digital EQUIPMENT CORPORATION

DRAWING DIRECTORY

CUSTOMER PRINT SET INDEX

THIS IS PRINT SET

SEQUENCE	
WATCH DOG TIMER	B-DD-KW11-W
DEVICE CONTROL	D-BS-KW11-W-1
TEST CONNECTOR	C-IA-7009463
WATCH DOG TIMER	D-CS-M7823-Ø-1
ADDRESS SELECTOR	D-CS-M1Ø5-Ø-1
INTERRUPT CONTROL	D-CS-M7821-Ø-1
KW11-W ENG. SPEC.	A-SP-KW11-W-2
KW11-W ADJUSTMENT PROCEDURE	A-SP-KW11-W-3
KW11-W ACCEPTANCE PROCEDURE	A-SP-KW11-W-4
ACCESSORY LIST	A-AL-KW11-W-5
WATCH DOG TIMER (PL)	A-PL-KW11-W

UNIT VARIATIONS

VAR	TITLE	PRINT SET
KW11-W	WATCH DOG TIMER	1

REVISIONS		
REV	CHG. NO.	DATE
A	00001	6-25-76 M. SAMALE 7-1-76

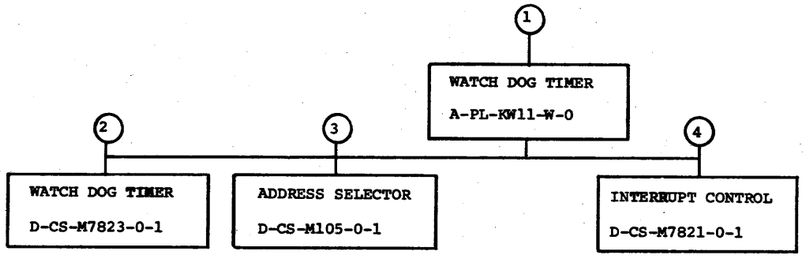
USED ON OPTION/MODEL	
SHEET 1 OF 3	

DRN. E. WILSON	DATE 10/29/73	TITLE WATCH DOG TIMER
CHK'D. K. GLEEZEN	DATE	
PROJ ENG. [signature]	DATE 7/23/74	
PROD. [signature]	DATE 7/23/74	SIZE B, CODE DD, NUMBER KW11-W, REV A
FIELD SERV. [signature]	DATE 7/23/74	DIST

DRB 106

DEC 16-(328)-1062-IA-R072

KW11-W



TITLE		SIZE	CODE	NUMBER	REV
WATCH DOG TIMER	SHEET 2 OF 3	B	DD	KW11-W	A

DRB 107
DEC 16-(325)-1062-3-N871

CUSTOMER PRINT SET KW11-W				MFG. SET	FIND NO.	DRAWING NO.	REV	NO OF SHT	DESCRIPTION	OPTION NO./FILE DATE
X					1	B-DD-KW11-W	A	3	WATCH DOG TIMER	
X						D-BS-KW11-W-1	#	1	DEVICE CONTROL	
X						C-IA-7009463-0-0	A	1	TEST CONNECTOR	
X						A-SP-KW11-W-2	A	8	KW11-W ENGINEERING SPEC.	
X						A-SP-KW11-W-3	A	5	KW11-W ADJUSTMENT PROCEDURE	
X						A-SP-KW11-W-4	*	6	KW11-W ACCEPTANCE PROCEDURE	
X						A-AL-KW11-W-5	A	1	KW11-W ACCESSORY LIST	
X						A-PL-KW11-W	*	1	WATCH DOG TIMER (PL)	
X					2	D-CS-M7823-Ø-1	#	3	WATCH DOG TIMER	
						K-CO-M7823-Ø-4	#	1	X-Y COORDINATE HOLE LOCATION	
						D-AH-M7823-Ø-5	#	1	ASSY/DRILLING HOLE LAYOUT	
						B-MH-M7823-Ø-6	#	1	MODULE ECO HISTORY	
X					3	D-CS-M1Ø5-Ø-1	#	1	ADDRESS SELECTOR	
						K-CO-M1Ø5-Ø-4	#	1	X-Y COORDINATE HOLE LOCATION	
						D-AH-M1Ø5-Ø-5	#	1	ASSY/DRILLING HOLE LAYOUT	
						B-MH-M1Ø5-Ø-6	#	1	MODULE ECO HISTORY	
X					4	D-CS-M7821-Ø-1	#	2	INTERRUPT CONTROL	
						K-CO-M7821-Ø-4	#	1	X-Y COORDINATE HOLE LOCATION	
						D-AH-M7821-Ø-5	#	1	ASSY/DRILLING HOLE LAYOUT	
						B-MH-M7821-Ø-6	#	1	MODULE ECO HISTORY	

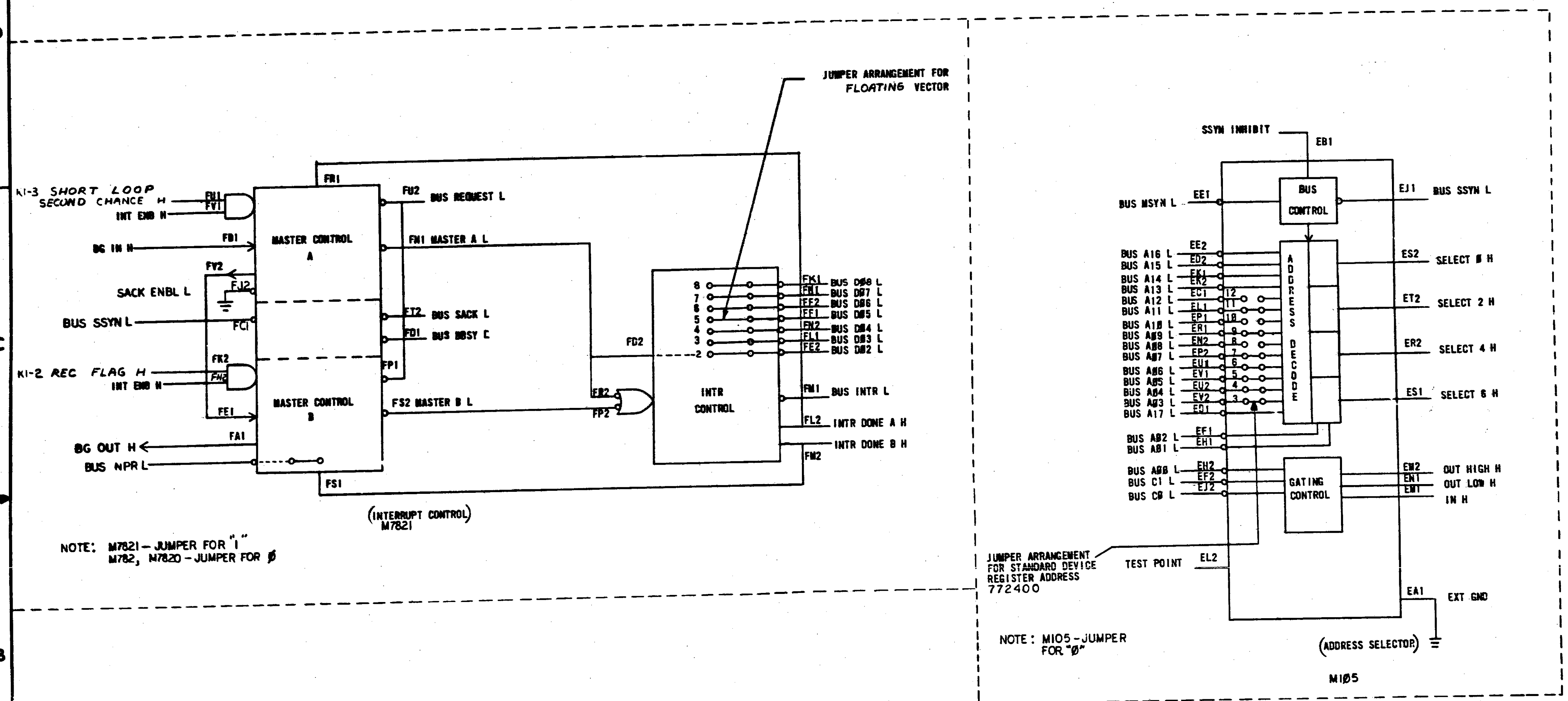
CUSTOMER PRINT SET				MFG SET	FIND NO.	DRAWING NO.	REV	NO OF SHT	DESCRIPTION	OPTION NO./FILE DATE

CUSTOMER PRINT SET CODES	
	X = PRINT OF DOCUMENT INCLUDED IN PRINT SET
	C = INCLUDES ALL PRINTS INDICATED ON DOCUMENT
	S = CONFIDENTIAL AUTHORIZED SIGNATURE REQUIRED

TITLE		SIZE	CODE	NUMBER	REV
WATCH DOG TIMER	SHEET 3 OF 3	B	DD	KW11-W	A

DRB 108

DEC 16-(325)-1062-2B-R972



FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP11		PARTS LIST		

UNLESS OTHERWISE SPECIFIED
DIMENSION IN INCHES
TOLERANCES
DECIMALS ± .005 FRACTIONS ± 1/64 ANGLES ± 0°30'
FINAL SURFACE QUALITY
REMOVE BURRS AND BREAK SHARP CORNERS

MATERIAL —
FINISH —

DRN E. Wilson DATE 11/3/73
CHK'D DATE
ENG Dan Bouser DATE
PROJ ENG Dan Bouser DATE
PROD Dan Bouser DATE

NEXT HIGHER ASSY A-ML-KL11-Ø
SCALE NONE
SHEET 1 OF 1

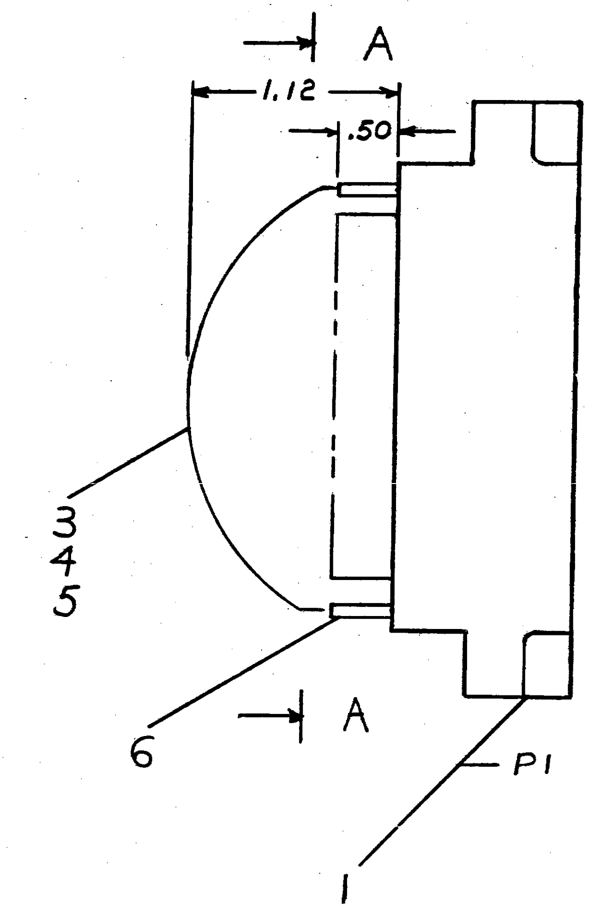
digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

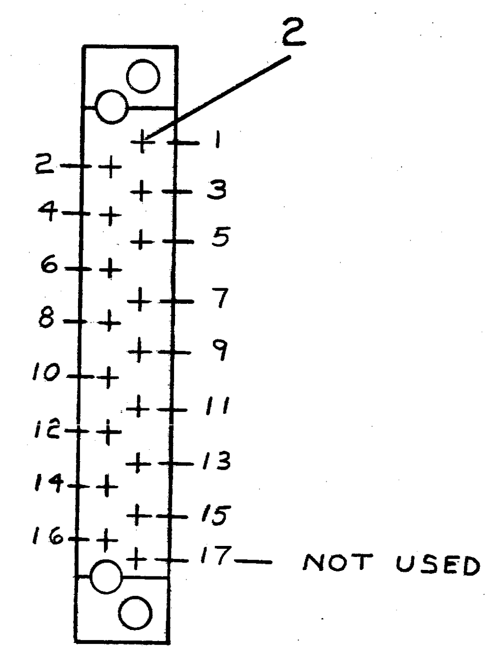
TITLE
DEVICE CONTROL

SIZE D CODE BS NUMBER KW11-W-1 REV.
DIST.

WIRE TABLE

ITEM NO	DESCRIPTION AWG	DESCRIPTION COLOR	FROM CONNECTION	FROM WITH	TO CONNECTION	TO WITH
3	#22	BLK	P1-1	2 & 6	P1-5	2 & 6
			P1-9	2 & 6	P1-13	2 & 6
3		BLK	P1-2	2 & 6	P1-15	2 & 6
5		ORG	P1-4	2 & 6	P1-6	2 & 6
			P1-8	2 & 6	P1-10	2 & 6
			P1-12	2 & 6	P1-14	2 & 6
4		BRN	P1-11	2 & 6	P1-16	2 & 6
3	#22	BRN	P1-3	2 & 6	P1-7	2 & 6





VIEW A-A
(REAR VIEW)
SCALE: NONE

PARTS LIST

QTY.	DESCRIPTION	PART NO.	ITEM NO.
A/R	SHRINKABLE TUBING (.50LG)	9107255-09	6
A/R	WIRE #22 AWG (ORG)	9107350-33	5
A/R	WIRE #22 AWG (BRN)	9107350-11	4
A/R	WIRE #22 AWG (BLK)	9107350-00	3
16	CONTACT SOLDER	1209480	2
1	CONNECTOR HOUSING	1209481	1

FIRST USED ON OPTION/MODEL: PDP-15 MEMORY

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES

TOLERANCES

DECIMALS	ANGLES
.xxx = .005 .xx = .02 .x = .1	±0° 30'

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY √

MATERIAL —

FINISH —

		DATE
DRN.	E. Wilson	5/21/73
CHKD.	[signature]	5-23-73
ENG.	[signature]	[illegible]
PROJ. ENG.	[signature]	[illegible]
PROD.	[signature]	[illegible]

NEXT HIGHER ASSY. —

SCALE NONE

SHEET 1 OF 1

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE: TEST CONNECTOR

SIZE	CODE	NUMBER	REV.
C	IA	7009463-0-0	A

DIST.

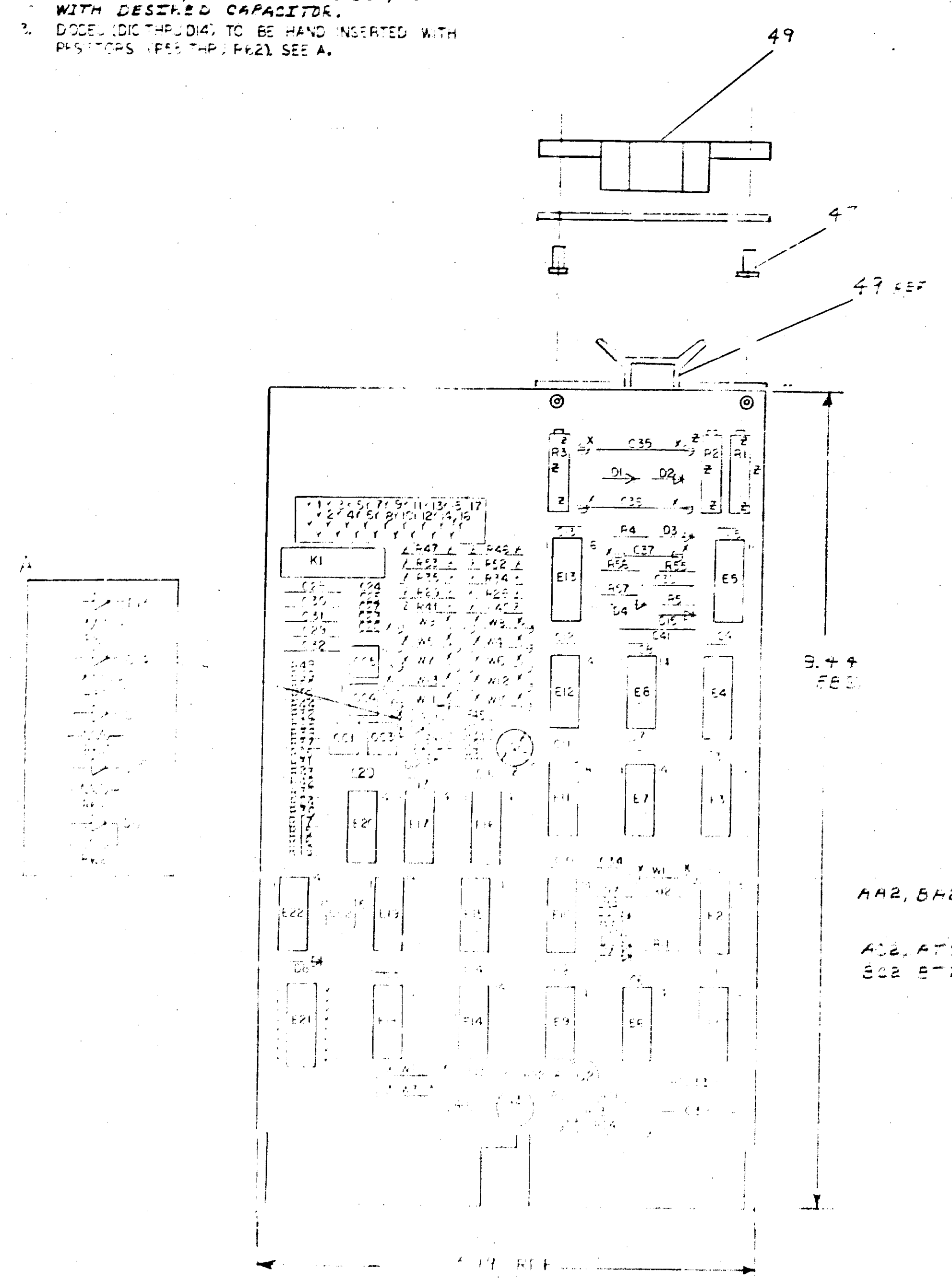
REVISIONS

REV.	CHANGE NO	CHK
A	KW11W-00001	[signature] 6-25-76; M. SAMALE; M. Samale 7-1-76

SIZE C CODE IA NUMBER 7009463-0-0 REV A

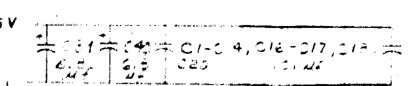
DEC FORM NO

NOTES:
1. ALL RES. ARE OHMS UNLESS OTHERWISE SPECIFIED
2. SPLIT LUGS, REPLACE C35, C36, C37 WITH DESIRED CAPACITOR.
3. DIODES (D10 THRU D14) TO BE HAND INSERTED WITH RESISTORS (R55 THRU R62). SEE A.

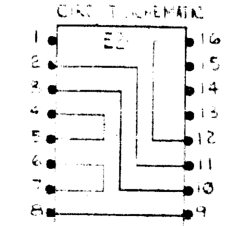


AA2, BA2 +5V

AD2, AT2
BD2, BT2



PRIORITY JUMPER
CIRCUIT SCHEMATIC



QTY	REF DESIGNATION	DESCRIPTION	PART NO	ITEM NO
REF		X-Y COORDINATE HOLE LOCATION	K-CD-M7323-0-4	1
REF		ASSY DRILLING HOLE LAYOUT	D-AH-M7323-0-8	2
REF		MODULE ECO HISTORY	B-MH-M7323-0-8	3
1		ETCHED CIRCUIT BOARD	[illegible]	4
1	C34	CAP 270 PF 100V 5%	[illegible]	5
5	C23-C27	CAP 1500 PF DISC	1000054	6
3	C39, C40, C41	CAP 6.8 UF 35V 10% TANT	[illegible]	7
2	C35, C36	CAP 150 UF 15V 20% D	1300064	8
18	C1-C14, C16-C17, C19, C20,	CAP .01 UF 100V 20% DISC	[illegible]	9
2	C37, C38	CAP 1 UF 35V 10% A	1001776	10
5	C28-C32	CAP .33 UF 20V 10% TANT	1005328	11
13	D1-D7, D9-D14	DIODE D664	1100114	12
1	D8	DIODE 1N4004	1105796	13
1	K1	RELAY 300 OHM 12V DC	1205543	14
1	J1	AMP #1-582390-1 (CONN)	1209482	15
1	E2	SOCKET GLASS 16 PIN AUGAT 216 AG1	1209638	16
5	R58, R59, R60, R61, R62	RES 270 OHM 1/4W 5%	1301972	17
1	R22	RES 150 OHM 1/2W 5%	1300249	18
1	R9, R27, R33, R39, R45, R51	RES 220 OHM 1/4W 5%	1300271	19
1	R5	RES 330 OHM 1/4W 5%	1300295	20
1	R7	RES 1K 1/4W 5%	[illegible]	21
5	R28, R34, R40, R46, R52	RES 1.2K 1/2W 5%	1300385	22
2	R20, R23	RES 1.8K 1/4W 5%	1300398	23
5	R26, R32, R38, R44, R50	RES 3.3K 1/4W 5%	1300439	24
7	R13, R14, R25, R31, R37, R43, R49	RES 4.7K 1/4W 5%	1300447	25
7	R11, R12, R24, R30, R36, R42, R48	RES 10K 1/4W 5%	1300479	26
5	R15-R19	RES 68K 1/4W 5%	1301327	27
1	R10	RES 750 1/4W 5%	1301401	28
5	R29, R35, R41, R47, R53	RES 1.6K 1/2W 5%	1302386	29
1	R21	RES 2K 1/4W 5%	1302386	30
1	R4	RES 18K 1/4W 5%	1302465	31
1	R8	RES 3.9K 1/4W 5%	[illegible]	32
3	R1, R2, R3	RES VARIABLE 50K	1309143-13	33
1	Q3	TRANS DEC2904	1501742	34
1	Q1	TRANS 2N3568	1502337	35
1	Q2	TRANS DEC6534D	1503409	36
3	E8, E9, E22	I.C. DEC 7474	1905547	37
3	E6, E14, E15	I.C. DEC 7400	1905575	38
1	E7	I.C. DEC 7473	1905587	39
6	E2, E3, E4, E10, E12, E19	I.C. DEC 8640	[illegible]	40
2	E16, E20	I.C. DEC 384	1909466	41
1	E17	I.C. DEC 7404	1909686	42
3	E1, E11, E18	I.C. DEC 8881	1909705	43
2	E5, E13	I.C. DEC 74123	1910436	44
5	OC1-OC5	I.C. OPTO COUPLED ISOLATOR	[illegible]	45
1		PRIORITY JUMPER	5408782	46
2		EYELETS 35-4-7	9006732	47
32		SPLIT LUGS	9006735	48
1		HANDLE FLIP CHIP-MAGENTA	9008337-6	49
3	R55, R56, R57	RES 5.6K 1/4W 5%	[illegible]	
1	R54	RES 10 OHM 1/2W 5%	[illegible]	
1	C33	CAP 39 UF 10V, 10% TANT	[illegible]	
	D15	DIODE ZENER [illegible]	[illegible]	
13	W1 - W13	JUMPER INSULATED (1-2007-1)	9009185	54

PARTS LIST

ETCH BOARD REV B

FIRST USED ON OPTION MODEL KW11-W

IC TYPE	GND	+ 5V
DEC 384	[illegible]	8
DEC 8881	7	8
DEC 7473	11	4
DEC 74123	8	16

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

DEC NO	EIA NO	DEC NO	EIA NO
[illegible]	2N2904A		
[illegible]	2N3009A		
[illegible]	[illegible]		

SEMICONDUCTOR CONVERSION CHART

REVISIONS

NEXT HIGHER ASSY: [illegible]

DIGITAL EQUIPMENT CORPORATION

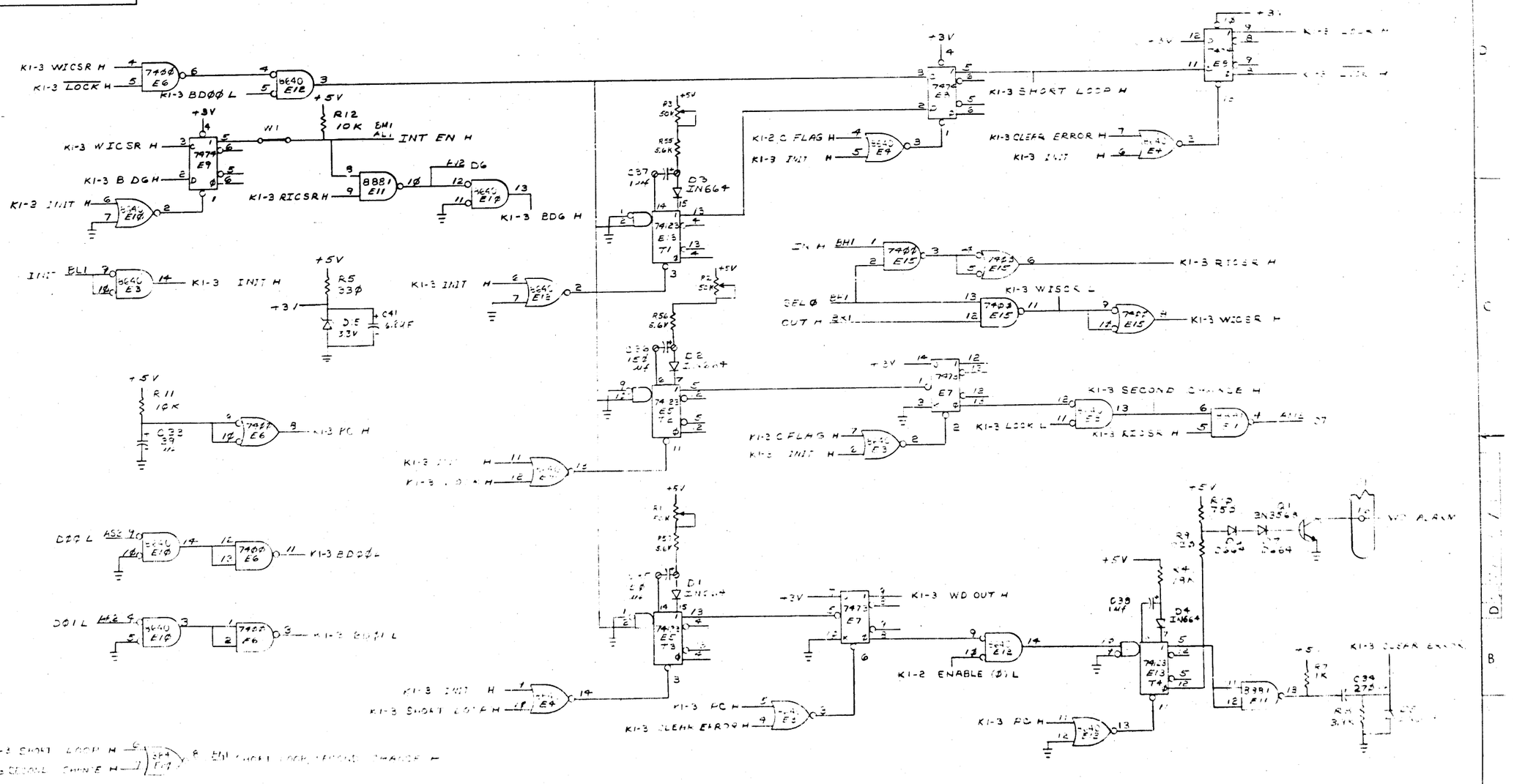
TITLE: WATCHDOG TIMER

SIZE D CODE CS NUMBER [illegible] REV

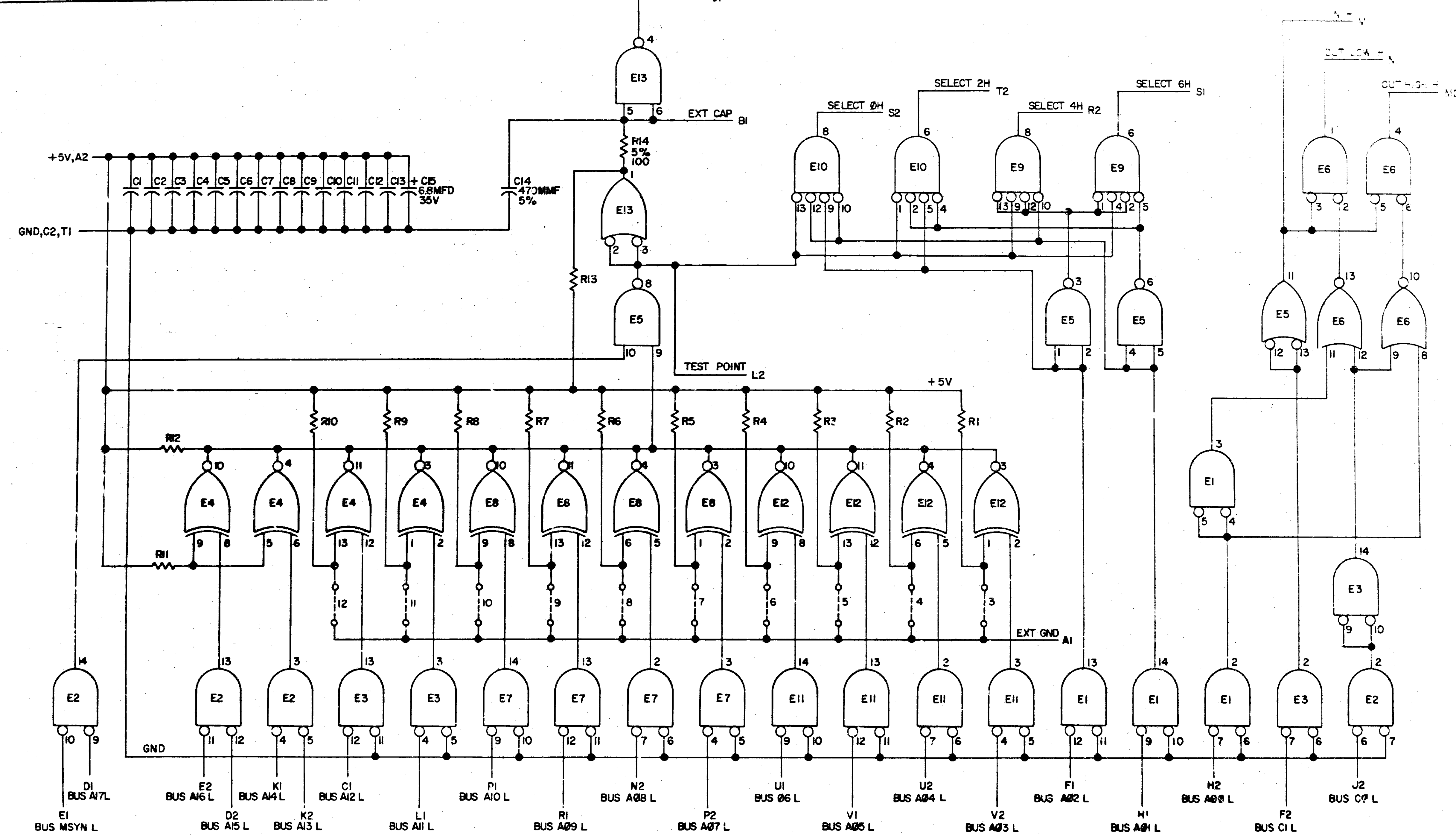
+ LATCH
- LATCH
+D15
-D15
+D7
-D7
+REC INPUT
-REC INPUT
+EX ENABLE
-EX ENABLE
R53 1.6K W13
R52 1.2K W12
R51 220 R58 270
D14 IN 664
R47 1.6K W11
R46 1.2K W10
R45 220 R59 270
D13 IN 664
R41 1.6K W9
R40 1.2K W8
R39 220 R60 270
D12 IN 664
R35 1.6K W7
R34 1.2K W6
R33 220 R61 270
D11 IN 664
R29 1.6K W5
R28 1.2K W4
R27 220 R62 270
D10 IN 664
OC4 10C
OC5 10C
OC1 10C
OC2 10C
OC3 10C
+5V
R50 3.3K
R49 4.7K
R48 10K
C28 .33 Mf
C27 1500 PF
R19 68K
R44 3.3K
R43 4.7K
R42 10K
C29 .33 Mf
C26 1500 PF
R18 68K
R38 3.3K
R37 4.7K
R36 10K
C30 .33 Mf
C25 1500 PF
R17 68K
R32 3.3K
R31 4.7K
R30 10K
C31 .33 Mf
C24 1500 PF
R16 68K
R26 3.3K
R25 4.7K
R24 10K
C32 .33 Mf
C23 1500 PF
R15 68K
384 E20
384 E16
7474 E22
8881 E18
8881 E1
8891 E11
7400 E14
6640 E19
6640 E2
7404 E17
R20 1.8K
R21 2K
Q2 2N6539D
R22 150
D8 IN4004
K1
-15V
NO
NC
J1
Q3 2N2904
D9 5084
R23 1.8K
R54 10
≈4.7V
GND
SEL Ø6
OUT H
K1-3 BDØØ L
K1-3 WDOUT H
K1-3 INIT H
K1-3 RICSR H
K1-3 SHORT LOOP H
AD2 D15
IN H
SEL Ø4
AM2 D7
BG IN H
BG OUT H
BUS BG4 OUT H
BUS BG4 IN H
BUS BG5 OUT H
BUS BG5 IN H
BUS BG6 OUT H
PRIORITY JUMPER E21
BUS BR7 L
BUS BR6 L
BUS BR5 L
BUS BR4 L
BUS REQUEST
BUS BG7 IN
BUS BG7 OUT
BUS BG6 IN
REC FLAG H
AD1
AE2 D14
K1-3 WICSR L
DATA L AL2 1Ø
K1-3 B INT H
K1-2 C FLAG H
SEL Ø2 L
K1-2 ENABLE (Ø) L
K1-3 BDØ1 L
K1-3 PC H
K1-3 CLEAR ERROR H
W1 W2 W3

REVISIONS		
SYM	CHANGE NO	REV

TITLE: WATCH DOG TIMER (K1-2)
SIZE: D | CODE: CS | NUMBER: M7823-Ø-1
SCALE | SHEET 2 OF 3 | DIST



WATCH DOG TIMER



UNLESS OTHERWISE INDICATED:
- O----O INDICATES JUMPERS
- RESISTORS ARE 1K, 1/4W, 5%
- CAPACITORS ARE .01MFD, 100V, 20%
- E1, E2, E3, E7, E11 ARE DEC8640
- E4, E8, E12 ARE DEC8242
- E9, E10 ARE DEC8815
- E5 IS DEC74H00
- E6 IS DEC7402
- E13 IS DEC8881

PIN 1 ON E1, E2, E3, E7, E11 = GND
PIN 8 ON E1, E2, E3, E7, E11 = +5V
PIN 7 ON E4, E5, E6, E8, E9, E10, E12, E13 = GND
PIN 14 ON E4, E5, E6, E8, E9, E10, E12, E13 = +5V

REVISIONS		
REV.	CHG NO	CHK
A	LR1	
B	00002	
C	00003	

TRANSISTOR & DIODE CONVERSION CHART

DEC	EIA	DEC	EIA

DRN 11-26-69 · CHK'D 1-7-70 · ENG · PROD

DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS

TITLE: ADDRESS SELECTOR M105

SIZE C · CODE CS · NUMBER M105-0-1 · REV

PRINTED CIRCUIT REV C

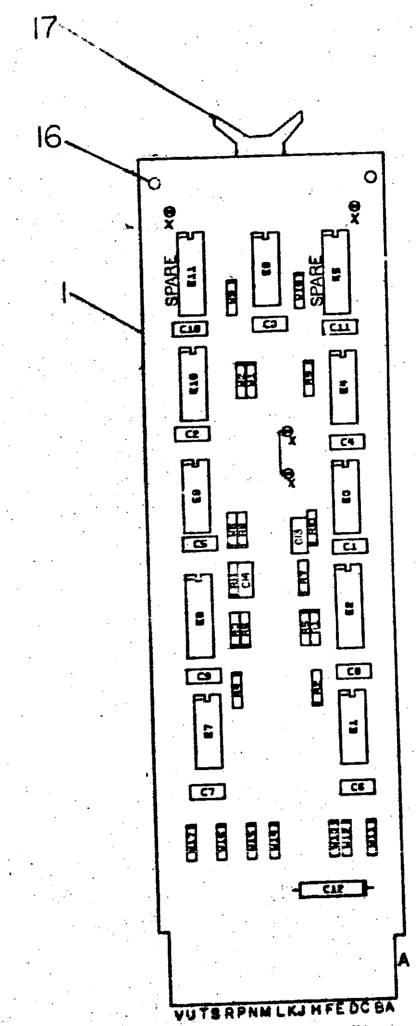
DEC FORM NO. DRG 102

NOTES:

1. VECTOR BIT JUMPERS MUST BE CUT FOR A "ZERO" AND MUST BE INSERTED FOR A "ONE"
2. NPR JUMPER (W9) MUST BE CUT FOR SOME PDP-11 PROCESSORS; IF THE RIGHT HALF REQUEST CIRCUIT IS USED FOR NPR'S; OR IF PIN J1 IS NOT WIRED ON THE M7621 SLOT.
3. DETAILS ON COMPONENTS ARE NOTED IN THE PARTS REFERENCE, PLACEMENT IS NOTED IN THE COMPONENT PLACEMENT DIAGRAM.
4. GND AND +5V ARE USUALLY PIN 7 AND PIN 14, RESPECTIVELY EXCEPTIONS ARE:

IC TYPE	GND	+5V
DEC 8640	PIN 1	PIN 6

5. UNLESS OTHERWISE NOTED RESISTANCE IS IN OHMS, CAPACITANCE IS IN PICOFARADS. CAPACITORS WITHOUT ANY NOTED VALUES ARE .01 MFD.
6. DEC 8640'S WERE PHASED IN AS 380 REPLACEMENTS. ANY 380 FAILURES SHOULD BE REPLACED BY 8640'S.



JUMPER CONVERSION CHART

W1	LA
W2	PA
W9	LB
W10	PB
W11	V2
W12	V3
W13	V4
W14	V5
W15	V6
W16	V7
W17	V8
W6	N1

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
REF		X-Y COORDINATE HOLE LOCATION	[illegible]	[illegible]
REF		ASSY DRILLING HOLE LAYOUT	[illegible]	[illegible]
REF		MODULE ECO HISTORY	[illegible]	[illegible]
1		ETCHED CIRCUIT BOARD	[illegible]	[illegible]
1	C12	CAP 6.8 µf 35V 10% S TANT	[illegible]	[illegible]
11	C1, THRU C11	CAP .01 µf 100V 20% DISC	[illegible]	4
2	R5, R6	RES 330Ω 1/4 W 5%	[illegible]	5
3	R7, R8, R9	RES 10K 1/4 W 5%	[illegible]	[illegible]
6	R1, R2, R3, R4, R10, R11	RES 180Ω 1/4 W 5%	1305547	[illegible]
1	E4	DEC IC 7474	[illegible]	[illegible]
1	E3	DEC IC 7400	[illegible]	[illegible]
1	E10	DEC IC 7402	[illegible]	[illegible]
2	E1, E7	DEC IC 8881	[illegible]	[illegible]
1	E6	DEC IC 7403	[illegible]	[illegible]
1	E9	DEC IC 8640	[illegible]	[illegible]
2	E2, E8	LSI 8647	[illegible]	[illegible]
4	TP1 THRU TP4	SPLIT LUGS	9006795	[illegible]
10	W1, W6, W9, W11-W17	JUMPERS,	[illegible]	[illegible]
2		EYELET, HANDLE	[illegible]	[illegible]
1		HANDLE FLIPCHIP (MAGENTA)	[illegible]	[illegible]
2	C13, C14	CAP 680PF 100V 5%	[illegible]	[illegible]

PARTS LIST

ETCH BOARD REV C

SEMICONDUCTOR CONVERSION CHART

DEC NO.	EIA NO.	DEC NO.	EIA NO.

REVISIONS: E — REV'T EDIT REDRAWN — L. CONDON

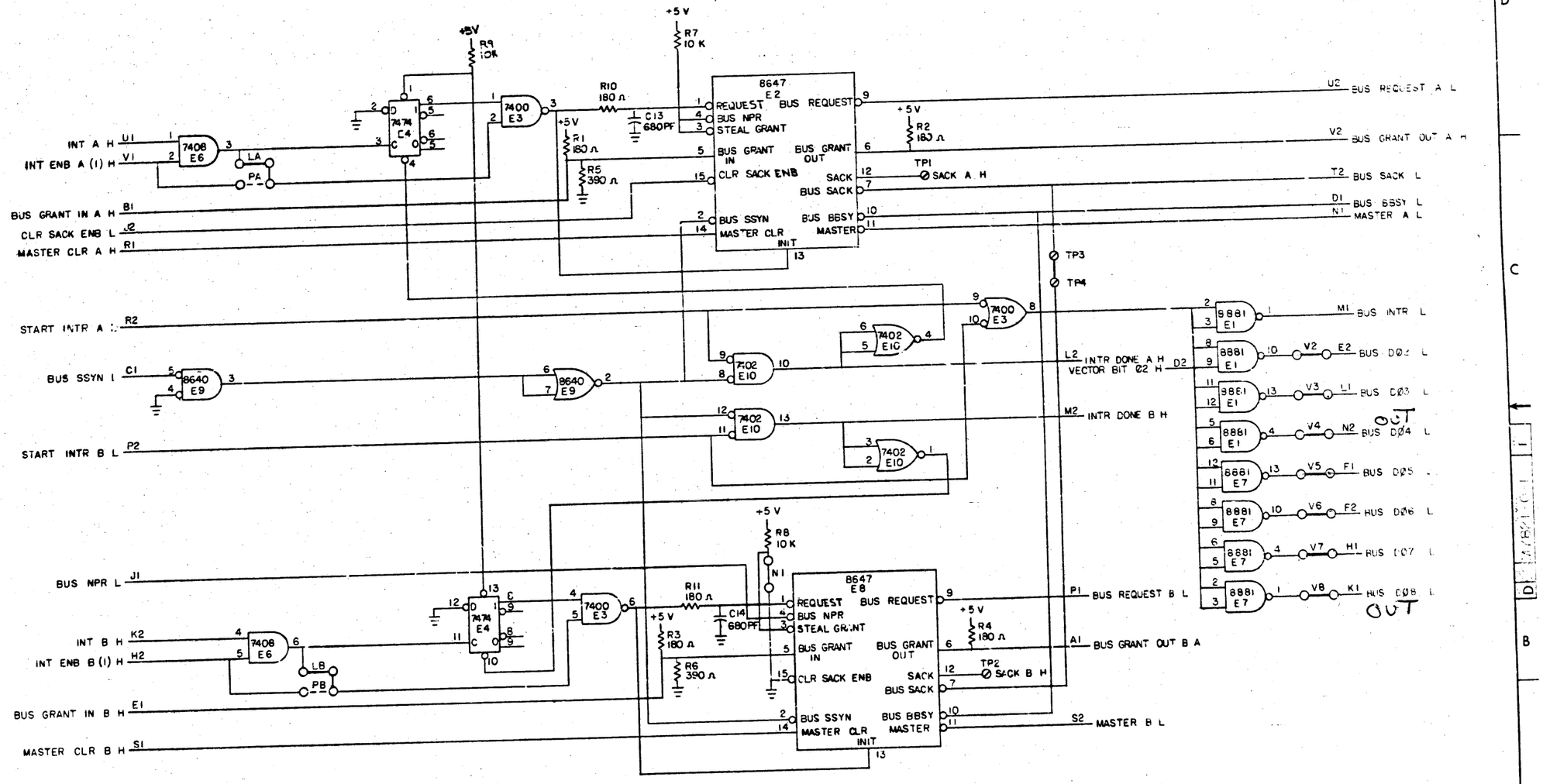
DRN. J. MARINI — DATE [illegible]
CHK'D. R. COOK — DATE [illegible]
ENG. L. CONDON — DATE 9-29-71
PROJ. ENG. L. CONDON — DATE 9-29-71
PROD. G. STRINGER — DATE
NEXT HIGHER ASSY —//—
SCALE —//—
SHEET 1 OF 2

DIGITAL EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE: INTERRUPT CONTROL M7821

SIZE	CODE	NUMBER	REV.
D	CS	M7821 Ø 1	E

DIST.



REVISIONS		
CHK	CHANGE NO	REV.

TITLE	SIZE	CODE	NUMBER	REV.
INTERRUPT CONTROL	D	CS	M7821-0-1	E
SCALE	SHEET 2 OF 2	DIST		

DEC FORM NO. DRD 138

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 4/4/74

TITLE KW11-W Engineering Specifications

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE
A		00001		6/76	M. Samela	7-1-76

ENG	APPD	SIZE	CODE	NUMBER	REV
Jon Brewser		A	SP	KW11-W-2	A

ENGINEERING SPECIFICATION — CONTINUATION SHEET

TITLE KW11-W Engineering Specifications

1. Environmental Specifications:

Operating Temperature	+10°c to +50°c
Relative Humidity (no condensation)	20% to 95%
Power Requirements (of option)	+5V, ±.25V, 1.3 amps -15V, ±.25V, .2 AMPS
Power Dissipation	12 Watts

1.1 Performance Specifications:

Inputs (optically isolated)	
Input Levels (selected by jumpers)	6V, 24V, 48V norminal
Input Current	+13ma to +22ma = "1" -2 MA to +2 MA = "Ø"
Input Response Time (6V step input)	2.5ms. max. normal 50us. maximum optional
Common Mode Input Impedance	10^{10} ohms minimum
Outputs	
Relay Output	Form C 28V,of 250ma (3VA)resistive
Solid State Output	Open Collector 55V, 100ma (~3W).
Timing	
T1, Short Loop	Refer to KW11-W Adjustment Procedure
T2, Second Chance	"
T3, Watchdog	"
T4, Error Pulse	5msec. ±30%

ENG	APPD	SIZE	CODE	NUMBER	REV
		A	SP	KW11-W-2	A

ENGINEERING SPECIFICATION — CONTINUATION SHEET

TITLE KW11-W Engineering Specifications:

2.0 Programming

The device registers and associated addresses are listed in Section 2.1. Note that these addresses can be changed by altering the jumpers on the M105 address selector module. However, any programs or other software referring to these addresses must also be modified accordingly.

2.1 Register Address Assignments

Register	Address
CSR/WD (Watchdog Control and Status Register)	772400
Clear Flags (T1, Short Loop; T2, Second Chance)	772402
External CSR	772404
Switch Relay	772406

2.2 -Vector Address Assignments (Floating Vectors)

Short Loop	350
Second Chance	350
Receive Flag	354

	SIZE	CODE	NUMBER	REV
	A	SP	KW11-W-2	A

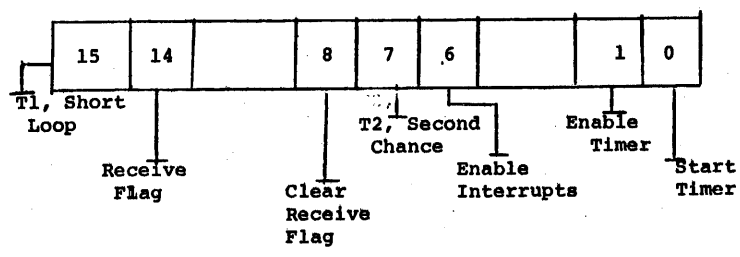
ENGINEERING SPECIFICATION — CONTINUATION SHEET

TITLE KW11-W Engineering Specifications

2.3 Option Priority

The priority level of both interrupts is set at BR7. However, this priority may be changed by changing the priority jumper plug. (Levels of BR4 through BR7 are available.)

2.4 CSR/WD (Watchdog Control and Status Register, 772400)



	SIZE	CODE	NUMBER	REV
	A	SP	KW11-W-2	A

Bit	Name	Meaning and Operation
15	T1, Short Loop	Is set to a "1" if the watchdog is readdressed before T1 times out. An interrupt is generated if Enable Interrupts (Bit 6) is also set. Read only bit. Cleared by INIT and Clear Flags.
14	Receive Flags	This bit is under control of the user's device and is set to a "1" when enabled. An interrupt is generated if Enable Interrupts (Bit 6) is also set. Read only bit. Cleared by INIT and Clear Receive Flag.
8	Clear Receive Flag	When set to a "1", clears out the Receive Flag, (Bit 14). Write only bit.
7	T2, Second Chance	Is set to a "1" if the T2 delay times out. Can be used as a warning to indicate that the watchdog is about to time out and generate an error pulse. An interrupt is generated if Enable Interrupts (Bit 6) is also set. Read only bit. Cleared by INIT and Clear Flags.
6	Enable Interrupts	When set, allows an interrupt to be generated provided T1, Short Loop (Bit 15),Receive Flag (Bit 14), or T2, Second Chance (Bit 7) becomes set. Read/Write bit. Cleared by INIT.

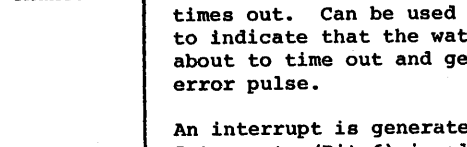
Bit	Name	Meaning and Operation
1	Enable Timer	When set to a "1", enables the output stage of the watchdog, under program control or external control. Write only bit. Cleared by trailing edge of 5msec. error pulse and by internally generated power clear on power-up only.
ø	Start Timer	When set to a "1" in the CSR/WD address, the timer is started. Write only bit.

2.5 Clear Flags (772400)

When issued, clears out all flags; T1, Short Loop (Bit 15); T2, Second Chance (Bit 7).

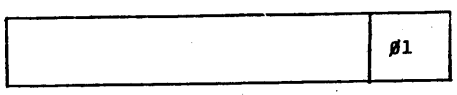
Read only.

2.6 External CSR (772404)



Bit	Name	Meaning and Operation
15	D15	Input bit used to monitor external device status. Read only bit.
7	DØ7	Input bit used to monitor external device status. Read only bit.

2.7 Switch Relay (772406)



Bit ø - When set to a "1", energizes the output relay.
Write only bit.

3.0 Interfacing Specifications

3.1 Output Connector (DEC 12-05549). The mating connector for cabling into the Watchdog Timer is supplied and is a DEC 12-9481. Pins are DEC 12-9480.

Pin	Signal Name
1	N.O.
2	C
3	N.C.
4	+ Latch
5	- Latch
6	+ D15
7	- D15
8	+ DØ7
9	- DØ7
10	+ Rec. Input
11	- Rec. Input
12	+ External Enable
13	- External Enable
14	+4.7V
15	GND
16	Solid State Output

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MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 6/14/74

TITLE KW11-W Adjustment Procedure

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE
A		00001		6/76	M. Samek	7-1-76

ENG	APPD	SIZE	CODE	NUMBER	REV
		A	SP	KW11-W-3	A

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ENGINEERING SPECIFICATION — CONTINUATION SHEET

TITLE KW11-W Adjustment Procedure

Equipment:

W900 Extender Board
453 Textronic Scope or Equivalent
KW11-W Option and Print Set
Diagnostic MAINDEC-11-DZKWC-A-PB-D
I.C. Test Clip
Test Connector 7009463

1.0 Set-Up:

Halt PDP-11 and turn off power. Disconnect user's cable and remove from system M7823. Install all jumpers on M7823; refer to print D-CS-M7823-0-1. Connect test connect 7009463 to M7823 in place of user cable. Install W900 extender board in place of M7823. Refer to table 1 for desired ranges for short loop (T1), second chance (T2), and watchdog (T3) respectively. Solder desired capacitor on split lugs on M7823. Refer to print D-CS-M7823-0-1 for split lug position. After the above procedure is complete, connect the M7823 piggy-back on the W900 module.

2.0 Delay Adjustments:

2.1 Turn on power and load MAINDEC-11-DZKWC-A-PB using absolute loader; refer to program write-up MAINDEC-11-DZKWC-A-D.

2.2 After meeting all criteria of the KW11-W Logic Test first address, vector address and priority, the operator must key in on the keyboard "2" carriage returns for delay test. The teletype will respond with the following:

(1) Delay Adjustment Test
(2) Delay: (1) Watchdog, (2) Warning & Short Loop

2.3 The operator must input 1 carriage return. This will pulse all three delays; Short Loop (T1), Second Chance (T2), and Watchdog (T3).

	SIZE	CODE	NUMBER	REV
	A	SP	KW11-W-3	A

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DRA 108

ENGINEERING SPECIFICATION — CONTINUATION SHEET

TITLE KW11-W Adjustment Procedure

2.4 Place the I.C. test chip on E13 (74123) and scope probe to pin 13 and adjust R3 for desired range of Short Loop (T1). (Refer to drawing D-CS-M7823-0-1).

2.5 Place the I.C. test chip on E5 (74123)and scope probe to pin 5 and adjust the R2 for desired range of second chance (T2). (Refer to drawing D-CS-M7823-0-1).

2.6 Place scope probe on pin 13 and adjust R1 for desired range of watchdog (T3). (Refer to drawing D-CS-M7823-0-1).

2.7 Turn off computer power and remove extender board and install M7823.

2.8 Turn on computer power and run logic test. Refer to KW11-W Acceptance Procedure. Proceed to 3.0.

3.0 Set-Up for User Application:

3.1 Turn off computer power and remove M7823 Watchdog Timer.

3.2 Remove test connect (7009463) and cut optional jumpers; refer to table 2 and 2.1 for user application.

3.3 Connect the M7823 user cable and install M7823 into the computer and turn on power.

3.4 When the above criteria is met, the adjustment of the KW11-W is complete.

	SIZE	CODE	NUMBER	REV
	A	SP	KW11-W-3	A

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DRA 108

ENGINEERING SPECIFICATION — CONTINUATION SHEET

TITLE KW11-W Adjustment Procedure

A note should be made that Short Loop (T1) should be a maximum of 10% of Second Chance (T2) time base.

Table 1

Capacitor C37	Short Loop (T1)	Range
.47uf		650 usec.-6.0msec.
1 uf		1.5msec.-10msec.
2.2uf		3msec.-25msec.
3.9uf		5.1msec.-50msec.

Capacitor C36	Second Chance (T2)	Range
10uf		15msec.-120msec.
15uf		20msec.-150msec.
100uf		150msec-1.2 sec.
150uf		180msec-1.5 sec.
180uf		210msec-2 sec.

Capacitor C35	Watchdog (T3)	Range
10uf		15msec-120msec
15uf		20msec-150msec
100uf		150msec-1.2 sec.
150uf		180msec-1.5 sec.
180uf		210msec-2 sec.

If desired range is NOT above, the following formula can be used to calculate the range:

T = Nsec CX = Pf
RX = K
RX = 5K minimum/50K maximum
T = .28 (RX) (CX)

NOTE:
T1, T2, and T3 are shipped from factory at 5 ms, 1 sec and 1.5 sec, respectively.

	SIZE	CODE	NUMBER	REV
	A	SP	KW11-W-3	

DEC FORM NO DEC 16-(381)-1022-N370
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Table 2

Jumpers	IN	OUT
W1 Program Interrupt Enable	X	
W1 Always Enable		X
W2 Program External Enable	X	
W2 Not Program External Enable		X
W3 External Enable	X	
W3 Not External Enable		X

Table 2-1

Input Voltages		$	24	48
External Enable	W4	IN	OUT	OUT
External Enable	W5	IN	IN	OUT
Receive Input	W6	IN	OUT	OUT
Receive Input	W7	IN	IN	OUT
DØ7	W8	IN	OUT	OUT
DØ7	W9	IN	IN	OUT
D15	W1Ø	IN	OUT	OUT
D15	W11	IN	IN	OUT
Latch	W12	IN	OUT	OUT
Latch	W13	IN	IN	OUT

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ENGINEERING SPECIFICATION

DATE 4/4/74

TITLE KW11-W Acceptance Procedure

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE

ENG	APPD	SIZE	CODE	NUMBER	REV
		A	SP	KW11-W-4	

DEC 16-(392)-1079-N971
DRA 107

1.0 Equipment:

PDP11 Small Computer

SPS (Small Peripheral Slot)

M7823 (Watchdog Timer)

M105 (Address Selector)

M7821 (Vector Address Selector)

Test Connector (7009463)

KW11-W Logic Test Maindec-11-DZKWC-A-PB/D

KW11-W Overlay Maindec-11-DZKWE-A-PB/D

DECX11 Module Maindec-11-DXKWW-A-PR/D

2.0 Set-Up:

To exercise the KW11-W Option, ALL jumpers must be installed on the M7823. Refer to print D-CS-M7823-0-1. The test connector, 7009463, must be used on KW11-W Logic Test and KW11-W Overlay or Maindec-11-DXKWW-A.

3.0 Testing KW11-W:

Load Maindec-11-DZKWC-A-PB into the PDP11 using absolute loader. Refer to program write-up, Maindec-11-DZKWC-A-D.

3.1 Load and start 200. The teletype will respond as follows:

First Device Address:

The operator must respond by inputting 6 characters plus a carriage return on the keyboard.

Example:

Example:

First Device Address = 772400

3.2 The teletype will respond as follows:

First Int. Vector =

The operator must respond by inputting 3 characters plus a carriage return on the keyboard.

Example:

Δ First Int. Vector = 350

3.3 The teletype will respond as follows:

Priority Int. Level =

The operator must respond by inputting 1 character

Δ Using floating vector, refer to system configuration. Should be between DQ11 and DU11.

Example:

Priority Int. Level = 7

Proceed to 4.0.

4.0 Running the Logic Test:

The teletype will respond with the following:

Logic Test (1), Delay Test (2)*, Dynamic (3)

The operator must respond by inputting on the keyboard "1" with a carriage return for logic test.

The teletype will respond with the following:

1
Logic Test

This test, upon completion, will type out "PASS".

This test should run for a minimum of 5 minutes.

Procede to 5.0.

NOTE: Delay test (2) is part of the adjustment procedure.

5.0 Running Dynamic Test:

Put Bit ØØ in the Switch Register to get back into the monitor or halt machine and load and start 240. If the operator has gone back into the monitor, a keyboard input must be used. Type in "3", carriage return. Will get into Dynamic Test.

The teletype on every 100 completions of Dynamic Test will type "PASS". This test should run for a minimum of 15 minutes. After successfully passing the above criteria, procede to 6.0.

6.0 Running GTP Overlay:

If DECX11 module is available, proceed to 7.0. Load Maindec-11-DZQGA-B-PB GTP (General Test Program) using Absolute Loader. Refer to program write-up, Maindec-11-DZQGA-B-D. Run entire system for one pass of GTP.

Halt the PDP11 after one successful pass. Load Maindec-11-DZKWE-A-PB into PDP11 using Absolute Loader.

Restart GTP and run as required for system acceptance.

After completing 6.0, the acceptance testing is finished.

7.0 Running DECX11:

Refer to DECX11 Building Procedure and Build System Tape. Run as required. Upon completion, acceptance testing is finished.

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ACCESSORY LIST

MADE BY [signature] DATE 7/23/74	CHECKED [signature] DATE 7/23/74	SECTION	
ENG [signature] DATE 7/23/74	PROD [signature] DATE 7/23/74	ISSUED SECT.	

LEGEND
- D DOCUMENT
- DN DOCUMENT CHANGE NOTICE
- PA PAPER TAPE ASCII
- PB PAPER TAPE BINARY
- PM PAPER TAPE READ-IN-MODE

ITEM NO.	DWG NO./PART NO.	DESCRIPTION	QUANTITY/VARIATION							KIT CHECK BY ___ DATE ___	INSTALLATION CHECK BY ___ DATE ___
	12-9481	External Connector	1								
	12-9480	Pins	16								
	7009463	Test Connector	1								
	MD-11-DZKWC-A-PB/D	KW11-W Logic Test	1								
	MD-11-DZKWE-A-PB/D	KW11-W Overlay	1								
	MD-11-DXKWW-A-PR/D	DECX11 Module	1								

TITLE	ASSY. NO.	SIZE	CODE	NUMBER	REV.	ECO NO
KW11-W	SHEET 1 OF 1	A	AL	KW11-W-5	A	KW11W-00001

DIST.

DEC 16-(325)-1075-N172 DRA 121

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PARTS LIST

MADE BY E. WILSON
DATE 10/29/73
CHECKED [illegible]
DATE 8/19/73
SECTION
ENG [illegible]
DATE 7/23/74
PROD [illegible]
DATE 7/23/74
ISSUED SECT.

ITEM NO.	DWG NO./PART NO.	DESCRIPTION	QUANTITY/VARIATION
	D-CS-M7823-0-1	WATCH DOG TIMER	1
	D-CS-M105-0-1	ADDRESS SELECTOR	1
	D-CS-M7821-0-1	INTERRUPT CONTROL	1
	C-IA-7009463-0-0	TEST CONNECTOR	1
	1209480	CONTACT SOLDER	16
	1209481	CONNECTOR HOUSING	1

TITLE WATCH DOG TIMER
ASSY NO.
SHEET 1 OF 1
SIZE A
CODE PL
NUMBER KW11-W
REV.
ECO NO.
DIST.

DEC FORM DEC 16-(325)-1031-N870
DRA 110