ESU 120e

E1 Service Unit with Embedded SNMP

User Manual

Part Number 1200420L1

61200420L1-1B
January 2003

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901 Explorer Boulevard
P.O. Box 140000
Huntsville, AL 35814-4000
(256) 963-8000

The following conventions are used in this manual.

Cautions signify information that could prevent service interruption.

Notes provide additional useful information.

WARNING *Warnings provide information that could prevent damage to the equipment or endangerment to human life.*

Safety Instructions

When using your telephone equipment, please follow these basic safety precautions to reduce the risk of fire, electrical shock, or personal injury:

1. Do not use this product near water, such as a bathtub, wash bowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool.
2. Avoid using a telephone (other than a cordless-type) during an electrical storm. There is a remote risk of shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord, power supply, and/or batteries indicated in the manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for special disposal instructions.

Save These Important Safety Instructions

Federal Communications Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.

WARNING

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Canadian Emissions Requirements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioelectriques applicables aux appareils numériques de Class A prescrites dans la norme sur le materiel brouilleur: "Appareils Numeriques," NMB-003 edictee par le ministre des Communications.

CANADIAN EQUIPMENT LIMITATIONS

Notice: The Industry Canada Certification label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic waterpipe system, if present, are connected together. This precaution may be particularly important in rural areas.

WARNING	*Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or an electrician, as appropriate.*

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the equipment that the total of the LNs of all devices does not exceed 100.

Warranty and Customer Service

ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service. Warranty information can be found at www.adtran.com/warranty.

Customer Service, Product Support Information, and Training

ADTRAN will repair and return this product if within the warranty period from the date of shipment the product does not meet its published specification or the product fails while in service.

A return material authorization (RMA) is required prior to returning equipment to ADTRAN. For service, RMA requests, training, or more information, use the contact information given below.

Repair and Return

If you determine that a repair is needed, please contact our Customer and Product Service (CAPS) department to have an RMA number issued. CAPS should also be contacted to obtain information regarding equipment currently in house or possible fees associated with repair.

CAPS Department (256) 963-8722

Identify the RMA number clearly on the package (below address), and return to the following address:

ADTRAN Customer and Product Service
901 Explorer Blvd. (East Tower)
Huntsville, Alabama 35806

RMA # _____

Pre-Sales Inquiries and Applications Support

Your reseller should serve as the first point of contact for support. If additional pre-sales support is needed, the ADTRAN Support web site provides a variety of support services such as a searchable knowledge base, latest product documentation, application briefs, case studies, and a link to submit a question to an Applications Engineer. All of this, and more, is available at:

http://support.adtran.com

When needed, further pre-sales assistance is available by calling our Applications Engineering Department.

Applications Engineering (800) 615-1176

Post-Sale Support

Your reseller should serve as the first point of contact for support. If additional support is needed, the ADTRAN Support web site provides a variety of support services such as a searchable knowledge base, updated firmware releases, latest product documentation, service request ticket generation and trouble-shooting tools. All of this, and more, is available at:

http://support.adtran.com

When needed, further post-sales assistance is available by calling our Technical Support Center. Please have your unit serial number available when you call.

Technical Support (888) 4ADTRAN

Installation and Maintenance Support

The ADTRAN Custom Extended Services (ACES) program offers multiple types and levels of installation and maintenance services which allow you to choose the kind of assistance you need. This support is available at:

http://www.adtran.com/aces

For questions, call the ACES Help Desk.

ACES Help Desk (888) 874-ACES (2237)

Training

The Enterprise Network (EN) Technical Training Department offers training on our most popular products. These courses include overviews on product features and functions while covering applications of ADTRAN's product lines. ADTRAN provides a variety of training options, including customized training and courses taught at our facilities or at your site. For more information about training, please contact your Territory Manager or the Enterprise Training Coordinator.

Training Phone	(800) 615-1176, ext. 7500
Training Fax	(256) 963-6700
Training Email	training@adtran.com

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Chapter 1 Introduction

ESU 120e OVERVIEW

The ESU 120e is an E1/FE1 multiplexer with an Nx56/64 data port, a drop (PBX) interface, one option slot, and embedded SNMP management. The ESU 120e's option slot accepts one of many available option modules for voice and data applications.

The ESU 120e serves as the link between user data sources such as local area network (LAN) bridges and routers, computers, CAD systems, teleconferencing equipment, and PBXs. Through the use of multiple data ports, the ESU 120e can simultaneously connect one or more of these devices to an E1 circuit. The amount of bandwidth allocated to each port is custom-programmable. You can manually allocate bandwidth or set the bandwidth to automatically change at predetermined times to use the available bandwidth most advantageously. Changes in the configuration do not disrupt data flow in channels that are not being reconfigured. The unique architecture and the availability of option modules provide a path for growth to accommodate future requirements.

The ESU 120e offers a variety of network management options. You can manage via Simple Network Management Protocol (SNMP) through the 10BaseT or chain-in ports. If you are using T-Watch PRO™, a Microsoft® Windows® program, you can manage the ESU 120e via the same 10BaseT or chain-in ports. An enhanced VT-100 terminal interface is also provided.

ESU 120e Features

The following list describes the standard features in the ESU 120e.

- A single E1 interface
- An Nx56/64 data port and G.703 drop port interface
- Data port supports V.35, EIA-530, V.36, and X.21 electrical interfaces
- An inband communication channel requiring only 8k of bandwidth from a single TS0
- One option slot to house option modules with up to four additional ports, including voice and data
- Allows mix of port types to meet the data interface requirements
- Easy configuration capabilities using simplistic menus displayed in a liquid crystal display (LCD) window operated by a front panel keypad
- Two programmable configuration maps that define the bandwidth allocation between data ports
- Flash memory for software updates
- Selectable timing from the network, from the Nx56/64 or drop ports, internally, or from a secondary interface
- QRSS; 511 test patterns using Nx option
- Extensive self-test and monitoring provides assurance of proper operation
- SNMP, Telnet, and T-Watch PRO Management via SLIP or 10BaseT

Option Module Architecture

The ESU 120e features a unique architecture that allows the addition of one option module and plug-on board which will accommodate an additional application.

ESU 120e Option Modules

The following option modules are available for use with the ESU 120e:

Nx 56/64 V.35 Plug-In/Plug-On
(P/N: 1202054L1/1202053L1)

- Provides a single synchronous V.35 DTE interface
- Configurable in increments of 56 kbps or 64 kbps up to 1.536 Mbps
- Remote configuration and control via the FDC or in-band channel
- Hot-swappable

Nx 56/64 530 Module (Plug-In Only)
(P/N: 1200054L2)

- Provides a single synchronous EIA-530 DTE interface
- Configurable in increments of 56 kbps or 64 kbps up to 1.536 Mbps

Dual Nx 56/64 V.35 Plug-In/Plug-On
(P/N: 1200142L1#HS/1200159L1)

- Provides two mini-DTE interfaces adapted to V.35 DTE interfaces through adapter cable (sold separately)
- Configurable in increments of 56 kbps or 64 kbps up to 1.536 Mbps (per interface)
- Available pre-packaged with cables (4200142L1#HS for Plug-In, 4200159L1 for Plug-On)
- Hot-swappable

Nx DBU (Plug-In Only)
(P/N: 1200158L1#HS)

- V.35 DTE and DCE interfaces
- Automatic dial backup capability via V.35 DCE interface
- Dial backup requires external DCE device
- Hot-swappable

Router (Plug-In Only)
(P/N: 1200350L1)

- Supports full MAC bridging and spanning tree filtering
- 10BaseT LAN interface
- Supports IP routing
- Layer 2 PPP and Frame Relay Support

ESU 120e CONFIGURATION APPLICATION

The following example illustrates a possible ESU 120e application.

Router and PBX Application

In this application, the base Nx54/64 provides a V.35 interface to a router. The PBX is interfaced to the ESU 120e with the base drop interface. The 10BaseT port allows SNMP network management over the LAN. See Figure 1-1.

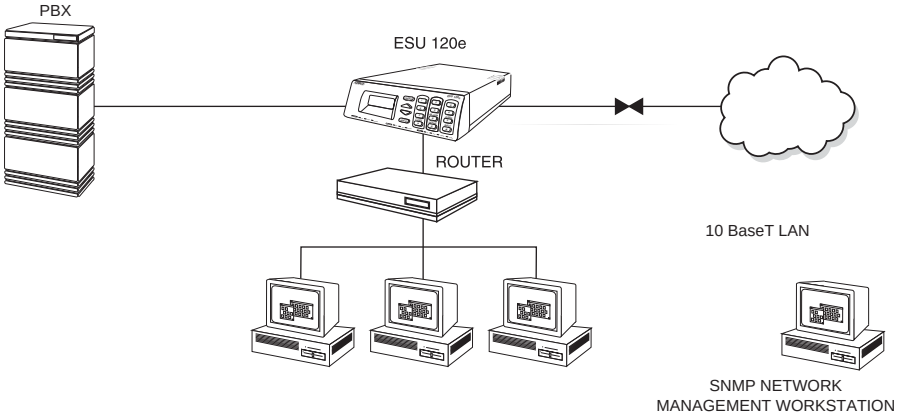


Figure 1-1. Router and PBX Application Set Up

Chapter 2 Installation

UNPACK, INSPECT, POWER UP

Receipt Inspection

Carefully inspect the ESU 120e for any shipping damages. If you suspect damage, file a claim immediately with the carrier and then contact ADTRAN Customer Service (see the front section of this manual). If possible, keep the original shipping container for use in shipping the ESU 120e back for repair or for verification of damage during shipment.

ADTRAN Shipments Include

- The ESU 120e
- A DB-25 to modular adapter for VT-100 and T-Watch PRO access.
- An 8-position modular cable for connection to the chain-in port (6 ft.)
- The user manual

Customer Provides

- Power cord
- Cable(s) for connection to either the 120 Ω DB-15 or 75 Ω BNC network interfaces
- Cables for any expansion modules to be used with the ESU 120e
- 10BaseT cable for connection to a LAN or router (if you plan to use remote management features)

POWER CONNECTION

Power is supplied to the ESU 120e through an IEC-type power connector on the rear of the unit.

Power to the ESU 120e must be from a grounded 90-240 VAC, 50/60 Hz source. See ***Grounding Instructions****.*

Grounding Instructions

Grounding instruction information from the *Underwriters' Laboratory UL 1950 3rd Edition* is provided in this section.

An equipment grounding conductor that is not smaller in size than the ungrounded branch-circuit supply conductors is to be installed as part of the circuit that supplies the product or system. Bare, covered, or insulated grounding conductors are acceptable. Individually covered or insulated equipment grounding conductors shall have a continuous outer finish that is either green, or green with one or more yellow stripes. The equipment grounding conductor is to be connected to ground at the service equipment.

The attachment-plug receptacles in the vicinity of the product or system are all to be of a grounding type, and the equipment grounding conductors serving these receptacles are to be connected to earth ground at the service equipment.

A supplementary equipment grounding conductor shall be installed between the product or system and ground that is in addition to the equipment grounding conductor in the power supply cord.

The supplementary equipment grounding conductor shall not be smaller in size than the ungrounded branch-circuit supply conductors. The supplementary equipment grounding conductor shall be connected to the product at the terminal provided, and shall be connected to ground in a manner that will retain the ground connection when the product is unplugged from the receptacle. The connection to

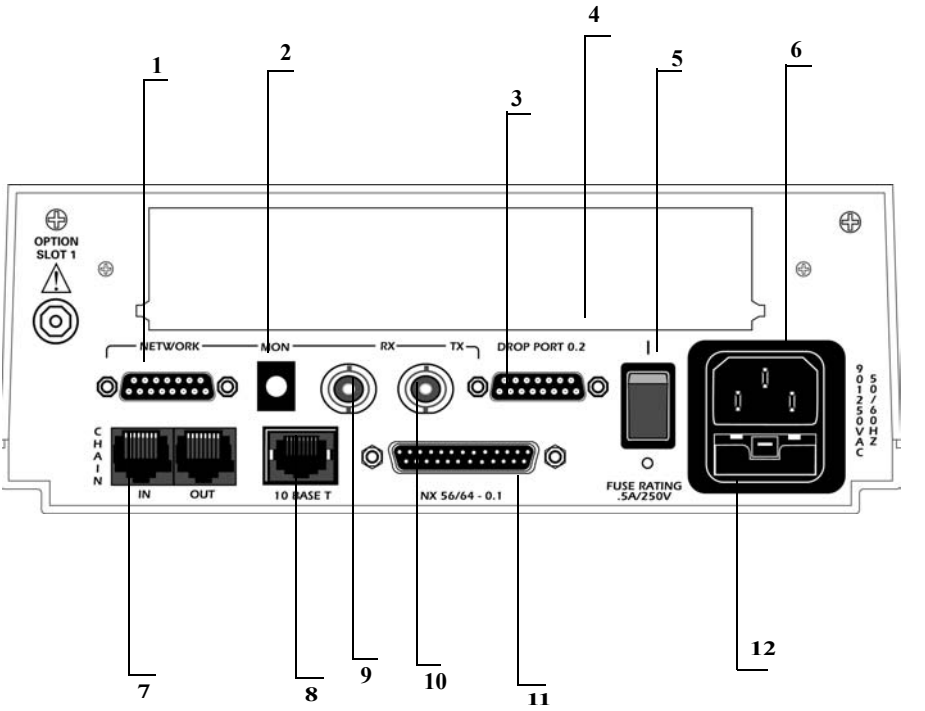
ground of the supplementary equipment grounding conductor shall be in compliance with the rules for terminating bonding jumpers at Part K or Article 250 of the National Electrical Code, ANSI/NFPA 70. Termination of the supplementary equipment grounding conductor is permitted to be made to building steel, to a metal electrical raceway system, or to any grounded item that is permanently and reliably connected to the electrical service equipment ground.

Bare, covered, or insulated grounding conductors are acceptable. A covered or insulated grounding conductor shall have a continuous outer finish that is either green, or green with one or more yellow stripes.

The supplemental grounding conductor shall be connected to the equipment using a number 8 ring terminal. The terminal should be fastened to the grounding lug provided on the rear panel of the equipment. The ring terminal should be installed using the appropriate crimping tool (AMP P/N 59250 T-EAD Crimping Tool or equivalent).

IDENTIFICATION OF REAR PANEL LAYOUT

Figure 2-1 shows the configuration of the ESU 120e rear panel.



1 Network 120 Ω Connector
2 Network Receive Monitor Jack
3 Drop Port Connector (To PBX)
4 Option Slot
5 Power Switch
6 IEC Power Connector
7 Control In/Out Connection
8 10BaseT Connector (To LAN for Management)
9 Network 75 Ω Receive Connector
10 Network 75 Ω Transmit Connector
11 Data Port Connector
12 Fuse Tray

Figure 2-1. ESU 120e Rear Panel

ESU120e INTERFACES

The ESU 120e is equipped with an Nx56/64 data port, a G.703 drop interface, an option slot, management interfaces, and an E1 interface in the rear panel. See Figure 2-2.

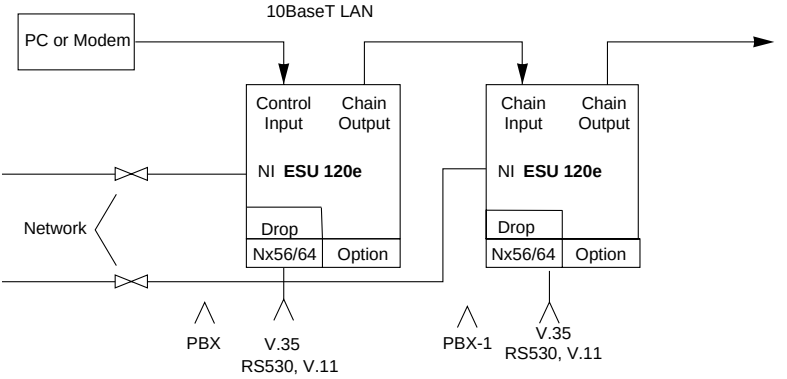


Figure 2-2. ESU 120e Interfaces

Network Interfaces

The Network Interface (NI) port provides the connection to the E1. This port complies with the applicable ANSI and CCITT standards. Either the 120Ω DB-15 or the 75Ω BNC interface may be used for the NI. The 75/120 selection must be made with the front panel menus. For more information see *Wiring* on page 101.

Network Test Interface

The MON test jack provides a bridged access jack for non-intrusive monitoring of the incoming E1.

Nx56/64 Serial Interface

The Nx56/64 provides a serial interface that operates from 56 kbps to 1.984 Mbps. The Nx56/64 can be configured as a V.35, V.36, EIA-530, or V.11 electrical interface through the front panel menus. This port provides 511 pattern generation and detection, as well as remote loopback capability.

Drop (PBX) Interface

The drop interface provides a G.703 interface for a PBX or other equipment.

Control Port Input

The control port input provides an EIA-232 input from a PC or a modem for control of the ESU 120e. You can also use it as a chain input from another ESU 120e or ESU 100. For more information see *Wiring* on page 101.

Chain Port Output

The chain port output provides an EIA-232 output to chain control to other ESU 120es. For more information see *Wiring* on page 101.

10BaseT Interface

The 10BaseT interface provides the LAN interface for managing the ESU 120e with SNMP or T-Watch PRO. For more information see *Wiring* on page 101.

POWER UP TESTING AND INITIALIZATION

When shipped from the factory, the ESU 120e is set to factory default conditions. At the first application of power, the unit automatically executes a memory self-test. A full self-test can be run from the front panel, and a pass code and unit ID may be set using the UTIL menu.

Self-Test

Upon a power-up, the LCD displays **MEMORY TEST NOW TESTING** and the **TEST** LEDs are illuminated. When the self-test is completed with no failures detected, the **OK** LED illuminates green and the LCD momentarily displays **ALL TESTS PASSED**. If a failure is detected, a list of failures is displayed in the LCD window. The full self-test procedure (invoked from the front panel or T-Watch PRO) consists of the following tests:

Board-level tests
Each of the ESU 120e boards contains an on-board processor which executes a series of tests checking the circuitry on the board.

RAM and EPROM tests
Verify on-board circuitry.

Unit-level tests

- Front panel LED verification.
- Board-to-board interface test. A test pattern is sent from the controller through a loopback on all other boards and checked on the controller. This verifies the data path, clocks, and control signals for the entire chassis.

Initialization

Set User Passcode

The ESU 120e is designed to operate with or without the use of a passcode. The default condition is without a passcode.

If the unit is to be remotely accessed using T-Watch PRO, you must enter a passcode. When managing a number of units, the passcode can be the same for all the units.

The passcode should be a number easily remembered. Once entered, the passcode is required to access any operation other than viewing. See *Set Passcode* on page 72 for details.

Set Unit Identification

The Unit ID sets the unit to respond to remote control (controlled by a device other than the front panel or terminal). If no Unit ID is recorded it is not possible to operate from any remote control device, including the local PC for T-Watch PRO or SNMP. See *Unit ID* on page 74 for details.

Set Control Port

The ESU 120e can be configured from the control port when T-Watch PRO, SNMP, or the terminal interface are being used.

If the control port is to be used, the control port baud rate must also be selected.

Chain-In (PC)

The unit can be controlled from an external PC connected directly or via modem to the chain-in port. When using chain-in, the selection of the control port baud rate from 9600 (factory default), 1200, 2400, or 4800, or 38400 must be made using the **UNIT CONFIGURATION** menu. See *Unit* on page 62 for details.

Unless locked out externally, the front panel can also control the unit.

Chain-In/Chain-Out

ESU 120e units and other ESUs can be linked together to form a chain. Figure 2-3 shows an example of a chain-in arrangement with a PC or a modem. The first ESU 120e in the chain receives controlling input from the PC or modem.

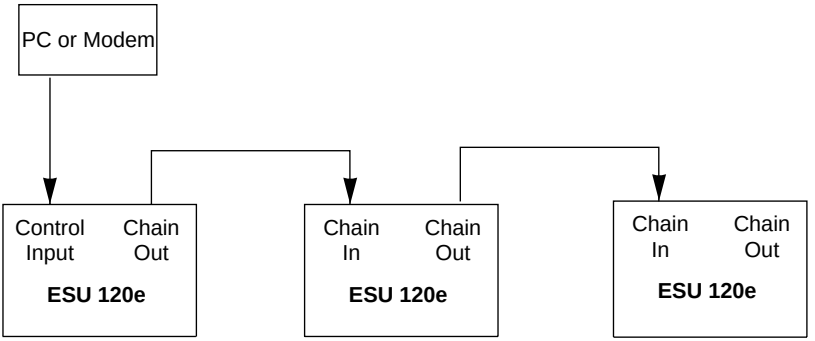


Figure 2-3. Example of Chain-In

Subsequent ESUs in the chain are in a position to intake information from another ESU. This in-taking of information from another ESU in the chain is identified as *chain in*. The baud rate for the chained units must match that of the first unit.

Unless locked out externally, the front panel can also control the unit.

At this point, the Unit Initialization procedure is concluded. If the unit is to be configured remotely, there are no additional items necessary to complete prior to executing remote configuration.

The Passcode, the Unit ID, and the Control Port settings are stored in a nonvolatile memory. This assures they are operable for subsequent power-up sequences.

NORMAL POWER-UP PROCEDURE

After the unit has been put into operation with the initial power-up and initialization, the subsequent power-up procedure includes only the Power-Up self-test followed by the request for a passcode (password) if this option was selected during initialization.

Use the number keys to enter the previously recorded passcode; then press **Enter**.

Chapter 3 Operation

FRONT PANEL OVERVIEW

The ESU 120e front panel monitors operation and controls the configuration of the unit. Figure 3-1 shows the ESU 120e front panel. Table 3-1 on page 38 describes each part of the front panel. Front panel operation is more fully described in subsequent pages.

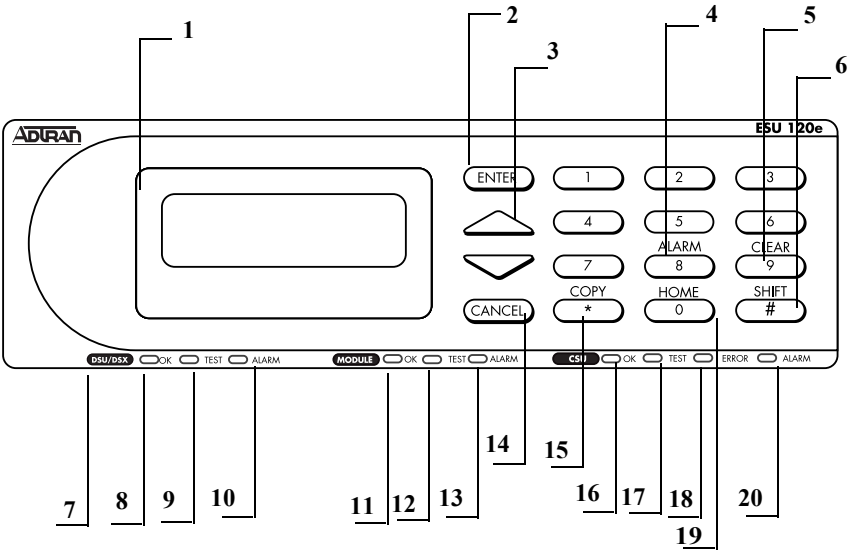


Figure 3-1. ESU 120e Front Panel

Table 3-1. Front Panel Descriptions

No	Name	Description
1	LCD Window	Displays menu items and messages in two lines by 16 characters, and displays alarm and status information.
2	Enter	Selects active menu item.
3	Up and Down Arrows	Scroll through/activate submenu items in the current menu. The flashing cursor indicates the active parameter.
4	Alarm	Quick access to the active alarm display menu.This can be activated while any other menu item is in use. When the **ALARM** menu is exited, the unit returns to the location of the same menu that was active when **ALARM** was selected.
5	Clear	Clears data/results fields.
6	Shift	Provides access to special function keys. The special function keys (**COPY**, **HOME**, **ALARM**, and **CLEAR**) are described in this table. Access special function keys by pressing and holding **SHIFT** before pressing the key with the special function. Special functions are labeled directly above the keys. For example, to use the **HOME** special function, press and hold the **SHIFT** key then press the **0** key.
7	DSU/Drop	Label for the DSX/Drop port LEDs.
8	OK (DSU/Drop status)	Data and Drop ports in normal mode with no errors.
9	Test (DSU/Drop Status)	Active when Data or Drop Port is in test mode.
10	Alarm (DSU/Drop Status)	Active when alarm condition has been detected on Data or Drop Port.
11	OK (Module Status)	Operation is in normal mode with no detected errors.
12	Test (Module Status)	Active when the module is in test mode.
13	Alarm (Module Status)	Active when an alarm condition has been detected.

Table 3-1. Front Panel Descriptions (Continued)

No	Name	Description
14	Cancel	Stops current activity and returns to the previous menu. Repeatedly press **CANCEL** until the desired menu level is reached. When a submenu item is displayed, press **CANCEL** to exit the current display and return to the previous menu.
15	Copy	Copies last data entered into the current TS0. The copy function operates without pressing the **SHIFT** key.
16	OK (CSU Status)	Operation is in normal mode with no detected errors
17	Test (CSU Status)	Active when network interface is in test mode.
18	Error (CSU Status)	Indicates errors such as BPV, OOF, and CRC.
19	Home	Returns to main menu from any menu location.
20	Alarm (CSU Status)	Active when alarm condition detected on the network interface.
21	Numeric Keypad	The numeric keypad contains the numbers 0 through 9 which are used to activate menu items and enter information (such as the IP address).

FRONT PANEL MENU STRUCTURE AND OPERATION

Menu Structure

The ESU 120e uses a multilevel menu structure containing both menu items and data fields. All menu operations and data display in the LCD window.

The opening menu is the access point to all other operations. Each Main menu item has several functions and submenus to identify and access specific parameters. The menu items are numbered and can be viewed by scrolling with the up and down arrows. (Menu operation is discussed on page 40.)

The front panel LCD of the Main menu contains four options: **STATUS**, **CONFIG**, **UTIL**, and **TEST**.

Status

The **STATUS** menu displays all relevant information for the network and DTE interfaces. For detailed information on status options, see *Status Menu* on page 47.

Config (Configuration)

The **CONFIGURATION** menu displays and sets the ESU 120e operational configuration, including all network interface parameters, the allocation of the TS0s, and the port parameters. For detailed information on configuration options, see *Configuration Menu* on page 55.

Util (Utilities)

The **UTILITY** menu displays and sets system parameters. For detailed information on utility options, see *Utility Menu* on page 71.

Test

The **TEST** menu initiates different types of unit tests and displays test results in the LCD window. For detailed information on test options, see *Test Menu* on page 77.

Menu Operation

To choose menu items, place the cursor on the desired menu item by pressing the number corresponding to the menu item or highlighting the menu item with the up and down arrow (also see Table 3-1 on page 38). All fields followed by a colon (:) are editable. Menu fields followed by an equal sign (=) cannot be edited; these fields are used for display only.

As an example, Table 3-2 on page 41 describes how to activate the **ALARM LIST** option from the **STATUS** Menu.

Table 3-2. Activating an Alarm List

Step	Action	Result
1	Activate the **STATUS** menu using the arrow keys or by pressing 1.	The cursor will flash on the number next to the activated selection.
2	Press **Enter** to select the menu item.	The selected menu is activated.
3	Use the arrow keys to view submenu items.	Submenu selections appear.
4	Select the desired submenu item (in this example **ACTIVE ALARMS**) with the arrow keys or by pressing the corresponding number key (**ACTIVE ALARMS** is 3).	The submenu item (**ACTIVE ALARMS**) is activated.
5	Press **Enter**.	The **ALARM LIST** appears.
6	Use the arrow keys to scroll through the **ALARM LIST**.	

Editing Data Fields

You can edit data fields preceded by a colon (:). Table 3-3 describes using the front panel keys to edit data fields.

Table 3-3. Editing a Data Field

Step	Action	Result
1	With the cursor positioned on the submenu item number, press **Enter**.	The cursor moves to the data field, (to the right of the submenu item name).
2	Using the arrows, scroll to scan the available value settings.	The value settings display one at a time in the data field position.
3	When the desired value is displayed in the data field position, press **Enter** to set that value.	When the value is set, the cursor moves back to the submenu item position, indicating the operation is complete.

Table 3-3. Editing a Data Field (Continued)

Step	Action	Result
4	Select another submenu field or press **Cancel** to return to the sub-menu.	Pressing **Cancel** prior to pressing **Enter** voids any data changes. The original data value is restored and the cursor returns to the submenu field.

Exiting Menu Field Operation Or Display

Press **Cancel** as many times as required to return to the desired menu level, or press **Home** to return to the main menu.

Using Special Function Keys

Table 3-1 on page 38 provides instructions for using the **SHIFT** key to activate the special function keys (**COPY**, **HOME**, **ALARM**, and **CLEAR**).

LED Descriptions

CSU Status

The CSU status LEDs display the operational condition of the network interface located on the controller board in the unit.

OK (green)
Indicates the operation is in the normal mode and no errors have been detected.

Test (yellow)
Indicates that the network interface is operating in a test mode. This includes a self-test or a test loopback. When illuminated, this LED also indicates that normal data flow is not occurring on the network interface.

Error (red)
Indicates an error such as a BPV, OOF, or CRC.

Alarm (red)

Indicates an alarm condition has been detected. When the alarm condition is no longer valid, the **OK** LED activates (turns on). To view an alarm condition, select the active alarm menu item or select **ALARM** by pressing **Shift 8**. If the alarm conditions have been corrected, the alarm which caused the activation of the **ALARM** LED can be viewed under the **UNIT HISTORY** menu.

DSU/Drop Status

OK (green)

Indicates the operation is in the normal mode and no errors have been detected.

Test (yellow)

Indicates that the interface is operating in a test mode. This includes a self-test or a test loopback. When illuminated, this LED also indicates that normal data flow is not occurring in at least one of the module ports.

Alarm (red)

Indicates an alarm condition has been detected. When the alarm condition is no longer valid, the **OK** LED activates (turns on). To view an alarm condition, select the active alarm menu item or select **ALARM** by pressing **SHIFT 8**. If the alarm conditions have been corrected, the alarm which caused the activation of the **ALARM** LED can be viewed under the **UNIT HISTORY** menu.

Module Status

OK (green)

Indicates the operation is in the normal mode and no errors have been detected.

Test (yellow)

Indicates that one of the interfaces is operating in a test mode. This includes a self-test or a test loopback. When illuminated, this LED also indicates that normal data flow is not occurring in at least one of the module ports.

Alarm (red)
Indicates an alarm condition has been detected. When the alarm condition is no longer valid, the **OK** LED activates (turns on). To view an alarm condition, select the active alarm menu item or select **ALARM** by pressing **Shift 8**. If the alarm conditions have been corrected, the alarm which caused the activation of the **ALARM** LED can be viewed under the **UNIT HISTORY** menu.

Data Port Identification

When configuring the unit, menu selections will include options from data port submenus. Selection of data ports is necessary because the ESU 120e uses a Slot-Port method to identify the data port the menu item is referencing. If a module containing a PBX drop option card with an Nx56/64 plug-on interface is installed in the option slot, it would be designated as:

drop Passthru=1.1

Where slot=1 and port =1.
The drop is located in the option slot and is the first port in that slot.

Nx56/64=1.2

Where slot=1 and port=2.
The Nx is located in the slot and is the second port in that slot.

The ports that are built into the ESU 120e are referenced as Slot 0. The Nx56/64 would be designated as 0.1 and the drop would be referenced as 0.2.

ALTERNATE METHODS OF CONTROL

T-Watch PRO (ADTRAN PC Program)

T-Watch PRO is the ADTRAN PC control program. It provides complete control over the configuration of the ESU 120e using a graphical interface. The T-Watch PRO program displays the same status and performance data as the front panel LCD. This data is displayed in the form of tables and graphs.

The T-Watch PRO program has the following capabilities:

- Interfaces with a modem which permits dialing into a remote ESU 120e location to configure the unit or read the status or performance of the unit.
- Receives traps from any ESU product.
- Records and creates display performance data over a 30-day period.
- Accesses units via the local area network.

To configure the ESU 120e to work with T-Watch PRO over the LAN, follow these steps:

Step	Action
1	Set the Unit ID using the Front Panel. See *Unit ID* on page 74 for details.
2	Set TCP/IP interface to 10BaseT (or SLIP) using the Front Panel.
3	Configure the IP address, default gateway, and subnet mask using the Front Panel.
4	Follow the installation instructions for T-Watch PRO to start the program and connect to the unit.

To set up the ESU 120e to work with T-Watch PRO over a direct EIA-232 connection, complete the following steps.

Step	Action
1	Set the Unit ID and set a passcode using the Front Panel. See *Unit ID* on page 74 and *Set Passcode* on page 72 for details.
2	Set the control port rate to the same setting as the PC Com port.
3	Using the DB-25 adapter and modular cable provided, connect the PC Com port to the Chain-In port on the ESU 120e.
4	Follow the installation instructions for T-Watch PRO to start the program and connect to the unit.

SNMP

The ADTRAN ESU 120e supports the Simple Network Management Protocol (SNMP) through the 10BaseT or Chain-In (SLIP) interface. See *SNMP* on page 95 for more information.

To use SNMP with the ESU 120e, do the following:

Step	Action
1	Set TCP/IP access as either 10BaseT or SLIP (Chain-In Port).
2	Set the IP address, default gateway, and subnet mask through the front panel.
3	The appropriate MIB browser must be loaded into the Network Management Station (available on the ADTRAN webpage at http://www.adtran.com). The MIB browser issues SNMP gets/sets to the ESU 120e.

Terminal Mode

The ESU 120e provides the front panel menus to a VT100 type terminal. This mode can be used to configure and monitor the unit. Initiate this mode by typing **<CTRL + PTT>** on the terminal once it is connected to the **CONTROL IN** port. For detailed information on this method of control, see Chapter 8, *Telnet/Terminal Menus* on page 87.

Telnet

You can connect to the ESU 120e via Telnet. Before attempting to connect via Telnet, define the IP address, the default gateway, and the subnet mask using the front panel. When you begin the Telnet session, you will be prompted for a password. The default password is ADTRAN. You can change this password using the **MANAGEMENT** submenu. The Telnet session will time out after a pre-defined value that is also set in the **MANAGEMENT** menu.

NOTE *Only one Telnet session can be active at a time.*

Chapter 4 Status Menu

STATUS MENU

The **STATUS** menu branch allows you to view the status of the ESU 120e operation. See Figure 4-1.

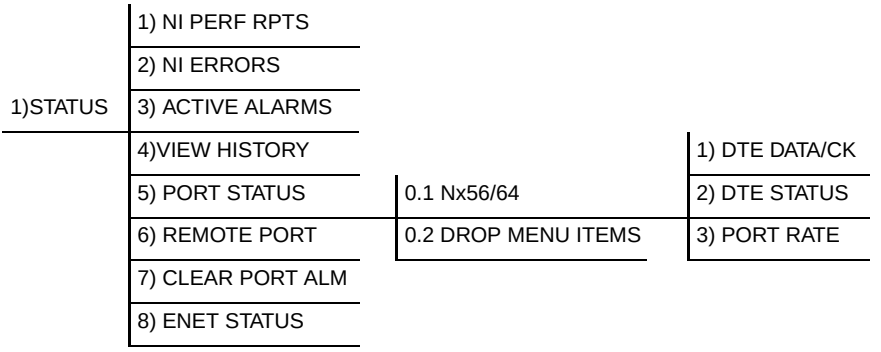


Figure 4-1. Status Menu Tree

Menu flow is normally depicted from left to right. Arrows on the lower right of the screen indicate the direction of scrolling to use to view additional menu items. At every level of the menu, pressing **Cancel** returns the system to the previous menu level. Repeatedly pressing **Cancel** returns the system to the Main menu.

Network Interface Performance Reports (NI PERF RPTS)

The menu item Network Interface Performance Reports (see Figure 4-2 on page 48) displays the user's copy of the performance data. The ESU 120e maintains this performance data on the network based on G.821. The data displayed is data accumulated over the last 15 minutes and over the last 24 hours.

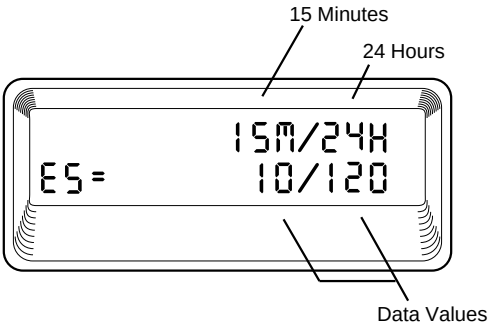


Figure 4-2. Network Interface Performance Report

Use the arrow keys to access the complete display of the following report fields.

%AS
Percentage of available seconds.

BES
Between 2 and 832 errors/sec.

%EF
Percentage of error free seconds.

DM
Number of minutes with bit error rate of 1×10^{-6} or greater.

ES
Number of errored seconds (1 or more errors/second).

SES
Number of severely errored seconds (more than 832 CRC errors/sec). Approximate equivalent to a 1×10^{-3} bit error rate.

UAS
Number of unavailable seconds (10 or more consecutive seconds).

If insufficient time has passed to collect data, **N/A** displays. Continue with standard operating procedures to exit the display.

When this menu is active, performance data can be cleared by pressing **Clear (Shift 9)** on the keypad. Only the user's copy of the performance data is cleared.

Since only the user's copy of performance data is cleared by the ESU 120e, the data displayed here might be different from the data sent to the network as PRM data.

Network Interface Errors (NI ERRORS)

The NI Errors submenu displays the types of errors the Network Interface (NI) detects. A blinking CSU error LED indicates that network errors are detected.

The asterisk (*) above an item indicates the types of errors detected. The error types are as follows:

CRC
CRC-4 bit errors. This is valid only if CRC-4 mode is enabled.

BPV
Bipolar violations.

XS0
Excess zeros.

FER
Framing errors.

Active Alarms

This menu item displays a list of current alarms reported by either the base controller or any of the ports. If no alarms are current, using this menu item displays **END OF LIST**.

This display includes two lines of text (see Figure 4-3 on page 50). The top line is the alarm source. The bottom line is the

alarm message. A list of alarm messages is found in *System Messages* on page 111.

In addition to normal menu operation, you can access this menu item with the **ALARM** function (**SHIFT 8**) on the keypad. If one or more of the **ALARM** LEDs are illuminated, an alarm is present. Pressing **Cancel** returns to the previous menu item.

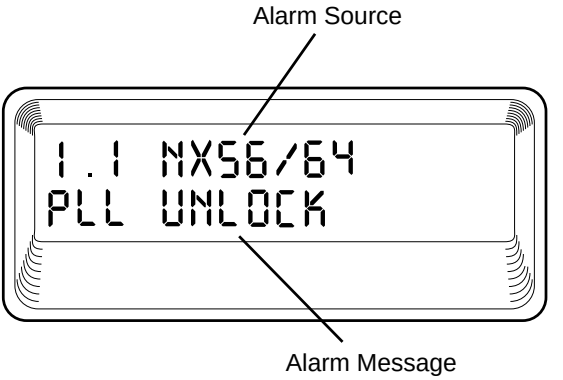


Figure 4-3. Display of Alarm Messages

View History

This menu item both displays and clears the accumulated status changes of the unit.

VIEW HISTORY displays a history of the first 20 status changes in the unit, including the date, time, and type of change. The unit also records for viewing, the date and time an alarm became active or inactive, as well as the date and time of test activation or deactivation.

To clear the **VIEW HISTORY** display, press **Clear (Shift 9)** with the **VIEW HISTORY** menu active.

Port Status

PORT STATUS displays the signals monitored on the data ports. For example, the Nx56/64 interface monitors the RTS, CTS, RD, and RD, along with other signal lines. When a port is selected, the LCD indicates whether the signal is present.

The base Nx interface offers the status screen listed in this section. When using other option cards, refer to the appropriate User's Manual for a definition of any status screens offered.

Port Status (0.1 Nx56/64 Interface)

DTE Data/CK

An asterisk (*) indicates an active status of the following lines.

TXD
Transmit data from the DTE.

RXD
Receive data toward the DTE.

ETC
External Transmit Clock from DTE.

LCK
Lock Status of the phase locked loop.

DTE Status

An asterisk (*) indicates an active status of the following lines:

RTS
Request to send from DTE.

CTS
Clear to send to DTE.

DCD
Data carrier detect to DTE.

DSR
Data set ready to DTE.

Port Rate

The **PORT RATE** displays the current setting of the Nx port. Continue with standard operating procedures to exit the display.

Port Status (0.2 DSX/Drop Interface)

CRC
An asterisk displays under the CRC if there are CRC errors in extended superframe format (ESF) mode. If CRC-4 is not enabled on the Drop Port, the LCD displays **N/A**.

BPV
An asterisk displays under the BPV if the Drop Port detects bipolar violations.

SLIP
An asterisk displays under the SLIP if the drop plug-on board detects frame slips. This is caused by multiple clock sources in the application.

FER
An asterisk displays under the FER if the Drop Port detects frame bit synchronization errors.

Remote Port

REMOTE PORT displays the status of activity on the **Control In** remote port. This is useful for troubleshooting communication sessions and for verifying cabling.

RX
Characters received at remote port.

ID
Unit ID received at remote port.

CRC
Correct CRC received.

PC
Correct passcode received.

TX
Characters transmitted from the remote port.

Clear Port Alarm

Clears the **LINK FAILED** alarms on option modules that have been removed from the ESU 120e chassis.

ENET Status

TX
Indicates that data is being transmitted from the 10BaseT port.

RX
Indicates that data is being received by the 10BaseT port.

LNK
Indicates the current status of the 10BaseT link integrity test (this should always be on when the unit is connected to a functional 10BaseT hub).

CPU
Active when the CPE is accessing the 10BaseT interface.

Chapter 5 Configuration Menu

CONFIGURATION

The **CONFIGURATION** menu sets the ESU 120e operational configuration, including all network interface parameters, the allocation of the TS0s, and the port parameters. See Figure 5-1 on page 56.

Menu flow is normally depicted from left to right. Arrows on the lower right of the screen indicate the direction of scrolling to use to view additional menu items. At every level of the menu, pressing **Cancel** returns the system to the previous menu level. Repeatedly pressing **Cancel** returns the system to the Main menu.

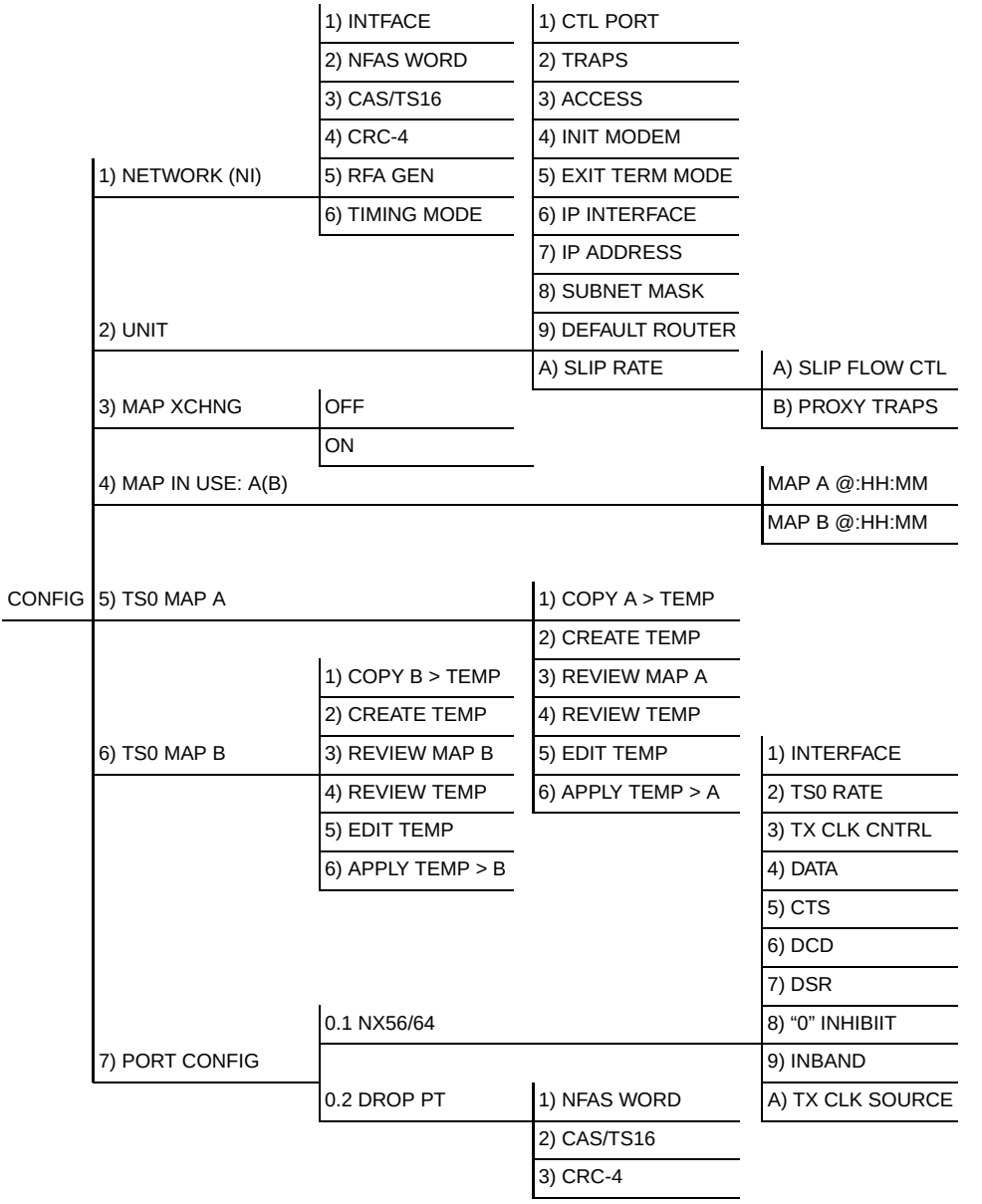


Figure 5-1. Configuration Menu Tree

Network (NI)

This menu item accesses the configuration of parameters associated with the network interface in the base unit. There are eight submenu items that include setting the format, the line build out (LBO), and the timing mode.

Interface (INTFACE)

Selects either the 120Ω DB-15 interface or the 75Ω BNC interface.
Choices: **120Ω**, **75Ω BAL**, and **75Ω UNBAL**

*In **75Ω UNBAL** mode, both the Tx and Rx are shield grounded.*

NFAS Word (Framing)

If enabled, the network interface receiver requires the NFAS word (TS0 in odd frames) and the FAS word (TS0 in even frames) for frame sync. When disabled, only the FAS word is needed for frame sync.
Choices: **ENABLE**, **DISABLE**

CAS/TS16

Enables/Disables Channel Associated signalling (time slot 16 multiframing). When this menu option is enabled, the following events occur.

1. The TS16 multiframe alignment signal is inserted in the outgoing data stream.
2. Signaling Bits are transmitted in TS 16 for all TS0s that are mapped to a signalling-capable port (Base Drop port, for example). In TS0s that are mapped to "Idle" or data ports, "1s" are transmitted in the signalling bit positions.

3. The TS16 multiframe alignment signal must be received or frame sync.

Note that if CAS/TS16 is enabled, TS16 may not be mapped to a port and will be forced to "Idle". When CAS/TS16 is disabled and TS16 is mapped to a port, the data in TS 16 will be mapped through from the network to the mapped port. For common channel signalling applications, CAS/TS16 should be disabled and TS16 mapped to the drop port. TS16 may also be mapped to the base Nx56/64 or an option module data port.

When CAS/TS16 is enabled, TS16 is forced to idle in TS0 Map A and B and may not be mapped. This configuration must be used if there are multiple signalling-capable ports that are mapped to the Network Interface. For applications where the Base Drop Port requires channel associated signalling (connection to a PBX, for example), CAS/TS16 must be enabled and TS16 left idle in the TS0 Map.

CRC-4

When this option is enabled, the CRC-4 checksum bits are transmitted in the outgoing E1 data stream. Also, the received signal is checked for errors.
Choices: **ENABLE**, **DISABLE**

RFA Gen

When enabled, remote frame alarm is transmitted toward the Network during alarms.
Choices: **ENABLE**, **DISABLE**

Timing Mode

Selects the clock source for transmission toward the network from the NI. See *ESU 120e Clock Sources* on page 59 for more information.

ESU 120e Clock Sources

The ESU 120e is operable from various clock sources, permitting it to perform properly in many different applications. Set the network interface clocking options with the clocking options set by the Network (NI) Configuration menu options.

The following clock source options are available:

- Network Timed
- Base Drop Timed
- Base DTE Timed
- Internal Timing
- Normal (CSU) (only when secondary interface module is installed)

The selected clock option always designates the clock source for transmission. Clocking necessary for receiving data is always recovered from incoming data.

Network Timed

The network is the source of timing. The received data clocking is looped back to the network where it is used to determine the transmission timing. This option is also referred to as loop timed as the transmission clock is derived from the received clock. See Figure 5-2.

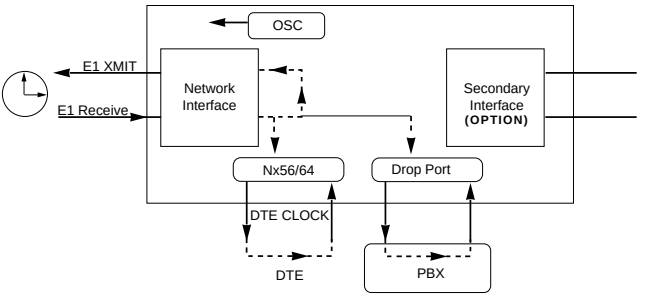


Figure 5-2. Network Timed Clock Source

Base Drop Timed

The PBX is the source of timing. The ESU 120e uses the clock derived by the Base Drop interface for transmission timing (see Figure 5-3).

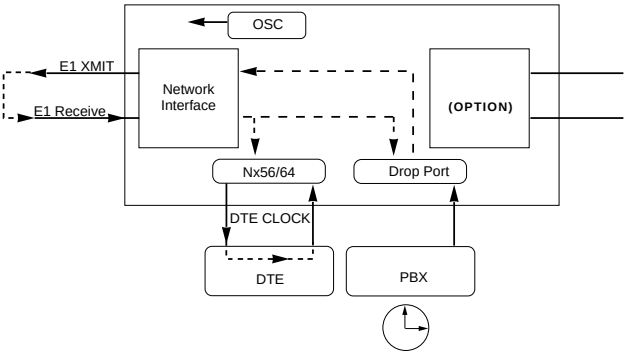


Figure 5-3. Drop Timed Clock Source

Base DTE Timed

The DTE is the source of timing. The ESU 120e uses the incoming DTE clock to determine the transmission timing. This is typically used in applications where it is necessary to have the DTE as the primary clock source (such as limited distance line drivers). See Figure 5-4.

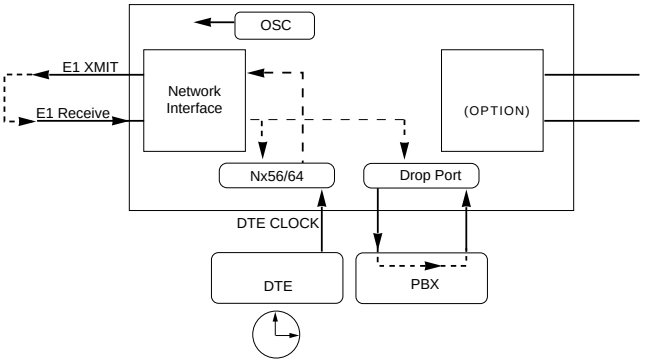


Figure 5-4. Base DTE Timed Clock Source

Internal Timing

The ESU 120e is the source of timing. The ESU 120e is configured to use its own internal oscillator as the source of timing. Applications include private line driver circuits where one end is set to network and the other to internal. See Figure 5-5.

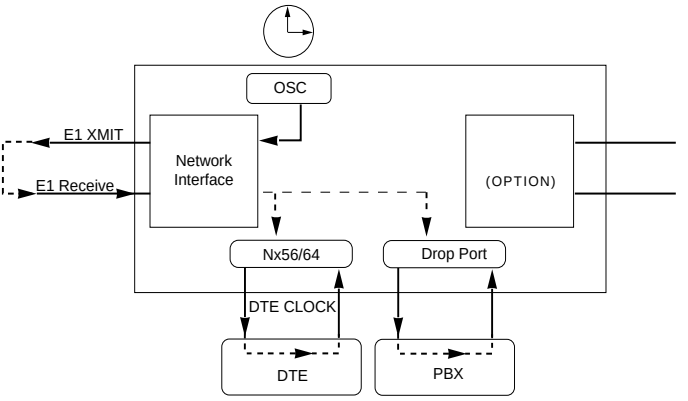


Figure 5-5. Internal Clock Source

Normal (CSU) Timing

The typical timing option arrangement is shown in Figure 5-6 on page 62. The PBX is loop-timed, sending data to the ESU 120e which is actually synchronous to the received data. The Network Interface (NI) is the actual source of all timings. This timing option is the same as that typically used for CSUs. This is the preferred mode for use with a PBX application.

This timing mode works equally well when the PBX is the source of timing. In that configuration the network would not be providing timing.

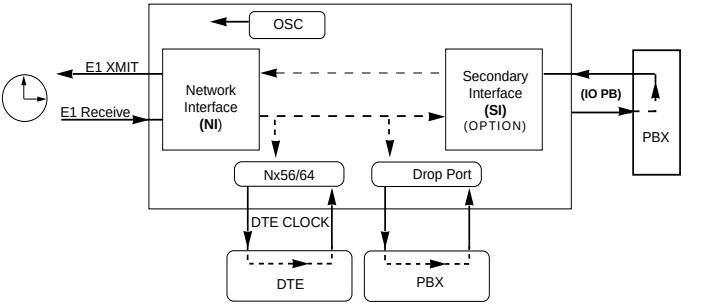


Figure 5-6. Normal (CSU) Timing

> **NOTE** *The network interface and secondary interface clocking options are set by using the Network (NI) Configuration menu options.*

Unit

The **UNIT** menu changes the baud rate of the Control In port and the setup of the Dial Out port. The menu items are:

Ctl Port

Sets the baud rate for communication with the PC or modem.
Choices: **1200**, **2400**, **9200**, **9600**, and **38400** kbps

Traps

Enables or disables the transmission of trap messages.
Choices: **ENABLE** and **DISABLE**

Access

Sets the method of connection from the ESU 120e to T-Watch/SNMP.
Choices:
DIRECT - Used if connected directly to the PC.
DIAL - Used when connection is through a modem. The dial string is entered from T-Watch/SNMP.

Init Modem

Allows you to choose an industry standard or a custom initialization string for a modem connected to the control port.
Choices: **INDUSTRY STANDARD** and **CUSTOM INITIALIZATION STRING**

Exit Term Mode

Takes the unit out of terminal mode.

IP Interface

Selects the TCP/IP physical interface (10BaseT Ethernet or SLIP) using the EIA-232 serial port.
Choices: **10BASET ETHERNET** or **SLIP**

*If this option is set to **SLIP**, the EIA-232 port **may not** be used as a terminal interface.*

IP Address

This is the IP address that uniquely identifies the ESU 120e on a TCP/IP network. This address is composed of four decimal numbers, each in the range of 0 to 255, separated by periods. This value is used for either the 10BaseT Ethernet or SLIP interface, depending on the IP interface setting.

Subnet Mask

This defines which part of a destination IP address is the Network number. It is used along with the ESU 120e IP address to determine which nodes must be reached through the default IP Gateway. This value is set to 0.0.0.0 when the IP interface option is set to SLIP.

Default Router

All IP Packets destined for nodes not on the ESU 120e unit's local network are not forwarded through this IP address. Normally, this address defines a router connected to the ESU 120e unit's local network. This value is ignored when the IP interface is set to SLIP.

SLIP Rate

This sets the baud rate for the Chain-In port when used as the SLIP connection for SNMP management.
Choices: **1200**, **2400**, **9600**, **19200**, **38400**

SLIP Flow CTL

This is used to activate flow control on the Chain-In port when used as the SLIP interface. Hardware mode uses RTS and CTS.
Choices: **NONE**, **HARDWARE**

Proxy Traps

This determines which interface is used for forwarding traps from units being "proxied" for.
Choices: **10BASET**, **CHAIN IN**

Map Exchange (Map Xchng)

The **MAP EXCHANGE** menu enables and sets the automatic time of day map switch. The unit provides selection of the hour, minute, and seconds for the map switching to take place. The menu items are:

OFF

Indicates that the map in use does not change (disabled).

ON

Indicates that the map in use will change at a user-selected time of day (enabled).

Scroll to select **AUTO** to enable or **OFF** to disable the Automatic Map Change feature and press **Enter** to activate the selection.

When **AUTO** is selected, the unit displays the screens to set times for switching. After editing Map A, press **Enter** to record the Map A settings and activate the selection fields for Map B. Use the same operation to edit switching time for Map B.

Map In Use: A(B)

This menu item controls the TS0 map the ESU 120e uses and displays the map in current use.

TS0 Map A and TS0 Map B

The TS0 maps designate which TS0s are assigned to which port. There are three maps: TS0 Map A, TS0 Map B, and the Temporary (Temp) map. See Figure 5-7.

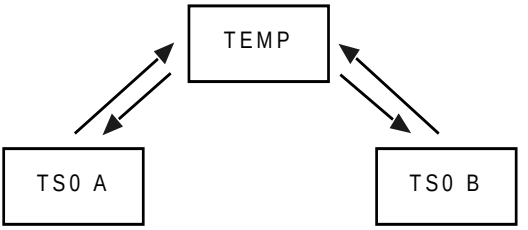


Figure 5-7. TS0 Map Designations

TS0 A and TS0 B are the current maps the ESU 120e uses. The Temp map generates a map before putting it into use.

You can copy TS0 A to TS0 B by copying the TS0 A map into the TEMP map. Then apply (write) the TEMP map into TS0 B.

The menu items are:

COPY A >TEMP

This copies the current map (A or B) into a TEMP map area. This permits modification without disturbing the existing map. When the modifications are completed, the TEMP map is written to current MAP A (B) by selecting **APPLY**.

CREATE TEMP

This creates a map by defining a port or Idle for all TS0s. When **CREATE TEMP** is first selected, all TS0s are set to **IDLE**. PORT: **IDLE**, **TST**, + option module ports

TST designates which TS0s are used for QRSS testing when activated under the **TEST** Menu. When not used for testing, the **TST** designation is identical to **IDLE**.

With the cursor on **CREATE TEMP**, press **Enter**. The unit displays the selection screen with the cursor positioned on the first selection TS0 number. See Figure 5-8.

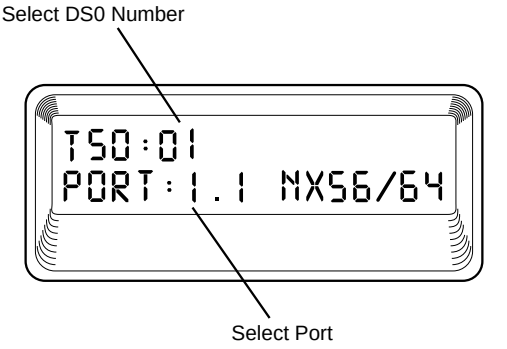


Figure 5-8. Create Temp Selection Screen

Use either the scroll method or numbers to enter the TS0 number (do not mix the use of the keys). Pressing **Enter** completes the selection and moves the cursor to **PORT**, the next field.

Scroll to select the **PORT,** which is dependent on the installed option card. Press **Enter** to complete the selection and move the cursor back to the TS0 field. With the cursor on the TS0 field, the TS0 number can be incremented or decremented by scrolling. If **Copy** is pressed, the contents of the last TS0 entered are placed in the new TS0 number.When all entries are complete, **CANCEL** moves the cursor to **APPLY**. Either apply the newly created TS0 map or press **CANCEL** to return to the TS0 Map A (B) submenu choices.

*Selecting **APPLY** will not disrupt the operation of unmodified ports.*

REVIEW MAP A(B)

Permits a quick review of the number of TS0s assigned to each port and the number of unassigned TS0s (Idle or TST) as defined in the currently applied Map A(B).

REVIEW TEMP

Permits a quick review of the number of TS0s assigned to each port and the number of unassigned TS0s (Idle or TST) as defined in the TEMP Map.

EDIT TEMP

The map in the TEMP file can be edited to whatever configuration is desired. If Map A had been copied into the TEMP file, the TEMP file could be applied after editing to MAP A or MAP B. The menu operation is identical to **CREATE TEMP** with the exception that the existing port selections display.

APPLY TEMP > A

Writes the TEMP map into Map A. **APPLY** is usually the last step in updating a map and is accessed automatically at the end of editing or creating a temporary map. Currently, it can be bypassed by selecting another menu choice.

Port Configuration (Port Config)

PORT CONFIGURATION selects and configures the parameters associated with any data port in the unit. For example, parameters for the Drop Port Interface (PBX) interface are set through this menu. The items that can be set depend on which option module is installed. The list of option ports will vary with the configuration.

The ESU 120e is designed so that any additional ports developed in the future will contain the appropriate menu selections for access.

The **CONFIGURATION** menus for options ports are described in separate sections of the manual supplied with the option card.

Port Config (0.1 Nx56/64 Interface)

The menu items are:

INTERFACE

This option sets the electrical interface for the Base Nx56/64 port.
Choices: **V.35**, **V.11 (X.21)**, **RS530**, **V.36**

TS0 RATE

This sets the base rate of the interface. The actual data rate depends on the number of TS0s assigned to the Nx port.
Choices: **56K** or **64K**

TX CLK CNTRL

Controls the clock used by the TSU 120e to accept transmit (TX) data from the DTE. The default is **NORMAL**. If the interface cable is long, causing a phase shift in the data, the clock can be selected as **INVERT**. This switches the phase of the clock, thus compensating for a long cable.
Choices: **NORMAL**, **INVERT**

DATA

Used to control the inverting of the DTE data. This inversion can be useful when operating with an HDLC protocol. It is often used as a means to ensure 1s density.
Choices: **NORMAL** or **INVERT**

*If **INVERT** is selected, zero (0) inhibit should also be selected to prevent an open DTE input from placing zeros on the network.*

CTS

Used to control characteristics of CTS.
Choices: **NORMAL** (see Table 5-1 on page 69) or **FORCE ON**

DCD

Data Carrier Detect. Indicates to the DTE when a valid signal is being received at the Network Interface.
Choices: **NORMAL** (see Table 5-1 on page 69) or **FORCE ON**

DSR

Data Set Ready. This signal indicates to the DTE when the DCE is turned on and ready for operations.
Choices: **NORMAL** (see Table 5-1) or **FORCE ON**

0 INHIB

The Nx interface will detect an uninterrupted string of zeros (0s) being transmitted toward the network. If 0s are transmitted for >1 second, the ESU 120e will force 1s.
Choices: **ON** or **OFF**

INBAND

The Nx56/64 port can provide an inband communications channel (for T-Watch and SNMP) between units. This is accomplished by using 8 kbps of the first TS0 assigned to that particular Nx56/64 port. If in 56K mode, no data bandwidth will be used. Inband must also be enabled at the destination port.
Choices: **ON**, **OFF**, **ON DEMAND**

TX CLK SOURCE

This controls the source of the clock used by the TSU 120e to accept transmit data from the DTE. The default is **INTERNAL**. If the application requires that the DTE device provides the clock with the transmit data, the **EXTERNAL** setting is used.
Choices: Internal, External

Table 5-1. Normal Mode of Operation

RTS	Signal	V.54 Loopback	511 TST ON	Self Test Active	Netwk Test Active	No TS0 Mapped	Network Alarm
CTS	Follows	OFF	OFF	OFF	OFF	OFF	OFF
DCD	—	—	—	OFF	—	OFF	OFF
DSR	—	OFF	OFF	OFF	OFF	OFF	—
Where "—" = don't care *Until backup becomes active							

Port Config (0.2 DSX/Drop Port)

The menu items are given below:

NFAS Word

If enabled, the network interface receiver requires the NFAS word (TS0 in odd frames) and the FAS word (TS0 in even frames) for frame sync. When disabled, only the FAS word is needed for frame sync.
Choices: **ENABLE**, **DISABLE**

CAS/TS16

Enables/Disables Channel Associated signalling time slot 16 multiframing). When this menu option is enabled, the following events occur:

1. The TS16 multiframe alignment signal is inserted in the outgoing data stream (toward the PBX).
2. Signaling Bits are transmitted in TS 16.
3. The TS16 multiframe alignment signal must be received for frame sync.

If CAS/TS16 is enabled on the Drop Port, it must also be enabled on the Network Interface.

CRC-4

When this option is enabled, the CRC-4 checksum bits are transmitted in the outgoing data stream toward PBX. Also, the received signal is checked for errors.
Choices: **ENABLE**, **DISABLE**

Chapter 6 Utility Menu

UTILITY

The **UTILITY** menu tree displays and sets system parameters (see Figure 6-1 on page 71). This includes setting the time and date, resetting all parameters to factory values, and re-initializing the unit. This menu also displays the unit software revision and the unit ID setting.

Menu flow is normally depicted from left to right. Arrows on the lower right of the screen indicate the scrolling direction to view additional menu items. At every level of the menu, press **Cancel** to return the system to the previous menu level. Repeatedly pressing **Cancel** returns the system to the Main menu.

3) UTIL	1) TIME/DATE	TIME: HH:MM:SS
		DATE: MM/DD/YY
	2) FACTORY RESTORE	Returns all configurations to factory settings
	3) SET PASSCODE	
	4) UNIT ID	
	5) SOFTWARE REV	Displays Current Software Revision
	6) PORT UTILITY	
	7) ENET ADDRESS	
	8) CMD MODE	

Figure 6-1. Utility Menu Tree

Time/Date

This menu option is used to display or edit the current time and date. The ESU 120e maintains the time and date during power-off conditions. To configure the Time/Date, do the following:

If you want to....	Do this
Record an entry and move to the next editing position	Press **Enter** after any numeric change.
Move to a different field	Press **Enter** at the editing position without making any changes, or use the up and down arrow keys.
End the editing process	Press **Cancel**.

Factory Restore

This menu item is used to restore the factory default settings for all unit parameters, including configured TS0 maps.

Set Passcode

Enter Passcode from Other Menus

The **PASSCODE** prompt may make an unexpected appearance from other menu operations. This happens only when the unit is operating in the limited access mode, such as without an active passcode. The limited access mode may become active even if a passcode was entered (for example, when there is no activity for ten minutes). If the unit is to be remotely accessed using T-Watch PRO, a passcode must be entered.

When managing a number of units, the passcode can be the same for all.

If the unexpected appearance of the **PASSCODE** prompt occurs, for example, while operating in a limited access mode and attempting to change the **DATA RATE**, use the following key sequence: **CONFIG** > **UNIT** > **CNTROL PORT** > **DATA RATE**. Use the number keys to enter the correct passcode; then press **Enter**. The unit displays **ACCESS GRANTED**.

Pressing any key after entering a passcode causes the unit to return to the previous active menu. In this case it returns to **CONFIG** > **UNIT** > **CNTROL PORT** > **DATA RATE** to permit changing the data rate.

Change/Set Passcode

The passcode can be changed or set at any time or eliminated altogether through the **UTILITY** menu item **SET PASSCODE**. This procedure requires the current passcode (if one is established) for operation.

The passcode can only be entered by using numbers. After entering the desired passcode, press **Enter**.

Set a null passcode at the **SET PASSCODE** menu by pressing **Enter** without any numbers. This sets a null passcode and grants unlimited access.

Automatic Time-out Feature

For added security protection the unit is equipped with an automatic time-out for operation with the password. After ten minutes of inactivity, the unit reverts to limited access operation. To make changes in the configuration, the passcode can be reentered. If the passcode number is lost, contact ADTRAN Customer Service for assistance.

No Passcode Desired

At the **NEW PASSCODE** prompt (in the **SET PASSCODE** menu), press **Enter** without any numerical entry. The system nullifies the need to enter a password for subsequent use and proceeds to the **UNIT ID** prompt.

Unit ID

This menu is used to access the current Unit ID setting. Viewing is available in limited access mode. Editing or changing the Unit ID requires the use of a password as in editing mode. Unit Identification numbers must be between 2 and 250. If an out-of-range number is entered, the unit assumes the upper limit number of 250.

Set the Unit Identification

In the **UNIT ID** menu under the **UTIL** menu, enter any value between 2 and 250. The number 1 is reserved for the PC.

Pressing **Enter** records the Unit ID number and establishes its availability for operation by remote control. The unit proceeds to the **SET CONTROL PORT** prompt.

No Unit ID Desired

Without entering any numbers at the Unit ID prompt, press **Enter**. Pressing **Enter** with no Unit ID recorded establishes the unit as not able to be operated by remote control.

Software Revision (Software Rev)

This menu provides access to the display of the current software revision level loaded into the base unit controller. This information is required when requesting assistance from ADTRAN Customer Service or when updates are needed.

Press **Cancel** to exit.

Port Utility

This menu provides access to the display of the current software information for each port installed in the unit. This information is required when requesting assistance from ADTRAN customer service or when updates are needed.

Enet Address

Displays the Ethernet address for the 10BaseT port.

CMD Mode

Reserved for factory use.

Chapter 7 Test Menu

TEST

The **TEST** menu initiates different types of unit tests and displays test results in the LCD window. The **TEST** menu contains four items, **NETWORK TEST**s, **RUN SELF TESTS**, **PORT TEST**, and **CANCEL TEST**. See *Figure 7-1 on page 78* for the Test menu tree.

Executing tests will disrupt some of the normal operation. See individual menu items concerning tests before executing.

Menu flow is normally depicted from left to right. Arrows on the lower right of the screen indicate the scrolling direction to view additional menu items. At each level of the menu, pressing **Cancel** returns the system to the previous menu level. Repeatedly pressing **Cancel** returns the system to the Main menu.

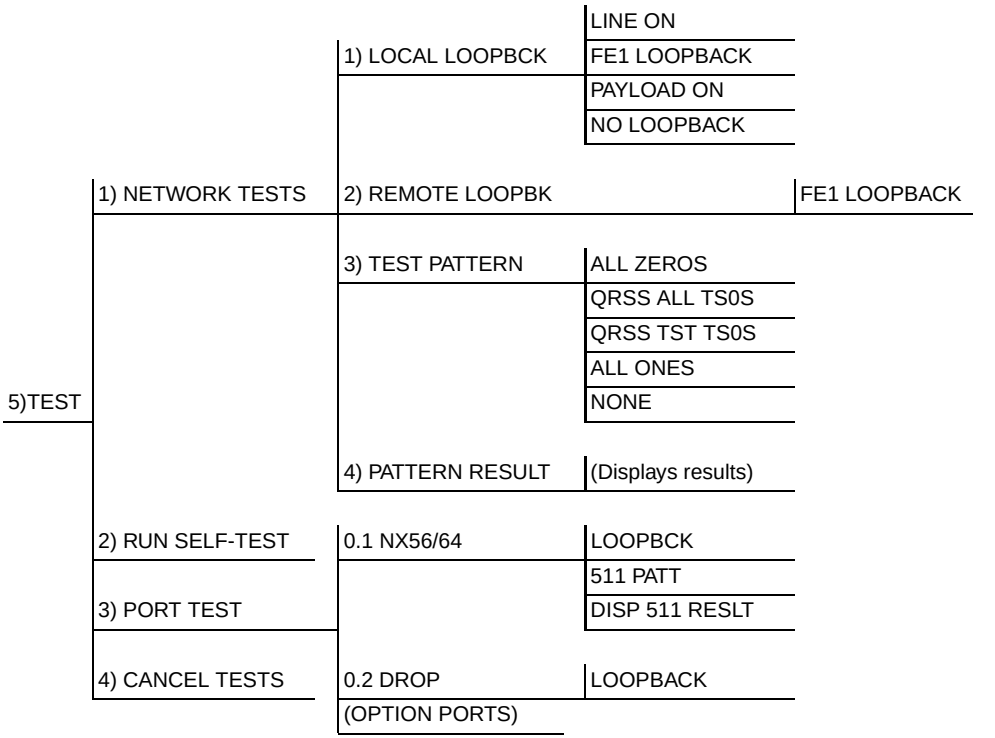


Figure 7-1. Test Menu Tree

Network Tests

Network tests control the activation of loopbacks and the initiation of data test patterns.

Network tests are run on the Network Interface (NI). You can select three different test configurations to determine the type of loopback and the pattern to run. Test results display in the LCD window.

Executing Network Tests will disrupt normal data flow unless only TST TS0s are selected for testing

Loopback Tests

A number of different loopbacks can be invoked locally from the front panel, by T-Watch commands, or remotely by using special in-band codes (AT&T D4 network loop-up and loop-down codes). Additionally, the loopbacks can be remotely controlled by means of out-of-band commands by the E1 ESF FDL or from T-Watch PRO via a modem connection.

Network Interface Loopbacks

Network interface loopbacks affect the entire E1 data stream (see Figure 7-2). The two types of network loopbacks are described below.

Line Loopback

Line loopback loops all of the received data back toward the network. The transmitted data is the identical line code that was received, including any bipolar violations or framing errors.

Payload Loopback

Payload loopback is similar to line loopback, except that the framing is extracted from the received data and then regenerated for the transmitted data.

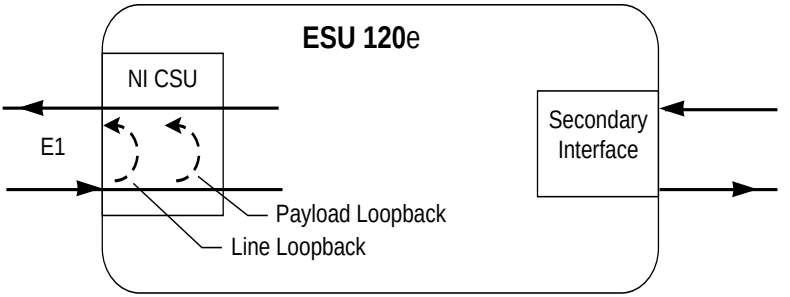


Figure 7-2. Network Loopback Tests

LOCAL LOOPBCK

There are four choices available for setting the local loopback:

Line On
Activates the line loopback on all TS0s.

FE1 Loopback
Activates a line loopback on all TS0s mapped to **TST** in the active map.

Payload On
Activates the payload loopback.

No Loopback
Deactivates the loopback.

Scroll to select a setting; then press **Enter**. The unit displays **LOCAL LOOPBCK** and **REMOTE LOOPBCK**.

REMOTE LOOPBCK

FE1 Loopback sends V.54 loopback code in all mapped TS0s toward the network. Far end will respond by initiating a local line loopback.

TEST PATTERN

All Ones
Sends an all ones pattern to the network.

All Zeros
Sends an all zeros pattern to the network.

QRSS Pattern
The QRSS pattern is commonly used to simulate real data in E1 interfaces. This pattern can be assigned to appear in all TS0s or only in TST TS0s. When QRSS is set in all TS0s and one of the network loopbacks previously described is activated at the far end, a total end-to-end integrity check can be run without the need for any external test equipment. When QRSS is assigned to TST TS0s, an integrity check of the link can be run along with normal data flow. The TST TS0s are user-assigned as part of the TS0 Map.

This sets the pattern for the test and initiates the transmission of the pattern. The test is terminated by selecting **NONE**. The following patterns are available:

QRSS All TS0s
Generates a QRSS test pattern and inserts the pattern into all TS0s.

QRSS TST TS0s
Inserts a QRSS pattern in those TS0s mapped as TST in the currently active map (A or B).

None
Terminates pattern generation.

QRSS always runs at 64K/TS0.

For example, use the up and down arrows to select **QRSS ALL TS0S**. Press **Enter** to record the selection. The ESU 120e starts to generate a QRSS test pattern and inserts the pattern into all TS0s. To end the test, select **NONE**.

PATTERN RESULT

Displays the results of the test currently active. You can leave and return to this menu item without interrupting the test.

Pressing **2** injects errors into the test pattern. These errors are detected by the device performing the pattern check.

ES
The number of seconds with at least 1 bit error.

BES
The number of seconds with more than 1 bit error and less than 320.

SES
The number of seconds with more than 320 bit errors.

***SYNC**
Indicates whether pattern sync is (yes) or is not (no) valid. The asterisk (*) indicates whether pattern sync has been lost since the start of testing.

Press **Shift+9** to clear the results. The results are accumulated until the test pattern is set to **NONE** or **CLEARED**.

Using TST TS0s for testing can be very useful, particularly in fractional E1 applications. You can run an end-to-end test on the Fractional TS0s by:

1. setting for Map B the TST in the same TS0 as used by Map A to receive data from an Nx56/64 port, and
2. looping the far end using a V.54 loopback code on the Nx56/64 port.

In addition, a single TS0 can be used for continuous testing while other TS0s are passing normal data. This will also provide an end-to-end check on the entire link. Set each end to send QRSS in TST TS0s (using 1 TS0) and occasionally view the results on the **PATTERN RESULT** menu selection.

Run Self-Test

The self-test checks the integrity of the electronic components' internal operation by performing memory tests and by sending and verifying data test patterns through all internal interfaces. Although actual user data cannot be passed during these tests, the self-test can be run with the network and DTE interfaces in place and will not disturb any external interface.

The memory portion of the self-test automatically executes upon power-up. A full self-test can be commanded from a front panel menu or from T-Watch PRO.

In addition to the specified self-tests, background tests are run on various parts of the internal electronics. These run during normal operation to confirm continued correct functioning.

This menu selection is used to execute a full internal self-test. The results of the self-tests are displayed in the LCD. Upon invoking the command, the LCD displays **SYSTEM SELF-TEST** and the **TEST** LEDs are illuminated. Test failures are displayed in the LCD window.

The self-test consists of the following tests:

Board level tests

Each of the ESU 120e boards contains an on-board processor which executes the following series of tests checking the circuitry on the board:

- RAM tests; EPROM checksum.
- TS0 map tests.
- On-board data path (sending a known test pattern through an on-board loop).

Unit level tests

- Front panel LED verification.
- Phase-Lock Loop verify.
- Board-to-board interface test.

A test pattern is sent from the controller through a loopback on all other boards and is checked on the controller. This verifies the data path, clocks, and control signals.

If a failure is detected, note the failure number prior to contacting ADTRAN Technical Support.

The execution of self-test will disrupt normal data flow and prevent remote communication until the self-test is completed.

Port Tests

The **PORT TESTS** menu is used to activate testing of specific data ports. It controls the activation of loopbacks and the initiation of data test patterns. Test results are displayed in the LCD window.

The execution of Port Tests will disrupt normal data flow in the port being tested.

Port Tests (0.1 Nx56/64 Interface)

0.1 Nx56/64 is the base Nx interface. It offers the following test functions.

LOOPBK

This initiates a loopback. The following options are available:

PRT/LCL
The Nx port activates both a Local loopback (back toward the DTE) and a Port loopback when either is invoked.

REMOTE
The remote loopback causes a V.54 code to be sent to the far end. The Nx at the far end activates a PRT/LCL loopback upon detection of the V.54 code.

OFF
The loop is deactivated.

The ESU 120e checks the remote loopback activation by detecting a proper response from the remote end. While waiting for the response, the display shows ***LOOPING****. If successful, the display changes to* ***LOOPED-UP****. If unsuccessful, the display shows* ***FAILED****.*

511 PATT

Activates the generation of the 511 test pattern.

ON
The pattern check circuitry is enabled and a test started. The test is ended by selecting **OFF**.

OFF
The pattern generation and check is disabled.

DISP 511 RESLT

Displays the results of the 511 test indicated in the 511 option. The results are in the form of the number of errored seconds. The error count can be cleared by pressing the **Clear key** (**Shift+9**).

Port Test (0.2 DSX/Drop Port)

LOOPBACK

Loopback activates the loopback function on the base Drop interface. The available loopbacks are a Port Loopback (towards the NI) and a Line Loopback (towards the PBX or other terminal equipment).

Cancel Tests

Use this menu selection to deactivate all active tests, including tests on option modules.

Chapter 8 Telnet/Terminal Menus

MAIN MENU

The **TELNET/TERMINAL** main menu is the first menu displayed after the telnet/terminal session is established. See *Figure 8-1*. The default telnet/terminal password is ADTRAN.

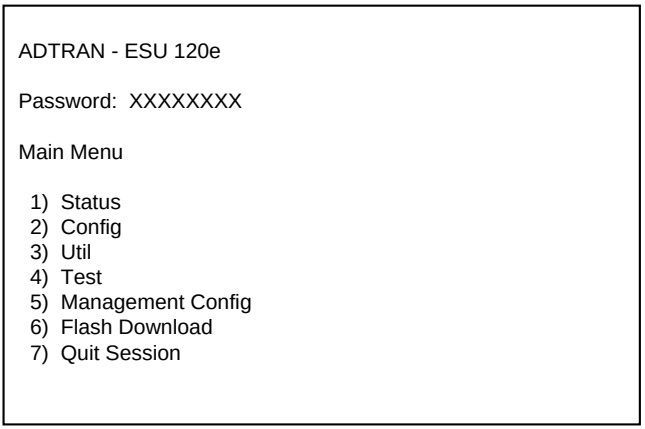


Figure 8-1. Telnet/Terminal Main Menu

NOTE *Only one telnet/terminal session may be active at a time.*

STATUS, CONFIG, UTIL, AND TEST MENU OPTIONS

These menu items access the same modified menus that you can access through the front panel. For detailed information on the available menu options, see the following sections:

- *Status Menu* on page 47
- *Configuration Menu* on page 55
- *Utility Menu* on page 71
- *Test Menu* on page 77

TS0 Maps Configuration Menu

The Telnet/Terminal version of the TS0 maps configuration menu takes advantage of the 24-line VT 100 display. Upon entering this menu, the current Temp (temporary) map displays and is followed by nine selections that you can use for configuring and reviewing map information.

TEMP MAP			
TS0	PORT	TS0	PORT
1	IDLE	17	IDLE
2	IDLE	18	IDLE
3	IDLE	19	IDLE
4	IDLE	20	IDLE
5	IDLE	21	IDLE
6	IDLE	22	IDLE
7	IDLE	23	IDLE
8	IDLE	24	IDLE
9	IDLE	25	IDLE
10	IDLE	26	IDLE
11	IDLE	27	IDLE
12	IDLE	28	IDLE
13	IDLE	29	IDLE
14	IDLE	30	IDLE
15	IDLE	31	IDLE
16	IDLE		

1) COPY MAP A TO TEMP MAP
2) COPY MAP B TO TEMP MAP
3) CREATE TEMP MAP
4) REVIEW MAP A
5) REVIEW MAP B
6) REVIEW TEMP MAP
7) EDIT TEMP MAP
8) APPLY TEMP MAP TO MAP A
9) APPLY TEMP MAP TO MAP B

Figure 8-2. TS0 Temp Map

You can use the up and down arrows or number keys to move the cursor from one selection to another. Press **Enter** to perform the action displayed in the LCD to the right of the cursor. Map configuration involves the following steps.

1. Initialize the Temp map to one of three configurations (**CURRENT MAP A**, **CURRENT MAP B**, or **ALL IDLES**). This step is optional.
2. Edit the Temp map so that it reflects the desired map configuration.
3. Replace the current TS0 map A or B configuration with the Temp map configuration.

Initializing the Temp Map

Upon entering the TS0 maps configuration menu, the Temp map reflects its last configured state. You can use selections:

If you want to	Use this selection
initialize the displayed Temp map to one of three configurations	**1 - 3**
initialize the Temp map from its current configuration to one which reflects the currently stored Map A or B configurations, respectively	**1 and 2**
initialize the Temp map to an all IDLE state (see Figure 8-2 on page 89)	**3**

Editing the Temp Map

If further changes to the Temp map are needed, use selection 7 to enter the Temp map edit mode. Upon entering this mode, the cursor location moves to TS0 number 1 in the TS0 field of the Temp map. The cursor may be moved from one TS0 to another using the up and down arrows until it is located at the TS0 number whose assigned port needs to be changed.

At this point, pressing **Enter** causes the cursor to move into the Port field. The up and down arrows are then used to scroll through the possible port selections.

To restore the previous port assignment and return to the TS0 field, press **ESC**. Otherwise, press **Enter** to save the current selected port and return to the TS0 field. When the cursor is again located in the Temp map TS0 field, press **ESC** a second time to cause the cursor to return to selection 1 below the Temp map display.

Applying the Temp Map

Once the Temp map reflects the desired configuration, use selections 8 or 9 to apply this configuration to Map A or B, respectively.

Reviewing Temp Maps

Selections 4 through 6 give a summary of the number of ports assigned to Map A, Map B, and the Temp map, respectively.

MANAGEMENT CONFIGURATION

This menu sets management information such as SNMP community names and trap destination addresses.

SNMP Read Community

SNMP Read Community Name defaults to public. An NMS using this community name has Read access for all supported MIB objects but does not have the ability to change MIB objects. This parameter must be set to the same value on both the ESU 120e and the NMS (OpenView®, etc.) in order for the NMS to have Read access to MIBs supported by the ESU 120e. This value must be a text string of 16 characters or less.

SNMP Read/Write Community

An SNMP NMS using this community name has full Read/Write access to all supported MIB objects (defaults to private). This setting must be the same value on both the ESU 120e and the NMS in order for the NMS to have Read/Write access to MIBs supported by the ESU 120e. This value must be a text string that is 16 characters or less.

To access other units external to the ESU 120e (proxied units) using an SNMP MIB browser, append a period and the unit ID of the external device to the ***READ ONLY*** *and Read/Write community name used in the MIB Browser, for example public.4. See SNMP on page 95 for more information.*

SNMP Trap Community

This community name is used for all SNMP traps forwarded by the ESU 120e. Traps received from daisy-chained units have a period and the Unit ID appended to the trap community name.

Host 1 Trap IP Address
The first of four entries for SNMP trap destination addresses. The ESU 120e forwards all SNMP traps to the IP address specified in this entry. If the address is set to the default value of 0.0.0.0, no traps are forwarded for this particular value.

Host 2 Trap IP Address
Defaults to 0.0.0.0. Second destination address for SNMP traps.

Host 3 Trap IP Address
Defaults to 0.0.0.0. Third destination address for SNMP traps.

Host 4 Trap IP Address
Defaults to 0.0.0.0. Fourth destination address for SNMP traps.

System Name
A text string that can uniquely identify an SNMP managed node.

System Contact
A text string containing the name, phone number, etc. of the individual responsible for maintaining an SNMP managed node.

System Location
A text string describing the physical location of an SNMP managed node (for example, SECOND FLOOR PBX ROOM).

Auth. Fail Traps Sent
(**DISABLED**, **ENABLED**: defaults to **DISABLED**)
When enabled, the ESU 120e issues an SNMP trap when any SNMP request is received with an invalid community name. Can be used for security purposes.

Poll Link Status Traps Sent

(**DISABLED**, **ENABLED**, defaults to **DISABLED**)
When enabled, the ESU 120e sends an SNMP trap whenever a device configured to be polled fails to respond. When the device begins responding to polls, a poll link-up trap is sent. The format of the traps is defined in the agent MIB.

Ping IP Host

Allows the user to Ping a specific IP address.

Telnet/Terminal Timeout

The ESU 120e terminates a telnet or terminal session if no activity is detected for this length of time. Only one telnet or terminal session may be active at one time. This timeout prevents an unattended session from blocking interactive access to the agent. The default value is five minutes.

Telnet/Terminal Password

This option allows modification of the password required for entry into a telnet or terminal session. The default value is **adtran**.

Exit

Returns to the ESU 120e main menu.

FLASH DOWNLOAD

The ESU 120e uses flash memory that allows software updates via the EIA-232 port or the 10BaseT port.

XMODEM

Open a terminal session to the ESU 120e and select **XMODEM FLASH DOWNLOAD**. This selection allows the user to perform a flash upgrade using XMODEM protocol.

Trivial File Transfer Protocol (TFTP)

Open a Telnet session to the ESU 120e and select **TFTP FLASH DOWNLOAD**. This selection allows the user to set the IP address of the server where the upgrade file resides. The user can also set the filename of the upgrade file if it is other than default.

TFTP Server IP Address: 0.0.0.0.
Enter the IP address of the server where the upgrade file resides.

The server address is not retained over a power cycle.

TFTP Server File name: T120e.biz
Enter the name of the upgrade file that resides on the TFTP Server.

The default filename may already be correct.

Begin Firmware update.
Select this item and press **Enter** to begin the flash upgrade using TFTP. After the download is complete, the ESU 120e will close the Telnet session to reprogram the software. The Telnet session may be opened again several minutes later. If the upgrade fails after the Telnet session is closed, the unit must be Flash downloaded using XMODEM.

QUIT SESSION

Terminates the telnet/terminal session.

Appendix A SNMP

As local area network (LAN) environments became standardized over the past ten years, multi-vendor equipment grew with competition. It became necessary to manage the various vendor equipment from a single control console. Thus, the Simple Network Management Protocol (SNMP) emerged as the standard for managing commercial TCP/IP networks.

The term *SNMP* broadly refers to the message protocols used to exchange information between the network and the managed devices, as well as to the structure of network management databases.

SNMP BASIC COMPONENTS

SNMP has three basic components: Network Manager, Agent, and MIB.

Network Manager

This is a control program that collects, controls, and presents data pertinent to the operation of the network devices. It resides on a network management station.

Agent

This is a control program that responds to queries and commands from the network manager and returns requested information or invokes configuration changes initiated by the manager. It resides in each network device.

MIB

This is an index to the organized data within a network device. It defines the operating parameters that can be controlled or monitored. When requesting the network manager to retrieve or modify a particular piece of

information about a network device, the network manager transmits the request to that network device. The agent in that device interprets the incoming request, performs the requested task, and sends its response to the network manager. The network manager collects all the data from the various network devices and presents it in a consistent form.

COMMANDS

Using SNMP Version 1, the network manager can issue three types of commands: GetRequest, GetNextRequest, and SetRequest.

GetRequest
This command retrieves a single item or the first in a series from a network device.

GetNextRequest
This command retrieves the next item in a series from a network device.

SetRequest
This command writes information to a network device.

MESSAGES

The network device issues two types of messages: **GetResponse** and **Trap**.

GetResponse
This message is the response to a network manager **GetRequest** or **GetNextRequest** command.

Trap
This is an unsolicited message issued by a network device to report an operational anomaly or an alarm condition to the network manager.

These messages are typically encased within informational packets and transported over the LAN or WAN (wide area network).

ESU 120E SNMP ACCESS

The ESU 120e comes configured with community names (Read - **public** and Read/Write - **public**) for SNMP MIB Browser access to the unit. The ESU 120e can also act as an SNMP proxy agent for external units. To access MIB variables on externally chained devices, append a period and the Unit ID of the device to the Read and Read/Write community names. For example, if the Read community name configured in the ESU 120e is **public,** specifying **public.3** as the community name in the SNMP MIB Browser allows reading SNMP MIB variables from an externally chained unit with a Unit ID of 3.

SNMP TRAP CONFIGURATION

Traps received by the ESU 120e from external units and the host unit are converted into SNMP traps and forwarded to the configured NMS. The source of the trap is uniquely identified at the NMS by a combination of the IP address of the ESU 120e and the Unit ID of the sending device. The Unit ID is present in the trap packet appended to the end of the trap community packet name, for example **public.4**. It is also included as an Octet String variable (adProdPhysAddress) in the trap packet as defined in the individual product MIBs. The latest versions of the product MIBs, by default, display the appended trap community name in their descriptions.

Typical steps required for Management Station trap configuration are loading the device specific MIBs and loading or creating device-specific Trap Definition Files. The current product MIBs contain keywords embedded in comments that can be used by some network management platforms to automatically generate Trap Definitions. Otherwise, the descriptions may be used as a template for Trap Definitions.

If individual option card port and slot identification is required, it is present in the four- byte adProdPhysAddress field of the trap packet. The first two bytes are the Unit ID of the base controller (least significant byte first). The next two

bytes are port and slot number. This field is the second object identifier in all traps sent from ESU/TDU products. For traps from the ISU 512, the Unit ID is the first object identifier. See the product MIBs for more information.

Definitions for Poll Link Up/Down traps are included in the ESU 120e MIB file: ESU 120e.MIB.

SNMP MIB BROWSER CONFIGURATION

The following steps are required to configure Network Manager MIB variable access through the ESU 120e:

1. Load the desired product MIBs on the network management station. If, for example, the administrator is managing ESU 120e and ISU 512 devices, load ESU 120e.MIB, ISU512.MIB, and RFC1406.MIB.
2. Create device entries in the NMS database for all units that are to be managed through the ESU 120e. The host unit should be configured as the Proxy agent for the external units. The IP address or host name used for the proxy designation is that of the ESU 120e.
3. Set community names in the device's entries for external units to the ESU 120e community name with the device Unit ID appended as defined in the previous section (*ESU 120e SNMP Access* on page 97).
4. Set the device timeout for all device entries in the NMS device database to five seconds, including the host unit.

SNMP MIB FILES

The ESU 120e supports several standard MIBs including the following:

- MIB-II (RFC-1213)
- DS1 E1/E1 MIB (RFC-1406)
- Ethernet MIB (RFC-1643)

It also supports several ADTRAN enterprise-specific MIBs including the following:

- ADTRAN Product MIB (ADTRAN.MIB)
- ADTRAN DS1 extensions MIB (ADS1.MIB)
- ESU/TDU Enterprise MIBs, such as ESU 120e.MIB

The standard MIB files are usually included with SNMP network management software. The latest versions of the ADTRAN enterprise-specific MIBs are available from the ADTRAN anonymous ftp site (ftp.adtran.com).

The MIB files are also located on the ADTRAN website at http://www.adtran.com.

Appendix B Connector Pinouts

WIRING

Network Interface Connector

The network connections are as follows:

Connector Type 15-pin female D connector

Table B-1. Network Pinouts

Pin	Name
1	Tx data (output)
2	Frame ground
3	Rx data (input)
4	Frame ground
5	Frame ground
7	Frame ground
9	Tx data (output)
11	Rx data (input)
6,8,10,12,13,14,15	Not Used

Control-In/Chain-In

This is used an as EIA-232 port for connection to a computer or modem (Control-In) or to another ESU 120e for TSU 100 (Chain-In). See Table B-2 for the pinout of the Control/Chain-In connector.

The Chain-In connections are as follows:

Connector Type RJ-48

Table B-2. Control-In/Chain-In Pinout

Pin	Name	Description
1	GND	Ground-connected to unit chassis
2	RTS	Request to send - flow control
3	RXDATA	Data received by the ESU 120e
4	UNUSED	
5	TXDATA	Data transmitted by the ESU 120e
6, 7	UNUSED	
8	CTS	Clear to send - flow control

Chain-Out

This is used to connect to another ESU 120e Chain-In connector. See Table B-3 for the pinout of the chain-out connector.

The chain-out connections are as follows:

Connector Type RJ-48

Table B-3. Chain-Out Connector Pinout

Pin	Name	Description
1	GND	Ground-connected to unit chassis. Connected to GND of next unit (pin 10)
2	UNUSED	
3	TX DATA	Data transmitted to chained units by the ESU 120e. Connect to RX DATA of the next unit (Chain-In pin 3)
4	UNUSED	
5	RX DATA	Data received from chained units by the ESU 120e. Connect to TX Data of the next unit (chain-in pin 5)
6,7,8	UNUSED	

Data Port Interface

Connector Type 25-pin female D connector

Table B-4. Nx56/64 Pin Assignments for EIA-530 and V.36

Pin	EIA/CCITT	Description	Source
1	Shield		_
2	BA (A)/103	Transmitted Data (TD-A)	DTE
3	BB (A)/104	Received Data A (RD-A)	DCE
4	CA (A) /105	Request to Send A (RTS-A)	DTE
5	CB (A) /106	Clear to Send A (CTS-A)	DCE
6	CC (A)/107	DCE Ready (DSR-A)	DCE
7	AB /102	Signal Ground	DTE
8	CF (A) /109	Received Line Detector (DCD-A)	DCE
9	DD (B) /115	Receiver Element Timing (RC-B)	DCE
10	CF (B)/109	Received Line Detector (DCD-B)	DCE
11	DA (B) /113	External Clock B (ETC-B)	DTE
12	DB (B)/114	Transmit Element Timing (TC-B)	DCE
13	CB (B)/106	Clear to Send (CTS-B)	DCE
14	BA (B)/103	Transmitted Data (TD-B)	DTE
15	DB (A)/114	Transmit Element Timing (TC-A)	DCE
16	BB (B) /104	Received Data (RD-B)	DCE
17	DD (A) /115	Receiver Element Timing (RC-A)	DCE
18	Not supported		
19	CA (B)/105	Request to Send (RTS-B)	DTE
20	Not supported		
21	Not supported		
22	CC (B)/107	DCE Ready (DSR-B)	DCE
23	Not supported		
24	DA (A) /113	External Clock A (ETC-A)	DTE
25	Not supported		

Table B-5. Nx56/64 Pin Assignments for V.35 Mode

Pin	Name	CCITT	Description	Source
1	GND		Protective GND	_
2	TD-A	103	Tx Data A	DTE
3	RD-A	104	Rx Data A	DCE
4	RTS	105	RTS	DTE
5	CTS	106	CTS - Clear to Send	DCE
6	DSR	107	DSR - Data Set Ready	DCE
7	GND	102	Signal GND	DTE
8	DCD	109	Rec Line Det	DCE
9	RC-B	115	Rx Timing B	DCE
10			Not Used	
11	ETC-B	113	External Clock B	DTE
12	TC-B	114	Tx Timing B	DCE
13			Not Used	DCE
14	TD-A	103	Tx Data B	DTE
15	TC-A	114	Tx Timing A	DCE
16	RD-B	104	Rx Data B	DCE
17	RC-A	115	Rx Timing A	DCE
18			Not Supported	
19			Not Used	
20		108	Not Supported	
21			Not Supported	
22			Not Supported	
23			Not Used	
24	ETC-A	113	External Clk A	DTE
25			Not supported	

Table B-6. DB-25 to V.35, 34-Pin Winchester Cable

DB-25 Pin	34-Pin	Name
1	A	Protective GND
2	P	Tx Data A
3	R	Rx Data A
4	C	RTS or RR
5	D	CTS
6	E	DSR
7	B	Signal GND
8	F	Rec Line Sig Det (DCD)
9	X	Rx Signal Timing B
10		Not Connected
11	W	External Clock B
12	AA	Tx Signal Timing B
13		Not Connected
14	S	Tx Data B
15	Y	Tx Signal Timing A
16	T	Rx Data B
17	V	Rx Signal Timing A
18	J	Local Loopback
19		Not Connected
20	H	DTR
21	B	Remote Loopback
22		Not Connected
23		Not Connected
24	U	External Clk A
25	K	Test Mode

Table B-7. Pin Assignments for Nx56/64 V.11/X.21 Mode

Pin	Name	Description	Source
1		Protective GND (shield)	n/a
2	T(A)	Transmit A	DTE
3	R(A)	Receive A	DCE
4	C(A)	Control A	DTE
7	G	Signal GND	n/a
8	I(A)	Indication A	DCE
9/12	S(B)	Signal Timing B	DCE
10	I(B)	Indication B	DCE
14	T(B)	Transmit B	DTE
15/17	S(A)	Signal Timing A	DCE
16	R(B)	Receive B	DCE
19	C(B)	Control B	DTE

Table B-8. Adapter Cable DB-25 to X.21, DB-15 Connector

Name	DB-25 Pin	DA15S Pin
Protective GND (Shield)	1	1
Signal GND	7	8
Control A	4	3
Control B	19	10
Indication A	8	5
Indication B	10	12
Transmit A	2	2
Transmit B	14	9
Receive A	3	4
Receive B	16	11
Signal Timing A	15/17	6
Signal Timing B	9/12	13

Base Drop (PBX)

The Drop has a DB-15 female connector as defined in Table B-9.

Table B-9. Pin Assignments for Terminal Interface

Pin	Name
1	Rx Data (output)
2	Frame Ground
3	Tx data (input)
4	Frame Ground
9	Rx data (output)
11	Tx data (input)
5,6,7,8,10, 12, 13, 14,15	Not used

10BaseT

The 10BaseT is used to connect the ESU 120e to the local area network. The required wiring connections are:

Connector Type Shielded RJ-48

Table B-10. Pin Assignments for 10BaseT Connector

Pin	Name (To Nic)
1	TX1
2	TX2
3	RX1
6	RX2

Appendix C System Messages

ALARM MESSAGES

This appendix lists and defines the alarm and status messages that appear on the ESU 120e screen.

Network Interface Alarms

Alarm	Description
Loss of Frame	NI unable to frame align with incoming FAS /NFAS framing pattern. Remote Alarm (Bit 3 of NFAS word) is transmitted out the network interface. AIS (unframed ones) is transmitted out the drop port.
Loss of TS16MF	NI unable to sync on TS16 multiframe signal. Valid only when CAS/TS16 framing enabled. Remote multiframe Alarm is transmitted out the network interface. ASI is transmitted out the drop port in TS16 only.
Remote Alarm	Remote alarm signal (Bit 3 of NFAS word) being received at network interface.
Remote MF Alarm	Remote multiframe alarm signal (Bit 6 of TS16 for three consecutive multiframes) being received at network interface.
AIS Received	Unframed ones being received at network interface. AIS transmitted out drop port interface.
TS16 AIS RCVD	Unframed ones being received in TS16 on network interface. Remote multiframe alarm transmitted out network interface. AIS in TS16 is transmitted out drop port.
Loss of CRC-4	NI unable to sync on CRC-4 multiframe signal. Valid only when CRC-4 framing is enabled. Remote Alarm is transmitted out the network interface. AIS is transmitted out the drop port.
Loss of Signal	No signal detected at NI

Nx56/64 Interface

The following messages indicate an alarm condition on the Nx56/64 card:

Alarm	Description
Clock Slip	Difference in frequency of the data clock at the network and DTE.
PLL Alarm	Unable to achieve Phase Locked Loop on the clock provided by the network interface.
Zeros Alarm	All zeros (0s) data being sent toward the network interface.
FIFO Alarm	Error in propagation of data through the FIFOs.
No EXT Clock	No external transmit clock at DTE (only appears if EXT CLK is selected).

Drop Port Interface

The following messages indicate a condition on the Base Drop (PBX) interface:

Message	Description
Loss of Frame	Drop Port unable to frame align with incoming FAS/NFAS framing pattern. Remote Alarm (Bit 3 TS0 NFAS word) is transmitted on the drop port interface.
Loss of TS16 MF	Drop Port unable to sync on TS16 multiframe signal. Valid only when CAS/TS16 framing enabled. Remote multiframe Alarm is transmitted out the drop port interface. AIS is transmitted out the drop port in TS16 only.
Loss of CRC-4	Drop Port unable to sync on CRC-4 multiframe signal. Valid only when CRC-4 framing is enabled. Remote Alarm is transmitted out the drop port interface. AIS is transmitted out the drop port.
Loss of Signal	No signal detected at the drop port interface.
Remote Alarm	Remote alarm signal (Bit 3 of NFAS word) being received at drop port interface.
Remote MF Alarm	Remote multiframe alarm signal (Bit 6 of TS16 for three consecutive multiframes) being received at drop port interface.
AIS Received	Unframed ones being received at the Drop Port interface.
Frame Slip	Indicates clock being received at drop port is different frequency than network clock.
Excessive BER	Excessive Bit Error ratio. A bit error ratio of greater than $1X10^{-3}$ is being received at the Drop Port interface.

Status Messages

Network Interface (NI)

Message	Description
Payload On	Payload loopback activated
Line On	Loopback off
Loopback Off	All loopbacks deactivated
Factory Restore	Factory setting restored
Power On	Unit powered on
Self-Test	Internal self-test performed

Nx56/64 Interface

The following messages indicate the status of the Nx56/64 card:

Message	Description
Loop Up	Data is looped at both the network interface and DTE interface of the card.
Remote Loop Up	Sending V.54 pattern in an attempt to loop up a remote device.
511 Pattern On	Sending 511 pattern towards the network interface.
Loop Down	Data is no longer looped back at the network interface or DTE interface.
511 Pattern Off	No longer sending 511 pattern towards the network interface.

Drop (PBX) Interface

The following messages indicate the status of the Drop (PBX) interface:

Message	Description
Frame Slip	Indicates a Frame Slip has occurred on the Drop interface; this is present in Alarm History only.
Line Loop Up	Line loopback activated.
Port Loop Up	Port loopback activated.
Loopdown	Loopback has been deactivated.

Appendix D Specifications

ELECTRICAL SPECIFICATIONS

Network Interface

Electrical	G.703
Framing	(G.704) CRC-4, FAS,CAS
Jitter	G.823
Line Code	HDB3
Mechanical	75Ω (BNC); 120Ω (DB-15)
Receiver Sensitivity	-30 dB

Nx56/64 Drop Port Interface

Nx56/64 (V.35 Interface)

Electrical	CCITT V.35 Synchronous, V.11 (x.21), EIA 530
Rates	56 kbps to 1.984 Mbps in 56k or 64k increments
Clock Options	Normal/Inverted and internal/external
Tests	Local Loopback (bilateral) Remote Loopback (V.54)
Test Pattern	511 with errored seconds display and error inject capability
Data inversion	Menu selectable
1s Density Protection	Force 1s to network after one second of consecutive zeros from DTE. User selectable (On/Off)
CTS, DCD, DSR	Normal or Force On
Connector	DB-25

Drop Port Interface

Electrical	G.703
Framing	(G.704) CRC-4, FAS,CAS
Jitter	G.823
Line Code	HDB3
Mechanical	120Ω (DB-15)

Management Interfaces

Chain-In/Out Ports

Interface Devices	PC Serial Port, Modem or SLIP connection to router
Interface Type	EIA-232
Data Rates	9600, 2400, 1200, 2400, 4800, 9600, 19200, 38400
Data Format	EIA-232 N81
Protocols	T-Watch/ADLP, ATEL/ADLP, TCP/IP/SLIP
Connector	RJ-45

10BaseT Interface

Interface	IEEE 802.3 Compliant
Rate	10 Mbps
Connector	RJ45
Receiver	Accepts signal > 300 mV
Protocols	Network: IP Transport: TCP, UDP Service: SNMP, TELNET, ICMP, ARP, PING, T- WATCH

Option Slot Interface

Interface	ADTRAN proprietary, accepts ESU Option Modules.

Chassis Specifications

Height	Less than 3.5 inches (will fit in a 2U rack mount opening)
Width	Two units will fit within a 19-inch rack

Environmental Specifications

Input Power	90-250 VAC, 50/60 Hz
Fuse	0.6 A, 250 V
Operating Temperature	0 deg C to 45 deg C
Max Power	15 Watts
Max Current	0.2 A

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