ETHERNET SERVICE MANUAL

NOVEMBER, 1984

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CHAPTER 1 GENERAL DATA

ETHERNET SERVICE MANUAL

1.1 HOW TO USE THIS SERVICE MANUAL

This service manual provides information necessary for maintenance of the Xerox Ethernet Network, including the Repeater.

1.1.1 MANUAL CONTENT

The manual is divided into eight chapters. Content of chapters is described below.

Chapter 1. General Data
This chapter provides information or instructions for manual usage, specifications, tools and supplies lists, and general procedures.

Chapter 2. Installation/Removal
This chapter provides procedures for installation and removal of equipment by a Service Representative.

Chapter 3. Repair Data
This chapter provides procedures for removal, replacement, and adjustment of parts. Each procedure refers to related parts list (PL) in Chapter 4.

Chapter 4. Parts Identification
This chapter provides exploded view illustrations of parts (and parts configuration) and a matching list of parts descriptions. The parts list refers to the related repair procedures in Chapter 3. Symbols used on parts illustrations are defined in Section 1.1.2.

Chapter 5. Print/Display Quality
This chapter is provided only in applicable manuals.

Chapter 6. Troubleshooting
This chapter provides Level 01 Troubleshooting and Information Gathering Checks, Ethernet troubleshooting introduction and explanations, Level 1 Checkout, Level 2 Check Charts, and power distribution BSDs.

Chapter 7. Plug/Jack Lists
This chapter defines harness reference numbers, provides plug/jack location diagrams, shows wiring data with illustrations for each harness, and identifies connectors by generic type. On wiring illustrations, letters are used for reference to connector diagrams.

Chapter 8. Principles of Operation
This chapter provides a narrative discussion of the operation of the Ethernet Network. Block diagrams show functional areas and relationships within the Network configurations.

1.1.2 MANUAL SYMBOLS

Symbols used in service manuals are defined below.

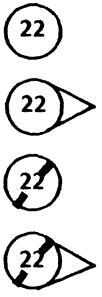


Figure 1-1 Tag Change Symbols

Tag change symbols appear on exploded view illustrations in Chapter 4 and on Block Schematic Diagrams in Chapter 6. The number within the symbol (not shown in figure) matches the tag number identified in the Change Tag Index in Chapter 1.

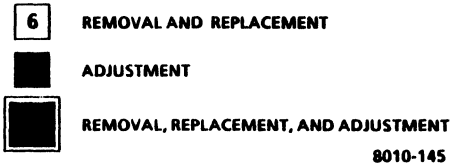


Figure 1-2 Repair Procedure Symbols

Repair procedure symbols appear on exploded view illustrations in Chapter 4, located near the applicable item number on the drawing. The number within the symbol matches the number of the repair procedure provided in Chapter 3.

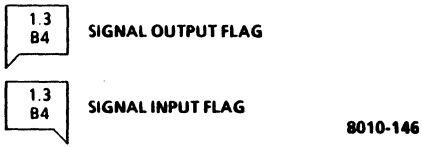


Figure 1-3 Block Schematic Symbols

Signal flags are used on Block Schematic Diagrams in Chapter 6. The numbers within the symbol identify the related BSD chain and the zone reference on the related BSD.

1.1.3 REVISION MARKS

Service manual revisions are provided by a change package or a new issue of the manual. On the changed or added pages, a letter (at the bottom of the page) is used to identify level of revision. The following list defines methods used to identify the changes on each page.

Text	Change bar in left margin
Tables	Change bar at left side of the changed data
Changed Illustrations	Number (indicating the level of revision) next to drawing number; change bar at left side of drawing number
New Illustrations	Change bar at left side of drawing number

When additional levels of revision are needed, revision marks for earlier revisions are taken out, and only new revisions are identified. Each revision includes a new title page containing a Revision Control List. The list provides page numbers where revisions have occurred as well as letters identifying the level of revision.

1.1.4 IDENTIFICATION OF SPECIFIC ITEMS

If parts or data are used only with a specific device, the applicable device is identified with one of the statements defined below. If no statement is provided, the part or data is used multinationally and for all applicable devices.

USO only	-- United States Operations
XC only	-- Xerox Canada
USO/XC only	-- United States Operations/Xerox Canada
RX only	-- Rank Xerox
No statement	-- Multinational

1.1.5 COMMENT SHEETS

Service Representatives can identify corrections or improvements needed in service manuals, and send that information to Service Education personnel on a Comment Sheet. The Comment Sheet is located on the last page of each manual.

1.2 SPECIFICATIONS

1.2.1 PRODUCT CODES

Repeater
USO/XC and RX T28

1.2.2 PHYSICAL SPECIFICATIONS

PVC Coaxial Cable Sections

Part Number	152S23980
Length	76 feet 9 inches (23.4 m)
Weight	9.0 pounds (4.1 kg)
Part Number	152S23981
Length	230 feet 4 inches (70.2 m)
Weight	26 pounds (11.8 kg)
Part Number	152S23982
Length	383 feet 10 inches (117.0 m)
Weight	43 pounds (19.5 kg)

TEFLON Coaxial Cable Sections

Part Number	152S23990
Length	76 feet 9 inches (23.4 m)
Weight	10.0 pounds (4.5 kg)
Part Number	152S23991
Length	230 feet 4 inches (70.2 m)
Weight	30.0 pounds (13.6 kg)
Part Number	152S23992
Length	383 feet 10 inches (117.0 m)
Weight	50.0 pounds (22.7 kg)

Coaxial Connectors

Type	PVC Screw-on, N Series, Male
Assembled Length	1.75 inches (4.5 cm)
Type	TEFLON Screw-on, N Series, Male
Assembled Length	1.75 inches (4.5cm)

Coaxial Cable Bend Radius

Temporary Flex	8 inch (20.3 cm) minimum
Installed Position	12 inch (30.5 cm) minimum

Network Segment

Maximum Length	1640 feet (500 m)

Coaxial Adapters

Type	N Series, Female
Assembled Length	1.75 inches (4.5 cm)
Type	Right Angle, N Series, Male/Female
Assembled Length	75 inches (4.5 cm)

Terminator

Impedance	50 ohms (+/- 1%)
Installed Length	2.75 inches (6.9 cm)

Transceiver Spacing

Distance of 8 feet 2 inches (2.5 m) between transceivers

Transceiver

Width	3 inches (7.6 cm)
Height	3 inches (7.6 cm)
Length	6 inches (15.2 cm)

PVC Transceiver Cable

Part Number	152S23803
Length	15 feet (4.6 m)
Weight	1.1 pounds (0.5 kg)
Part Number	152S23804
Length	30 feet (9.2 m)
Weight	2.2 pounds (1.0 kg)
Part Number	152S23805
Length	60 feet (18.3 m)
Weight	4.4 pounds (2.0 kg)
Part Number	152S23806
Length	164 feet (50 m)
Weight	12 pounds (5.4 kg)

TEFLON Transceiver Cable

Part Number	152S24013
Length	15 feet (4.6 m)
Weight	1.3 pounds (0.6 kg)
Part Number	152S24014
Length	30 feet (9.2 m)
Weight	2.5 pounds (1.1 kg)
Part Number	152S24015
Length	60 feet (18.3 m)
Weight	5.0 pounds (2.3 kg)
Part Number	152S24016
Length	164 feet (50 m)
Weight	12 pounds (5.4 kg)

Repeater

Width	14 inches (35.6 cm)
Height	8.5 inches (21.6 cm)
Length	8 inches (20.3 cm)
Weight	15 lbs (6.8 kg)

1.2.3 REPEATER SPACE REQUIREMENTS

Figures 1-4 and 1-5 show minimum space required for ventilation and for service of equipment. There must be free air circulation in the area surrounding the Repeater. The illustrations do not provide an example of a normal installation.

One wall outlet is required for each Repeater. Length of Repeater power cord is 8 feet (2.44 m).

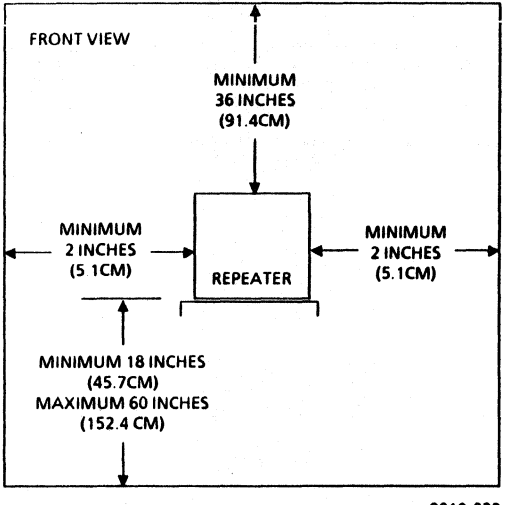


Figure 1-4 Repeater Space Requirements (Front View)

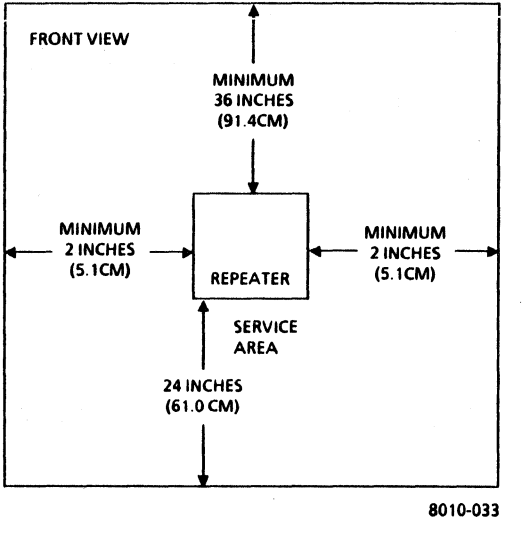


Figure 1-5 Repeater Space Requirements (Top View)

1.2.4 REPEATER ELECTRICAL SPECIFICATIONS

Circuit conductors and ground conductors must be installed in accordance with local electrical requirements. A standard 15A, 2 pole, 3-wire grounded duplex receptacle is required for proper unit operation.

USO/XC ONLY: AC power is obtained from a grounded wall outlet. Voltages required at the wall outlet are 103 to 127 VAC (RMS) line-to-neutral, 0 to 3 VAC neutral-to-ground, single phase, 60 Hz, at 0.35A.

RX ONLY: AC power is obtained from a grounded wall outlet. Voltages required at the wall outlet are 193 to 264 VAC, at 50 Hz.

Power consumption specifications for the Repeater are 0.35 ampere current and 40 watts power.

1.2.5 ENVIRONMENTAL SPECIFICATIONS

Temperature Range

Ethernet

41oF to 122°F (5°C to 50°C)

Repeater

50°F to 90°F (10°C to 35°C)

Humidity Range

Ethernet

10% to 95%; maximum wet bulb temperature 78°F (26°C)

Repeater

15% to 85%; maximum wet bulb temperature 78°F (26°C)

1.3 SUPPLEMENTAL TOOLS AND SUPPLIES

In addition to a Basic XOPD Tool Kit 600T1391 (described in the 8000 Series Reference Manual), a Coax Coring Tool Kit 600T1665 is required for service of an Ethernet Network. The Coax Coring Tool Kit consists of the items described in Table 1-1. Supplemental tools required for service of an Ethernet Network are described in Table 1-2.

Table 1-1 Coax Coring Tool Kit 600T1665	
Part No.	**Description**
600T1669	Coax Cable Coring Tool
600T1670	Coax Shield Remover
600T1671	Coax Replacement Cutting Tip

Table 1-2 Ethernet Supplemental Tools	
Part No.	**Description**
600T822	Pin Extractor
600T1656	Universal Loopback Tool
600T1680	Coax Cable Stripper
600T1706	Transceiver Terminator Tool

1.4 GENERAL PROCEDURES

1.4.1 LADDER USAGE

WARNING

Observe the following safety rules when the Xerox Ethernet Ladder (1P80714) is required for service of the network.

1. Use only the approved Xerox Ethernet Ladder.
2. Inform customer about a damaged ladder.
3. Inform customer if an approved ladder is not available.
4. Before use, fully open and lock the ladder in place.
5. Position the ladder to prevent slippage, or hold ladder in place during use.
6. Do not place ladder on boxes or other items to obtain additional elevation.
7. Do not place ladder near a door that opens toward ladder unless the door is locked or blocked.
8. Face the ladder when going up or down.
9. Do not use top of ladder or next cleat down from top to obtain elevation.
10. Do not allow ladder to be used by more than one person at a time.

CHAPTER 2 INSTALLATION/REMOVAL

ETHERNET SERVICE MANUAL

2.1 INTRODUCTION

Normally, Ethernet installations are performed by either a Xerox approved contractor or a contractor selected by customer. If Ethernet is installed within a single room, and the coaxial cable is placed on the floor between devices, the Service Representative may be required to perform the installation.

Repeater installation and removal is performed by the Service Representative. Appropriate procedures are provided in this Chapter

2.2 ETHERNET INSTALLATION

Installation instructions for Ethernet are provided in the Ethernet Network Facility Contractors Manual.

2.3 REPEATER PRE-INSTALLATION CHECKS

1. VERIFY THAT REQUIRED INSTALLATION EQUIPMENT IS AVAILABLE.

NOTE: If more than one Repeater is to be installed with its related cable segment, reference to a diagram of network topography is recommended.

   a. Ensure that network consists of at least two segments of cable.
   b. Verify that part number of each transceiver is 73S80509 (or later issue); if part number is an earlier issue, obtain the correct transceiver.
   c. Ensure that two transceivers and two tap-block assemblies are available for each Repeater.
   d. Ensure that two transceiver cables are available for each Repeater.

2. USO/XC ONLY. MEASURE AND VERIFY VOLTAGE AT WALL RECEPTACLE (FIGURE 2-1).

CAUTION

If any of the voltage measurements is not as specified below, the cause must be corrected. Inform the customer that the equipment must not be connected to the wall receptacle, and that a licensed electrician must correct the wiring. Do not try to make the correction. If the improper condition has not been corrected before the next call, provide a written report to your manager about the improper wiring.

   a. Select the proper voltage scale.
   b. Measure voltage between AC hot (ACH) and neutral (ACN).

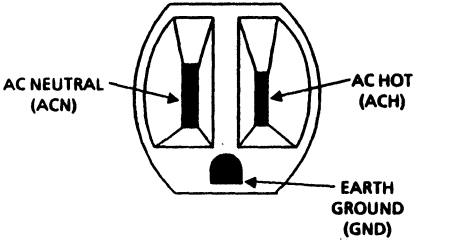


Figure 2-1 Wall Receptacle (USO/XC)

c. Verify that meter reading is between 103 VAC and 127 VAC.
d. Measure voltage between ACH and ground (GND).
e. Verify that meter reading is between 103 VAC and 127 VAC.
f. Measure voltage between GND and ACN.
g. Verify that meter reading is less than 3 VAC.

3. RX ONLY: MEASURE AND VERIFY VOLTAGE AT WALL RECEPTACLE (FIGURE 2-2).

CAUTION

If any of the voltage measurements is not as specified below, the cause must be corrected. Inform the customer that the equipment must not be connected to the wall receptacle, and that a licensed electrician must correct the wiring. Do not try to make the correction. If the improper condition has not been corrected before the next call, provide a written report to your manager about the improper wiring.

a. Measure voltage between LIVE and NEUTRAL.
b. Verify that voltage is within -15% to +6% of nominal line voltage.
c. Measure voltage between LIVE and GROUND.
d. Verify that voltage is within -15% to +6% of nominal line voltage.
e. Measure voltage between NEUTRAL and GROUND.
f. Verify that voltage is less than 3 VAC.

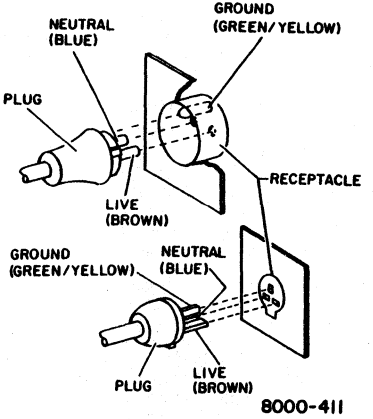


Figure 2-2 Wall Receptacle (RX)

2.4 REPEATER INSTALLATION

1. PERFORM THE PRE-INSTALLATION CHECKS (2.3).
2. REMOVE REPEATER FROM CARTON.
   a. Open carton.
   b. Remove bubble bag that contains AC power cord and retainer clamp.
   c. Remove Repeater from carton.
3. VERIFY AC INPUT POWER CONFIGURATION (FIGURE 2-3).
   a. Determine the nominal input voltage at wall recep tacle.
   b. Remove PWA from input power control.
   c. On PWA, locate the voltage indication that matches the wall receptacle (Figure 2-3).
   d. Replace PWA with the matching voltage indication placed up and at left side.
4. IF APPLICABLE, INSTALL TAP-BLOCK ASSEMBLIES AND TRANSCEIVERS ON THE SEGMENTS OF CABLE BEING ATTACHED WITH A REPEATER.
   a. Refer to chapter 3 for detailed instructions for tapping the coaxial cable.
5. CONNECT TRANSCEIVER CABLES.
   a. If applicable, connect transceiver cables to the transceivers.

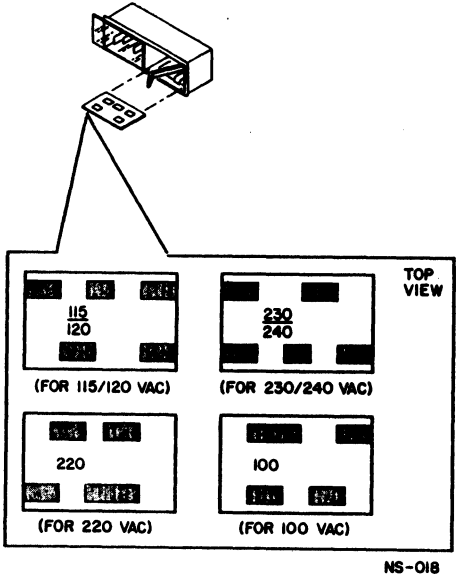


Figure 2-3 AC Input Power Configuration PWA

b. Connect transceiver cables to the receptacles labeled XCVR LEFT and XCVR RIGHT on the Repeater panel.

6. CONNECT AC POWER CORD.
   a. Connect AC power cord into Repeater.
   b. Secure AC power cord with retainer clamp.
   c. Ensure that Repeater ON/OFF switch is in the OFF position.
   d. Connect AC power to wall outlet.
7. SWITCH ON REPEATER POWER.
8. VERIFY THAT LEDs ILLUMINATE.
   a. Verify that LEDs on transceivers illuminate.
   b. On Repeater, verify that the LEDs labeled + 5 VDC and + 12 VDC illuminate.
9. VERIFY THAT THE REPEATER IS FUNCTIONING CORRECTLY.
   a. Perform Ethernet On-Line Diagnostics between 8000 Processors, or 8000 Processor and 860, that are connected to different segments of cable.

NOTE: When data is transmitted on the network, LEDs on Repeater illuminate. The XMT L LED illuminates when a data packet at XCVR RIGHT receptacle is transmitted to XCVR LEFT receptacle. The XMT R LED illuminates when a data packet at XCVR LEFT receptacle is transmitted to XCVR RIGHT receptacle. Because the intensity of LEDs is controlled by the recurrence rate of each data packet, at times it is very difficult to see the LEDs illuminate

b Observe that the XMT L and XMT R LEDs illuminate while the test is performed.
c. Verify that test results are 99% or better.

2.5 ETHERNET REMOVAL

Because Ethernet network hardware is owned by the customer, removal of Ethernet hardware is not performed by Xerox personnel.

2.6 REPEATER REMOVAL

1. SWITCH OFF REPEATER POWER.
2. ENSURE THAT REPEATER IS READY FOR REMOVAL.
   a. Disconnect AC power cord from wall outlet.
   b. Disconnect transceiver cables from Repeater.

3

CHAPTER 3 REPAIR DATA

ETHERNET SERVICE MANUAL

3.1 COAXIAL CABLE
REF PL 4.1

Service Representatives are not required to repair the coaxial cable. Either a Xerox contractor or a contractor selected by customer must perform the repairs.

3.2 CONNECTOR
REF PL 4.1

REMOVAL

1. REMOVE COAX CONNECTION INSULATION.
2. DISCONNECT ADAPTER OR TERMINATOR.
3. REMOVE CONNECTOR.
   a. **Crimp-on connector:** Cut off connector from coaxial cable as close to connector as possible.
   b. **Screw-on connector:** Remove screw-on connector from end of coaxial cable. Cut off 2 inches (5 cm) of cable from end where connector was removed.

REPLACEMENT

1. STRIP THE COAXIAL CABLE.

CAUTION

Use care to prevent cutting the braid or center conductor.

   a. Using the Coaxial Cable Stripping Tool (600T1680), or approved alternate tool, strip the cable 0.5 inch (1.3 cm) from end of cable as shown in Figure 3-1.

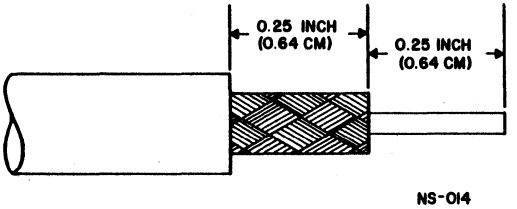


Figure 3-1 Coaxial Cable Preparation

   b. Ensure that outer braid has a smooth surface.
   c. Cut off any loose braid that may cause a short.
2. INSTALL SCREW-ON CONNECTOR ONTO THE STRIPPED CABLE (FIGURE 3-2).

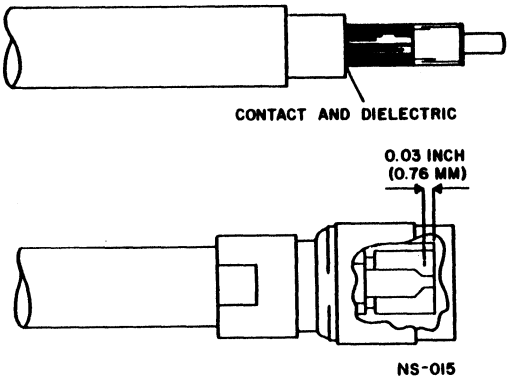


Figure 3-2 Connector Installation

a. Turn contact in a clockwise direction around center conductor until rear end of contact is flush with inner dielectric.
b. Turn connector in a clockwise direction onto cable.
c. Ensure that connector is installed with end of contact within 0.03 inch (0.76 mm) of front edge of connector.
3. REPLACE ADAPTER OR TERMINATOR.
4. REPLACE COAX CONNECTION INSULATION.

3.3 ADAPTER
REF PL 4.1

REMOVAL
1. REMOVE ADAPTER.
   a. Remove coax connection insulation.
   b. Disconnect coaxial connectors from both ends of adapter.

REPLACEMENT
1. INSTALL ADAPTER.
   a. Perform removal procedure in reverse order.

3.4 TERMINATOR
REF PL 4.1

REMOVAL

1. REMOVE TERMINATOR.
   a. Remove coax connection insulation.
   b. Disconnect coaxial connector from end of terminator.

REPLACEMENT

1 INSTALL TERMINATOR.
   a. Perform removal procedure in reverse order.

3.5 TRANSCEIVER
REF PL 4.1

REMOVAL

1. REMOVE TRANSCEIVER.
   a. Remove transceiver insulator.
   b. Disconnect transceiver cable from transceiver.
   c. Disconnect transceiver from tap-block assembly.
   d. Remove and discard O-ring seal from transceiver probe.

REPLACEMENT

1. INSTALL TRANSCEIVER.

CAUTION

Do not use a damaged O-ring on the transceiver probe.

   a. Locate a new O-ring seal, and check the O-ring for damage.
   b. Install new O-ring seal, and ensure that O-ring is correctly placed on transceiver probe.

CAUTION

To prevent damage to O-ring seal, tighten transceiver into tap-block by hand only,

   c. Perform removal procedure in reverse order.
2. VERIFY THE REPAIR.
   a. Perform Ethernet On-Line diagnostic tests.

3.6 TAP-BLOCK ASSEMBLY
REF PL 4.1

1. REMOVE TAP-BLOCK ASSEMBLY.
   a. Remove transceiver (3.5).

b. Using a 1/2 inch wrench and a 9/16 inch wrench, loosen bolt securing the tap-block assembly to coaxial cable.
c. Remove tap-block assembly from coaxial cable.

2 REPAIR THE COAXIAL CABLE.
a. Using RTV Sealant (63P559), repair the tap hole in coaxial cable.

REPLACEMENT

1 INSTALL TAP-BLOCK ASSEMBLY.
a Position the new tap point within 2 inches (5 cm) of the repaired tap hole.

NOTE: If tap-block is to be installed on TEFLON coaxial cable, the shim (included in Transceiver Kit) should be in stalled around cable

b. Install tap-block assembly, and tighten the securing nut and bolt.

CAUTION

Be careful when threading the coring tool into the access hole. If the tool is threaded incorrectly, the result will be damage to tap-block assembly.

2. TAP COAXIAL CABLE.
a. Using the Coaxial Cable Coring Tool (600T1669), thread the tool into the access hole in tap-block assembly until tool is in a fully seated position.
b. Remove the coring tool from tap-block assembly.
c. Place Shield Remover Tool (600T1670) into the access hole in tap-block assembly.
d. Turn shield remover tool in a clockwise direction until the access hole is free of <u>all</u> braid or foil.
e. Check the access hole to ensure that hole is free of any remaining braid or foil.
3. REPLACE TRANSCEIVER (3.5)
4. VERIFY THE REPAIR.
a. Perform Ethernet On-Line diagnostic tests.

4

CHAPTER 4 PARTS IDENTIFICATION

ETHERNET SERVICE MANUAL

USO/XC ONLY

PL 4.1 ETHERNET

ITEM	PART NO.	DESCRIPTION
1	118P80281	Insulator, Transceiver
2	73S80509	Kit, ENET Transceiver (Note 1)
3	116P80772	Tap-Block Assembly (P/O item 2)
4		CABLE, PVC COAXIAL
	- -	77 ft (23.4 m) (ref only)
	- -	230 ft (70.2 m) (ref only)
	- -	384 ft (117 m) (ref only)
		CABLE, TEFLON COAXIAL
	- -	77 ft (23.4 m) (ref only)
	- -	230 ft (70.2 m) (ref only)
	- -	384 ft (117 m) (ref only)
5	113P80692	Adapter, Right Angle Coaxial (Male/-Female) (Note 2)
6	114P20073	Connector, Screw-on Coaxial (Male, PVC)
	114P20075	Connector, Screw-on Coaxial (Male, TEFLON)
7	113P80647	Adapter, Coaxial Barrel (Female/-Female)
8	73S80449	Kit, Coax Connection Insulation
9	- -	Sleeve, Insulating (P/O item 8)
10	113P80648	Terminator, 50 Ohm
11		CABLE, PVC TRANSCEIVER
	152S23803	15 ft (4.6 m)
	152S23804	30 ft (9.2 m)
	152S23805	60 ft (18.3 m)
	152S23806	164 ft (50 m)
		CABLE, TEFLON TRANSCEIVER
	152S24013	15 ft (4.6 m)
	152S24014	30 ft (9.2 m)
	152S24015	60 ft (18.3 m)
	152S24016	164 ft (50 m)
12	73S80417	Kit, Information Outlet
A	20W10201	Cable Tie (RX only)

NOTE 1: Transceiver Kit 73S80509 includes O-ring shim required for TEFLON cable.

NOTE 2: Coaxial Barrel Adapter 113P80647 is required with use of Right Angle Coaxial Adapter 113P80692.

☐ Removal and Replacement 3.1 to 3.6, inclusive

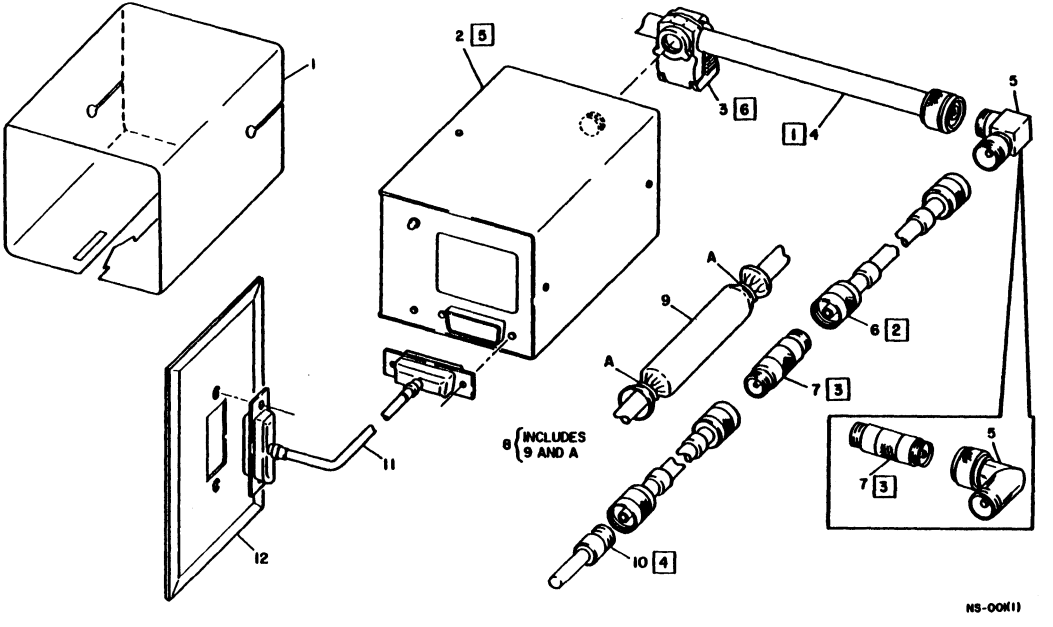


Figure 4-1 Ethernet Parts

PL 4.2 REPEATER

ITEM	PART NO.	DESCRIPTION
1	140S82889	PWA, Repeater
2	105S80431	Power Supply
3	- -	Cover, Top (ref only)
4	142S80062	Filter, Line
5	4P80192	Bumper
6	152S81336	Harness, Repeater
7	708W1401	Fuse 1A
8	117P80598	Cord, AC Power
9	110P80502	Switch, On/Off
10	- -	Cover, Bottom (ref only)

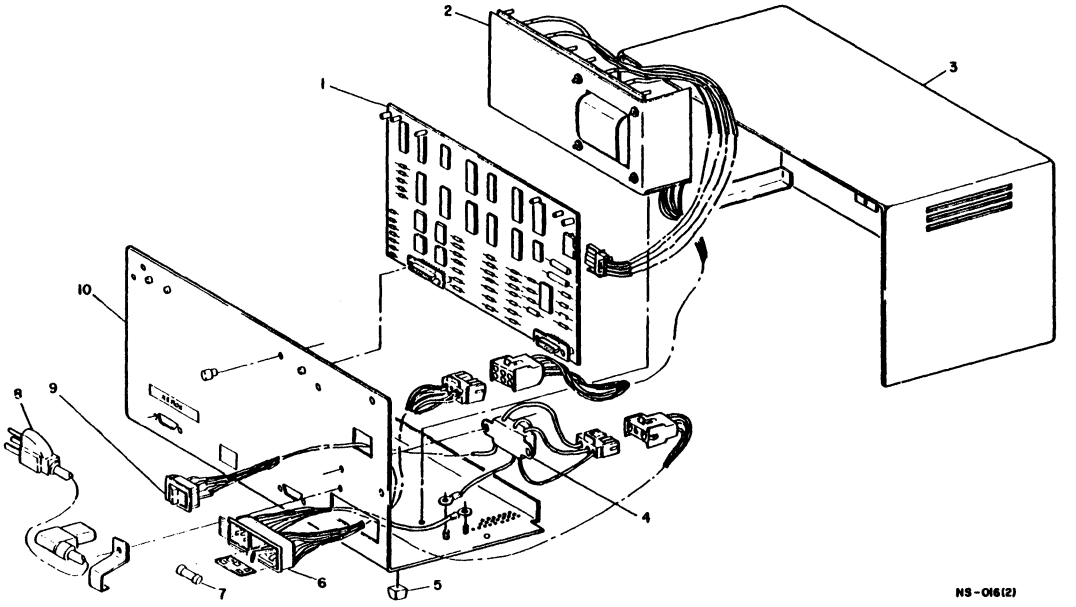


Figure 4-2 Repeater Parts

CHAPTER 5 PRINT/DISPLAY QUALITY

ETHERNET SERVICE MANUAL

REFER TO APPROPRIATE SERVICE MANUAL

CHAPTER 6 TROUBLESHOOTING

ETHERNET SERVICE MANUAL

INTRODUCTION TO NETWORK SYSTEMS TROUBLESHOOTING

Figure 6-1 provides a Level 01 Troubleshooting Flowchart to assist in determining where to start troubleshooting a problem on a large network.

The most important step in Level 01 Troubleshooting is to obtain as much information as possible before troubleshooting in any one area. The System Administrator can identify specific types of network failures. The System Administrator is the best source of information about network problems.

After you have obtained and made an analysis of all available information, use the flowchart (Figure 6-1) to determine where to start troubleshooting.

NOTE: The Level 01 Flowchart was designed with dependency upon the System Administrator to provide necessary information for answers to questions in the chart. If the System Administrator is not available, use the Information Gathering Checks to obtain the information needed to complete the Level 01 Flowchart.

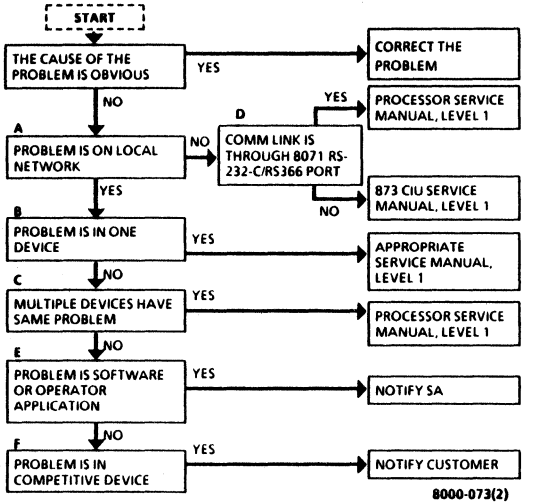


Figure 6-1 Level 01 Troubleshooting Flowchart

How to Use Information Gathering Checks

The Information Gathering Checks are labeled to match the decision blocks of the Level 01 Troubleshooting Flowchart (Figure 6-1). For example, if there is not enough information to determine an answer to Block A, use Check A in the Information Gathering Checks.

The Checks provide assistance in one or more of the following ways

- Definitions are provided for names used in decision blocks.
- Examples are provided to explain statements within the decision blocks.
- Additional steps are provided to assist in obtaining necessary information.
- Some quick, basic steps are provided that may correct the problem.

INFORMATION GATHERING CHECKS

A Problem is on Local Network

- If problem involves any communications off the local Ethernet, this statement should be answered "NO".
- Any problem unique to just one workstation or server is considered to be on the local net.
- Obtain site plan from System Administrator to verify that service or device is on local net.
- From Clearinghouse, list services to verify that the service being accessed is available and started. Ensure that service is registered to the proper processor ID number.

B Problem is in One Device

- A device is a Workstation (8010, 860, 820) or Server.
- Problem is considered to be on one device, if all other workstations and servers are functioning.
- The following are examples of what can be done to isolate problem to one workstation or server:
  - If a service cannot be accessed from a workstation, try accessing it from a second workstation.

- If second workstation cannot access a service, try accessing a service that is installed on a second server.

The above checks will tell you if the problem is in just one workstation, just one server, or the problem is in more than one device.

C Multiple Devices Have Same Problem

- Examples of Check C include:
  - More than one system cannot reach a service.
  - More than one system fails with same MP Code.
- If multiple devices have same problem, troubleshooting should be performed from the server.

D Communications Link is through 8071 RS-232-C/RS-366 Port

- Obtain Port Fact Sheet and Site Plan from System Administrator to determine if port is on an 8071 or on an 873. If port is on an 873, answer "NO" to this statement.
- Obtain port name, and perform a "Test Port" using that name. The Display will show whether the port is on an 873 CIU or on the local 8000 port (8071).

E Problem is in Software or Operator Application

- TBS

F Problem is in Competitive Device

- TBS

INTRODUCTION TO ETHERNET TROUBLESHOOTING

Ethernet Service Strategy

Steps required for isolation of Ethernet faults are provided in sequence below.

1. Using the Network Systems Troubleshooting Flowchart (Figure 6-1), perform Level 01 Troubleshooting.
2. Perform the Level 1 Checkout Procedure. Level 1 Checkout includes preparation for diagnostics and performance of 8000 diagnostics. Instructions for using diagnostics are provided in the 8000 Network Systems Diagnostics Handbook.
3. Perform any Level 2 Check Chart procedures indicated by Level 1 Checkout.
4. USO only. If corrective action does not correct the problem, ask for assistance from the Region Engineering Specialist (RES). Additional assistance is available from the Network Support Center (NSC) in Dallas.

   RX only. Any call for assistance (RES/NSE/ANALYST) should be made to the Technical Specialist.

Check Charts are designed to include dependency on specific visible indications. If specific indications occur, several areas of the system are eliminated as a cause of failure. As a result, the Level 1 Checkout must be performed in the specified sequence provided in the procedure. If an indication is not observed and later a failure occurs, the dependent Check Charts will not be valid. Since Level 1 eliminates areas that cause a failure, the remaining areas can be checked quickly.

Use the appropriate amount of time (determined by branch management) to troubleshoot a problem. Then, if a correction cannot be made, ask for assistance from the RES. For USO, the last step for correcting a problem is to obtain assistance from the NSC in Dallas. Telephone numbers for the NSC are provided below.

NSC	1-800-NSC-8010
Texas	1-800-NSC-8000

LEVEL 1 CHECKOUT EXPLANATION

Figure 6-2 provides a sample of the format of a Level 1 Checkout procedure. An explanation of the three columns is provided below.

PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
POWER (1)	(2)	(3)
2 Ensure System power is on, and look for following conditions.	a. Card cage fans operate.	6.1
	b. Power supply fan operates.	6.2
	c. Floppy drive motor operates	6.3
	d. With disc console, disc console fan operates.	6.4

8000-156(1)

Figure 6-2 Sample Level 1 Checkout

1. The PROCEDURE column describes the actions required to perform the step.

2. In the INDICATIONS column, statements marked with letters describe indications of the correct operation. Statements marked with an asterisk symbol (*) and the word IF describe indications of incorrect conditions requiring the access of Level 2 Check Charts.

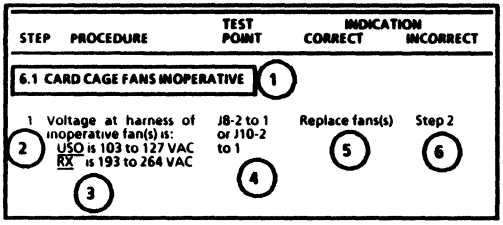
   Check and verify the indications in the sequence provided. If the sequence is not observed, the Level 2 Access will not be valid for the correct isolation of faults.

3. The LEVEL 2 ACCESS column identifies the number of the appropriate Level 2 Check Chart procedure for corrective action for conditions described below:
   a. One of the indications does not occur.
   b. An incorrect indication occurs.

Level 1 Checkout provides appropriate references to diagnostic procedures or other appropriate service manuals.

LEVEL 2 CHECK CHART EXPLANATION

Figure 6-3 provides a sample of the format of a Level 2 Check Chart. Content of the various sections is described below.



8000-157(1)

Figure 6-3 Sample Level 2 Check Chart

1. Within section 1 is the number and name of the Level 2 Check Chart.

2. The STEP column provides the number sequence of steps in the check chart. Since some steps may not be required, the check charts provide reference to the required steps for isolation of a fault.

3. The PROCEDURE column describes any required preparations. Voltage tolerances are specified within the procedure. All AC voltages are identified with VAC, and all DC voltages are identified with V. Negative DC voltages include the negative symbol (-); the positive symbol (+) is not used. **Always switch off system power if it is necessary to connect or disconnect plugs or remove or install PWAs.** If a required preparation can cause an electrical shock, the procedure will specify instructions to switch off power.

4. The TEST POINT column identifies how and where to check the procedure statement. If a voltage reading is required, the first point is for the RED (+) lead, and the second point is for the BLACK (-) lead. If no second point is provided, the BLACK lead must be connected to a DC return (ground).

5. If the voltage or visible indication was CORRECT (or occurred as specified), the CORRECT INDICATION column provides instructions to continue troubleshooting, to replace a component, or to perform an adjustment.

6. If the voltage or visible indication was INCORRECT (or did not occur as specified), the INCORRECT INDICATION column provides instructions to continue troubleshooting, to replace a component, or to perform an adjustment.

STEP	PROCEDURE		INDICATIONS	LEVEL 2 ACCESS
	PREPARATION			
1.	Ensure all Services (i.e., Print Service, File Service) are registered to the proper 8000 Processor ID Number.			
	DIAGNOSTIC SEQUENCE			
1	Perform Echo Test (Ethernet On-line Diagnostics) between 8000 Processors, or 8000 Processor and 860, that cannot communicate with each other.	* IF	After exiting test, screen indicates test results were less than 99%, go to Step 2.	
		* IF	After exiting test, screen indicates test results were 99% or better and Network problem is still suspect,	6.1
	NOTE: If services are not stopped during Echo Test, the results cannot be considered accurate.			
2.	Ask the System Administrator to stop all services.			
3.	Perform Echo Test between 8000 Processors, or 8000 Processor and 860, that cannot communicate with each other.	* IF	After exiting test, screen indicates test results were 98% or less,	6.2
		* IF	Network problem is still suspect,	6.1

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
6.01 NETWORK TEST PROCEDURE				
1.	All facilities hardware is accessible (guidelines are specified in Contractor's Manual, Section 2.2.1).	Visual	Check Chart 6.03	Step 2
2.	Transceiver is easily accessible.	Visual	Step 3	Step 4
3	Remove transceiver from tap block. Perform resistance check on cable. Resistance is 24 to 26 ohms.	Center conductor (+) to tap block (-)	Replace OPT PWA. If problem still exists, notify RES/NSC.	Step 6
4.	Locate one end of cable segment. Remove the terminator and perform resistance check. Resistance is 48 to 52 ohms.	Center (+) to shield (-)	Step 5	Step 6
5.	Test the terminator that was removed in Step 4. Resistance is 48 to 52 ohms.	Center (+) to shield (-)	Notify RES/NSC	Replace Terminator
6.	Use site plan and determine point to split cable (at connector) which is closest to the middle. Remove the connector and install terminators on cable sections. Perform Boot Diagnostics on one device for both sections. Diagnostics run successfully on both sections.	Visual	Clean connectors, then notify RES/NSC	Step 7
7.	Problem section can be split again.	Visual	Repeat Step 6	Notify customer (Contractor is to repair)

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
6.02 ETHERNET ON-LINE ISOLATION				
PURPOSE: You have been directed to this check chart because two 8000 Processors, or an 8000 Processor and an 860, cannot communicate with each other.				
NOTE: Ensure services are stopped.				
1.	Network has a Repeater.	Visual	Step 2	Step 3
2.	Communication problem only exists between machines on differenct sides of Repeater.	Visual	Check Chart 6.06	Step 3
3.	Perform Echo Test from another 8000 Processor to each of the original 8000 Processors, or 8000 Procesor and 860. After exiting test, test results are better to one of the suspect systems, but 98% or less to the other suspect system.	Visual	On system with results of 98% or less, check transceiver cable connections at transceiver and at rear of Processor, then replace in order: OPT PWA Transceiver Drop Cable Transceiver	If network problem still suspect, 6.01

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INDICATION INCORRECT
6.03 NETWORK ISOLATION				
NOTE: To perform the following checks, all facilities hardware must be accessible.				
1.	Remove both end terminators from cable. At one end of cable, meter reads infinity.	Center (+) to shield (-)	Step 2	Check Chart 6.04
2.	Resistance of terminator is 48 to 52 ohms.	Center (+) to shield (-)	Step 3	Check Chart 6.04
3.	Clean/check the cable connectors. Replace terminators. Disconnect a transceiver to take resistance check on cable. Resistance is 24 to 26 ohms.	Center (+) to shield (-)	Step 4	Check Chart 6.05
4	Connect transceiver, and run Boot Diagnostics on problem Processor(s). Test 0322 passes.	Visual	----	Contact RES/NSC
6.04 SHORTED NETWORK ISOLATION				
1.	Ensure terminators are still removed. Use site plan and determine point to split cable (at connector) which is closest to the middle Resistance on each cable is infinity.	Center (+) to shield (-)	Clean/replace Coaxial Screw-on Adapter and Connectors	Step 2
2.	Problem section can be split again.	Visual	Repeat Step 1	Step 3

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
3.	Check and clean all connectors on both ends of suspected cable. Resistance on cable is infinity.	Center (+) to shield (-)	Connect network and verify connections just made are good. If problem still exists, call RES/NSC.	Step 4
4.	Disconnect a transceiver on suspected cable. Check/clean tap hole. Resistance on cable is infinity.	Center (+) to shield (-)	Connect transceiver and verify network. If problem still exists, replace transceiver.	Step 5
5.	Another transceiver is on suspected cable that can be removed.	Visual	Repeat Step 4	Call RE/NSC for assistance.
6.05 OPEN NETWORK ISOLATION				
1.	Use site plan and determine point to split cable (at connector which is closest to the middle). Resistance of each cable is 48 to 52 ohms.	Center (+) to shield (-)	Step 2	Step 3
2.	Continuity is present on center conductor of Coaxial Adapter.	Visual	Clean/check Coaxial Adapter and Screw-on Connectors. If problem still exists, replace Coaxial Adapter.	Replace Coaxial Adapter

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
3.	Problem section can be split again.	Visual	Repeat Step 1	Notify customer to contact Contractor for repair

6.06 REPEATER ISOLATION

PURPOSE: You are performing this check chart because a communication problem exists between machines on different sides of Repeater

1.	Both Repeater +5VDC and +12VDC LEDs are on.	Visual	Step 2	Check Chart 6.07
2.	Transceiver cables going to Repeater will reach a Processor.	Visual	Step 3	Step 6
3.	Disconnect left transceiver cable from Repeater, and connect to rear of Processor. Run Boot Diagnostics on Processor. Test 0322 passes.	Visual	Step 4	Step 5
4.	Connect left transceiver cable to Repeater, then disconnect right transceiver cable from Repeater, and connect to rear of Processor. Run Boot Diagnostics on Processor. Test 0322 passes.	Visual	Replace Repeater PWA	Step 5
5.	Disconnect transceiver cable from transceiver, and install Universal Loopback Tool (Ethernet) on end of cable. Boot Diagnostics pass Test 0322.	Visual	Replace Transceiver	Replace Transceiver Cable

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
6.	Perform Echo Test between 8000 Processors that are on different sides of Repeater, in both directions (i.e., from Processor A to B, then from Processor B to A). Monitor XMIT L and XMIT R LEDs on Repeater. XMIT L or XMIT R LED occasionally illuminates while test is being performed in either direction.	Visual	Replace Repeater PWA	If XMIT L LED did not illuminate, replace in order: (Right) Transceiver (Right) Transceiver Cable Repeater PWA If XMIT R LED did not illuminate, replace in order: (Left) Transceiver (Left) Transceiver Cablr Repeater PWA If no LEDs illuminted, replace Repeater PWA
6.07 REPEATER POWER SUPPLY ISOLATION				
1.	Both Repeater + 5VDC and + 12VDC LEDs are off.	Visual	Step 3	Step 2
2.	Disconnect P2. Voltages at P2 are:		Replace Repeater PWA	Replace Power Supply
	4.75V to 5.25V	P2-3		
	11.5V to 12.5V	P2-1		
3.	Fuse F1 is good, not open.	Visual	Step 4	Replace fuse.

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
4.	Voltage at Power Supply P1 is: USO is 103 to 127 VAC RX is 193 to 264 VAC	Power Supply USO - P1-1 to 2 RX - P1-1 to 5 or 4	Replace Plower Supply	Step 5
5	Disconnect Repeater AC power cord from wall outlet. Voltage at wall outlet is: USO is 103 to 127 VAC RX is 193 to 264 VAC	ACH to ACN	Step 6	Notify customer of power needs

Figure 6-4 USO AC Outlet at Wall

6.	Connect AC power cord to wall outlet, and disconnect AC power cord from Repeater. Voltage at AC power cord is: USO is 103 to 127 VAC RX is 193 to 264 VAC	AC power cord 1 to 3	Step 7	Replace AC power cord

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
7.	Connect AC power cord to Repeater. Voltage at Input Power Control Harness is: USO is 103 to 127 VAC RX is 193 to 264 VAC	Input Power Control Harness P2-1 to 2	Step 8	Replace Input Power Control
8	Voltage at Line Filter is: USO is 103 to 127 VAC RX is 193 to 264 VAC	Input Power Control Harness P2-3 to blue wire at On/Off switch	Step 9	Replace Line Filter
9.	Voltage at Input Power Control terminals is: USO is 103 to 127 VAC RX is 193 to 264 VAC	Input Power Control terminals L to B	Replace Input Power Control	Replace On/Off switch

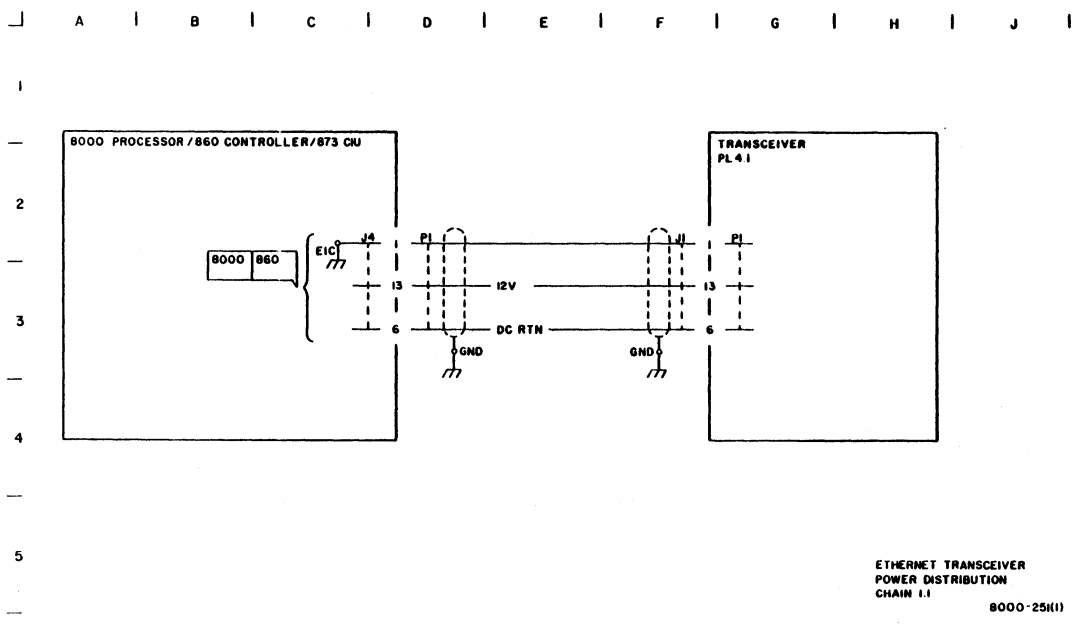


Figure 6-5 Chain 1.1 Ethernet Transceiver Power Distribution

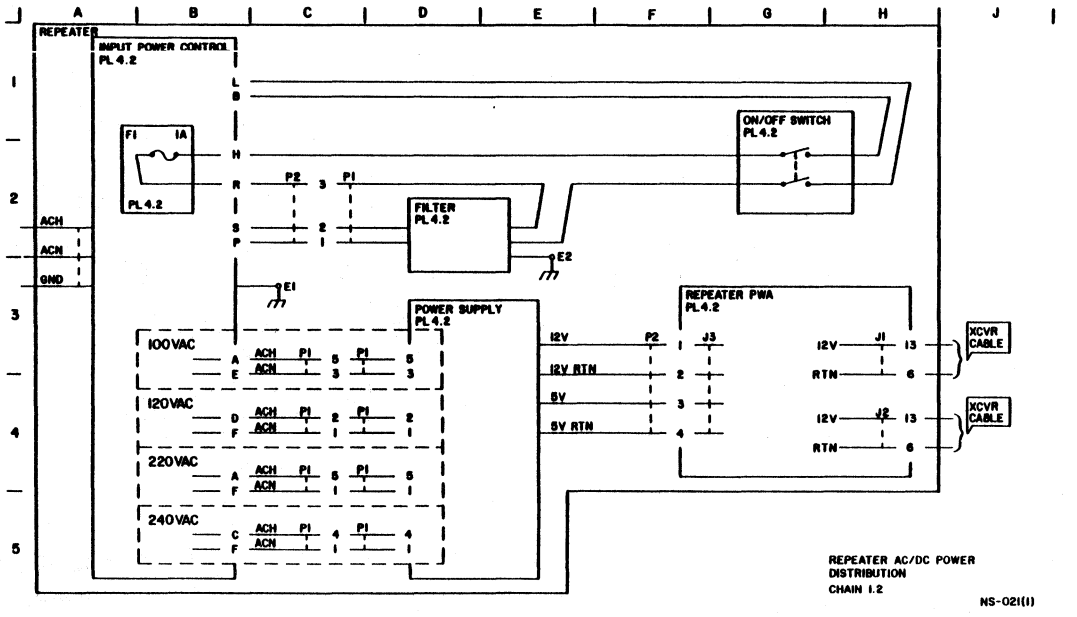


Figure 6-6 Chain 1.2 Repeater AC/DC Power Distribution

CHAPTER 7 PLUG/JACK LIST

ETHERNET SERVICE MANUAL

7.1 INTRODUCTION

Harnesses for the Ethernet Network are each identified with an alphanumeric code (W00). These harness codes are defined in Section 7.2. The codes are used on plug/jack location diagrams.

In Section 7.3, plug/jack location diagrams (Figures 7-1 and 7-2) are provided to show actual locations of plugs and jacks. Each plug/jack is identified by harness code and plug/jack name.

Section 7.4 provides an illustration of the wiring data for each harness. The wiring data illustrations (Figures 7-3 and 7-4) use letter codes, within a hexagonal symbol, which identify related connector diagrams.

Pin location diagrams for various types of connectors are provided in Section 7.5. The diagrams (Figures 7-5 to 7-8, inclusive) show pin side view of the connectors.

7.2 HARNESS IDENTIFICATION

W70 Transceiver Cable
W71 Repeater Harness

7.3 PLUG/JACK LOCATIONS

Refer to Figures 7-1 and 7-2 for illustrations of plug/jack locations and identification.

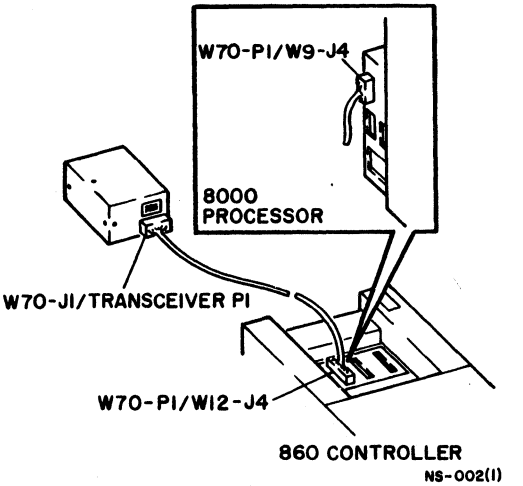


Figure 7-1 Transceiver Cable Plug/Jack Locations

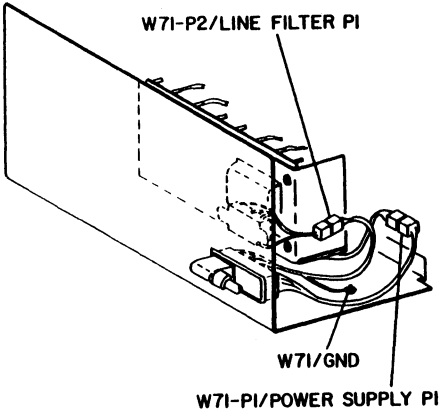


Figure 7-2 Repeater Harness Plug/Jack Locations

7.4 WIRING DATA

Refer to Figures 7-3 and 7-4 for illustration of the wiring data for each harness.

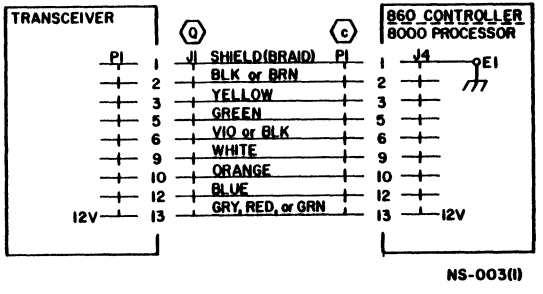


Figure 7-3 Transceiver Cable W70

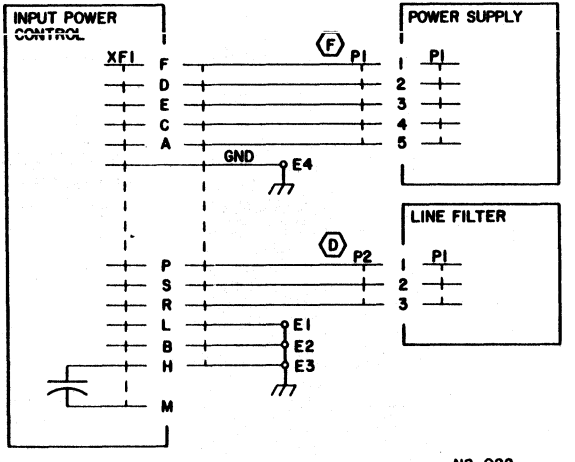


Figure 7-4 Repeater Harness W71

7.5 CONNECTOR IDENTIFICATION

Refer to Figures 7-5 to 7-8, inclusive, for pin location diagrams for various types of connectors used on harnesses. The diagrams show pin side view of connectors.

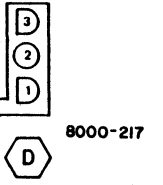


Figure 7-5 Connector Type D

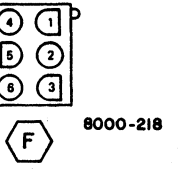


Figure 7-6 Connector Type F

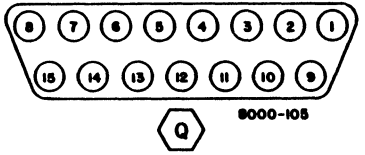


Figure 7-7 Connector Type Q

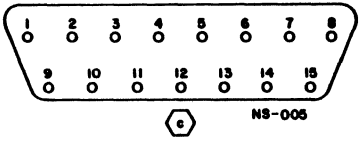


Figure 7-8 Connector Type c

CHAPTER 8 PRINCIPLES OF OPERATION

ETHERNET SERVICE MANUAL

INTRODUCTION

Ethernet provides a communications facility for high-speed data exchange among computers and other digital devices. This facility is located within a geographic area of moderate size.

The Ethernet design was developed by Xerox Corporation. The commercial specification for Ethernet was developed by the combined efforts of Digital Equipment Corporation, Intel Corporation, and Xerox Corporation.

For narrative discussion, Ethernet operation can be divided into the three functional levels described below.

Network — The Network is a functional level which consists of cables and associated hardware. The network provides the communications medium for interaction capability between Users and Servers.

User — The User is a functional level which consists of one or more devices or stations. These devices (or users) are capable of initiating action required to request services from the Servers.

Server — The Server is a functional level which consists of one or more devices or stations.

These devices (or servers) are capable of responding to requests for services initiated by the Users.

Because Ethernet does not have a central control, Ethernet is known as a passive medium. Each device connected to the network controls the access to the network; as a result, all devices on the network are equal. The method used to control the network access is called Carrier Sense Multiple Access/ with Collision Detection (CSMA/CD).

The Ethernet facility is the Network level. The Network level includes the coaxial cable with associated hardware, trans ceivers, repeaters, and transceiver cables. This service manual provides narrative discussion of the Network level. Refer to the 8000 Series Refrence Manual or appropriate independent service manuals for narrative discussion of the User and Server levels.

8.1 COAXIAL CABLE

Characteristics of the coaxial cable include a low noise level, 50 ohm impedance, heat resistance, UL approval, and TEFLON or PVC external insulation (cable jacket). The cable is designed to transmit information at a rate of 10 megabits per second. The cable can be placed in various environments such as a lowered ceiling, raised floor, or cable trough in the floor.

The TEFLON/PVC cable jacket provides insulation between the cable sheath and any structural metal within the building. The cable jacket has annular marks at each length of 8.2 feet +/-2 inches (2.5 m +/-5 cm). A color contrast between the marks and the cable jacket is provided for easy identification. The marks indicate the correct points to attach transceivers.

A network is made of sections of cable. Sections are connected to form a segment. Segment length has a limit of 500 metres; however, extended segment length (to a maximum of 1,500 metres) can be obtained with by using two repeaters. Repeaters provide signal regeneration required to increase the strength of data signals along the extended length of the cable.

8.2 CONNECTORS AND ADAPTERS

Connectors and adapters are the hardware used to connect cable sections. The connectors and adapters are N-Series (industry designation) hardware which provides a 50 ohm constant impedance.

8.3 COAXIAL CABLE TERMINATOR

To eliminate signal reflection from the ends of the cable, the cable segments must be terminated at each end. The ter minator provides a cable termination impedance that is equal in value to the characteristic 50 ohm impedance of the cable.

8.4 TRANSCEIVER

The transceiver is a device which is attached directly to the coaxial cable. The transceiver is the interface method be tween the network and the User and Server level devices. The major functions of transceivers are described below.

Transceivers transmit and receive signals on the coaxial cable.

Transceivers detect signal collisions when more than one device tries to use the network at the same time.

Transceivers protect against failures and electrical interference caused by a radio transmission.

Transceivers provide electrical ground for the network.

8.5 TRANSCEIVER CABLE

The transceiver cable provides an electrical interface between a device (860, 8000 Series Server) and the transceiver. Cable length varies, but the maximum transceiver cable length is 165 feet (50 m) The cable consists of four shielded pairs of wires within a TEFLON/PVC cable jacket. One pair of wires provides ground and 12V to the transceiver. Each of the remaining three pairs provide a signal path for the Transmit Data, Receive Data, and Collision Detect signals.

8.6 ETHERNET INTERFACE

The interface functions are performed by each station connected to Ethernet. Normally, the functions occur within the various devices by actions of components such as the 860 EIB PWA or the 8000 Processor OPT PWA. The major interface functions are described below.

To reduce the frequency of possible signal collisions, the carrier sense signal is monitored.

If collisions are detected by transceivers, the collisions are controlled.

If the signals are changed during transmission, the signals are decoded for identification by the receiving station.

8.7 PACKET SWITCHING

To transmit information, Ethernet uses a method known as packet switching. At the transmission source, a large data stream is divided into small, predefined units. These units, which are known as packets, are transmitted. At the receiving station, the units are assembled into the original data stream.

To prevent any loss of data, each packet includes a control data section at each end of the packet. Figure 8-1 provides an illustration of the content of a packet.

The packet data sections shown in Figure 8-1 are described below.

Preamble	This 8 byte code provides packet synchronization and traffic control.
Destination Address	This 6 byte code identifies the station to which the packet is being transmitted.

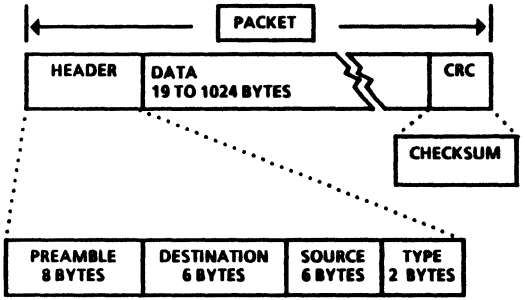


Figure 8-1 Packet Content

Source Address — This 6 byte code identifies the station from which the packet is sent.

Type — This 2 byte code describes packet type and identi fies the differences between the control and data sections. The control section is used for system initialization, inquiry, or acknowledgement. The data section includes the actual information being transmitted by the user.

CRC — The Cyclical Redundancy Check (CRC) is a code used to verify integrity of transmitted data. Characteristics of the CRC code include the detecting and isolating of incorrect data bits and identifying a requirement to repeat a transmission.

8.8 ETHERNET DIAGNOSTICS

Ethernet diagnostics are contained within 8000 Series products. The Ethernet On-Line Diagnostic test is used to check the Ethernet network. This test requires network communication between a remote device and the device running the diagnostics. In this discussion, the device that runs the diagnostic test is called the "host machine". At the host machine, the user must provide processor and Ethernet identification numbers of the remote device before running the diagnostic test. The remote machine functions as the "echo server" during the test. All the present 8000 Series products, as well as 860 IPS with Ethernet COMM, have the echo capability. Echo capability will be included in future products on Ethernet.

The Ethernet On-Line Diagnostic test is known as an "echo test". The host machine transmits a sequence of packets and waits for the remote machine to echo the packets.

Each packet has a sequence number which includes a predetermined algorithm for identification of packet length and content. Default values are predetermined for packet size, packet transmission rate, packet content, and wait time for packet echo. The user is not required to determine or provide default values.

During the diagnostic test, the host machine transmits a packet and then waits for a packet echo from the remote machine. The diagnostic test program uses three different symbols to indicate status of the test.

1 The test program displays the symbol "?" to indicate failure to receive a good packet. Reasons for this indication are explained below.
   a. Identification provided for remote machine is the same as for host machine.
   b. Identification number provided for processor is zero.
   c. No response is received from specified remote machine after transmission of 16 packets.
   d. More than half the transmitted packets are lost.
   e. No packet echo is received from remote machine.
   f. Packet has an error (such as a CRC error or a misaligned byte boundary).

2. The test program displays the symbol " ! " to indicate the successful completion of a single packet echo test. This indication is provided if the packet echoed includes the correct sequence number, the correct length, and a matched data pattern.
3. The test program displays the symbol "#" if the packet is good, but sequence number is wrong or packet type is incorrect. This symbol indicates various possible problems. An example of the occurrence of the "#" symbol is provided below.
   a. Because of excessive workload of remote device, packet echo is late. Although there is no problem in host machine, remote machine, or the connect ing Ethernet, the "#" symbol will be displayed.

For each packet transmitted, one (and only one) of the three symbols is displayed to indicate packet status.

When a user stops the test, a summary of the results is displayed. The summary consists of the following information:

1. Quantity of packets transmitted
2. Quantity of packets echoed which were free of error when received
3. Percentage of packets that were free of error in relation to total of packets transmitted

8.9 REPEATER

The Repeater is considered a major assembly. For discussion only, it will be divided into subassemblies as shown in Figure 8-2. These subassemblies do not represent the sparing level; refer to Chapter 4 for a list of spared parts for the Repeater.

Discussion of the Repeater will include the following topics:

1. Input Power Control
2. Power Supply
3. Repeater PWA

8.9.1 INPUT POWER CONTROL

AC line voltage is applied to the Input Power Control, then to a line filter. One of the output lines from the filter connects directly to the on/off switch, the other line is routed back to the Input Power Control, where it is fused and then connected to the switch. Both wires from the switch are then routed back to the Input Power Control for distribution to the power supply transformer. The block schematic diagram for AC/DC power distribution (Chain 1.2) in Chapter 6 illustrates the distribution of AC/DC power.

A PWA, which is an integral part of the Input Power Control, is installed so that it corresponds to the nominal line voltage present. This will connect the correct terminals together at the transformer.

8.9.2 POWER SUPPLY

The power supply is of the multiple output type, which furnishes +5V and +12V. The +5V is used by the Repeater PWA and +12V is used by the Transceivers.

8.9.3 REPEATER PWA

The Repeater PWA controls the function of receiving packets of information from one segment of cable and transmitting them to the corresponding cable.

Four LEDs (+5VDC, +12VDC, XMIT L, and XMIT R) are mounted the PWA to give an indication of the Repeater status. If a packet of information is received on the XCVR RIGHT connector and transmitted to XCVR LEFT connector, the XMIT L LED will illuminate. XMIT R LED will illuminate when a packet is received on the XCVR LEFT connector and transmitted to the XCVR RIGHT connector.

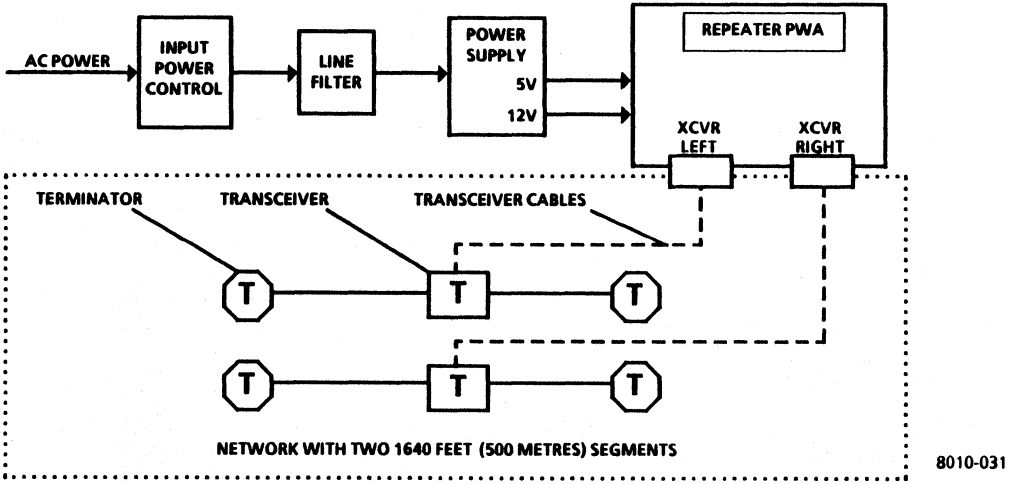


Figure 8-2 Repeater Block Diagram

Use this Comment Sheet to assist in identification of errors or needed improvements in this manual. For specific errors, include specific page number in the report.

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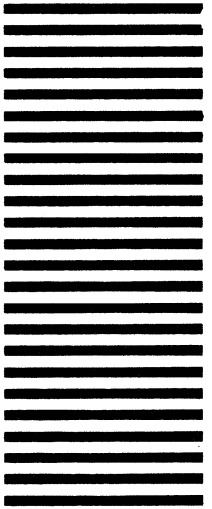

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