

**Lucent Technologies**  
Bell Labs Innovations



# **Data Networking Products Special Module Reference**

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# Preface

The *Data Networking Products Special Module Reference* provides the information needed to install, configure, and administer the special purpose E2A Module and Synchronous Line Module (SLM). Procedures for routine operations, maintenance, and troubleshooting are also included.

## Document Organization

The *Data Networking Products Special Module Reference* explains all aspects of module hardware, software, and troubleshooting in the following six chapters:

<b>Special Module Overview</b>	includes a physical description of the E2A Module and SLM and an overview of special module features.
<b>Special Module Installation</b>	explains how to insert and remove the E2A Module and SLM and associated input/output (I/O) boards.
<b>Special Module Cabling</b>	describes the cables and adapters required to connect compatible equipment and devices to E2A Modules and SLMs, and illustrates cabling configurations.
<b>Special Module Administration</b>	explains the implications of choosing certain options and provides procedures for initial and routine administration.
<b>Special Module Troubleshooting</b>	provides the information and procedures needed to isolate and resolve module-related problems.
<b>Special Module Commands</b>	provides a detailed reference of the commands needed to administer, control, and maintain the E2A Module and SLM. Included are command syntax sections, explanations of parameter options, input/output examples, report field definitions, and system responses.

In addition, an **Appendix** furnishes sample database entry forms as a guide for entering information the configuration database. A listing of the document **Contents** and an **Index** are provided to locate information quickly.

## Related Documentation

*Publications* describes the complete documentation set available for the node; see inside front cover for ordering information.

The documents required for use with the *Special Module Reference* include the following:

- the *Data Networking Products Planning Guide*
- the *BNS-2000 Node Reference*
- the *Data Networking Products Trunk Module Reference*

The *Data Networking Products Multipurpose Concentrator Reference* should be consulted if the E2A Module and/or SLM is installed in a BNS-2000 MPC. In addition, the *Data Networking Products Messages Reference* documents alarms associated with the modules and the *Data Networking Products Commands Reference* explains related node commands.

*Data Networking Products Terminology* lists and defines many technical terms found within this document. In addition, vendor documents might be necessary for end devices connected to these interface modules.

The following is a recommended list of documents for the Switching Control Center System (SCCS):

- *SCCS/CE3 E2A Subsystem User Guide* (OPA-4P252-01)
- *SCCS/CE3 Synchronous Subsystem User Guide* (OPA-4P253-01)
- *SCCS/CE3 Input Messages User Guide* (OPA-4P255-01)
- *SCCS/CE3 Administration User Guide* (OPA-4P251-01)

Equivalent documentation may be available for other Operations Support Systems (OSSs).

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# Special Module Overview

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# Special Module Overview

The E2A Module and the Synchronous Line Module (SLM) provide special services for the central office (CO) Operations Systems Network (OSN). The E2A Module and SLM can reside in a node or BNS-2000 MPC.

The E2A Module provides asynchronous telemetry service between CO switching equipment and the Switching Control Center System (SCCS). This customized module meets the specific needs of SCCS; it is not used in other applications. The E2A is used for data connections between the SCCS, via datasets, and its electronic switches. It has four telemetry ports, each operating asynchronously at 1200 bps.

The SLM is a software-downloadable module that provides synchronous, BX.25 Issue 2 service between CO switching equipment and several Operations Systems, including SCCS, the Multifunction Operations System (MFOS), and Engineering and Administration Data Acquisition System (EADAS). This module provides four BX.25 Issue 2 synchronous data links for connection to various Operations Systems. It converts the Universal Receiver Protocol (URP) from a Computer Port Module (CPM)-connected host machine to the BX.25 Issue 2 protocol. The software for the SLM is downloaded from a CPM-connected host processor. The SLM can only receive calls from a CPM-connected host processor; it cannot originate calls.

## Physical Description

### E2A Module

The E2A Module is a single-board interface module that consists of the TN1012 main circuit pack and the ED5P074-30,G1 input/output (I/O) distribution board.

### SLM

The SLM is a double-board module consisting of a single board processor (MC5P025A1) and a SCSI/DKI distribution board (UN221). These boards must occupy two adjacent, addressable slots. In a node, the MC5P025A1 board must be inserted in an odd-numbered slot. The SLM uses two I/O distribution boards:

- **ED5P077-30,G1** for the SCSI/DKI (UN221)
- **ED5P080-30,G1** for the single board processor (MC5P025A1)

**NOTE:** The ED5P085-30,G1 board is an earlier version of the I/O processor board for the SLM. The ED5P080-30, G1 board supersedes this board.

## Module Faceplates

Both module faceplates contain three light-emitting diodes (LEDs), a reset push button, a three-state mode switch, and a latch. When pressed, the reset push button reinitializes the module and clears the connections. The mode switch positions of ENABLE, DIAGNOSE, and DISABLE and the green, yellow, and red LEDs indicate the module's current mode of operation and its service state. The latch is used to remove or insert the module, and to secure it in place.

In addition to the LEDs on the module faceplates, the SLM processor I/O boards have two red LEDs that indicate whether the module is in loopback mode for diagnostic testing and whether the node or concentrator link is in a fault state. The SLM processor I/O boards also have an SW1 switch that toggles board operation from loopback mode (up position) to the standard operating mode (down position).

## Features

The E2A Module provides asynchronous telemetry communications and data transport between central office switching equipment and SCCS.

The SLM provides synchronous telemetry communications and data transport between central office switching equipment and Operations Support Systems (OSSs).

## Downloadable Software

The SLM downloads executable code into its memory when one or more ports are restored to service. All operation of this module is governed by the downloaded code.

Downloadable code is stored on a host machine. For example, the host processor could be a CE3 host supporting SCCS, or an SCS host supporting MFOS. The downloadable code exists in at least two versions, based on whether the network element with which it is interfacing uses BX.25 or X.25 protocol.

The SLM can be downloaded only if a download server is configured on the supporting host machine. When the SLM is entered into the node database, administrative commands prompt for the name of the download server and the name of the file that contains the downloadable code on the supporting host.

**NOTE:** The download server name that is entered with other module configuration data in the node database must exactly match the server name that is defined on the supporting host machine, or the download will fail.

The E2A Module is similar to the SLM in that its operation is governed by code executed from on-board memory. However, the E2A Module code is not downloaded; it is permanently burned into the E2A Module's circuit board read-only memory (ROM). The E2A Module code was written by SCCS developers to reflect the unique use of this module.

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# Special Module Installation

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# Special Module Installation

This chapter explains how to install the E2A Module and SLM. It includes procedures for inserting and removing these modules and their associated input/output (I/O) boards.

## Inserting and Removing I/O Boards

The ED5P074-30,G1 I/O board (for the E2A Module) and ED5P077-30,G1, ED5P080-30,G1 I/O boards (for the SLM) plug into the rear of a node or BNS-2000 MPC. I/O boards are held in place by shrouds on the backplane pin field and secured with two screws. I/O boards should always be in place before the corresponding module is installed.

To avoid possible damage to module circuitry, remove the I/O board(s) only when checking the board (for type or damage), or when relocating or replacing the board(s). If a board must be removed, follow **Procedure 2-2, Removing an I/O Board**.

---

### PROCEDURE 2-1. Inserting an I/O Board

**WARNING:** If the node is powered up, the I/O distribution board corresponding to the front module *must* be in position when the front module is inserted or removed. Otherwise, circuits may be damaged.

1. Verify that the I/O board is the right one for the module being installed. Refer to Table 2-1.
2. Check the board to see if any switch settings are required before installing it.

The SLM module has two circuit packs, UN221 and MC5PO25A1, with associated I/O boards, ED5P077-30,G1, and ED5P080-30,G1, that have switch settings. Refer to Switch Settings for SLM I/O Boards to make the proper switch settings before inserting these boards.

**NOTE:** ED5P085-30,G1 is the earlier version of the ED5P080-30/G1 board. Refer to Switch Settings for SLM I/O Boards for the correct settings for this board.

The I/O board for the E2A Module does not have any switch settings.

3. Align the I/O board backplane connector with the backplane pin field at the rear of the slot shelf, and align the screws with the screw holes. Slip the backplane connector onto the pins. The board should seat easily. If you have to push hard, check to see if the board is canted or if some pins are bent.

**PROCEDURE 2-1. Inserting an I/O Board** (continued)

4. Insert the screws and tighten them securely.

---

**PROCEDURE 2-2. Removing an I/O Board**

It is not necessary to remove a I/O board just because the corresponding module was removed. Remove an I/O board only to relocate or swap the I/O board itself, to confirm a number, or set a switch.

**WARNING:** Do not remove the I/O board before removing the module.

1. If the I/O board is to be removed completely, disconnect all wiring, labeling the ends if necessary. (The module must be removed from the slot before the I/O board is removed.)
2. Loosen the screws in the top and bottom tabs and rock the board gently as you pull it out.

**Module and I/O Board Correspondences**

Table 2-1 specifies the I/O distribution board to be used in conjunction with each control and interface module. Whenever the boards are first installed, or when changes are made to a functioning node, it is wise to verify that the correct boards have been installed.

---

**TABLE 2-1. Module and I/O Board Correspondences**

Module Type	Designation	I/O Board	Comments
E2A	TN1012	ED5P074-30,G1	E2A telemetry for SCCS
SLM	UN221 MC5P025A1	ED5P077-30,G1 ED5P080-30,G1	BX.25 Issue 2, Levels 1,2,3

**Switch Settings for SLM I/O Boards**

This section supplies switch and jumper settings for SLM I/O boards, according to their interface module connection.

**NOTE:** The directions in this section apply when you are holding the I/O board with the 963C100 backplane connector to your left, the DB25 interface connectors to your right, and the switches facing you. A slide switch is to be moved in the specified direction. A rocker switch is to be pushed in on the specified side.

The 16 switches on the ED5P077-30,G1 board are grouped into sets of 4, one set for each I/O port.

Default settings in the following tables are indicated with a •.

**TABLE 2-2. Switch Settings for I/O Board ED5P077-30,G1**

Switch	Function	Left	Right	Comments
S1,3,5,7: Pos. 1	EIA-24 (Ext Clk)	•		L: Not controlled by USART TCLK R: Controlled by USART TCLK
S1,3,5,7: Pos. 2	USART TCLK		•	L: Not controlled by DCE TCLK R: Controlled by DCE TCLK
S1,3,5,7: Pos. 3	USART RCLK		•	L: Controlled by DCE RCLK R: Controlled by EIA-24 (Ext Clk)
S2,4,6,8: Pos. 1	USART DCD		•	L: Controlled by DCE DSR R: Controlled by DCE DCD

**TABLE 2-3. Switch Settings for I/O Board ED5P080-30,G1**

Switch	Function	Left	Right	Comments
S1.1	BS0	•		L: Address select BS0 (Pin 346) grounded R: Open circuit
S1.2	BS1	•		L: Address select BS1 (Pin 347) grounded R: Open circuit
S1.3	BS2	•		L: Address select BS2 (Pin 348) grounded R: Open circuit

ED5P085-30,G1 is the predecessor to the ED5P080-30,G1 I/O board.

**TABLE 2-4. Switch Settings for I/O Board ED5P085-30,G1**

Switch	Function	Left	Right	Comments
S1.1	BS0	•		L: Address select BS0 (Pin 346) grounded R: Open circuit
S1.2	BS1	•		L: Address select BS1 (Pin 347) grounded R: Open circuit

**NOTE:** Switch settings for specific applications may differ from the default settings. For SCCS/TNM application switch settings, consult the *SCCS/CE3 Synchronous Subsystem User Guide* (OPA-4P253-01). The switch settings in this document differ from the default settings in Tables 2-2 and 2-3.

## Inserting and Removing a Module

An E2A Module or SLM is inserted into a slot at the front of the node or BNS-2000 MPC. To prevent damage to module circuitry if the node is powered up, the I/O board(s) must be in place at the rear of the slot before the module(s) is inserted.

In general, the modules in the front of the shelf are held in place by clamping levers. Most modules have an ENABLE/DISABLE switch. Before inserting the module, open the clamp and move the switch (if any) to DISABLE.

**WARNING:** Always wear an electrostatic discharge (ESD) wrist strap when handling modules to avoid damage to the circuits. Grounding jacks for the wrist strap are located to the right on both front and back of the node cabinet. When inserting modules into the MPC15, ground the strap to the chassis of the concentrator.

### PROCEDURE 2-3. Inserting a Module

This procedure explains how to insert an E2A Module or SLM, whether new, relocated, or returned to service.

1. Verify that the slot(s) in which the module(s) and its I/O board(s) is to be installed is the correct slot and it is free. Refer to the *BNS-2000 Node Reference* for the node numbering scheme and to the *Data Networking Products Multipurpose Concentrator Reference* for the MPC slot numbering scheme.

**PROCEDURE 2-3. Inserting a Module** (continued)

**NOTE:** The slot numbering referred to in this Note is viewed from an individual shelf, where the slot numbers are determined by starting immediately to the right of the third power supply.

The SLM is a double-board module. In a node or BNS-2000 MPC, these boards must occupy two addressable, adjacent slots. The UN221 is almost always located and administered in an odd-numbered slot or slot 12 and those directly above it (that is, slot 28, slot 44, etc.), with the MPC5P025A1 in the next higher slot to the right. Only one double board can be installed in the slot range 11 to 14 and the corresponding higher numbered slot ranges.

2. Set the switch on the module faceplate to DISABLE.
3. With the lever extended, carefully push the module all the way into the slot until the pins on the backplane slip into the receptacle on the board.
4. Close the lever to lock the module into position.
5. Move the MODE switch on the faceplate to the ENABLE position.

---

**PROCEDURE 2-4. Removing a Module**

1. If the MODE switch is in the ENABLE position, move it to DISABLE. This will take down all calls in progress.
2. Open the lever on the faceplate.
3. Pull the module straight out of the slot.

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# Special Module Cabling

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# Special Module Cabling

The sections that follow present cabling configurations for the E2A and SLM special modules, which can be installed in a node or BNS-2000 MPC. Each cabling configuration represents the required connections between the module and other equipment associated with the special purpose application. The cabling for the node cabinet or concentrator is determined by its supported special purpose interface modules and the physical characteristics and configuration that apply to each.

**WARNING:** The first 25 feet of data cabling connected to the node or BNS-2000 MPC must be shielded to meet Federal Communications Commission (FCC) Electromagnetic Interference (EMI) requirements. If longer cable runs are needed for a given configuration, unshielded cables can be used after the first 25 feet.

When Lucent Technologies cables and other components are specified, no other cables and components can be used. Otherwise, Lucent is not liable for failure to meet FCC regulations.

## Physical Characteristics

The E2A Module consists of one circuit pack and an associated I/O distribution board while the SLM consists of two circuit packs and two associated I/O distribution boards. These I/O distribution boards provide connectors for the cable interface.

Table 3-1 provides guidance for connecting cables to the I/O boards used with these modules. To use this table, first find the I/O board to which you want to connect a cable. Then check for the module in the front of the cabinet. If there is a Y in the **Sw** (switch) column, the switch settings are given along with the procedure for inserting an I/O board in **Special Module Installation**. The I/O cable should be labeled with the slot number of the I/O board. If all the specifications match, plug the cable into the connector specified in the **Connector** and **Remarks** columns.

Terminating points on connector cables are referred to as pin (plug) and shell (receptacle) to distinguish the end types.

**TABLE 3-1. I/O Board Connectors and Applications**

<b>ED</b>	<b>Module</b>	<b>Sw</b>	<b>Connectors</b>	<b>Remarks</b>
<b>5P077-30,G1</b>	SLM/UN221	Y	40 -pin ribbon	4 ports total
<b>5P080-30,G1</b>	MC5P025A1	Y	40 -pin ribbon	
<b>or</b> <b>5P085-30,G1*</b>	MC5P025A1	Y	40 -pin ribbon	
<b>5P074-30,G1</b>	E2A	N	4 DB25 RS232	Port numbers are labeled from the bottom up

\* Predecessor to the ED5P080-30,G1 board.

## Cabling from E2A Module to Central Office via Modem

Cabling for the E2A Module may be configured as follows:

- The E2A Module consists of a TN1012 circuit pack and an ED5P074-30, G1 I/O distribution board. Each E2A Module provides four RS-232 DTE asynchronous ports.
- An M25AS cable is used to connect each port on the I/O distribution board to a modem (in other words, a data set).
- The local modem is connected to the remote modem via a private 4-wire data facility. In some applications, the remote location may use more than one modem connected through a 4-wire multi-port bridge.

**NOTE:** See the appropriate SCCS documentation for detailed information regarding the E2A connection in the Central Office.

**TABLE 3-2. Ordering Information: E2A Module to Central Office via Modem**

CABLE OR ADAPTER NAME	DESCRIPTION	ED5P055-31 GROUP NUMBER	PRICE ELEMENT CODE (PEC)
M25AS	25-pin-M 25-pin-F	G(118), G(L)	2752-118, 27519

## Cabling from SLM to Central Office via Modem

Cabling for the SLM may be configured as follows:

- The SLM is a two-board set consisting of an MC5P025A1 processor board and its associated I/O distribution board (ED5P080-30, G1) and a UN221 SCSI/DKI interface board and its associated I/O distribution board (ED5P077-30 G1).
- The SLM provides four RS-232 DTE ports via the ED5P077-30, G1 I/O distribution board.
- An M25AS-MOD cable is used to connect each port of the ED5P077-30, G1 I/O distribution board to a modem (data set).
- The modem is typically connected to a data auxiliary set that is connected to a matching set at a remote DMERT SPCS location. This connection is made over a 4-wire private data facility.

**NOTE:** See the appropriate SCCS documentation for detailed information regarding the SLM connections at remote locations.

---

**TABLE 3-3. Ordering Information: SLM to Central Office via Modem**

CABLE OR ADAPTER NAME	DESCRIPTION	ED5P055-31 GROUP NUMBER	PRICE ELEMENT CODE (PEC)
M25AS-MOD	25-pin-F 25-pin-M	G(178), G(L)	2752-178, 27519

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# Special Module Administration

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# Special Module Administration

This chapter discusses the administrative procedures used to administer the E2A Module and SLM.

Before administration of these modules can begin, the appropriate groups with which the port or ports can be associated must be entered into the database with **enter group**. Group association is restricted to hardware type. For more information on groups and other database elements that should be entered before administering the E2A Module and SLM, see the *BNS-2000 Node Reference*.

## StarKeeper II NMS Administration

E2A Module and SLM administration via *StarKeeper*® II NMS is accomplished by using the cut-through mode of *StarKeeper* II NMS. E2A Module and SLM commands are entered and executed almost as they would be entered and executed on the direct console connection. *StarKeeper* II NMS does not allow all of the same abbreviations nor does it validate input information. Refer to the following sections on E2A Module and SLM administration and to the appropriate *StarKeeper* II NMS documentation for information on accessing the cut-through mode for your node.

## Command Sets

E2A Module and SLM port information is added to the database, and thereafter manipulated and checked, with the **enter**, **change**, **delete**, and **verify** commands. The **enter** and **change** commands have an extensive parameter prompting sequence in which configurable options are specified in the database. Once specified, these options can be checked with the **verify** command and removed with the **delete** command.

The **restore** and **remove** commands control the service state of the module ports; these commands, which affect hardware performance and call processing, are often used in conjunction with administration and maintenance procedures. The **remove** and **restore** commands can be used with **verify oosmods**, which list all out-of-service modules.

The **diagnose** command is used for module maintenance and troubleshooting, along with other maintenance- and status-related commands, such as **dstat module**.

TABLE 4-1. Special Module Command Sets

Administration	Operation	Maintenance	Related Objects
enter e2a change e2a verify e2a delete e2a	restore e2a remove e2a	diagnose e2a	group* module address
enter slm change slm verify slm delete slm	restore slm remove slm	diagnose slm	group* module address
* This object should be entered before configuring the module in the database.			

## Parameter Considerations

Some parameter specifications that are made during an iteration of **enter e2a** or **enter slm** do not affect other parameters or database elements entered, or the general performance of the network, node, or concentrator. Other parameters require special consideration because of the nature of the hardware configuration or the application being supported. These parameters are explained in this section.

The syntax of **enter e2a** and **enter slm** in **Special Module Commands** and the database entry forms provided in the **Appendix** give the correct prompting sequence. In addition, the parameter definitions for **enter slm** in **Special Module Commands** explain how to enter the version of software to be downloaded from the host.

### Module Address

The **MODULE ADDRESS** parameter is used to identify the location of a particular piece of hardware known as a module. The address of the module depends on its physical placement in a node or a supported concentrator. When a module is installed directly into a node slot, its address is typically represented as:

<module>

Where: *module* represents the node slot number that the module occupies.

If the module is installed in a concentrator, the concentrator is then connected to the node by a link interface module (LIM) and to the link itself. When a module is installed in a concentrator slot, its address is represented as:

<concentrator/module>

Where: *concentrator* is a number indicating the node slot number that the LIM occupies;

*module* is a number indicating the concentrator slot number that the module occupies.

A slight variation of this addressing method is demonstrated with the **verify** command, which allows you to specify either **one** module address or, with the word *all*, every module address. For example:

```
verify slm all
```

## Port Number

The **PORT NUMBER** parameter is a number from 1 to 4 that identifies a physical port on a module. A port number or port numbers can be entered as a single port number entry or as a multiple port number entry. For a single port number entry, enter only **one** port number:

```
PORT NUMBER [1-4: +(1-4)]: 1
```

For a multiple port number entry, enter a series of numbers (x,y,z), a range of numbers (x-z), or a combination of both (w,x-z):

```
PORT NUMBER [1-4: +(1-4)]: 1,3,4
```

```
PORT NUMBER [1-4: +(1-4)]: 1-4
```

```
PORT NUMBER [1-4: +(1-4)]: 1,2-4
```

When entering multiple port numbers, the parameter specifications made apply to all port numbers input at the **PORT NUMBER** prompt.

## Download Server/Software Version

The software for the SLM is downloaded from a CPM-connected host processor. The **DOWNLOAD SERVER** parameter allows the user to specify the source of the downloadable software to be the *controller* or a valid service address for a download server. The **SOFTWARE VERSION** parameter specifies the filename of the executable software to be downloaded to the module.

The service address must correspond exactly with the name of the download server process on the supporting host machine. On an SCCS/CE3 machine, the download server is executed out of the *etc/inittab* directory as an */etc/dkserver* process. The download server name is specified by the **-s** argument to the */etc/dkserver* process. Server entries in the */etc/inittab* directory on SCCS/CE3 support machines are made through the **assign: tty** SCCS shell command. Refer to the *SCCS/CE3 Administration User Guide* (OPA-4P251-01) or the *SCCS/CE3 Input Messages User Guide* (OPA-4P255-01) for more information about the **assign: tty** command.

The path to the executable software should be */scc/etc/board/binary* for an SCCS/CE3 host machine.

SCCS/TNM supports two versions of downloadable software. One version configures the module to interface with BX.25 network elements (NEs) such as a 5ESS® central office switch or Signal Transfer Point (2STP) switch. The other version configures the module to interface with X.25 NEs, such as a Network Control Point (2NCP). Downloaded software does not have to be limited to executable code that supports a specific interface. SCCS/TNM has a BX.25

synchronous office simulator that simulates a synchronous connection to a BX.25 network element. This tool is used in a test environment to generate sample messages to assist with code debugging.

## Administrative Procedures

The initial administration of the E2A Module or SLM (**Procedure 4-1**) is not hardware dependent—that is, the special purpose module does not have to be physically installed before its information is entered in the database. However, for routine administration and operations procedures, such as removing and restoring module ports to service or displaying the status of the hardware, module installation is required.

For minor database changes, such as modifications to only a few parameters, follow **Procedure 4-2**. For database changes involving extensive configuration adjustments, follow **Procedure 4-3**.

---

### PROCEDURE 4-1. Entering a Module in the Database

1. Use **verify group**, to determine if the appropriate group names have been entered. If they do not appear in the database as required (they were deleted; they have changed; they are misspelled), see the *BNS-2000 Node Reference* for procedures on how to make the necessary changes.
2. Use **enter e2a** or **enter slm** to begin administration. Have your completed database entry forms handy and remember that default values can be specified by pressing  or , as shown in the prompted entry examples in **Special Module Commands**.
3. Use **verify e2a** or **verify slm** to check your entries.
4. If you made any errors or have to change parameter specifications, use **change e2a** or **change slm**. If you need to start over, use **delete e2a** or **delete slm** to eliminate all entries made; then begin again with the **enter** command.

**PROCEDURE 4-1. Entering a Module in the Database** (continued)

5. If the module has been installed, use **restore e2a** or **restore slm** to return ports to service.

---

**PROCEDURE 4-2. Making Minor Database Changes**

A minor database change constitutes a change to a few parameter options for one or two ports.

1. If changes involve addresses or groups, make the needed changes with iterations of the **address** or **group** commands. Use **verify <object>** to check additions/modifications.
2. Remove module ports from service with **remove <object>**.

**NOTE:** The **COMMENT** parameter of a module or port can be changed without removing it from service.

3. Make modifications with **change <object>**.
4. Check changes with **verify <object>**.
5. Return module ports to service with **restore <object>**.

---

**PROCEDURE 4-3. Making Extensive Database Changes**

An extensive database change constitutes a change made to most of the parameter options for all configured ports on one or more modules.

1. If changes involve addresses or groups, make the needed changes with iterations of the **address** or **group** commands. Use **verify <object>** to check additions/modifications.
2. Use **verify e2a** or **verify slm** to get a report of the existing parameter options specified. If necessary, complete the database entry forms provided in the **Appendix**.
3. Remove module ports from service with **remove e2a** or **remove slm**.
4. Eliminate all database information with **delete e2a** or **delete slm**.
5. Re-enter all information with the **enter** command.
6. Verify changes with the **verify** command.
7. Return module ports to service with **restore e2a** or **restore slm**.

#### PROCEDURE 4-4. Moving Database Information to Another Module Address

Module information can be moved to another module address with the **move** command or with a combination of **delete** and **enter**.

##### Method 1:

1. Remove module ports from service with **remove <object>**.
2. Use **verify module** to ensure that a database entry has not been made for the new module address. (If a database address does exist for the specified module address, the command fails.)
3. Use **move module** to transfer database information from one module address to another.
4. Physically move the hardware.
5. Using the new module address, put module ports back into service with **restore <object>**.

##### Method 2:

1. If **move module** is not appropriate for the situation, input **verify <object>** to get a report of the configuration data.
2. Use **remove <object>** to remove the port from service.
3. Use **delete <object>** to eliminate all information at the existing module address.
4. Use **enter <object>** to add the information to the new address.
5. Check information entered at the new address with the **verify** command.
6. Physically move the hardware.
7. Restore the new module port to service with **restore e2a** or **restore slm**.

---

#### PROCEDURE 4-5. Copying Database Information to Another Module Address

Module port information can be duplicated from one module address to another module address with the **copy** command or with a combination of **verify** and **enter**.

##### Method 1:

1. If an additional module must be installed that will require **exactly** the same parameter specifications as a currently installed and configured module, use **remove <object>** to take the module port out of service.
2. Use **verify module** to ensure that a database entry has not been made for the new module address. (If a database entry already exists for the specified module address, the **copy** command will fail.)

**PROCEDURE 4-5. Copying Database Information to Another Module Address**  
(continued)

3. Use **copy module** to duplicate the database information from one module address to another.
4. Use **restore e2a** or **restore slm** to put module ports back into service.

**NOTE:** For both the original and new modules, this method assumes that you have installed the correct hardware in the new slot address before doing the **restore**.

**Method 2:**

1. If **copy module** is not appropriate, use **verify <object>** to get a report of the existing parameter options specified. If necessary, complete the database entry forms furnished in the **Appendix**.
2. Re-enter the information with **enter <object>**.
3. Check information entered with the **verify** command.

## Reports

The following table explains the reports available to assist with analysis of node/concentrator/network performance, system expansion, troubleshooting, and other routine tasks.

Report Topic	Command	Description
connection data	<b>display connections</b>	Lists established connections for modules, groups, or hosts. Group names are included.
module data	<b>dstat module</b>  <b>verify e2a</b> <b>verify module</b> <b>verify slm</b>	Lists hardware/software data. Module must be installed. Verifies information on an E2A module and its ports. Verifies module data for a specified address or all modules Verifies information on a SLM module and its ports.
out-of-service modules	<b>verify oosmods</b>	Lists all configured concentrators and modules that are currently out of service.
port/module data	<b>display held</b>  <b>verify comment</b>  <b>verify group</b>	Lists call hold information for in-service ports for an module or group. Shows destination of call by module address, channel number, and group name. Displays comments entered for a module or its port, channel, or group port. Lists service addresses for a port, module, or group.
traffic data*	<b>display traffic*</b>	Lists traffic data for modules, groups, or hosts. Segment counts are included.

---

\* BNS-2000 only

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# Special Module Troubleshooting

<b>Problem Indicators</b>	<b>5-3</b>
<b>Problem Areas</b>	<b>5-5</b>
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---

# Special Module Troubleshooting

For information about a general, systematic approach to troubleshooting, refer to the *BNS-2000 Node Reference*. If the problem is related to the BNS-2000 MPC, refer to the *Data Networking Products Multipurpose Concentrator Reference*. Using the methods outlined in those documents, you can diagnose problems affecting the entire node or concentrator and isolate localized problems to a specific interface module.

Once the problem is isolated to a special purpose module, this chapter can help identify and further isolate module-related problems. It provides problem indicators that are module-specific, a checklist of problem areas, and detailed procedures or further references to remedy the problem. This chapter does not provide problem-isolation techniques or procedures for end users. Refer to the *BNS-2000 Node Reference* for this information.

## Problem Indicators

Module faceplate indicators and the output of certain commands are often problem indicators that are specific to the module.

**Faceplate Indicators.** The lights associated with the faceplate are green, yellow, and red. They indicate on-line, off-line, and fault states. When the red light (fault light) is lit, the module circuitry and the database are inconsistent.

When pressed, the reset push button clears the module buffers and registers, and restarts the module application program. Ports are taken out of service and connections are terminated.

**Command Output.** The output of operations commands—such as **diagnose e2a** and those listed in the following table—can indicate an existing or potential problem.

TABLE 5-1. Command Output

Command	Description	Further Reference
<b>diagnose e2a</b> <b>diagnose slm</b>	Enables execution of port loopback tests. Test patterns can be looped from the Control Computer to internal and external ports, and local and remote modems.	See <b>Special Module Diagnostics</b> in this chapter. See <b>diagnose e2a</b> and <b>diagnose slm</b> in <b>Special Module Commands</b> . See appropriate vendor documentation for connected end device.
<b>display connections</b>	Shows established connections for modules, groups, or hosts. Group names are included.	See <b>Procedure 5-2. Solving Terminal and/or Data Device Problems</b> .
<b>display held</b>	Shows call held information for all in-service module ports, including module address, port number, and group name of the call originating port; held status, slot, port number, tag name, and group name of the call destination port. Helps determine if the call held limit (seven calls at one time per port) has been reached.	See the <i>Commands Reference</i> .
<b>display traffic</b>	Shows established connections for modules, groups, or hosts. Segment counts are included.	See <b>Procedure 5-2. Solving Terminal and/or Data Device Problems</b> .
<b>dstat module</b>	Provides useful hardware and software troubleshooting information, such as the number of module resets, parity errors, and sanity errors that occurred during a five-minute interval; and module service state and mode state information as determined by status packet data. Output can be compared to that of the <b>verify</b> command and module faceplate indicators.	See the <i>BNS-2000 Node Reference</i> .
<b>verify e2a</b> <b>verify slm</b>	Shows all parameter options configured for a specified module port or ports; useful in determining if currently configured parameter options of the module and connected end device options match.	See <b>Special Module Commands</b> .

## Problem Areas

Once you have determined that the problem does not involve the node or its critical modules, the BNS-2000 MPC, or any connected end device, the problem can be isolated to the module. The following tables further isolate module-specific problems.

**TABLE 5-2. Asynchronous Service—E2A Module Problems Checklist**

√ Symptoms/Indicators	Possible Causes	Actions
<p>___ Transmission problems.</p> <p>___ No communication between node and host.</p> <p>___ No communication between BNS-2000 MPC and connected end devices.</p>	<p>Faulty cabling.</p> <p>Incorrect cables, adapters, or grounding.</p>	<p>See <b>Procedure 5-1. Resolving Asynchronous Service Transmission Problems.</b></p> <p>See <b>Special Module Cabling.</b></p> <p>See the <i>BNS-2000 Node Reference</i> for node grounding requirements and end-user troubleshooting procedures; see the <i>Data Networking Products Multipurpose Concentrator Reference</i> for BNS-2000 MPC grounding requirements.</p>
<p>___ No calls in progress or cannot make calls (shown via alarms or <b>display connections</b> or <b>display traffic</b> output).</p> <p>___ Red LED lit on module</p> <p>___ End users unable to connect to node. (They report no <b>DESTINATION:</b> prompt or garbled characters on terminal.)</p>	<p>Bad cabling connection.</p> <p>E2A Module faulty.</p> <p>Blown slot fuse.</p> <p>Ports not in service.</p> <p>Faulty module.</p> <p>Group to which remote port is assigned has host autobaud option on and system has set the remote port speed to the originator's port speed.</p> <p>Inconsistent terminal and E2A Module port options.</p> <p>Speed selected by hardware strap is inconsistent with external baud rate.</p> <p>Problem with connected end device.</p>	<p>See <b>Procedure 5-2. Solving Terminal and/or Data Device Problems.</b></p> <p>See the <i>BNS-2000 Node Reference</i> for slot fuse and command information.</p> <p>See E2A Module diagnostic procedures in this chapter.</p> <p>See the <i>BNS-2000 Node Reference</i> for procedures regarding end user problems.</p> <p>See E2A Module diagnostic procedures in this chapter.</p> <p>See appropriate vendor documentation for connected end device.</p>

**TABLE 5-2. Asynchronous Service—E2A Module Problems Checklist** (continued)

✓ Symptoms/Indicators	Possible Causes	Actions
<p>___ Output of <b>diagnose e2a</b> indicates problems.</p>	<p>Faulty connection</p> <p>Faulty module</p> <p>Problem with connected end device</p>	<p>See E2A Module diagnostic procedures in this chapter.</p> <p>See the <i>BNS-2000 Node Reference</i> for troubleshooting procedures regarding end user problems.</p> <p>See appropriate vendor documentation for connected end device.</p>

**TABLE 5-3. Synchronous Service—SLM Problems Checklist**

Symptoms/Indicators	Possible Causes	Actions
<p>___ Module will not download or restore.</p> <p>___ Link does not come up.</p> <p>___ PDD is not established.</p> <p>___ No data transport between host and terminal.</p> <p>___ Link comes up but no data is passed.</p> <p>___ Reports or alarm messages indicate problems.</p> <p>___ Red LED on module.</p>	<p>Faulty module, I/O board, or cable.</p> <p>Module or port out of service.</p> <p>Incorrect port configuration.</p> <p>Timing problem.</p> <p>Pipelining problem.</p>	<p>See <b>Procedure 5-3. Resolving Synchronous Service Download Failure.</b></p> <p>See <b>Procedure 5-4. Resolving General SLM Failures.</b></p> <p>See the <i>BNS-2000 Node Reference</i> for further information about resolving synchronous service problems.</p>
<p>___ Output of <b>diagnose slm</b> indicates problems.</p> <p>___ Transmission problems.</p>	<p>Faulty connection.</p> <p>Faulty module.</p> <p>Problem with host connection.</p> <p>Faulty cabling.</p>	<p>See SLM diagnostic procedures in this chapter.</p> <p>See the <i>BNS-2000 Node Reference</i> for troubleshooting host connection problems.</p> <p>See <b>Special Module Cabling.</b></p>

TABLE 5-3. Synchronous Service—SLM Problems Checklist (continued)

Symptoms/Indicators	Possible Causes	Actions
<p>_____ No communication between node and host.</p> <p>_____ No communication between BNS-2000 MPC and connected end devices.</p>	<p>Incorrect cables, adapters, or grounding.</p>	<p>See the <i>BNS-2000 Node Reference</i> for node grounding requirements and end-user troubleshooting procedures; see the <i>Data Networking Products Multipurpose Concentrator Reference</i> for BNS-2000 MPC grounding requirements.</p>
<p>_____ No calls in progress or cannot make calls (shown via alarms or <b>display connections</b> or <b>display traffic</b> output).</p>	<p>Bad cabling connection.</p> <p>SLM faulty.</p> <p>Blown slot fuse.</p> <p>Ports not in service.</p>	<p>See <b>Procedure 5-2. Solving Terminal and/or Data Device Problems.</b></p> <p>See the <i>BNS-2000 Node Reference</i> for slot fuse and command information.</p>
<p>_____ Red LED lit on module.</p>	<p>Faulty module.</p>	<p>See SLM diagnostic procedures in this chapter.</p>
<p>_____ End users unable to connect to node. (They report no <b>DESTINATION:</b> prompt or garbled characters on terminal.)</p>	<p>Group to which remote port is assigned has host autobaud option on and system has set the remote port speed to the originator's port speed.</p> <p>Inconsistent terminal and SLM port options.</p> <p>Speed selected by hardware strap is inconsistent with external baud rate.</p> <p>Problem with connected end device.</p>	<p>See the <i>BNS-2000 Node Reference</i> for procedures regarding end user problems.</p> <p>See SLM diagnostic procedures in this chapter.</p> <p>See appropriate vendor documentation for connected end device.</p>

## Procedures

The following procedures should be followed when troubleshooting an E2A Module or SLM.

For the E2A Module:

- **Procedure 5-1. Resolving Asynchronous Service Transmission Problems**
- **Procedure 5-2. Solving Terminal and/or Data Device Problems**
- **Procedure 5-5. Removing a Module or Port from Service**
- **Procedure 5-6. Restoring a Module or Port to Service**
- **Procedure 5-7. Starting Loopback Tests**

- **Procedure 5-8. Running the Internal Port Test**
- **Procedure 5-9. Running the External Port Test**

For the SLM:

- **Procedure 5-3. Resolving Synchronous Service Download Failure**
- **Procedure 5-4. Resolving General SLM Failures**
- **Procedure 5-5. Removing a Module or Port from Service**
- **Procedure 5-6. Restoring a Module or Port to Service**
- **Procedure 5-7. Starting Loopback Tests**
- **Procedure 5-10. Running the Internal Port Test**
- **Procedure 5-11. Running the Local Modem Test**
- **Procedure 5-12. Running the Remote Modem Test**
- **Procedure 5-13. Performing Off-line Diagnostics**

---

#### **PROCEDURE 5-1. Resolving Asynchronous Service Transmission Problems**

1. Verify that the cables are appropriate for the application; see **Special Module Cabling**.
2. Verify that the module and/or port are in service.
3. Execute the **dstat** command and check for problems.
4. Verify data transport by checking the RD and TD indicators on the breakout box.

---

#### **PROCEDURE 5-2. Solving Terminal and/or Data Device Problems**

1. Check the cabling for loose connections.
2. Check the terminal configuration. Make sure it is compatible with the configurations entered into the node database for flow control, parity, baud rate, and duplex.
3. Verify that the E2A Module external baud rate strap is in the correct position for the external baud rate.
4. Have end users enter the host speed switching signal so the host adjusts its baud rate. Check the host documentation for the correct speed switching signal.
5. Use **remove e2a** to take the port out of service and **restore e2a** to put the port back into service.
6. Check for a blown slot fuse. See the *BNS-2000 Node Reference*.

**PROCEDURE 5-2. Solving Terminal and/or Data Device Problems** (continued)

7. Run module diagnostics. See **E2A Module Diagnostics** in this chapter.

---

**PROCEDURE 5-3. Resolving Synchronous Service Download Failure**

1. Record any alarm when a failure occurs; see the *Data Networking Products Messages Reference* for a more complete description.
2. If the module is in a concentrator, check the link for errors.
3. Use the **verify slm** command to check what the download server and software version are. If they are not the Control Computer defaults, see if the path to the serving host is functional.
4. Reseat the module and try to download again using the **restore slm** command.
5. Replace the module and attempt to download again.
6. Check the voltages on the backplane/slot to see if there is a potential power problem and verify that the voltage on the modular power supplies for the node are set correctly; see the *BNS-2000 Node Reference*.
7. Perform off-line diagnostics on the module; see **SLM Diagnostics**.

---

**PROCEDURE 5-4. Resolving General SLM Failures**

Sometimes, the **verify slm** command shows a module to be out-of-service due to a fault condition, but the module passes all off-line and on-line diagnostics. Attempts to restore the module to service fail. If this is the case, apply the following procedure.

1. Set the MODE switch on each board to DISABLE.
2. Unfasten the latch, and slide each SLM board out an inch or so, then push each board back into place and re-fasten the latch. Repeat this step three times.
3. I/O distribution boards and DB25 connectors attached to the boards should also be reseated.
4. Move the board's MODE switch to DIAG.
5. Press the board's RESET switch and move the MODE switch to ENABLE. Press the RESET switch again.
6. Try to restore the module to service using the **restore** command.
7. If the preceding steps fail to restore the module, try physically moving the module boards to different hardware slots. Change the physical address of the module in the node configuration database using the **move module** command.

## Diagnostics

This section explains how to begin running E2A Module/SLM diagnostics and the cables and connectors needed. It is supplemented by descriptions of the **diagnose e2a** and **diagnose slm** commands in the **Special Module Commands** chapter, which explain the diagnostic prompting sequence and the meaning of each parameter and its options. System responses are also included.

Diagnostics can help in locating and isolating a defective module or problems in a transmission path such as an improper connection to an I/O distribution board. They can be used:

- when the module is first defined in the database
- when configuration changes are made
- when module integrity is in question

Unlike the control module diagnostics that are run when the Control Computer is not operational, diagnostics for interface modules are run when the Control Computer is operational; that is, when the Control Computer is handling call requests.

Diagnostics are executed at the **CCO>** prompt using the **diagnose** command. They affect service only on the module/port being diagnosed.

Module diagnostics are either tests run on the module hardware or loopback tests that isolate problems in a transmission path to a replaceable unit, such as a module or cable.

A loopback test works as follows:

- The **diagnose** command (for example, **diagnose e2a**) sends a test pattern from the local Control Computer over a path (or circuit) to a designated endpoint and back to the Control Computer.
- When the test pattern returns to the local Control Computer, the Control Computer checks to see if it matches what was sent.
  - If it does match, the path is most likely operating properly.
  - If it does not match, there is a problem in the path.

Loopback tests are continued on increasingly larger portions of the transmission path. When a test fails, this indicates that the trouble is somewhere in the incremental portion of the path tested.

To run an on-line test, the module must be in service and the port being tested must be out of service. To run an off-line test, the module must be out of service.

Procedures for removing modules from and restoring modules to service follow.

E2A Module loopback tests consist of an Internal Port Test and an External Port Test.

SLM tests consist of both on-line and off-line diagnostics. The on-line tests are the Internal Port Test, the Local Modem Test, and the Remote Modem Test. The off-line test checks the module hardware.

Some general testing guidelines include:

- If end user problems occur after database configuration changes have been made or after an end user has changed terminal options, verify port options with the **verify** command before running the **diagnose** command.
- When installing or changing a module, run the **diagnose** command on all ports.

**NOTE:** Throughout this chapter, the commands used in the diagnostics are given in one-line entry mode. Complete command syntax and all messages that appear during the diagnostics are given in **Special Module Commands**.

---

#### **PROCEDURE 5-5. Removing a Module or Port from Service**

1. Use the **remove** command to remove a module or port from service.
  2. Use the **dstat** command to verify that the module or port is out of service.
- 

#### **PROCEDURE 5-6. Restoring a Module or Port to Service**

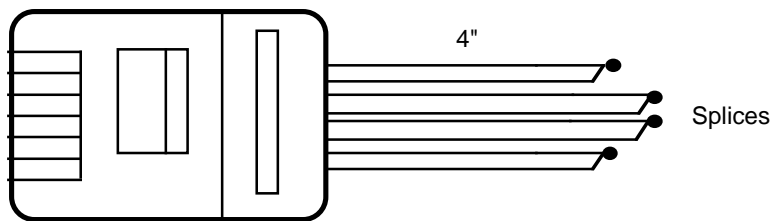
1. Use the **restore** command to restore a module or port to service.
2. Use the **dstat** command to verify that the module or port is in service.

#### **Loopback Connectors**

Loopback connectors are used with the **diagnose** command to perform incremental loopback tests of the data circuit between the E2A Module and SLM and connected end devices. When connectors are not available, loopback connectors for use with a modular jack or 110 patch panel can be built. The SLM external port test, however, requires the ED5P056-30,G24 loopback connector.

The following figures illustrate how to build loopback connectors.

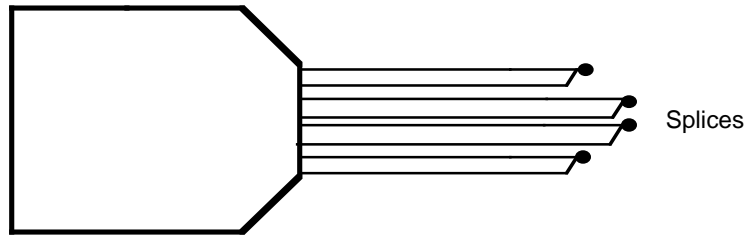
The top portion of the figure below shows how to modify one end of an 8-conductor modular plug. The bottom portion is a wiring schematic for the plug.



MODULAR PLUG PIN NO.	CONDUCTOR COLOR	CONNECT AS INDICATED
8	SLATE	
7	BROWN	
6	YELLOW	
5	GREEN	
4	RED	
3	BLACK	
2	ORANGE	
1	BLUE	

**FIGURE 5-1. Loopback Connector for Use with a Modular Jack**

The top portion of the figure below shows how to modify one end of a 4-pair 110 patch panel patchcord. The bottom portion is a wiring schematic for the plug.



PATCHCORD PLUG TERMINAL NO.	CONDUCTOR COLOR	CONNECT AS INDICATED
8	BR-W	8
7	W-BR	7
6	G-W	6
5	W-G	5
4	O-W	4
3	W-O	3
2	BL-W	2
1	W-BL	1

**FIGURE 5-2. Loopback Connector for Use with a 110 Patch Panel**

**PROCEDURE 5-7. Starting Loopback Tests**

1. Remove the port to be tested from service: **remove <object> <mod addr> <port num>**
2. Verify that the port has been taken out of service: **verify <object> <mod addr>**
3. Put any modems in loopback mode, and attach appropriate loopback connectors and cables. If appropriate loopback connectors are unavailable, refer to the preceding directions that explain how to build a suitable set of connectors. The SLM *external\_port* test requires a loopback connector (ED5P056-30,G24).

In addition, when connecting loopback connectors for the *local\_modem* or *remote\_modem* test, it is not necessary to connect the loopback connector beyond the modem in most instances.

**NOTE:** Improperly installed connectors and cables can produce diagnostic errors.

**Loopback Connectors**

Table 5-4 shows the loopback connectors required to run loopback diagnostics.

**TABLE 5-4. Loopback Connectors**

Service/Module	Loopback Test	Hardware Description	Connector ED or Other ID	Comcode
E2A	External port	E2A test cable	ED5P055-30,G24	—
SLM	External port	RS-232-C Loop Conn	ED5P056-30,G24	—

**E2A Module Diagnostics**

The E2A Module diagnostics provide two tests: the Internal Port test and External Port test.

The Internal Port test sends a test pattern from the Control Computer to the E2A Module port being tested, where it is looped back to the Control Computer. If the test pattern returned to the Control Computer matches the pattern sent, the test passes, indicating that this portion of the E2A circuit is working. Otherwise, the test fails, indicating internal trouble in the port being tested.

The External Port test requires loopback connections. The loopback point may be either the E2A Module null modem cable connected to the test port and another E2A Module port serving as a receive port for the External Port test, or a 4-wire null modem cable connected to the remote ports of the modems that are connected to the E2A Module ports.

The External Port test sends a test pattern from the Control Computer through the transmit portion of the test port, and through the loopback point, to the receive port. A test pattern is then sent from the receive port back through the loopback point to the receive portion of the E2A Module test port.

The test pattern that is received is checked at both E2A Module ports; if it agrees with the test pattern that was sent, the test passes, indicating that portion of the E2A Module is working. If the received test pattern does not agree with the test pattern that was sent, there is trouble somewhere in that portion of the E2A circuit.

**NOTE:** The E2A Module diagnostics test only one E2A Module port at a time. When installing or changing E2A Modules, be sure to test all E2A Module ports. All E2A Module diagnostics interrupt service to the port being diagnosed. Other ports on the same module are unaffected.

---

#### **PROCEDURE 5-8. Running the Internal Port Test**

1. Enter **diagnose e2a <module address> <port #> internal\_port**
2. If the **LOOP-AROUND TEST SUCCESSFUL** message is displayed, the test passes. Go to **Running External Port Test**, below.
3. If the **LOOP-AROUND TEST FAILED** message is displayed, the test has failed. The trouble may be in the E2A Module port. Replace the E2A Module and repeat the test.

---

#### **PROCEDURE 5-9. Running the External Port Test**

1. Connect one end of an E2A Module test cable (ED5P055-30, G24) to the E2A Module port being tested.
2. Connect the other end to a known good E2A Module port. This working port may be on the same E2A Module or on another E2A Module, but it must be on the same node as the port being tested.
3. Enter **diagnose e2a <module address> <port #> external\_port**
4. If the test passes, the problem is not in the E2A Module or I/O distribution board. Go to Step 5.
5. If the test fails, the problem may be in the E2A Module I/O distribution board or in the E2A Module itself. Replace the I/O distribution board and repeat the test. If the test still fails, replace the module and repeat the test.
6. Remove the E2A null modem cable and reconnect the modem cables to the E2A Module ports.
7. Connect one end of a 4-wire null modem cable to the remote side of the modem connected to the port being tested.

#### PROCEDURE 5-9. Running the External Port Test (continued)

8. Connect the other end of a 4-wire null modem cable to the remote side of the modem connected to a working E2A Module port. The working port may be on the same E2A Module or on another E2A Module, but it must be on the same node as the port being tested.
9. Enter **diagnose e2a <module address> <port #> external\_port**
10. If the test passes, the E2A Module port, cables, and local modem are good. The problem may be in the data transmission facilities or on the other side of the data link. Remove the 4-wire null modem cable and reconnect the modem to the data facilities.
11. If the test fails, the local modem or the cables between the local modem and the I/O distribution board may be faulty. Replace the faulty component and repeat the test.

### SLM Diagnostics

Both on-line and off-line diagnostics are available for the SLM.

On-line diagnostics are run on one port at a time and affect service on that port only. When installing or changing an SLM, be sure to test all SLM ports.

Off-line diagnostics check the module hardware.

**Caution:** When you remove the SLM from service, you must use the **remove** command and place the MODE switch in the ENABLE position. Otherwise, you will receive an error message when you try to restore it.

---

#### PROCEDURE 5-10. Running the Internal Port Test

**Applicability:** When running the Internal Port test on the SLM, a synchronous loopback modem (2400 B only) must be connected to the port under test.

1. Connect the synchronous loopback modem to the port.
2. Enter **diagnose slm <module address> on-line <port #> internal\_port**
3. If the test passes, go to **Running the Local Modem Test**, below.
4. If the test fails, the trouble may be in the SLM. Replace the module and repeat the test.
5. Remove the synchronous loopback modem when testing is complete.

---

#### PROCEDURE 5-11. Running the Local Modem Test

1. Put the local modem in loopback mode.
2. Enter **diagnose slm <module address> on-line <port #> local\_modem**
3. If the test passes, the problem is not in the module, I/O distribution board, or local modem. Go to **Remote Modem Test**, below.

**PROCEDURE 5-11. Running the Local Modem Test** (continued)

4. If the test fails, the problem is probably in the I/O distribution board, the cables between the I/O board and the modem, or the local modem. Replace the faulty component and repeat the test.

---

**PROCEDURE 5-12. Running the Remote Modem Test**

1. Remove the local modem from loopback mode and put the remote modem in loopback mode.
2. Enter **diagnose slm <module address> on-line <port #> remote\_modem**
3. If the test passes, the transmission path from the local Control Computer to the remote modem is working. If a problem still exists from the remote connection, the connection between the remote modem and the remote connection may be faulty. Replace the faulty component and repeat the test.
4. If the test fails, either the data facility (the transmission path between the modems) or the remote modem is faulty. Replace the faulty component and repeat the test.

---

**PROCEDURE 5-13. Performing Off-line Diagnostics**

1. Remove the module from service.
2. Verify that the SLM is in ROM mode by moving the MODE switch down to DIAG and then up to ENABLE. The red LEDs on the two boards that make up this module should light. If the LED on either board fails to light, replace that board and repeat this step. If this does not fix the problem, check the cabling and the I/O distribution boards for defects. If the problem still exists, continue with step 3 to run the off-line diagnostics.
3. Enter **diagnose slm <module address> off-line**
4. If the test passes, the following messages appear:  

```
BOOT DIAGNOSTICS PASSED  
MEMORY TEST PASSED  
M diagnose slm <module number> off-line  
OFFLINE TESTS SUCCESSFUL
```
5. If the test fails, an error message is displayed with a recommended action. Follow the steps indicated in this message.

---

# Special Module Commands

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---

# Special Module Commands

This chapter describes the commands related to the administration, operation, and maintenance of the E2A Module and SLM. System responses for all commands are provided at the end of the chapter.

The **enter e2a** and **enter slm** commands show the full prompting sequence and contain a list of parameter definitions. In addition, the database entry forms provided in the **Appendix** follow the prompting sequence for each module entered.

Other commands that are related to the administration, operation, and maintenance of these special modules are documented in the *Data Networking Products Commands Reference*.

## E2A Module Commands

The E2A Module provides telemetry service for the Switching Control Center System (SCCS). It is used for data connectivity between the SCCS and, via data sets, its analog electronic switches. The E2A Module has four telemetry ports, each operating asynchronously at 1200 bps.

---

## change e2a

The **change e2a** command enables you to modify information on the local receiving groups to which E2A Module ports belong. Before executing **change e2a**, remove the appropriate E2A Module ports from service with **remove e2a**. The **COMMENT** parameter can be changed without removing the E2A module port(s) from service.

### Syntax

You can input **change e2a** in prompted entry only. The command syntax for **enter e2a** and **change e2a** are similar. The defaults for **change e2a** are those values, conditions, or states that currently exist in the database. They are displayed within parentheses in the parameter prompt.

### Parameters

When *none* is specified at the **PORT x GROUP NAME** prompt, the group name **and** the comment regarding that group name are deleted. For a further explanation, refer to the parameter definitions supplied in **enter e2a**.

### Prompted Entry: Changing E2A Module Port Information

```
CC0> change
OBJECTS [...e2a...]: e2a
MODULE ADDRESS: 33
PORT 1 GROUP NAME (or "none") [up to 8 chars: +(e2agrp1)]: +
COMMENT [up to 60 chars double quoted: +("1 in aisle a")]: +
PORT 2 GROUP NAME (or "none") [up to 8 chars: +(e2agrp2)]: +
COMMENT [up to 60 chars double quoted: +("2 in aisle b")]: +
PORT 3 GROUP NAME (or "none") [up to 8 chars: +(e2agrp3)]: none
PORT 4 GROUP NAME (or "none") [up to 8 chars: +(e2agrp4)]: +
COMMENT [up to 60 chars double quoted: +("4 in aisle d")]: +
CC0>
```

delete e2a

---

## delete e2a

The **delete e2a** command enables you to eliminate database information on the local receiving groups to which E2A Module ports belong. Before entering **delete e2a**, all module ports must be taken out of service with **remove e2a**.

### Syntax

You can input **delete e2a** in prompted or one-line entry.

```
CC0> delete
OBJECTS [...e2a...]: e2a
MODULE ADDRESS:
```

### Parameters

Refer to the parameter definition supplied in **enter e2a**.

### Prompted Entry: Deleting E2A Module Information

```
CC0> delete
OBJECTS [...e2a...]: e2a
MODULE ADDRESS: 33
CC0>
```

### One-line Entry: Deleting E2A Module Information

```
CC0> delete e2a 33
```

---

## diagnose e2a

The **diagnose e2a** command enables you to run two types of loopback tests for an E2A Module port. Only one port can be tested at a time. Before executing **diagnose e2a**, use **remove e2a** to take the port to be tested out of service.

The loopback diagnostics test the E2A Module transmission path by sending a test pattern from the Control Computer, through the E2A path, to a loopback point and back to the Control Computer. The received test pattern is checked at the Control Computer; if it agrees with the transmitted test pattern, the test passes and that portion of the E2A circuit is good. If the received test pattern does not agree with the transmitted test pattern, internal port trouble exists.

For the external port test, another port (known to be trouble free) is required in addition to the port being tested. The two ports do not have to be on the same E2A Module, but both modules must be in the same node and both ports must be removed from service. If both ports are on the same E2A Module, only port pairs 1,3 and 2,4 can be used. One port must be the receiver; the other the transmitter. Any other port combination is invalid (the test will fail). Other ports on the E2A Module(s) are not affected.

### Syntax

You can input **diagnose e2a** in prompted or one-line entry.

```
CC0> diagnose
OBJECTS [...e2a...]: e2a
MODULE ADDRESS:
PORT NUMBER [1-4]:
TEST TYPE [internal_port, external_port: +(external_port)]:
For an external_port:
The external_port loop requires a module and port to receive the test message:
MODULE ADDRESS:           - can be the same E2A Module -
PORT NUMBER [1-4]:       - must be a different E2A Module port -
```

### Parameters

#### PORT NUMBER

A number from 1 to 4 specifying an E2A Module port. Only a single port number entry is allowed. For *external\_port*, two different port numbers must be specified. When running the test on ports that are on the same board, the ports must be paired as 1, 3 or 2, 4.

### Parameters *(continued)*

**TEST TYPE** Specifies the diagnostic to be run.

- *internal\_port*  
This test extends to the UART within the DCE or DTE port being diagnosed. It does not check the integrity of the interface terminators and receivers.
- *external\_port*  
This test, which is valid for DCE ports only, extends through the port to an external, 25-pin loopback connector. It checks the integrity of the I/O distribution board, and the interface terminators and receivers.

For the remaining parameters, refer to the definitions supplied in **enter e2a**.

### Prompted Entry: Running E2A Module Internal Port Diagnostics

```
CC0> diagnose
OBJECTS [...e2a...]: e2a
MODULE ADDRESS: 33
PORT NUMBER [1-4]: 1
TEST TYPE [internal_port, external_port: +(external_port)]: internal_port

M diagnose e2a 33 1 internal_port
  LOOP-AROUND TEST SUCCESSFUL

Test Port Is Out Of Service, Use RESTORE to Place It In Service
CC0>
```

---

### Prompted Entry: Running E2A Module External Port Diagnostics

```
CC0> diagnose
OBJECTS [...e2a...]: e2a
MODULE ADDRESS: 33
PORT NUMBER [1-4]: 1
TEST TYPE [internal_port, external_port: +(external_port)]: +

The external_port loop requires a module and port to receive the test message:
MODULE ADDRESS: 33
PORT NUMBER [1-4]: 3

Place The Loop-Around Connection on the E2A Ports
Type 'yes' To Continue, 'no' To Stop Command
[yes, no]: yes

M diagnose e2a 33 1 external_port
  LOOP-AROUND TEST SUCCESSFUL

Test and Receive Ports Are Out Of Service, Use RESTORE to Place In Service
Replace The Loop-Around Connection With Normal Connection.
CC0>
```

### One-line Entries: Running E2A Module Internal and External Port Diagnostics

```
CC0> diagnose e2a 33 1 internal_port
<diagnostic output>
CC0> diagnose e2a 33 1 external_port
<diagnostic output>
```

enter e2a

---

## enter e2a

The **enter e2a** command enables you to add information regarding the local receiving groups to which E2A Module ports belong.

### Syntax

You can input **enter e2a** in prompted entry only. The defaults are shown in parentheses.

```
CC0> enter
OBJECTS [...e2a...]: e2a
MODULE ADDRESS:

PORT 1 GROUP NAME (or "none") [up to 8 chars]:
If PORT 1 GROUP NAME is not "none":
COMMENT [up to 60 chars double quoted]:

PORT 2 GROUP NAME (or "none") [up to 8 chars]:
If PORT 2 GROUP NAME is not "none":
COMMENT [up to 60 chars double quoted]:

PORT 3 GROUP NAME (or "none") [up to 8 chars]:
If PORT 3 GROUP NAME is not "none":
COMMENT [up to 60 chars double quoted]:

PORT 4 GROUP NAME (or "none") [up to 8 chars]:
If PORT 4 GROUP NAME is not "none":
COMMENT [up to 60 chars double quoted]:
```

### Parameters

#### MODULE ADDRESS

A number identifying the shelf slot the module occupies. Only a single module address is allowed.

#### PORT x GROUP NAME

A string of 1 to 8 characters that specifies the name of the local receiving group to which the port designated as *x* belongs. The local receiving group must be entered with **enter group**. A unique group can be assigned to one port only.

#### COMMENT

If **PORT x GROUP NAME** has been specified, a string of 1 to 60 characters, enclosed in double quotation marks, that contains useful administrative information.

---

**Prompted Entry: Entering E2A Module Port Information**

```
CC0> enter
OBJECTS [...e2a...]: e2a
MODULE ADDRESS: 33
PORT 1 GROUP NAME (or "none") [up to 8 chars]: e2agrp1
COMMENT [up to 60 chars double quoted]: "1 in aisle a"
PORT 2 GROUP NAME (or "none") [up to 8 chars]: e2agrp2
COMMENT [up to 60 chars double quoted]: "2 in aisle b"
PORT 3 GROUP NAME (or "none") [up to 8 chars]: e2agrp3
COMMENT [up to 60 chars double quoted]: "3 in aisle c"
PORT 4 GROUP NAME (or "none") [up to 8 chars]: e2agrp4
COMMENT [up to 60 chars double quoted]: "4 in aisle d"
CC0>
```

remove e2a

---

## remove e2a

The **remove e2a** command enables you to take an E2A Module and its ports out of service. The module is removed from service when its last port is taken out of service. Any in-progress calls are interrupted.

### Syntax

You can input **remove e2a** in prompted or one-line entry.

```
CC0> remove
OBJECTS [...e2a...]: e2a
MODULE ADDRESS:
PORT NUMBER [1-4]:
```

### Parameters

#### PORT NUMBER

A number from 1 to 4 specifying an E2A Module port. Multiple port number entries are allowed.

For the remaining parameter, refer to the definition supplied in **enter e2a**.

### Prompted Entry: Removing an E2A Module Port From Service

```
CC0> remove
OBJECTS [...e2a...]: e2a
MODULE ADDRESS: 33
PORT NUMBER [1-4]: 3
CC0>
```

### One-line Entry: Removing an E2A Module Port From Service

```
cc0> remove e2a 33 3
```

---

## restore e2a

The **restore e2a** command enables you to put E2A Module ports into service initially, or after their manual or automatic removal.

### Syntax

You can input **restore e2a** in prompted or one-line entry.

```
CC0> restore
OBJECTS [...e2a...]: e2a
MODULE ADDRESS:
PORT NUMBER [1-4]:
```

### Parameters

#### PORT NUMBER

A number from 1 to 4 specifying an E2A Module port. Multiple port number entries are allowed.

For the remaining parameter, refer to the definition supplied in **enter e2a**.

### Prompted Entry: Restoring an E2A Module Port to Service

```
CC0> restore
OBJECTS [...e2a...]: e2a
MODULE ADDRESS: 33
PORT NUMBER [1-4]: 3
CC0>
```

### One-line Entry: Restoring an E2A Module Port to Service

```
CC0> restore e2a 33 3
```

## verify e2a

The output of the **verify e2a** command enables you to check database information regarding the local receiving groups to which the ports for a particular E2A Module or all E2A Modules belong.

### Syntax

You can input **verify e2a** in prompted or one-line entry.

```
CC0> verify
OBJECTS [...e2a...]: e2a
MODULE ADDRESS [(all)]:
```

### Parameters

Except for specification of the word *all*, meaning every E2A Module, the **MODULE ADDRESS** parameter definition for **verify e2a** is the same as that for **enter e2a**.

### Prompted Entry: Verifying E2A Module information

```
CC0> verify
OBJECTS [...e2a...]: 33
MODULE ADDRESS [(all)]: 33
<system output>
```

### One-line Entry/Output: Verifying E2A Module information

```
CC0> verify e2a 33
<yy-mm-dd hh:mm:ss NODE=<name>
M verify e2a 33
MODULE ADDRESS: 33
MODULE TYPE: e2a
SERVICE STATE: out (manual)

PORT  SRVC      GROUP
  1    out      e2agrp1
  2    out      e2agrp2
  4    out      e2agrp4

PORT  COMMENT
  1    1 in aisle a
  2    2 in aisle b
  4    4 in aisle d
CC0>
```

---

### Report Fields

This table correlates each report field heading shown in the output of **verify e2a** with the parameter for which you are prompted in **enter e2a** or **change e2a**. The information in the second column of the table indicates the parameter option specified with the command. An asterisk (\*) indicates that a parameter is *not applicable* or *not used*.

Report Field Name	Corresponding Parameter Name
COMMENT	COMMENT
GROUP	GROUP NAME
MODULE ADDRESS	MODULE ADDRESS
MODULE TYPE	OBJECTS
PORT*	port number of the hardware module
SERVICE STATE*	service state of the module
SRVC*	service state of the port

## SLM Commands

The Synchronous Line Module (SLM) provides an interface of up to four BX.25 Issue 2 synchronous data links for various OSSs. It is used to convert the Universal Receiver Protocol (URP) to the BX.25 Issue 2 protocol. The SLM, which is a downloadable module, consists of two boards providing four synchronous ports.

---

## change slm

The **change slm** command enables you to modify information on the local receiving groups to which SLM ports belong. Before executing **change slm**, remove the appropriate SLM ports from service with **remove slm**. The **COMMENT** parameter can be changed without removing the SLM port(s) from service.

### Syntax

You can input **change slm** in prompted entry only. The command syntax for **enter slm** and **change slm** are similar. The defaults for **change slm** are those values, conditions, or states that currently exist in the database. They are displayed within parentheses in the parameter prompt.

### Parameters

When *none* is specified at the **PORT x GROUP NAME** prompt, the group name **and** the comment on that group name are deleted. For a further explanation, refer to the parameter definitions supplied in **enter slm**.

### Prompted Entry: Changing the Group for an SLM Port

```
CC0> change
OBJECTS [...slm...]: slm
MODULE ADDRESS: 3
DOWNLOAD SERVER [(controller)]: +
SOFTWARE VERSION [(slm.1.4.01)]: +
PORT 1 GROUP NAME (or "none") [up to 8 chars: +(slmgrp1)]: +
COMMENT [up to 60 chars double quoted: +("1 in aisle a")]: +
PORT 2 GROUP NAME (or "none") [up to 8 chars: +(slmgrp2)]: +
COMMENT [up to 60 chars double quoted: +("2 in aisle b")]: +
PORT 3 GROUP NAME (or "none") [up to 8 chars: +(slmgrp3)]: none
PORT 4 GROUP NAME (or "none") [up to 8 chars: +(slmgrp4)]: +
COMMENT [up to 60 chars double quoted: +("4 in aisle d")]: +
CC0>
```

delete slm

---

## delete slm

The **delete slm** command enables you to eliminate database information on the SLM. Before entering **delete slm**, all module ports must be taken out of service with **remove slm**.

To delete information regarding port groups, use **change slm** and specify *none* at the **PORT x GROUP NAME** prompt.

### Syntax

You can input **delete slm** in prompted or one-line entry.

```
CC0> delete
OBJECTS [...slm...]: slm
MODULE ADDRESS:
```

### Parameters

Refer to the parameter definition supplied in **enter slm**.

### Prompted Entry: Deleting SLM information

```
CC0> delete
OBJECTS [...slm...]: slm
MODULE ADDRESS: 3
CC0>
```

### One-line Entry: Deleting SLM information

```
CC0> delete slm 3
```

## diagnose slm

The **diagnose slm** command enables you to perform *on-line* loopback tests or *off-line* tests for an out-of-service SLM port. Only one port can be tested at a time. For *off-line* tests, all ports must be out of service. For *on-line* loopback tests, only the port to be tested must be out of service. However, if all ports are out of service, the module is downloaded before the port can be diagnosed.

The loopback tests for *on-line* diagnostics test an SLM transmission path by sending a test pattern from the Control Computer through the SLM path to a loopback point and back to the Control Computer. The received test pattern is checked at the Control Computer; if it agrees with the transmitted test pattern, the test passes and that portion of the SLM circuit is good. If the received test pattern does not agree with the transmitted test pattern, internal port trouble exists.

The *off-line* diagnostics verify hardware integrity, by providing fault isolation capability in addition to that provided by the *on-line* loopback tests. The *off-line* diagnostics are performed by the resident firmware and the downloaded diagnostic software.

### Syntax

You can input **diagnose slm** in prompted or one-line entry.

```
CC0> diagnose
OBJECTS [...slm...]: slm
MODULE ADDRESS:
SLM TEST TYPE [on-line, off-line]:
For on-line testing:
PORT NUMBER [1-4]:
TEST TYPE [internal_port, local_modem, remote_modem: +(internal_port)]:
```

### Parameters

#### PORT NUMBER

A number from 1 to 4 specifying an SLM port. Multiple port number entries are not allowed.

#### SLM TEST TYPE

Specifies whether the test is to be run *on-line* or *off-line*.

**TEST TYPE** If the test is *on-line*, specifies the type of loopback diagnostic to be run.

- *internal\_port*  
This test extends to the UART within the DCE or DTE port being diagnosed. It does not check the integrity of interface terminators and receivers.
- *local\_modem*  
This test, which is valid for DTE ports only, extends to the port's local modem. The local modem must be in loopback mode.

- *remote\_modem*

This test, which is valid for DTE ports only, extends to the port's remote modem. The remote modem must be in loopback mode.

For the remaining parameter, refer to the definition supplied in **enter slm**.

### Prompted Entry: Running Off-line SLM Port Diagnostics

```
CC0> diagnose
OBJECTS [...slm...]: slm
MODULE ADDRESS: 3
SLM TEST TYPE [on-line, off-line]: off-line

        PLEASE WAIT
        TEST IS RUNNING

BOOT DIAGNOSTICS PASSED
MEMORY TEST PASSED

THE NEXT TEST WILL TAKE ABOUT 3 MINUTES TO COMPLETE
DEPRESS THE 'DELETE' KEY TO INTERRUPT
M diagnose slm 3 off-line
  OFFLINE TESTS SUCCESSFUL
CC0>
```

---

### Prompted Entry: Running On-line SLM Port Diagnostics

```
CC0> diagnose
OBJECTS [...slm...]: slm
MODULE ADDRESS: 3
SLM TEST TYPE [on-line, off-line]: on-line
PORT NUMBER [1-4]: 1
TEST TYPE [internal_port, local_modem,
remote_modem: +(internal_port)]: +
        DOWNLOAD IN PROGRESS . . . . .

        PLEASE WAIT
        TEST IS RUNNING

<yy-mm-dd hh:mm:ss NODE=<name>
M diagnose slm 3 on-line 1 internal
        LOOP_AROUND COMPLETED SUCCESSFULLY
CC0>
```

### One-line Entries: Running On-line and Off-line SLM Port Diagnostics

```
CC0> diagnose slm 3 off-line
<diagnostic output>
CC0> diagnose slm 3 on-line 1 internal_port
<diagnostic output>
```

enter slm

---

## enter slm

The **enter slm** command enables you to add information regarding the local receiving groups to which SLM ports belong.

### Syntax

You can input **enter slm** in prompted entry only. The defaults are shown in parentheses.

```
CC0> enter
OBJECTS [...slm...]: slm
MODULE ADDRESS:
DOWNLOAD SERVER [(controller)]:
SOFTWARE VERSION [(version)]:

PORT 1 GROUP NAME (or "none") [up to 8 chars]:
If PORT 1 GROUP NAME is not "none":
COMMENT [up to 60 chars double quoted]:
PORT 2 GROUP NAME (or "none") [up to 8 chars]:
If PORT 2 GROUP NAME is not "none":
COMMENT [up to 60 chars double quoted]:
PORT 3 GROUP NAME (or "none") [up to 8 chars]:
If PORT 3 GROUP NAME is not "none":
COMMENT [up to 60 chars double quoted]:
PORT 4 GROUP NAME (or "none") [up to 8 chars]:
If PORT 4 GROUP NAME is not "none":
COMMENT [up to 60 chars double quoted]:
```

### Parameters

#### COMMENT

If **PORT x GROUP NAME** has been specified, a string of 1 to 60 characters, enclosed in double quotation marks, that contains useful administrative information.

#### DOWNLOAD SERVER

Specifies the source of the downloadable software to be the *controller* or a valid service address for a download server.

#### MODULE ADDRESS

A number identifying the shelf slot that the module occupies. Only a single module address is allowed. Since the SLM is a double-board module, see **Special Module Installation** for additional details concerning module addresses.

#### PORT x GROUP NAME

A string of 1 to 8 characters that specifies the name of the local receiving group to which the port designated as *x* belongs. The local receiving group must be entered with the **enter group** command. Each unique group can be assigned to one port only.

**SOFTWARE VERSION**

Specifies the particular version of software to be downloaded to the module. This corresponds to a version on the CPM-connected Host Operations System.

**Prompted Entry: Entering SLM Port Information**

```
CC0> enter
OBJECTS [...slm...]: slm
MODULE ADDRESS: 3
DOWNLOAD SERVER [+(controller)]: +
SOFTWARE VERSION [+(slm.1.4.01)]: +
PORT 1 GROUP NAME (or "none") [up to 8 chars]: slmgrp1
COMMENT [up to 60 chars double quoted]: "1 in aisle a"
PORT 2 GROUP NAME (or "none") [up to 8 chars]: slmgrp2
COMMENT [up to 60 chars double quoted]: "2 in aisle b"
PORT 3 GROUP NAME (or "none") [up to 8 chars]: slmgrp3
COMMENT [up to 60 chars double quoted]: "3 in aisle c"
PORT 4 GROUP NAME (or "none") [up to 8 chars]: slmgrp4
COMMENT [up to 60 chars double quoted]: "4 in aisle d"
CC0>
```

## remove slm

The **remove slm** command enables you to take an SLM and its ports out of service. The module is removed from service when its last port is taken out of service. Any in-progress calls are interrupted.

### Syntax

You can input **remove slm** in prompted or one-line entry.

```
CC0> remove
OBJECTS [...slm...]: slm
MODULE ADDRESS:
PORT NUMBER [1-4]:
```

### Parameters

#### PORT NUMBER

A number from 1 to 4 specifying an SLM port. Multiple port number entries are allowed.

For the remaining parameter, refer to the definition supplied in **enter slm**.

### Prompted Entry: Removing an SLM Port from Service

```
CC0> remove
OBJECTS [...slm...]: slm
MODULE ADDRESS: 3
PORT NUMBER [1-4]: 3
CC0>
```

### One-line Entry: Removing an SLM Port from Service

```
CC0> remove slm 3 3
```

---

## restore slm

The **restore slm** command enables you to put SLM ports into service initially, or after their manual or automatic removal.

**WARNING:** If you restore an SLM when its front panel switch is in the DIAG position, the module hangs and the download fails. To recover, you cannot just move the switch to the ENABLE position. You must first remove the SLM from service, put the switch in the ENABLE position, and then restore the SLM to service.

### Syntax

You can input **restore slm** in prompted or one-line entry.

```
CC0> restore
OBJECTS [...slm...]: slm
MODULE ADDRESS:
PORT NUMBER [1-4]:
```

### Parameters

#### PORT NUMBER

A number from 1 to 4 specifying an SLM port. Multiple port number entries are allowed.

For the remaining parameter, refer to the definition supplied in **enter slm**.

### Prompted Entry: Restoring an SLM Port to Service

```
CC0> restore
OBJECTS [...slm...]: slm
MODULE ADDRESS: 3
PORT NUMBER [1-4]: 3
CC0>
```

### One-line Entry: Restoring an SLM Port to Service

```
CC0> restore slm 3 3
```

## verify slm

The output of the **verify slm** command enables you to check database information regarding the local receiving groups to which the ports for a particular SLM or all SLMs belong.

### Syntax

You can input **verify slm** in prompted or one-line entry.

```
CC0> verify
OBJECTS [...slm...]: slm
MODULE ADDRESS [+(all)]:
```

### Parameters

The **MODULE ADDRESS** parameter definition for **verify slm** is the same as **enter slm**, except that this command allows you to specify *all*, which means every SLM.

### Prompted Entry: Verifying SLM Information

```
CC0> verify
OBJECTS [...slm...]: slm
MODULE ADDRESS [+(all)]: 3
<report output>
```

### One-line Entry/Output: Verifying SLM Information

```
CC0> verify slm 3
  <yy-mm-dd hh:mm:ss NODE=<name>
M verify slm 3
MODULE ADDRESS: 3
MODULE TYPE: slm                NCHLS: 8
SERVICE STATE: out (manual)    SERVICE TYPE: dtsr
DOWNLOAD SERVER: controller
VERSION: slm.1.4.01
PORT  SRVC      GROUP
  1   out      slmgrp1
  2   out      slmgrp2
  4   out      slmgrp4
PORT  COMMENT
  1   1 in aisle a
  2   2 in aisle b
  4   4 in aisle d
CC0>
```

---

## Report Fields

This table correlates each report field heading shown in the output of **verify slm** with the parameter for which you are prompted in **enter slm** or **change slm**. The information in the second column indicates the parameter option specified with the command. An asterisk (\*) indicates that a parameter is *not* applicable or *not* used.

Report Field Name	Corresponding Parameter Name
COMMENT	COMMENT
DOWNLOAD SERVER	DOWNLOAD SERVER
GROUP	GROUP NAME
MODULE ADDRESS	MODULE ADDRESS
MODULE TYPE	OBJECTS
NCHLS	None: first available user channel
PORT	None: port number of the hardware module
SERVICE STATE	None: service state of the module
SERVICE TYPE	None: driver used by host computer as associated with dtsr service
SRVC	None: service state of the port
VERSION	SOFTWARE VERSION

## System Responses

This section contains system responses for the **e2a** and **slm** commands. It is organized by the key phrases that preface each response. Refer to the *Commands Reference* for a detailed explanation of each key phrase.

**INPUT ERROR:**

**Cannot assign to a trunk group.**

You can only assign a local receiving group to the port. The group cannot be an originating group, a trunk group, or a two-way group.

**Cannot <enter/change/delete/remove/restore> second board of SLM module.**

The second board cannot be configured. Only the module address of the first SLM board is needed to manipulate data or the module itself.

**Download server <service address> is not a valid address.**

No information is entered in the database for the specified service address. Use **enter address** to configure the service address.

**Group already assigned to a port.**

A group can only be assigned to one E2A Module port since each E2A Module port represents a different physical link.

**Group has non E2A hardware; cannot mix hardware types.**

The port cannot be assigned to a local, receiving group that is already associated with another hardware type. Use **verify group** to determine the module type that references this group.

**Group must be receive only.**

You can only assign a local receiving group to the port. The group cannot be an originating group, a trunk group, or a two-way group.

**Module Does Not Exist: <addr>**

No information is entered in the database for the specified module address.

**Module <addr> in service.**

The specified E2A Module is already in service. You can only restore an out-of-service module. Use **verify e2a** to check the status of the E2A Module.

**Module is not an SLM.**

The module at the specified address is a type other than an SLM. Use **verify slm <all>** to check SLM information, then enter the correct module address.

**Module <addr> is not an E2A.**

The specified module address was previously assigned to another module type. Use **verify module** to determine the type of module. Use **verify e2a <all>** to determine which module(s) are E2A Module(s). Then retry the command.

**INPUT ERROR:****Parameter Out of Range: <num>**

The value specified is not within the allowed range for the parameter. Enter an allowed value and continue the command.

**Slot is reserved: <addr>**

The particular module address is reserved for another module.

**REMOVE/RESTORE FAILED:****cannot assign ports for module <addr>. Reboot once and try again.**

If the message **no more ports** appears, the configuration has grown in excess of 10% since the last reboot. A single reboot allocates 10% more channels. If the same failure occurs after a reboot, the configuration is too large.

**cannot assign process to port for module <addr>.**

The port is assigned. The Control Computer was unable to spawn a process for the port.

**cannot get text file for module <addr>.**

If the message **no such file or directory** appears, the file system on the generic disk is inconsistent. Refer to recovery procedures and use **fsck** to repair the damage or recover using a backup disk.

If the message **out of memory** occurs, too many different call processors were active in the configuration. Remove all of one type (trunks, terminals, sync) before retrying.

**control computer in slot <addr>. Delete module and re-enter.**

The module address specified is reserved for the Control Computer. Enter the correct module address and retry the command.

**could not send message to config.**

The command processor was unable to send a message to the database configuration process.

**inconsistent database entry for module <addr>. Delete and re-enter.****module <addr> contains a <type> module (<type> expected).**

The indicated module address contains a different module than that type specified on the command line.

**module address <addr> is beyond CLOCK.**

The module address specified is higher in number than the Clock. Enter the correct module address (which must be a lower address than that occupied by the Clock) and retry the command.

**module <addr> is in loop-around mode.**

The diagnosed module port might have been left in the loopback mode. To clear the port of loopback mode, remove and restore the port to service. Rerun the diagnostic. If the message recurs, remove all module ports from service; then restore to service a port other than the port being diagnosed. (This restoration process causes the application code to be redownloaded.) Repeat the diagnostic. If the message recurs, the port is faulty and should be left out of service.

**REMOVE/RESTORE FAILED:**

**no switch memory available. Module <addr> cannot be restored.**

The Control Computer cannot allocate the amount of switch memory the module requires. This situation occurs if all switch memory was allocated or if it was fragmented by removing and restoring several modules. Reboot the node so the memory space can be reallocated in a contiguous block.

**software inconsistency for module <addr>.**

The versions of software on disk are incompatible.

**system too busy to process module <addr>. Try again later.**

The system is burdened with other call processing tasks. Retry the command later.

**unrecognized error code for module <addr>.**

**DIAGNOSTICS:****ANOTHER DIAGNOSTIC PROCESS IS RUNNING.****TRY AGAIN LATER.**

Both Control Computer ports are configured as consoles. Another diagnostic process is running on the other console port; only one diagnostic can be running at one time. Retry the command later.

**BAD CHECKSUM**

The diagnostic process received a checksum error.

**BOOT DIAGNOSTICS PASSED****MEMORY TEST PASSED****THE NEXT TEST WILL TAKE ABOUT 3 MINUTES TO COMPLETE****DEPRESS THE 'DELETE' KEY TO INTERRUPT.**

The boot and memory portions of the diagnostic have succeeded; the diagnostic continues with the remaining off-line test routines.

**CAN NOT FIND TEST FILE**

The diagnostic could not find the SLM download diagnostic file (*slm.diag* in the */diagnostics* directory). Use a backup to replace the file and rerun the diagnostic.

**Cannot Make Maintenance Process Special**

The command processor was unable to give priority to the maintenance process.

**Cannot Send Message to Config**

The command processor cannot communicate with the Control Computer. Rerun the test. If the message reappears, run the test on other ports having the same problems. If the test passes, the problem could have been a software error or a heavy system load. Log the error.

**CAN'T CONNECT MODULE <addr> DATA CHANNEL****CAN'T CONNECT MODULE <addr> SUPERVISION CHANNEL**

The diagnostic process cannot connect to the specified module data or supervision channel.

**CAN'T FIND DOWNLOAD FILE**

The diagnostic process cannot locate the module's software file.

### DIAGNOSTICS:

#### **Cannot Send Message To Port Process**

The diagnostic process cannot communicate with the port process indicating the Control Computer has software problems and is overloaded. Retry diagnostics. If this message reappears, then log the error.

#### **Could Not Put E2A In-service**

#### **Could Not Put E2A In-service With Loop**

#### **Could Not Reset E2A**

The E2A Module cannot be initialized before performing the loopback diagnostics. A problem exists with the module firmware. Retry **diagnostic e2a**. If the message recurs, log the error and replace the module.

#### **COULD NOT RUN LOOP-AROUND TEST**

The loopback diagnostic could not be started, indicating a software problem in the Control Computer. Rerun diagnostics. If the message reappears, log the error.

#### **DIAGNOSTIC EXITS**

The diagnostic exited without running the test because you responded *no* when prompted to move hardware to run the diagnostic or you indicated that the module is not to be removed from service.

#### **DIAGNOSTIC EXITS DUE TO DELETE**

The diagnostic exited because the  key was pressed.

#### **Diagnostic Requires Service Interruption To Module.**

#### **May Diagnostic Take Module Out Of Service?**

The diagnostic requires you to remove the module from service first. If you respond no, the diagnostic exits.

#### **Diagnostic Requires Service Intervention To Port.**

#### **For external\_port loop, service to both ports is interrupted.**

The diagnostic requires you to remove the port(s) from service first.

**DIAGNOSTICS:****DOWNLOAD IN PROGRESS FOR THIS MODULE.****PLEASE TRY AGAIN LATER.**

The specified module is currently downloading software. Retry the command later.

**DOWNLOAD NOT PROGRESSING**

The download is hung.

**DOWNLOAD SERVER HUNG UP.**

The download file server is hung.

**DOWNLOAD SERVER IS BUSY.**

The download file server is processing another task.

**DOWNLOAD SERVER WON'T ACKNOWLEDGE**

The download file server is not responding to requests for acknowledgment.

**DOWNLOADING FAILS**

Some portion of the download procedure failed, causing the diagnostic to exit. Downloading can fail if the module has periodic problems that do not appear during the boot or memory diagnostics, but fail during a download. If repeated attempts of running the diagnostic fail, replace the boards one at a time, then examine the paddleboards and cable.

**ERROR FROM PORT PROCESS**

The Control Computer process responsible for port diagnostics experienced a software problem. Retry the command.

**ERROR IN LOOP-AROUND DATA COMPARISON**

A problem exists in the communications path because the data sent to the module port did not match the data the port received.

**ERROR IN SENDING MESSAGE TO CONFIG**

Because of possible database errors, a missing board, Control Computer errors, or a bad disk, the configuration process could not associate the diagnostic text with the port being diagnosed. Make sure the module and I/O board are installed properly. Use **verify e2a** and **dstat module** to ensure the integrity of the module and database. If problems do not surface, reissue the command on other modules. If the command executes successfully on other modules, the module might be faulty. Replace the board and rerun the diagnostic. If the command does not execute successfully, the diagnostic text file might not reside on disk. This file, *termdiag*, is in the */wn00/dkcproc* directory. Verify its presence. (Use the **utilsh** command. Use the **cd** command to access the directory.) If the file is missing, replace it with a backup copy and repeat **diagnose e2a**.

**EXIT DUE TO DELETE**

The diagnostic was aborted because the  key was pressed at the system console.

**Failed sending M\_DIAG to slmdiag.**

A software problem occurred in the Control Computer. Rerun the test. If the message occurs again, log the error.

**DIAGNOSTICS:**

**LOOP\_AROUND TEST FAILED**

The loopback diagnostic failed because the test message sent to the E2A Module port did not match the data received from the port.

**LOOP\_AROUND TEST SUCCESSFUL**

The loopback diagnostic process for module and port specified was successful.

**MODULE BOOT DIAGNOSTIC FAILED**

The SLM diagnostics were unable to talk to the module or the module itself is faulty. If you suspect that the diagnostics cannot talk to the module, check the I/O board and cabling. Replace the SCSI/DKI board if using the ECPU Control Computer, and repeat the diagnostic. If the problem persists, replace the I/O board and cables and repeat the diagnostic. If you suspect the module is faulty, replace the module.

**MODULE GAVE WRONG VERSION**

The SLM supplied the wrong version of the downloadable file.

**MODULE HAS BAD MEMORY**

The RAM diagnostic has failed. Replace the module and repeat the test.

**MODULE REMOVED FROM SERVICE**

The module is not currently in service.

**Module <addr> Port <num> is unassigned.**

The specified module and port are not currently entered.

**NO DATA RETURNED FROM PORT**

External clocking might not be provided to the port. Check connections for the modem providing clocking. If they are secure, rerun the diagnostic. If the message recurs, replace the SLM.

**NO RESPONSE FROM MODULE**

The module is not acknowledging the diagnostic process.

**NO RESPONSE FROM PORT PROCESS**

The Control Computer process responsible for port diagnostics did not communicate with the command processor. A software problem exists in the Control Computer or it is overloaded. Rerun **diagnose e2a**. If the message reappears, log the error.

**OFFLINE TEST FAILED**

One of the downloadable diagnostics has encountered an error. The board is bad. (The red LED on the front of the circuit pack is lit.) Replace the board and rerun the command. If the command fails again, replace the SCSI/DKI board, if using the ECPU Control Computer.

**OFFLINE TESTS SUCCESSFUL**

The downloadable diagnostics run have succeeded without error.

**Place The Loop-Around Connection On The E2A Ports**

The diagnostic requires the installation of a loopback connector.

**DIAGNOSTICS:****Port Is Out Of Service, Use RESTORE To Place It In Service.**

This message appears after completion of the *internal\_port* test as a reminder to restore the port to service.

**Place Local Modem In Loop-Around Mode.****Place Remote Modem In Loop-Around Mode.**

Install the proper loopback connectors and put the local/remote modem into loopback mode. See the *BNS-2000 Node Reference* for procedures.

**Place <Local/Remote> Modem Back Into Non-Looping Mode To Avoid Activating Alarms.**

Put the local/remote modem back into its normal working mode.

**PORT MAY STILL BE IN LOOP-AROUND MODE**

The diagnosed module port might have been left in the loopback mode. To clear the port of loopback mode, remove and restore the port to service. Rerun the diagnostic. If the message recurs, remove all module ports from service; then restore to service a port other than the port being diagnosed. (This restoration process causes the application code to be redownloaded.) Repeat the diagnostic. If the message recurs, the port is faulty and should be left out of service.

**PORT PROCESS ABORTED BY CONFIG**

Because of probable hardware problems (a manual reset, a mode switch put in a position other than ENABLE, or the circuit or I/O board being physically removed), the configuration process killed any process associated with module ports. Check the physical integrity of the module. If it is satisfactory, use **dstat module** to display the status of the module. If the status proves satisfactory, rerun the test. If the above message is repeated, replace the module.

**rec() Failed Waiting For Message From Port Process**

The command processor cannot communicate with the process responsible for communicating with the port, possibly owing to a Control Computer software problem. Rerun the test. If the same message reappears, run the test on other module ports having problems. If all appears normal, the problem is probably a software error or an overburdened system. Log the error.

**Receive Module and Port Number Same as Transmit Module and Port Number  
DIAGNOSTIC ABORTED**

The port number of the receiving port must differ from the port number of the transmitting port. (The two ports can be on the same module.)

**RECEIVE PORTION OF LOOP FAILED****RECEIVE PORTION OF LOOP OK**

The previous two messages indicate the status of the receiving end of the loopback diagnostic.

**Replace The Loop-Around Connection With Normal Connection**

A reminder message telling you to remove the loopback connector.

**DIAGNOSTICS:**

**SLM Module Must Be Out of Service First**

**SLM Module Must Be Removed From Service First**

Before running off-line tests, the SLM must be removed from service with **remove slm**.

**STATUS POLLING SLOW OR NON-EXISTENT PLEASE TRY AGAIN LATER.**

Because of heavy system use, status polling is abnormally slow or not occurring. Use **dstat module** to verify that the board is in place and is responding to status polling. If it is, wait a few minutes and try the command again. If the message is repeated, log the error.

**TOO MANY ATTEMPTS TO DOWNLOAD**

The module download has been tried too many times.

**Test And Receive Ports Are Being Left Out Of Service**

This response is printed after the failure message for the external\_port test.

**Test And Receive Ports Are Out Of Service, Use RESTORE To Place In Service.**

This message is printed after successful completion of the external port test as a reminder to restore both ports to service.

**Test Port Is Being Left Out of Service**

Since the internal port test failed, the port is left out of service.

**Test Port Is Out of Service, Use RESTORE to Place It In Service**

This message is printed after the successful completion of the internal port test.

**The external\_port loop requires a module and port to receive the test message: <test message>**

For the *external\_port* test, you must specify an additional module address and a different port number. This message, along with the accompanying test message, is sent to the port specified.

**Timed Out Waiting For Message From Port Process**

The command processor cannot communicate with the process responsible for communicating with the port, possibly because of a software problem in the Control Computer. Rerun the test. If the same message reappears, run the test on the other module ports that are having problems. If all appears normal, the problem is probably a software error or a bogged-down system. Log the error.

**DIAGNOSTICS:****TRANSMIT PORTION OF LOOP FAILED****TRANSMIT PORTION OF LOOP OK**

The previous two messages indicate the status of the transmitting end of the loopback diagnostic.

**UNABLE TO ABORT PORT PROCESS****UNABLE TO ABORT RECEIVE PORT PROCESS****UNABLE TO ABORT TEST PORT PROCESS****UNABLE TO ABORT TRANSMIT PORT PROCESS**

Because of Control Computer software errors, the configuration process cannot abort the diagnostic process associated with the module being tested. Use **restore module** followed by **dstat module**; then use **remove module** followed by **dstat module**. If the command works properly, then rerun the diagnostic. If one of the system responses reappears, log the error.

**UNABLE TO COMMUNICATE WITH PORT PROCESS**

The command processor cannot communicate with the process responsible for communicating with the port, possibly due to a Control Computer software problem or a missing board. Be sure that the circuit board and the I/O board are correctly installed. Use **dstat module** to verify that the board is in place and is responding to status polling. Rerun the test. If the same message appears, run the test on other module ports with the same problems. If all appears normal, the problem might be software errors or an overburdened system. Log the error.

**UNABLE TO DOWNLOAD MODULE**

The Control Computer could not download the module software because no SLM ports were in service when the diagnostic was initiated. The SLM must have its application code downloaded before the diagnostic can continue. Try restoring a port, other than the port being diagnosed, first.

**UNABLE TO INITIALIZE SLM MODULE**

The port process responsible for communicating with the SLM was unable to prepare the module for communications. Rerun the command. If the message recurs, remove all SLM ports from service, reseat the module, and use **restore** on a port other than the one being diagnosed. If **restore** fails, take the action appropriate to the message received. If **restore** succeeds, run **diagnose slm** again on the original port.

**UNABLE TO INITIATE DOWNLOAD**

A software problem occurred in the Control Computer or the SLM board is missing or malfunctioning. Use **dstat module** to verify that the board is in place and is responding to status polling. Rerun the test. If message recurs, run the test on the other module ports having similar problems. If the message also occurs with other ports, try using **restore** to restore a port other than the one being diagnosed. This restoration process causes the application code to be downloaded to the SLM. If **restore** fails, take the action appropriate to the message received. If **restore** succeeds, run **diagnose slm** again on the original port while leaving the port just restored to service in service.

**DIAGNOSTICS:**

**UNABLE TO PLACE PORT IN LOOP-AROUND MODE.**

Make sure the modem is in place. Check the switch positions on the I/O board. If a test with a LOOP TYPE other than *internal\_port* is being run, this message appears if DCD is not high to the port. Be sure that the DTE loopback connector is on the terminal end of the modem if this signal is not being provided by the modem. Rerun the test. If it fails again, remove all module ports from service and use **restore slm** to restore to service a port other than the one being diagnosed. If the test fails again, replace the module or leave the port in question out of service.

**UNABLE TO REMOVE MODULE FROM DIAGNOSTIC MODE**

The module cannot be taken out of diagnostic mode.

**UNABLE TO SPAWN PORT PROCESS**

Because of possible database errors, a missing board, Control Computer errors, or a bad disk, the configuration process could not associate the diagnostic text with the port being diagnosed. Make sure the module boards and I/O board are installed properly. Use **verify** and **dstat** to verify the integrity of the database. If no apparent problems exist, rerun the command on other modules. If the command executes successfully on other modules, replace the module board and retry the command. If the command fails again, the text for the diagnostic is missing from the disk. Reboot with backups of the database and repeat the diagnostic.

**Unable to complete download for module <addr>**

The **restore** command could not execute because the system could not download module software.

**Use the REMOVE command to take the port out-of-service and then begin the diagnostic again!**

You began the diagnostic without first removing the port from service with the **remove** command.

**VERSION STRING REJECTED**

**Waiting For Config Ack - mtype=**

The command processor cannot communicate with the configuration process possibly owing to a Control Computer software problem. Rerun the test. If the same message appears, run the test on other module ports with the same problems. If all appears normal, the problem is probably a software error or an overburdened system. Log the error.

**Waiting for first M\_DIAG.**

**Waiting for final M\_DIAG\_ACK.**

A software problem exists in the Control Computer. Rerun the test. If the message reappears, log the error.

**WRONG TEST FILE**

When the download test file sends its internal identification code to the module, the Control Computer uses this code to check the actual filename of the diagnostic (*slm.diag*). If a mismatch occurs, this response is output.

**DIAGNOSTICS:****Watchdog Timer Is Being Left Off****Watchdog Timer Is On**

The module cannot be initialized before performing the loopback diagnostic process because of a firmware problem. Repeat the diagnostic. If the message recurs, log the problem and replace the E2A Module.

**WARNING:****Comment entry failed.**

**Comment File Compaction Failed; Comment File Deleted**  
**comment file too large.**  
**disk out of space.**  
**system too busy.**  
**unable to access comment file.**

If the comment file cannot be updated because of insufficient system resources, wait until the system is less busy before trying to reenter a comment.

**NO KEY PHRASE:****cannot abort; <remove/restore> in progress.**

<DEL> was pressed while the remove/restore process could not be terminated.

**DATABASE BEING MODIFIED - TRY AGAIN LATER**

The command process cannot continue because the database is being changed. Wait a while and retry the command.

**Module <addr> state unknown -- system did not respond.**

The remove or restore operations might have executed successfully, but the system did not notify the command processor of the current module service state. Use **dstat module** or **verify e2a** to determine the actual service state of the module. This system response most likely occurs during heavy system use.

**Port <#> is unassigned.**

The port number that you have specified is not entered in the database.

**SERIOUS DATABASE TRANSACTION PROBLEM - UPDATE NOT ACCEPTED**

The command process cannot continue because of a critical problem in the database. (Possibly, a file has been removed from the disk.) Contact your local support group.

---

## Appendix. Special Module Database Entry Forms

This section contains sample database entry forms. These forms give prompts that appear when **enter** commands are used, and the possible values (or range of values) that can be entered in response to the prompts. Default values are shown in *italics*.

**A-1. Entering an E2A Module and Its Ports**

**A-2. Entering an SLM and Its Ports**

**FORM A-1. Entering an E2A Module and Its Ports**

<b>MODULE ADDRESS</b>				
<b>PORT 1 GROUP NAME</b> [up to 8 chars, "none"]				
<b>PORT 1 COMMENT</b> [up to 60 chars double-quoted, none]				
<b>PORT 2 GROUP NAME</b> [up to 8 chars, "none"]				
<b>PORT 2 COMMENT</b> [up to 60 chars double-quoted, none]				
<b>PORT 3 GROUP NAME</b> [up to 8 chars, "none"]				
<b>PORT 3 COMMENT</b> [up to 60 chars double-quoted, none]				
<b>PORT 4 GROUP NAME</b> [up to 8 chars, "none"]				
<b>PORT 4 COMMENT</b> [up to 60 chars double-quoted, none]				

**FORM A-2. Entering an SLM and Its Ports**

<b>MODULE ADDRESS</b>				
<b>DOWNLOAD SERVER</b> [controller]				
<b>SOFTWARE VERSION</b> [slm.1.4.01]				
<b>PORT 1 GROUP NAME</b> [up to 8 chars, "none"]				
<b>PORT 1 COMMENT</b> [up to 60 chars double-quoted, none]				
<b>PORT 2 GROUP NAME</b> [up to 8 chars, "none"]				
<b>PORT 2 COMMENT</b> [up to 60 chars double-quoted, none]				
<b>PORT 3 GROUP NAME</b> [up to 8 chars, "none"]				
<b>PORT 3 COMMENT</b> [up to 60 chars double-quoted, none]				
<b>PORT 4 GROUP NAME</b> [up to 8 chars, "none"]				
<b>PORT 4 COMMENT</b> [up to 60 chars double-quoted, none]				

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