
(FOR USE WITH 4112)

3810-42

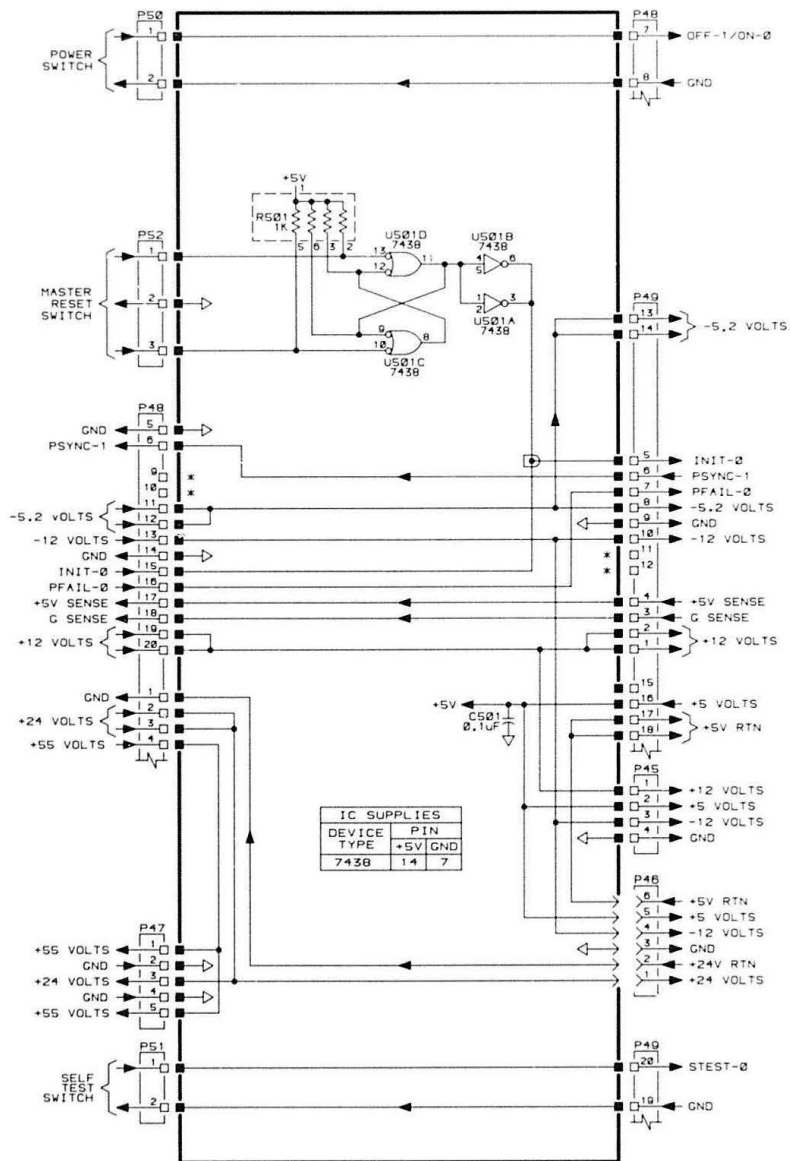
670-6478-00,01 HIGH VOLTAGE BOARD A13-1  
(1 OF 1)

HIGH VOLTAGE  
670-6478-00,01  
A13-1





3819-50  
**Power Supply Distribution (670-6811-00) Component Locations.**



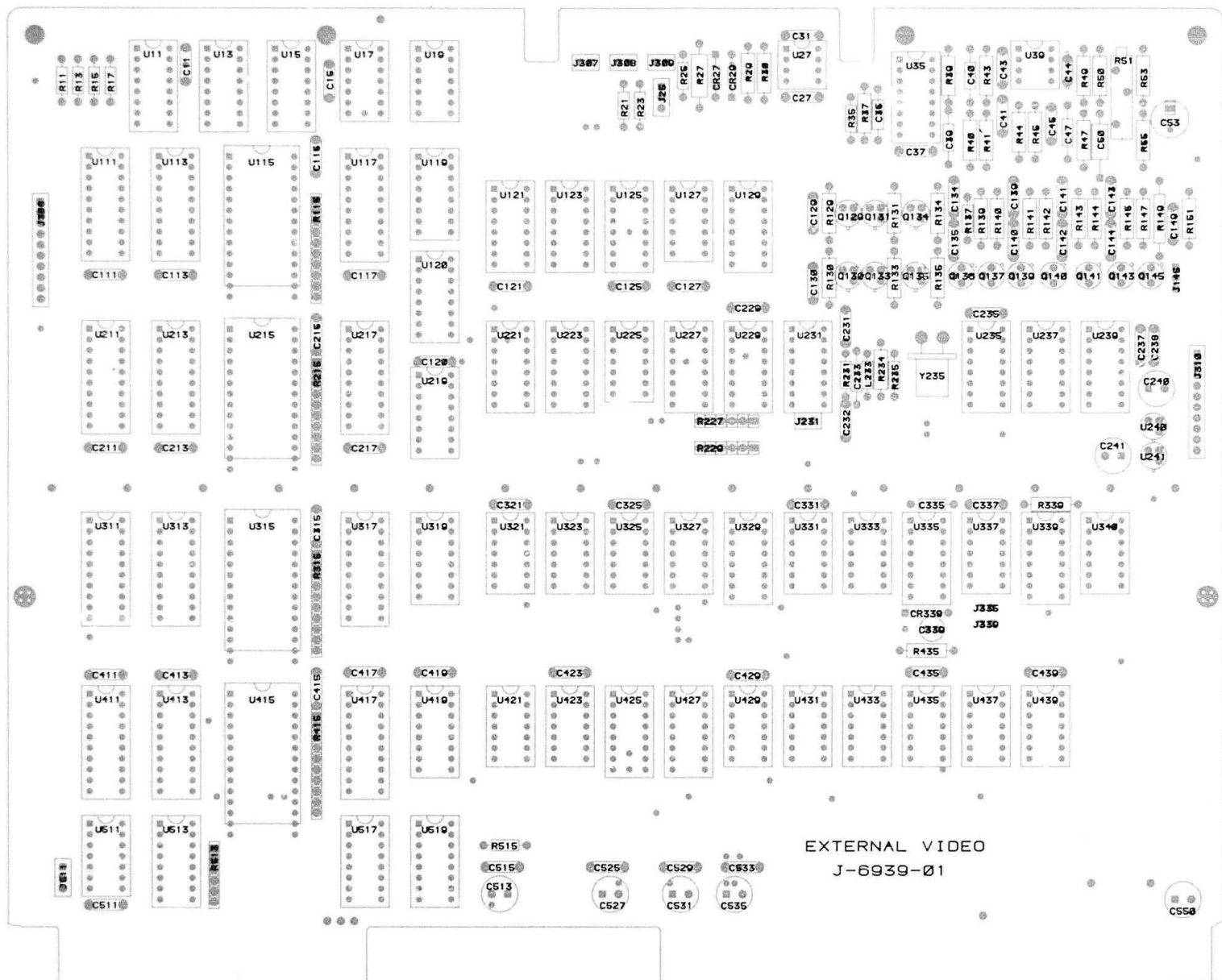
| IC SUPPLIES |     |     |
|-------------|-----|-----|
| DEVICE TYPE | +5V | GND |
| 7438        | 14  | 7   |

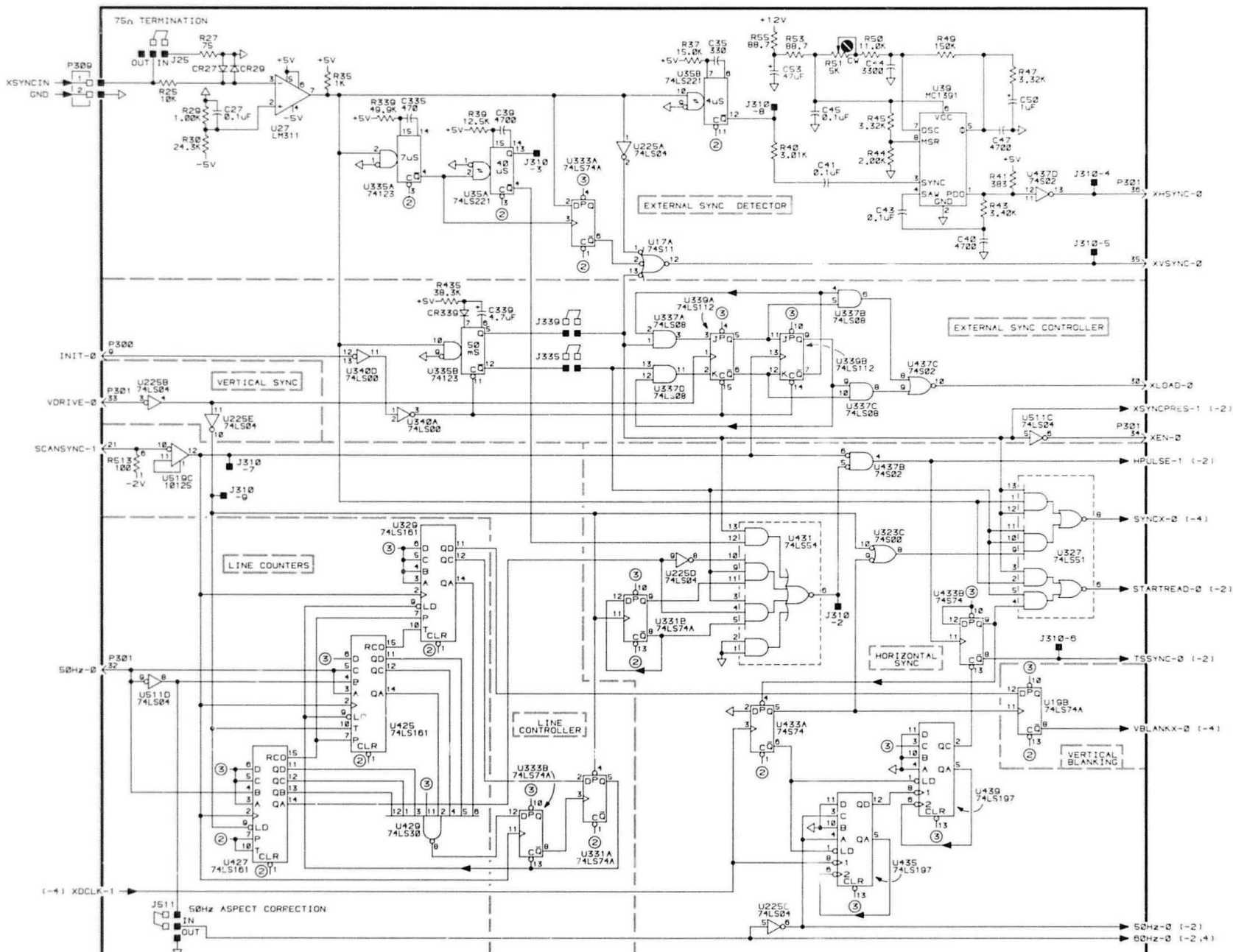
4112 \* P48-9 & -10 AND P49-11 & -12 ARE FILLED WITH CONNECTOR ORIENTATION PLUGS.

3819-44

670-8811-00 POWER SUPPLY DISTRIBUTION BD. A14-1

(1 OF 1)

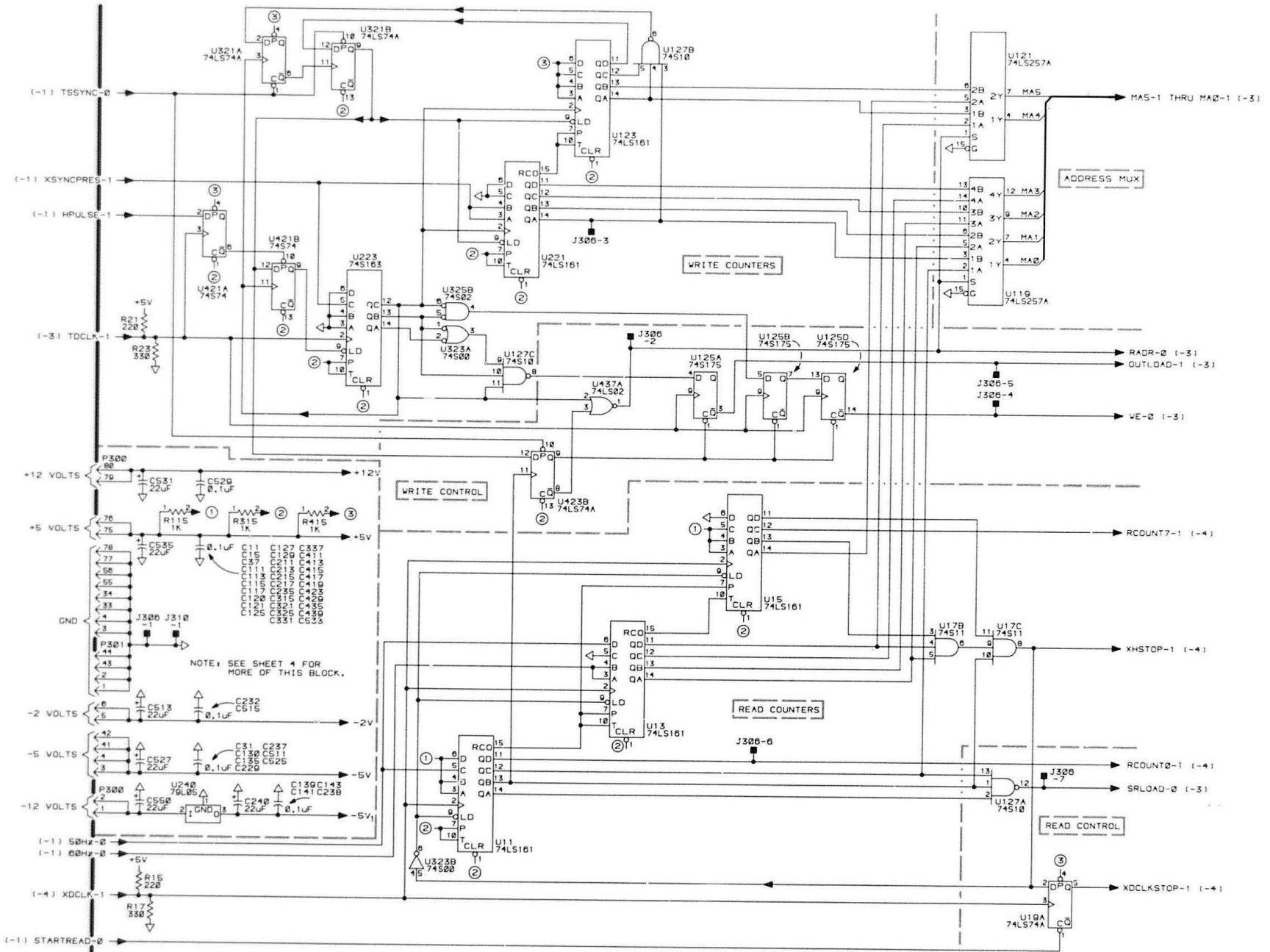




4112 OPT. 11

3819-122

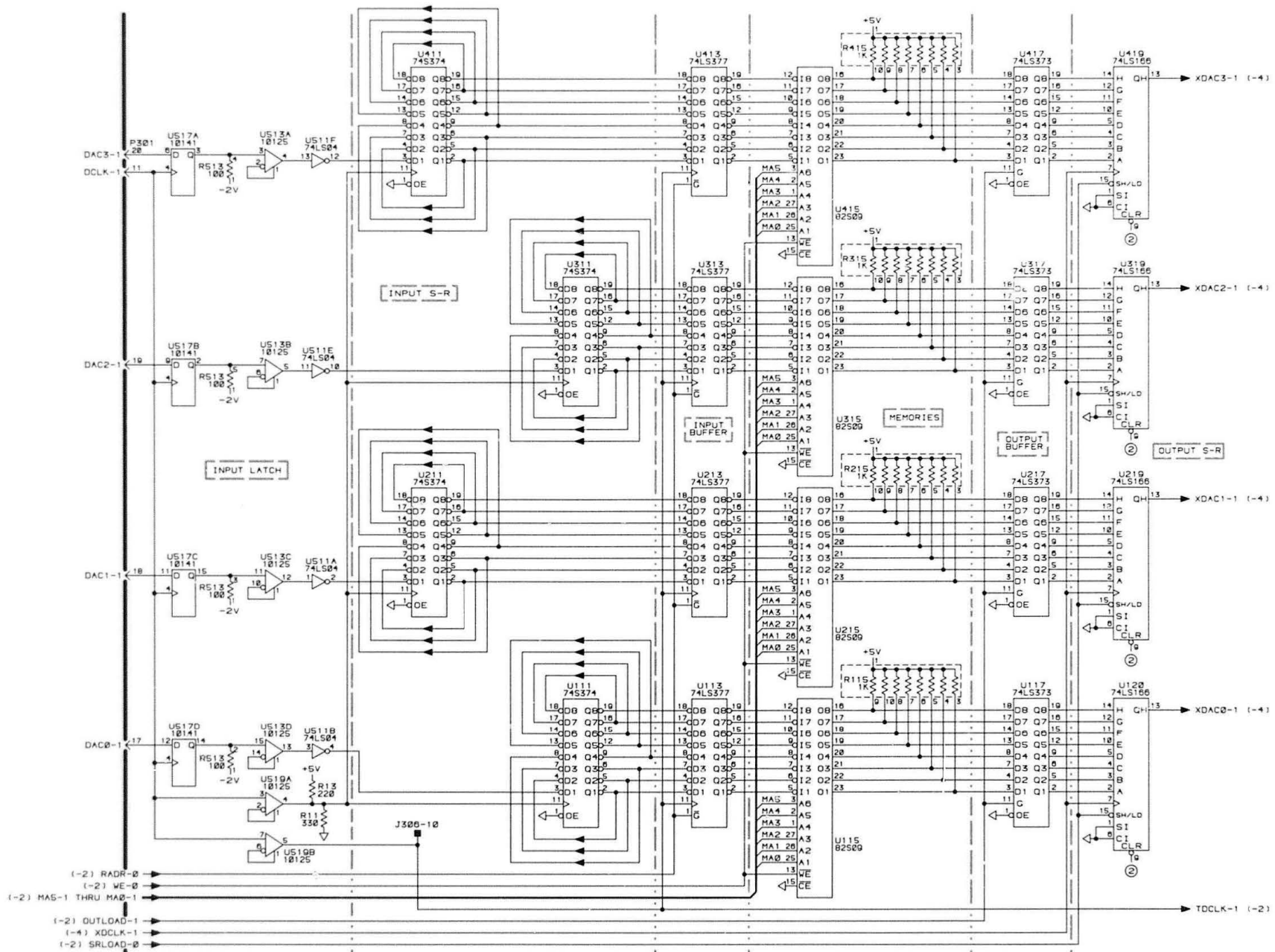
670-6803-00 EXTERNAL VIDEO BD. A15-1  
(1 OF 4)



4112 OPT. 11

3810-123

670-6803-00 EXTERNAL VIDEO BD. A15-2  
(2 OF 4)

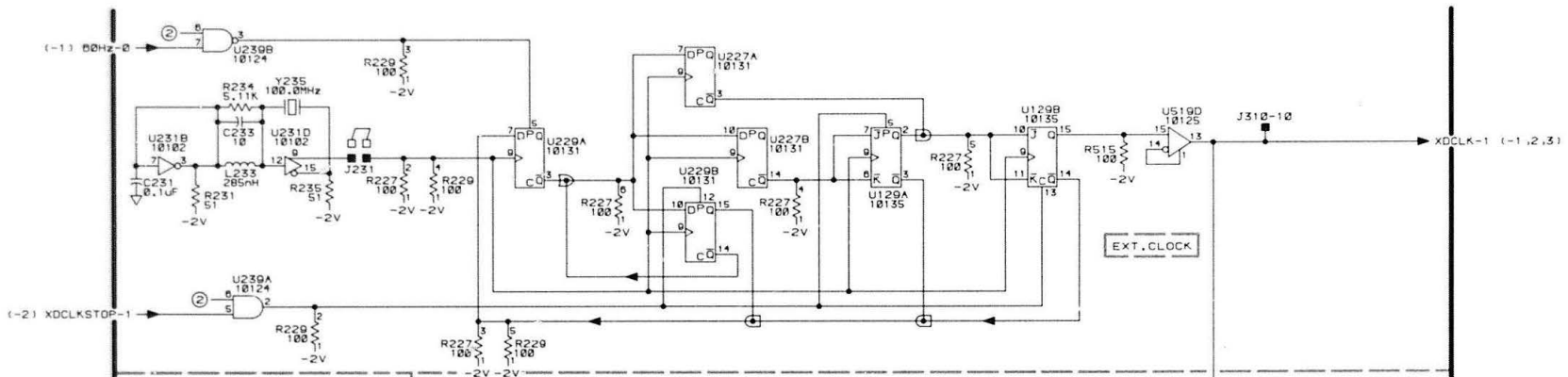


4112 OPT.11

3810-124

670-6803-00 EXTERNAL VIDEO BD. A15-3  
(13 OF 41)

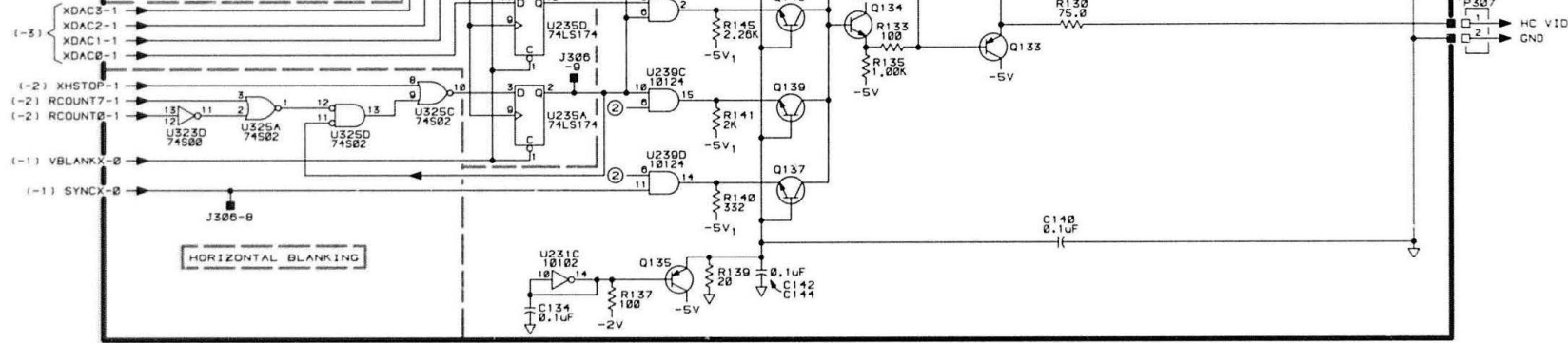
EXTERNAL VIDEO (OPT. 11) A15-3  
670-6803-00



IC SUPPLIES

| DEVICE TYPE     | PIN |       |     |
|-----------------|-----|-------|-----|
|                 | +5V | GND   | -5V |
| 10102           |     |       |     |
| 10131           | -   | 1, 10 | 8   |
| 10135           |     |       |     |
| 10141           |     |       |     |
| LM311           | 8   | 1     | -   |
| 10124           |     |       |     |
| 10125           | 9   | 10    | 8   |
| ALL 14 PIN IC'S | 14  | 7     | -   |
| 74LS112         |     |       |     |
| 74LS123         |     |       |     |
| 74LS161         |     |       |     |
| 74LS163         |     |       |     |
| 74LS160         | 16  | 8     | -   |
| 74LS174         |     |       |     |
| 74LS175         |     |       |     |
| 74LS221         |     |       |     |
| 74LS257A        |     |       |     |
| 74LS373         |     |       |     |
| 74LS374         | 20  | 10    | -   |
| 74LS377         |     |       |     |
| 82500           | 28  | 14    | -   |

NOTES: SEE SHEET 2 FOR MORE OF THIS BLOCK. GROUNDING STRIP IS AT +5V. KEYSLOTS ARE LOCATED AT P300 BETWEEN PINS 18/20 & 08/70. KEYSLOTS ARE LOCATED AT P301 BETWEEN PINS 12/14.

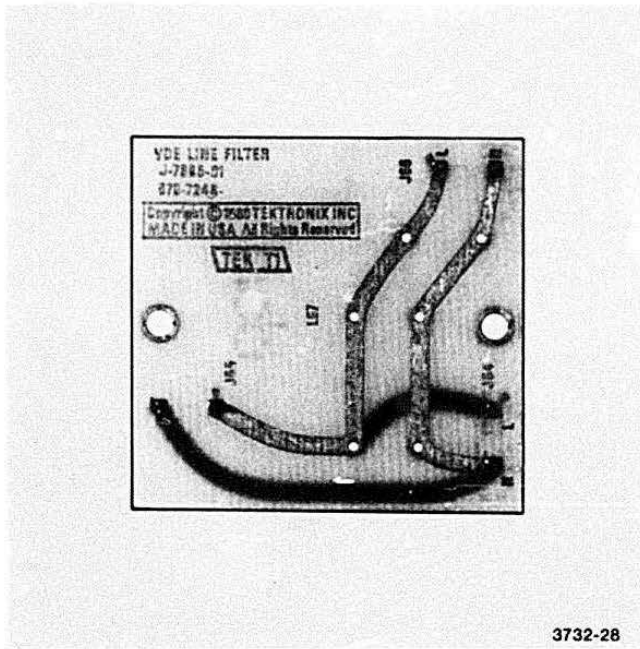


4112 OPT. 11

3819-125

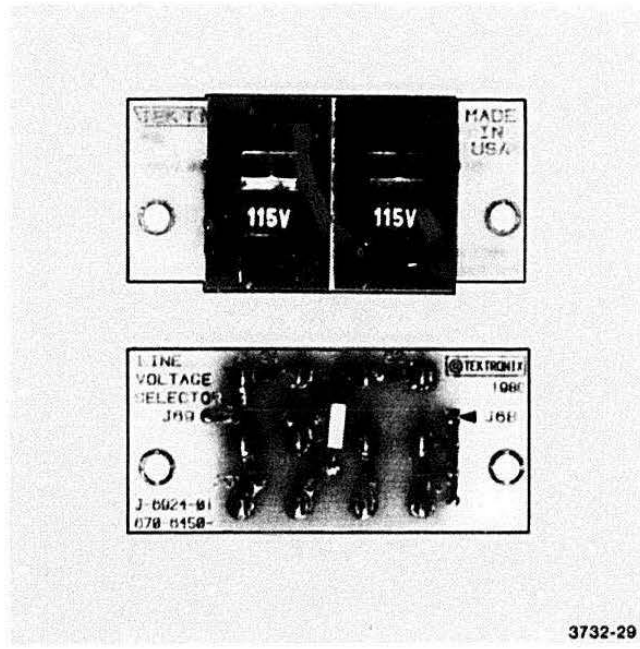
670-6803-00 EXTERNAL VIDEO BD. A15-4 (4 OF 4)

EXTERNAL VIDEO (OPT. 11) A15-4 670-6803-00



3732-28

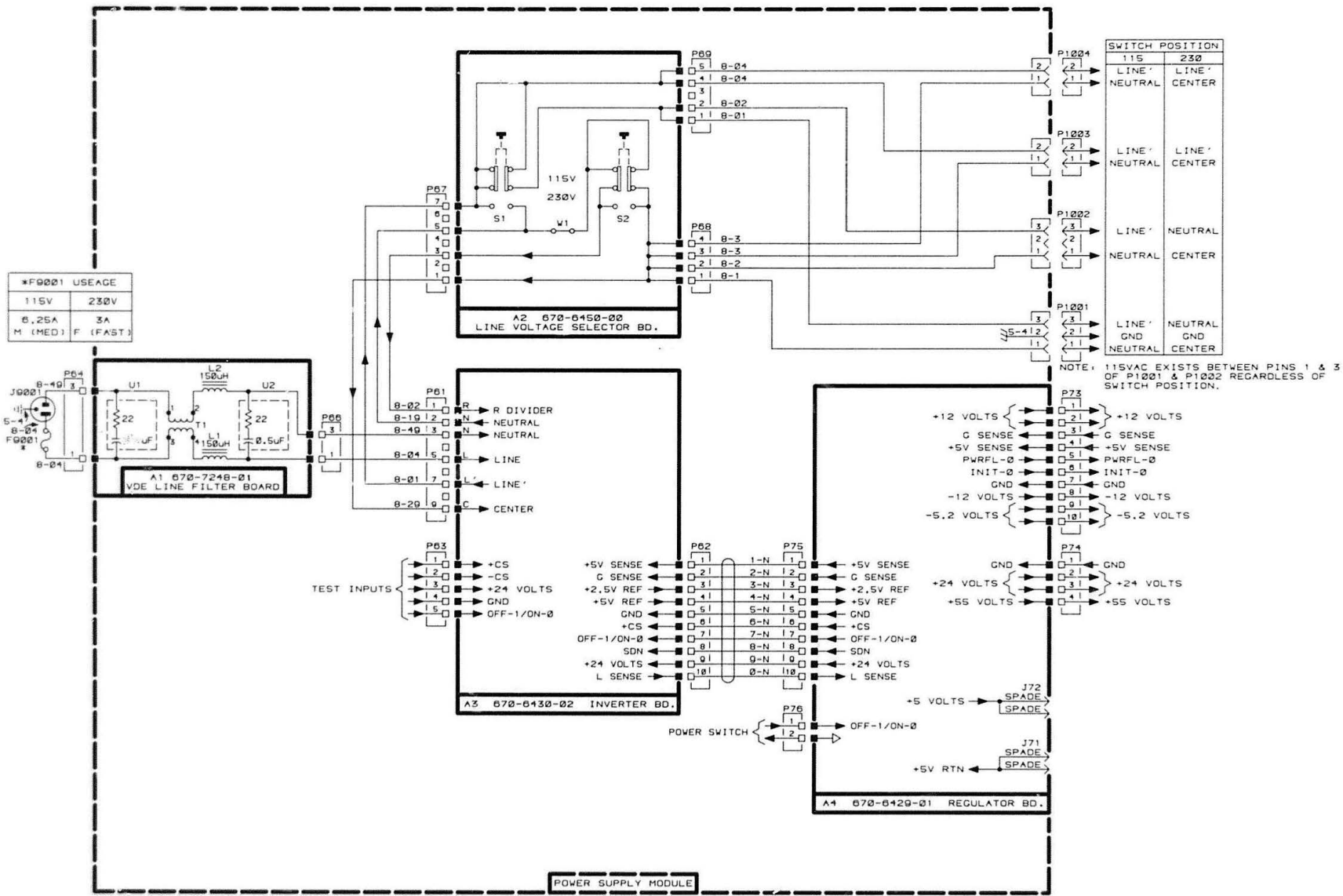
VDE Line Filter (670-7248-00) Component Location.



3732-29

Line Voltage Selector (670-6450-00) Component Locations.



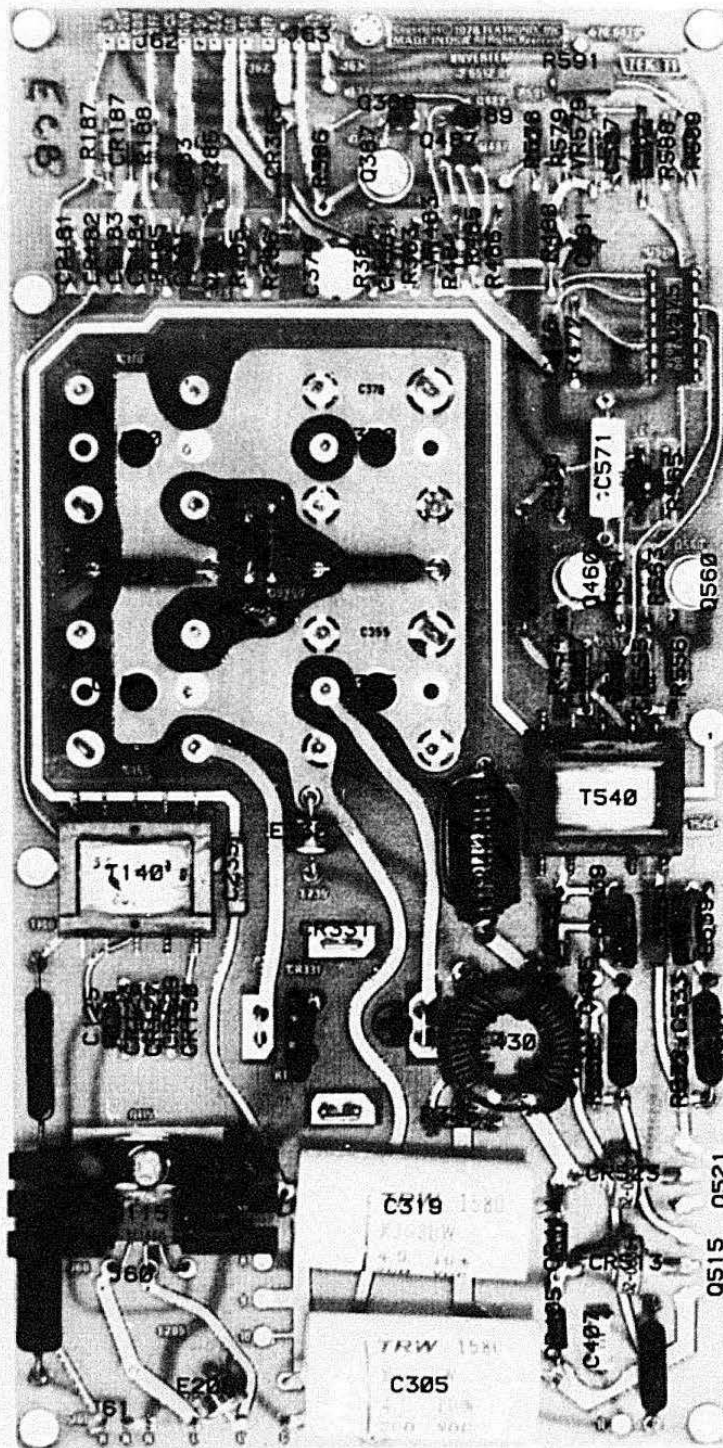


620-0295-02  
(FOR USE WITH 4112)

ADD. SEP 1982  
3310-120

670-7248-01  
670-6450-00

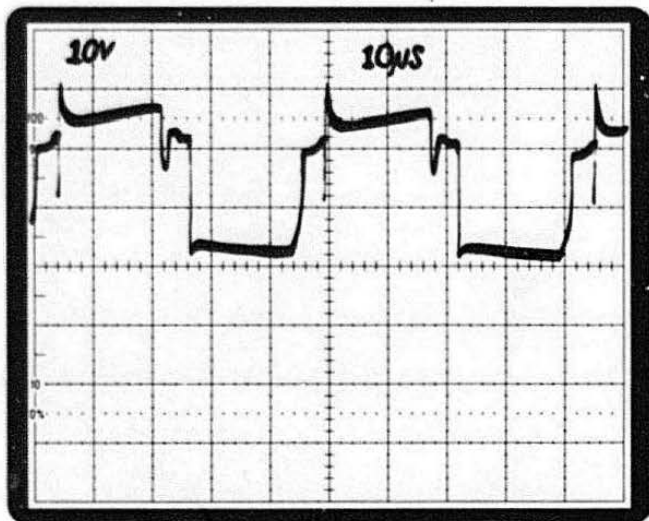
VDE LINE FILTER BD. A1-1  
LINE VOLTAGE SELECTOR BD. A2-1



Inverter (870-6430-00) Component Locations.

3732-30

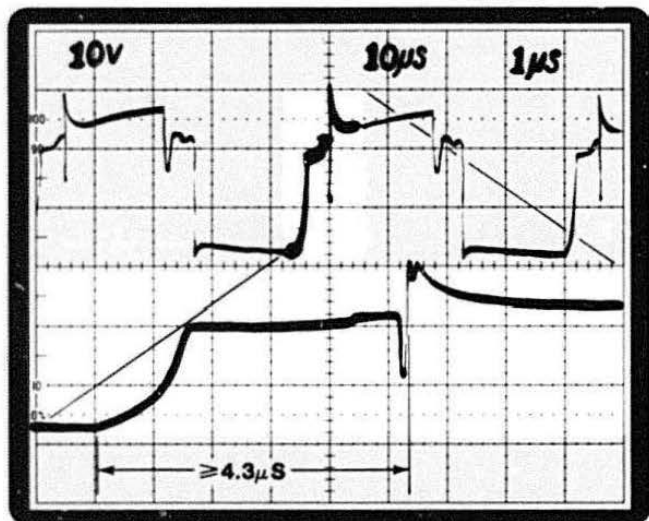
1



Basic Drive Waveform.

3732-8

1

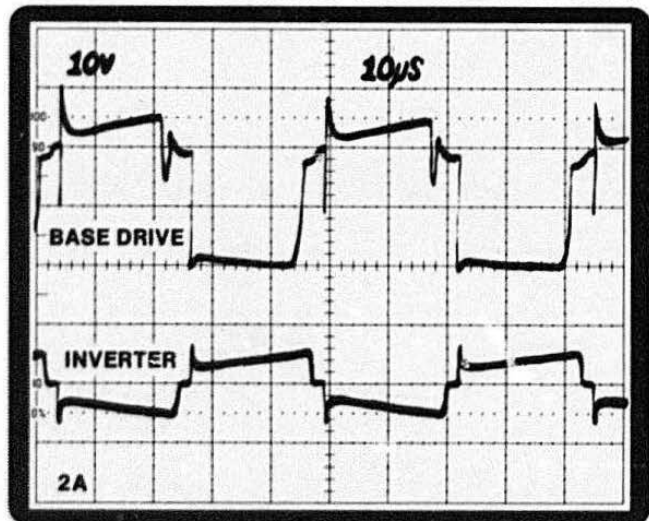


Inverter Dead Time.

3732-9

JUST BEFORE REGULATION (LOAD ABOUT 5A TOTAL)

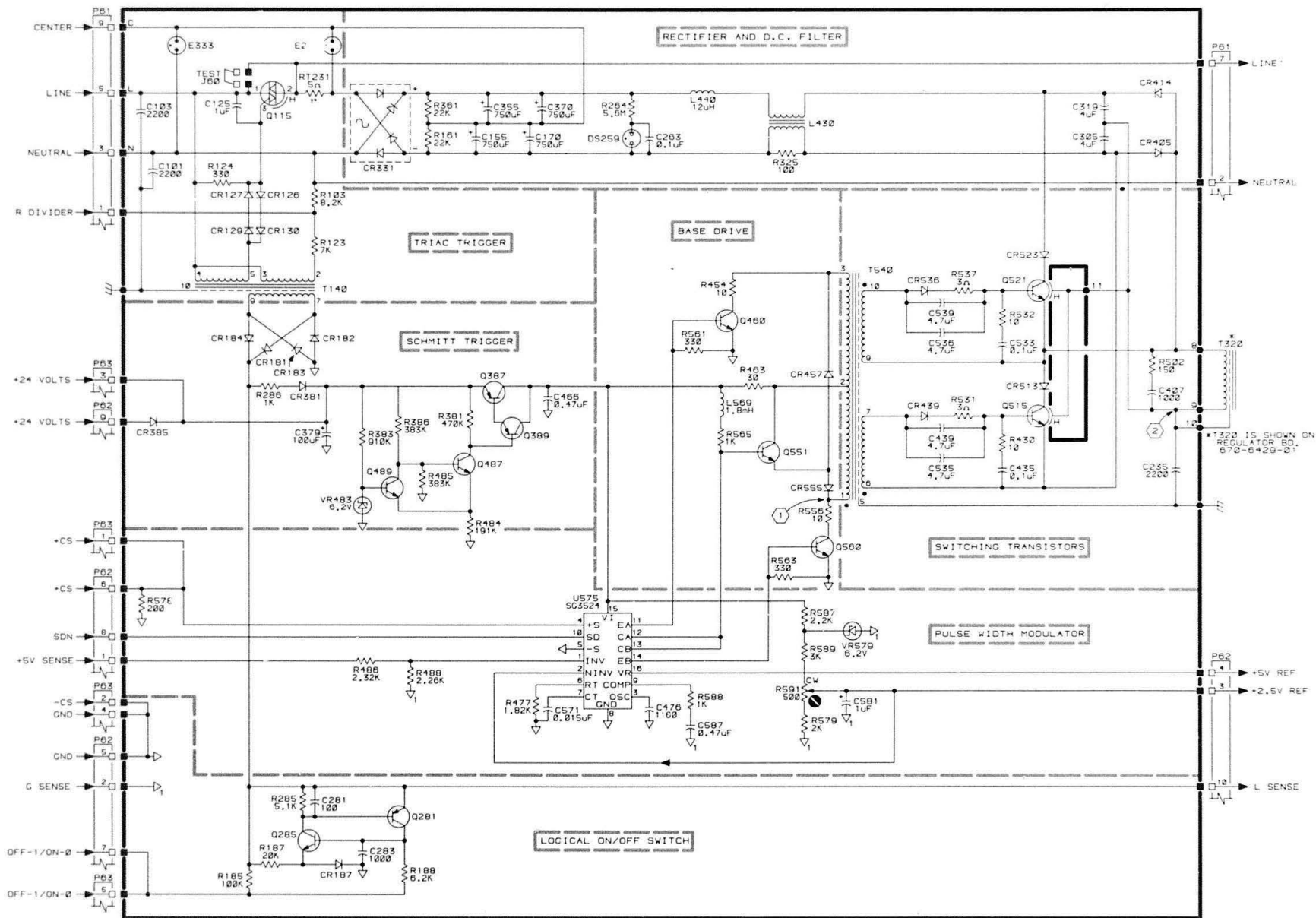
1



2

Inverter Waveform.

3732-12

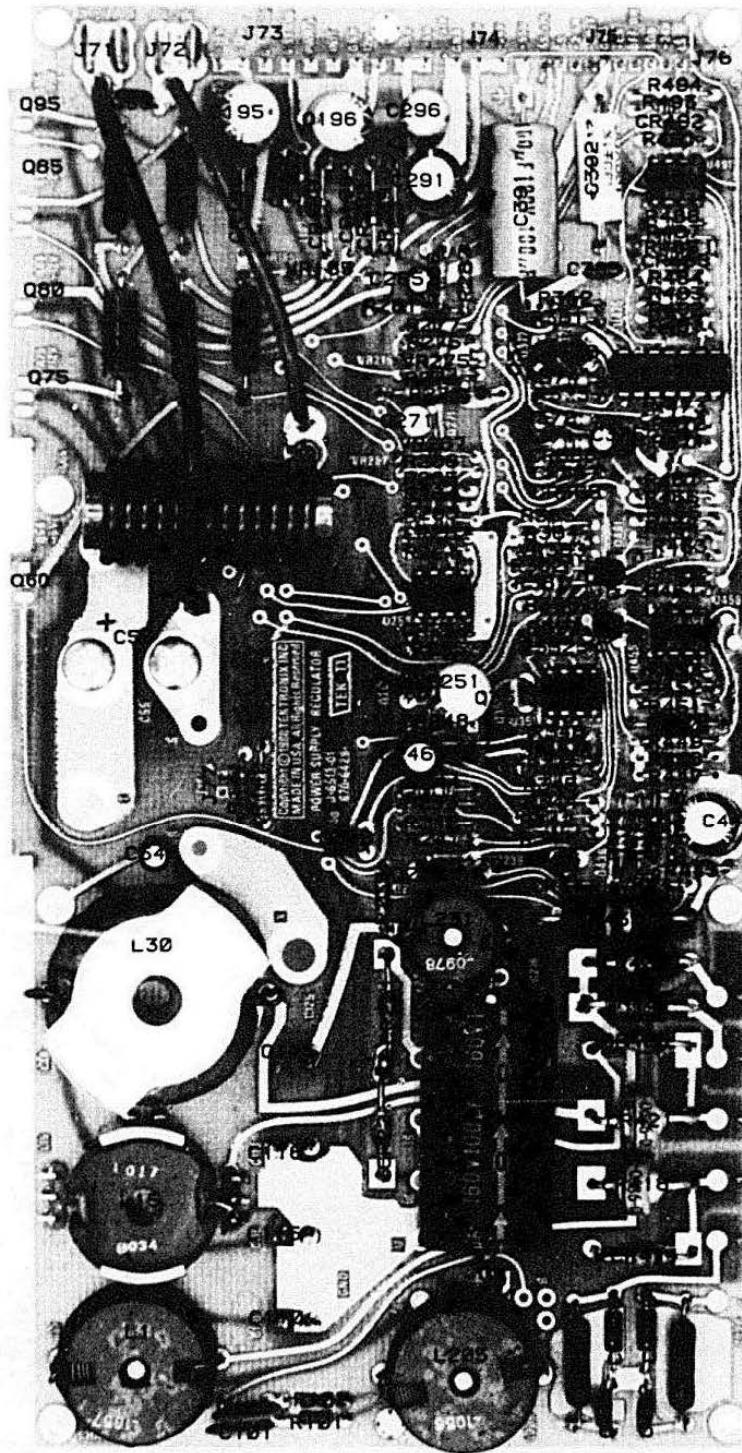


620-0295-02  
(FOR USE WITH 4112)

ADD, SEP 1982  
3819-121

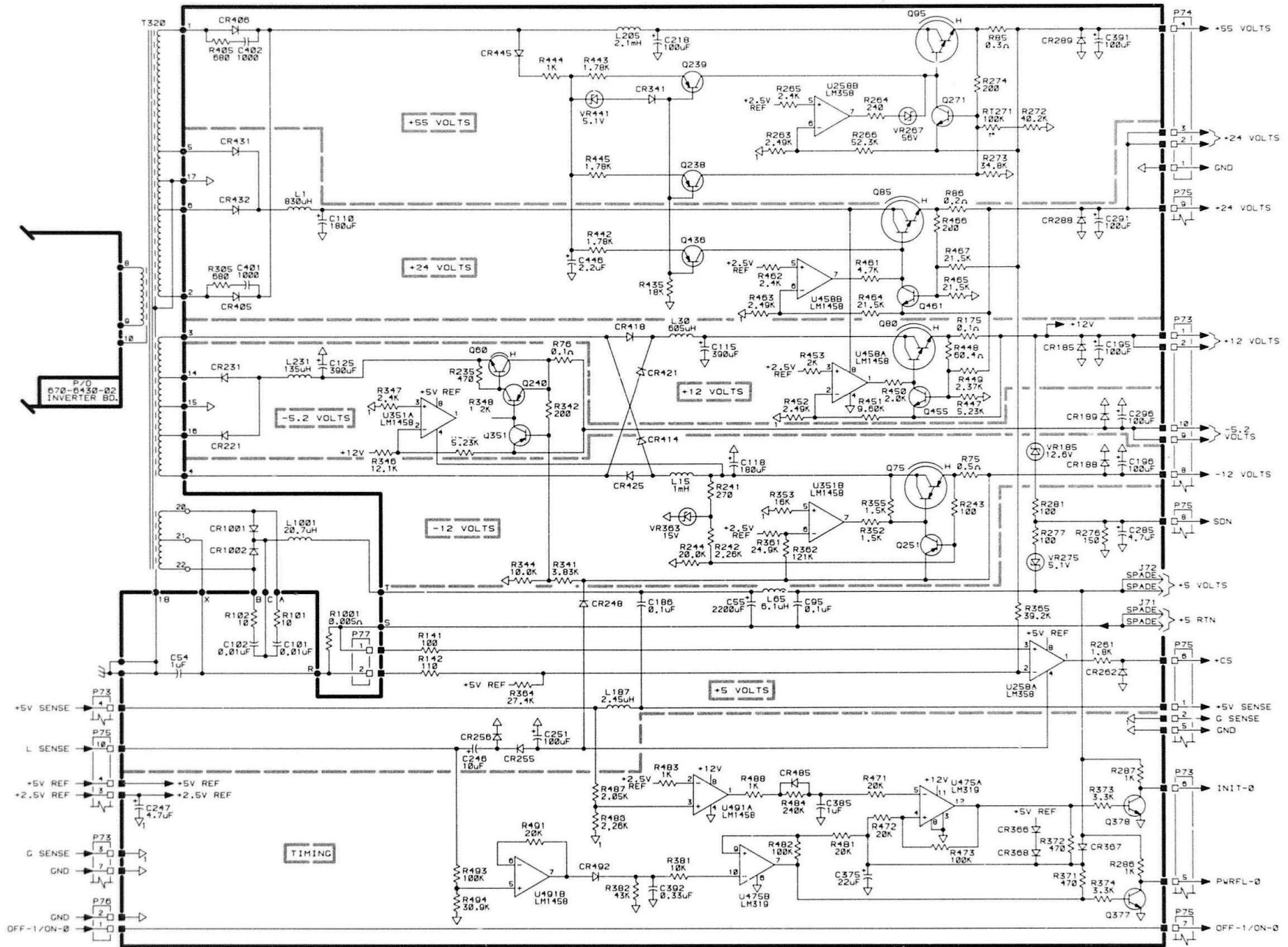
670-6430-02 INVERTER BD. A3-1

REGULATOR  
COMPONENT LOCATIONS



Regulator (670-6429-00) Component Locations.

3732-31



620-0295-02  
(FOR USE WITH 4112)

ADD, SEP 1982  
3819-122

670-6429-01 REGULATOR BD. A4-1

# Appendix A

## 4112 SIGNAL LIST

The following is a list of all the signals appearing on the schematics (in Section 8 of this volume).

Signals can originate and terminate on the same board, going from schematic to schematic (example: A8-1;A8-4 originates on Page 1 of the Vector Generator board schematics and terminates on the Page 4 schematic of the same board). Signals may have more than one destination. There may also be more than one signal with the same name (example: Signal, WALU0-0, goes from schematic A9-4 to schematics A9-1 and A9-2.

There is also another signal on the Dual Raster Memory board also called WALU0-0. This signal originates in schematic A10-6 and goes to schematics A10-2 and A10-3.). Usually signals with the same name perform the same function or close to the same function. In the cases where signals with the same name perform a different function, a second definition is given.

In the following list the microprocessor unit is abbreviated MPU. The terms processor, MPU, and 8086 are interchangeable.

| Signal          | Source;Destination                                | Explanation                                                                                                                                                                                                                                                                                                                                                               |
|-----------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1STINTA-0       | A2A1-2;A2A1-1                                     | First Interrupt Acknowledge.<br>This Processor board signal indicates when the first of two interrupt acknowledge (INTA) cycles is occurring. Only the second INTA contains useful information.                                                                                                                                                                           |
| 50Hz-0          | A7A1-3;A7A1-2, A9-1                               | The 50Hz-0 line can be strapped for either a 50Hz or 60Hz refresh rate (60Hz American; 50Hz European).                                                                                                                                                                                                                                                                    |
| A0-1 thru A19-1 | A2A1-2;A2A1-3, 4, 5<br>A4A1-1;A4A1-3<br>A6-1;A6-2 | (Local) Address (bits 0 through 19).<br>This is the processor board address bus. It is created in the address drivers block from the MPU AD0-AD19 outputs. Note that some of these bits appear also on the RAM/ROM and RAM Controller boards with similar functions.                                                                                                      |
| A15-0           | A4A1-1;A4A1-3                                     | A15-0 is the inverted local address line A15-1 and is used as a decoder bit for the ROM address decode section.                                                                                                                                                                                                                                                           |
| A6-1 thru A0-1  | A10-4;A10-5                                       | Demultiplexed address for raster memory RAMs.                                                                                                                                                                                                                                                                                                                             |
| ACCREAD-0       | A8-1;A8-3                                         | Decoded read strobe for slope generator RA register (at address F702).                                                                                                                                                                                                                                                                                                    |
| ACK1-0          | A4A1-1, A7A1-1;A2A1-1                             | Acknowledge 1.<br>This system bus signal can be used as a slave response for no MPU wait states. The Processor board uses ACK1 to terminate a bus data transfer when it detects a bus timeout condition from the bus timeout detector circuitry. (This signal can be output from the RAM/ROM board through the use of a cut strap, not currently output from this board.) |
| ACK2-0          | A4A1-1, A6-1;A2A1-1                               | Acknowledge 2.<br>ACK2 serves as an advanced transfer acknowledge to eliminate WAIT states in the MPU. The signal derives from SACK-0 which is output by the timing and control block inside the dynamic RAM controller. SACK-0 indicates the beginning of a memory access cycle.                                                                                         |

## SIGNALS LIST

| Signal               | Source;Destination                             | Explanation                                                                                                                                                                                                                         |
|----------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AD19-1 thru AD0-1    | A2A1-1, 2;A2A1-2                               | (MPU) Address/Data (bits 0 through 19).<br>These signals are the time-multiplexed memory I/O address and data bus output from the MPU. These bits are also input for data.                                                          |
| ADIS-0               | J357;A8-2                                      | Address Disable.<br>ADIS-0 is a square pin test signal on J357-3. When ADIS-0 is tied low, the address outputs of the 2911 state sequencer chips will be tri-stated.                                                                |
| ADRO-1 thru ADR19-1  | A2A1-2;A4A1-1, A6-1, A7A1-1, A8-1, A9-4, A10-6 | (System) Address (bits 0 through 19).<br>These are the system bus address lines.                                                                                                                                                    |
| AIOWC-0              | A2A1-2;A2A1-1, A8-1, A9-4                      | Advanced I/O Write Command.<br>This signal gives system bus I/O devices early indication of a write instruction. The timing is the same as a read command.                                                                          |
| ALE-1                | A2A1-2;A2A1-1                                  | Address Latch Enable.<br>ALE-1 strobes an address into the ADE block. It also synchronizes the Microprocessor Timing Generator, and de-glitches the ROM bank decoder.                                                               |
| ALL-1                | A8-5;A8-5<br>(Internal to the schematic)       | Output of the index control register. This causes the pixel write logic to generate a PWRT-0 on the Display Bus for every PRQST-1.                                                                                                  |
| AMWC-0               | A2A1-2;A2A1-1, A6-1                            | Advanced Memory Write Command.<br>AMWC-0 gives early indication of a write instruction to the system bus memory. The timing is the same as a read command — MRDC.                                                                   |
| AWT-0                | A2A1-1;A2A1-2, 4, 5                            | Advanced Write.<br>This is the advanced write command to all on-board devices. AWT-0 is derived from the MPU status lines and the Microprocessor Timing Generator.                                                                  |
| BANK0-0              | A8-5;A8-5<br>(Internal to the schematic)       | Output of the index control register. This signal selects which bank of the index file is currently in use.                                                                                                                         |
| BANKIN-0             | A6-2;A6-1                                      | BANKIN-0 is used in the address decoding logic on the RAM Controller board to indicate the presence or absence of a RAM Array board.                                                                                                |
| BANKSELECT-1         | A8-2;A8-2<br>(Internal to the schematic)       | A signal which selects which half of the microcode ROMs to be used for the requested routine (most significant bit of the opcode).                                                                                                  |
| BBCLK-1              | A2A1-A;A2A1-5                                  | Buffered Bus Clock.<br>BBCLK is a 4.9152 MHz signal which synchronizes the bus transfer logic and is the frequency source for the Programmable Timer and (Transmit) Baud Rate Generator block. This signal is the invert of BCLK-0. |
| BCLK-0               | A2A1-1;A2A1-1, P101                            | Bus Clock.<br>BCLK-0 is the system bus clock. It is a 4.9152 MHz square wave and is used by bus devices to synchronize bus master transfers. It is also used as a stable frequency source.                                          |
| BDAT3-1 thru BDAT0-1 | A9-4;A9-2                                      | Buffered 8086 data bus.                                                                                                                                                                                                             |
| BHE-0                | A2A1-1;A2A1-2                                  | BHE-0 is the low side of S7-1/BHE-0. BHE-0 is latched and then driven on to the system bus as BHEN-0 (see S7-1/BHE-0 and BHEN-0). BHE-0 is the local Processor board version of BHEN-0.                                             |



## SIGNALS LIST

| Signal             | Source;Destination                       | Explanation                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BHEN-0             | A2A1-2;A4A1-1, A6-1                      | Byte High Enable.<br>On the Processor board, BHE is latched and then driven onto the System bus as BHEN-0. BHEN-0 enables the high byte (D8-D15) on read, write, and interrupt acknowledge cycles.                                                                                                                                                                                                      |
| BIN-1              | A8-5;A8-5<br>(Internal to the schematic) | Beam In.<br>This signal is the logical "AND" of XIN-1 and YIN-1. This signal tells the memory control logic that the current beam position is on the screen.                                                                                                                                                                                                                                            |
| BLANK-0            | A7A1-3;A7A1-1, 2                         | BLANK-0 is a video blanking signal from the Video Timing Generator block. BLANK-0 controls blanking during horizontal and vertical retrace.                                                                                                                                                                                                                                                             |
| BLOCKMOVEDEST-1    | A9-1;A9-2<br>A10-1;A10-2, 3              | Block Move Destination.<br>The BLOCKMOVEDEST-1 signal is high during a vector cycle called Block Move Destination.                                                                                                                                                                                                                                                                                      |
| BMA-0 thru BMC-0   | A1-2;P43                                 | Bus Master A thru C.<br>Used with a factory test fixture (for test purposes only).                                                                                                                                                                                                                                                                                                                      |
| BMPO-0 thru BMP2-0 | A9-1;A9-2<br>A10-1;A10-2, 3              | Buffered bus signals of MPO-0 through MP2-0.                                                                                                                                                                                                                                                                                                                                                            |
| BPRN-0             | J104;A2A1-1                              | Bus Priority In.<br>BPRN is a signal from the bus priority logic on the Mother board that informs a potential bus master board that it has permission to become bus master.                                                                                                                                                                                                                             |
| BREQ-0             | A2A1-1;A1-2                              | Bus Request.<br>BRQ is a signal from a potential bus master board to the bus priority logic on the Motherboard that indicates that the potential bus master board needs to become the actual bus master.                                                                                                                                                                                                |
| BUSAEN-0           | A2A1-1;A2A1-2                            | Bus Address Enable.<br>BUSAEN-0 indicates that a board is bus master of the system bus. BUSAEN-0 is input to the Address enable of the bus controller chip, as well as an enable to the address drivers. BUSAEN-0 enables the bus controller to output the bus commands MRDC, MWTC, AMWC, IORDC, etc. BUSAEN-0 is gated with INTA and input to the INTA input of the programmable interrupt controller. |
| BUSGRT-0           | P104;A2A1-1                              | Bus Grant.<br>BUSGRT-0 acts as a preset for the bus transfer logic, causing BUSY-0 to be output.                                                                                                                                                                                                                                                                                                        |
| BUSGRT-1           | A2A1-1;A2A1-5                            | Bus Grant.<br>This signal is similar to BUSAEN, but has a slight timing difference. This signal enables data to be latched onto the data lines.                                                                                                                                                                                                                                                         |
| BUSY-0             | A8-2;A8-2<br>(Internal to the schematic) | Output of the opcode flag. This signal is set true by an I/O write to the opcode register and set false by the state sequencer (signal CBUSY-0). This flag can be tested by the state sequencer and is used to start execution of the micro-<br>opcode routine as requested through opcode.                                                                                                             |
| BUSY-0             | A2A1-1;A2A1-1                            | BUSY-0 indicates that a bus master is currently using the system bus. BUSY-0 delays bus master transfer until the current bus master is done.                                                                                                                                                                                                                                                           |

## SIGNALS LIST

| Signal             | Source;Destination          | Explanation                                                                                                                                                                                                                                                                                                                                        |
|--------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BVCLK1-1           | A8-3;A8-1, 2                | Buffered vector clock from the Display Bus (buffers VCLK-0).                                                                                                                                                                                                                                                                                       |
| BVCLK2-1           | A8-3, A8-1, 4, 5            | Buffered vector clock from the Display Bus (buffers VCLK-0).                                                                                                                                                                                                                                                                                       |
| BVCLK3-1           | A8-3;A8-4                   | Buffered vector clock from the Display Bus (buffers VCLK-0).                                                                                                                                                                                                                                                                                       |
| BVCLK4-1           | A8-3;A8-2                   | Buffered vector clock from the Display Bus (buffers VCLK-0).                                                                                                                                                                                                                                                                                       |
| C2-1, C1-1, & C0-1 | A8-2;A8-5                   | Counter.<br>These signals act as a three bit control field from the state controller. These signals then select the mode for the counter control logic.                                                                                                                                                                                            |
| CAS-0              | A6-1;A6-2<br>A4A1-1;A4A1-2  | Column Address Strobe.<br>This signal is generated by the Dynamic RAM Controller on both RAM/ROM and the RAM Controller boards. CAS-0 strobe the seven multiplexed column address bits appearing on RA0-1 thru RA6-1 (RAM address lines) on the RAM Array board.                                                                                   |
| CAS-1              | A7A1-2;A9-1, A10-1          | From RAM timing block. Column address strobe for the RAMs.                                                                                                                                                                                                                                                                                         |
| CAS0-1 thru CAS4-0 | A9-1;A9-3<br>A10-1;A10-4, 5 | Column Address Strobes for RAM.                                                                                                                                                                                                                                                                                                                    |
| CATHODE            | A12-1;CRT                   | Ties cathode of crt to ground.                                                                                                                                                                                                                                                                                                                     |
| CBLANK-0           | A7A1-3;A7A1-4               | Cursor blanking.<br>CBLANK-0 originates in the Video Timing Generator. CBLANK-0 blanks the cursor during retrace.                                                                                                                                                                                                                                  |
| CBRQ-0             | A2A1-1;A2A1-1               | Common Bus Request.<br>CBRQ-0 is used by potential bus masters to request bus mastership from higher priority bus masters. CBRQ-0 is generated by the Processor board along with BRQ (both of these signals are outputs of the same flip-flop). The Processor board then listens to CBRQ-0 and gives up the bus when another board asserts CBRQ-0. |
| CBUSY-0            | A8-2;A8-3                   | Clear Busy flag.<br>This state controller signal clears the busy flag that is set by writing an opcode to the Vector Generator.                                                                                                                                                                                                                    |
| CBUSY-0            | P286;A7A1-1                 | (Hard) Copy Busy.<br>From the Hard Copy Unit. Indicates that the HCU is busy making a copy.                                                                                                                                                                                                                                                        |
| CCREAD-0           | A8-1;A8-5                   | Decoded read strobe for the index control register (at address F71A).                                                                                                                                                                                                                                                                              |
| CDAT-0             | A8-2;A8-5                   | Clear New Data flag.<br>This state controller signal clears the New Data flag that is set by an I/O write to the Index file.                                                                                                                                                                                                                       |
| CLK-1              | A2A1-1;A2A1-2               | Clock.<br>CLK-1 is a direct output of the Clock Generator IC. It outputs a 4.9152 MHz square wave with a one third duty cycle. All blocks that must be synchronized with the local processor bus use this signal.                                                                                                                                  |
| CLKDIS-0           | P129;A4A1-1<br>P166;A6-1    | Clock Disable.<br>A TTL logic low level applied to this input pin disables the clock circuitry on the RAM/ROM or the RAM Controller board. (This is a test point for factory use only).                                                                                                                                                            |

## SIGNALS LIST

| Signal              | Source;Destination                                                           | Explanation                                                                                                                                                                    |
|---------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CLR1-0              | A8-1;A8-2, 5                                                                 | Buffered reset signal which is the "OR" of (1) the bus reset (RESET-0), (2) the square pin reset (INIT-0), and, (3) the software reset (io write to address F71E).             |
| CLR2-0              | A8-1;A8-2                                                                    | Buffered reset signal which is the "OR" of (1) the bus reset (RESET-0), (2) the square pin reset (INIT-0), and, (3) the software reset (io write to address F71E).             |
| CLR3-0              | A8-1;A-4, 5                                                                  | Buffered reset signal which is the "OR" of (1) the bus reset (RESET-0), (2) the square pin reset (INIT-0), and, (3) the software reset (io write to address F71E).             |
| CMD-1               | A2A1-4;A2A1-5                                                                | Command.<br>CMD-1 is the logical OR of RD and AWT on the Processor board.                                                                                                      |
| CNT1READ-0          | A8-1;A8-2                                                                    | Decoded read strobe for the 12-bit counter (at address F70E).                                                                                                                  |
| COL-1               | A7A1-2;A9-3, A10-4                                                           | From RAM timing, controls the ROW/COLUMN address multiplexer on the Raster Memory board.                                                                                       |
| COMINT-0            | A2A1-5;A2A1-2                                                                | Communications Interrupt.<br>COMINT-0 is the RS-232 Communications Interface received character interrupt signal. Other RS-232 interrupts are included in the TIMERINT signal. |
| CSR-0               | A8-2;A8-5                                                                    | Clear Shift Register flag.<br>This state controller signal clears the new shift register flag (the flag is set by an I/O write to SR1).                                        |
| CTS-1               | P102;A2A1-5                                                                  | Clear To Send.<br>CTS-1 is an RS-232 status input.                                                                                                                             |
| CURCLK-1            | A7A1-2;A7A1-4                                                                | Cursor clock.<br>CURCLK-0 originates in the Pixel Timing block and serves to clock the Cursor Video D flip-flop.                                                               |
| CURSYNC-0           | A7A1-1;A7A1-4                                                                | Cursor synchronizing pulse.<br>CURSYNC-0 originates in the pixel timing block and serves to keep the cursor synchronized to the pixel timing.                                  |
| D0-1 thru D19-1     | A9-2;A9-3<br>A10-3;A10-5                                                     | 20 bits of RAM memory input data.                                                                                                                                              |
| D15-1 thru D0-1     | A2A1-2;A2A1-3, 4, 5<br>A8-1, 2, 3, 4, 5                                      | (Local) Data (Bus).<br>These lines are the local data bus for the Processor board and the Vector Generator board.                                                              |
| DAC0-1 thru DAC3-1  | A9-4;A7A1-4                                                                  | Digital/analog converter signals.                                                                                                                                              |
| DAT0-1 thru DAT15-1 | A2A1-2, A4A1-2, A4A1-3, A6-2,<br>A7A1-1, 4, A8-1,<br>A9-1, 4, A10-1, 2, 3, 6 | (System) Data (Bus).<br>These lines are the system data bus. (Bidirectional on most boards).                                                                                   |
| DCD-1               | P102;A2A1-5                                                                  | Data Carrier Detect.<br>DCD-1 is an RS-232 status input.                                                                                                                       |
| DCLK-1              | A7A1-2;A9-4, A10-6                                                           | Dot (or dash) Clock.<br>25 Hz Clock for dot (or dash) pattern. Originates in Master Clock block of the Video Controller board.                                                 |
| DCRY-1              | A7A1-2;A7A1-3                                                                | Dot carry clock.<br>From the Pixel Timing block. DCRY-1 is the master clock for the CRT controller IC.                                                                         |

## SIGNALS LIST

| Signal              | Source;Destination                       | Explanation                                                                                                                                                                                                                                        |
|---------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DDA-0               | A8-2;A8-3                                | Slope Generator Enable.<br>This is a state sequencer signal which allows the slope generator to function.                                                                                                                                          |
| DIN15-1 thru DIN0-1 | A4A1-2;A5-1<br>A6-2;A5-1                 | Data In bits 0 through 15.<br>During RAM write operations, these 16 data bits contain the data that is written to RAM on the RAM Array board.                                                                                                      |
| DINLSB-0            | A6-1;A6-2                                | Data Input Enable Least Significant Byte.<br>During RAM write operations, DINLSB-0 enables the data input buffer for the least significant byte of data to drive data from the bus onto RAM data lines DIN7-1 thru DIN0-1 to the RAM Array boards. |
| DINMSB-0            | A6-1;A6-2                                | Data Input Enable Most Significant Byte.<br>During RAM write operations, DINMSB-0 enables the data input buffer for the most significant byte of data to drive data from the bus onto RAM data lines DIN15-1 thru DIN8-1 to the RAM Array boards.  |
| DOU-0               | A6-1;A6-2<br>A4A1-1;A4A1-2               | Data Output Enable.<br>During RAM read operations, DOU-0 enables the Data Output Latches to output their data to the system bus.                                                                                                                   |
| DOU15-1 thru DOU0-1 | A5-1;A4A1-2<br>A5-1;A6-2                 | Data Output bits 0 through 15.<br>These 16 data bits from the RAM Array board contain the RAM data output bits during RAM read operations.                                                                                                         |
| DSR-1               | P102;A2A1-5                              | Data Set Ready.<br>DSR-1 is an RS-232 status input.                                                                                                                                                                                                |
| DT-1/R-0            | A2A1-2;A2A1-4                            | Data Transmit/Receive.<br>DT-1/R-0 is a direct output of the bus controller. A high on this line indicates a WRITE to I/O or memory and a low is a READ.                                                                                           |
| DTR-1               | A2A1-5;P102                              | Data Terminal Ready.<br>DTR-1 is an RS-232 status output.                                                                                                                                                                                          |
| DY-1                | A9-4;A9-4<br>(Internal to the schematic) | Border latch output bit.                                                                                                                                                                                                                           |
| DYENB-0             | A8-2;A8-4                                | Delta Y Enable.<br>This state controller signal selects the Delta Y counter instead of the Y counter to send to the Display Bus.                                                                                                                   |
| EARLYCARRY-0        | A7A1-2;A7A1-3                            | Early Dot Carry clock.<br>Early Dot Carry clock from the Pixel Timing block. EARLY-CARRY-0 is used to help generate the PAUSE-1 signal.                                                                                                            |
| EBLANK-0            | A7A1-3;A7A1-4                            | ECL blank.<br>From the Video Timing block. EBLANK-0 is the ECL level composite blanking signal.                                                                                                                                                    |
| ECLR-0              | A7A1-2;A7A1-4                            | ECL generated clear pulse.<br>Clear pulse from the RAM Timing. ECLR-0 is used to control Y-cursor blanking.                                                                                                                                        |
| ENB12-0             | A8-2;A8-2<br>(Internal to the schematic) | Enable 12-Bit Counter.<br>A state controller signal which enables the 12-bit counter to decrement.                                                                                                                                                 |
| ENB8-0              | A8-2;A8-1                                | Enable 8-Bit Counter.<br>This state controller signal allows the 8-bit counter to decrement.                                                                                                                                                       |

## SIGNALS LIST

| Signal          | Source;Destination                       | Explanation                                                                                                                                                                                                                             |
|-----------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EQ-1            | A10-2;A10-3                              | A-B line from the ALU ICs on the Dual Plane Raster Memory board. This signal is used to generate EQUAL-1 (see EQUAL-1).                                                                                                                 |
| EQUAL-1         | A9-2, A10-3, A8-2                        | EQUAL-1 is a signal to the Vector Generator board indicating that both input ports of the raster ALU are equal (provided the ALU mode is set to XNOR).                                                                                  |
| ESYNC-0         | A7A1-3;A7A1-4                            | ECL synchronization pulse.<br>ESYNC-0 is an ECL level composite video synchronization pulse from the Video Timing block to the DAC.                                                                                                     |
| EXLD-0          | P281;A7A1-3                              | Causes CRT controller to go through self-booting sequence.                                                                                                                                                                              |
| EXT-0           | J3B2;A9-2, A10-2                         | Not currently used.                                                                                                                                                                                                                     |
| FIRST-0         | A8-1;A8-5                                | This signal is true after the X axis counter is loaded and it goes false when the X axis is counted. It is used to identify the first column of a wipe or blockmove.                                                                    |
| FLYBACK SIGNAL  | A12-1;A13-1                              | FLYBACK SIGNAL returns the beam to its starting point after a horizontal and/or vertical sweep.                                                                                                                                         |
| FMAT-0 & FMAT-1 | A8-2;A8-2<br>(Internal to the schematic) | Format.<br>A state controller signal that controls which latches the micro-code ROM data will be latched into.                                                                                                                          |
| HSYN-1          | A7A1-3;A7A1-4                            | Horizontal video synchronization pulse.<br>HSYN-1 is used to synchronize the monitor (J361 must be in place).                                                                                                                           |
| HSYNC-0         | A7A1-3;A12-1                             | Horizontal video synchronization pulse.<br>Invert of HSYN-1.                                                                                                                                                                            |
| HORIZ SYNC      | A7A1-3;A12-1                             | HORIZ SYNC is derived from the HSYNC-0 pulse on the Video Controller board and is used to control the timing of the left to right scan and return of the beam on the crt.                                                               |
| IDIS-0          | J357;A8-2                                | Instruction Disable.<br>IDIS-0 is a square pin-test signal on J357-2. When IDIS-0 is tied low, the outputs of the micro-opcode decoder ROM will be tristated.                                                                           |
| IN-0            | A4A1-2;A5-1                              | IN-0 is used with OUT-0 to indicate the presence or absence of a RAM Array board.                                                                                                                                                       |
| INH-0           | A8-5;A8-5<br>(Internal to the schematic) | Inhibit.<br>The ZERO-0 signal from the 12-bit counter qualified by the ZENB-0 signal from the state controller. INH-0 serves to inform the counter control and memory control logic of the end of a vector.                             |
| INH-0           | A6-1;A4A1-1                              | (Read) Inhibit.<br>When true low, INH-0 inhibits memory circuitry from placing its data onto the system bus while memory circuits are reading data (see INHIBIT-0). INH-0 may be output by test circuitry. INH-0 is not currently used. |
| INHIBIT-0       | A4A1-1;A4A1-3                            | This signal is a buffered version of the system bus signal INH-0. When true low, it inhibits the RAM/ROM board from outputting its data during RAM read or ROM read operations.                                                         |

## SIGNALS LIST

| Signal             | Source;Destination                  | Explanation                                                                                                                                                                                                                                                                  |
|--------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INIT-0             | A14-1;A2A1-1, 4, A8-1, A7A1-3       | Initialize.<br>INIT is used to generate reset which goes directly to the MPU and does a power-up reset operation. It also resets much of the sequential logic on the Processor board, as well as resetting logic on the Video Controller and Vector Generator boards.        |
| INT-0              | A7A1-1;P280                         | Interrupt request.                                                                                                                                                                                                                                                           |
| INT0-0 thru INT7-0 | <sup>a</sup> ;A2A1-2                | Interrupt 0 through 7.<br>INT0-1 thru INT7-0 are interrupt request signals to the Processor board. INT0-0, INT4-0, or INT5-0 can be generated by processor board devices.                                                                                                    |
| INTA-0             | A2A1-1;A2A1-1, 2                    | Interrupt Acknowledge.<br>INTA-0 informs the Programmable Interrupt Controller that its interrupt is acknowledged and it can put vectoring data on the system data bus.                                                                                                      |
| INTA-0             | A2A1-2;A2A1-1, 2                    | Interrupt Acknowledge.<br>INTA-0 is generated on the Processor board and is received by slave programmable interrupt counters (PICs) on other boards. INTA-0 notifies the slave PIC that its interrupt is acknowledged and it can put vectoring data on the system data bus. |
| INTERNAL-0         | A9-2;A9-1<br>A10-2;A10-1, 3         | Indicates where the input data for the B side of ALU comes from. 0 says data is from internal PDAT latches. 1 says data comes from an off board source. Always zero in the 4112 since there are no outside sources.                                                          |
| INTERNAL-1         | A10-2;A10-3                         | INTERNAL-1 is the invert of INTERNAL-0. It acts in the same manner as INTERNAL-0 but is not currently used.                                                                                                                                                                  |
| INTR-1             | A2A1-2;A2A1-1                       | Interrupt.<br>INTR-1 is a direct output of the INT pin of the programmable interrupt counter in the Interrupt Controller block. The signal is input directly to microprocessor INTR input. INT is the interrupt to the microprocessor.                                       |
| IORC-0             | A2A1-2;A7A1-1, A8-1, A9-4,<br>A10-6 | I/O Read Command.<br>This signal when low indicates that an I/O device should drive its data onto the system bus.                                                                                                                                                            |
| IOWC-0             | A2A1-2;A7A1-1, A8-1, A9-4,<br>A10-6 | I/O Write Command.<br>This signal when low indicates that an I/O device should read data on the system bus.                                                                                                                                                                  |
| K19-1 thru K0-1    | A10-2;A10-4                         | K19-1 thru K0-1 on the Dual Plane Raster Memory board has the same function as D19-1 thru D0-1 (data for the plane 0 memory array).                                                                                                                                          |
| KA0-1 thru KA3-1   | A2A1-4;A3-1                         | Keyboard Address 0 through 3.<br>These signal lines carry key matrix column addresses in addition to LED address and on-off information.                                                                                                                                     |
| KBDINT-0           | A4A1-4;A4A1-2                       | Keyboard Interrupt.<br>This signal is the interrupt for the keyboard. It is output from pin 24 of the peripheral interface microprocessor and input to the Interrupt Controller block as INT4 into the programmable interrupt counter.                                       |
| KBT1-1             | P104;A2A1-4                         | Keyboard Test.<br>KBT is the test input to the MPU Keyboard Controller.                                                                                                                                                                                                      |

<sup>a</sup> From all boards in system.

## SIGNALS LIST

| Signal           | Source;Destination       | Explanation                                                                                                                                                          |
|------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| KD0-1 thru KD7-1 | A3-1;A2A1-4              | Keyboard Data 0 through 7.<br>These lines carry key matrix data in addition to thumbwheel Grey code data.                                                            |
| KSTRB-0          | A2A1-4;A3-1              | Keyboard Strobe.<br>KSTRB-0 latches KA0-1 thru KA3-1 data into the Keyboard board circuitry.                                                                         |
| KWR-0            | A2A1-4;A3-1              | Keyboard Write.<br>KWR latches KA0-1 thru KA3-1 into the Keyboard circuitry that controls the LEDs                                                                   |
| L19-1 thru L0-1  | A9-2;A9-4<br>A10-3;A10-6 | Latch pixel data bits to the processor read latches. The bits are then latched in the block move latch for a processor read.                                         |
| LAST-0           | A8-1;A8-2, 5             | Zero count signal for the 8-bit counter.                                                                                                                             |
| LATCH-0          | A9-1;A9-2                | A low holds the previous RAM cycle output data in the block move latches. This data can then be used for the destination cycle of the block move.                    |
| LBHE-0           | A2A1-2;A2A1-4            | Latched Byte High Enable.<br>LBHE-0 is the Processor board equivalent of the system bus signal, BHEN (Byte High Enable).                                             |
| LINESYNC-0       | A7A1-3;A7A1-2            | LINESYNC-0 synchronizes the pixel timing to the video scan line.                                                                                                     |
| LOADdelY-0       | A8-1;A8-4                | Decoded write strobe for delta Y axis register (at address F708).                                                                                                    |
| LOAD-1           | A7A1-2;A9-4, A10-6       | Load enable for video shift registers.                                                                                                                               |
| LOADAXIS-0       | A8-1;A8-3                | Decoded write strobe for slope generator axis control register (at address F704).                                                                                    |
| LOADCC-0         | A8-1;A8-5                | Decoded write strobe for the index control register (at address F71A).                                                                                               |
| LOADCNT1-0       | A8-1;A8-2                | Decoded write strobe for 12-bit counter (at address F70E).                                                                                                           |
| LGADCOL-0        | A8-1;A8-5                | Decoded write strobe for the index file (at address F718).                                                                                                           |
| LOADMASK-0       | A8-1;A8-5                | Decoded write strobe for the mask file (at address F71C).                                                                                                            |
| LOADOP-0         | A8-1;A8-2                | Decoded write strobe for the OPCODE register (at address F714).                                                                                                      |
| LOADRA-0         | A8-1;A8-3                | Decoded write strobe for slope generator RA register (at address F702).                                                                                              |
| LOADRX-0         | A8-1;A8-3                | Decoded write strobe for slope generator RX register (at address F700).                                                                                              |
| LOADRY-0         | A8-1;A8-3                | Decoded write strobe for slope generator RY register (at address F706).                                                                                              |
| LOADSR1-0        | A8-1;A8-5                | Decoded write strobe for shift register 1 (at address F710).                                                                                                         |
| LOADSR2-0        | A8-1;A8-5                | Decoded write strobe for shift register 2 (at address F712).                                                                                                         |
| LOADX-0          | A8-1;A8-4                | Decoded write strobe for the X axis register (at address F70C). (NOTE: There is another signal called LOADX-0 on the Video Controller board, see second definition.) |
| LOADX-0          | A7A1-1;A7A1-4            | Load the X-Cursor register.                                                                                                                                          |
| LOADX-1          | A8-4;A-5                 | A positive logic version of the decoded write strobe for the X axis register (at address F70C).                                                                      |

## SIGNALS LIST

| Signal                | Source;Destination                       | Explanation                                                                                                                                                                                                                                                                               |
|-----------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LOADY-0               | A8-1;A8-4                                | Decoded write strobe for the Y axis register (at address F70A). NOTE: There is another signal called LOADY-0 on the Video Controller board, see second definition.                                                                                                                        |
| LOADY-0               | A7A1-1;A7A1-4                            | Load the Y-Cursor register.                                                                                                                                                                                                                                                               |
| LOCK-0                | A2A1-1;A2A1-1, J104                      | If LOCK-0 is low, it indicates that other system bus masters may not take control of the bus from the Processor board. This signal is manipulated by a "lock" prefix to any firmware instruction.                                                                                         |
| LS2-0 thru LS0-0      | A2A1-2;A2A1-1, 3, 5                      | Latched Status 0 through 2. These signals are the latched outputs of the MPU S0 – S2 signals. S0 – S2 indicate what state the MPU is in: interrupt acknowledge, read I/O, write I/O, halt, code access, read memory, or write memory.                                                     |
| M-1                   | A9-2;A9-4                                | A pull-up line to + 5 volts.                                                                                                                                                                                                                                                              |
| M1-1 & M0-0           | A8-2;A8-5                                | Two state sequencer signals which, after buffering through two levels of latches, become MODE0-0 and MODE1-0 on the Display Bus.                                                                                                                                                          |
| MAKECOPY-0            | A7A1-1;HCU                               | Caused by the host or the Hard Copy Key going low. Initiates hard copy cycle (makes a copy). Requires ground closure of TTL low for more than 1 ms.                                                                                                                                       |
| MAP-0                 | A8-2;A8-2<br>(Internal to the schematic) | Output of the micro-opcode decode ROM which enables the outputs of the opcode register.                                                                                                                                                                                                   |
| MAP-0                 | A9-4;A7A1-4, A10-6                       | Map write select. MAP-0 acts to disable the VID3-1 output as the map is being written.                                                                                                                                                                                                    |
| MC2-1, MC1-1, & MC0-1 | A8-2;A8-5                                | Memory Control.<br>These signals act as a three-bit control field from the state controller. These signals then select the mode for the memory control logic.                                                                                                                             |
| MDEN-1                | J104;A2A1-3                              | Memory Data Enable.<br>When driven low, this signal disables data drivers on the Processor board.                                                                                                                                                                                         |
| MODE0-1 and MODE1-1   | A8-5;A9-1, A10-1                         | The four states of these "mode bits" define the memory cycles as follows:<br>00 (0) defines operate, 01 (1) defines block move from source, 10 (2) defines blockmove to destination, and 11 (3) defines processor read cycles. NOTE: MODE0-1 is the least significant bit.                |
| MP4-0 thru MP0-0      | A8-5;A9-1, A10-1                         | Pixel (addressable latch) address for memory planes. MP4-0 thru MP0-0 originates in the Vector Generator board and is used to latch the PDAT bits and RAS mask for a 20-bit RAM word. During a block move, the address lines become five lines that mask the five zones in a 20-bit word. |
| MRDC-0                | A2A1-2;A2A1-1, A4A1-1, A6-1              | Memory Read Command.<br>MRDC-0 instructs memory to release data to the system bus.                                                                                                                                                                                                        |
| MRQST-0               | A8-5;A8-5<br>(Internal to the schematic) | Memory Request.<br>A signal from the memory control logic that requests a vector generator memory cycle. This signal becomes the Display Bus signal VRQST-0 after passing through a buffer latch.                                                                                         |



SIGNALS LIST

| Signal           | Source;Destination       | Explanation                                                                                                                                                                                                                                                                                                                                           |
|------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MVIDEO           | A7A1-4;A12-1             | Monitor video signal.<br>MVIDEO is the output taken from the four digital to analog converter lines DAC0-1 thru DAC3-1. MVIDEO becomes the VIDEO signal line on the Deflection Amplifier board.                                                                                                                                                       |
| MWTC-0           | A2A1-2;P101              | Memory Write Command.<br>This signal indicates that memory should latch and store data on the system bus.                                                                                                                                                                                                                                             |
| MX0-0 thru MX4-0 | A7A1-3, A8-4;A9-3, A10-4 | Multiplier X axis data.<br>Latched data to the Memory Address Selector.                                                                                                                                                                                                                                                                               |
| MY0-0 thru MY8-0 | A7A1-3, A8-4;A9-3, A10-4 | Multiplier Y axis data.<br>Latched data to the Memory Address Selector.                                                                                                                                                                                                                                                                               |
| N19-1 thru N0-1  | A10-2;A10-6              | N19-1 thru N0-1 on the Dual Plane Raster Memory board has the same function as L19-1 thru L0-1 on the Single Plane Raster Memory board (pixel data bits; see L19-1 thru L0-1).                                                                                                                                                                        |
| NEWDAT-0         | A8-5;A8-2                | New Data.<br>This signal indicates a value has been written into the index file by the 8086. It is set true by the I/O write, and set false by COAT-0.                                                                                                                                                                                                |
| NEWSR-0          | A8-5;A8-2                | New Shift Register.<br>A Signal which indicates that an I/O write to shift register 1 has occurred.                                                                                                                                                                                                                                                   |
| NMI-0            | J104;A2A1-1              | Non-Maskable Interrupt.<br>This is the non-maskable interrupt for the 8086 microprocessor. The 4112 system does not use it, but it is available for use by a test device via J104.                                                                                                                                                                    |
| NMI-1            | A2A1-1;J104              | Non-Maskable Interrupt.<br>This is NMI-0 inverted.                                                                                                                                                                                                                                                                                                    |
| NRFND-0          | A8-5;A7A1-1, A9-1        | Not ready for new data.<br>NRFND-0 is a signal from the Vector Generator to signal that it is not ready for new data.                                                                                                                                                                                                                                 |
| OBADR-0          | A2A1-3;A2A1-1, 2         | On-Board Address.<br>OBADR-0 indicates that the 8086 microprocessor is accessing a device on the Processor board.                                                                                                                                                                                                                                     |
| OBDEN-0          | A2A1-3;A2A1-2            | On-Board Data Enable.<br>OBDEN enables the data transceivers during an on-board data access.                                                                                                                                                                                                                                                          |
| OBINTA-0         | A2A1-2;A2A1-1, 3         | On-Board Interrupt Acknowledge.<br>OBINTA-0 indicates that the programmable interrupt counter is generating an interrupt vector address.                                                                                                                                                                                                              |
| OBIOX&X-0        | A2A1-3;A2A1-1, 2, 4, 5   | On-Board I/O (select) signals.<br>Local address lines A0, A2, and A3 select one of eight signals: OBIO0&F, OBIO1&E, OBIO2&B, OBIO3&A, OBIO4&7, OBIO5&6, OBIO6&3, and OBIO7&2. These are used to enable the RCI, PT&BRG, IC, KC, BTD, or SI blocks. These signals are selected during Processor board I/O reads and writes to X'00E0' through X'00EF'. |
| OBRAM-0          | A2A1-3;A2A1-4            | On-Board RAM.<br>OBRAM-0 enables the CMOS RAM for a READ or WRITE operation.                                                                                                                                                                                                                                                                          |

## SIGNALS LIST

| Signal         | Source;Destination                       | Explanation                                                                                                                                                                                                                                             |
|----------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OBROM-0        | A2A1-3;A2A1-1                            | On-Board ROM.<br>OBROM-0 enables the 32K of ROM on the Processor board for READ operations.                                                                                                                                                             |
| OUT-0          | A5-1;A4A1-2, 1<br>A5-1;A6-2              | OUT-0 is used with IN-0 to indicate the presence or absence of a RAM Array board.                                                                                                                                                                       |
| OUT0-1         | A2A1-5;A2A1-1                            | Output 0.<br>OUT0-1 is the output of a 16-bit programmable down counter. This provides variable timing delays for the system firmware. In the bus timeout detector block, OUT0-1 clocks the bus timeout counter whose output to the system bus is ACK1. |
| PO-0 thru P2-0 | A9-1;A9-2<br>A10-1;A10-2, 3              | Decoded MP3-0 and MP4-0 signals used for the three addressable latch clocks.                                                                                                                                                                            |
| PAUSE-1        | A7A1-3;A7A1-2                            | Causes the 50 MHz clock to stop. PAUSE-1 enables the video controller to sync to an external sync signal.                                                                                                                                               |
| PCARRY-0       | A8-5;A8-5<br>(Internal to the schematic) | Pixel Carry.<br>Carry out of the pixel counter (an input to the counter control logic).                                                                                                                                                                 |
| PCLK-1         | A7A1-2;A7A1-1                            | Power Supply synchronizer clock.                                                                                                                                                                                                                        |
| PDAT0-1        | A8-5;A9-1                                | Raster Memory plane 0 RAM data bit input line. (PDAT0-1 is always tied high. It is reserved for future use.)                                                                                                                                            |
| PDAT1-1        | A8-5;A9-1, A10-2, 3                      | Raster Memory plane 1 RAM data bit input line (tied high if there is no Dual Plane Raster Memory board present).                                                                                                                                        |
| PDAT2-1        | A8-5;A9-2                                | Raster Memory plane 2 RAM data bit input line.                                                                                                                                                                                                          |
| PINH-0         | A8-5;A8-5<br>(Internal to the schematic) | Pipelined Inhibit.<br>The PZERO-0 signal from the 12-bit counter qualified by ZENB-0 signal from the state controller. PINH-0 also serves to warn the memory control logic of the end of a vector.                                                      |
| PIPELINE-0     | A8-2;A8-2<br>(Internal to the schematic) | The output of the micro-opcode decode ROM which enables the outputs of the pipeline address latch.                                                                                                                                                      |
| PIX-1/MSK-0    | A8-2;A8-5                                | This state controller signal selects either the pixel counter or mask file data to send to the Display Bus.                                                                                                                                             |
| PIXCNTENB-0    | A8-5;A8-5<br>(Internal to the schematic) | Pixel Counter Enable.<br>Output of the counter control logic. This signal enables the pixel counter to count.                                                                                                                                           |
| PLATCH-0       | A9-1;A9-4<br>A10-1;A10-6                 | Processor Latch.<br>This latch is used to latch the pixel data into the processor read data latches.                                                                                                                                                    |
| POP8-0         | A8-2;A8-1                                | POP the 8-bit counter value. This state controller signal loads the 8-bit counter with the value contained in its buffer latch (the last value written by I/O).                                                                                         |
| POPX-0         | A8-2;A8-4                                | POP X Axis value.<br>This state controller signal loads the X axis register with the last value written by I/O.                                                                                                                                         |
| PREADH-0       | A9-4;A9-4<br>(Internal to the schematic) | Processor Read Latch (high byte enable).<br>A high will enable one of the three processor read latches.                                                                                                                                                 |
| PREADL-0       | A9-4;A9-4<br>(Internal to the schematic) | Processor Read Latch (low byte enable).<br>A high will enable two of the three processor read latches.                                                                                                                                                  |

## SIGNALS LIST

| Signal              | Source;Destination                       | Explanation                                                                                                                                                                                                                                                                                       |
|---------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PRQST-1             | A8-5;A8-5<br>(Internal to the schematic) | Pixel Request.<br>A signal which requests a pixel write (this may or may not result in a PWRT-0 on the Display Bus, depending on the operating mode of the index file).                                                                                                                           |
| PSYNC-1             | A7A1-1;A14-1                             | Power supply sync pulse.                                                                                                                                                                                                                                                                          |
| PWRT-0              | A8-5;A9-1, A10-1                         | Write pulse for the data and RAS addressable latch (see ALL-1).                                                                                                                                                                                                                                   |
| PZERO-0             | A8-2;A8-5                                | Pipelined Zero.<br>This signal is the zero count signal from the 12-bit counter delayed one clock cycle.                                                                                                                                                                                          |
| Q19-1 thru Q0-1     | A9-3, 4;A9-2<br>A10-5;A10-3              | Outputs of video shift registers and memory array. Acts as 20 bits of RAM output data.                                                                                                                                                                                                            |
| QC-1                | A9-4;A9-4<br>(Internal to the schematic) | Video output of the shift register.                                                                                                                                                                                                                                                               |
| QS0-1 and QS1-1     | A2A1-1;J104                              | Queue Status 0 and 1.<br>QS0-1 and QS1-1 are direct outputs of the microprocessor that are not used on the Processor board.                                                                                                                                                                       |
| QUAL-0              | A8-2;A8-2<br>(Internal to the schematic) | Qualifier.<br>A State Controller signal that serves as a scope or logic analyzer trigger.                                                                                                                                                                                                         |
| R19-1 thru R0-1     | A10-4, 6;A10-2                           | R19-1 thru R0-1 on the Dual Plane Raster Memory board has the same function as Q19-1 thru Q0-1 on the Single Plane Raster Memory board (acts as 20 bits of RAM output data).                                                                                                                      |
| RA0-1 thru RA6-1    | A4A1-1;A4A1-2, A5-1<br>A6-1;A6-2, A5-1   | RAM Address bits 0 through 6.<br>These signals are the seven multiplex row and column addresses from the dynamic RAM controller to the dynamic RAMs on the RAM Array board.                                                                                                                       |
| RAMWRITE-0          | A4A1-1;A4A1-2                            | RAMWRITE-0 indicates to the Dynamic RAM Controller and the data input receivers on the RAM/ROM board that a RAM write operation has been requested.                                                                                                                                               |
| RAS-0               | A4A1-1;<br>A4A1-2;A5-1                   | Row Address Strobe.<br>RAS-0 is generated by the Dynamic RAM Controller on the RAM/ROM board. RAS-0 strobes the seven multiplexed row address bits appearing on RA0-1 thru RA6-1 into the RAMs on the RAM Array board.                                                                            |
| RAS-1               | A7A1-2;A9-1, A10-1                       | Row Address Strobe.<br>RAS-1 originates in the RAM timing generator and is used to strobe the RAMs.                                                                                                                                                                                               |
| RAS0-0 thru RAS19-0 | A9-1;A9-3<br>A10-1;A10-4, 5              | Row Address Strobe.<br>Strobe for the dynamic RAMs.                                                                                                                                                                                                                                               |
| RAS0-0 thru RAS3-0  | A6-1;A6-2                                | Row Address Strobe 0 through 3.<br>These signals are generated by the Dynamic RAM Controller on the RAM Controller board. RAS0-0 thru RAS3-0 strobe the seven multiplexed row address bits appearing on RA0-1 thru RA6-1 into the RAMs on the appropriate RAM Array board (RAM Bank 0 through 3). |
| RCLK-1              | P102;A2A1-5                              | Receive Clock.<br>RCLK-1 is an RS-232 external clock signal generated by a modem or other external device. RCLK-1 can be used to clock data into the Processor board's UART.                                                                                                                      |

## SIGNALS LIST

| Signal         | Source;Destination            | Explanation                                                                                                                                                                            |
|----------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RD-0           | A2A1-1;A2A1-2, 4, 5           | Read.<br>If RD-0 is low, it indicates the microprocessor is performing an I/O or memory read cycle, either to the local or system bus.                                                 |
| RDATA-1        | P102;A2A1-5                   | Received Data.<br>RDATA-1 is the RS-232 serial data input from a modem or other external device to the Processor board.                                                                |
| RDIS-0         | J357;A8-2                     | ROM Disable<br>RDIS-0 is a square pin test signal on J357-4. When RDIS-0 is tied low, the outputs of the microcode ROMs will be tristated.                                             |
| RDY-1          | J104;A2A1-1                   | Ready.<br>RDY-1 is the 8086 microprocessor RDY signal output to test connector J104.                                                                                                   |
| RDYAND-0       | J104;A2A1-1                   | Ready And.<br>RDYAND-0 is an input from a test device connected to J104 that can disable the RDY line to the MPU, causing the MPU to enter a WAIT state.                               |
| RDYOR-0        | J104;A2A1-1                   | Ready Or.<br>RDYOR-0 is an input from a test device connected to J104 that can activate the RDY line to the MPU, causing the MPU to exit a WAIT state.                                 |
| READ-0         | A4A1-1;A4A1-3                 | READ-0 is the buffered version of the system bus signal MRDC.                                                                                                                          |
| REF-0          | A7A1-2;A9-1, A10-1            | Indicates that a screen refresh memory cycle is taking place.                                                                                                                          |
| RENB-0         | A7A1-2;A7A1-3                 | Enable signal for screen refresh Memory Buffer.                                                                                                                                        |
| RESET-0        | A7A1-3;A7A1-1, 4<br>J357;A8-1 | Logic reset pulse.<br>RESET-0 is generated when INIT-0 is received from the 8086 bus. RESET-0 also appears on J357-5 and can be used to reset the logic on the Vector Generator board. |
| RING-1         | P102;A2A1-5                   | RING-1 is an RS-232 status input indicating that an auto-answering modem is ringing.                                                                                                   |
| ROMREAD-1      | A4A1-3;A4A1-1                 | ROMREAD-1 indicates that a ROM read operation is in progress. This signal is used to generate an acknowledge signal (ACK1 or ACK2) to the bus master.                                  |
| RQ-0/GT[0/1]-0 | A2A1-1;J104                   | Request/Grant.<br>RQ/GT0 is the local MPU bus request/grant signal. It is available to J104 test connector, but is not used on-board.                                                  |
| RST-0          | A2A1-1;A2A1-2, 4, 5           | Reset.<br>RST-0 is RST-1 inverted (see RST-1).                                                                                                                                         |
| RST-1          | A2A1-1;A2A1-5                 | Reset.<br>RST is derived from the system bus signal INIT-0 and is synchronized to the MPU clock. RST resets the MPU and other devices on the Processor board.                          |
| RTS-1          | A2A1-5;P102                   | Request To Send.<br>RTS-1 is an RS-232 signal generated by the RS232 Communications Interface block on the Processor board.                                                            |

## SIGNALS LIST

| Signal         | Source;Destination                       | Explanation                                                                                                                                                                                                                                                                                                                                                                      |
|----------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S0-0 thru S2-0 | A2A1-1;A2A1-2                            | Status 0 through 2.<br>These status lines have eight states taken together and indicate whether an interrupt acknowledge read I/O, write I/O, halt, code access, read memory, or write memory is occurring. The bus controller IC in the Bus Command Driver block interprets the S0-0, S1-0, and S2-0 signals and outputs INTA, IOWC, AIOWC, IORC, MRDC, MWTC, AMWC accordingly. |
| S7-1/BHE-0     | A2A1-1;A2A1-2                            | Status 7/Byte High Enable.<br>This signal is interpreted as BHE-0 during the MPU state T1. It enables D8 – D15 onto the local data bus. During T2, T3, or T4 this signal is interpreted as S7-1.                                                                                                                                                                                 |
| SACK-0         | A8-1;A7A1-1, A9-1                        | Synchronized system acknowledge.<br>SACK-0 originates at the Vector Generator board and is used to synchronize the I/O writes from the 8086 to the Vector Generator state machine.                                                                                                                                                                                               |
| SCANSYNC-1     | A7A1-2;P281                              | Scan sync pulse.<br>SCANSYNC-1 originates in the Pixel timing block and is used on the External Video board to synchronize the horizontal scanning of the External Video board with the Video Controller.                                                                                                                                                                        |
| SDCD-1         | P102;A2A1-5                              | Secondary Data Carrier Detect.<br>SDCD-1 is the RS-232 secondary data carrier detect signal.                                                                                                                                                                                                                                                                                     |
| SENSE-1        | A8-2;A8-2<br>(Internal to the schematic) | A state controller signal that controls the sense (inversion) of the selected test condition.                                                                                                                                                                                                                                                                                    |
| SHIFTENB-0     | A8-5;A8-5<br>(Internal to the schematic) | Shift Enable.<br>Output of the counter control logic. This signal enables the pattern shift registers to rotate.                                                                                                                                                                                                                                                                 |
| SINIT-0        | A8-1;A8-2                                | System initialize.<br>Reset for the state sequencer. This is the logical "OR" of the (1) bus reset (RESET-0) and (2) software reset (I/O write to address F71E) signals.                                                                                                                                                                                                         |
| SLOW-0         | A7A1-3;A7A1-2                            | Causes the DCRY-1 signal to go at one half the normal rate (for external scan time during vertical sync).                                                                                                                                                                                                                                                                        |
| SR1READ-0      | A8-1;A8-5                                | Decoded read strobe for shift register 1 (at address F710).                                                                                                                                                                                                                                                                                                                      |
| SR2READ-0      | A8-1;A8-5                                | Decoded read strobe for shift register 2 (at address F712).                                                                                                                                                                                                                                                                                                                      |
| SRTSA-1        | A2A1-5;P102                              | Secondary Request To Send (RS-232A).<br>SRTSA-1 is the RS-232A secondary request to send output. SRTS is defined on a different connector pin for RS-232C, and so is strappable on the board.                                                                                                                                                                                    |
| SRTSC-1        | A2A1-5;P102                              | Secondary Request To Send (RS-232C).<br>SRTSC-1 is the RS-232C counterpart to SRTSA-1 above.                                                                                                                                                                                                                                                                                     |
| STATEN-0       | A2A1-5;A2A1-1                            | Status Enable.<br>STATEN-0 is low during an MPU read of status at I/O location X'00ED' or X'00EF'.                                                                                                                                                                                                                                                                               |
| STEST-0        | A14-1;A2A1-5, A7A1-3                     | Self Test.<br>STEST-0 is a line on the system bus which the processor can read via a 3-state driver. The line is low when the Self-Test button is pressed.                                                                                                                                                                                                                       |

## SIGNALS LIST

| Signal          | Source;Destination                       | Explanation                                                                                                                                                                                                                                                 |
|-----------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T3W4-1          | A2A1-1;A2A1-3                            | (State) T3, Wait, 4.<br>T3W4-1 is high when the MPU is in a T3, T4, or TW (WAIT) state. T3W4-1 enables on-board data transceivers.                                                                                                                          |
| T4I-0           | A2A1-1;A2A1-3                            | (State) T4, Idle.<br>T4I-0 is low during MPU T4 and TI (idle) states. It turns off data transceivers during T4 in on-board memory and I/O READs.                                                                                                            |
| TBLANK-0        | A7A1-3;A7A1-2                            | TTL level composite blank.                                                                                                                                                                                                                                  |
| TCLK-1          | P102;A2A1-5                              | Transmit Clock.<br>TCLK-1 is the RS-232 transmit clock output from the Processor board.                                                                                                                                                                     |
| TDATA-1         | A2A1-5;P102                              | Transmitted Data.<br>TDATA-1 is the RS-232 signal on which serial data is transmitted from the Processor board.                                                                                                                                             |
| TEQ-1           | A8-2;A8-2<br>(Internal to the schematic) | Test Equal.<br>A state controller signal that allows the EQUAL-1 signal from the Display Bus to be tested by the state controller (used by the video memory test).                                                                                          |
| TEST SIG        | P586;A12-1                               | TEST SIG causes a blank illuminated screen. TEST SIG comes from the Video Controller board under the name of STEST-0 (self test).                                                                                                                           |
| TEST-0          | J104;A2A1-1                              | TEST-0 is an input to the processor. It is available at pin 50 on the test connector, but is not used on-board (see second definition).                                                                                                                     |
| TEST-0          | A7A1-1;A8-5, A9-1, A10-1                 | TEST-0 puts the Raster Memory boards into test mode.                                                                                                                                                                                                        |
| TEST-1          | A2A1-5;A2A1-1                            | TEST-1 is a signal that the processor can set to enable the Clock Generator to locally terminate an on-board or off-board READ or WRITE operation. The signal is used for testing purposes, and is similar in function to the Bus Timeout Detector circuit. |
| TESTCONDITION-1 | A8-2;A8-2<br>(Internal to the schematic) | The output of the test condition mux, test gate, and delay flip-flop that acts as an input to the micro-opcode decode ROM. This signal allows conditional opcodes to "make a choice" between two actions.                                                   |
| TF1-0 & TF2-0   | A8-5;A8-2                                | Test Flags 1 & 2.<br>Two general purpose flags from the high byte of the index file register. These signals are used by the 8086 to direct the Vector Generator during some routines. These flags can be tested by the state controller.                    |
| TIMERINT-0      | A2A1-5;A2A1-2                            | Timer Interrupt.<br>TIMERINT-0 indicates the presence of either a Programmable Interval timer1 interrupt, a UART TXEMT interrupt, a UART TXRDY interrupt, an RS-232 status change interrupt, or an Programmable Interval TIMER0 interrupt (via RSCD).       |
| TIMR1-1         | A2A1-5;A2A1-1                            | Timer 1.<br>This signal is output from the O1 output (pin 13) of the Programmable Interval Timer. O1 is the output of a 16-bit programmable down counter.                                                                                                   |
| TXC-0           | A2A1-5;P102                              | Transmit Clock.<br>TXC is the buffered output of the Programmable Interval Timer 1 to the RS-232 connector. It is not presently used.                                                                                                                       |

## SIGNALS LIST

| Signal             | Source;Destination                       | Explanation                                                                                                                                                                                                                                                                        |
|--------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UBCLK-1            | A2A1-1;A2A1-4, 5                         | Unbuffered Bus Clock.<br>UBCLK-1 is a 4.9152 MHz square wave clock provided to clock the UART and peripheral interface microprocessor.                                                                                                                                             |
| VACK-0             | A7A1-2;A9-1, A10-1                       | Acknowledges that a memory cycle has been granted.                                                                                                                                                                                                                                 |
| VBUSY-0            | A8-2;A9-1                                | Vector Generator busy.                                                                                                                                                                                                                                                             |
| VCLK-0             | A7A1-2;A8-3, A9-1                        | Clock for the Vector Generator.                                                                                                                                                                                                                                                    |
| VDRIVE-0           | A9-1;P381                                | Tied high if no External Video board is installed.                                                                                                                                                                                                                                 |
| VENB-0             | A7A1-2;A8-4, A9-1, A10-1                 | Enables the Vector Generator memory address buffers.                                                                                                                                                                                                                               |
| VENB-1             | A9-1;A9-2<br>A10-1;A10-2, 3              | Vector Enable.<br>VENB-1 is high when the RAM cycle is doing any type of Vector Generator function.                                                                                                                                                                                |
| VERT SYNC          | A7A1-3;A12-1                             | VERT SYNC controls the timing of the vertical scan and return of the beam on the crt. VERT SYNC is a direct line from VSYNC-0 on the Video Controller board.                                                                                                                       |
| VGADR-0            | A7A1-1;A8-1, A9-4, A10-6                 | The decoded most significant five bits of the raster I/O Address.                                                                                                                                                                                                                  |
| VGRDY-1            | P280;A7A1-1                              | Vector Generator ready status signal.                                                                                                                                                                                                                                              |
| VID3-1             | A7A1-4;P281                              | Video bits.                                                                                                                                                                                                                                                                        |
| VID3-1 thru VID0-1 | A7A1-4, A9-4;A10-6                       | Video Controller board cursor video output (VID3-1) and Raster Memory planes data bit input lines.                                                                                                                                                                                 |
| VIDEO              | A7A1-4;HCU                               | Hard copy video signal.                                                                                                                                                                                                                                                            |
| VIDEO              | A7A1-4;A12-1                             | VIDEO turns the crt electron beam on or off and controls the grey scales. VIDEO is a direct line from MVIDEO on the Vector Generator board (see MVIDEO).                                                                                                                           |
| VRQST-0            | A8-5;A7A1-2, A9-1                        | Request from the Vector Generator to the Video Controller for a memory cycle.                                                                                                                                                                                                      |
| VSYNC-0            | A7A1-3;A7A1-1, P281                      | Vertical synchronizing signal.                                                                                                                                                                                                                                                     |
| VTIME-0            | A7A1-1;A7A1-4                            | Vertical retrace time.                                                                                                                                                                                                                                                             |
| W1-0 thru W4-0     | A9-1;A9-3<br>A10-1;A10-4, 5              | Write pulse for RAMs.                                                                                                                                                                                                                                                              |
| WAIT-1             | A8-2;A8-1                                | This state controller signal can delay the syncing of the write pulse. If the write pulse is delayed by WAIT-1 this delays SACK-0, thereby delaying the acknowledge to the 8086. This operation can allow the Vector Generator to sync the 8086 to the Vector Generator operation. |
| WALU0-0            | A9-4;A9-1, 2<br>A10-6;A10-1, 2, 3        | A clock pulse that latches the ALU mode latch and the write enable latch.                                                                                                                                                                                                          |
| WBORDER-0          | A9-4;A9-4<br>(Internal to the schematic) | Write Border Latch.<br>Output of I/O Decode section. This signal acts as a clock for the flip-flop of the video shift register.                                                                                                                                                    |
| WELSB-0            | A4A1-1;A4A1-2, A5-1<br>A6-1;A6-2, A5-1   | Write Enable Least Significant Byte.<br>WELSB-0 is a control strobe to the RAM Array board indicating that a write operation to the least significant byte of RAM is in progress.                                                                                                  |

## SIGNALS LIST

| Signal          | Source;Destination                     | Explanation                                                                                                                                                                                                  |
|-----------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WEMSB-0         | A4A1-1;A4A1-2, A5-1<br>A6-1;A6-2, A5-1 | Write Enable Most Significant Byte.<br>WEMSB is a control strobe to the RAM Array board indicating that a write operation to the most significant byte of RAM is in progress.                                |
| WENB-1          | A9-1;A9-4<br>A10-1;A10-6               | Write Enable status bit for Self-Test. Output of flip-flop in the RAM control section.                                                                                                                       |
| WR-1            | A7A1-2;A9-1, A10-1                     | WR-1 originates in the RAM timing generator and is the write enable signal for the RAMs.                                                                                                                     |
| WWENB-1         | A10-1;A10-6                            | Write enable status bit for Self-Test. Output of flip-flop in the RAM control section. WWENB-1 is only used on the Dual Plane Raster Memory board and corresponds to WENB-1.                                 |
| X19-1 thru X0-1 | P382;A9-2, A10-3                       | Not currently used.                                                                                                                                                                                          |
| XACK-0          | A4A1-1;A4A1-2<br>A6-1;A6-2             | Transfer Acknowledge.<br>The Dynamic RAM Controller generates XACK-0 to acknowledge that a RAM read or write operation is in progress. This signal latches the RAM output data into the data output latches. |
| XCARRY-0        | A8-4;A8-5                              | Carry out of the X register.                                                                                                                                                                                 |
| XCLK-0          | P129;A4A1-1<br>P166;A6-1               | External Clock.<br>When the clock circuitry is disabled using CLKDIS-0, an external TTL clock signal may be fed into XCLK to control the Dynamic RAM Controller (this is a test point for factory use only). |
| XCNTENB-0       | A8-5;A8-1, 4                           | X Counter Enable.<br>This is a state controller signal that enables the X axis register to count and causes the first signal to go false.                                                                    |
| XEN-0           | A9-1;A7A1-3, A7A1-1                    | External sync mode enable.<br>From the External Video board to the Video Controller board. XEN-0 is tied high if there is no External Video board in place.                                                  |
| XENB-1          | A8-3;A8-5                              | X Enable.<br>The slope generator output that signifies that the X axis should be counted on the next cycle. This signal interfaces with the counter control logic.                                           |
| XHSYNC-0        | A9-1;A7A1-3                            | External horizontal sync.<br>From the External Video board to synchronize the Video Controller's horizontal sync to an external source. Tied high if there is no External Video board attached.              |
| XIN-1           | A8-4;A8-5                              | A signal that means that the 3 most significant bits of the X axis register are zero. This signifies that the X position is in the physical screen.                                                          |
| XLD-0           | A8-4;A8-1, 5                           | X Load.<br>This signal loads the X axis counter and Pixel counter with the value in the buffer latch (the last value written by I/O). It also sets FIRST-0 true.                                             |
| XLOAD-0         | P381;A9-1                              | External sync pulse change signal (not currently used).                                                                                                                                                      |
| XNEXT-0         | A8-3;J350                              | Inverted XENB-1 signal (for test purposes).                                                                                                                                                                  |
| XREAD-0         | A8-1;A8-4, 5                           | Decoded read strobe for the X axis register (at address F70C).                                                                                                                                               |
| XSIGN-0         | A8-3;A8-4, 5                           | Signal from the axis control register that determines which direction the X counter will count.                                                                                                              |



## SIGNALS LIST

| Signal          | Source;Destination | Explanation                                                                                                                                                                                        |
|-----------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XSIGN-1         | A8-3;J350          | Inverted version of XSIGN-0 (for test purposes).                                                                                                                                                   |
| XTRA-1          | A5-1;none          | Extra.<br>XTRA-1 is an extra line of the RAM Array board that is currently not used.                                                                                                               |
| XVSYNC-0        | A9-1;A7A1-3        | External vertical sync.<br>From the External Video board to synchronize the Video Controller board's vertical sync to an external source. Tied high if there is no External Video board installed. |
| Y19-1 thru Y0-1 | P402;A10-2         | Not currently used.                                                                                                                                                                                |
| Y-1/-0          | A8-2;A8-4          | This is a state sequencer signal that selects either the Y axis or delta Y axis to be sent to the Display Bus.                                                                                     |
| YCONTENB-0      | A8-5;A8-4          | Y Counter Enable.<br>Output of counter control logic which enables the Y axis register to count.                                                                                                   |
| YENB-1          | A8-3;A8-5          | Y Enable.<br>The slope generator output that signifies the Y axis should be counted on the next cycle.                                                                                             |
| YIN-0           | A8-4;A8-5          | A signal that means that the 3 most significant bits of the Y axis register are zero. This signifies that the Y position is in the physical screen.                                                |
| YNEXT-0         | A8-3;J350          | Inverted YENB-1 signal (for test purposes).                                                                                                                                                        |
| YREAD-0         | A8-1;A8-4          | Decoded read strobe for the Y axis register (at address F70A).                                                                                                                                     |
| READ-0          | A8-1;A8-4          | Decoded read strobe for the delta Y axis register (at address F708).                                                                                                                               |
| YSIGN-0         | A8-3;A8-4          | Signal from the axis control register that determines which direction the Y and delta Y counters will count.                                                                                       |
| YSIGN-1         | A8-3;J350          | Inverted version of YSIGN-0 (for test purposes).                                                                                                                                                   |
| ZENB-0          | A8-2;A8-5          | Zero Enable.<br>This state controller signal enables two zero detect signals (ZERO-0 and PZERO-0).                                                                                                 |
| ZERO-0          | A8-2;A8-5          | This signal indicates the 12-bit counter is zero. Testable by the state controller and also used to end a vector through hardware.                                                                 |

# Appendix B

## ASCII CHARTS

This appendix includes a standard ASCII code chart and additional ASCII code charts which define the specific characters used as parameters (indicated by unshaded areas).

The code charts are:

### Table Description

- B-1 ASCII Code Chart
- B-2 Characters Used in <Char> Parameters
- B-3 Characters Used in <Int> and <Int+> Parameters

- B-4 Characters Used in <Int-Report> Parameters
- B-5 Characters Used in <Xy> Parameters
- B-6 Characters Used in <Xy-Report> Parameters
- B-7 United Kingdom Character Set
- B-8 Swedish Character Set
- B-9 Danish/Norwegian Character Set
- B-10 APL Character Set

**Table B-1**  
**ASCII CODE CHART**

| BITS |    | 0 0     |    | 0 0 1 |     | 0 1 0   |    | 0 1 1 |    | 1 0 0     |              | 1 0 1 |  | 1 1 0     |  | 1 1 1 |  |
|------|----|---------|----|-------|-----|---------|----|-------|----|-----------|--------------|-------|--|-----------|--|-------|--|
| B7   | B6 | CONTROL |    |       |     | FIGURES |    |       |    | UPPERCASE |              |       |  | LOWERCASE |  |       |  |
| B4   | B3 | B2      | B1 |       |     |         |    |       |    |           |              |       |  |           |  |       |  |
| 0    | 0  | 0       | 0  | NUL   | DLE | SP      | 0  | @     | P  | \         | p            |       |  |           |  |       |  |
|      |    |         |    | 0     | 16  | 32      | 48 | 64    | 80 | 96        | 112          |       |  |           |  |       |  |
| 0    | 0  | 0       | 1  | SOH   | DC1 | !       | 1  | A     | Q  | a         | q            |       |  |           |  |       |  |
|      |    |         |    | 1     | 17  | 33      | 49 | 65    | 81 | 97        | 113          |       |  |           |  |       |  |
| 0    | 0  | 1       | 0  | STX   | DC2 | "       | 2  | B     | R  | b         | r            |       |  |           |  |       |  |
|      |    |         |    | 2     | 18  | 34      | 50 | 66    | 82 | 98        | 114          |       |  |           |  |       |  |
| 0    | 0  | 1       | 1  | ETX   | DC3 | #       | 3  | C     | S  | c         | s            |       |  |           |  |       |  |
|      |    |         |    | 3     | 19  | 35      | 51 | 67    | 83 | 99        | 115          |       |  |           |  |       |  |
| 0    | 1  | 0       | 0  | EOT   | DC4 | \$      | 4  | D     | T  | d         | t            |       |  |           |  |       |  |
|      |    |         |    | 4     | 20  | 36      | 52 | 68    | 84 | 100       | 116          |       |  |           |  |       |  |
| 0    | 1  | 0       | 1  | ENQ   | NAK | %       | 5  | E     | U  | e         | u            |       |  |           |  |       |  |
|      |    |         |    | 5     | 21  | 37      | 53 | 69    | 85 | 101       | 117          |       |  |           |  |       |  |
| 0    | 1  | 1       | 0  | ACK   | SYN | &       | 6  | F     | V  | f         | v            |       |  |           |  |       |  |
|      |    |         |    | 6     | 22  | 38      | 54 | 70    | 86 | 102       | 118          |       |  |           |  |       |  |
| 0    | 1  | 1       | 1  | BEL   | ETB | /       | 7  | G     | W  | g         | w            |       |  |           |  |       |  |
|      |    |         |    | 7     | 23  | 39      | 55 | 71    | 87 | 103       | 119          |       |  |           |  |       |  |
| 1    | 0  | 0       | 0  | BS    | CAN | (       | 8  | H     | X  | h         | x            |       |  |           |  |       |  |
|      |    |         |    | 8     | 24  | 40      | 56 | 72    | 88 | 104       | 120          |       |  |           |  |       |  |
| 1    | 0  | 0       | 1  | HT    | EM  | )       | 9  | I     | Y  | i         | y            |       |  |           |  |       |  |
|      |    |         |    | 9     | 25  | 41      | 57 | 73    | 89 | 105       | 121          |       |  |           |  |       |  |
| 1    | 0  | 1       | 0  | LF    | SUB | *       | :  | J     | Z  | j         | z            |       |  |           |  |       |  |
|      |    |         |    | 10    | 26  | 42      | 58 | 74    | 90 | 106       | 122          |       |  |           |  |       |  |
| 1    | 0  | 1       | 1  | VT    | ESC | +       | ;  | K     | I  | k         | {            |       |  |           |  |       |  |
|      |    |         |    | 11    | 27  | 43      | 59 | 75    | 91 | 107       | 123          |       |  |           |  |       |  |
| 1    | 1  | 0       | 0  | FF    | FS  | ,       | <  | L     | \  | l         | l'           |       |  |           |  |       |  |
|      |    |         |    | 12    | 28  | 44      | 60 | 76    | 92 | 108       | 124          |       |  |           |  |       |  |
| 1    | 1  | 0       | 1  | CR    | GS  | -       | =  | M     | I  | m         | }            |       |  |           |  |       |  |
|      |    |         |    | 13    | 29  | 45      | 61 | 77    | 93 | 109       | 125          |       |  |           |  |       |  |
| 1    | 1  | 1       | 0  | SO    | RS  | .       | >  | N     | ^  | n         | ~            |       |  |           |  |       |  |
|      |    |         |    | 14    | 30  | 46      | 62 | 78    | 94 | 110       | 126          |       |  |           |  |       |  |
| 1    | 1  | 1       | 1  | SI    | US  | /       | ?  | O     | -  | o         | RUBOUT (DEL) |       |  |           |  |       |  |
|      |    |         |    | 15    | 31  | 47      | 63 | 79    | 95 | 111       | 127          |       |  |           |  |       |  |

\* 1 on some keyboards or systems

Table B-2  
 CHARACTERS USED IN <CHAR> PARAMETERS

| BITS |    |    |    | 00      |     | 001     |    | 010       |    | 011       |              | 100       |  | 101       |  | 110       |  | 111       |  |
|------|----|----|----|---------|-----|---------|----|-----------|----|-----------|--------------|-----------|--|-----------|--|-----------|--|-----------|--|
| B7   | B6 | B5 |    | CONTROL |     | FIGURES |    | UPPERCASE |    | UPPERCASE |              | UPPERCASE |  | UPPERCASE |  | UPPERCASE |  | UPPERCASE |  |
| B4   | B3 | B2 | B1 |         |     |         |    |           |    |           |              |           |  |           |  |           |  |           |  |
| 0    | 0  | 0  | 0  | NUL     | DLE | SP      | 0  | @         | P  | \         | p            |           |  |           |  |           |  |           |  |
|      |    |    |    | 0       | 16  | 32      | 48 | 64        | 80 | 96        | 112          |           |  |           |  |           |  |           |  |
| 0    | 0  | 0  | 1  | SOH     | DC1 | !       | 1  | A         | Q  | a         | q            |           |  |           |  |           |  |           |  |
|      |    |    |    | 1       | 17  | 33      | 49 | 65        | 81 | 97        | 113          |           |  |           |  |           |  |           |  |
| 0    | 0  | 1  | 0  | STX     | DC2 | "       | 2  | B         | R  | b         | r            |           |  |           |  |           |  |           |  |
|      |    |    |    | 2       | 18  | 34      | 50 | 66        | 82 | 98        | 114          |           |  |           |  |           |  |           |  |
| 0    | 0  | 1  | 1  | ETX     | DC3 | #       | 3  | C         | S  | c         | s            |           |  |           |  |           |  |           |  |
|      |    |    |    | 3       | 19  | 35      | 51 | 67        | 83 | 99        | 115          |           |  |           |  |           |  |           |  |
| 0    | 1  | 0  | 0  | EOT     | DC4 | \$      | 4  | D         | T  | d         | t            |           |  |           |  |           |  |           |  |
|      |    |    |    | 4       | 20  | 36      | 52 | 68        | 84 | 100       | 116          |           |  |           |  |           |  |           |  |
| 0    | 1  | 0  | 1  | ENQ     | NAK | %       | 5  | E         | U  | e         | u            |           |  |           |  |           |  |           |  |
|      |    |    |    | 5       | 21  | 37      | 53 | 69        | 85 | 101       | 117          |           |  |           |  |           |  |           |  |
| 0    | 1  | 1  | 0  | ACK     | SYN | &       | 6  | F         | V  | f         | v            |           |  |           |  |           |  |           |  |
|      |    |    |    | 6       | 22  | 38      | 54 | 70        | 86 | 102       | 118          |           |  |           |  |           |  |           |  |
| 0    | 1  | 1  | 1  | BEL     | ETB | /       | 7  | G         | W  | g         | w            |           |  |           |  |           |  |           |  |
|      |    |    |    | 7       | 23  | 39      | 55 | 71        | 87 | 103       | 119          |           |  |           |  |           |  |           |  |
| 1    | 0  | 0  | 0  | BS      | CAN | (       | 8  | H         | X  | h         | x            |           |  |           |  |           |  |           |  |
|      |    |    |    | 8       | 24  | 40      | 56 | 72        | 88 | 104       | 120          |           |  |           |  |           |  |           |  |
| 1    | 0  | 0  | 1  | HT      | EM  | )       | 9  | I         | Y  | i         | y            |           |  |           |  |           |  |           |  |
|      |    |    |    | 9       | 25  | 41      | 57 | 73        | 89 | 105       | 121          |           |  |           |  |           |  |           |  |
| 1    | 0  | 1  | 0  | LF      | SUB | *       | :  | J         | Z  | j         | z            |           |  |           |  |           |  |           |  |
|      |    |    |    | 10      | 26  | 42      | 58 | 74        | 90 | 106       | 122          |           |  |           |  |           |  |           |  |
| 1    | 0  | 1  | 1  | VT      | ESC | +       | ;  | K         | [  | k         | {            |           |  |           |  |           |  |           |  |
|      |    |    |    | 11      | 27  | 43      | 59 | 75        | 91 | 107       | 123          |           |  |           |  |           |  |           |  |
| 1    | 1  | 0  | 0  | FF      | FS  | ,       | <  | L         | \  | l         | l*           |           |  |           |  |           |  |           |  |
|      |    |    |    | 12      | 28  | 44      | 60 | 76        | 92 | 108       | 124          |           |  |           |  |           |  |           |  |
| 1    | 1  | 0  | 1  | CR      | GS  | -       | =  | M         | ]  | m         | }            |           |  |           |  |           |  |           |  |
|      |    |    |    | 13      | 29  | 45      | 61 | 77        | 93 | 109       | 125          |           |  |           |  |           |  |           |  |
| 1    | 1  | 1  | 0  | SO      | RS  | .       | >  | N         | ^  | n         | ~            |           |  |           |  |           |  |           |  |
|      |    |    |    | 14      | 30  | 46      | 62 | 78        | 94 | 110       | 126          |           |  |           |  |           |  |           |  |
| 1    | 1  | 1  | 1  | SI      | US  | /       | ?  | O         | _  | o         | RUBOUT (DEL) |           |  |           |  |           |  |           |  |
|      |    |    |    | 15      | 31  | 47      | 63 | 79        | 95 | 111       | 127          |           |  |           |  |           |  |           |  |

\* |  
 | on some keyboards or systems



Table B-4  
 CHARACTERS USED IN <INT-REPORT> PARAMETERS

<Hil-Report> Characters

| BITS |   | 0 0 0   | 0 0 1 | 0 1 0   | 0 1 1 | 1 0 0     | 1 0 1 | 1 1 0     | 1 1 1 |                 |
|------|---|---------|-------|---------|-------|-----------|-------|-----------|-------|-----------------|
| HEX  |   | CONTROL |       | FIGURES |       | UPPERCASE |       | LOWERCASE |       |                 |
| 0    | 0 | 0       | NUL   | DLF     | SP    | 0         | @     | P         | \     | p               |
| 0    | 0 | 1       | SOH   | DC1     | !     | 1         | A     | Q         | a     | q               |
| 0    | 0 | 1       | STX   | DC2     | "     | 2         | B     | R         | b     | r               |
| 0    | 0 | 1       | ETX   | DC3     | #     | 3         | C     | S         | c     | s               |
| 0    | 1 | 0       | EOT   | DC4     | \$    | 4         | D     | T         | d     | t               |
| 0    | 1 | 0       | ENQ   | NAK     | %     | 5         | E     | U         | e     | u               |
| 0    | 1 | 1       | ACK   | SYN     | &     | 6         | F     | V         | f     | v               |
| 0    | 1 | 1       | BEL   | ETB     | '     | 7         | G     | W         | g     | w               |
| 1    | 0 | 0       | BS    | CAN     | (     | 8         | H     | X         | h     | x               |
| 1    | 0 | 0       | HT    | EM      | )     | 9         | I     | Y         | i     | y               |
| 1    | 0 | 1       | LF    | SUB     | *     | :         | J     | Z         | j     | z               |
| 1    | 0 | 1       | VT    | ESC     | +     | ;         | K     | [         | k     | {               |
| 1    | 1 | 0       | FF    | FS      | ,     | <         | L     | \         | l     | l'              |
| 1    | 1 | 0       | CR    | GS      | -     | =         | M     | ]         | m     | }               |
| 1    | 1 | 0       | SO    | RS      | .     | >         | N     | ^         | n     | ~               |
| 1    | 1 | 1       | SI    | US      | /     | ?         | O     | _         | o     | RUBOUT<br>(DEL) |

<LoI-Report> Characters

| BITS |   | 0 0 0   | 0 0 1 | 0 1 0   | 0 1 1 | 1 0 0     | 1 0 1 | 1 1 0     | 1 1 1 |                 |
|------|---|---------|-------|---------|-------|-----------|-------|-----------|-------|-----------------|
| HEX  |   | CONTROL |       | FIGURES |       | UPPERCASE |       | LOWERCASE |       |                 |
| 0    | 0 | 0       | NUL   | DLE     | SP    | 0         | @     | P         | \     | p               |
| 0    | 0 | 1       | SOH   | DC1     | !     | 1         | A     | Q         | a     | q               |
| 0    | 0 | 1       | STX   | DC2     | "     | 2         | B     | R         | b     | r               |
| 0    | 0 | 1       | ETX   | DC3     | #     | 3         | C     | S         | c     | s               |
| 0    | 1 | 0       | EOT   | DC4     | \$    | 4         | D     | T         | d     | t               |
| 0    | 1 | 0       | ENQ   | NAK     | %     | 5         | E     | U         | e     | u               |
| 0    | 1 | 1       | ACK   | SYN     | &     | 6         | F     | V         | f     | v               |
| 0    | 1 | 1       | BEL   | ETB     | '     | 7         | G     | W         | g     | w               |
| 1    | 0 | 0       | BS    | CAN     | (     | 8         | H     | X         | h     | x               |
| 1    | 0 | 0       | HT    | EM      | )     | 9         | I     | Y         | i     | y               |
| 1    | 0 | 1       | LF    | SUB     | *     | :         | J     | Z         | j     | z               |
| 1    | 0 | 1       | VT    | ESC     | +     | ;         | K     | [         | k     | {               |
| 1    | 1 | 0       | FF    | FS      | ,     | <         | L     | \         | l     | l'              |
| 1    | 1 | 0       | CR    | GS      | -     | =         | M     | ]         | m     | }               |
| 1    | 1 | 0       | SO    | RS      | .     | >         | N     | ^         | n     | ~               |
| 1    | 1 | 1       | SI    | US      | /     | ?         | O     | _         | o     | RUBOUT<br>(DEL) |

381B-89

Table B-5  
CHARACTERS USED IN <XY> PARAMETERS

<HiY>, <HiX> Characters

| BITS |          | CONTROL        |                | FIGURES         |                 | UPPERCASE       |                 | LOWERCASE       |                 |
|------|----------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| B4   | B3 B2 B1 | 0 <sub>0</sub> | 0 <sub>1</sub> | 0 <sub>10</sub> | 0 <sub>11</sub> | 1 <sub>00</sub> | 1 <sub>01</sub> | 1 <sub>10</sub> | 1 <sub>11</sub> |
| 0    | 0 0 0    | NUL            | DLE            | SP              | 0               | @               | P               | \               | p               |
| 0    | 0 0 1    | SOH            | DC1            | !               | 1               | A               | Q               | a               | q               |
| 0    | 0 1 0    | STX            | DC2            | "               | 2               | B               | R               | b               | r               |
| 0    | 0 1 1    | ETX            | DC3            | #               | 3               | C               | S               | c               | s               |
| 0    | 1 0 0    | EOT            | DC4            | \$              | 4               | D               | T               | d               | t               |
| 0    | 1 0 1    | ENQ            | NAK            | %               | 5               | E               | U               | e               | u               |
| 0    | 1 1 0    | ACK            | SYN            | &               | 6               | F               | V               | f               | v               |
| 0    | 1 1 1    | BEL            | ETB            | '               | 7               | G               | W               | g               | w               |
| 1    | 0 0 0    | BS             | CAN            | (               | 8               | H               | X               | h               | x               |
| 1    | 0 0 1    | HT             | EM             | )               | 9               | I               | Y               | i               | y               |
| 1    | 0 1 0    | LF             | SUB            | *               | :               | J               | Z               | j               | z               |
| 1    | 0 1 1    | VT             | ESC            | +               | ;               | K               | {               | k               | {               |
| 1    | 1 0 0    | FF             | FS             | ,               | <               | L               | \               | l               |                 |
| 1    | 1 0 1    | CR             | GS             | -               | =               | M               |                 | m               | }               |
| 1    | 1 1 0    | SO             | RS             | .               | >               | N               | ^               | n               | ~               |
| 1    | 1 1 1    | SI             | US             | /               | ?               | O               | _               | o               | -               |

<LoY>, <Extra> Characters

| BITS |          | CONTROL        |                | FIGURES         |                 | UPPERCASE       |                 | LOWERCASE       |                 |
|------|----------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| B4   | B3 B2 B1 | 0 <sub>0</sub> | 0 <sub>1</sub> | 0 <sub>10</sub> | 0 <sub>11</sub> | 1 <sub>00</sub> | 1 <sub>01</sub> | 1 <sub>10</sub> | 1 <sub>11</sub> |
| 0    | 0 0 0    | NUL            | DLE            | SP              | 0               | @               | P               | \               | p               |
| 0    | 0 0 1    | SOH            | DC1            | !               | 1               | A               | Q               | a               | q               |
| 0    | 0 1 0    | STX            | DC2            | "               | 2               | B               | R               | b               | r               |
| 0    | 0 1 1    | ETX            | DC3            | #               | 3               | C               | S               | c               | s               |
| 0    | 1 0 0    | EOT            | DC4            | \$              | 4               | D               | T               | d               | t               |
| 0    | 1 0 1    | ENQ            | NAK            | %               | 5               | E               | U               | e               | u               |
| 0    | 1 1 0    | ACK            | SYN            | &               | 6               | F               | V               | f               | v               |
| 0    | 1 1 1    | BEL            | ETB            | '               | 7               | G               | W               | g               | w               |
| 1    | 0 0 0    | BS             | CAN            | (               | 8               | H               | X               | h               | x               |
| 1    | 0 0 1    | HT             | EM             | )               | 9               | I               | Y               | i               | y               |
| 1    | 0 1 0    | LF             | SUB            | *               | :               | J               | Z               | j               | z               |
| 1    | 0 1 1    | VT             | ESC            | +               | ;               | K               | {               | k               | {               |
| 1    | 1 0 0    | FF             | FS             | ,               | <               | L               | \               | l               |                 |
| 1    | 1 0 1    | CR             | GS             | -               | =               | M               |                 | m               | }               |
| 1    | 1 1 0    | SO             | RS             | .               | >               | N               | ^               | n               | ~               |
| 1    | 1 1 1    | SI             | US             | /               | ?               | O               | _               | o               | -               |

<LoX> Characters

| BITS |          | CONTROL        |                | FIGURES         |                 | UPPERCASE       |                 | LOWERCASE       |                 |
|------|----------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| B4   | B3 B2 B1 | 0 <sub>0</sub> | 0 <sub>1</sub> | 0 <sub>10</sub> | 0 <sub>11</sub> | 1 <sub>00</sub> | 1 <sub>01</sub> | 1 <sub>10</sub> | 1 <sub>11</sub> |
| 0    | 0 0 0    | NUL            | DLE            | SP              | 0               | @               | P               | \               | p               |
| 0    | 0 0 1    | SOH            | DC1            | !               | 1               | A               | Q               | a               | q               |
| 0    | 0 1 0    | STX            | DC2            | "               | 2               | B               | R               | b               | r               |
| 0    | 0 1 1    | ETX            | DC3            | #               | 3               | C               | S               | c               | s               |
| 0    | 1 0 0    | EOT            | DC4            | \$              | 4               | D               | T               | d               | t               |
| 0    | 1 0 1    | ENQ            | NAK            | %               | 5               | E               | U               | e               | u               |
| 0    | 1 1 0    | ACK            | SYN            | &               | 6               | F               | V               | f               | v               |
| 0    | 1 1 1    | BEL            | ETB            | '               | 7               | G               | W               | g               | w               |
| 1    | 0 0 0    | BS             | CAN            | (               | 8               | H               | X               | h               | x               |
| 1    | 0 0 1    | HT             | EM             | )               | 9               | I               | Y               | i               | y               |
| 1    | 0 1 0    | LF             | SUB            | *               | :               | J               | Z               | j               | z               |
| 1    | 0 1 1    | VT             | ESC            | +               | ;               | K               | {               | k               | {               |
| 1    | 1 0 0    | FF             | FS             | ,               | <               | L               | \               | l               |                 |
| 1    | 1 0 1    | CR             | GS             | -               | =               | M               |                 | m               | }               |
| 1    | 1 1 0    | SO             | RS             | .               | >               | N               | ^               | n               | ~               |
| 1    | 1 1 1    | SI             | US             | /               | ?               | O               | _               | o               | -               |

3818-90

Table B-6  
 CHARACTERS USED IN <XY-REPORT> PARAMETERS

| BITS |    |    |    | 0 0 |    | 0 1 |         | 1 0 |         | 1 1 |           |    |           |              |
|------|----|----|----|-----|----|-----|---------|-----|---------|-----|-----------|----|-----------|--------------|
| B7   | B6 | B5 | B4 | B3  | B2 | B1  | CONTROL |     | FIGURES |     | UPPERCASE |    | LOWERCASE |              |
| 0    | 0  | 0  | 0  | 0   | 0  | 0   | NUL     | DLE | SP      | 0   | @         | P  | \         | p            |
|      |    |    |    |     |    |     | 0       | 16  | 32      | 48  | 64        | 80 | 96        | 112          |
| 0    | 0  | 0  | 1  |     |    |     | SOH     | DC1 | !       | 1   | A         | Q  | a         | q            |
|      |    |    |    |     |    |     | 1       | 17  | 33      | 49  | 65        | 81 | 97        | 113          |
| 0    | 0  | 1  | 0  |     |    |     | STX     | DC2 | "       | 2   | B         | R  | b         | r            |
|      |    |    |    |     |    |     | 2       | 18  | 34      | 50  | 66        | 82 | 98        | 114          |
| 0    | 0  | 1  | 1  |     |    |     | ETX     | DC3 | #       | 3   | C         | S  | c         | s            |
|      |    |    |    |     |    |     | 3       | 19  | 35      | 51  | 67        | 83 | 99        | 115          |
| 0    | 1  | 0  | 0  |     |    |     | EOT     | DC4 | \$      | 4   | D         | T  | d         | t            |
|      |    |    |    |     |    |     | 4       | 20  | 36      | 52  | 68        | 84 | 100       | 116          |
| 0    | 1  | 0  | 1  |     |    |     | ENQ     | NAK | %       | 5   | E         | U  | e         | u            |
|      |    |    |    |     |    |     | 5       | 21  | 37      | 53  | 69        | 85 | 101       | 117          |
| 0    | 1  | 1  | 0  |     |    |     | ACK     | SYN | &       | 6   | F         | V  | f         | v            |
|      |    |    |    |     |    |     | 6       | 22  | 38      | 54  | 70        | 86 | 102       | 118          |
| 0    | 1  | 1  | 1  |     |    |     | BEL     | ETB | /       | 7   | G         | W  | g         | w            |
|      |    |    |    |     |    |     | 7       | 23  | 39      | 55  | 71        | 87 | 103       | 119          |
| 1    | 0  | 0  | 0  |     |    |     | BS      | CAN | (       | 8   | H         | X  | h         | x            |
|      |    |    |    |     |    |     | 8       | 24  | 40      | 56  | 72        | 88 | 104       | 120          |
| 1    | 0  | 0  | 1  |     |    |     | HT      | EM  | )       | 9   | I         | Y  | i         | y            |
|      |    |    |    |     |    |     | 9       | 25  | 41      | 57  | 73        | 89 | 105       | 121          |
| 1    | 0  | 1  | 0  |     |    |     | LF      | SUB | *       | :   | J         | Z  | j         | z            |
|      |    |    |    |     |    |     | 10      | 26  | 42      | 58  | 74        | 90 | 106       | 122          |
| 1    | 0  | 1  | 1  |     |    |     | VT      | ESC | +       | ;   | K         | [  | k         | {            |
|      |    |    |    |     |    |     | 11      | 27  | 43      | 59  | 75        | 91 | 107       | 123          |
| 1    | 1  | 0  | 0  |     |    |     | FF      | FS  | ,       | <   | L         | \  | l         | l*           |
|      |    |    |    |     |    |     | 12      | 28  | 44      | 60  | 76        | 92 | 108       | 124          |
| 1    | 1  | 0  | 1  |     |    |     | CR      | GS  | -       | =   | M         | ]  | m         | }            |
|      |    |    |    |     |    |     | 13      | 29  | 45      | 61  | 77        | 93 | 109       | 125          |
| 1    | 1  | 1  | 0  |     |    |     | SO      | RS  | .       | >   | N         | ^  | n         | ~            |
|      |    |    |    |     |    |     | 14      | 30  | 46      | 62  | 78        | 94 | 110       | 126          |
| 1    | 1  | 1  | 1  |     |    |     | SI      | US  | /       | ?   | O         | -  | o         | RUBOUT (DEL) |
|      |    |    |    |     |    |     | 15      | 31  | 47      | 63  | 79        | 95 | 111       | 127          |

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 | on some keyboards or systems

3818-91

Table B-7  
UNITED KINGDOM CHARACTER SET

| BITS |    |    |    | 0 0 |    | 0 1 |                  | 1 0 |    | 1 1 |                          |   |   |                 |       |    |    |    |       |    |     |     |
|------|----|----|----|-----|----|-----|------------------|-----|----|-----|--------------------------|---|---|-----------------|-------|----|----|----|-------|----|-----|-----|
| B7   | B6 | B5 | B4 | B3  | B2 | B1  | CONTROL          |     |    |     | HIGH X & Y GRAPHIC INPUT |   |   |                 | LOW X |    |    |    | LOW Y |    |     |     |
| 0    | 0  | 0  | 0  | 0   | 0  | 0   | NUL              | DLE | SP | 0   | @                        | P | \ | p               | 0     | 16 | 32 | 48 | 64    | 80 | 96  | 112 |
| 0    | 0  | 0  | 0  | 1   | 0  | 0   | SOH              | DC1 | !  | 1   | A                        | Q | a | q               | 1     | 17 | 33 | 49 | 65    | 81 | 97  | 113 |
| 0    | 0  | 0  | 1  | 0   | 0  | 0   | STX              | DC2 | "  | 2   | B                        | R | b | r               | 2     | 18 | 34 | 50 | 66    | 82 | 98  | 114 |
| 0    | 0  | 0  | 1  | 1   | 0  | 0   | ETX              | DC3 | £  | 3   | C                        | S | c | s               | 3     | 19 | 35 | 51 | 67    | 83 | 99  | 115 |
| 0    | 1  | 0  | 0  | 0   | 0  | 0   | EOT              | DC4 | \$ | 4   | D                        | T | d | t               | 4     | 20 | 36 | 52 | 68    | 84 | 100 | 116 |
| 0    | 1  | 0  | 0  | 1   | 0  | 0   | ENQ              | NAK | %  | 5   | E                        | U | e | u               | 5     | 21 | 37 | 53 | 69    | 85 | 101 | 117 |
| 0    | 1  | 0  | 1  | 0   | 0  | 0   | ACK              | SYN | &  | 6   | F                        | V | f | v               | 6     | 22 | 38 | 54 | 70    | 86 | 102 | 118 |
| 0    | 1  | 0  | 1  | 1   | 0  | 0   | BEL              | ETB | /  | 7   | G                        | W | g | w               | 7     | 23 | 39 | 55 | 71    | 87 | 103 | 119 |
| 1    | 0  | 0  | 0  | 0   | 0  | 0   | BS<br>BACK-SPACE | CAN | (  | 8   | H                        | X | h | x               | 8     | 24 | 40 | 56 | 72    | 88 | 104 | 120 |
| 1    | 0  | 0  | 0  | 1   | 0  | 0   | HT               | EM  | )  | 9   | I                        | Y | i | y               | 9     | 25 | 41 | 57 | 73    | 89 | 105 | 121 |
| 1    | 0  | 0  | 1  | 0   | 0  | 0   | LF               | SUB | *  | :   | J                        | Z | j | z               | 10    | 26 | 42 | 58 | 74    | 90 | 106 | 122 |
| 1    | 0  | 0  | 1  | 1   | 0  | 0   | VT               | ESC | +  | ;   | K                        | [ | k | {               | 11    | 27 | 43 | 59 | 75    | 91 | 107 | 123 |
| 1    | 1  | 0  | 0  | 0   | 0  | 0   | FF               | FS  | ,  | <   | L                        | \ | l | l*              | 12    | 28 | 44 | 60 | 76    | 92 | 108 | 124 |
| 1    | 1  | 0  | 0  | 1   | 0  | 0   | CR<br>RETURN     | GS  | -  | =   | M                        | ] | m | }               | 13    | 29 | 45 | 61 | 77    | 93 | 109 | 125 |
| 1    | 1  | 0  | 1  | 0   | 0  | 0   | SO               | RS  | .  | >   | N                        | ^ | n | ~               | 14    | 30 | 46 | 62 | 78    | 94 | 110 | 126 |
| 1    | 1  | 0  | 1  | 1   | 0  | 0   | SI               | US  | /  | ?   | O                        | _ | o | RUBOUT<br>(DEL) | 15    | 31 | 47 | 63 | 79    | 95 | 111 | 127 |

3673-51



Table B-8  
SWEDISH CHARACTER SET

| BITS |    |    |    | CONTROL               |           | HIGH X & Y GRAPHIC INPUT |         | LOW X   |         | LOW Y    |                        |
|------|----|----|----|-----------------------|-----------|--------------------------|---------|---------|---------|----------|------------------------|
| B7   | B6 | B5 | B4 | 000                   | 001       | 010                      | 011     | 100     | 101     | 110      | 111                    |
| 0    | 0  | 0  | 0  | NUL<br>0              | DLE<br>16 | SP<br>32                 | 0<br>48 | @<br>64 | P<br>80 | \<br>96  | p<br>112               |
| 0    | 0  | 0  | 1  | SOH<br>1              | DC1<br>17 | !<br>33                  | 1<br>49 | A<br>65 | Q<br>81 | a<br>97  | q<br>113               |
| 0    | 0  | 1  | 0  | STX<br>2              | DC2<br>18 | "<br>34                  | 2<br>50 | B<br>66 | R<br>82 | b<br>98  | r<br>114               |
| 0    | 0  | 1  | 1  | ETX<br>3              | DC3<br>19 | #<br>35                  | 3<br>51 | C<br>67 | S<br>83 | c<br>99  | s<br>115               |
| 0    | 1  | 0  | 0  | EOT<br>4              | DC4<br>20 | \$<br>36                 | 4<br>52 | D<br>68 | T<br>84 | d<br>100 | t<br>116               |
| 0    | 1  | 0  | 1  | ENQ<br>5              | NAK<br>21 | %<br>37                  | 5<br>53 | E<br>69 | U<br>85 | e<br>101 | u<br>117               |
| 0    | 1  | 1  | 0  | ACK<br>6              | SYN<br>22 | &<br>38                  | 6<br>54 | F<br>70 | V<br>86 | f<br>102 | v<br>118               |
| 0    | 1  | 1  | 1  | BEL<br>BELL<br>7      | ETB<br>23 | '<br>39                  | 7<br>55 | G<br>71 | W<br>87 | g<br>103 | w<br>119               |
| 1    | 0  | 0  | 0  | BS<br>BACK SPACE<br>8 | CAN<br>24 | (<br>40                  | 8<br>56 | H<br>72 | X<br>88 | h<br>104 | x<br>120               |
| 1    | 0  | 0  | 1  | HT<br>9               | EM<br>25  | )<br>41                  | 9<br>57 | I<br>73 | Y<br>89 | i<br>105 | y<br>121               |
| 1    | 0  | 1  | 0  | LF<br>10              | SUB<br>26 | *<br>42                  | :<br>58 | J<br>74 | Z<br>90 | j<br>106 | z<br>122               |
| 1    | 0  | 1  | 1  | VT<br>11              | ESC<br>27 | +<br>43                  | ;<br>59 | K<br>75 | Ä<br>91 | k<br>107 | ä<br>123               |
| 1    | 1  | 0  | 0  | FF<br>12              | FS<br>28  | ,<br>44                  | <<br>60 | L<br>76 | Ö<br>92 | l<br>108 | ö<br>124               |
| 1    | 1  | 0  | 1  | CR<br>RETURN<br>13    | GS<br>29  | -<br>45                  | =<br>61 | M<br>77 | Å<br>93 | m<br>109 | å<br>125               |
| 1    | 1  | 1  | 0  | SO<br>14              | RS<br>30  | .<br>46                  | ><br>62 | N<br>78 | ^<br>94 | n<br>110 | ~<br>126               |
| 1    | 1  | 1  | 1  | SI<br>15              | US<br>31  | /<br>47                  | ?<br>63 | O<br>79 | _<br>95 | o<br>111 | RUBOUT<br>(DEL)<br>127 |

3673-52

Table B-9  
DANISH/NORWEGIAN CHARACTER SET

| BITS |    |    |    | 0 0 |    | 0 0 1 |         | 0 1 0 |    | 0 1 1 |                          | 1 0 0 |   | 1 0 1        |            | 1 1 0 |    | 1 1 1 |       |    |     |     |     |
|------|----|----|----|-----|----|-------|---------|-------|----|-------|--------------------------|-------|---|--------------|------------|-------|----|-------|-------|----|-----|-----|-----|
| B7   | B6 | B5 | B4 | B3  | B2 | B1    | CONTROL |       |    |       | HIGH X & Y GRAPHIC INPUT |       |   |              | LOW X      |       |    |       | LOW Y |    |     |     |     |
| 0    | 0  | 0  | 0  | 0   | 0  | 0     | NUL     | DLE   | SP | 0     | @                        | P     | \ | p            | 0          | 16    | 32 | 48    | 64    | 80 | 96  | 112 |     |
| 0    | 0  | 0  | 1  | 0   | 0  | 0     | SOH     | DC1   | !  | 1     | A                        | Q     | a | q            | 1          | 17    | 33 | 49    | 65    | 81 | 97  | 113 |     |
| 0    | 0  | 1  | 0  | 0   | 0  | 0     | STX     | DC2   | "  | 2     | B                        | R     | b | r            | 2          | 18    | 34 | 50    | 66    | 82 | 98  | 114 |     |
| 0    | 0  | 1  | 1  | 0   | 0  | 0     | ETX     | DC3   | #  | 3     | C                        | S     | c | s            | 3          | 19    | 35 | 51    | 67    | 83 | 99  | 115 |     |
| 0    | 1  | 0  | 0  | 0   | 0  | 0     | EOT     | DC4   | \$ | 4     | D                        | T     | d | t            | 4          | 20    | 36 | 52    | 68    | 84 | 100 | 116 |     |
| 0    | 1  | 0  | 1  | 0   | 0  | 0     | ENQ     | NAK   | %  | 5     | E                        | U     | e | u            | 5          | 21    | 37 | 53    | 69    | 85 | 101 | 117 |     |
| 0    | 1  | 1  | 0  | 0   | 0  | 0     | ACK     | SYN   | &  | 6     | F                        | V     | f | v            | 6          | 22    | 38 | 54    | 70    | 86 | 102 | 118 |     |
| 0    | 1  | 1  | 1  | 0   | 0  | 0     | BEL     | ETB   | /  | 7     | G                        | W     | g | w            | BELL       | 7     | 23 | 39    | 55    | 71 | 87  | 103 | 119 |
| 1    | 0  | 0  | 0  | 0   | 0  | 0     | BS      | CAN   | (  | 8     | H                        | X     | h | x            | BACK-SPACE | 8     | 24 | 40    | 56    | 72 | 88  | 104 | 120 |
| 1    | 0  | 0  | 1  | 0   | 0  | 0     | HT      | EM    | )  | 9     | I                        | Y     | i | y            | 9          | 25    | 41 | 57    | 73    | 89 | 105 | 121 |     |
| 1    | 0  | 1  | 0  | 0   | 0  | 0     | LF      | SUB   | *  | :     | J                        | Z     | j | z            | 10         | 26    | 42 | 58    | 74    | 90 | 106 | 122 |     |
| 1    | 0  | 1  | 1  | 0   | 0  | 0     | VT      | ESC   | +  | ;     | K                        | Æ     | k | æ            | 11         | 27    | 43 | 59    | 75    | 91 | 107 | 123 |     |
| 1    | 1  | 0  | 0  | 0   | 0  | 0     | FF      | FS    | ,  | <     | L                        | Ø     | l | ø            | 12         | 28    | 44 | 60    | 76    | 92 | 108 | 124 |     |
| 1    | 1  | 0  | 1  | 0   | 0  | 0     | CR      | GS    | -  | =     | M                        | Å     | m | å            | RETURN     | 13    | 29 | 45    | 61    | 77 | 93  | 109 | 125 |
| 1    | 1  | 1  | 0  | 0   | 0  | 0     | SO      | RS    | .  | >     | N                        | ^     | n | ~            | 14         | 30    | 46 | 62    | 78    | 94 | 110 | 126 |     |
| 1    | 1  | 1  | 1  | 0   | 0  | 0     | SI      | US    | /  | ?     | O                        | -     | o | RUBOUT (DEL) | 15         | 31    | 47 | 63    | 79    | 95 | 111 | 127 |     |

3673-55

Table B-10  
APL CHARACTER SET

| BITS |    |    |    | 0 0                   |           | 0 0 1    |         | 0 1 0                    |         | 0 1 1    |                        | 1 0 0 |  | 1 0 1 |  | 1 1 0 |  | 1 1 1 |  |
|------|----|----|----|-----------------------|-----------|----------|---------|--------------------------|---------|----------|------------------------|-------|--|-------|--|-------|--|-------|--|
| B7   | B6 | B5 |    |                       |           |          |         |                          |         |          |                        |       |  |       |  |       |  |       |  |
| B4   | B3 | B2 | B1 | CONTROL               |           |          |         | HIGH X & Y GRAPHIC INPUT |         |          |                        | LOW X |  |       |  | LOW Y |  |       |  |
| 0    | 0  | 0  | 0  | NUL<br>0              | DLE<br>16 | SP<br>32 | 0<br>48 | -<br>64                  | *<br>80 | ◇<br>96  | P<br>112               |       |  |       |  |       |  |       |  |
| 0    | 0  | 0  | 1  | SOH<br>1              | DC1<br>17 | “<br>33  | 1<br>49 | α<br>65                  | ?<br>81 | A<br>97  | Q<br>113               |       |  |       |  |       |  |       |  |
| 0    | 0  | 1  | 0  | STX<br>2              | DC2<br>18 | )<br>34  | 2<br>50 | ⊥<br>66                  | ρ<br>82 | B<br>98  | R<br>114               |       |  |       |  |       |  |       |  |
| 0    | 0  | 1  | 1  | ETX<br>3              | DC3<br>19 | <<br>35  | 3<br>51 | ∩<br>67                  | ∟<br>83 | C<br>99  | S<br>115               |       |  |       |  |       |  |       |  |
| 0    | 1  | 0  | 0  | EOT<br>4              | DC4<br>20 | ≤<br>36  | 4<br>52 | L<br>68                  | ~<br>84 | D<br>100 | T<br>116               |       |  |       |  |       |  |       |  |
| 0    | 1  | 0  | 1  | ENQ<br>5              | NAK<br>21 | =<br>37  | 5<br>53 | ε<br>69                  | ↓<br>85 | E<br>101 | U<br>117               |       |  |       |  |       |  |       |  |
| 0    | 1  | 1  | 0  | ACK<br>6              | SYN<br>22 | ><br>38  | 6<br>54 | -<br>70                  | U<br>86 | F<br>102 | V<br>118               |       |  |       |  |       |  |       |  |
| 0    | 1  | 1  | 1  | BEL<br>BELL<br>7      | ETB<br>23 | ]<br>39  | 7<br>55 | ∇<br>71                  | ω<br>87 | G<br>103 | W<br>119               |       |  |       |  |       |  |       |  |
| 1    | 0  | 0  | 0  | BS<br>BACK-SPACE<br>8 | CAN<br>24 | v<br>40  | 8<br>56 | Δ<br>72                  | ∩<br>88 | H<br>104 | X<br>120               |       |  |       |  |       |  |       |  |
| 1    | 0  | 0  | 1  | HT<br>9               | EM<br>25  | ^<br>41  | 9<br>57 | ι<br>73                  | ↑<br>89 | I<br>105 | Y<br>121               |       |  |       |  |       |  |       |  |
| 1    | 0  | 1  | 0  | LF<br>10              | SUB<br>26 | ≠<br>42  | (<br>58 | ο<br>74                  | ∩<br>90 | J<br>106 | Z<br>122               |       |  |       |  |       |  |       |  |
| 1    | 0  | 1  | 1  | VT<br>11              | ESC<br>27 | ÷<br>43  | [<br>59 | ι<br>75                  | ←<br>91 | K<br>107 | {<br>123               |       |  |       |  |       |  |       |  |
| 1    | 1  | 0  | 0  | FF<br>12              | FS<br>28  | ,<br>44  | ;<br>60 | □<br>76                  | ∟<br>92 | L<br>108 | ∩<br>124               |       |  |       |  |       |  |       |  |
| 1    | 1  | 0  | 1  | CR<br>RETURN<br>13    | GS<br>29  | +<br>45  | ×<br>61 | <br>77                   | →<br>93 | M<br>109 | }<br>125               |       |  |       |  |       |  |       |  |
| 1    | 1  | 1  | 0  | SO<br>14              | RS<br>30  | .<br>46  | :<br>62 | T<br>78                  | ≥<br>94 | N<br>110 | \$<br>126              |       |  |       |  |       |  |       |  |
| 1    | 1  | 1  | 1  | SI<br>15              | US<br>31  | /<br>47  | \<br>63 | ο<br>79                  | -<br>95 | O<br>111 | RUBOUT<br>(DEL)<br>127 |       |  |       |  |       |  |       |  |

3673-54



*Please Check for  
CHANGE INFORMATION  
at the Rear of this Manual*

**620-0295-00  
620-0295-01  
620-0295-02  
LOW VOLTAGE  
POWER SUPPLY  
SERVICE MANUAL**

**Tektronix, Inc  
P.O. Box 500  
Beaverton, Oregon 97077**

MANUAL PART NO 070-3732-00  
PRODUCT GROUP 16

First Printing FEB 1981  
Revised FEB 1983  
SEP

**WARNING**

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

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# MANUAL REVISION STATUS

**PRODUCT:** 620-0295-00, 01, 02 Low Voltage Power Supply

This manual supports the following versions of this product: Part Numbers 620-0295-00 and up

| REV DATE | DESCRIPTION                            |
|----------|----------------------------------------|
| FEB 1981 | Original Issue                         |
| SEP 1981 | Revised: pages 2-2 and 2-3.            |
| OCT 1981 | Revised: pages 4-3 and 5-11.           |
| NOV 1981 | Revised: pages 1-1, 2-3, 5-1, and 5-3. |
| NOV 1981 | Added: page 1-2.                       |
| FEB 1983 | Revised: pages ii and iv.              |

# CONTENTS

| Section                             |                                           | Page |
|-------------------------------------|-------------------------------------------|------|
| Section 1                           | <b>INTRODUCTION</b>                       |      |
|                                     | About This Manual .....                   | 1-1  |
|                                     | Description of the Module .....           | 1-1  |
|                                     | General .....                             | 1-1  |
|                                     | Physical Description .....                | 1-1  |
|                                     | Differences Among Versions .....          | 1-2  |
| Section 2                           | <b>SPECIFICATIONS</b>                     |      |
|                                     | Physical .....                            | 2-1  |
|                                     | Electrical .....                          | 2-1  |
|                                     | Environmental .....                       | 2-3  |
|                                     | External Connections .....                | 2-4  |
| Section 3                           | <b>MAINTENANCE</b>                        |      |
|                                     | Safety Summary .....                      | 3-1  |
|                                     | General .....                             | 3-1  |
|                                     | Changing the Line Voltage .....           | 3-2  |
|                                     | Troubleshooting .....                     | 3-2  |
|                                     | Equipment Required .....                  | 3-3  |
|                                     | Preparation .....                         | 3-4  |
|                                     | Control Circuit .....                     | 3-4  |
|                                     | Primary Circuit .....                     | 3-6  |
|                                     | Logical On/Off Switch .....               | 3-7  |
|                                     | DC Supplies .....                         | 3-8  |
|                                     | Timing Circuit .....                      | 3-8  |
|                                     | Assembly/Disassembly .....                | 3-9  |
|                                     | Replacing the Line Rectifier .....        | 3-9  |
|                                     | Replacing the Switching Transistors ..... | 3-9  |
|                                     | Removing the Inverter Board .....         | 3-10 |
|                                     | Removing the Regulator Board .....        | 3-11 |
| Replacing the + 5 V Rectifier ..... | 3-12                                      |      |
| Access to the Cavity .....          | 3-12                                      |      |
| Section 4                           | <b>PERFORMANCE CHECK</b>                  |      |
|                                     | Equipment Required .....                  | 4-1  |
|                                     | Procedures .....                          | 4-2  |

## NOTE

*Refer to the host product service manual for the adjustment procedure.*

|                                          |     |
|------------------------------------------|-----|
| DC Voltages .....                        | 4-2 |
| INIT-0 and PWRFL-0 .....                 | 4-2 |
| Maximum and Minimum Line Voltage .....   | 4-3 |
| Current Limiting and Maximum Loads ..... | 4-3 |

|                   |                                          |      |
|-------------------|------------------------------------------|------|
| <b>Section 5</b>  | <b>THEORY OF OPERATION</b>               |      |
|                   | Introduction .....                       | 5-1  |
|                   | DC Supplies .....                        | 5-2  |
|                   | System Interface Signals .....           | 5-2  |
|                   | Block Description .....                  | 5-3  |
|                   | Detailed Circuit Description .....       | 5-4  |
|                   | Primary Circuit .....                    | 5-4  |
|                   | Control Circuit .....                    | 5-6  |
|                   | DC Supplies .....                        | 5-8  |
|                   | Timing Circuit .....                     | 5-11 |
| <b>Section 6</b>  | <b>REPLACEABLE ELECTRICAL PARTS</b>      |      |
| <b>Section 7</b>  | <b>DIAGRAMS AND SCHEMATICS</b>           |      |
| <b>Section 8</b>  | <b>REPLACEABLE MECHANICAL PARTS</b>      |      |
| <b>Appendix A</b> | <b>SIGNAL DEFINITIONS AND REFERENCES</b> |      |

## TABLES

| <b>Table</b> | <b>Description</b>                | <b>Page</b> |
|--------------|-----------------------------------|-------------|
| 2-1          | Line Input .....                  | 2-1         |
| 2-2          | DC Supplies .....                 | 2-2         |
| 2-3          | TTL Signals .....                 | 2-3         |
| 2-4          | Environmental Limits .....        | 2-3         |
| 2-5          | External Connections .....        | 2-4         |
| 4-1          | Power Supply Voltage Limits ..... | 4-2         |
| 5-1          | Base Drive Circuit States .....   | 5-8         |



# ILLUSTRATIONS

| Figure | Description                                   | Page |
|--------|-----------------------------------------------|------|
| 1-1    | The 620-0295-00 Low Voltage Power Supply..... | vi   |
| 1-2    | Line Voltage Switches.....                    | 1-2  |
| 2-1    | Dimensions.....                               | 2-1  |
| 3-1    | Changing Line Voltage.....                    | 3-2  |
| 3-2    | Test Connectors.....                          | 3-3  |
| 3-3    | Connection of Test Load.....                  | 3-4  |
| 3-4    | Base Drive Test Point.....                    | 3-5  |
| 3-5    | Base Drive Waveform.....                      | 3-5  |
| 3-6    | Inverter Dead Time.....                       | 3-5  |
| 3-7    | Connecting the Current Probe.....             | 3-6  |
| 3-8    | Bypassing Triac.....                          | 3-6  |
| 3-9    | Inverter Waveform.....                        | 3-7  |
| 3-10   | Mounting of Switching Transistors.....        | 3-9  |
| 3-11   | Removing the Inverter Board.....              | 3-10 |
| 3-12   | Removing the Regulator Board.....             | 3-11 |
| 3-13   | Mounting the Diodes to the Heat Sink.....     | 3-12 |
| 4-1    | Power Supply Test Points.....                 | 4-2  |
| 4-2    | Power-Up Waveform.....                        | 4-3  |
| 4-3    | Power-Down Waveform.....                      | 4-3  |
| 5-1    | Simplified Inverter Circuit.....              | 5-1  |
| 5-2    | Configuration for the 115 V Line.....         | 5-4  |
| 5-3    | Configuration for the 230 V Line.....         | 5-5  |
| 5-4    | Logical On/Off Switch.....                    | 5-6  |
| 5-5    | Pulse Width Modulator I.C.....                | 5-7  |
| 5-6    | Typical Post-Regulator Circuit.....           | 5-9  |
| 5-7    | Foldback Current Limiting Characteristic..... | 5-9  |

## **SAFETY SUMMARY**

### **DO NOT SERVICE ALONE**

Do not perform service or adjustment of this module unless another person capable of rendering first aid and resuscitation is present.

### **USE CARE WHEN SERVICING WITH POWER ON**

Dangerous voltages exist at several points in this module. To avoid personal injury do not touch exposed connections or components while the power is on.

Disconnect the power before removing protective panels, soldering, or replacing components.

After the power has been disconnected, the neon flasher on the inverter board indicates that dangerous voltages still are present in the filter capacitors.

### **POWER SOURCE**

This module is intended to operate from a power source that applies less than 250 volts rms between the supply conductors or between either the supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

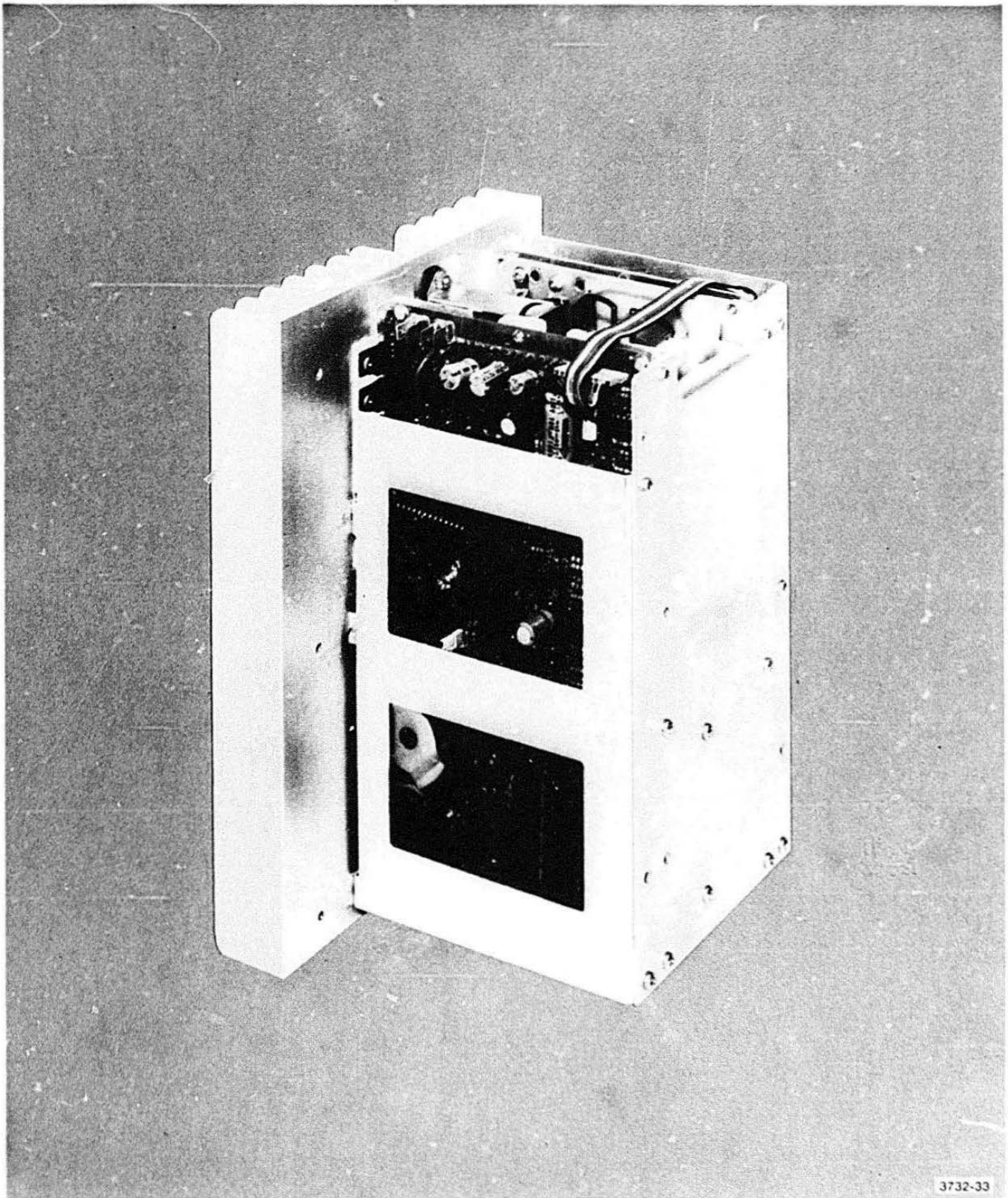


Figure 1-1. The 620-0295-00 Low Voltage Power Supply.

# Section 1

## INTRODUCTION

### ABOUT THIS MANUAL

This manual is intended for use by technicians servicing Tektronix products that contain the 620-0295-00, -01, or -02 Low Voltage Power Supply module (Figure 1-1).

The manual contains the following information:

- Specifications.
- Troubleshooting information.
- Performance check procedures.
- Circuit description.
- Replaceable parts lists and schematics.

Installation and adjustment procedures depend on the product in which the module is installed. Consult the service manual for that product.

### DESCRIPTION OF THE MODULE

#### GENERAL

The power supply module is intended for use in a number of Tektronix products, such as the TEKTRONIX 4112 Computer Display Terminal and the TEKTRONIX 4909 Multi-User File Management System. This manual uses the term "host product" to refer to the product in which the module is installed.

The module supplies the following regulated DC voltages to the host product: 5 V, -5.2 V, 12 V, -12 V, 24 V, and 55 V. In addition, 120 VAC is available to drive motors.

The module occupies approximately 5 by 5 by 9.5 inches within the chassis of the host product. An external heat sink is approximately 7.5 by 10 inches. Screws through the heat sink attach the module to the chassis.

#### PHYSICAL DESCRIPTION

##### Main Assemblies

The power supply circuits are contained primarily on four boards:

- A VDE Line Filter board, which provides line filtering to meet VDE certification requirements for electromagnetic compatibility. (The VDE is the certifying agency in the Federal Republic of Germany.)
- A Line Voltage Selector board.
- An Inverter board, which rectifies and filters the line voltage, then chops it at 20 kHz to drive the inverter transformer. The Control circuit regulates voltages by varying the width of the 20 kHz pulses according to the input and output voltages and load current.
- A Regulator board, which rectifies and filters output of the inverter transformer and provides post-regulation. It also contains protection circuits and asserts TTL signals for use by the host product.

AC is available to drive fans and other components.

## INTRODUCTION

### Controls and Indicators

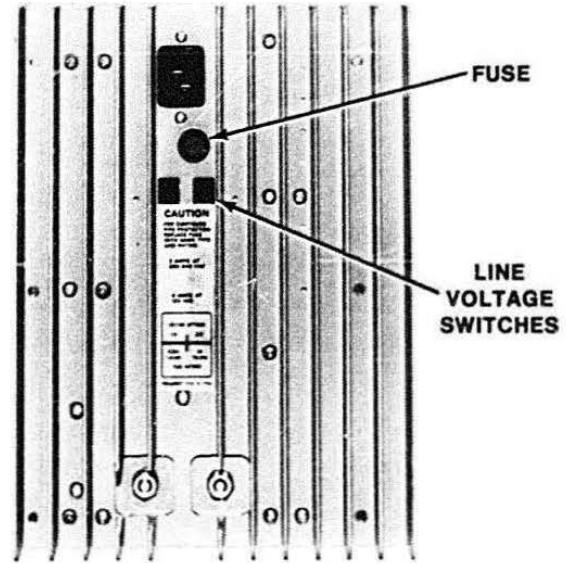
- Two Line Voltage switches allow operation on either 115 or 230 VAC nominal line voltage. These switches are accessible through the heat sink (Figure 1-2).
- A Logical On/Off switch isolates the system switch from line voltage. The host product turns on the power supply by grounding the switch signal line (OFF-1/ON-0). This allows the host product to keep the power on until its operations are complete even if the operator has turned off the system power switch.
- A high voltage warning flasher indicates the presence of dangerous voltages on the Inverter board.

### Differences Among Versions

This section describes the main differences among the -00, -01, and -02 versions of the module.

The -01 version differs primarily in the location of a spark gap on the Inverter board. The change supports operation at line voltages of 240 V. Component changes on the Regulator board altered the -5.2 V and 55 V current limits.

The -02 version incorporates the hand modifications of the -01 version. It also adds filter components to the VDE Line Filter board and the Inverter board. The chassis-mounted line filter was changed.



3732-34

Figure 1-2. Line Voltage Switches.

## Section 2

# SPECIFICATIONS

### PHYSICAL

Figure 2-1 gives the dimensions of the module. It weighs 9.5 lbs (4.3 kg).

### ELECTRICAL

Tables 2-1, 2-2, and 2-3 give the electrical specifications for the Power Supply module. The following definitions explain the column headings.

**Characteristic:** Property of equipment.

**Performance Requirement:** A statement that defines a characteristic in quantitative terms of performance, usually in limit form. The Performance Check section of this manual describes procedures to verify the performance.

**Supplemental Information:** Statements that explain performance requirements or that provide reference information. These are not supported by performance check procedures in the manual.

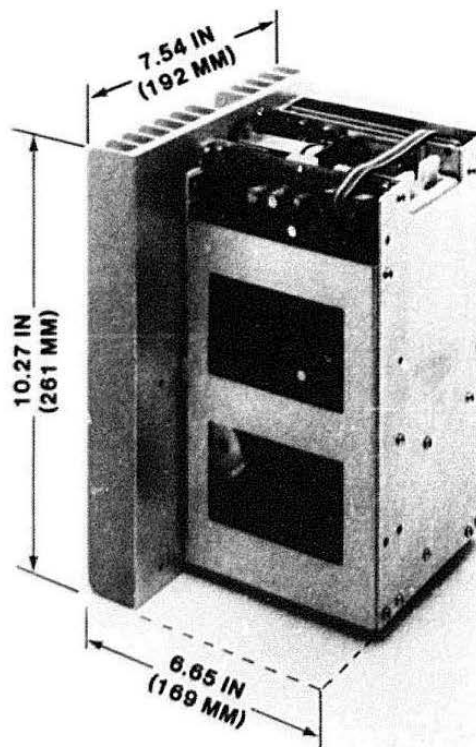
The performance requirements cited in this section are valid only within the following conditions:

- The load on the + 5 V supply is between 3 and 30 A.
- AC line supply is 48 to 66 Hz, 90 to 132 V or 180 to 264 V, with the crest factor between 1.35 and 1.414. The crest factor is the ratio of peak to rms voltage. It falls below 1.414 as the voltage departs from a sine wave.
- The module has been calibrated within and is operating within the specified environmental limits.

Table 2-1  
LINE INPUT

| Characteristic                                 | Performance Requirement     | Supplemental Information                |
|------------------------------------------------|-----------------------------|-----------------------------------------|
| Line voltage<br>115 V nominal<br>230 V nominal | 90 to 132 V<br>180 to 264 V |                                         |
| Frequency                                      |                             | 48 to 66 Hz                             |
| Crest factor                                   |                             | 1.35 to 1.414                           |
| Fuses                                          |                             | 115 V: 6.25 A medium<br>230 V: 3 A fast |
| Maximum power consumption                      |                             | 350 W <sup>a</sup>                      |

<sup>a</sup>Excluding AC for fans and disk. If maximum current were drawn from all DC supplies simultaneously, it would result in input power of approximately 510 W.



3732-35

Figure 2-1. Dimensions.

## SPECIFICATIONS

**Table 2-2**  
**DC SUPPLIES**

| Characteristic                   | Performance Requirement | Supplemental Information |
|----------------------------------|-------------------------|--------------------------|
| <b>+ 5 V Supply <sup>a</sup></b> |                         |                          |
| Regulation                       | ± 3%                    | Measured at sense line   |
| Ripple                           |                         | 100 mV p-p               |
| Minimum load                     |                         | 3 A <sup>b</sup>         |
| Maximum load                     | 30 A                    |                          |
| Foldback current limiting        | < 37 A                  |                          |
| Overvoltage protection           |                         | ≤ 7 V                    |
| <b>+ 12 V Supply</b>             |                         |                          |
| Regulation                       | ± 3%                    | <sup>c</sup>             |
| Ripple                           |                         | 20 mV p-p                |
| Maximum load                     | 4 A                     |                          |
| Foldback current limiting        | < 6 A                   |                          |
| Reverse voltage clamp            |                         | -0.7 V                   |
| Overvoltage protection           |                         | ± 15 VDC<br>± 17 V peak  |
| <b>+ 24 V Supply</b>             |                         |                          |
| Regulation                       | ± 3%                    |                          |
| Ripple                           |                         | 20 mV p-p                |
| Maximum load                     | 1.8 A                   |                          |
| Foldback current limiting        | < 2.8 A                 |                          |
| Reverse voltage clamp            |                         | -0.7 V                   |

<sup>a</sup>5.075 V at point of regulation in host product.

<sup>b</sup>Minimum loads are not required for the other supply voltages.

<sup>c</sup>Special Requirements for Memory Boards: During power up, the -12 V supply must reach -5 Volts before the +12 V supply reaches +10 V. During power down, the +12 V supply must not overshoot.

| Characteristic            | Performance Requirement | Supplemental Information                          |
|---------------------------|-------------------------|---------------------------------------------------|
| <b>+ 55 V Supply</b>      |                         |                                                   |
| Regulation                | ± 2%                    | Initial setting:<br>+ 55.1 V ± 100 mV             |
| Temperature coefficient   |                         | 5 mV per °C average<br>from 0 to 70°C at<br>VR579 |
| Ripple                    |                         | 25 mV p-p at 60 Hz<br>50 mV p-p at 40 kHz         |
| Maximum load              | 1.25 A                  |                                                   |
| Foldback current limiting | < 1.9 A                 |                                                   |
| Reverse voltage clamp     |                         | -0.7 V                                            |
| <b>- 5.2 V Supply</b>     |                         |                                                   |
| Regulation                | ± 4%                    |                                                   |
| Ripple                    |                         | 100 mV p-p                                        |
| Maximum load              | 4 A                     |                                                   |
| Foldback current limiting | < 4.8 A                 |                                                   |
| Reverse voltage clamp     |                         | + 0.7 V                                           |
| <b>- 12 V Supply</b>      |                         |                                                   |
| Regulation                | ± 3%                    |                                                   |
| Ripple                    |                         | 20 mV p-p                                         |
| Maximum load              | 1 A                     |                                                   |
| Foldback current limiting | < 1.5 A                 |                                                   |
| Reverse voltage clamp     |                         | + 0.7 V                                           |

**Table 2-3  
TTL SIGNALS**

| Characteristic | Performance Requirement                                                                                                              | Supplemental Information         |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| INIT-0         | Must stay low at least 50 ms after +5 V supply reaches +4.75 volts (nom.). Goes low when +5 V supply drops below +4.75 volts (nom.). | TTL initialization signal        |
| PWRFL-0        | Must go low at least 11 ms before INIT-0.                                                                                            | TTL power failure warning signal |

**ENVIRONMENTAL**

Table 2-4 describes the environment in which the Power Supply module is intended to operate. The performance requirements in the electrical specification are valid only if these environmental limits are met.

**Table 2-4  
ENVIRONMENTAL LIMITS**

| Characteristic                                       | Information                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature<br>Operating<br>ambient<br>Non-operating | Heat sink: 0 to 40°C<br>Circuit boards: 0 to 70°C<br>-55 to 75°C                                                                                                                                                                                                                                |
| Humidity<br>Operating and<br>Non-operating           | Up to 90% noncondensing                                                                                                                                                                                                                                                                         |
| Altitude<br>Operating<br>Non-operating               | 15,000 ft (4.5 km). Decrease maximum operating temperature -1°C for every 1,000 ft (300 m) above 5,000 ft (1.5 km).<br>50,000 ft (15 km)                                                                                                                                                        |
| Vibration<br>Non-operating                           | Withstands 0.015 in p-p (0.38 mm), 10 to 55 Hz sine wave, 15 min each axis and 10 min each axis at resonance or 55 Hz.                                                                                                                                                                          |
| Shock<br>Non-operating                               | Withstands 30 g, halfsine, 11 ms, 18 shocks                                                                                                                                                                                                                                                     |
| Bench handling<br>Non-operating                      | Withstands drop from 45 degrees, 4 in (102 mm), or equilibrium on all significant faces.                                                                                                                                                                                                        |
| Packaged product<br>vibration and shock              | Qualifies under National Safe Transit Association Pre-Shipment Test Procedure, Project 1A-B-1, when packaged as shipped from factory.                                                                                                                                                           |
| Electromagnetic<br>compatibility                     | Qualifies under FCC standard for Class A computing devices (Docket No. 20780) and VDE 0871/6.8 with respect to conducted emissions.<br><br>For radiated emissions, refer to specification for the host product.                                                                                 |
| Line transients<br>Oscillatory surge<br>Ride-through | Withstands oscillatory surges up to 2.5 kV at 1.5 MHz.<br><br>At line voltages between 95 and 132 V or 180 and 264 V, supplies remain within regulation for at least 20 ms after loss of line voltage. For line voltages between 90 and 95 V, supplies remain in regulation for at least 10 ms. |



## SPECIFICATIONS

### EXTERNAL CONNECTIONS

Table 2-5 describes the connections between the Power Supply module and the host product.

Table 2-5

#### EXTERNAL CONNECTIONS

| Connector | Name        | Use                                  |
|-----------|-------------|--------------------------------------|
| J71       | + 5 RTN     | Return for + 5 V supply              |
| J72       | + 5         | + 5 V output                         |
| J73-1     | + 12 V      | + 12 V output                        |
| -2        | + 12 V      | + 12 V output                        |
| -3        | G SENSE     | Ground sense from host product       |
| -4        | + 5 V SENSE | + 5 V sense from host product        |
| -5        | PWRFL-0     | Power failure warning                |
| -6        | INIT-0      | Power up initialization signal       |
| -7        | GND         | Return for all supplies except + 5 V |
| -8        | - 12 V      | - 12 V output                        |
| -9        | - 5.2 V     | - 5.2 V output                       |
| -10       | - 5.2 V     | - 5.2 V output                       |
| J74-1     | GND         | Ground                               |
| -2        | + 24 V      | + 24 V output                        |
| -3        | + 24 V      | + 24 V output                        |
| -4        | + 55 V      | + 55 V output                        |
| J76-1     | OFF-1/ON-0  | Power control line from host product |
| -2        | GND         | Ground                               |
| J1001 1-3 |             | 115 VAC output                       |
| -2        |             | Safety ground                        |
| J1002 1-3 |             | 115 VAC output (empty)               |
| -2        |             |                                      |
| J1003     |             | 115 VAC output                       |
| J1004     |             | 115 VAC output                       |
| J9001     |             | Power cord                           |

## Section 3

# MAINTENANCE

## SAFETY SUMMARY

### WARNING

*The VDE Line Filter, Line Voltage Selector, and Inverter boards are connected directly to the AC lines. To avoid injury by electrical shock an isolation transformer should be used during servicing of these boards.*

*Turning off the host product does not disconnect the Power Supply module from the AC lines nor does it always shut down the DC supplies on certain host products. Do not rely on the host system switch to remove voltages. Disconnect the power cable from the AC line.*

*After the power has been disconnected, the neon flasher on the Inverter board indicates that dangerous voltages are still present in the filter capacitors.*

*Some fault conditions may cause the switching transistors or other primary components to explode. To avoid injury to your eyes wear safety glasses while servicing the power supply.*

## GENERAL

The module does not require routine maintenance.

This section contains procedures and information on the following topics:

- Changing the line voltage.
- Troubleshooting and bringing up supplies which have been repaired.

- Assembly/disassembly of the module.

Refer to the Performance Check section for the performance check procedure. Refer to the host product service manual for the adjustment procedure.

## CHANGING THE LINE VOLTAGE

Two switches allow selection of either 115 or 230 V nominal line voltage. The switches are accessible through the heat sink.

1. Remove the power cord.

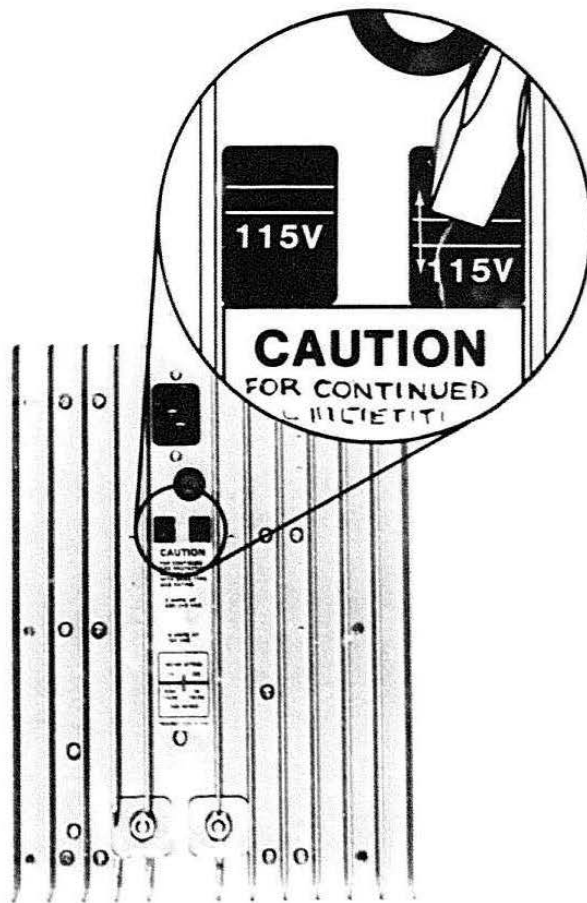
**WARNING**

*To avoid electrical shock, make certain that the power is disconnected before changing the Line Voltage switches and fuse.*

**CAUTION**

*To avoid possible damage to the equipment, make certain that both switches are set to the same voltage.*

2. Use a screwdriver to move the switches to the desired setting (Figure 3-1).
3. Replace the fuse with one of the proper rating (refer to Table 2-1).
4. Replace the power cord with the proper type. Refer to the host product service manual for information on power cord options and accessory part numbers.



3732-4

Figure 3-1. Changing Line Voltage.

## TROUBLESHOOTING

This section provides help in troubleshooting the major blocks of the power supply. These are (in the order tested) the Control circuit, the Primary circuit, the Logical On/Off switch, the DC supplies, and the Timing circuit. The procedure in this section also should be used to bring up supplies which have been repaired.

The tests in this section should be performed with the module disconnected from the host product and operating into a suitable load (described in the list of required equipment).

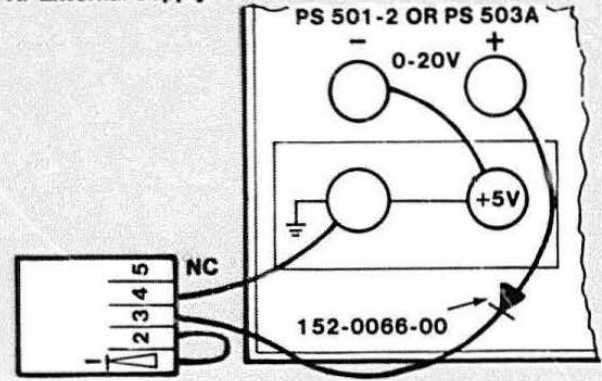
**EQUIPMENT REQUIRED**

- TEKTRONIX 465 dual trace oscilloscope (or equivalent).
- TEKTRONIX P6302 current probe and TEKTRONIX AM503 amplifier, or TEKTRONIX P6042 current probe (or equivalent).
- TEKTRONIX PS501-2 or PS503A power supply (or equivalent) with the + 5 V and variable supplies connected in series to provide 10 to 24 V variable and at least 200 mA. Connect the external supply through a five-pin harmonica connector wired as shown in Figure 3-2A.
- Variable autotransformer capable of at least 6 A at 115 V or 3 A at 230 V, output variable from 0 to at least 115% of line voltage.
- Isolation transformer.
- Remote switch with five-pin harmonica connector (Figure 3-2B) to fit J63. (A two-pin jumper may be substituted.)
- Three-pin harmonica connector to fit J60, wired as shown in Figure 3-2C.
- Load to draw between 3 and 30 A of + 5 V. Connect + 5 V SENSE to the + 5 V output at the load. Connect + 5 RTN, GND, and G SENSE at a common point at the load (Figure 3-3).

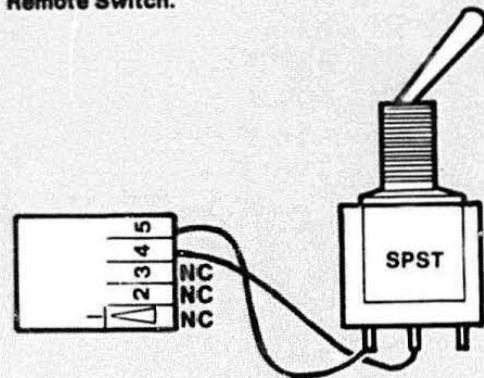
**NOTE**

All DC grounds are floating from the power supply chassis. GND is the working ground and return for all supplies except + 5 V. G SENSE gives voltage regulators a direct reference to ground in the host product. GND, G SENSE, and + 5 V RTN should be connected to a common point at the load.

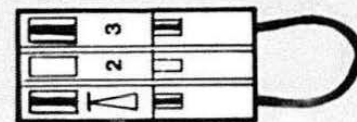
**A. External Supply.**



**B. Remote Switch.**



**C. Jumper**



3732-5

Figure 3-2. Test Connectors.

## MAINTENANCE

### PREPARATION

1. Verify that the Line Voltage switches are set to the proper voltage.

#### WARNING

The fuse holder is connected directly to the AC lines without an intervening switch. To avoid injury by electrical shock, disconnect the power cord before removing the fuse.

2. Verify that the proper fuse is installed. Refer to Table 2-1 for the fuse specification.
3. Connect a suitable load, such as the one described in Figure 3-3.

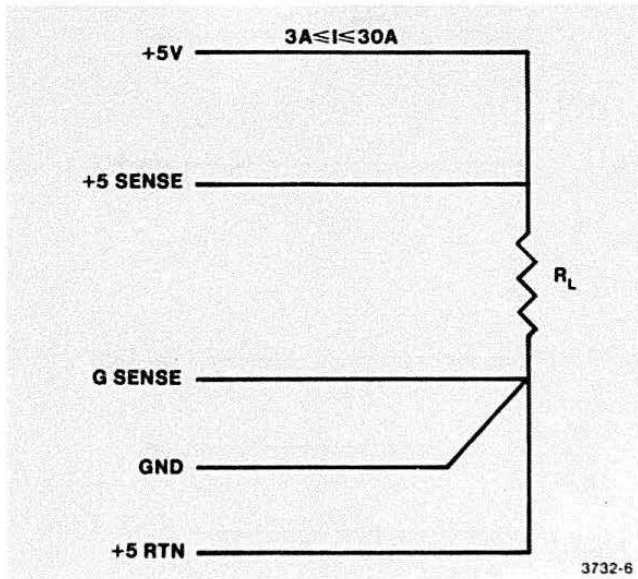


Figure 3-3. Connection of Test Load.

### CONTROL CIRCUIT

This test examines the output of the Control circuit before connecting the Power Supply to the AC line. An external source provides local DC to operate the circuit. The Logical On/Off switch is tested separately.

1. Set the oscilloscope as follows:

|                |            |
|----------------|------------|
| CH 1 VOLTS/DIV | 10         |
| TIME/DIV       | 10 $\mu$ s |
| TRIGGER SOURCE | CHANNEL 1  |
| TRIGGER SLOPE  | +          |
| TRIGGER MODE   | AUTO       |

2. Connect Channel 1 of the oscilloscope to Pin 1 of the base drive transformer (T540, Figure 3-4). Position the ground reference in the center of the screen.
3. Connect the external DC source to J63 using the harmonica connector shown in Figure 3-2A. If the external supply does not include a voltmeter, connect one across its output. (The loop between Pins 1 and 2 of the harmonica connector disables the +5 V current limiting circuit. The current sense amplifier does not operate properly in the absence of line voltage.)
4. Turn on the external DC source. Gradually bring up the DC voltage while observing the oscilloscope display. The Schmitt trigger should turn on when the voltage reaches about 21 V. At this point, the display should appear similar to that shown in Figure 3-5.

Failure to trigger may be caused by bad transistors in the Schmitt trigger. Departure from the waveform shown in the figure indicates a fault in the Pulse Width Modulator circuit or the Base Drive circuit.

#### NOTE

If the switching transistors have failed, CR457 and CR555 may have become leaky and should also be replaced.

5. Gradually turn down the DC voltage. The Schmitt trigger should turn off at about 11 V.
6. Reset the external DC to 24 V.
7. Change the oscilloscope setting as follows:
 

|               |                    |
|---------------|--------------------|
| B TIME/DIV    | 1 $\mu$ S          |
| HORIZ DISPLAY | A INTEN            |
| B SOURCE      | STARTS AFTER DELAY |
8. Adjust DELAY TIME POS until the intensified zone agrees with that shown in the top of Figure 3-6.

9. Change HORIZ DISPLAY to B DLY'D and verify that the dead time interval (shown in Figure 3-6) is equal to or greater than 4.3  $\mu$ s. If it is not, replace U575.
10. Reset HORIZ DISPLAY to A.

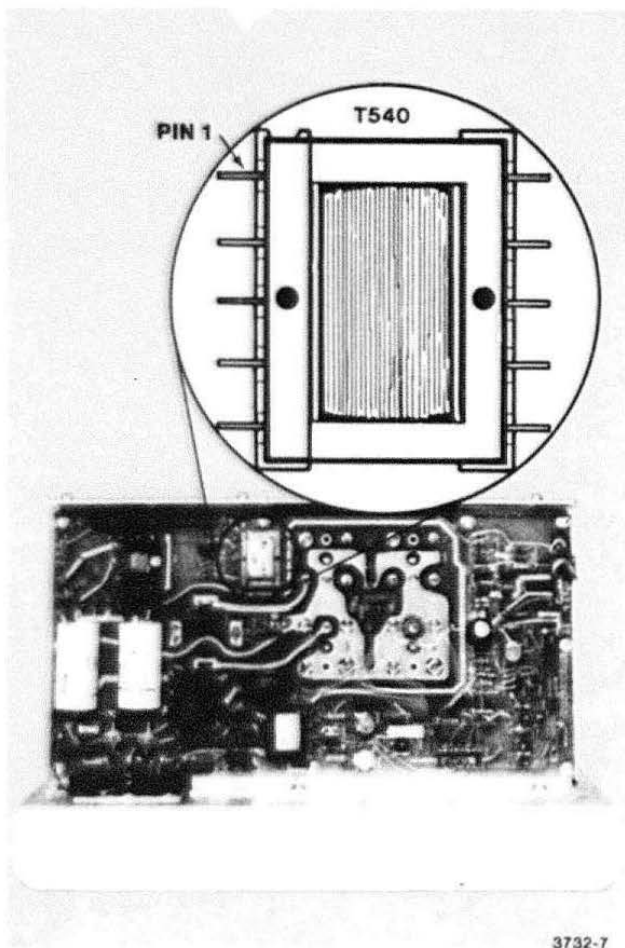
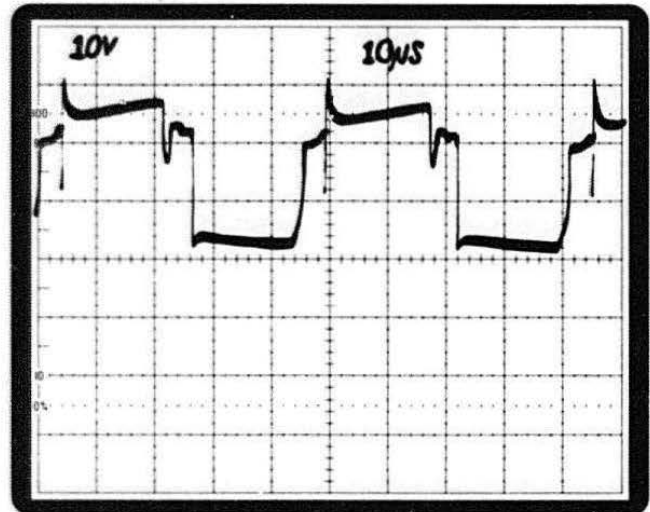
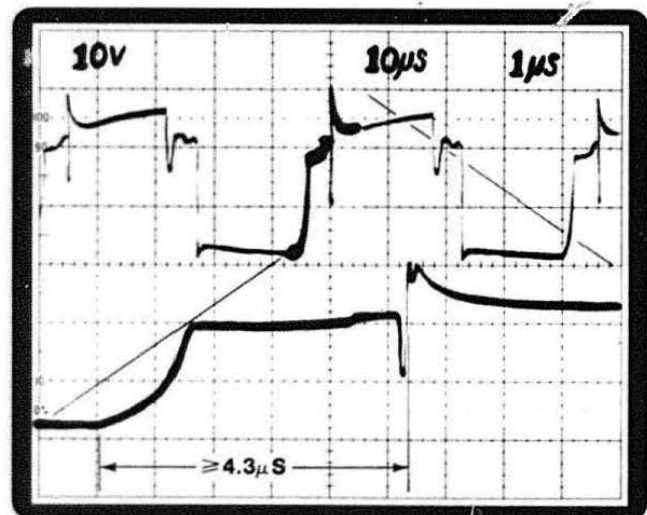


Figure 3-4. Base Drive Test Point.



3732-8

Figure 3-5. Base Drive Waveform.



3732-9

Figure 3-6. Inverter Dead Time.

**PRIMARY CIRCUIT**

This test applies AC to the Primary circuit. The test checks the primary side of the inverter and the local DC supply for the Control circuit.

1. Set up the oscilloscope and external supply as described in Steps 1, 2, 3, and 6 of the preceding test.
2. Turn off the external DC supply.
3. Connect the DC current probe amplifier output to Channel 2.
  - a. Connect the current probe to Lead 9 of the inverter transformer (T320). This is the white wire located as shown in Figure 3-7.
  - b. Set AMPS/DIV on the current probe amplifier to 2 A.
  - c. Set Channel 2 VOLTS/DIV to the value specified on the amplifier (typically 10 mV).
  - d. Position the ground reference two divisions from the bottom of the screen.

4. Place the jumper (Figure 3-2C) on J60 (Figure 3-8). This bypasses the triac. It also bypasses the Logical On/Off Switch and the power switch on the host product.
5. Verify that the autotransformer is off and that the voltage control is set to 0. Connect the power supply to the isolation transformer, and then connect the isolation transformer to the autotransformer.
6. Turn on the external DC supply.

**CAUTION**

*The + 5 V current limiting circuit is disabled during this portion of the test. To avoid damage to the supply, carefully observe the oscilloscope display for current greater than 4 A (2 divisions).*

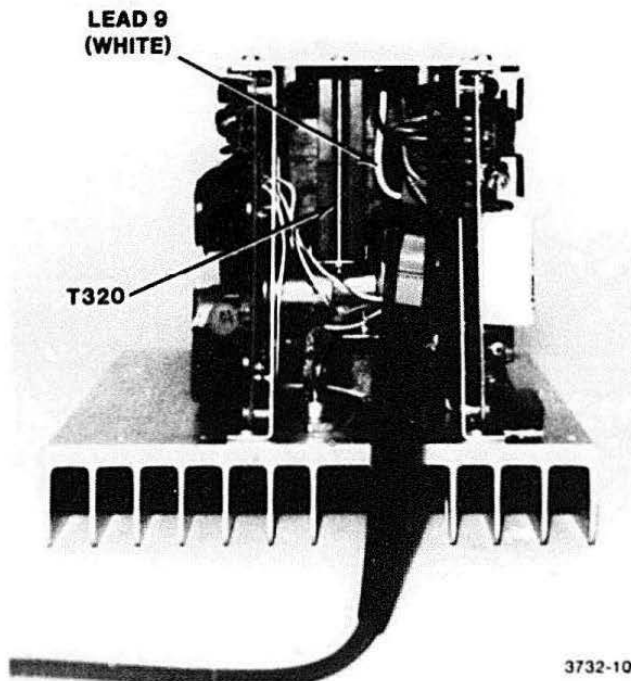


Figure 3-7. Connecting the Current Probe.

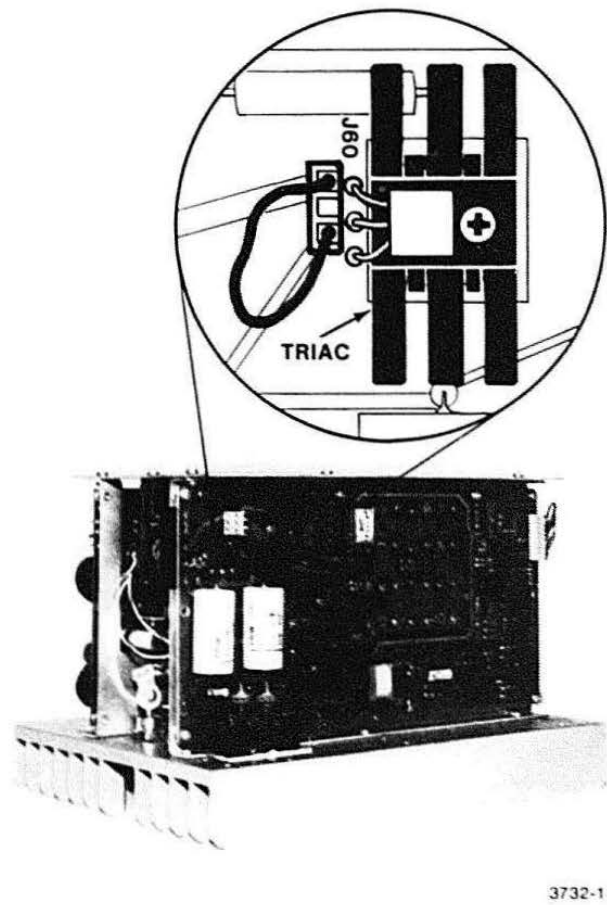


Figure 3-8. Bypassing Triac.

7. This step examines the inverter waveform while applying line voltage. Refer to Figure 3-9, which compares the Inverter waveform (bottom) with the Base Drive waveform (top) which was obtained in the previous test.
  - a. Turn on the autotransformer. Gradually increase the line voltage while watching the oscilloscope. The current increases gradually while the control is moved from approximately 12% to 40% of its travel. During this period the supply voltages are coming up.
  - b. The pulse width narrows when the supply comes into regulation. This should occur at approximately 1 A with a minimum load or at approximately 2 A with a 15 A load on the + 5 V supply. Further increases in the line voltage should continue to reduce the duty cycle.

**NOTE**

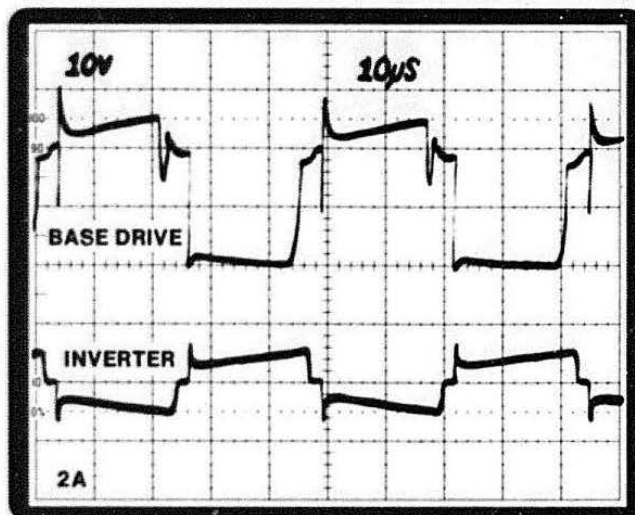
*A fault is indicated if the primary current exceeds approximately 4 A or if the waveform departs markedly from that shown in the lower half of Figure 3-9.*

8. Remove the harmonica connector which attaches the external supply to J63. This also enables current limiting. The power supply should continue to run. Failure to do so indicates a fault in the + 5 V current limiting circuit or the + 24 V internal supply to the Control circuit.

**LOGICAL ON/OFF SWITCH**

1. Turn off the autotransformer.
2. Remove the jumper which bypasses the triac.
3. Connect the five-pin harmonica with the remote switch to J63. The connector should be wired as shown in Figure 3-2B.
4. Turn on the autotransformer. The power supply should *not* come on.
5. Turn on the power supply using the remote switch installed in Step 3. The power supply should come up and the waveform should look the same as in Figure 3-9. A difference in the waveforms indicates a fault in the Logical On/Off Switch or the triac.

**JUST BEFORE REGULATION (LOAD ABOUT 5A TOTAL)**



3732-12

Figure 3-9. Inverter Waveform.



## MAINTENANCE

### DC SUPPLIES

1. While measuring the + 55 V output at J74-4, adjust R591 on the Inverter board for a reading of + 55.1 V  $\pm$  100 mV.
2. Use the procedure in the Performance Check section to test the DC supplies.

Four conditions affect all supplies by causing the Control circuit to shut down the inverter or to reduce its output.

- If the + 5 V load current exceeds its limit, + CS (current sense) causes foldback limiting at the Pulse Width Modulator. This reduces the unregulated voltage at each regulator.
- If the - 12 V supply drops to 0 V, again the + 5 V current sense amplifier causes foldback limiting at the pulse width modulator.
- If the + 5 V supply exceeds 6.0 V, SDN (shutdown) causes the Pulse Width Modulator to shut off the base drive signals.
- If the + 12 V supply exceeds 13.5 V, again SDN causes the Pulse Width Modulator to shut off the base drive signals.

Other overvoltage or overcurrent conditions ordinarily affect only that supply.

### TIMING CIRCUIT

Use the procedure in the Performance Check section to verify the functioning and relationship of INIT-0 (initialization) and PWRFL-0 (power failure warning).

The interval between the loss of line voltage and INIT-0 depends greatly upon the host product load and the previous line voltage. INIT-0 may remain high for as long as two seconds.

PWRFL-0 is relatively unaffected by the host product load or the line voltage, provided that AC is present on the line. PWRFL-0 does *not* provide warning of low line voltage.

## ASSEMBLY/DISASSEMBLY

### WARNING

The VDE Line Filter, Line Voltage Selector, and Inverter boards are connected directly to the AC lines. Turning off the host product does not disconnect the supply from the AC lines nor does it always shut down the DC supplies on certain host products. To avoid injury or damage to components always disconnect the power cable from the AC line before replacing components.

Most components can be serviced by removing the covers over the Inverter and Regulator boards. Do not remove the panel opposite the heat sink.

### REPLACING THE LINE RECTIFIER (CR331)

The line rectifier bridge (CR331) can be replaced without removing the Inverter board. Unsolder the lugs from the front of the board and remove the bridge by reaching into the power supply cavity.

### REPLACING THE SWITCHING TRANSISTORS

#### NOTE

If the switching transistors have failed, CR457 and CR555 may have become leaky and should also be replaced.

1. Remove the cover over the Inverter board.
2. Remove the cover over the switching transistors.
3. Unsolder the transistor leads.
4. Bend the leads of the new transistors until they are approximately the same shape as the old ones.

### WARNING

Silicon grease is extremely irritating to the eyes. Handle with care and wash hands thoroughly after use.

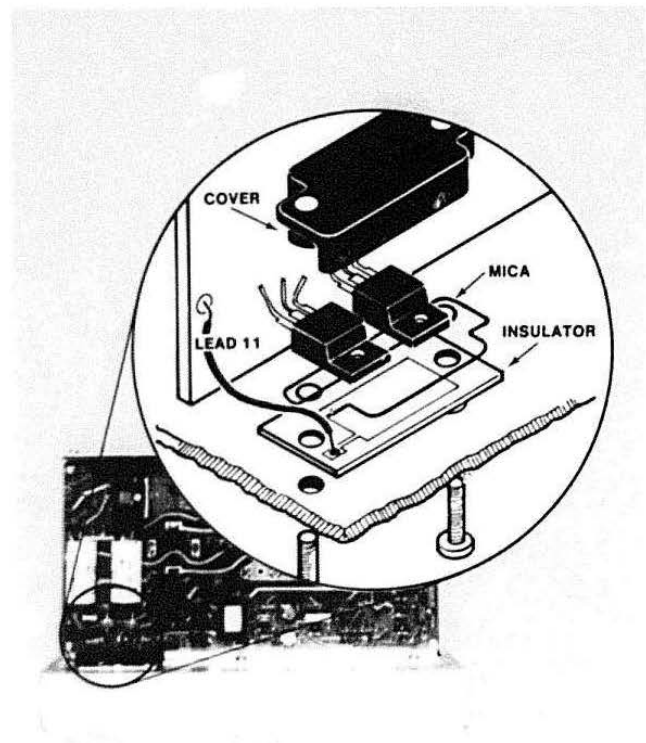
5. Inspect the mica washer and replace it if it is cracked or torn. Lightly coat the surfaces of the insulator and washer with silicon grease and remove any excess. Install the parts in the order shown in Figure 3-10.

6. Place the center leads of the transistors over their solder pads.

### CAUTION

If you tighten the screws too much, you will break the insulator under the transistors.

7. Screw the cover in place. This presses the transistors against the insulator. Be careful not to pinch the lead from the insulator shield.
8. Solder the center leads, and then form and solder the others.



3732-13

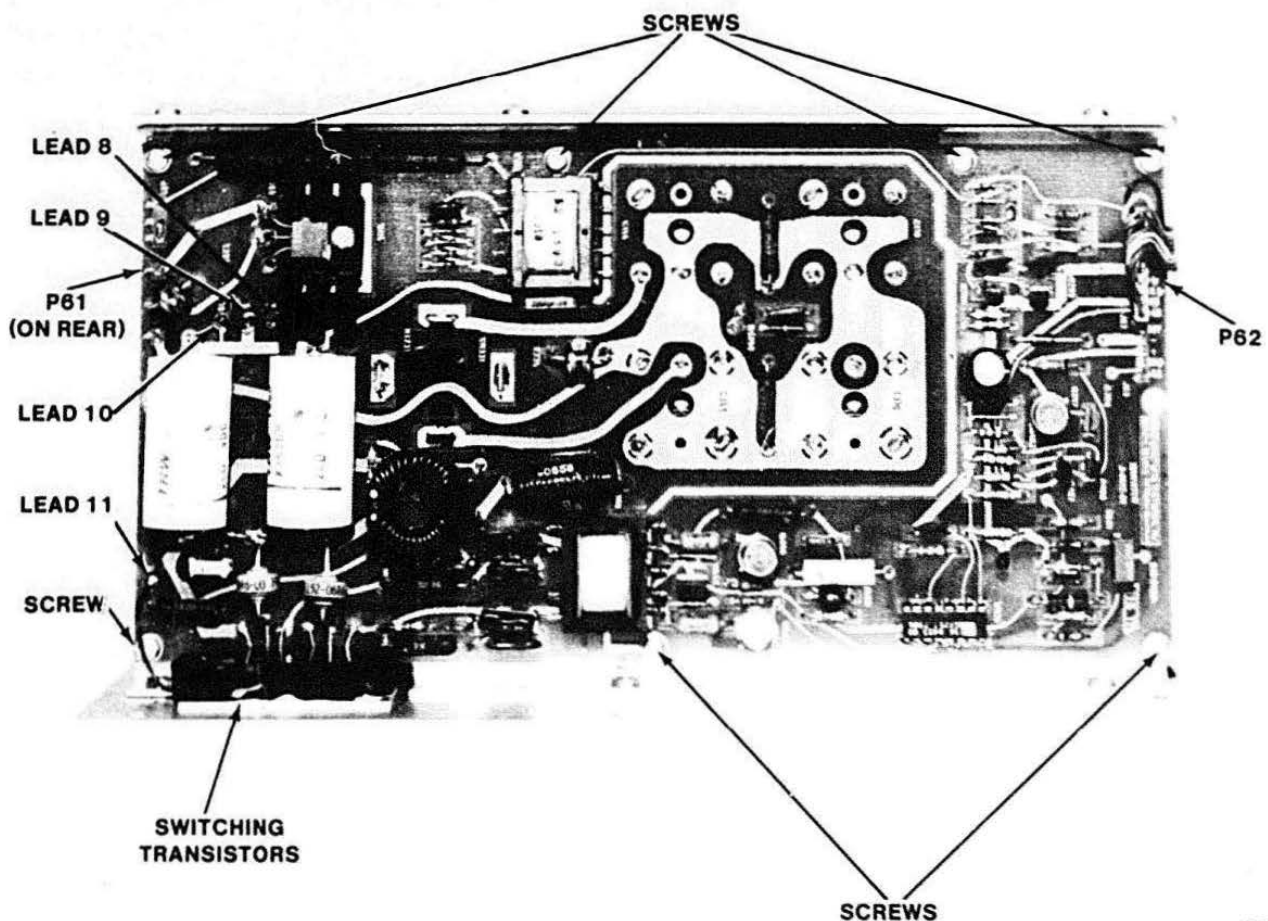
Figure 3-10. Mounting of Switching Transistors.

## MAINTENANCE

### REMOVING THE INVERTER BOARD

Refer to Figure 3-11.

1. Remove the cover over the Inverter board.
2. Disconnect P61 and P62. (P61 is on the rear of the board.)
3. Unsolder the gray, white, and black transformer leads where they come through board from the rear. These are marked 8, 9, and 10 respectively on the board.
4. Unsolder Lead 11 from the board.
5. Remove the cover from the switching transistors.
6. Remove the seven screws holding the board in place and remove the board.
7. Reverse the procedure to reinstall the board. Do not overtighten the switching transistor cover or you may break the insulator underneath.



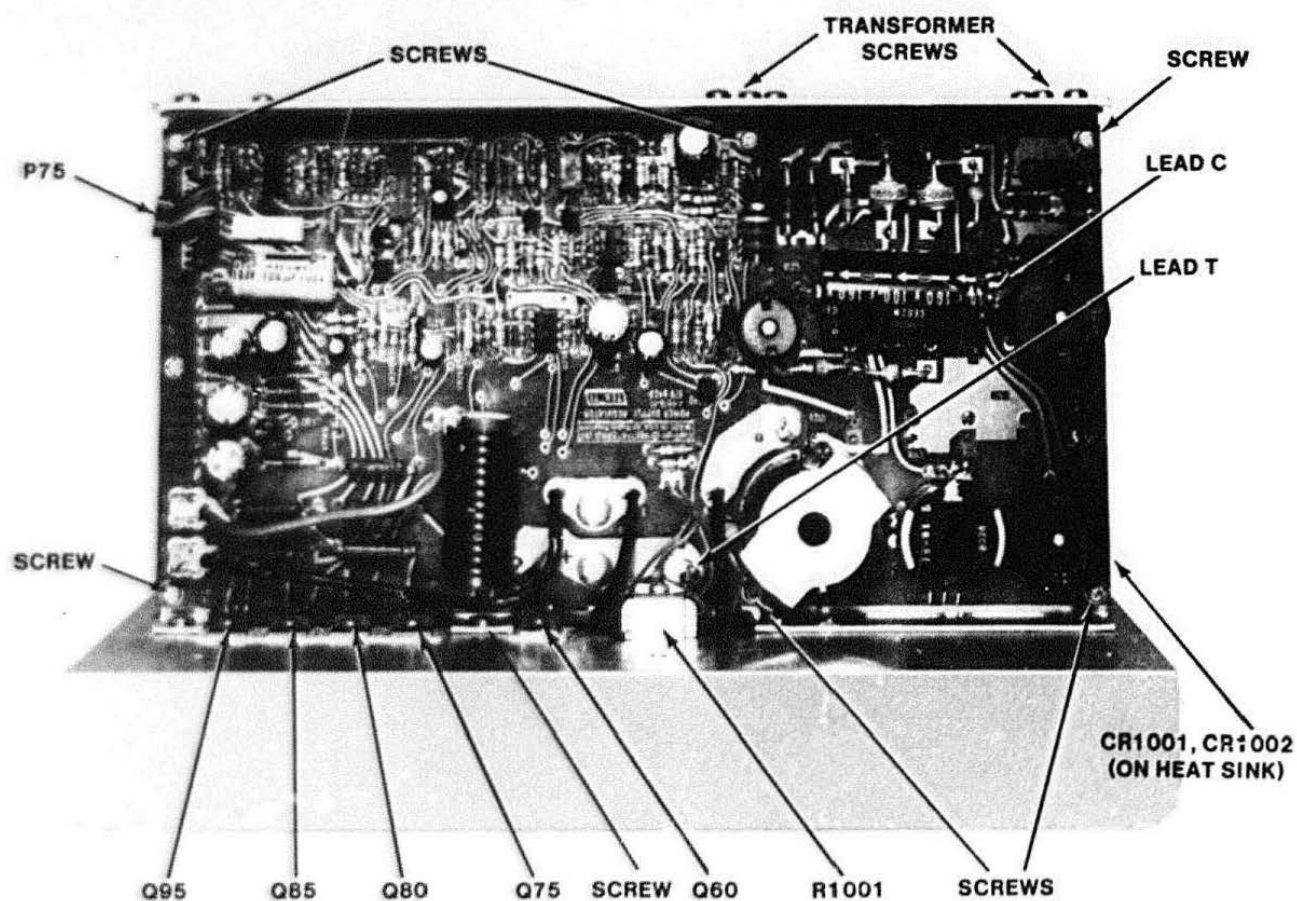
3732-14

Figure 3-11. Removing the Inverter Board.

### REMOVING THE REGULATOR BOARD

Refer to Figure 3-12.

1. Remove the cover over the Regulator board.
2. Disconnect P75.
3. Unscrew the transformer leads from the + 5 V diodes (CR1001, CR1002) on the heat sink.
4. Unsolder Lead C where it comes through the board. This is the diode common.
5. Unsolder the gray, white, and black transformer leads from the *Inverter board* (Figure 3-11). These are marked 8, 9, and 10 respectively on the board.
6. Return to the Regulator board. Remove the screws fastening Q60, Q75, Q80, Q85, and Q95 to the heat sink. Save the washers and mica insulators.
7. Remove the clamp holding R1001 to the heat sink.
8. Remove the two screws which fasten the power transformer to the panel opposite the heat sink.
9. Loosen the board by removing the seven mounting screws.
10. Unsolder Lead T (from the chassis-mounted inductor, L1001) and pull the board off the lead.
11. Reverse the procedure to reinstall the board.



3732-15

Figure 3-12. Removing the Regulator Board.

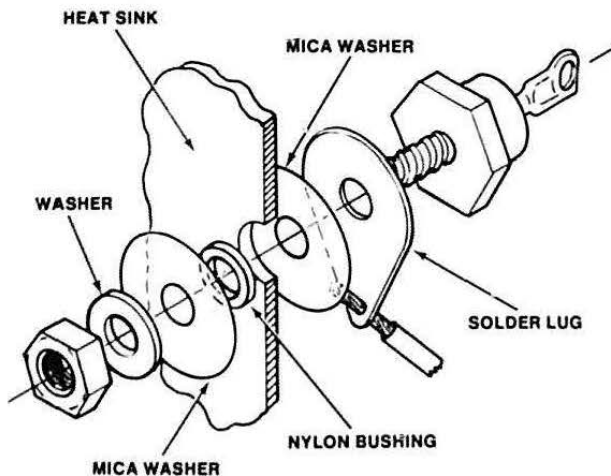
## REPLACING THE +5 V RECTIFIER (CR1001, CR1002)

Before removing the diodes, note the rotation of their tops from the lines of the chassis. This angle (about 45°) makes it easier to grip the nuts while fastening or unfastening the transformer leads.

### WARNING

*Silicon grease is extremely irritating to the eyes. Handle with care and wash hands thoroughly after use.*

Figure 3-13 shows the assembly of the + 5 V rectifier diodes on the heat sink. The small nylon bushing fits inside the hole. Carefully inspect the mica washers for tears or cracks. Coat both sides lightly with silicon grease and wipe off any excess.



3737-16

Figure 3-13. Mounting the Diodes to the Heat Sink.

## ACCESS TO THE CAVITY

To replace the + 5 V chassis-mounted inductor (L1001), the large filter capacitor (C55), or the Line Voltage Selector board, first remove the *Inverter board* and its support bracket in one piece.

1. Remove the cover over the Inverter board.
2. Unsolder the gray, white, and black transformer leads from the Inverter board (Figure 3-11). These are numbered 8, 9, and 10 on the board.
3. Unsolder Lead 11 from the board.
4. Remove the cover over the switching transistors.
5. Unfasten the safety ground leads (green and yellow) and lugs from the Inverter board bracket.
6. Unplug P61 and P62 from the Inverter board. (P61 is on the rear of the board.) Unplug P64 and P66 from the VDE Filter board.
7. Remove the six screws holding the bracket in place.
8. Reverse the procedure to reinstall the board and bracket. Do not overtighten the cover on the switching transistors or you may break the insulator underneath.

## Section 4

# PERFORMANCE CHECK

The procedures in this section compare the performance of the Power Supply module with the electrical requirements given in the Specifications section. These procedures are for use with supplies which appear to be operating properly. For troubleshooting assistance or to bring up supplies which have been repaired, refer to the Maintenance section.

The following conditions must be met in order for the electrical requirements to be valid:

- The line supply must be 48 to 66 Hz, 115 V nominal (90 to 132 V) or 230 V nominal (180 to 264 V), with a crest factor between 1.35 and 1.414.
- The load on the + 5 V supply must be between 3 A and 30 A. The check may be performed with the module connected to a properly functioning host product or to the test load described in the Maintenance section

- The module must have been calibrated within and tested within the environmental limits described in the Specifications section.

If the performance on any test does not meet the requirement and cannot be adjusted, then repair the power supply and repeat the entire performance check.

### EQUIPMENT REQUIRED

- TEKTRONIX SC 504 dual trace oscilloscope (or equivalent).<sup>1</sup>
- TEKTRONIX DM 501 voltmeter (or equivalent accurate to  $\pm 0.1\%$  at 55 V).<sup>1</sup>
- Flat blade 1/8-inch screwdriver.

<sup>1</sup> Requires suitable mainframe such as TEKTRONIX TM 515.

## PROCEDURES

### DC VOLTAGES

Refer to Figure 4-1 for the location of test points.

1. Turn on the power supply.
2. Connect the reference lead of the voltmeter to G SENSE (J73-3).
3. Referring to Table 4-1, measure each voltage at the test point indicated and compare it with the corresponding limits.
4. If any voltage falls outside of the limits, refer to the adjustment procedure in the service manual for the host product. (If the module is being checked by itself, adjust R591 on the Inverter board for a reading of  $+ 55.1 \text{ V} \pm 100 \text{ mV}$  while measuring the  $+ 55 \text{ V}$  output at J74-4. Repeat Step 3.)

Table 4-1

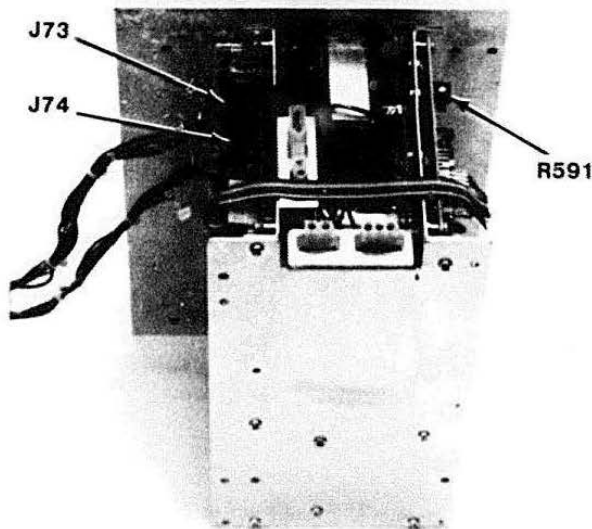
POWER SUPPLY VOLTAGE LIMITS

| Nominal Voltage     | Test Point | Range <sup>a</sup>                                |
|---------------------|------------|---------------------------------------------------|
| + 5 V <sup>b</sup>  | J73-4      | 4.85 to 5.15 V ( $5 \text{ V} \pm 3\%$ )          |
| -5.2 V              | J73-10     | -4.99 to -5.41 V<br>( $-5.2 \text{ V} \pm 4\%$ )  |
| + 12 V              | J73-1      | 11.64 to 12.36 V ( $12 \text{ V} \pm 3\%$ )       |
| -12 V               | J73-8      | -11.64 to -12.36 V<br>( $-12 \text{ V} \pm 3\%$ ) |
| + 24 V              | J74-2      | 23.28 to 24.72 V ( $24 \text{ V} \pm 3\%$ )       |
| + 55 V <sup>c</sup> | J74-4      | 53.90 to 56.10 V ( $55 \text{ V} \pm 2\%$ )       |

<sup>a</sup> Measured to J73-3.

<sup>b</sup> 5.075 V at point of regulation in host product.

<sup>c</sup> 55.1 V at power supply.



3732-17

Figure 4-1. Power Supply Test Points.

### INIT-0 AND PWRFL-0

1. Set the oscilloscope as follows:

|                  |          |
|------------------|----------|
| TIME/DIV         | 10 ms    |
| VERT MODE        | CHOP     |
| CH1 VOLTS/DIV    | 2 V      |
| CH1 COUPLING     | DC       |
| CH2 VOLTS/DIV    | 2 V      |
| CH2 COUPLING     | DC       |
| TRIGGER SOURCE   | CH1      |
| TRIGGER COUPLING | AC       |
| TRIGGER MODE     | AUTO     |
| TRIGGER SLOPE    | +        |
| TRIGGER LEVEL    | Midrange |

2. Turn on the power supply.
3. Test the trigger level by touching the Channel 1 probe to + 5 V SENSE (J73-4). If the oscilloscope does not trigger on contact, adjust TRIGGER LEVEL and repeat. Fasten the probe to + 5 V SENSE.
4. Connect Channel 2 to INIT (J73-6).
5. Position the Channel 1 ground reference at the center of the screen and position the Channel 2 ground reference one division above the bottom.
6. Set TRIGGER MODE to SINGLE SWEEP.
7. Turn the power supply OFF and then ON.

Compare the waveform with that shown in Figure 4-2. INIT-0 should remain low for at least 50 ms after + 5 V SENSE reaches its lower margin of 4.75 V

8. Change the oscilloscope settings as follows:

|               |      |
|---------------|------|
| TRIGGER MODE  | AUTO |
| TRIGGER SLOPE | -    |

9. Move the Channel 1 probe to PWRFL-0 (J73-5). Test the trigger level by touching the probe to the pin and removing it. If the oscilloscope does not trigger when the probe is removed, adjust TRIGGER LEVEL and repeat. Fasten the probe to PWRFL-0.
10. Turn off the power. This simulates a power failure and should trigger the oscilloscope.

Compare the waveform with that shown in Figure 4-3. PWRFL-0 should go low at least 11 ms before INIT-0. Because the interval varies with line voltage and the load on the power supply, you may need to adjust TIME/DIV to as little as 2 ms or as much as 200 ms.

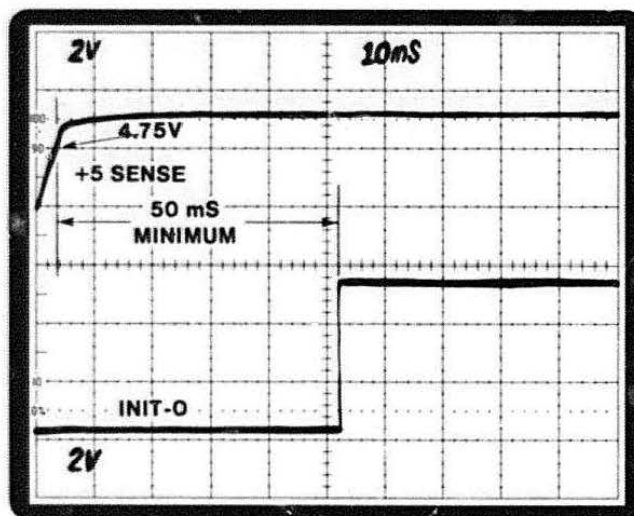
### MAXIMUM AND MINIMUM LINE VOLTAGE

The preceding checks may be repeated while using an autotransformer to adjust the line voltage to the minimum and maximum values given in Table 2-1. However, a complete test requires special equipment which is not ordinarily available to customers. Consult your Tektronix Service Center for further information.

### CURRENT LIMITING AND MAXIMUM LOADS

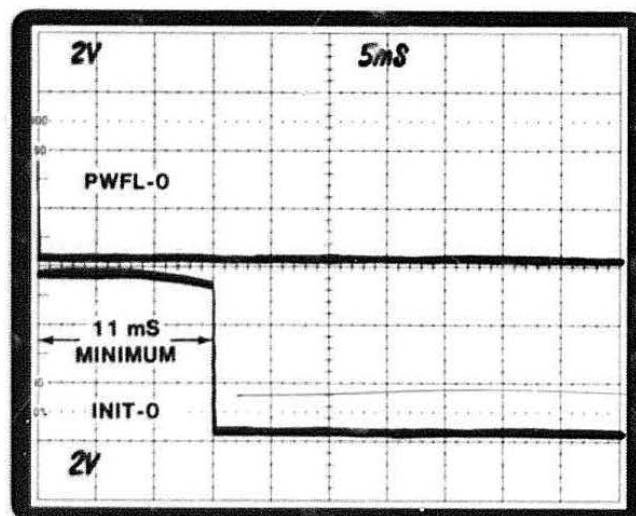
Checking performance of the current limiting circuits and operation at maximum load requires special test equipment which is not ordinarily available to customers. Consult your Tektronix Service Center for further information.

This completes the performance check.



3732-18A

Figure 4-2. Power-Up Waveform.



3732-19

Figure 4-3. Power-Down Waveform.



## Section 5

# THEORY OF OPERATION

## INTRODUCTION

The Power Supply module uses a high-efficiency, pulse-width-modulated inverter. This circuit rectifies and filters the line voltage, and then chops it at 20 kHz to couple power to the DC supplies.

Figure 5-1 is a simplified diagram of the inverter. Two switching transistors push and pull current through the inverter transformer at 20 kHz. The secondary of the inverter transformer feeds a typical full wave rectifier. An LC filter smooths the 40 kHz square waves from the rectifier.

The Control circuit regulates the +5 V output by varying the duty cycle of the switches between 0 and 45% each. Increasing the duty cycle raises the average voltage in the secondary.

The module contains four circuit boards:

- A VDE Line Filter board (Schematic A1) to meet electromagnetic compatibility requirements. (VDE is the certifying agency in Federal Republic of Germany.)
- A Line Voltage Selector board (Schematic A2) with two switches to select nominal line voltages of 115 or 230 volts.
- An Inverter board (Schematic A3), which contains the Primary and Control circuits.
- A Regulator board (Schematic A4), which contains the DC supplies and a timing circuit to assert interface signals.

An interconnect diagram shows connections among the boards and the host product. Schematics A1 and A2 for the VDE Line Filter and Line Voltage Selector boards also are on this sheet.

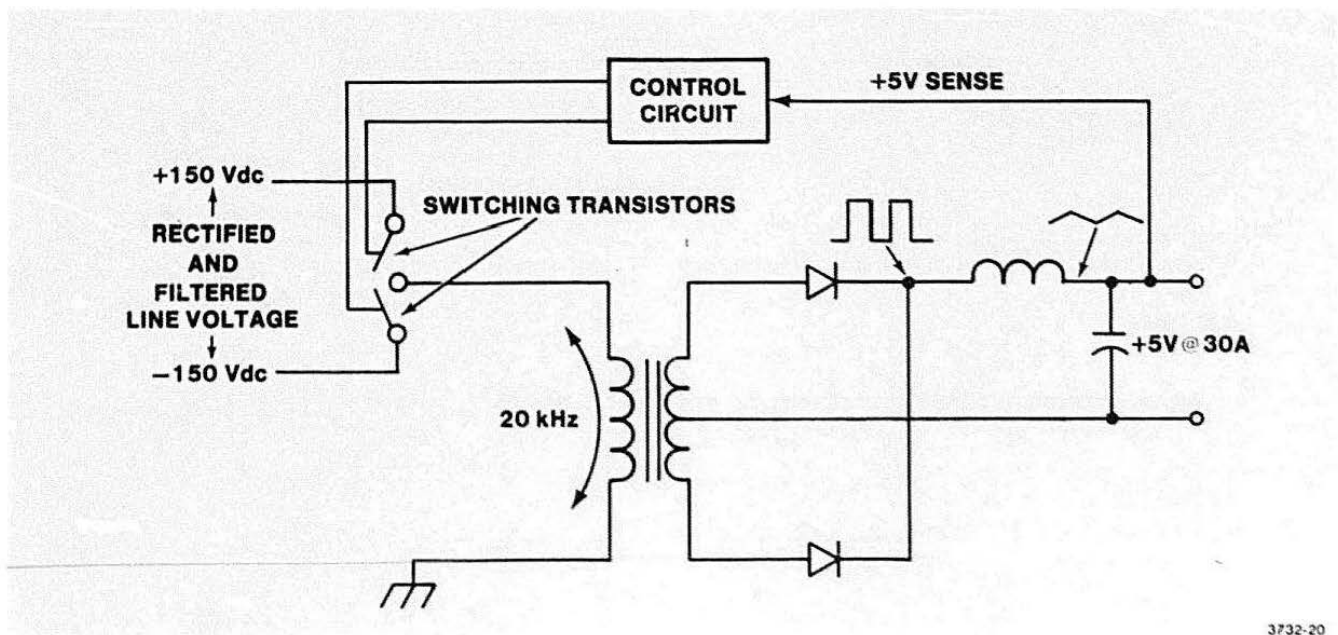


Figure 5-1. Simplified Inverter Circuit.

3732-20

## THEORY OF OPERATION

### DC SUPPLIES

The module provides the following voltages to the host product:

|        |        |
|--------|--------|
| + 5 V  | 30 A   |
| + 12 V | 4 A    |
| + 24 V | 1.8 A  |
| + 55 V | 1.25 A |
| -5.2 V | 4 A    |
| -12 V  | 1 A    |

#### NOTE

*All DC supplies must not be fully loaded simultaneously. Table 2-1 gives the maximum load through the power cord excluding AC for motors.*

All DC grounds in the Power Supply module are floating from the chassis. This protects the chassis from corrosion by forcing current to return through the wiring harness.

Three types of ground connections are used between the module and a common ground point in the host product:

- GND is the power supply working ground and return for all supplies except + 5 V.
- + 5 V RTN is a separate return for the + 5 V, 30 A supply.
- G SENSE (ground sense) gives voltage regulators a direct reference to ground in the host product. Since the line does not carry load current, the ground reference does not vary with changes in the load.

### SYSTEM INTERFACE SIGNALS

|            |                                                                                                                               |
|------------|-------------------------------------------------------------------------------------------------------------------------------|
| OFF-1/ON-0 | The host product grounds this signal to turn on the power supply.                                                             |
| INIT-0     | Initialization. The power supply holds this signal low for at least 50 ms after the + 5 V supply comes into regulation.       |
| PWRFL-0    | Power failure warning. The power supply pulls this signal low at least 11 ms before the + 5 V supply drops out of regulation. |

## BLOCK DESCRIPTION

The block diagram (foldout) shows the major elements of the power supply: the Primary circuit, the Control circuit, and the DC supplies.

The Primary circuit consists of a line filter, a line voltage selector, a rectifier and DC filter, and two switching transistors. These are connected to the remainder of the power supply through transformers and to the chassis through a capacitor which has a 2 kV rating. This arrangement isolates line voltage from the chassis and other circuits and provides a minimum breakdown voltage of 1.5 kV.

The Control circuit consists of a Logical On/Off switch, a Schmitt trigger, a Pulse Width Modulator circuit, and a Base Drive circuit.

- The Logical On/Off switch controls a triac on the AC line. The host product controls this switch by OFF-1/ON-0.
- The Schmitt trigger supplies local DC to the Pulse Width Modulator and base drive. During power-up, this current comes from the Logical On/Off switch until the 24 V supply comes up.
- The Pulse Width Modulator circuit regulates the + 5 V supply (and provides preliminary regulation for the others) by varying the duty cycle of the switching transistors.
- The Base Drive circuit amplifies these control signals and couples them to the bases of the switching transistors.

The DC supplies provide rectification, filtering, regulation, and overload protection. Feedback to the Pulse Width Modulator causes it to shut down if the + 5 V or + 12 V supply exceeds its voltage limit and also provides foldback current limiting for the + 5 V supply. The Timing circuit asserts power-up initialization and power failure warning signals to the host product.

## DETAILED CIRCUIT DESCRIPTION

### PRIMARY CIRCUIT

**WARNING**

The VDE Line Filter, Line Voltage Selector, and Inverter boards are connected directly to the AC lines. To avoid injury by electrical shock, an isolation transformer should be used during servicing of these boards.

Hazardous voltages are present in the primary circuit. After power has been disconnected, the neon flasher on the Inverter board indicates that these voltages are still present in the filter capacitors.

Refer to Schematic A2 (on same sheet as the interconnect diagram).

### Line Voltage Selector

Two switches configure the primary circuit for operation from either 115 or 230 V lines.

The 115 V configuration (Figure 5-2) creates a voltage doubler by connecting N (neutral) to the C line between the filter capacitors. The four 115 VAC connectors (J1001 through J1004) are driven in parallel directly across N and L' (the AC line on the switched side of the triac). These connectors provide power for fans and disk drives.

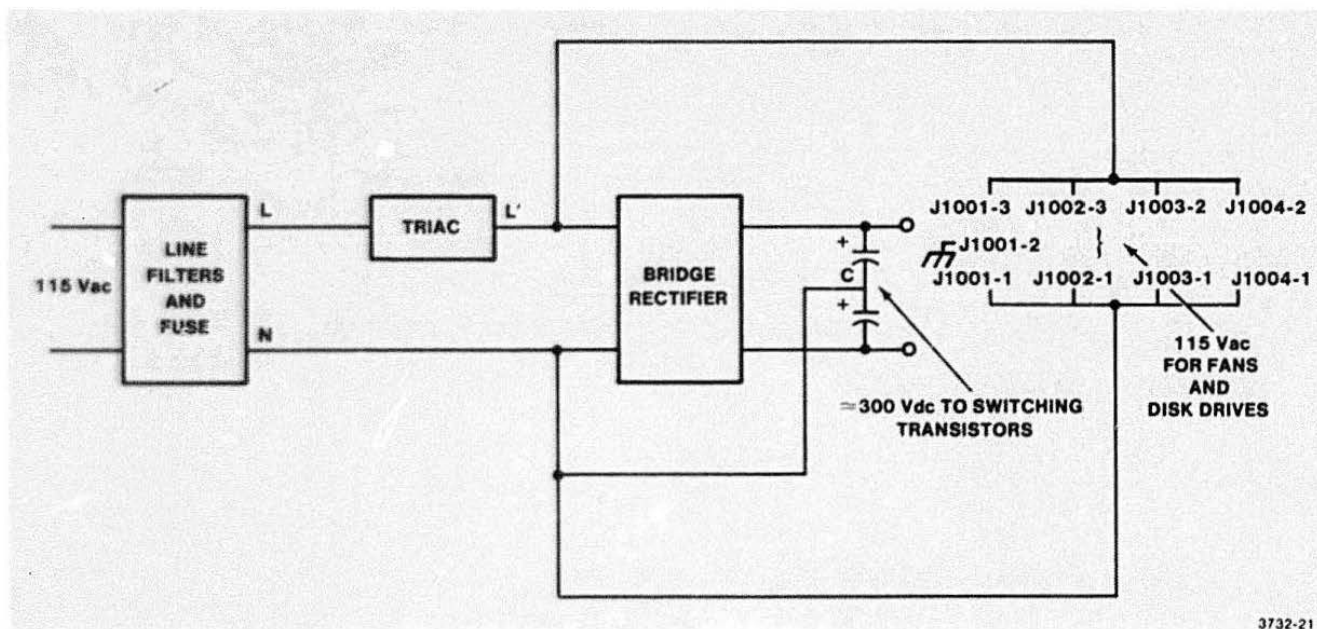


Figure 5-2. Configuration for the 115 V Line.

The 230 V configuration (Figure 5-3) uses a capacitive voltage divider to form one side of the 115 VAC circuits for the fans and disk drives.

Refer to Schematic A3.

### Line Rectifier and DC Filter

Line current passes through a bridge rectifier (CR331) and  $\pi$  filter. About 300 V appears across this network. A neon warning flasher indicates the presence of dangerous voltages. A thermistor limits in-rush current when the system is turned on.

### Switching Transistors

Switching transistors Q515 and Q521 alternately push and pull current through the primary of T320. These transistors are controlled by a Pulse Width Modulator in the Control circuit and are operated in either cutoff or saturation. Their duty cycle determines the +5 output voltage. Two diodes (CR405 and CR414) clamp the peak reverse voltage when the field in the transformer collapses. A snubber circuit absorbs transients and minimizes ringing during off time.

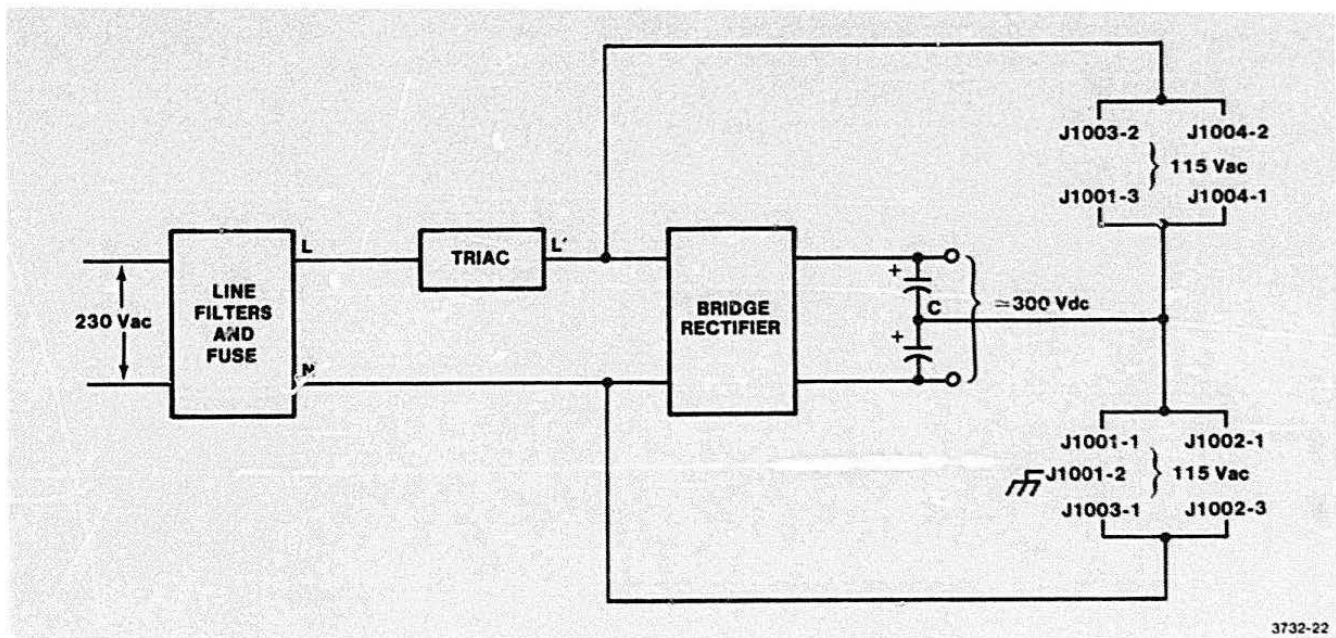


Figure 5-3. Configuration for the 230 V Line.

CONTROL CIRCUIT

Logical On/Off Switch

**WARNING**

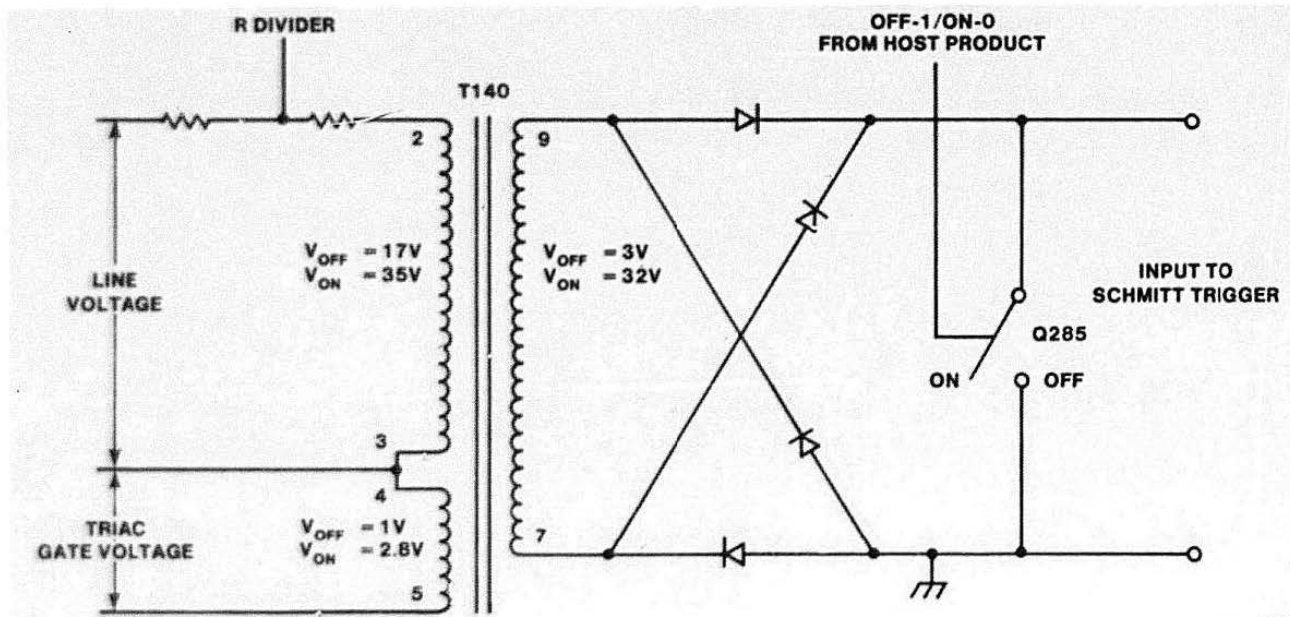
Turning off the host product On/Off switch does not disconnect the Power Supply module from the AC lines nor does it always shut down the DC supplies on certain host products. To avoid electrical shock or damage to components, do not rely on the host system switch to remove voltages. Disconnect the power cable from the AC line.

A triac controls the line voltage to the power supply. The OFF-1/ON-0 signal from the host product causes the Logical On/Off switch to gate the triac via transformer coupling. This maintains isolation of the primary circuit. It also allows the host product to keep the power supply turned on until its operations are completed even though the operator has turned off the product switch. This feature is not used by all host products.

Figure 5-4 is a simplified diagram of the Logical On/Off switch. Current flows through the primary of T140 (Terminals 2 and 3) whenever the module is connected to the AC lines. The voltage developed in the primary induces a small voltage across Terminals 4 and 5 for the triac gate. This gate voltage depends on the state of the host product On/Off switch.

**Switch OFF.** When the switch is off (that is, OFF-1/ON-0 is high or floating), Q285 is forward-biased. This transistor in effect shorts the secondary of T140. The low reflected impedance causes most of the line voltage to be dropped across the resistance in series with the primary. R DIVIDER adjusts this resistance according to the selected line voltage. As a result, the voltage induced across Terminals 4 and 5 is not sufficient to turn on the triac.

**Switch ON.** When the switch is on (that is, OFF-1/ON-0 is grounded), Q285 is shut off. Consequently, the voltage across the secondary of T140 can rise to approximately 32 V. This results in sufficient voltage across Terminals 4 and 5 to turn on the triac for each half cycle of line voltage. The voltage across Terminals 7 and 9 also drives other portions of the Control circuit until the 24 V supply comes up.



3732-23

Figure 5-4. Logical On/Off Switch.

### Schmitt Trigger

Refer to Schematic A3.

The Schmitt trigger turns on power to the Pulse Width Modulator circuit when the output of the Logical On/Off switch charges C379 to 21 V. Once the + 24 V supply comes up, it ordinarily holds C379 to that level. If the voltage falls below 11 V, however, the Schmitt trigger snaps off and shuts off the power supply.

### Pulse Width Modulator

The Pulse Width Modulator circuit regulates the + 5 V supply by varying the on time of the switching transistors. It also provides preliminary regulation for the other supplies.

Figure 5-5 is a simplified block diagram of the Pulse Width Modulator I.C. and associated components. An oscillator alternately enables two output transistors while the error amplifier determines their duty cycles. Transistor  $Q_A$  controls one switching transistor (Q521) through Pin 11 and the Base Drive circuit. Similarly,  $Q_B$  controls the other switching transistor (Q515) through Pin 14. The RC timing circuit is set for twice the inverter frequency of 20 kHz.

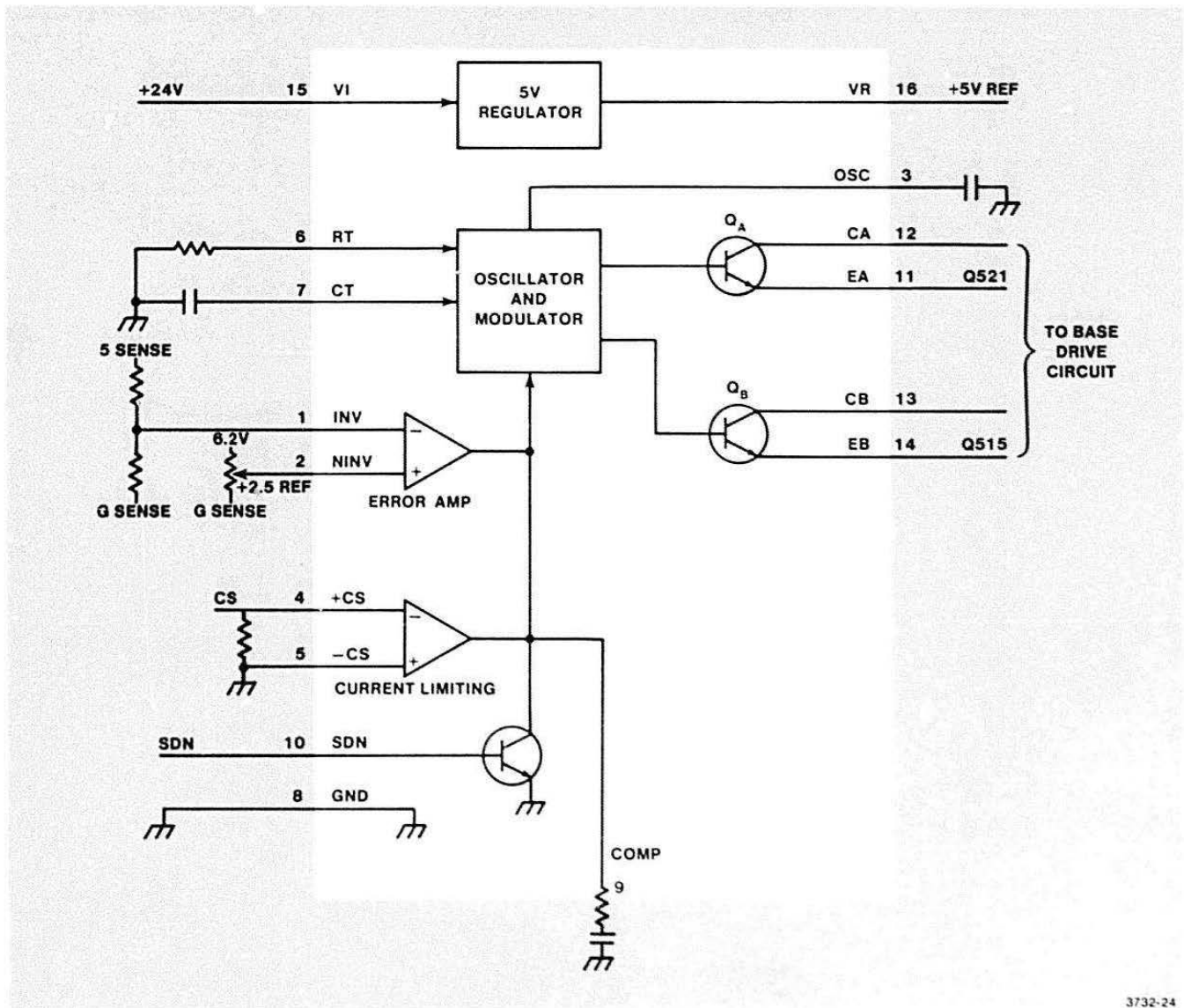


Figure 5-5. Pulse Width Modulator I.C.

3732-24

## THEORY OF OPERATION

The error amplifier compares a sample of the + 5 V voltage with a 2.5 V reference. The difference between + 5 V SENSE and G SENSE (ground sense) reflects the load voltage at the point of regulation in the host product. This voltage is divided in half and applied to the inverting input. The 2.5 V REF voltage is a temperature-compensated reference for the noninverting input. This reference is adjusted to calibrate the supply. The 2.5 V REF and 5 V REF (a + 5 V reference generated in the I.C.) voltages also are used on the Regulator board.

Two other signals from the Regulator board affect pulse width modulation. CS (current sense) causes foldback current limiting when it exceeds 200 mV. SDN (shutdown) shuts off the modulator if excessive voltage is detected on the + 5 V or + 12 V supply.

A 40 kHz pulse at Pin 3 can be used to trigger an oscilloscope.

### Base Drive

Refer to Schematic A3.

The Base Drive circuit biases the switching transistors through the base drive transformer (T540). The circuit contains three active devices (Q460, Q551, and Q560) which are controlled by the output of the pulse width modulator. Table 5-1 summarizes the four states of the circuit.

**Table 5-1**  
**BASE DRIVE CIRCUIT STATES**

| State | Q460 | Q551 | Q560 | Effect on Switching Transistors |
|-------|------|------|------|---------------------------------|
| 1     | ON   | OFF  | OFF  | Turns on Q521                   |
| 2     | OFF  | ON   | OFF  | Helps turn off Q521             |
| 3     | OFF  | OFF  | ON   | Turns on Q515                   |
| 4     | OFF  | ON   | OFF  | Helps turn off Q515             |

Q460 and Q560 determine the direction of current through the primaries of the base drive and inverter transformers.

- In State 1, the Pulse Width Modulator has turned on Q460. Current flows from Terminal 2 to Terminal 3 of T540. Current induced in the secondary forward-biases the corresponding switching transistor (Q521).
- In State 2, the Pulse Width Modulator has shut off Q460 and turned on Q551. Two speed-up capacitors help to shut off the switching transistor. Q551 helps to collapse the field and prevents the other switching transistor from being turned on by induced voltage when the capacitors discharge.
- In States 3 and 4, the process is repeated with the other switching transistor.

## DC SUPPLIES

### General

Figure 5-6 shows a series post-regulator circuit which is typical of those used for all supplies except + 5 V. The + 5 V supply is regulated by feedback to the Pulse Width Modulator. The current direction in negative supplies differs from that shown in the figure.

The circuit consists of six elements:

- A Darlington pair in an emitter-follower configuration. This pass transistor causes the output voltage to follow the voltage at its base.
- A sampling network. This voltage divider feeds a sample of the output to the inverting input of an error amplifier.



- An error amplifier, which compares the sampled output with a reference voltage. Falling output voltage causes the error amplifier to increase the voltage at the base of the pass transistor. This increases the load current and voltage.
- A current source, which provides additional base current. Some of the supplies do not include this element.
- A foldback current limit. As the load resistance decreases, the supply provides additional current until the current limit is reached (Figure 5-7). At this point further reduction in load resistance causes less current to be sent to the load. The operating point moves down the characteristic curve as the load resistance is reduced to zero. This increasing sensitivity to current overload is called foldback current limiting. It reduces dissipation in the event of a short circuit. Increasing the load resistance reverses the process.
- A reverse voltage clamp, consisting of a diode.

Refer to Schematic A4.

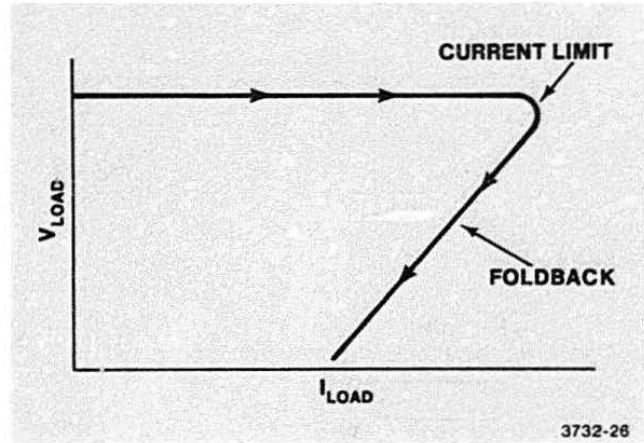


Figure 5-7. Foldback Current Limiting Characteristic.

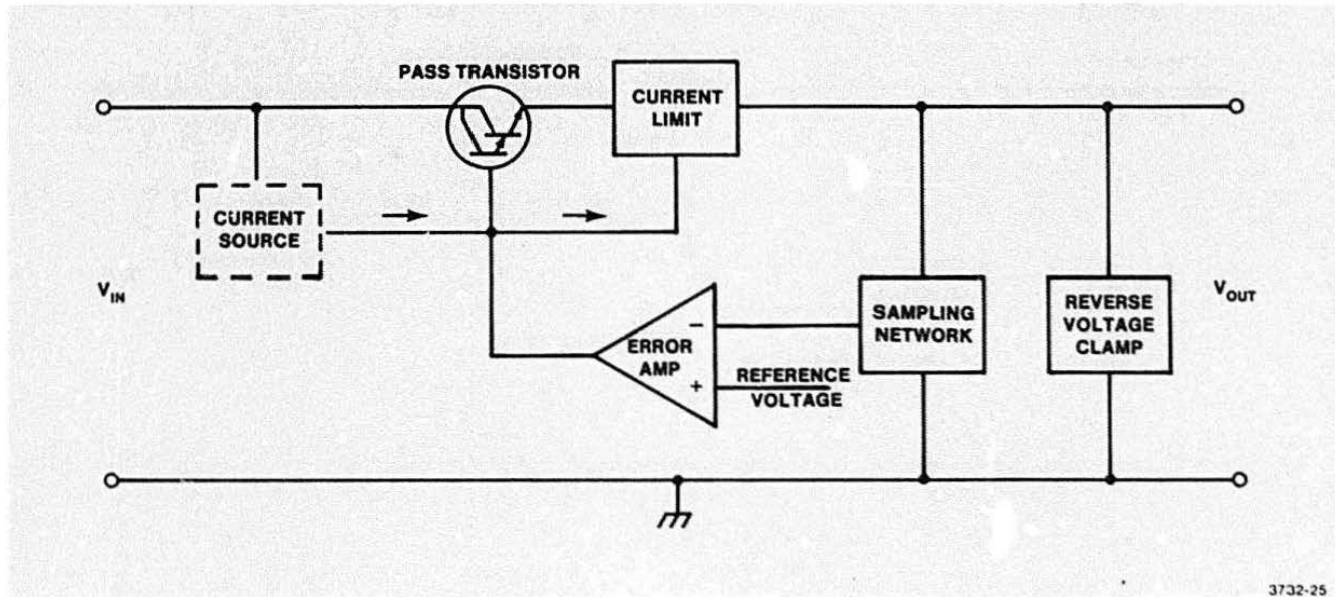


Figure 5-6. Typical Post-Regulator Circuit.

## THEORY OF OPERATION

### -5.2 V Supply

The source of the -5.2 V supply is a full wave rectifier between Terminals 14 and 16. The inverting input to the error amplifier is taken between the -5.2 and +12 V supplies. The scaled voltage is close to ground potential when the supplies are operating properly.

Foldback current limiting holds the load current to less than 4.8 A. Q351 ordinarily is off. When the current reaches its limit, the voltage drops across R76 and R342 are sufficient to turn on Q351. This reduces the voltage at the base of Q240 and shuts off the pass transistor, thereby reducing the output. The reduced output voltage increases the voltage across R342. Since R342 and R76 are in series, this reduces the load current needed to keep Q351 in the limiting mode.

### +12 V Supply

The +12 V supply shares the windings between Terminals 3 and 4. A full wave rectifier feeds the smoothing filter. The voltage sampling network holds the inverting input to the error amplifier close to the 2.5 V reference.

Q455 provides foldback current limiting at 6 A or less. At this point, the voltage across the current sense resistor (R175) and R448 causes Q455 to reduce the voltage at the base of the pass transistor. As the output voltage is reduced, the increasing drop across R448 provides current foldback.

A Zener diode provides overvoltage protection. If the supply exceeds 13.5 V, current through the diode asserts SDN to shut down the Pulse Width Modulator.

### -12 V Supply

The -12 V supply is driven by a full-wave rectifier which shares Terminals 3 and 4 with the +12 V supply. The sampling network scales the voltage between the -12 V output and +2.5 REF. If the output is exactly -12 V, the sampling network holds the inverting input of the error amplifier at ground. Otherwise, a change in the output voltage causes the error amplifier to alter the voltage at the base of the pass transistor.

Foldback current limiting keeps the output from exceeding 1.5 A. When the load current reaches this level, the voltage drops across R75 and R243 turn on Q251. This lowers the voltage at the base of the pass transistor. The resultant drop in output voltage initiates foldback by increasing the drop across R243.

### 24 V Supply

The +24 V supply shares a winding with the +55 V supply.

The supply includes a constant current source consisting of R442, VR441, and Q436. This supplies about 3 mA to the base of the pass transistor. An error amplifier controls the base voltage. The inverting input to the amplifier is held at about 2.5 V by scaling a sample of the output voltage.

R86 causes current limiting at less than 2.8 A. If the current reaches this value, the drops across R86 and R466 are sufficient to turn on Q461 and reduce the voltage at the base of the pass transistor. The increasing drop across R466 causes foldback limiting.

## 55 V Supply

Power is supplied by a full-wave rectifier across Terminals 1 and 2 of T320. A 3 mA constant current source provides base current to the pass transistor.

The error amplifier controls the base voltage through a Zener diode. This diode raises the output of the error amplifier to about 56.5 V at minimum load. The sampling network holds the inverting input at about 2.5 V.

R85 senses the load current and turns on Q271 at less than 1.9 A. R274 and a second constant current source (Q238) cause foldback limiting.

## +5 V Supply

The +5 V supply is taken from Terminals 20 and 22 of T320 with a floating return to Terminal 21. Current passes through a primary smoothing filter and a secondary hash filter. The +5V SENSE voltage provides feedback from the host product to the Pulse Width Modulator in the Control circuit. The supply is designed to give  $5.075\text{ V} \pm 3\%$  at the point of regulation in the host product.

Foldback limiting keeps the current from exceeding 37 A. The current sense amplifier compares the drop across the current sense resistor (R1001) with a reference voltage across R142. Current from +5 V REF and the +55 V supply ordinarily holds the reference voltage at about 170 mV. When the drop across the sense resistor exceeds this amount, the amplifier drives CS (current sense) positive. If CS exceeds 200 mV, it causes the Pulse Width Modulator to reduce all output voltages. The decline in the +55 V supply reduces the reference voltage at R142. This causes limiting to occur with less load current.

During power-up, a charge pump creates a negative supply for the current sense amplifier until the regulated supplies come up. This avoids a false overcurrent shutdown. The pump is driven by L SENSE from the Logical On/Off switch. It builds a negative voltage across C251 by charging C246 through CR256 and then discharging it through CR255.

A Zener diode provides overvoltage protection at 6.0 V by sending SDN (shutdown) to the Pulse Width Modulator.

## TIMING CIRCUIT

### Initialization (INIT-0)

The INIT-0 signal goes low when the +5 V supply drops below 4.75 V and remains low for at least 50 ms after the +5 V comes up to 4.75 V. The signal can be used to reset the host product.

The +5 V output is sampled in the host product via +5 V SENSE. The divider values are such that input to the op amp equals 2.5 V REF when the +5 V supply reaches its lower margin of 4.75 V. At this point during power-up, the op amp begins charging C385. The RC network provides a delay of at least 50 ms. When the voltage across C385 exceeds about 4.5 V, output of the comparator goes low. This drives INIT-0 high.

While the +5 V supply is coming up, +5 V REF supplies voltage to the noninverting input of the comparator.

During power-down, the process is reversed except that the RC delay is much shorter. When the +5 V supply falls below 4.75 V, the output of the op amp goes negative and C385 discharges through the diode. This causes the output of the comparator to go high and causes INIT-0 to go low.

### Power Failure (PWRFL-0)

A power failure circuit monitors the line input and pulls PWRFL-0 low if the AC is interrupted. Thus, this signal warns the host product that the DC supplies might fail. It does not provide warning of failure due solely to low line voltage.

The circuit tests L SENSE (line sense) from the Logical On/Off switch in the Control circuit. A divider scales L SENSE to approximately 6 V peak and applies it to a voltage follower which charges C392 during power-up. When the capacitor reaches about 4.5 V the output of the comparator goes low and drives PWRFL-0 high.

The time constant is such that the output of the comparator ordinarily stays low between line peaks. If the line AC fails, however, C392 discharges sufficiently to drive the output of the comparator high. This in turn causes PWRFL-0 to go low.

The +5 V supply remains within margin for at least 11 ms after the power failure alarm.

# Section 6

## REPLACEABLE ELECTRICAL PARTS

### PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

#### LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

#### CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

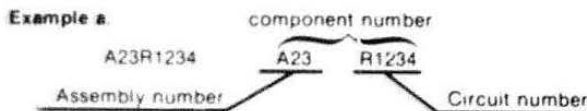
The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

#### ABBREVIATIONS

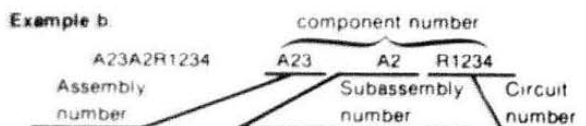
Abbreviations conform to American National Standard Y1.1.

#### COMPONENT NUMBER (column one of the Electrical Parts List)

A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following.



Read: Resistor 1234 of Assembly 23



Read: Resistor 1234 of Subassembly 2 of Assembly 23

#### TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

#### SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

#### NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

#### MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

#### MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

# REPLACEABLE ELECTRICAL PARTS

## CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code | Manufacturer                                                                | Address                                    | City, State, Zip          |
|-----------|-----------------------------------------------------------------------------|--------------------------------------------|---------------------------|
| 000FJ     | MARCOM SWITCHES INC.                                                        | 67 ALBANY STREET                           | CAZENOVIA, N.Y. 13035     |
| 000LI     | TOPTRON CORP                                                                |                                            | TOKYO, JAPAN              |
| 00213     | NYTRONICS, COMPONENTS GROUP, INC.,<br>SUBSIDIARY OF NYTRONICS, INC.         | ORANGE STREET                              | DARLINGTON, SC 29532      |
| 00779     | AMP, INC.                                                                   | P.O. BOX 3608                              | HARRISBURG, PA 17105      |
| 01121     | ALLEN-BRADLEY COMPANY                                                       | 1201 2ND STREET SOUTH                      | MILWAUKEE, WI 53204       |
| 01281     | TRW ELECTRONIC COMPONENTS, SEMICONDUCTOR<br>OPERATIONS                      | 14520 AVIATION BLVD.                       | LAWNSDALE, CA 90260       |
| 01295     | TEXAS INSTRUMENTS, INC.<br>SEMICONDUCTOR GROUP                              | P.O. BOX 5012                              | DALLAS, TX 75222          |
| 02777     | HOPKINS ENGINEERING COMPANY                                                 | 12900 FOOTHILL BLVD.                       | SAN FERNANDO, CA 91342    |
| 03508     | GENERAL ELECTRIC COMPANY, SEMI-CONDUCTOR<br>PRODUCTS DEPARTMENT             | ELECTRONICS PARK                           | SYRACUSE, NY 13201        |
| 04222     | AVX CERAMICS, DIVISION OF AVX CORP.                                         | P O BOX 867                                | MYRTLE BEACH, SC 29577    |
| 04713     | MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.                                    | 5005 E MCDOWELL RD, PO BOX 20923           | PHOENIX, AZ 85036         |
| 07263     | FAIRCHILD SEMICONDUCTOR, A DIV. OF<br>FAIRCHILD CAMERA AND INSTRUMENT CORP. | 464 ELLIS STREET                           | MOUNTAIN VIEW, CA 94042   |
| 14193     | CAL-R, INC.                                                                 | 1601 OLYMPIC BLVD.                         | SANTA MONICA, CA 90404    |
| 14433     | ITT SEMICONDUCTORS                                                          | 3301 ELECTRONICS WAY<br>P O BOX 3049       | WEST PALM BEACH, FL 33402 |
| 14552     | MICRO SEMICONDUCTOR CORP.                                                   | 2830 E FAIRVIEW ST.                        | SANTA ANA, CA 92704       |
| 14752     | ELECTRO CUBE INC.                                                           | 1710 S. DEL MAR AVE.                       | SAN GABRIEL, CA 91776     |
| 15454     | RODAN INDUSTRIES, INC.                                                      | 2905 BLUE STAR ST.                         | ANAHEIM, CA 92806         |
| 22526     | BERG ELECTRONICS, INC.                                                      | YOUK EXPRESSWAY                            | NEW CUMBERLAND, PA 17070  |
| 27014     | NATIONAL SEMICONDUCTOR CORP.                                                | 2900 SEMICONDUCTOR DR.                     | SANTA CLARA, CA 95051     |
| 34335     | ADVANCED MICRO DEVICES                                                      | 901 THOMPSON PL.                           | SUNNYVALE, CA 94086       |
| 50558     | ELECTRONIC CONCEPTS, INC.                                                   | 526 INDUSTRIAL V/WAY WEST                  | EATONTOWN, NJ 07724       |
| 54473     | MATSUSHITA ELECTRIC, CORP. OF AMERICA                                       | 1 PANASONIC WAY                            | SECAUCUS, NJ 07094        |
| 55680     | NICHICON/AMERICA CORP.                                                      | 6435 N PROESEL AVENUE                      | CHICAGO, IL 60645         |
| 56289     | SPRAGUE ELECTRIC CO.                                                        | 87 MARSHALL ST.                            | NORTH ADAMS, MA 01247     |
| 57668     | R-OHM CORP.                                                                 | 16931 MILLIKEN AVE.                        | IRVINE, CA 92713          |
| 59660     | TUSONIX INC.                                                                | 2155 N FORBES BLVD                         | TUCSON, AZ 85705          |
| 72982     | ERIE TECHNOLOGICAL PRODUCTS, INC.                                           | 644 W. 12TH ST.                            | ERIE, PA 16512            |
| 73138     | BECKMAN INSTRUMENTS, INC., HELIPOT DIV.                                     | 2500 HARBOR BLVD.                          | FULLERTON, CA 92634       |
| 74276     | SIGNALITE DIV., GENERAL INSTRUMENT CORP.                                    | 1933 HECK AVE.                             | NEPTUNE, NJ 07753         |
| 75042     | TRW ELECTRONIC COMPONENTS, IRC FIXED<br>RESISTORS, PHILADELPHIA DIVISION    | 401 N. BROAD ST.                           | PHILADELPHIA, PA 19108    |
| 75915     | LITTELFUSE, INC.                                                            | 800 E. NORTHWEST HWY                       | DES PLAINES, IL 60016     |
| 76493     | BELL INDUSTRIES, INC.,<br>MILLER, J. W., DIV.                               | 19070 REYES AVE., P O BOX 5825             | COMPTON, CA 90224         |
| 80009     | TEKTRONIX, INC.                                                             | P O BOX 500                                | BEAVERTON, OR 97077       |
| 84411     | TRW ELECTRONIC COMPONENTS, TRW CAPACITORS                                   | 112 W. FIRST ST.                           | OGALLALA, NE 69153        |
| 90201     | MALLORY CAPACITOR CO., DIV. OF<br>P. R. MALLORY AND CO., INC.               | 3029 E. WASHINGTON STREET<br>P. O. BOX 372 | INDIANAPOLIS, IN 46206    |
| 91637     | DALE ELECTRONICS, INC.                                                      | P. O. BOX 609                              | COLUMBUS, NE 68601        |
| T0510     | PANASONIC COMPANY DIVISION OF<br>MATSUSHITA ELECTRIC CORP OF AMERICA        | ONE PANASONIC WAY                          | SECAUCUS, NJ 07094        |
| T0515     | RIFA WORLD PRODUCTS, INC.                                                   | P.O. BOX 517                               | SONOMA, CA 95476          |

REPLACEABLE ELECTRICAL PARTS

| Component No             | Tektronix Part No | Serial/Model No Eff | Dscont | Name & Description                        | Mfr Code | Mfr Part Number |
|--------------------------|-------------------|---------------------|--------|-------------------------------------------|----------|-----------------|
| CIRCUIT BOARD ASSEMBLIES |                   |                     |        |                                           |          |                 |
| A1                       | 670-7248-00       |                     |        | CKT BOARD ASSY:VDE FILTER                 | 80009    | 670-7248-00     |
| A1                       | -----             |                     |        | (620-0295-00, -01 ONLY)                   |          |                 |
| A1                       | 670-7248-01       |                     |        | CKT BOARD ASSY:VDE FILTER                 | 80009    | 670-7248-00     |
| A1                       | -----             |                     |        | (620-0295-02 ONLY)                        |          |                 |
| A2                       | 670-6450-00       |                     |        | CKT BOARD ASSY:VOLTAGE SELECTOR           | 80009    | 670-6540-00     |
| A3                       | 670-6430-00       |                     |        | CKT BOARD ASSY:INVERTER                   | 80009    | 670-6430-00     |
| A3                       | -----             |                     |        | (620-0295-00 ONLY)                        |          |                 |
| A3                       | 670-6430-01       |                     |        | CKT BOARD ASSY:INVERTER                   | 80009    | 670-6430-01     |
| A3                       | -----             |                     |        | (620-0295-01 ONLY)                        |          |                 |
| A3                       | 670-6430-02       |                     |        | CKT BOARD ASSY:INVERTER                   | 80009    | 670-6430-02     |
| A3                       | -----             |                     |        | (620-0295-02 ONLY)                        |          |                 |
| A4                       | 670-6429-00       |                     |        | CKT BOARD ASSY:REGULATOR                  | 80009    | 670-6429-00     |
| A4                       | -----             |                     |        | (620-0295-00, -01 ONLY)                   |          |                 |
| A4                       | 670-6429-01       |                     |        | CKT BOARD ASSY:REGULATOR                  | 80009    | 670-6429-01     |
| A4                       | -----             |                     |        | (620-0295-02 ONLY)                        |          |                 |
| A4                       | 670-6429-02       |                     |        | CKT BOARD ASSY:REGULATOR                  | 80009    | 670-6429-02     |
| A4                       | -----             |                     |        | (620-0295-05 ONLY)                        |          |                 |
| A1 VDE FILTER            |                   |                     |        |                                           |          |                 |
| A1                       | 670-7248-00       |                     |        | CKT BOARD ASSY:VDE FILTER                 | 80009    | 670-7248-00     |
| A1                       | -----             |                     |        | (620-0295-00, -01 ONLY)                   |          |                 |
| A1                       | 670-7248-01       |                     |        | CKT BOARD ASSY:VDE FILTER                 | 80009    | 670-7248-01     |
| A1                       | -----             |                     |        | (670-0295-02 ONLY)                        |          |                 |
| A1J64                    | 131-0589-00       |                     |        | TERMINAL,PIN:0.46 L X 0.025 SQ            | 22526    | 48283-029       |
| A1J64                    | -----             |                     |        | (QUANTITY OF 2)                           |          |                 |
| A1J65                    | 131-0589-00       |                     |        | TERMINAL,PIN:0.46 L X 0.025 SQ            | 22526    | 48283-029       |
| A1J65                    | -----             |                     |        | (QUANTITY OF 2;620-0295-00,01 ONLY)       |          |                 |
| A1J66                    | 131-0589-00       |                     |        | TERMINAL,PIN:0.46 L X 0.025 SQ            | 22526    | 48283-029       |
| A1J66                    | -----             |                     |        | (QUANTITY OF 2)                           |          |                 |
| A1L1                     | 108-1124-00       |                     |        | COIL,RF:FIXED,TOROID,150MH                | 80009    | 108-1124-00     |
| A1L1                     | -----             |                     |        | (620-0295-02 ONLY)                        |          |                 |
| A1L2                     | 108-1124-00       |                     |        | COIL,RF:FIXED,TOROID,150MH                | 80009    | 108-1124-00     |
| A1L2                     | -----             |                     |        | (620-0295-02 ONLY)                        |          |                 |
| A1T1                     | 120-1458-00       |                     |        | TRANSFORMER,RF:TORIOD                     | 80009    | 120-1458-00     |
| A1T1                     | -----             |                     |        | (620-0295-02 ONLY)                        |          |                 |
| A1U1                     | 285-1244-00       |                     |        | CAPACITOR-RES:0.5UF,10%,22 OHM,10%,250VAC | T0515    | PMR2026/05-122  |
| A1U1                     | -----             |                     |        | (620-0295-02 ONLY)                        |          |                 |
| A1U2                     | 119-1168-00       |                     |        | CAPACITOR-RES:0.1UF,20% & 22 OHM,10%,250V | 14752    | RG1782-1        |
| A1U2                     | -----             |                     |        | (620-0295-02 ONLY)                        |          |                 |

# REPLACEABLE ELECTRICAL PARTS

| Component No.       | Tektronix<br>Part No. | Serial/Model No.<br>Eff Dscont | Name & Description                       | Mfr<br>Code | Mfr Part Number |
|---------------------|-----------------------|--------------------------------|------------------------------------------|-------------|-----------------|
| A2 VOLTAGE SELECTOR |                       |                                |                                          |             |                 |
| A2                  | 670-6450-00           |                                | CKT BOARD ASSY:VOLTAGE SELECTOR          | 80009       | 670-6450-00     |
| A2J67               | 131-0589-00           |                                | TERMINAL,PIN:0.46 L X 0.025 SQ           | 22526       | 48283-029       |
| A2J67               | -----                 |                                | (QUANTITY OF 4)                          |             |                 |
| A2J68               | 131-0589-00           |                                | TERMINAL,PIN:0.46 L X 0.025 SQ           | 22526       | 48283-029       |
| A2J68               | -----                 |                                | (QUANTITY OF 4)                          |             |                 |
| A2J69               | 131-0589-00           |                                | TERMINAL,PIN:0.46 L X 0.025 SQ           | 22526       | 48283-029       |
| A2J69               | -----                 |                                | (QUANTITY OF 4)                          |             |                 |
| A2S1                | 260-1980-01           |                                | SWITCH,SLIDE:DPDT,10A,125V,MKD 115V/230V | 000FJ       | 4021.1913       |
| A2S2                | 260-1980-01           |                                | SWITCH,SLIDE:DPDT,10A,125V,MKD 115V/230V | 000FJ       | 4021.1913       |
| A2W1                | 131-0566-00           |                                | BUS CONDUCTOR:DUMMY RES.2.375,22 AWG     | 57668       | JWW-0200E0      |

REPLACEABLE ELECTRICAL PARTS

| Component No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Name & Description                      | Mfr Code | Mfr Part Number  |
|---------------|--------------------|-----------------------------|-----------------------------------------|----------|------------------|
| A3 INVERTER   |                    |                             |                                         |          |                  |
| A3            | 670-6430-00        |                             | CKT BOARD ASSY:INVERTER                 | 80009    | 670-6430-00      |
| A3            | -----              |                             | (620-0295-00 ONLY)                      |          |                  |
| A3            | 670-6430-01        |                             | CKT BOARD ASSY:INVERTER                 | 80009    | 670-6430-01      |
| A3            | -----              |                             | (620-0295-01 ONLY)                      |          |                  |
| A3            | 670-6430-02        |                             | CKT BOARD ASSY:INVERTER                 | 80009    | 670-6430-02      |
| A3            | -----              |                             | (620-0295-02 ONLY)                      |          |                  |
| A3C101        | 285-1246-00        |                             | CAP.,FXD.PAPER:0.047UF,20%,250VAC       |          |                  |
| A3C101        | -----              |                             | (670-6430-02 ONLY)                      |          |                  |
| A3C103        | 285-1246-00        |                             | CAP.,FXD.PAPER:0.047UF,20%,250VAC       |          |                  |
| A3C103        | -----              |                             | (670-6430-02 ONLY)                      |          |                  |
| A3C125        | 283-0177-00        |                             | CAP.,FXD.CER DI:1UF,+80-20%,25V         | 56289    | 2C20Z5U105Z025B  |
| A3C155        | 290-0829-00        |                             | CAP.,FXD.ELCTLT:750UF,+100-10%,200V     | 90201    | PF751SR2J3P2     |
| A3C170        | 290-0829-00        |                             | CAP.,FXD.ELCTLT:750UF,+100-10%,200V     | 90201    | PF751SR2J3P2     |
| A3C235        | 285-1196-00        |                             | CAP.,FXD.PAPER:0.01UF,20%,250V          | 84411    | PME 271 Y 510    |
| A3C263        | 283-0057-00        |                             | CAP.,FXD.CER DI:0.1UF,+80-20%,200V      | 56289    | 2C20Z5U104Z200B  |
| A3C281        | 283-0060-00        |                             | CAP.,FXD.CER DI:100PF,5%,200V           | 59660    | 855-535U2J101J   |
| A3C283        | 283-0067-00        |                             | CAP.,FXD.CER DI:0.001UF,10%,200V        | 59660    | 835-515-Z5D0102K |
| A3C305        | 285-1203-00        |                             | CAP.,FXD.PLSTC:4UF,10%,200V             | 14752    | C2551            |
| A3C319        | 285-1203-00        |                             | CAP.,FXD.PLSTC:4UF,10%,200V             | 14752    | C2551            |
| A3C355        | 290-0829-00        |                             | CAP.,FXD.ELCTLT:750UF,+100-10%,200V     | 90201    | PF751SR2J3P2     |
| A3C370        | 290-0829-00        |                             | CAP.,FXD.ELCTLT:750UF,+100-10%,200V     | 90201    | PF751SR2J3P2     |
| A3C379        | 290-0844-00        |                             | CAP.,FXD.ELCTLT:100UF,-10+-75%.35 WVDC  | 54473    | ECE-A35V100L     |
| A3C407        | 281-0536-00        |                             | CAP.,FXD.CER DI:1000PF,10%,500V         | 72982    | 301000 X 5P0102K |
| A3C435        | 283-0111-00        |                             | CAP.,FXD.CER DI:0.1UF,20%,50V           | 56289    | 273C11           |
| A3C439        | 283-0194-00        |                             | CAP.,FXD.CER DI:4.7UF,20%,50V           | 56289    | 5C37Z5U475M050B  |
| A3C466        | 283-0134-00        |                             | CAP.,FXD.CER DI:0.47UF,+80-20%,50V      | 72982    | 8131N087Z5U0474Z |
| A3C476        | 283-0114-00        |                             | CAP.,FXD.CER DI:0.0015UF,5%,200V        | 59660    | 805534Y5D0152J   |
| A3C476        | -----              |                             | (670-6430-00,-01 ONLY)                  |          |                  |
| A3C476        | 283-0397-00        |                             | CAP.,FXD.CER DI:1160PF,2%,100V          | 04222    | SR301AVG6GAA     |
| A3C476        | -----              |                             | (670-6430-02 ONLY)                      |          |                  |
| A3C533        | 283-0111-00        |                             | CAP.,FXD.CER DI:0.1UF,20%,50V           | 56289    | 273C11           |
| A3C535        | 283-0194-00        |                             | CAP.,FXD.CER DI:4.7UF,20%,50V           | 56289    | 5C37Z5U475M050B  |
| A3C536        | 283-0194-00        |                             | CAP.,FXD.CER DI:4.7UF,20%,50V           | 56289    | 5C37Z5U475M050B  |
| A3C539        | 283-0194-00        |                             | CAP.,FXD.CER DI:4.7UF,20%,50V           | 56289    | 5C37Z5U475M050B  |
| A3C571        | 285-0596-00        |                             | CAP.,FXD.PLSTC:0.01UF,1%,100V           | 14752    | 410B1B103F       |
| A3C571        | -----              |                             | (670-6420-00,-01 ONLY)                  |          |                  |
| A3C571        | 285-0719-00        |                             | CAP.,FXD.PLSTC:0.015UF,5%,100V          | 84411    | 663UW-15351      |
| A3C571        | -----              |                             | (670-6420-02 ONLY)                      |          |                  |
| A3C581        | 290-0534-00        |                             | CAP.,FXD.ELCTLT:1UF,20%,35V             | 56289    | 196D105X0035HA1  |
| A3C587        | 283-0134-00        |                             | CAP.,FXD.CER DI:0.47UF,+80-20%,50V      | 72982    | 8131N087Z5U0474Z |
| A3CR126       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR127       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR129       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR130       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR181       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR182       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR183       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR184       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR187       | 152-0141-02        |                             | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A3CR331       | 152-0713-00        |                             | SEMICONV DEVICE:RECT BRIDGE,SI,400V,35A | 04713    | SDA10388K        |
| A3CR381       | 152-0333-00        |                             | SEMICONV DEVICE:SILICON,55V,200MA       | 07263    | FDH-6012         |
| A3CR385       | 152-0066-00        |                             | SEMICONV DEVICE:SILICON,400V,750MA      | 14433    | LG4016           |
| A3CR405       | 152-0400-00        |                             | SEMICONV DEVICE:SILICON,400V,1A         | 80009    | 152-0400-00      |



# REPLACEABLE ELECTRICAL PARTS

| Component No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Name & Description                       | Mfr Code | Mfr Part Number |
|---------------|--------------------|-----------------------------|------------------------------------------|----------|-----------------|
| A3CR414       | 152-0400-00        |                             | SEMICONV DEVICE:SILICON,400V,1A          | 80009    | 152-0400-00     |
| A3CR439       | 152-0066-00        |                             | SEMICONV DEVICE:SILICON,400V,750MA       | 14433    | LG4016          |
| A3CR457       | 152-0333-00        |                             | SEMICONV DEVICE:SILICON,55V,200MA        | 07263    | FDH-6012        |
| A3CR513       | 152-0686-00        |                             | SEMICONV DEVICE:RECT,SI,100V,5A          | 04713    | SR3273          |
| A3CR523       | 152-0686-00        |                             | SEMICONV DEVICE:RECT,SI,100V,5A          | 04713    | SR3273          |
| A3CR536       | 152-0066-00        |                             | SEMICONV DEVICE:SILICON,400V,750MA       | 14433    | LG4016          |
| A3CR555       | 152-0333-00        |                             | SEMICONV DEVICE:SILICON,55V,200MA        | 07263    | FDH-6012        |
| A3DS259       | 150-0035-00        |                             | LAMP,GLOW:90V,0.3MA,AID-T,WIRE LD        | 000LI    | JH005/3011JA    |
| A3E205        | 119-0181-00        |                             | ARSR,ELEC SURGE:230V,GAS FILLED          | 74276    | CG230L          |
| A3E205        | -----              |                             | (670-6430-00 ONLY)                       |          |                 |
| A3E235        | 119-0181-00        |                             | ARSR,ELEC SURGE:230V,GAS FILLED          | 74276    | CG230L          |
| A3E235        | -----              |                             | (670-6430-00, -01, -02 ONLY)             |          |                 |
| A3E333        | 119-0181-00        |                             | ARSR,ELEC SURGE:230V,GAS FILLED          | 74276    | CG230L          |
| A3E333        | -----              |                             | (670-6430-01, -02 ONLY)                  |          |                 |
| A3J60         | 131-0608-00        |                             | TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD | 22526    | 47357           |
| A3J60         | -----              |                             | (QUANTITY OF 2)                          |          |                 |
| A3J61         | 131-0589-00        |                             | TERMINAL,PIN:0.46 L X 0.025 SQ           | 22526    | 48283-029       |
| A3J61         | -----              |                             | (QUANTITY OF 9)                          |          |                 |
| A3J62         | 131-0608-00        |                             | TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD | 22526    | 47357           |
| A3J62         | -----              |                             | (QUANTITY OF 10)                         |          |                 |
| A3J63         | 131-0608-00        |                             | TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD | 22526    | 47357           |
| A3J63         | -----              |                             | (QUANTITY OF 5)                          |          |                 |
| A3L430        | 120-1165-00        |                             | TRANSFORMER,RF:TOROID,COMMON MODE REJECT | 80009    | 120-1165-00     |
| A3L440        | 108-0337-00        |                             | COIL,RF:25UH                             | 80009    | 108-0337-00     |
| A3L569        | 108-0691-00        |                             | COIL,RF:1.8MH                            | 76493    | 02279           |
| A3Q115        | 151-0537-00        |                             | THYRISTOR:TRIAC,10A,400V                 | 03508    | SC146DX176      |
| A3Q281        | 151-0342-00        |                             | TRANSISTOR:SILICON,PNP                   | 07263    | S035928         |
| A3Q285        | 151-0432-00        |                             | TRANSISTOR:SILICON,NPN                   | 27014    | T07391E2        |
| A3Q387        | 151-0208-02        |                             | TRANSISTOR:SILICON,PNP                   | 80009    | 151-0208-02     |
| A3Q389        | 151-0453-00        |                             | TRANSISTOR:SILICON,PNP                   | 80009    | 151-0453-00     |
| A3Q460        | 151-0136-03        |                             | TRANSISTOR:SILICON,NPN,SEL               | 80009    | 151-0136-03     |
| A3Q487        | 151-0126-00        |                             | TRANSISTOR:SILICON,NPN                   | 04713    | ST1046          |
| A3Q489        | 151-0126-00        |                             | TRANSISTOR:SILICON,NPN                   | 04713    | ST1046          |
| A3Q551        | 151-0323-00        |                             | TRANSISTOR:SILICON,NPN,SEL FROM MJE521   | 04713    | SJE916          |
| A3Q560        | 151-0136-03        |                             | TRANSISTOR:SILICON,NPN,SEL               | 80009    | 151-0136-03     |
| A3R103        | 308-0237-00        |                             | RES.,FXD,WW:8.2K OHM,5%,5W               | 14193    | SA50-8201J      |
| A3R123        | 308-0336-00        |                             | RES.,FXD,WW:7K OHM,5%,5W                 | 91637    | CW2A-70000J     |
| A3R124        | 315-0331-00        |                             | RES.,FXD,CMPSN:330 OHM,5%,0.25W          | 01121    | CB3315          |
| A3R161        | 308-0429-00        |                             | RES.,FXD,WW:22K OHM,1%,3W                | 91637    | RS2B-B22001F    |
| A3R185        | 315-0104-00        |                             | RES.,FXD,CMPSN:100K OHM,5%,0.25W         | 01121    | CB1045          |
| A3R187        | 315-0203-00        |                             | RES.,FXD,CMPSN:20K OHM,5%,0.25W          | 01121    | CB2035          |
| A3R188        | 315-0622-00        |                             | RES.,FXD,CMPSN:6.2K OHM,5%,0.25W         | 01121    | CB6225          |
| A3R264        | 316-0565-00        |                             | RES.,FXD,CMPSN:5.6M OHM,10%,0.25W        | 01121    | CB5651          |
| A3R285        | 315-0512-00        |                             | RES.,FXD,CMPSN:5.1K OHM,5%,0.25W         | 01121    | CB5125          |
| A3R286        | 315-0102-00        |                             | RES.,FXD,CMPSN:1K OHM,5%,0.25W           | 01121    | CB1025          |
| A3R325        | 315-0101-00        |                             | RES.,FXD,CMPSN:100 OHM,5%,0.25W          | 01121    | CB1015          |
| A3R361        | 308-0429-00        |                             | RES.,FXD,WW:22K OHM,1%,3W                | 91637    | RS2B-B22001F    |
| A3R381        | 315-0474-00        |                             | RES.,FXD,CMPSN:470K OHM,5%,0.25W         | 01121    | CB4745          |
| A3R383        | 315-0914-00        |                             | RES.,FXD,CMPSN:910K OHM,5%,0.25W         | 01121    | CB9145          |
| A3R386        | 321-0441-00        |                             | RES.,FXD,FILM:383K OHM,1%,0.125W         | 91637    | MFF1816G38302F  |
| A3R430        | 315-0100-00        |                             | RES.,FXD,CMPSN:10 OHM,5%,0.25W           | 01121    | CB1005          |
| A3R454        | 308-0574-00        |                             | RES.,FXD,WW:10 OHM,5%,2W                 | 91637    | RS2B162K10R00J  |
| A3R463        | 308-0142-00        |                             | RES.,FXD,WW:30 OHM,5%,3W                 | 91637    | RS2B-K30R00J    |

REPLACEABLE ELECTRICAL PARTS

| Component No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Name & Description                        | Mfr Code | Mfr Part Number |
|---------------|--------------------|-----------------------------|-------------------------------------------|----------|-----------------|
| A3R477        | 321-0229-00        |                             | RES.,FXD,FILM:2.37K OHM,1%,0.125W         | 91637    | MFF1816G23700F  |
| A3R477        | -----              |                             | (670-6430-00, -01 ONLY)                   |          |                 |
| A3R477        | 321-0218-00        |                             | RES.,FXD,FILM:1.82K OHM,1%,0.125W         | 91637    | MFF1816G18200F  |
| A3R477        | -----              |                             | (670-6430-02 ONLY)                        |          |                 |
| A3R484        | 321-0412-00        |                             | RES.,FXD,FILM:191K OHM,1%,0.125W          | 91637    | MFF1816G19102F  |
| A3R485        | 321-0441-00        |                             | RES.,FXD,FILM:383K OHM,1%,0.125W          | 91637    | MFF1816G38302F  |
| A3R486        | 321-0228-00        |                             | RES.,FXD,FILM:2.32K OHM,1%,0.125W         | 91637    | MFF1816G23200F  |
| A3R488        | 321-0227-00        |                             | RES.,FXD,FILM:2.26K OHM,1%,0.125W         | 91637    | MFF1816G22600F  |
| A3R502        | 308-0218-00        |                             | RES.,FXD,WW:150 OHM,5%,3W                 | 00213    | 1240S-150-5     |
| A3R531        | 308-0441-00        |                             | RES.,FXD,WW:3 OHM,5%,3W                   | 91637    | CW2B-3R00J      |
| A3R532        | 315-0100-00        |                             | RES.,FXD,CMPSN:10 OHM,5%,0.25W            | 01121    | CB1005          |
| A3R537        | 308-0441-00        |                             | RES.,FXD,WW:3 OHM,5%,3W                   | 91637    | CW2B-3R00J      |
| A3R556        | 308-0574-00        |                             | RES.,FXD,WW:10 OHM,5%,2W                  | 91637    | RS2B162K10R00J  |
| A3R561        | 315-0331-00        |                             | RES.,FXD,CMPSN:330 OHM,5%,0.25W           | 01121    | CB3315          |
| A3R563        | 315-0331-00        |                             | RES.,FXD,CMPSN:330 OHM,5%,0.25W           | 01121    | CB3315          |
| A3R565        | 315-0102-00        |                             | RES.,FXD,CMPSN:1K OHM,5%,0.25W            | 01121    | CB1025          |
| A3R578        | 315-0201-00        |                             | RES.,FXD,CMPSN:200 OHM,5%,0.25W           | 01121    | CB2015          |
| A3R579        | 315-0202-00        |                             | RES.,FXD,CMPSN:2K OHM,5%,0.25W            | 01121    | CB2025          |
| A3R587        | 302-0222-00        |                             | RES.,FXD,CMPSN:2.2 OHM,10%,0.50W          | 01121    | EB2221          |
| A3R588        | 315-0102-00        |                             | RES.,FXD,CMPSN:1K OHM,5%,0.25W            | 01121    | CB1025          |
| A3R589        | 315-0302-00        |                             | RES.,FXD,CMPSN:3K OHM,5%,0.25W            | 01121    | CB3025          |
| A3R591        | 311-1139-00        |                             | RES.,VAR,NONWIR:500 OHM,20%,0.50W         | 73138    | 72-43-0         |
| A3RT231       | 307-0746-00        |                             | RES.,THERMAL:5 OHM,10%,7A/DEG C           | 15454    | SG-6            |
| A3T140        | 120-1354-00        |                             | XFMR,PWR,STPDN:TRIGGER,LF                 | 80009    | 120-1354-00     |
| A3T540        | 120-1119-01        |                             | TRANSFORMER,RF:BASE DRIVE                 | 80009    | 120-1119-01     |
| A3U575        | 156-0933-00        |                             | MICROCIRCUIT,LI:REGULATOR,PULSE WIDTH MOD | 80009    | 156-0933-00     |
| A3VR483       | 153-0058-00        |                             | SEMICON DVC,SE:ZENER,SEL:6.2V,5%,10MA     | 80009    | 153-0058-00     |
| A3VR579       | 152-0317-00        |                             | SEMICON DVC,ZENER,0.25W,6.2V,5%           | 04713    | SZG20012        |

# REPLACEABLE ELECTRICAL PARTS

| Component No. | Tektronix Part No. | Serial/Model No. Eff Dscnt | Name & Description                      | Mfr Code | Mfr Part Number  |
|---------------|--------------------|----------------------------|-----------------------------------------|----------|------------------|
| A4 REGULATOR  |                    |                            |                                         |          |                  |
| A4            | 670-6429-00        |                            | CKT BOARD ASSY:REGULATOR                | 80009    | 670-6429-00      |
| A4            | -----              |                            | (620-0295-00, -01 ONLY)                 |          |                  |
| A4            | 670-6429-01        |                            | CKT BOARD ASSY:REGULATOR                | 80009    | 670-6429-01      |
| A4            | -----              |                            | (620-0295-02 ONLY)                      |          |                  |
| A4            | 670-6429-02        |                            | CKT BOARD ASSY:REGULATOR                | 80009    | 670-6429-02      |
| A4            | -----              |                            | (620-0295-05 ONLY)                      |          |                  |
| A4C54         | 290-0778-00        |                            | CAP.,FXD,ELCTLT:1UF,+50-10%,50V         | 54473    | ECE-A50N1        |
| A4C55         | 290-0754-00        |                            | CAP.,FXD,ELCTLT:2200UF,+75%-10%,10VDC   | 56289    | 432D222010AA2    |
| A4C95         | 283-0024-00        |                            | CAP.,FXD,CER DI:0.1UF,+80-20%,50V       | 72982    | 8121N083Z5U0104Z |
| A4C101        | 283-0068-00        |                            | CAP.,FXD,CER DI:0.01UF,+100-0%,500V     | 59660    | 87i-533E103P     |
| A4C102        | 283-0068-00        |                            | CAP.,FXD,CER DI:0.01UF,+100-0%,500V     | 59660    | 871-533E103P     |
| A4C110        | 290-0798-00        |                            | CAP.,FXD,ELCTLT:180UF,+100-10%,40V      | 56289    | 672D187HO4ODM5C  |
| A4C115        | 290-0818-00        |                            | CAP.,FXD,ELCTLT:390UF,+100-10%,40V      | 56289    | 672D397H040DS5C  |
| A4C118        | 290-0798-00        |                            | CAP.,FXD,ELCTLT:180UF,+100-10%,40V      | 56289    | 672D187HO4ODM5C  |
| A4C125        | 290-0818-00        |                            | CAP.,FXD,ELCTLT:390UF,+100-10%,40V      | 56289    | 672D397H040DS5C  |
| A4C186        | 283-0024-00        |                            | CAP.,FXD,CER DI:0.1UF,+80-20%,50V       | 72982    | 8121N083Z5U0104Z |
| A4C195        | 290-0770-00        |                            | CAP.,FXD,ELCTLT:100UF,+50-10%,25V       | 56289    | 502D230          |
| A4C196        | 290-0770-00        |                            | CAP.,FXD,ELCTLT:100UF,+50-10%,25V       | 56289    | 502D230          |
| A4C218        | 290-0750-00        |                            | CAP.,FXD,ELCTLT:100UF,+50-10%,160V      | 56289    | D76244           |
| A4C246        | 290-0779-00        |                            | CAP.,FXD,ELCTLT:10UF,+50-10%,50VDC      | 56289    | 502D237          |
| A4C247        | 290-0524-00        |                            | CAP.,FXD,ELCTLT:4.7UF,20%,10V           | 90201    | TDC475M010EL     |
| A4C251        | 290-0770-00        |                            | CAP.,FXD,ELCTLT:100UF,+50-10%,25V       | 56289    | 502D230          |
| A4C285        | 290-0782-00        |                            | CAP.,FXD,ELCTLT:4.7UF,+75-10%,35V       | 55680    | ULA1V4R7TEA      |
| A4C291        | 290-0844-00        |                            | CAP.,FXD,ELCTLT:100UF,-10+75%,35 WVDC   | 54473    | ECE-A35V100L     |
| A4C296        | 290-0755-00        |                            | CAP.,FXD,ELCTLT:100UF,+50-10%,10V       | 55680    | ULA1A01TEA       |
| A4C375        | 290-0776-00        |                            | CAP.,FXD,ELCTLT:22UF,+50-10%,10V        | 55680    | ULA1A220TEA      |
| A4C385        | 283-0203-00        |                            | CAP.,FXD,CER DI:0.47UF,20%,50V          | 72982    | 8131M058Z5U0474M |
| A4C385        | -----              |                            | (670-6429-00 ONLY)                      |          |                  |
| A4C385        | 290-0183-00        |                            | CAP.,FXD,ELCTLT:1UF,10%,35V             | 90201    | TAC105K035P02    |
| A4C385        | -----              |                            | (670-6429-01 ONLY)                      |          |                  |
| A4C391        | 290-0408-01        |                            | CAP.,FXD,ELCTLT: 100UF,-10%+50%,100WVDC | T0510    | ECEB2AV101S      |
| A4C392        | 285-1133-00        |                            | CAP.,FXD,PLSTC:0.33UF,1%,100V           | 50558    | MH12D334F        |
| A4C401        | 283-0000-00        |                            | CAP.,FXD,CER DI:0.001UF,+100-0%,500V    | 59660    | 831610Y5U0102P   |
| A4C402        | 283-0000-00        |                            | CAP.,FXD,CER DI:0.001UF,+100-0%,500V    | 59660    | 831610Y5U0102P   |
| A4C446        | 290-0758-00        |                            | CAP.,FXD,ELCTLT:2.2UF,+50-10%,160V      | 56289    | 502D227          |
| A4CR185       | 152-0066-00        |                            | SEMICONV DEVICE:SILICON,400V,750MA      | 14433    | LG4016           |
| A4CR188       | 152-0066-00        |                            | SEMICONV DEVICE:SILICON,400V,750MA      | 14433    | LG4016           |
| A4CR189       | 152-0066-00        |                            | SEMICONV DEVICE:SILICON,400V,750MA      | 14433    | LG4016           |
| A4CR221       | 152-0655-00        |                            | SEMICONV DEVICE:SILICON,100V,3A         | 03508    | A115AX39         |
| A4CR231       | 152-0655-00        |                            | SEMICONV DEVICE:SILICON,100V,3A         | 03508    | A115AX39         |
| A4CR248       | 152-0333-00        |                            | SEMICONV DEVICE:SILICON,55V,200MA       | 07263    | FDH-6012         |
| A4CR255       | 152-0333-00        |                            | SEMICONV DEVICE:SILICON,55V,200MA       | 07263    | FDH-6012         |
| A4CR256       | 152-0333-00        |                            | SEMICONV DEVICE:SILICON,55V,200MA       | 07263    | FDH-6012         |
| A4CR262       | 152-0141-02        |                            | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A4CR288       | 152-0066-00        |                            | SEMICONV DEVICE:SILICON,400V,750MA      | 14433    | LG4016           |
| A4CR289       | 152-0066-00        |                            | SEMICONV DEVICE:SILICON,400V,750MA      | 14433    | LG4016           |
| A4CR341       | 152-0141-02        |                            | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A4CR366       | 152-0141-02        |                            | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A4CR367       | 152-0141-02        |                            | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A4CR368       | 152-0141-02        |                            | SEMICONV DEVICE:SILICON,30V,150MA       | 01295    | 1N4152R          |
| A4CR405       | 152-0400-00        |                            | SEMICONV DEVICE:SILICON,400V,1A         | 80009    | 152-0400-00      |
| A4CR406       | 152-0400-00        |                            | SEMICONV DEVICE:SILICON,400V,1A         | 80009    | 152-0400-00      |

REPLACEABLE ELECTRICAL PARTS

| Component No. | Tektronix Part No. | Serial/Model No. Eff Dscnt | Name & Description                         | Mfr Code | Mfr Part Number |
|---------------|--------------------|----------------------------|--------------------------------------------|----------|-----------------|
| A4CR414       | 152-0655-00        |                            | SEMICOND DEVICE: SILICON, 100V, 3A         | 03508    | A115AX39        |
| A4CR418       | 152-0686-00        |                            | SEMICOND DEVICE: RECT, SI, 100V, 5A        | 04713    | SR3273          |
| A4CR421       | 152-0686-00        |                            | SEMICOND DEVICE: RECT, SI, 100V, 5A        | 04713    | SR3273          |
| A4CR425       | 152-0655-00        |                            | SEMICOND DEVICE: SILICON, 100V, 3A         | 03508    | A115AX39        |
| A4CR431       | 152-0661-00        |                            | SEMICOND DEVICE: RECT, SI, 600V, 3A, FAST  | 04713    | MR856           |
| A4CR432       | 152-0661-00        |                            | SEMICOND DEVICE: RECT, SI, 600V, 3A, FAST  | 04713    | MR856           |
| A4CR445       | 152-0061-00        |                            | SEMICOND DEVICE: SILICON, 175V, 100MA      | 07263    | FDH2161         |
| A4CR485       | 152-0141-02        |                            | SEMICOND DEVICE: SILICON, 30V, 150MA       | 01295    | 1N4152R         |
| A4CR492       | 152-0141-02        |                            | SEMICOND DEVICE: SILICON, 30V, 150MA       | 01295    | 1N4152R         |
| A4J71         | 131-2427-00        |                            | TERM, QIK DISC: CKT BD, BRASS              | 00779    | G2409-1         |
| A4J71         | -----              |                            | (QUANTITY OF 2)                            |          |                 |
| A4J72         | 131-2427-00        |                            | TERM, QIK DISC: CKT BD, BRASS              | 00779    | G2409-1         |
| A4J72         | -----              |                            | (QUANTITY OF 2)                            |          |                 |
| A4J73         | 131-0589-00        |                            | TERMINAL, PIN: 0.46 L X 0.025 SQ           | 22526    | 48283-029       |
| A3J74         | -----              |                            | (QUANTITY OF 10)                           |          |                 |
| A4J74         | 131-0589-00        |                            | TERMINAL, PIN: 0.46 L X 0.025 SQ           | 22526    | 48283-029       |
| A4J74         | -----              |                            | (QUANTITY OF 4)                            |          |                 |
| A4J75         | 131-0608-00        |                            | TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD | 22526    | 47357           |
| A4J75         | -----              |                            | (QUANTITY OF 10)                           |          |                 |
| A4J76         | 131-0608-00        |                            | TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD | 22526    | 47357           |
| A4J76         | -----              |                            | (QUANTITY OF 2)                            |          |                 |
| A4J77         | 131-0608-00        |                            | TERMINAL, PIN: 0.365 L X 0.025 PH BRZ GOLD | 22526    | 47357           |
| A4J77         | -----              |                            | (QUANTITY OF 2)                            |          |                 |
| A4L1          | 108-1057-00        |                            | COIL, RF: FIXED, 830UH                     | 80009    | 108-1057-00     |
| A4L15         | 108-1017-00        |                            | COIL, RF: FXD, 1MH                         | 80009    | 108-1017-00     |
| A4L30         | 108-0860-00        |                            | COIL, RF: FIXED, 605UH                     | 80009    | 108-0860-00     |
| A4L65         | 108-1055-00        |                            | COIL, RF: FIXED, 6.1UH                     | 80009    | 108-1055-00     |
| A4L187        | 108-0509-00        |                            | COIL, RF: 2.45UH                           | 80009    | 108-0509-00     |
| A4L205        | 108-1056-00        |                            | COIL, RF: FIXED, 2.1MH                     | 80009    | 108-1056-00     |
| A4L231        | 108-0978-00        |                            | COIL, RF: FIXED, 135UH                     | 80009    | 108-0978-00     |
| A4Q238        | 151-0443-00        |                            | TRANSISTOR: SILICON, PNP                   | 04713    | SPS7950         |
| A4Q239        | 151-0443-00        |                            | TRANSISTOR: SILICON, PNP                   | 04713    | SPS7950         |
| A4Q240        | 151-0188-00        |                            | TRANSISTOR: SILICON, PNP                   | 04713    | SPS6868K        |
| A4Q251        | 151-0188-00        |                            | TRANSISTOR: SILICON, PNP                   | 04713    | SPS6868K        |
| A4Q271        | 151-0250-00        |                            | TRANSISTOR: SILICON, NPN                   | 07263    | S036744         |
| A4Q351        | 151-0188-00        |                            | TRANSISTOR: SILICON, PNP                   | 04713    | SPS6868K        |
| A4Q377        | 151-0190-00        |                            | TRANSISTOR: SILICON, NPN                   | 07263    | S032677         |
| A4Q378        | 151-0190-00        |                            | TRANSISTOR: SILICON, NPN                   | 07263    | S032677         |
| A4Q436        | 151-0443-00        |                            | TRANSISTOR: SILICON, PNP                   | 04713    | SPS7950         |
| A4Q455        | 151-0190-00        |                            | TRANSISTOR: SILICON, NPN                   | 07263    | S032677         |
| A4Q461        | 151-0190-00        |                            | TRANSISTOR: SILICON, NPN                   | 07263    | S032677         |
| A4R75         | 308-0087-00        |                            | RES, FXD, WW: 0.5 OHM, 1%, 1W              | 80009    | 308-0087-00     |
| A4R76         | 308-0643-00        |                            | RES, FXD, WW: 0.1 OHM, 3%, 3W              | 91637    | RS2B-ER1000H TR |
| A4R85         | 308-0463-00        |                            | RES, FXD, WW: 0.3 OHM, 1%, 3W              | 91637    | RS2B-KR3000F    |
| A4R86         | 308-0795-00        |                            | RES, FXD, WW: 0.2 OHM, 5%, 3W              | 91637    | CW-2B-R2000J-TR |
| A4R101        | 315-0100-00        |                            | RES, FXD, CMPSN: 10 OHM, 5%, 0.25W         | 01121    | CB1005          |
| A4R102        | 315-0100-00        |                            | RES, FXD, CMPSN: 10 OHM, 5%, 0.25W         | 01121    | CB1005          |
| A4R141        | 315-0101-00        |                            | RES, FXD, CMPSN: 100 OHM, 5%, 0.25W        | 01121    | CB1015          |
| A4R142        | 321-0101-00        |                            | RES, FXD, FILM: 110 OHM, 1%, 0.125W        | 91637    | MFF1816G110R0F  |
| A4R175        | 308-0643-00        |                            | RES, FXD, WW: 0.1 OHM, 3%, 3W              | 91637    | RS2B-ER1000H TR |
| A4R235        | 315-0471-00        |                            | RES, FXD, CMPSN: 470 OHM, 5%, 0.25W        | 01121    | CB4715          |
| A4R241        | 315-0271-00        |                            | RES, FXD, CMPSN: 270 OHM, 5%, 0.25W        | 01121    | CB2715          |
| A4R242        | 321-0227-00        |                            | RES, FXD, FILM: 2.26K OHM, 1%, 0.125W      | 91637    | MFF1816G22600F  |
| A4R243        | 321-0097-00        |                            | RES, FXD, FILM: 100 OHM, 1%, 0.125W        | 91637    | MFF1816G100R0F  |

REPLACEABLE ELECTRICAL PARTS

| Component No. | Tektronix   | Serial/Model No. |        | Name & Description                | Mfr Code | Mfr Part Number |
|---------------|-------------|------------------|--------|-----------------------------------|----------|-----------------|
|               | Part No.    | Eff              | Dscont |                                   |          |                 |
| A4R244        | 321-0318-00 |                  |        | RES.,FXD,FILM:20K OHM,1%,0.125W   | 91637    | MFF1816G20001F  |
| A4R261        | 315-0182-00 |                  |        | RES.,FXD,CMPSN:1.8K OHM,5%,0.25W  | 01121    | CB1825          |
| A4R263        | 321-0231-00 |                  |        | RES.,FXD,FILM:2.49K OHM,1%,0.125W | 91637    | MFF1816G24900F  |
| A4R264        | 315-0241-00 |                  |        | RES.,FXD,CMPSN:240 OHM,5%,0.25W   | 01121    | CB2415          |
| A4R265        | 315-0242-00 |                  |        | RES.,FXD,CMPSN:2.4K OHM,5%,0.25W  | 01121    | CB2425          |
| A4R266        | 321-0358-00 |                  |        | RES.,FXD,FILM:52.3K OHM,1%,0.125W | 91637    | MFF1816G52301F  |
| A4R272        | 321-0347-00 |                  |        | RES.,FXD,FILM:40.2K OHM,1%,0.125W | 91637    | MFF1816G40201F  |
| A4R273        | 322-0341-00 |                  |        | RES.,FXD,FILM:34.8K OHM,1%,0.25W  | 75042    | CEBT0-3482F     |
| A4R274        | 321-0126-00 |                  |        | RES.,FXD,FILM:200 OHM,1%,0.125W   | 91637    | MFF1816G200R0F  |
| A4R276        | 315-0151-00 |                  |        | RES.,FXD,CMPSN:150 OHM,5%,0.25W   | 01121    | CB1515          |
| A4R277        | 315-0101-00 |                  |        | RES.,FXD,CMPSN:100 OHM,5%,0.25W   | 01121    | CB1015          |
| A4R281        | 315-0101-00 |                  |        | RES.,FXD,CMPSN:100 OHM,5%,0.25W   | 01121    | CB1015          |
| A4R286        | 315-0102-00 |                  |        | RES.,FXD,CMPSN:1K OHM,5%,0.25W    | 01121    | CB1025          |
| A4R287        | 315-0102-00 |                  |        | RES.,FXD,CMPSN:1K OHM,5%,0.25W    | 01121    | CB1025          |
| A4R305        | 308-0314-00 |                  |        | RES.,FXD,WW:680 OHM,5%,3W         | 91637    | CW2B 680R0J     |
| A4R341        | 321-0249-00 |                  |        | RES.,FXD,FILM:3.83K OHM,1%,0.125W | 91637    | MFF1816G38300F  |
| A4R342        | 321-0126-00 |                  |        | RES.,FXD,FILM:200 OHM,1%,0.125W   | 91637    | MFF1816G200R0F  |
| A4R344        | 321-0289-00 |                  |        | RES.,FXD,FILM:10K OHM,1%,0.125W   | 91637    | MFF1816G10001F  |
| A4R345        | 321-0262-00 |                  |        | RES.,FXD,FILM:5.23K OHM,1%,0.125W | 91637    | MFF1816G52300F  |
| A4R346        | 321-0297-00 |                  |        | RES.,FXD,FILM:12.1K OHM,1%,0.125W | 91637    | MFF1816G12101F  |
| A4R347        | 315-0242-00 |                  |        | RES.,FXD,CMPSN:2.4K OHM,5%,0.25W  | 01121    | CB2425          |
| A4R348        | 315-0122-00 |                  |        | RES.,FXD,CMPSN:1.2K OHM,5%,0.25W  | 01121    | CB1225          |
| A4R352        | 315-0152-00 |                  |        | RES.,FXD,CMPSN:1.5K OHM,5%,0.25W  | 01121    | CB1525          |
| A4R353        | 315-0163-00 |                  |        | RES.,FXD,CMPSN:16K OHM,5%,0.25W   | 01121    | CB1635          |
| A4R355        | 315-0152-00 |                  |        | RES.,FXD,CMPSN:1.5K OHM,5%,0.25W  | 01121    | CB1525          |
| A4R361        | 321-0327-00 |                  |        | RES.,FXD,FILM:24.9K OHM,1%,0.125W | 91637    | MFF1816G24901F  |
| A4R362        | 321-0393-00 |                  |        | RES.,FXD,FILM:121K OHM,1%,0.125W  | 91637    | MFF1816G12102F  |
| A4R364        | 321-0331-00 |                  |        | RES.,FXD,FILM:27.4K OHM,1%,0.125W | 91637    | MFF1816G27401F  |
| A4R365        | 321-0346-00 |                  |        | RES.,FXD,FILM:39.2K OHM,1%,0.125W | 91637    | MFF1816G39201F  |
| A4R371        | 315-0471-00 |                  |        | RES.,FXD,CMPSN:470 OHM,5%,0.25W   | 01121    | CB4715          |
| A4R372        | 315-0471-00 |                  |        | RES.,FXD,CMPSN:470 OHM,5%,0.25W   | 01121    | CB4715          |
| A4R373        | 315-0332-00 |                  |        | RES.,FXD,CMPSN:3.3K OHM,5%,0.25W  | 01121    | CB3325          |
| A4R374        | 315-0332-00 |                  |        | RES.,FXD,CMPSN:3.3K OHM,5%,0.25W  | 01121    | CB3325          |
| A4R381        | 315-0103-00 |                  |        | RES.,FXD,CMPSN:10K OHM,5%,0.25W   | 01121    | CB1035          |
| A4R382        | 315-0433-00 |                  |        | RES.,FXD,CMPSN:43K OHM,5%,0.25W   | 01121    | CB4335          |
| A4R405        | 308-0314-00 |                  |        | RES.,FXD,WW:680 OHM,5%,3W         | 91637    | CW2B 680R0J     |
| A4R435        | 305-0183-00 |                  |        | RES.,FXD,CMPSN:18K OHM,5%,2W      | 01121    | HB1835          |
| A4R442        | 321-0217-00 |                  |        | RES.,FXD,FILM:1.78K OHM,1%,0.125W | 91637    | MFF1816G17800F  |
| A4R443        | 321-0217-00 |                  |        | RES.,FXD,FILM:1.78K OHM,1%,0.125W | 91637    | MFF1816G17800F  |
| A4R444        | 315-0102-03 |                  |        | RES.,FXD,CMPSN:1K OHM,5%,0.25W    | 01121    | CB1025          |
| A4R445        | 321-0217-00 |                  |        | RES.,FXD,FILM:1.78K OHM,1%,0.125W | 91637    | MFF1816G17800F  |
| A4R447        | 321-0262-00 |                  |        | RES.,FXD,FILM:5.23K OHM,1%,0.125W | 91637    | MFF1816G52300F  |
| A4R448        | 321-0076-00 |                  |        | RES.,FXD,FILM:60.4 OHM,1%,0.125W  | 91637    | MFF1816G60R40F  |
| A4R449        | 321-0229-00 |                  |        | RES.,FXD,FILM:2.37K OHM,1%,0.125W | 91637    | MFF1816G23700F  |
| A4R450        | 301-0202-00 |                  |        | RES.,FXD,CMPSN:2K OHM,5%,0.50W    | 01121    | EB2025          |
| A4R451        | 321-0639-00 |                  |        | RES.,FXD,FILM:9.6K OHM,1%,0.125W  | 91637    | MFF1816G96000F  |
| A4R452        | 321-0231-00 |                  |        | RES.,FXD,FILM:2.49K OHM,1%,0.125W | 91637    | MFF1816G24900F  |
| A4R453        | 315-0202-00 |                  |        | RES.,FXD,CMPSN:2K OHM,5%,0.25W    | 01121    | CB2025          |
| A4R458        | 301-0132-00 |                  |        | RES.,FXD,CMPSN:1.3K OHM,5%,0.50W  | 01121    | EB1325          |
| A4R458        | -----       |                  |        | (620-0295-05 ONLY)                |          |                 |
| A4R461        | 315-0472-00 |                  |        | RES.,FXD,CMPSN:4.7K OHM,5%,0.25W  | 01121    | CB4725          |
| A4R462        | 315-0242-00 |                  |        | RES.,FXD,CMPSN:2.4K OHM,5%,0.25W  | 01121    | CB2425          |
| A4R463        | 321-0231-00 |                  |        | RES.,FXD,FILM:2.49K OHM,1%,0.125W | 91637    | MFF1816G24900F  |
| A4R464        | 321-0321-00 |                  |        | RES.,FXD,FILM:21.5K OHM,1%,0.125W | 91637    | MFF1816G21501F  |

REPLACEABLE ELECTRICAL PARTS

| Component No. | Tektronix Part No. | Serial/Model No. Eff Dscnt | Name & Description                         | Mfr Code | Mfr Part Number |
|---------------|--------------------|----------------------------|--------------------------------------------|----------|-----------------|
| A4R465        | 321-0321-00        |                            | RES.,FXD.FILM:21.5K OHM,1%,0.125W          | 91637    | MFF1816G21501F  |
| A4R466        | 321-0126-00        |                            | RES.,FXD.FILM:200 OHM,1%,0.125W            | 91637    | MFF1816G200R0F  |
| A4R467        | 321-0321-00        |                            | RES.,FXD.FILM:21.5K OHM,1%,0.125W          | 91637    | MFF1816G21501F  |
| A4R471        | 315-0203-00        |                            | RES.,FXD.CMPSN:20K OHM,5%,0.25W            | 01121    | CB2035          |
| A4R472        | 315-0203-00        |                            | RES.,FXD.CMPSN:20K OHM,5%,0.25W            | 01121    | CB2035          |
| A4R473        | 315-0104-00        |                            | RES.,FXD.CMPSN:100K OHM,5%,0.25W           | 01121    | CB1045          |
| A4R481        | 315-0203-00        |                            | RES.,FXD.CMPSN:20K OHM,5%,0.25W            | 01121    | CB2035          |
| A4R482        | 315-0104-00        |                            | RES.,FXD.CMPSN:100K OHM,5%,0.25W           | 01121    | CB1045          |
| A4R483        | 315-0102-00        |                            | RES.,FXD.CMPSN:1K OHM,5%,0.25W             | 01121    | CB1025          |
| A4R484        | 315-0244-00        |                            | RES.,FXD.CMPSN:240K OHM,5%,0.25W           | 01121    | CB2445          |
| A4R484        | -----              |                            | (670-6429-00 ONLY)                         |          |                 |
| A4R484        | 315-0274-00        |                            | RES.,FXD.CMPSN:270K OHM,5%,0.25W           | 01121    | CB2745          |
| A4R484        | -----              |                            | (670-6429-01 ONLY)                         |          |                 |
| A4R486        | 321-0227-00        |                            | RES.,FXD.FILM:2.26K OHM,1%,0.125W          | 91637    | MFF1816G22600F  |
| A4R487        | 321-0223-00        |                            | RES.,FXD.FILM:2.05K OHM,1%,0.125W          | 91637    | MFF1816G20500F  |
| A4R488        | 315-0102-00        |                            | RES.,FXD.CMPSN:1K OHM,5%,0.25W             | 01121    | CB1025          |
| A4R491        | 315-0203-00        |                            | RES.,FXD.CMPSN:20K OHM,5%,0.25W            | 01121    | CB2035          |
| A4R493        | 321-0385-00        |                            | RES.,FXD.FILM:100K OHM,1%,0.125W           | 91637    | MFF1816G10002F  |
| A4R494        | 321-0331-00        |                            | RES.,FXD.FILM:27.4K OHM,1%,0.125W          | 91637    | MFF1816G27401F  |
| A4RT271       | 307-1097-00        |                            | RES.,THERMAL:32K OHM,2% AT 50 DEG C        | 15454    | 10E104-DC-S     |
| A4U258        | 156-0853-00        |                            | MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER,DUAL | 27014    | LM358N          |
| A4U351        | 156-0158-01        |                            | MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER | 04713    | MC1458P1DS      |
| A4U458        | 156-0158-01        |                            | MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER | 04713    | MC1458P1DS      |
| A4U458        | -----              |                            | (620-0295-00,-01,-02 ONLY)                 |          |                 |
| A4U458        | 156-0853-00        |                            | MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER,DUAL | 27014    | LM358N          |
| A4U458        | -----              |                            | (620-0295-05 ONLY)                         |          |                 |
| A4U475        | 156-1226-00        |                            | MICROCIRCUIT,LI:DUAL COMPARATOR,14 DIP     | 34335    | AM319D          |
| A4U491        | 156-0158-01        |                            | MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER | 04713    | MC1458P1DS      |
| A4VR185       | 152-0508-00        |                            | SEMICONV DEVICE:ZENER,0.4W,12.6V,5%        | 80009    | 152-0508-00     |
| A4VR267       | 152-0268-00        |                            | SEMICONV DEVICE:ZENER,0.4W,56V,5%          | 80009    | 152-0268-00     |
| A4VR275       | 152-0195-00        |                            | SEMICONV DEVICE:ZENER,0.4W,5.1V,5%         | 04713    | SZ11755         |
| A4VR363       | 152-0243-00        |                            | SEMICONV DEVICE:ZENER,0.4W,15V,5%          | 14552    | TD3810983       |
| A4VR441       | 152-0195-00        |                            | SEMICONV DEVICE:ZENER,0.4W,5.1V,5%         | 04713    | SZ11755         |
| A4VR458       | 152-0265-00        |                            | SEMICONV DEVICE:ZENER,0.4W,24V,5%          | 04713    | SZG35009K8      |
| A4VR458       | -----              |                            | (620-0295-05 ONLY)                         |          |                 |

# REPLACEABLE ELECTRICAL PARTS

| Component No. | Tektronix Part No. | Serial/Model No. Eff | Dscont  | Name & Description                   | Mfr Code | Mfr Part Number |
|---------------|--------------------|----------------------|---------|--------------------------------------|----------|-----------------|
| CHASSIS PARTS |                    |                      |         |                                      |          |                 |
| CR1001        | 152-0642-00        |                      |         | SEMICONV DEVICE:RECT.SI.35V.40A.DO-5 | 01281    | SD5218          |
| CR1002        | 152-0642-00        |                      |         | SEMICONV DEVICE:RECT.SI.35V.40A.DO-5 | 01281    | SD5218          |
| F9001         | 159-0011-00        |                      |         | FUSE,CARTRIDGE:3AG.6.25A.125V.5SEC   | 75915    | 3136.25         |
| F9001         | -----              |                      |         | (FOR OPTION FUSE CHANGE. SEE HOST    |          |                 |
| F9001         | -----              |                      |         | PRODUCT SERVICE MANUAL)              |          |                 |
| FL1001        | 119-1435-00        | B010100              | B021149 | FILTER,RFI:10A,125/250V.60HZ         | 02777    | F85432          |
| FL1001        | -----              |                      |         | (620-0295-00, -01 ONLY)              |          |                 |
| FL1001        | 119-1306-00        | B021150              |         | FILTER,RFI:6A.250V.50-400HZ          | 56289    | 6JX5431A        |
| FL1001        | -----              |                      |         | (620-0295-00, -01 ONLY)              |          |                 |
| FL1001        | 119-1306-00        |                      |         | FILTER,RFI:6A.250V.50-400HZ          | 56289    | 6JX5431A        |
| FL1001        | -----              |                      |         | (620-0295-02 ONLY)                   |          |                 |
| L1001         | 108-1054-00        |                      |         | COIL,RF:FIXED,20.7UH                 | 80009    | 108-1054-00     |
| Q60           | 151-0621-00        |                      |         | TRANSISTOR:SILICON,NPN               | 03508    | X44H382         |
| Q75           | 151-0657-00        |                      |         | TRANSISTOR:SILICON,PNP               | 04713    | SJE1973         |
| Q80           | 151-0656-00        |                      |         | TRANSISTOR:SILICON,NPN               | 04713    | SJE1972         |
| Q85           | 151-0656-00        |                      |         | TRANSISTOR:SILICON,NPN               | 04713    | SJE1972         |
| Q95           | 151-0656-00        |                      |         | TRANSISTOR:SILICON,NPN               | 04713    | SJE1972         |
| Q515          | 151-0679-00        |                      |         | TRANSISTOR:SILICON,NPN               | 04713    | SJE362          |
| Q521          | 151-0679-00        |                      |         | TRANSISTOR:SILICON,NPN               | 04713    | SJE362          |
| R1001         | 308-0818-00        |                      |         | RES.,FXD,WW:0.005 OHM,3%,10W         | 91637    | RH10-89/005 3%  |
| T320          | 120-1309-00        |                      |         | XFMR,PWR,SDN & SU:CONVERTER,HF       | 80009    | 120-1309-00     |
| T320          | -----              |                      |         | (620-0295-00, -01 ONLY)              |          |                 |
| T320          | 120-1309-01        |                      |         | XFMR,PWR,SDN & SU:CONVERTER,HF       | 80009    | 120-1309-01     |
| T320          | -----              |                      |         | (620-0295-02 ONLY)                   |          |                 |

# Section 8 REPLACEABLE MECHANICAL PARTS

## PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important when ordering parts to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

## SPECIAL NOTES AND SYMBOLS

X000 Part first added at this serial number  
00X Part removed after this serial number

## FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

## INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

```

1 2 3 4 5 Name & Description
Assembly and/or Component
Attaching parts for Assembly and/or Component
 --- * ---
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
 --- * ---
Parts of Detail Part
Attaching parts for Parts of Detail Part
 --- * ---

```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol --- \* --- indicates the end of attaching parts.

**Attaching parts must be purchased separately, unless otherwise specified.**

## ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

## ABBREVIATIONS

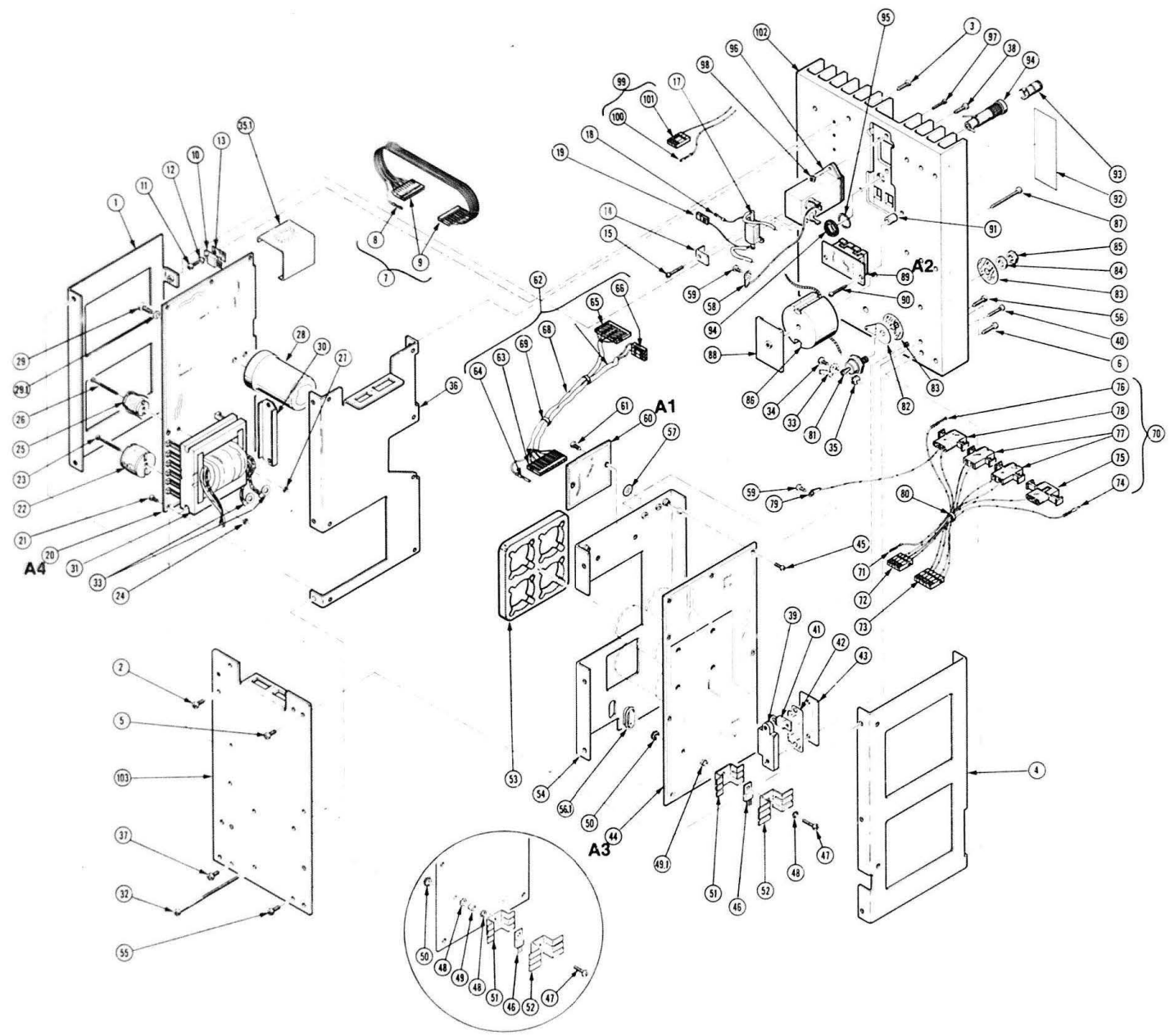
|       |                    |         |                       |          |                      |          |                 |
|-------|--------------------|---------|-----------------------|----------|----------------------|----------|-----------------|
| #     | INCH               | ELECTRN | ELECTRON              | IN       | INCH                 | SE       | SINGLE END      |
| ACTR  | NUMBER SIZE        | ELEC    | ELECTRICAL            | INCAND   | INCANDESCENT         | SECT     | SECTION         |
| ADPTR | ACTUATOR           | ELECTLT | ELECTROLYTIC          | INSUL    | INSULATOR            | SEMICOND | SEMICONDUCTOR   |
| ALIGN | ADAPTER            | ELEM    | ELEMENT               | INTL     | INTERNAL             | SHLD     | SHIELD          |
| AL    | ALIGNMENT          | EPL     | ELECTRICAL PARTS LIST | LPHLDR   | LAMPHOLDER           | SHLDR    | SHOULDERED      |
| ASSEM | ALUMINUM           | EQPT    | EQUIPMENT             | MACH     | MACHINE              | SKT      | SOCKET          |
| ASSY  | ASSEMBLED          | EXT     | EXTERNAL              | MECH     | MECHANICAL           | SL       | SLIDE           |
| ATTN  | ASSEMBLY           | FIL     | FILLISTER HEAD        | MTG      | MOUNTING             | SLFLKG   | SELF-LOCKING    |
| AWG   | ATTENUATOR         | FLEX    | FLEXIBLE              | NIP      | NIPPLE               | SLVG     | SLEEVING        |
| BD    | AMERICAN WIRE GAGE | FLH     | FLAT HEAD             | NON WIRE | NOT WIRE WOUND       | SPR      | SPRING          |
| BRKT  | BOARD              | FLTR    | FILTER                | OBD      | ORDER BY DESCRIPTION | SQ       | SQUARE          |
| BRS   | BRACKET            | FR      | FRAME or FRONT        | OD       | OUTSIDE DIAMETER     | SST      | STAINLESS STEEL |
| BRZ   | BRASS              | FSTNR   | FASTENER              | OVH      | OVAL HEAD            | STL      | STEEL           |
| BSHG  | BRONZE             | FT      | FOOT                  | PH BRZ   | PHOSPHOR BRONZE      | SW       | SWITCH          |
| CAB   | BUSHING            | FXD     | FIXED                 | PL       | PLAIN or PLATE       | T        | TUBE            |
| CAP   | CABINET            | GSKT    | GASKET                | PLSTC    | PLASTIC              | TERM     | TERMINAL        |
| CER   | CAPACITOR          | HDL     | HANDLE                | PN       | PART NUMBER          | THD      | THREAD          |
| CHAS  | CERAMIC            | HEX     | HEXAGON               | PNH      | PAN HEAD             | THK      | THICK           |
| CKT   | CHASSIS            | HEX HD  | HEXAGONAL HEAD        | PWR      | POWER                | TNSN     | TENSION         |
| COMP  | CIRCUIT            | HEX SOC | HEXAGONAL SOCKET      | RCPT     | RECEPTACLE           | TPG      | TAPPING         |
| CONN  | COMPOSITION        | HLCPS   | HELICAL COMPRESSION   | RES      | RESISTOR             | TRH      | TRUSS HEAD      |
| COV   | CONNECTOR          | HLEXT   | HELICAL EXTENSION     | RGD      | RIGID                | V        | VOLTAGE         |
| CPLG  | COVER              | HV      | HIGH VOLTAGE          | RLF      | RELIEF               | VAR      | VARIABLE        |
| CRT   | COUPLING           | IC      | INTEGRATED CIRCUIT    | RTNR     | RETAINER             | W/       | WITH            |
| DEG   | CATHODE RAY TUBE   | ID      | INSIDE DIAMETER       | SCH      | SOCKET HEAD          | WSHR     | WASHER          |
| DWR   | DEGREE             | IDNT    | IDENTIFICATION        | SCOPE    | OSCILLOSCOPE         | XFMR     | TRANSFORMER     |
|       | DRAWER             | IMPLR   | IMPELLER              | SCR      | SCREW                | XSTR     | TRANSISTOR      |



# REPLACEABLE MECHANICAL PARTS

## CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code | Manufacturer                                                  | Address                                  | City, State, Zip                       |
|-----------|---------------------------------------------------------------|------------------------------------------|----------------------------------------|
| 00779     | AMP, INC.                                                     | P.O. BOX 3608                            | HARRISBURG, PA 17105                   |
| 06383     | PANDUIT CORPORATION                                           | 17301 RIDGELAND                          | TINLEY PARK, IL 60477                  |
| 08261     | SPECTRA-STRIP CORP                                            | 7100 LAMPSON AVE.                        | GARDEN GROVE, CA 92642                 |
| 08530     | RELIANCE MICA CORP                                            | 342-39TH ST.                             | BROOKLYN, NY 11232                     |
| 12703     | JUDD WIRE DIV. ELECTRONIZED<br>CHEMICALS CORP                 | 250 TURNPIKE RD P.O. BOX 390             | TURNERS FALLS, MA 01376                |
| 13103     | THERMALLOY COMPANY, INC.                                      | 2021 W VALLEY VIEW LANE<br>P O BOX 34829 | DALLAS, TX 75234                       |
| 22526     | BERG ELECTRONICS, INC.                                        | YOUK EXPRESSWAY                          | NEW CUMBERLAND, PA 17070               |
| 22670     | G.M. NAMEPLATE, INC                                           | 2040 15TH AVENUE WEST                    | SEATTLE, WA 98119                      |
| 23050     | PRODUCT COMPONENTS CORP                                       | 30 LORRAINE AVE.                         | MT VERNON, NY 10553                    |
| 24931     | SPECIALITY CONNECTOR CO., INC.                                | 2620 ENDRESS PLACE                       | GREENWOOD, IN 46142                    |
| 27264     | MOLEX PRODUCTS CO.                                            | 5224 KATRINE AVE.                        | DOWNERS GROVE, IL 60515                |
| 73743     | FISCHER SPECIAL MFG CO.                                       | 446 MORGAN ST.                           | CINCINNATI, OH 45206                   |
| 77250     | PHEOLL MANUFACTURING CO., DIVISION<br>OF ALLIED PRODUCTS CORP | 5700 W. ROOSEVELT RD.                    | CHICAGO, IL 60650                      |
| 78189     | ILLINOIS TOOL WORKS, INC.<br>SHAKEPROOF DIVISION              | ST. CHARLES ROAD<br>P O BOX 500          | ELGIN, IL 60120<br>BEAVERTON, OR 97077 |
| 80009     | TEKTRONIX, INC                                                |                                          |                                        |
| 83309     | ELECTRICAL SPECIALITY CO., SUBSIDIARY OF<br>BELDEN CORP.      | 213 E. HARRIS AVE. SOUTH                 | SAN FRANCISCO, CA 94080                |
| 83385     | CENTRAL SCREW CO                                              | 2530 CRESCENT DR.                        | BROADVIEW, IL 60153                    |
| 86044     | CALIFORNIA GASKET COMPANY                                     | 1601 W. 134 STREET                       | GARDENA, CA 90249                      |
| 86445     | PENN FIBRE AND SPECIALTY CO., INC.                            | 2032 E. WESTMORELAND ST.                 | PHILADELPHIA, PA 19134                 |
| 86928     | SEASTROM MFG. COMPANY, INC.                                   | 701 SONORA AVENUE                        | GLENDALE, CA 91201                     |
| 92907     | TEXTRON INC. CAMCAR DIV                                       | 600 18TH AVE                             | ROCKFORD, IL 61101                     |
| 53629     | PANEL COMPONENTS CORP                                         | 2015 SECOND ST.                          | BERKELEY, CA 94170                     |



REV AUG 1983

620-0295-00 POWER SUPPLY

REPLACEABLE MECHANICAL PARTS

| Fig & Index No | Tektronix Part No | Serial/Model No Eff | Dscont  | Qty | 1 2 3 4 5 | Name & Description                                                                              | Mfr Code | Mfr Part Number |
|----------------|-------------------|---------------------|---------|-----|-----------|-------------------------------------------------------------------------------------------------|----------|-----------------|
| 1.             |                   |                     |         | 1   |           | POWER SUPPLY:LOW VOLTAGE                                                                        |          |                 |
| -1             | 200-2455-00       | B010100             | B010279 | 1   |           | COVER,PWR SPLY:LEFT,AL                                                                          | 80009    | 200-2455-00     |
|                | 200-2455-01       | B010280             |         | 1   |           | COVER,PWR SPLY:LEFT,AL<br>*****ATTACHING PARTS*****                                             | 80009    | 200-2455-01     |
| -2             | 211-0504-00       |                     |         | 2   |           | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL                                                          | 83385    | OBD             |
| -3             | 211-0510-00       |                     |         | 3   |           | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL<br>*****END ATTACHING PARTS*****                       | 83385    | OBD             |
| -4             | 200-2456-00       |                     |         | 1   |           | LOWER,PWR SPLY:RIGHT,AL<br>*****ATTACHING PARTS*****                                            | 80009    | 200-2456-00     |
| -5             | 211-0504-00       |                     |         | 3   |           | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL                                                          | 83385    | OBD             |
| -6             | 211-0510-00       |                     |         | 3   |           | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL<br>*****END ATTACHING PARTS*****                       | 83385    | OBD             |
| -7             | 175-3379-00       |                     |         | 1   |           | CA ASSY,SP,ELEC:10,26 AWG,7.0 L,RIBBON                                                          | 80009    | 175-3379-00     |
| -8             | 131-0707-00       |                     |         | 10  |           | CONNECTOR,TERM:22-26 AWG,BRS & CU BE GOL                                                        | 22526    | 47439           |
|                | 175-0833-00       |                     |         | AR  |           | WIRE,ELECTRICAL:10 WIRE RIBBON                                                                  | 08261    | SS-1026-7       |
| -9             | 352-0168-03       |                     |         | 2   |           | CONN BODY,PL,EL:10 WIRE ORANGE                                                                  | 80009    | 352-0168-03     |
|                |                   |                     |         | -   |           | (A3P62 TO A4P75)                                                                                |          |                 |
| -10            |                   |                     |         | 5   |           | TRANSISTORS:(SEE CHASSIS PARTS Q60,Q75,Q8 Q85, AND Q95 REPL)<br>*****ATTACHING PARTS*****       |          |                 |
| -11            | 211-0097-00       |                     |         | 5   |           | SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL                                                         | 83385    | OBD             |
| -12            | 210-1291-00       |                     |         | 5   |           | WASHER,SHLDR:0.118 ID X 0.1 THK,PLSTC<br>*****END ATTACHING PARTS*****                          | 80009    | 210-1291-00     |
| -13            | 342-0328-00       |                     |         | 5   |           | INSULATOR,PLATE:XSTR,ALUMINUM                                                                   | 80009    | 342-0328-00     |
| -14            | 343-0870-00       |                     |         | 1   |           | CLAMP,RESISTOR:ALUMINUM<br>*****ATTACHING PARTS*****                                            | 80009    | 343-0870-00     |
| -15            | 211-0016-00       |                     |         | 1   |           | SCREW,MACHINE:4-40 X 0.625 INCH,PNH STL<br>*****END ATTACHING PARTS*****                        | 83385    | OBD             |
| -16            | 198-4300-00       |                     |         | 1   |           | WIRE SET,ELEC:                                                                                  | 80009    | 198-4300-00     |
| -17            |                   |                     |         | 1   |           | RESISTOR:(SEE CHASSIS PARTS R1001 REPL)                                                         |          |                 |
| -18            | 131-0707-00       |                     |         | 2   |           | CONNECTOR,TERM:22-26 AWG,BRS & CU BE GOL                                                        | 22526    | 47439           |
| -19            | 352-0169-04       |                     |         | 1   |           | CONN BODY,PL,EL:2 WIRE YELLOW                                                                   | 80009    | 352-0169-04     |
|                |                   |                     |         | -   |           | (A4P77)                                                                                         |          |                 |
| -20            |                   |                     |         | 1   |           | CKT BOARD ASSY:REGULATOR(SEE A4 REPL)<br>*****ATTACHING PARTS*****                              |          |                 |
| -21            | 211-0244-00       |                     |         | 7   |           | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL<br>(620-0295-00, -01 ONLY)                             | 78189    | OBD             |
|                | 211-0008-00       |                     |         | 7   |           | SCREW,MACHINE:4-40 X 0.250,PNH,STL,CD PL<br>(620-0295-02 ONLY)<br>*****END ATTACHING PARTS***** | 83385    | OBD             |
|                |                   |                     |         | -   |           | CKT BOARD ASSY INCLUDES:                                                                        |          |                 |
| -22            |                   |                     |         | 2   |           | COIL:(SEE A4L1,A4L205 REPL)<br>(CORE MUST NOT TOUCH PAD)<br>*****ATTACHING PARTS*****           |          |                 |
| -23            | 211-0031-00       |                     |         | 2   |           | SCREW,MACHINE:                                                                                  | 83385    | OBD             |
|                | 210-1017-00       |                     |         | 2   |           | WASHER,NONMETAL:0.281 ID X 0.875 INCH ID                                                        | 80009    | 210-1017-00     |
| -24            | 220-0665-00       |                     |         | 2   |           | NUT,PLAIN,HEX:SLFLKG,4-40 X 0.25,PLSTC<br>(620-0295-00 ONLY)                                    | 23050    | OBD             |
|                | 210-0586-00       |                     |         | 2   |           | NUT,PL,ASSEM WA:4-40 X 0.25,STL<br>(620-0295-01 ONLY)<br>*****END ATTACHING PARTS*****          | 83385    | OBD             |
| -25            |                   |                     |         | 1   |           | COIL:(SEE A4L231 REPL)<br>(CORE MUST NOT TOUCH PAD)<br>*****ATTACHING PARTS*****                |          |                 |
| -26            | 211-0031-00       |                     |         | 1   |           | SCREW,MACHINE:                                                                                  | 83385    | OBD             |
|                | 210-0847-00       |                     |         | 1   |           | WASHER,FLAT:0.164 ID X 0.500 OD,NYLON                                                           | 83309    | OBD             |
| -27            | 220-0665-00       |                     |         | 1   |           | NUT,PLAIN,HEX:SLFLKG,4-40 X 0.25,PLSTC<br>(620-0295-00 ONLY)                                    | 23050    | OBD             |
|                | 210-0586-00       |                     |         | 1   |           | NUT,PL,ASSEM WA:4-40 X 0.25,STL<br>(620-0295-01 ONLY)<br>*****END ATTACHING PARTS*****          | 83385    | OBD             |
|                | 195-1207-00       |                     |         | 1   |           | LEAD,ELECTRICAL:12 AWG,3.5 L,2-N<br>(J72 TO A4C55)                                              | 80009    | 195-1207-00     |
|                | 195-1592-00       |                     |         | 1   |           | LEAD,ELECTRICAL:12 AWG,5.0 L,0-N<br>(J71 TO A4C55)                                              | 80009    | 195-1592-00     |

REPLACEABLE MECHANICAL PARTS

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Qty | 1 2 3 4 5 | Name & Description                                                                                   | Mfr Code | Mfr Part Number  |
|------------------|--------------------|----------------------|--------|-----|-----------|------------------------------------------------------------------------------------------------------|----------|------------------|
| 1-28             | -----              |                      |        | 1   |           | CAPACITOR:(SEE A4C55 REPL)<br>.....(ATTACHING PARTS).....                                            |          |                  |
| -29              | 212-0507-00        |                      |        | 2   |           | SCREW,MACHINE:10-32 X 0.375 INCH,PNH ST                                                              | 83385    | OBD              |
| -29 1            | 210-0010-00        |                      |        | 2   |           | WASHER,LOCK:INT.0 20 ID X 0.376" OD,STL<br>.....(END ATTACHING PARTS).....                           | 78189    | 1210-00-00-0541C |
| -30              | 343-0869-00        |                      |        | 1   |           | CLAMP,XFMR:3.125 L,AL                                                                                | 80009    | 343-0869-00      |
| -31              | -----              |                      |        | 1   |           | TRANSFORMER:(SEE CHASSIS PARTS T320 REPL)<br>.....(ATTACHING PARTS).....                             |          |                  |
| -32              | 211-0688-00        |                      |        | 2   |           | SCREW,MACHINE:6-32 X 3.0.PNH,STL CD PL<br>.....(END ATTACHING PARTS).....                            | 93907    | OBD              |
| -33              | 210-0333-00        |                      |        | 2   |           | TERMINAL LUG:0.255 ID,BRASS,TIN PLATED<br>.....(ATTACHING PARTS).....                                | 86928    | 5411-38          |
| -34              | 211-0504-00        |                      |        | 2   |           | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL                                                               | 83385    | OBD              |
| -35              | 210-0457-00        |                      |        | 2   |           | NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL<br>.....(END ATTACHING PARTS).....                            | 83385    | OBD              |
| -35 1            | 337-0120-00        | B010176              |        | 1   |           | SHIELD,ELEC:PWR SUPPLY                                                                               | 80009    | 337-0120-00      |
| -36              | 407-2475-00        |                      |        | 1   |           | BRACKET,SUPPORT:REGULATOR,AL<br>.....(ATTACHING PARTS).....                                          | 80009    | 407-2475-00      |
| -37              | 211-0504-00        |                      |        | 3   |           | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL                                                               | 83385    | OBD              |
| -38              | 211-0510-00        |                      |        | 4   |           | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL<br>.....(END ATTACHING PARTS).....                          | 83385    | OBD              |
| -39              | 200-2269-00        |                      |        | 1   |           | COVER,XSTR:<br>.....(ATTACHING PARTS).....                                                           | 80009    | 200-2269-00      |
| -40              | 211-0551-00        |                      |        | 2   |           | SCREW,MACHINE:6-32 X 0.562 INCH,PNH STL<br>.....(END ATTACHING PARTS).....                           | 83385    | OBD              |
| -41              | -----              |                      |        | 2   |           | TRANSISTOR:(SEE CHASSIS Q515,Q521 REPL)                                                              |          |                  |
| -42              | 342-0458-00        |                      |        | 1   |           | INSULATOR,PLATE:TRANSISTOR,MICA                                                                      | 08530    | OBD              |
| -43              | 342-0449-01        |                      |        | 1   |           | INSULATOR,PLATE:TRANSISTOR,ALUMINA,PRINTE                                                            | 80009    | 342-0449-01      |
| -44              | -----              |                      |        | 1   |           | CKT BOARD ASSY:INVERTER(SEE A3 REPL)<br>.....(ATTACHING PARTS).....                                  |          |                  |
| -45              | 211-0244-00        |                      |        | 7   |           | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL<br>(620-0295-00, -01 ONLY)                                  | 78189    | OBD              |
|                  | 211-0008-00        |                      |        | 7   |           | SCREW,MACHINE:4-40 X 0.250,PNH,STL,CD PL<br>(620-0295-02 ONLY)<br>.....(END ATTACHING PARTS).....    | 83385    | OBD              |
|                  | -----              |                      |        | -   |           | CKT BOARD ASSY INCLUDES:                                                                             |          |                  |
| -46              | -----              |                      |        | 1   |           | TRANSISTOR:(SEE A3Q115 REPL)<br>.....(ATTACHING PARTS).....                                          |          |                  |
| -47              | 211-0511-00        |                      |        | 1   |           | SCREW,MACHINE:6-32 X 0.500,PNH,STL,CD PL<br>(620-6430-00, -01 ONLY)                                  | 83385    | OBD              |
|                  | 211-0507-00        |                      |        | 1   |           | SCREW,MACHINE:6-32 X 0.312 INCH,PNH STL<br>(620-6430-02 ONLY)                                        | 83385    | OBD              |
| -48              | 210-0005-00        |                      |        | 2   |           | WASHER,LOCK:#6 EXT.0.02 THK,STL<br>(670-6430-00, -01 ONLY)                                           | 78189    | 1106-00          |
|                  | 210-0005-00        |                      |        | 1   |           | WASHER,LOCK:#6 EXT.0.02 THK,STL<br>(670-6430-02 ONLY)                                                | 78189    | 1106-00          |
| -49              | 210-1270-00        |                      |        | 1   |           | WASHER,FLAT:0.141 ID X 0.04 THK,AL<br>(670-6430-00, -01 ONLY)                                        | 80009    | 210-1270-00      |
| -49 1            | 129-0971-00        |                      |        | 1   |           | SPACER,POST:0.15 L,6-32,BRS ALLOY,0.25<br>(670-6430-02 ONLY)                                         | 80009    | 129-0971-00      |
| -50              | 210-0457-00        |                      |        | 1   |           | NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL<br>(670-6430-00, -01 ONLY)<br>.....(END ATTACHING PARTS)..... | 83385    | OBD              |
| -51              | 214-3309-00        |                      |        | 1   |           | HEAT SINK,XSTR:TO-202 OR TO-220,AL                                                                   | 13103    | OBD              |
| -52              | 214-2956-00        |                      |        | 1   |           | HEAT SINK,XSTR:TO-220,AL                                                                             | 13103    | 6071B            |
| -53              | 343-0937-00        |                      |        | 1   |           | RETAINER,CAP:POLYURETHANE                                                                            | 80009    | 343-0937-00      |
| -54              | 407-2475-00        |                      |        | 1   |           | BRACKET,SUPPORT:INVERTER,AL<br>.....(ATTACHING PARTS).....                                           | 80009    | 407-2475-00      |
| -55              | 211-0504-00        |                      |        | 3   |           | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL                                                               | 83385    | OBD              |
| -56              | 211-0510-00        |                      |        | 3   |           | SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL                                                             | 83385    | OBD              |
| -56 1            | 348-0253-00        |                      |        | 1   |           | GROMMET,PLASTIC:BLACK,OBLONG,3 OXO 925<br>.....(END ATTACHING PARTS).....                            | 30009    | 348-0253-00      |
| -57              | 334-3379-02        |                      |        | 2   |           | MARKER,IDENT:MARKED GROUND SYMBOL                                                                    | 80009    | 334-3379-02      |

REPLACEABLE MECHANICAL PARTS

| Fig & Index | Tektronix Part No. | Serial/Model No. Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                                                           | Mfr Code | Mfr Part Number  |
|-------------|--------------------|----------------------|--------|-----|---|---|---|---|---|----------------------------------------------------------------------------------------------|----------|------------------|
| 1-          | 195-1040-00        |                      |        | 1   |   |   |   |   |   | LEAD,ELECTRICAL:18 AWG,4 0 L,5-4 (GROUND TO FL1001)                                          | 80009    | 195-1040-00      |
| -58         | 210-0202-00        |                      |        | 1   |   |   |   |   |   | TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED                                                     | 78189    | 2104-06-00-2520N |
| -59         | 211-0503-00        |                      |        | 2   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.188 INCH,PNH STL ***** (END ATTACHING PARTS)*****                     | 83385    | OBD              |
| -60         | -----              |                      |        | 1   |   |   |   |   |   | CKT BOARD ASSY:VDE(SEE A1 REPL) ***** (ATTACHING PARTS)*****                                 |          |                  |
| -61         | 211-0504-00        |                      |        | 2   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL (620-2095-00, -01 ONLY)                               | 83385    | OBD              |
|             | 211-0008-00        |                      |        | 2   |   |   |   |   |   | SCREW,MACHINE:4-40 X 0.250,PNH,STL,CD PL (620-2095-02 ONLY) ***** (END ATTACHING PARTS)***** | 83385    | OBD              |
|             | 346-0128-00        | B010215              |        | 1   |   |   |   |   |   | STRAP,TIE DOWN:0.1W X 8 0" LONG,NYLON                                                        | 06383    | PLT2M            |
|             | 343-0549-00        |                      |        | 1   |   |   |   |   |   | STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG                                                       | 06383    | PLT1M            |
| -62         | 198-4298-00        |                      |        | 1   |   |   |   |   |   | WIRE SET,ELEC:                                                                               | 80009    | 198-4298-00      |
| -63         | 352-0205-00        |                      |        | 1   |   |   |   |   |   | CONN BODY,PL,EL:9 WIRE BLACK (A3P61)                                                         | 80009    | 352-0205-00      |
| -64         | 131-0792-00        |                      |        | 12  |   |   |   |   |   | CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL                                                       | 22526    | 46221            |
| -65         | 352-0203-00        |                      |        | 1   |   |   |   |   |   | HLDR,TERM CONN:7 WIRE BLACK (A2P67)                                                          | 80009    | 352-0203-00      |
| -66         | 352-0199-00        |                      |        | 1   |   |   |   |   |   | CONN BODY,PL,EL:3 WIRE BLACK (A1P66)                                                         | 80009    | 352-0199-00      |
| -67         | 175-2817-00        |                      |        | 1   |   |   |   |   |   | CABLE,SP,ELEC:2.18 AWG,W/GRAY JACKET                                                         | 12703    | MK02UT           |
| -68         | 175-1517-00        |                      |        | 1   |   |   |   |   |   | CABLE ASSY,RF:50 OHM COAX,20 0 L                                                             | 80009    | 175-1517-00      |
| -69         | 343-0549-00        |                      |        | 2   |   |   |   |   |   | STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG                                                       | 06383    | PLT1M            |
| -70         | 198-4343-00        |                      |        | 1   |   |   |   |   |   | WIRE SET,ELEC:                                                                               | 80009    | 198-4343-00      |
| -71         | 131-0621-00        |                      |        | 8   |   |   |   |   |   | CONNECTOR,TERM:22-26 AWG,BRS & CU BE GOL                                                     | 22526    | 46231            |
| -72         | 352-0200-00        |                      |        | 1   |   |   |   |   |   | HLDR,TERM CONN:4 WIRE BLACK (A2P68)                                                          | 80009    | 352-0200-00      |
| -73         | 352-0201-00        |                      |        | 1   |   |   |   |   |   | CONN BODY,PL,EL:5 WIRE BLACK (A2P69)                                                         | 80009    | 352-0201-00      |
| -74         | 131-0945-00        |                      |        | 2   |   |   |   |   |   | CONTACT,ELEC:CONNECTOR,BRASS TIN PL                                                          | 27264    | 02-09-2101       |
| -75         | 204-0884-00        |                      |        | 1   |   |   |   |   |   | CONN BODY,PLUG:3 CONTACT,MALE (P1002 TO B1002 ON 4112)                                       | 27264    | 03-09-2031       |
| -76         | 131-0948-00        |                      |        | 7   |   |   |   |   |   | CONTACT,ELEC:CONNECTOR,BRASS TIN PL                                                          | 27264    | 02-09-1103       |
| -77         | 204-0826-00        |                      |        | 2   |   |   |   |   |   | CONN BODY,RCPT:2 CONT,FEMALE (P1003,P1004 TO B1003,B1004 ON 4112)                            | 27264    | 03-09-1021       |
| -78         | 204-0734-00        |                      |        | 1   |   |   |   |   |   | CONN BODY,RCPT:3 CONTACTS (P1001)                                                            | 27264    | 03-09-1031       |
| -79         | 210-0202-00        |                      |        | 1   |   |   |   |   |   | TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED                                                     | 78189    | 2104-06-00-2520N |
| -80         | 343-0549-00        |                      |        | 1   |   |   |   |   |   | STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG                                                       | 06383    | PLT1M            |
| -81         | -----              |                      |        | 2   |   |   |   |   |   | DIODE (SEE CHASSIS CR1001,CR1002 REPL) ***** (ATTACHING PARTS)*****                          |          |                  |
| -82         | 210-0285-00        |                      |        | 2   |   |   |   |   |   | TERMINAL,LUG:                                                                                | 00779    | 321051           |
| -83         | 210-1286-00        |                      |        | 4   |   |   |   |   |   | WASHER,FLAT:0.25 ID X 0.002 THK,MICA                                                         | 86928    | 5624-72-2        |
|             | 210-1115-00        |                      |        | 2   |   |   |   |   |   | WASHER,FLAT:0.27 ID X 0.062 THK,0.37 OD                                                      | 86445    | OBD              |
| -84         | 210-0853-00        |                      |        | 2   |   |   |   |   |   | WASHER,FLAT:0.25 ID X 0.50 OD                                                                | 86044    | OBD              |
| -85         | 210-0412-00        |                      |        | 2   |   |   |   |   |   | NUT,PLAIN,HEX:0.25-28 X 0.438,BRS C,D PL ***** (END ATTACHING PARTS)*****                    | 73743    | 3091-402         |
| -86         | -----              |                      |        | 1   |   |   |   |   |   | COIL:(SEE CHASSIS PARTS L1001 REPL) ***** (ATTACHING PARTS)*****                             |          |                  |
| -87         | 211-0530-00        |                      |        | 1   |   |   |   |   |   | SCREW,MACHINE:6-32 X 1.75 INCH,PNH STL                                                       | 83385    | OBD              |
| -88         | 343-0871-00        |                      |        | 1   |   |   |   |   |   | CLAMP,MOUNTING POT COIL AL ***** (END ATTACHING PARTS)*****                                  | 80009    | 343-0871-00      |
| -89         | -----              |                      |        | 1   |   |   |   |   |   | CKT BOARD ASSY:V SELECTOR(SEE A2 REPL) ***** (ATTACHING PARTS)*****                          |          |                  |
| -90         | 211-0016-00        |                      |        | 2   |   |   |   |   |   | SCREW,MACHINE:4-40 X 0.625 INCH,PNH STL ***** (END ATTACHING PARTS)*****                     | 83385    | OBD              |
| -91         | 166-0033-00        |                      |        | 2   |   |   |   |   |   | SPACER,SLEEVE:0.375 L X 0.18 ID,AL                                                           | 80009    | 166-0033-00      |
| -92         | 334-3918-00        |                      |        | 1   |   |   |   |   |   | MARKER,IDENT MKD CAUTION                                                                     | 22670    | OBD              |
| -93         | 200-2264-00        |                      |        | 1   |   |   |   |   |   | CAP,FUSEHOLDER 3AG FUSES                                                                     | S3629    | FEK 031 1666     |
| -94         | 204-0832-00        |                      |        | 1   |   |   |   |   |   | BODY,FUSEHOLDER 3AG,5 X 20MM FUSES                                                           | S3629    | 031.1673(MDLFEU) |
| -95         | 210-1039-00        |                      |        | 1   |   |   |   |   |   | WASHER,LOCK INT:0.521 ID X 0.625 INCH O                                                      | 24931    | OBD              |

**REPLACEABLE MECHANICAL PARTS**

| Fig & Index No | Tektronix Part No. | Serial/Model No. Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                     | Mfr Code | Mfr Part Number |
|----------------|--------------------|----------------------|--------|-----|---|---|---|---|---|----------------------------------------|----------|-----------------|
| 1-96           | -----              |                      |        | 1   |   |   |   |   |   | FILTER,RFI:(SEE FL1001 REPL)           |          |                 |
|                | -----              |                      |        | -   |   |   |   |   |   | (620-0295-00-.01 ONLY)                 |          |                 |
|                | -----              |                      |        | 1   |   |   |   |   |   | CONN,RCPT:(SEE J9001 REPL)             |          |                 |
|                | -----              |                      |        | -   |   |   |   |   |   | (620-0295-02 ONLY)                     |          |                 |
|                |                    |                      |        |     |   |   |   |   |   | ***** (ATTACHING PARTS) *****          |          |                 |
| -97            | 211-0198-00        |                      |        | 2   |   |   |   |   |   | SCREW,MACHINE:4-40 X 0.438 PNH,STL,POZ | 77250    | OBD             |
| -98            | 210-0586-00        |                      |        | 2   |   |   |   |   |   | NUT,PL,ASSEM WA:4-40 X 0.25,STL        | 83385    | OBD             |
|                |                    |                      |        |     |   |   |   |   |   | ***** (END ATTACHING PARTS) *****      |          |                 |
| -99            | 198-4476-00        |                      |        | 1   |   |   |   |   |   | WIRE SET,ELEC:                         | 80009    | 198-4476-00     |
| -100           | 131-0792-00        |                      |        | 2   |   |   |   |   |   | CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL | 22526    | 46221           |
| -101           | 352-0199-00        |                      |        | 1   |   |   |   |   |   | CONN BODY,PL,EL:3 WIRE BLACK           | 80009    | 352-0199-00     |
|                | -----              |                      |        | -   |   |   |   |   |   | (A1P64)                                |          |                 |
| -102           | 214-3022-01        |                      |        | 1   |   |   |   |   |   | HEAT SINK,ELEC:POWER SUPPLY,ALUMINUM   | 80009    | 214-3022-01     |
| -103           | 386-4331-00        |                      |        | 1   |   |   |   |   |   | SUPPORT,PWR SPLY:FRONT,AL              | 80009    | 386-4331-00     |

# Section 7

## DIAGRAMS AND SCHEMATICS

### Symbols and Reference Designators

Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors = Values one or greater are in picofarads (pF).  
 Values less than one are in microfarads ( $\mu$ F).

Resistors = Ohms ( $\Omega$ )

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

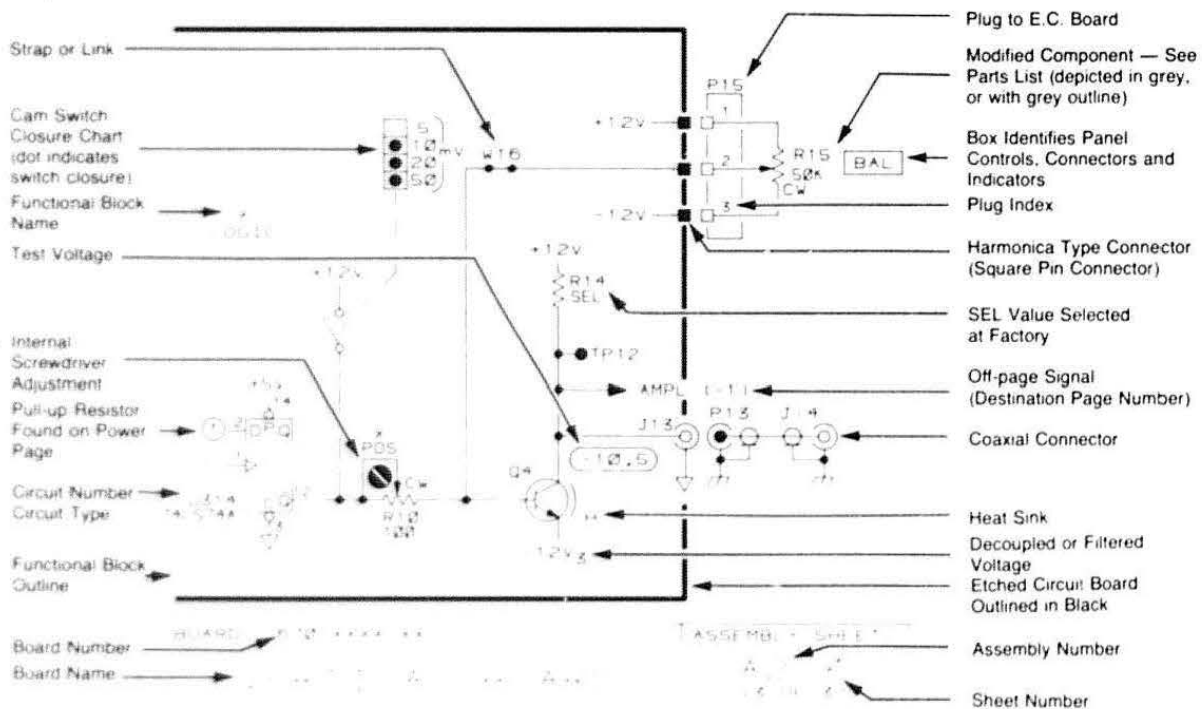
Abbreviations are based on ANSI Y1.1-1972. Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc., are:

- Y14.15, 1966     Drafting Practices
- Y14.2, 1973     Line Conventions and Lettering
- Y10.5, 1968     Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering

The following prefix letters are used as reference designators to identify components or assemblies on the diagrams.

|                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A    Assembly, separable or repairable (circuit board, etc.)</p> <p>AT   Attenuator, fixed or variable</p> <p>B    Motor</p> <p>BT   Battery</p> <p>C    Capacitor, fixed or variable</p> <p>CB   Circuit breaker</p> <p>CR   Diode, signal or rectifier</p> <p>DL   Delay line</p> <p>DS   Indicating device (lamp)</p> <p>E    Spark Gap, Ferrite bead</p> <p>F    Fuse</p> <p>FL   Filter</p> | <p>H    Heat dissipating device (heat sink, heat radiator, etc.)</p> <p>HR   Heater</p> <p>HY   Hybrid circuit</p> <p>J    Connector, stationary portion</p> <p>K    Relay</p> <p>L    Inductor, fixed or variable</p> <p>M    Meter</p> <p>P    Connector, movable portion</p> <p>Q    Transistor or silicon-controlled rectifier</p> <p>R    Resistor, fixed or variable</p> <p>RT   Thermistor</p> | <p>S    Switch or contactor</p> <p>T    Transformer</p> <p>TC   Thermocouple</p> <p>TP   Test point</p> <p>U    Assembly, inseparable or non-repairable (integrated circuit, etc.)</p> <p>V    Electron tube</p> <p>VR   Voltage regulator (zener diode, etc.)</p> <p>W    Wirestrap or cable</p> <p>Y    Crystal</p> <p>Z    Phase shifter</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The following special symbols may appear on the diagrams.



# DIAGRAMS AND SCHEMATICS

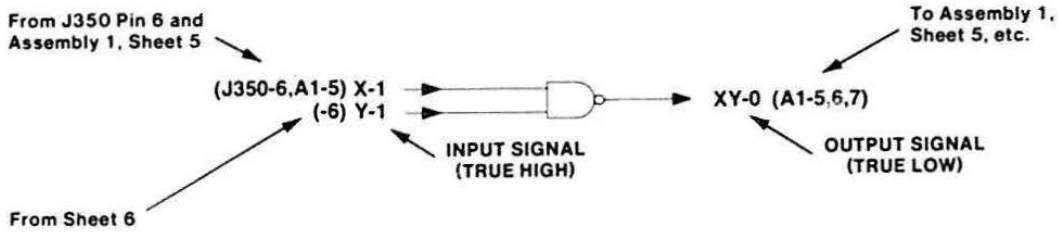
## 1. True High and True Low Signals

Signal names on the schematics are followed by -1 or a -0. A TRUE HIGH signal is indicated by -1, and a TRUE LOW signal is indicated by -0.

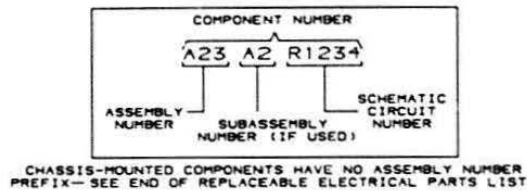
SIGNAL -1 = TRUE HIGH  
SIGNAL -0 = TRUE LOW

## 2. Cross-References

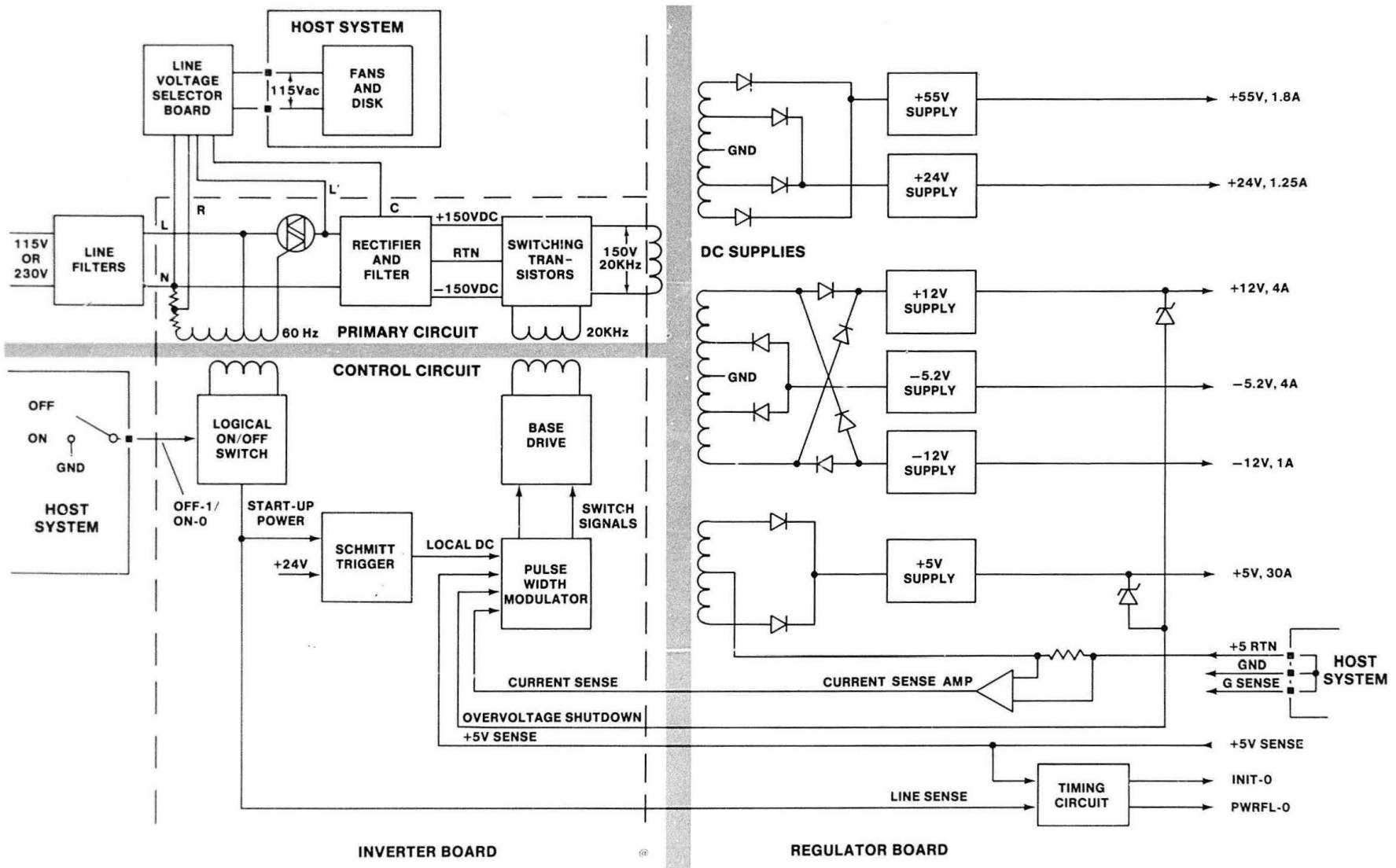
Schematic cross-references (from to information) are included on the schematics. The "from" reference only indicates the signal "source," and the "to" reference lists all loads where the signal is used. All from to information will be enclosed in parentheses.



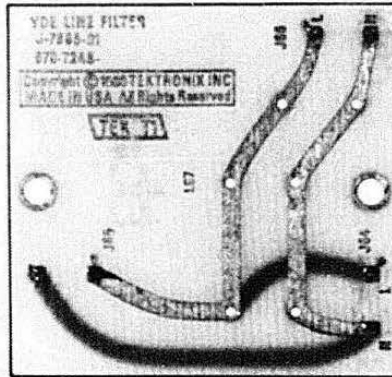
## 3. Component Number Example





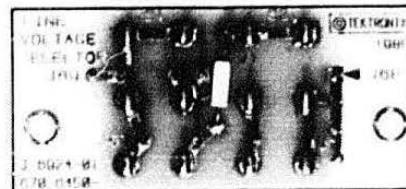
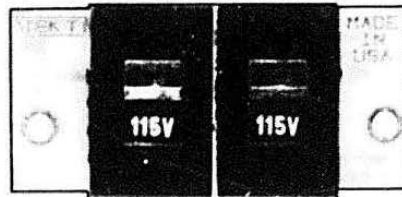


**POWER SUPPLY BLOCK DIAGRAM**  
620-0295-00



3732-28

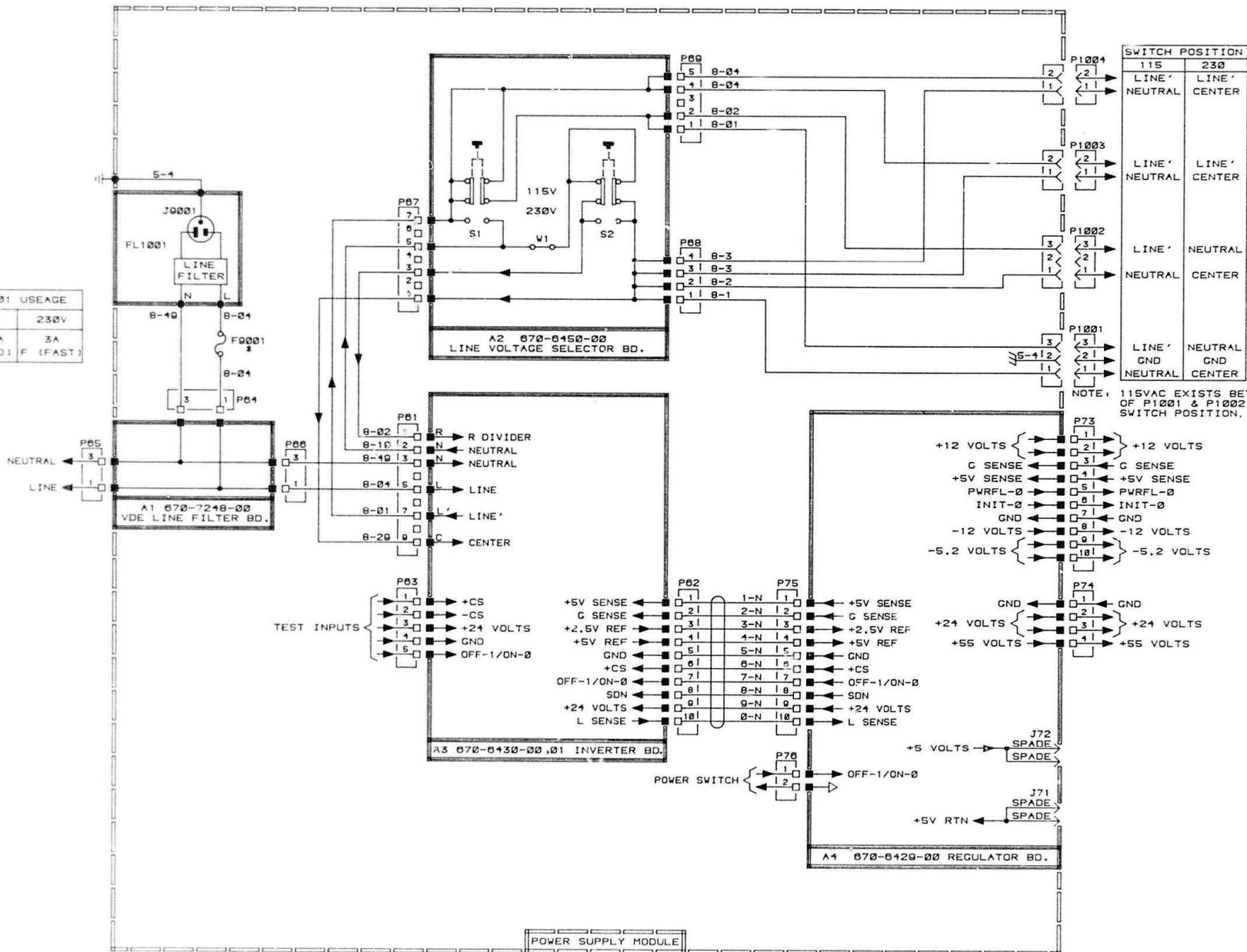
VDE Line Filter (670-7248-00) Component Location.



3732-29

Line Voltage Selector (670-6450-00) Component Location.

| *F0001 USAGE |          |
|--------------|----------|
| 115V         | 230V     |
| 0.25A        | 3A       |
| M (MED)      | F (FAST) |



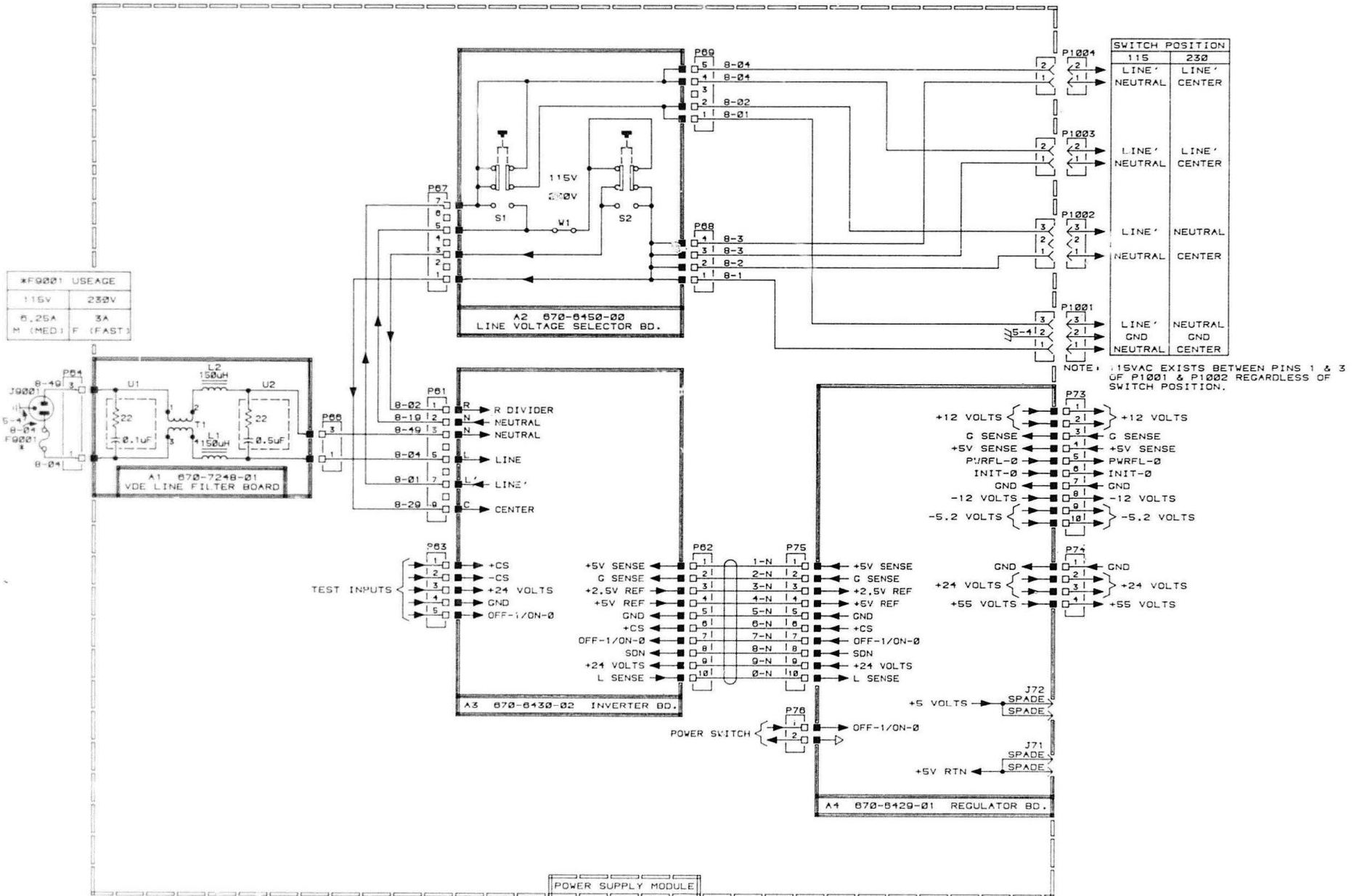
620-0295-00 ,01

REV. FEB 1983  
3732-38

070-7248-00  
070-6450-00

VDE LINE FILTER BD. A1-1  
LINE VOLTAGE SELECTOR BD. A2-1

| *F9001 USAGE     |                |
|------------------|----------------|
| 115V             | 230V           |
| 6.25A<br>M (MED) | 3A<br>F (FAST) |



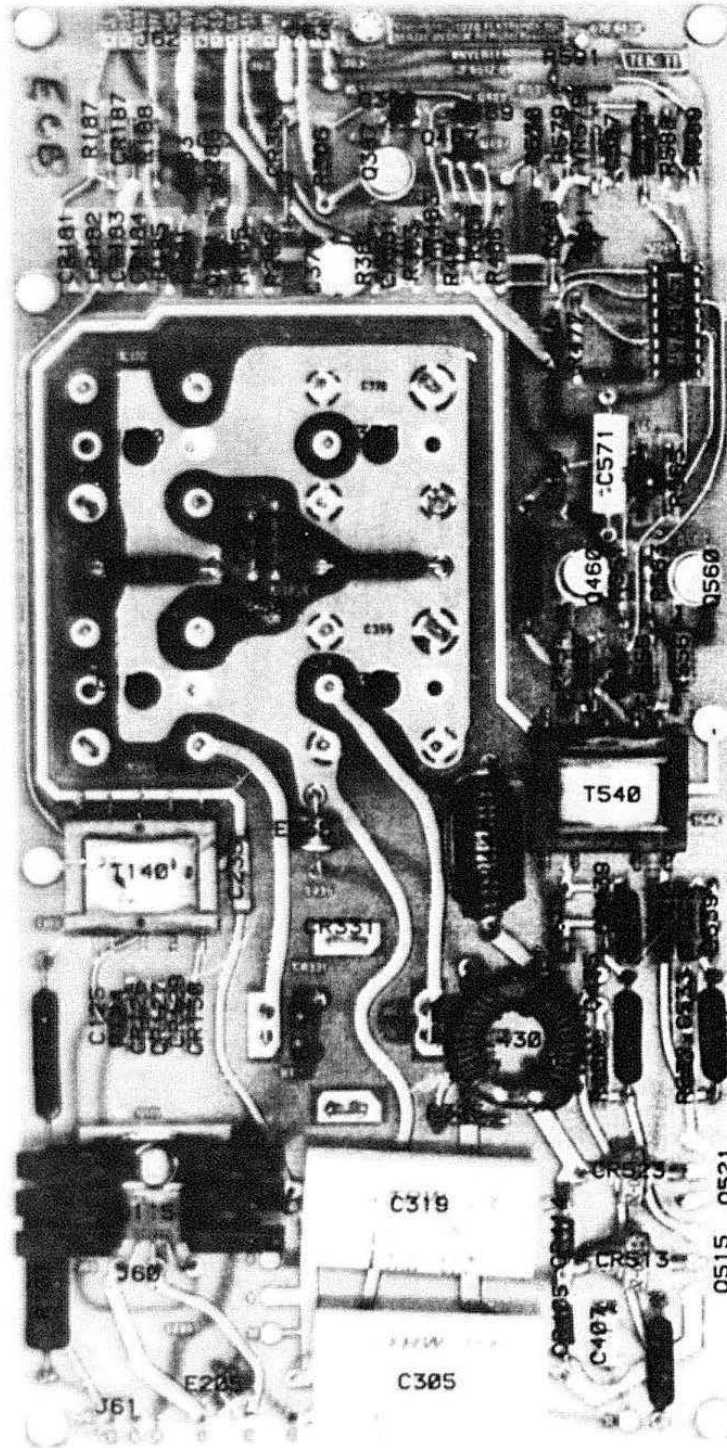
620-0295-02

ADD FEB 1983  
3732-39

670-7248-01  
670-6450-00

VDE LINE FILTER BD. A1-1  
LINE VOLTAGE SELECTOR BD. A2-1

INVERTER  
COMPONENT LOCATION



Inverter (670-6430-00) Component Location.

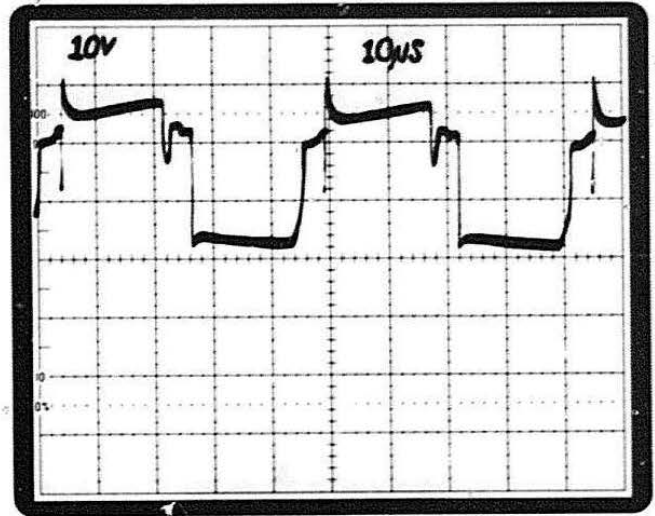
3732-30

24 V External DC to Control Circuit

+ 5 V Current limiting disabled

Line AC OFF

1

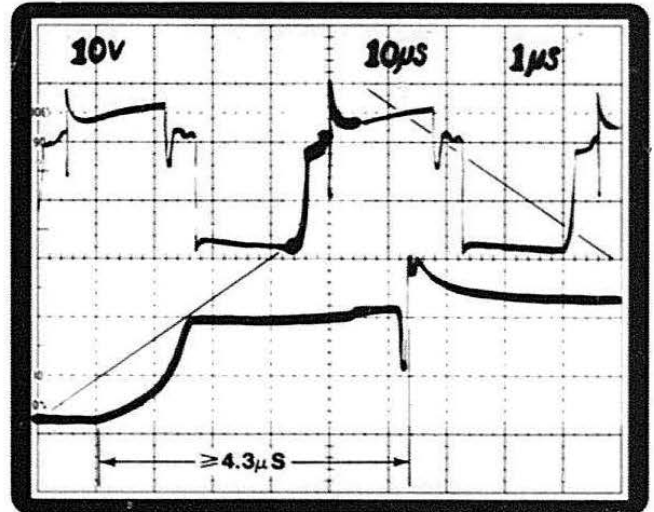


3732-8

Basic Drive Waveform.

Same as above

1



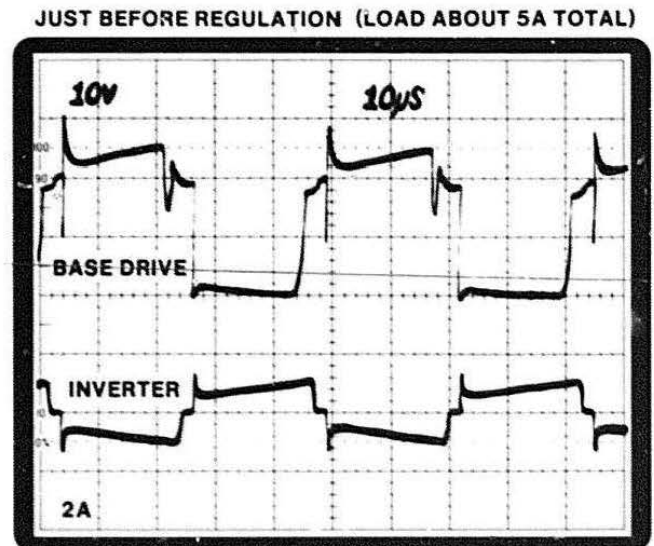
3732-9

Inverter Dead Time.

**CAUTION**

+ 5 V current limiting disabled. Watch for current greater than 4A (2 divisions).

1

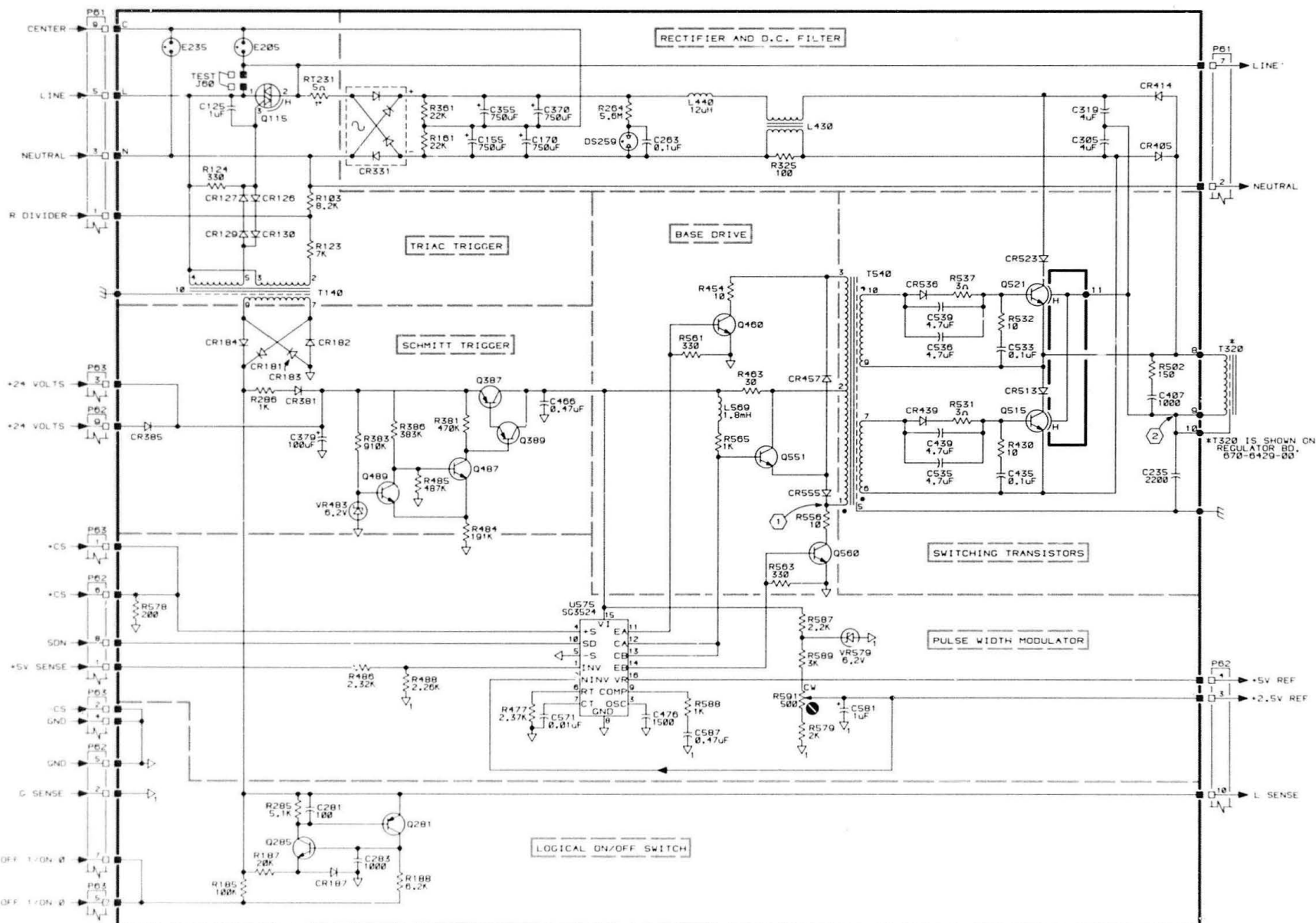


3732-12

Inverter Waveform.

CURRENT  
PROBE  
2A/DIV

2



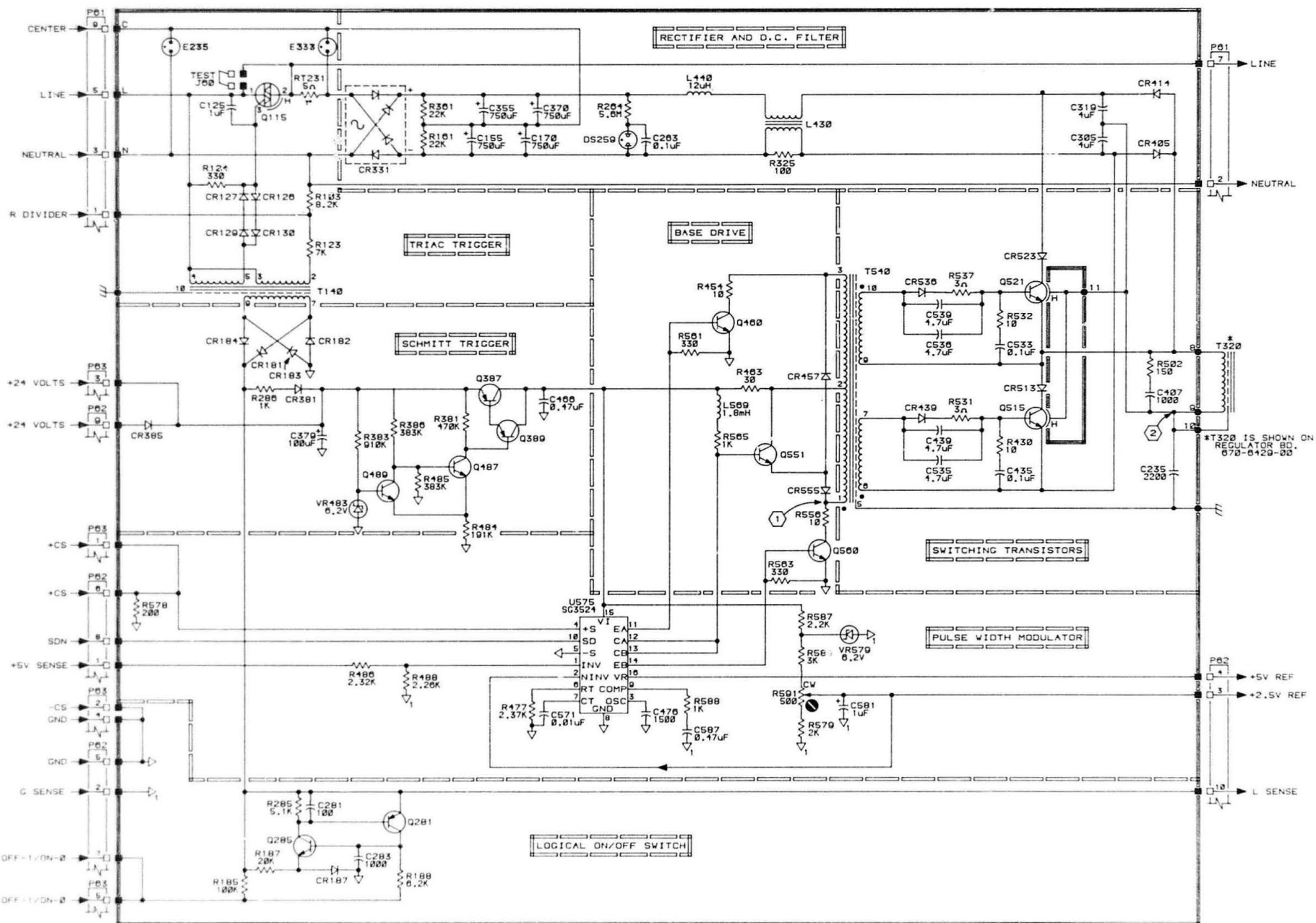
620-0295-00

3732-2

670-6430-00 INVERTER BD. A3-1







620-0295-01

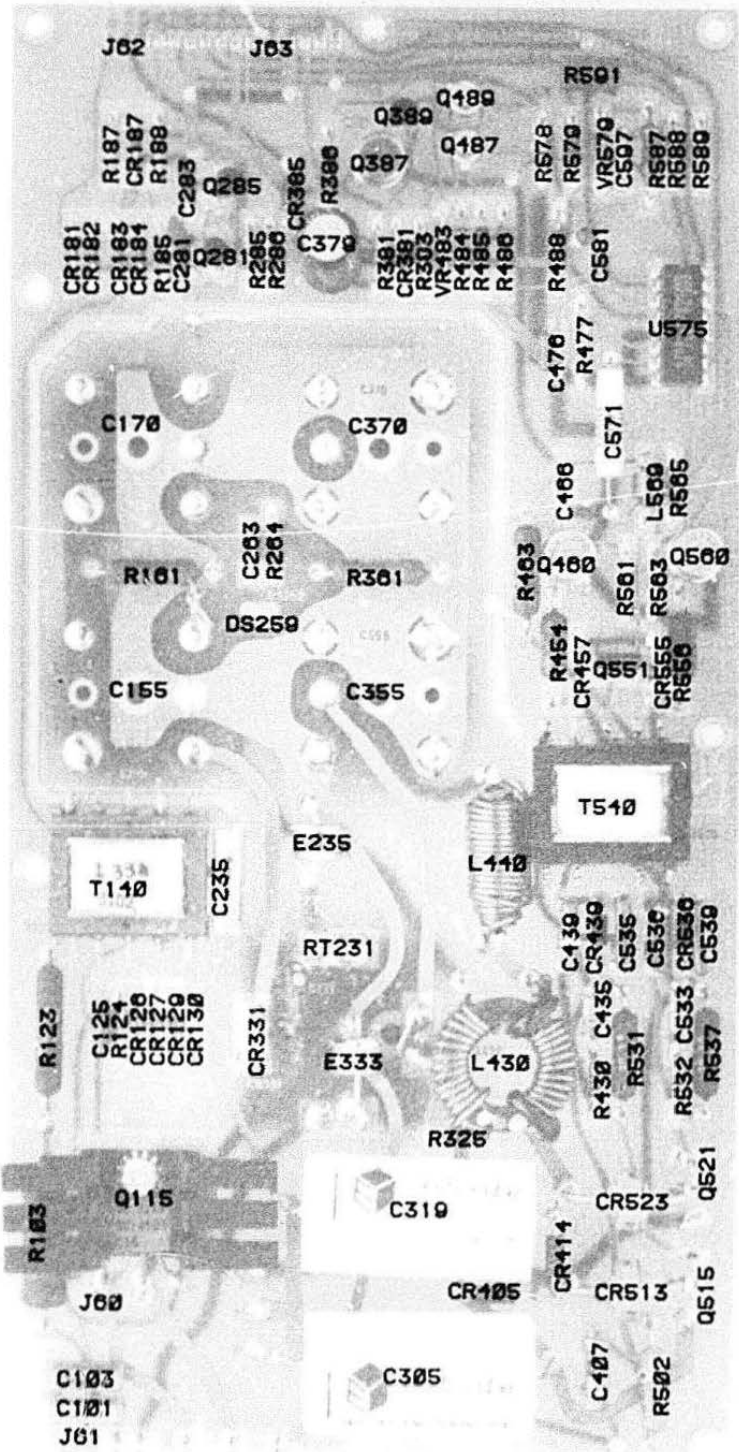
ADD, FEB 1983  
3732-41

620-0430-01 INVERTER BD. A3-1

INVERTER  
620-0430-01

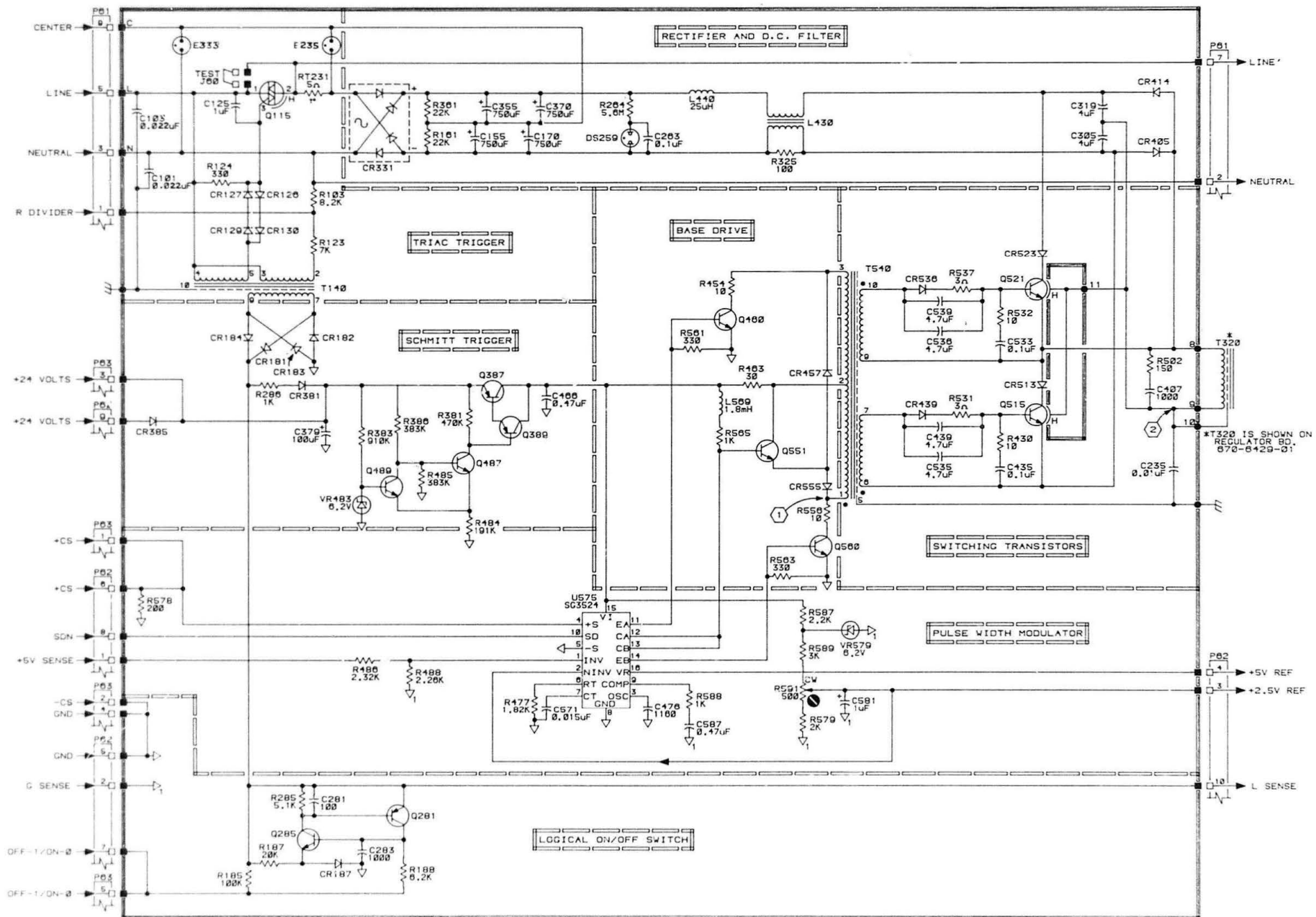
A3

\*T320 IS SHOWN ON  
REGULATOR BD.  
670-0420-00



3732-37

Inverter (670-6430-02) Component Location.



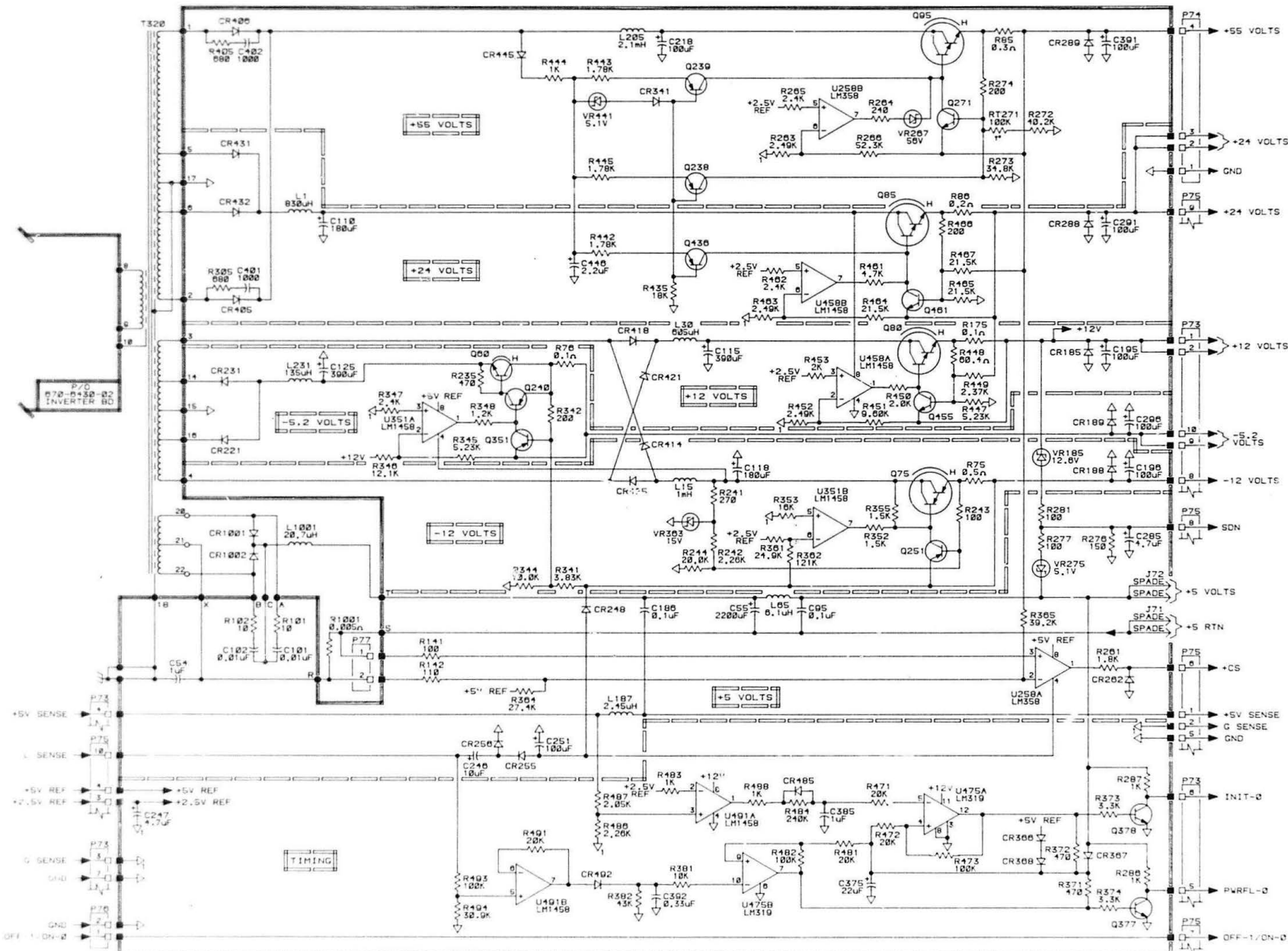
620-0295-02

ADD, FEB 1983  
3752-42

670-6430-02 INVERTER BD. A3-1







62J-0295-02

ADD, FEB 1985  
3732-44

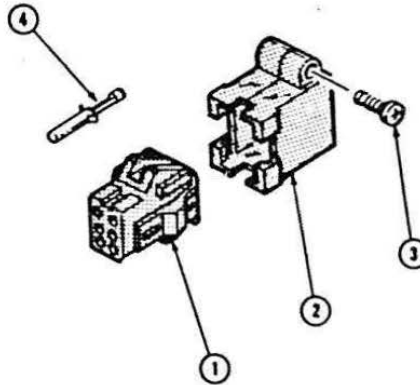
670-6429-01 REGULATOR BD. A4-1

## Appendix A

### SIGNAL DEFINITIONS AND REFERENCES

| Signal Name | Source (Schematic) | Destination (Schematic) | Description                                                                                                                                                                                             |
|-------------|--------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| + 2.5 V REF | A3                 | A4                      | Temperature compensated reference for Pulse Width Modulator and most other regulators. Adjust this to calibrate the supplies.                                                                           |
| + 5 V REF   | A3                 | A4                      | A local reference generated by the Pulse Width Modulator.                                                                                                                                               |
| + 5 V SENSE | Host<br>A4         | A4<br>A3                | Samples + 5 voltage at point of regulation in the host product.                                                                                                                                         |
| CS          | A4                 | A3                      | Output of + 5 V current sense amplifier to Pulse Width Modulator. Causes foldback limiting if it exceeds 200 mV.                                                                                        |
| G SENSE     | Host<br>A4         | A4<br>A3                | Senses ground reference at point of regulation in host product.                                                                                                                                         |
| GND         | Host<br>A4         | A4<br>A3                | Local ground reference for power supply and return for all supplies except + 5 V. Power supply chassis is floating.                                                                                     |
| INIT-0      | A4                 | Host                    | Power up initialization signal for host product. It stays low at least 50 ms after + 5 V comes into regulation.                                                                                         |
| L SENSE     | A3                 | A4                      | Line sense for power failure warning logic. It also provides negative supply for current sense amplifier during power-up.                                                                               |
| OFF-1/ON-0  | Host<br>A4         | A4<br>A3                | The host product pulls this line low to turn on the power supply and lets it float to turn off the supply.                                                                                              |
| PWRFL-0     | A4                 | Host                    | Power failure warning. Provides at least 11 ms warning to host product that DC supplies might fail.                                                                                                     |
| R DIVIDER   | A2                 | A3                      | Resistive divider. This adjusts the resistive load in series with the primary of T140 according to the selected line voltage. At 230 V nominal both resistors are in series. At 115 V only one is used. |
| SDN         | A4                 | A3                      | Shutdown signal to Pulse Width Modulator. Caused by the + 5 V supply exceeding 6.0 V, the + 12 V supply exceeding 13.5 V, or loss of the - 12 V supply to the current sense amplifier.                  |

**CALIBRATION FIXTURE**  
**for 4110 SERIES OPTION 02**  
Part No. 067-1042-00



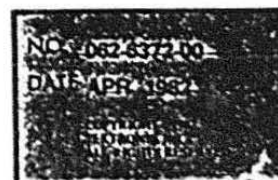
**REPLACEABLE PARTS LIST**

| Fig. & index No      | Tektronix Part No. | Serial/Model No. Eff | Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                  | Mfr Code | Mfr Part Number |
|----------------------|--------------------|----------------------|--------|-----|---|---|---|---|---|-----------------------------------------------------|----------|-----------------|
| 1-1                  | 204-0798-00        |                      |        | 1   |   |   |   |   |   | CONN BODY, PLUG: 6 CONTACTS, FEMALE                 | 00779    | 1-350241-9      |
| -2                   | 337-2523-00        |                      |        | 1   |   |   |   |   |   | SHIELD, ELEC: UPPER REAR SUBPANEL (ATTACHING PARTS) | 80009    | 337-2523-00     |
| -3                   | 213-0761-00        |                      |        | 1   |   |   |   |   |   | SCREW, TPG, TF: 6-20 X 0.438 L, PNH, TYPE B STL     | 000BL    | OBD             |
| -4                   | 131-1818-00        |                      |        | 4   |   |   |   |   |   | CONTACT, ELEC: SERIES MR, MALE, GOLD PL             | 00779    | 350019-2        |
| STANDARD ACCESSORIES |                    |                      |        |     |   |   |   |   |   |                                                     |          |                 |
|                      | 062-6372-00        |                      |        | 1   |   |   |   |   |   | DATA SHEET: 067-1042-00                             | 80009    | 062-6372-00     |

**CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER**

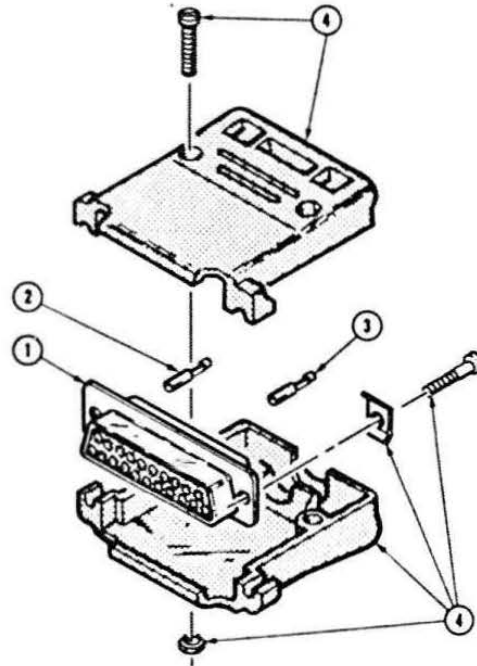
| Mfr Code | Manufacturer    | Address            | City, State, Zip     |
|----------|-----------------|--------------------|----------------------|
| 000BL    | CANCAR          | 533 PENGUIN CT, SE | OLYMPIA, WA 98503    |
| 00779    | AMP, INC.       | P O BOX 3608       | HARRISBURG, PA 17105 |
| 80009    | TEKTRONIX, INC. | P O BOX 500        | BEAVERTON, OR 97077  |

062-6372-00  
APR 82





**CALIBRATION FIXTURE  
for 4110 SERIES  
Part No. 067-1043-00**



**REPLACEABLE PARTS LIST**

| Fig & Index No       | Tektronix Part No | Serial/Model No Eff | Discont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                          | Mfr Code | Mfr Part Number |
|----------------------|-------------------|---------------------|---------|-----|---|---|---|---|---|---------------------------------------------|----------|-----------------|
| 1-1                  | 131-1461-00       |                     |         | 1   |   |   |   |   |   | CONN BODY, RCPT: 25 FEMALE CONTACTS         | 00779    | 205207-1        |
| -2                   | 131-1279-01       |                     |         | 4   |   |   |   |   |   | CONTACT, ELEC: CONN, FEM                    | 00779    | 66505-4         |
| -3                   | 131-1451-00       |                     |         | 5   |   |   |   |   |   | CONTACT, ELEC: CONN FEMALE, CU ALY, GOLD PL | 00779    | 66504-4         |
| -4                   | 200-1667-00       |                     |         | 1   |   |   |   |   |   | SHLD ELEC CONN: 25 CONTACT, TYPE HD SIZE 3  | 80009    | 200-1667-00     |
| STANDARD ACCESSORIES |                   |                     |         |     |   |   |   |   |   |                                             |          |                 |
|                      | 062-6373-00       |                     |         | 1   |   |   |   |   |   | DATA SHEET: 067-1043-00                     | 80009    | 062-6373-00     |

**CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER**

| Mfr Code | Manufacturer    | Address      | City, State, Zip     |
|----------|-----------------|--------------|----------------------|
| 00779    | AMP, INC.       | P O BOX 3608 | HARRISBURG, PA 17105 |
| 80009    | TEKTRONIX, INC. | P O BOX 500  | BEAVERTON, OR 97077  |

062-6373-00  
APR 82

