Tekelec EAGLE® 5

Maintenance

910-5884-001 Revision A
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Introduction

Topics:

Overview

The *Maintenance Manual* provides preventive and corrective maintenance procedures used in maintaining the EAGLE 5 ISS and the Multi-Purpose Server (MPS) systems.

WARNING: Be sure to wear a wrist strap connected to the wrist strap grounding point of the EAGLE 5 Integrated Signaling System (ISS) before performing any maintenance procedures on the EAGLE 5 ISS.

The manual is organized as follows:

- *Introduction* provides general information about the organization of this manual, a description of the EAGLE 5 ISS maintenance strategy, and a list of acronyms and abbreviations.
- *Preventive Maintenance* provides recommended scheduled routines for the EAGLE 5 ISS.
- *Corrective Maintenance* provides procedures to use in response to all system alarms by the EAGLE 5 ISS.

In addition, these appendices of this manual provide useful reference material for maintenance, diagnostic, and troubleshooting activities.

- *Card Removal/Replacement Procedures*
- *Holdover Clock Troubleshooting Procedures*
- *Part Numbers*

Note: EAGLE 5 ISS supporting ANSI networks make use of the LNP and SEAS features. EAGLE 5 ISS supporting ITU networks do not include these systems.

Scope and Audience

This manual is intended for maintenance personnel who must maintain the EAGLE 5 ISS. The technician should be familiar with SS7 protocols. The manual provides preventive and corrective procedures that will aid maintenance personnel in maintaining the EAGLE 5 ISS.

Preventive maintenance procedures are routines to be carried out on a scheduled basis to help prevent system failures. These routines are industry-standard recommendations and may be adopted to fit any company maintenance plan.

The corrective maintenance procedures are those used in response to a system alarm or output message. These procedures are EAGLE 5 ISS-specific and aid in the detection, isolation, and repair of faults.

Related Publications

For information about additional publications that are related to this document, refer to the *Related Publications* document. The *Related Publications* document is published as a part of the *Release Documentation* and is also published as a separate document on the Tekelec Customer Support Site.

Documentation Availability, Packaging, and Updates

Tekelec provides documentation with each system and in accordance with contractual agreements. For General Availability (GA) releases, Tekelec publishes a complete EAGLE 5 ISS documentation set. For Limited Availability (LA) releases, Tekelec may publish a documentation subset tailored to specific feature content or hardware requirements. Documentation Bulletins announce a new or updated release.

The Tekelec EAGLE 5 ISS documentation set is released on an optical disc. This format allows for easy searches through all parts of the documentation set.

The electronic file of each manual is also available from the *Tekelec Customer Support* site. This site allows for 24-hour access to the most up-to-date documentation, including the latest versions of Feature Notices.

Printed documentation is available for GA releases on request only and with a lead time of six weeks. The printed documentation set includes pocket guides for commands and alarms. Pocket guides may also be ordered separately. Exceptions to printed documentation are:

- Hardware or Installation manuals are printed without the linked attachments found in the electronic version of the manuals.
- The Release Notice is available only on the Customer Support site.

Note: Customers may print a reasonable number of each manual for their own use.

Documentation is updated when significant changes are made that affect system operation. Updates resulting from Severity 1 and 2 Problem Reports (PRs) are made to existing manuals. Other changes are included in the documentation for the next scheduled release. Updates are made by re-issuing an electronic file to the customer support site. Customers with printed documentation should contact their Sales Representative for an addendum. Occasionally, changes are communicated first with a Documentation Bulletin to provide customers with an advanced notice of the issue until officially released in the documentation. Documentation Bulletins are posted on the Customer Support site and can be viewed per product and release.

Locate Product Documentation on the Customer Support Site

Access to Tekelec's Customer Support site is restricted to current Tekelec customers only. This section describes how to log into the Tekelec Customer Support site and locate a document. Viewing the document requires Adobe Acrobat Reader, which can be downloaded at www.adobe.com.

1. Log into the *Tekelec Customer Support* site.

   Note: If you have not registered for this new site, click the **Register Here** link. Have your customer number available. The response time for registration requests is 24 to 48 hours.

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.
4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

Documentation Admonishments

Admonishments are icons and text throughout this manual that alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

Table 1: Admonishments

	**DANGER**: (This icon and text indicate the possibility of *personal injury*.)
	**WARNING**: (This icon and text indicate the possibility of *equipment damage*.)
	**CAUTION**: (This icon and text indicate the possibility of *service interruption*.)

Customer Care Center

The Tekelec Customer Care Center is your initial point of contact for all product support needs. A representative takes your call or email, creates a Customer Service Request (CSR) and directs your requests to the Tekelec Technical Assistance Center (TAC). Each CSR includes an individual tracking number. Together with TAC Engineers, the representative will help you resolve your request.

The Customer Care Center is available 24 hours a day, 7 days a week, 365 days a year, and is linked to TAC Engineers around the globe.

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Tekelec Technical Assistance Centers are located around the globe in the following locations:

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

  1-888-FOR-TKLC or 1-888-367-8552 (toll-free, within continental USA and Canada)

  1-919-460-2150 (outside continental USA and Canada)

TAC Regional Support Office Hours:

8:00 a.m. through 5:00 p.m. (GMT minus 5 hours), Monday through Friday, excluding holidays

- **Central and Latin America (CALA)**

  Phone:

  USA access code +1-800-658-5454, then 1-888-FOR-TKLC or 1-888-367-8552 (toll-free)

  TAC Regional Support Office Hours (except Brazil):

  10:00 a.m. through 7:00 p.m. (GMT minus 6 hours), Monday through Friday, excluding holidays

  - **Argentina**

    Phone:

    0-800-555-5246 (toll-free)

  - **Brazil**

    Phone:

    0-800-891-4341 (toll-free)

    TAC Regional Support Office Hours:

    8:30 a.m. through 6:30 p.m. (GMT minus 3 hours), Monday through Friday, excluding holidays

  - **Chile**

    Phone:

    1230-020-555-5468

  - **Colombia**

    Phone:

    01-800-912-0537

  - **Dominican Republic**

    Phone:

    1-888-367-8552

  - **Mexico**

    Phone:

    001-888-367-8552

  - **Peru**

    Phone:

    0800-53-087

  - **Puerto Rico**

    Phone:

    1-888-367-8552 (1-888-FOR-TKLC)

  - **Venezuela**

    Phone:

0800-176-6497

- **Europe, Middle East, and Africa**

  Regional Office Hours:

  8:30 a.m. through 5:00 p.m. (GMT), Monday through Friday, excluding holidays

  - **Signaling**

    Phone:

    +44 1784 467 804 (within UK)

  - **Software Solutions**

    Phone:

    +33 3 89 33 54 00

- **Asia**

  - **India**

    Phone:

    +91 124 436 8552 or +91 124 436 8553

    TAC Regional Support Office Hours:

    10:00 a.m. through 7:00 p.m. (GMT plus 5 1/2 hours), Monday through Saturday, excluding holidays

  - **Singapore**

    Phone:

    +65 6796 2288

    TAC Regional Support Office Hours:

    9:00 a.m. through 6:00 p.m. (GMT plus 8 hours), Monday through Friday, excluding holidays

Problem Report (PR)

The assigned Technical Support engineer opens a problem report (PR) using problem criteria as defined in "TL-9000 Quality System Metrics (Book Two, Release 3.0" and the following sections.

Critical

Critical problems severely affect service, capacity/traffic, billing, and maintenance capabilities and requires immediate corrective action, regardless of time of day or day of the week, as viewed by a customer upon discussion with the supplier. For example:

- A loss of service that is comparable to the total loss of effective functional capacity of an entire switching or transport system.
- A reduction in capacity or traffic handling capacity such that expected loads cannot be handled.
- Any loss of safety or emergency capability (for example, 911 calls).

Major

Major problems cause conditions that seriously affect system operations, maintenance, and administration, etc., and require immediate attention as viewed by the customer upon discussion with the supplier. The urgency is less than in a critical situations because of a lesser immediate or impending effect on system performance, customer, and the customer's operation and review. For example:

- Reduction in any capacity/traffic measurement function
- Any loss of functional visibility and/or diagnostic capability
- Short outage equivalent to system or subsystem outages, with accumulated duration of greater than two minutes in any 24-hour period, or that continue to repeat during longer periods
- Repeated degradation of DS1 or higher rate spans or connections
- Prevention of access for routine administrative activity
- Degradation of access for maintenance or recovery operations
- Degradation of the system's ability to provide any required critical or major trouble notification
- Any significant increase in product related customer trouble reports
- Billing error rates that exceed specifications
- Corruption of system or billing databases

Minor

Other problems that a customer does not view as critical or major are considered minor. Minor problems do not significantly impair the functioning of the system and do not significantly affect service to customers. These problems are tolerable during system use.

Engineering complaints are classified as minor unless otherwise negotiated between the customer and supplier.

Emergency Response

In the event of a critical service situation, emergency response is offered by the Tekelec Customer Care Center 24 hours a day, 7 days a week. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with an EAGLE 5 ISS that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical problems affect service and/or system operation resulting in:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with the Tekelec Customer Care Center.

Hardware Repair and Return

Any system components being returned for repair or replacement must be processed through the Tekelec Return Material Authorization (RMA) procedures. A hardware repair is defined as an item returned to Tekelec due to a failure, with the returned item being repaired and returned to the customer. It is essential that serial numbers are recorded correctly. RMAs cannot be created without a valid serial number. All repair and quality information is tracked by serial number. *Table 2: Basic RMA Types* lists the basic RMA types.*Table 3: RMA Reasons for Return* lists the RMA return reasons.

Table 2: Basic RMA Types

Replacement Type	Description	Turnaround
Priority Advance Replacement	Customer requests the URGENT replacement of a damaged product	Same Day Shipment
Advance Replacement	Customer request the replacement of a damaged product	Shipment Within 3 Business Days
Repair / Return	Customer will return a damaged product for repair	Shipment Within 5 Days After Receipt
Expendable	A damaged part, such as a cable, is replaced, but the Customer does not return the damaged product	Depends on Urgency - Shipment Within 3 Business Days

Table 3: RMA Reasons for Return

Reason for Return	Description
Damaged by Environment	Product damaged by environmental phenomena such as water damage or earthquake.
Damaged in Shipment	Damaged between shipment from Tekelec and receipt at the Customer's installation site.
DOA – Dead on Arrival	Product is not functional when it is first installed at the Customer's location.
Lab Return	Products returned from lab sites.

Reason for Return	Description
Product Capture	Defect to be captured by Quality or Engineering (not Product Recall).
Product Deficiency	Anything wrong with the part that doesn't fall into another category.
Product Recall	Products recalled by divisions for the repair of a defect or replacement of defective products.
Return – No Product Deficiency	Anything returned without the product being defective.

Repair and Return Shipping Instructions

All returned equipment, assemblies, or subassemblies must be shipped to the Tekelec Repair and Return Facility specified by the *Customer Care Center*. The item being returned must be shipped in the original carton or in an equivalent container assuring proper static handling procedures and with the freight charges prepaid.

The assigned RMA number must be clearly printed on the "RMA#:" line of the shipping label on the outside of the shipping package. If the RMA number is not placed on the label, the return could be delayed.

Procedure - RMA

1. Obtain and confirm the following information before contacting the *Customer Care Center*:
   - Your name:
   - Company name:
   - Call-back number:
   - Email address:
   - Which product you are calling about?
   - Site location:
   - CLLI number
   - System serial number (NT, CE, LM, DS, etc…):
   - Complete software release (e.g., 28.0.1-41.53.0):
   - Upgrade forms

     WI005153

     WI005154

     WI005218

     WI005219

     WI005220

- Tekelec card type: (e.g., MPL, DSM, etc.):
- Tekelec card part number (870-####-##):
- Associated serial number (102########):
- Reason for return or replacement (isolated from system):
- Full name of person the replacement card is being shipped to:
- Shipping address:

  Note: If possible, include associated alarms (UAMs) and a copy of the associated output (capture file).

2. Contact the *Customer Care Center* and request a Return of Material Authorization (RMA).
3. If the item is a like-for-like advance replacement, the *Customer Care Center* arranges for shipment of the replacement item to the customer.
   a) Wait for the replacement component to arrive.
   b) Package the defective component in the box of materials you received with your replacement. Use proper static handling procedures.
   c) Label the outside and inside of the box with your RMA number clearly visible. Place the packing slip from the received replacements on the inside of your box.
   d) Ship the defective component to the return address listed on the packing slip.
4. If the item is a repair/return, the *Customer Care Center* arranges for shipment of the replacement item to the customer.
   a) Package the defective component in a suitable package for shipping. Use proper static handling procedures.
   b) Label the outside and inside of the box with your RMA number clearly visible. Include a packing slip with all the information from *Step 1* along with the RMA number.
   c) Ship the defective component to the following address:

      TEKELEC

      Attn: RMA Department

      5200 Paramount Parkway

      Morrisville, NC 27560

      RMA#: <assigned by Tekelec>

   d) Wait for the repaired component to arrive.

Maintenance Strategy

The EAGLE 5 ISS is equipped with an automated surveillance system, which allows many failures to be detected and repaired autonomously. When trouble is detected, and its cause determined, the system software attempts to isolate the trouble and recover itself through reinitialization. Because of the use of distributed processing throughout the system, the reinitialization can be localized with little or no impact on the rest of the system or network.

If the system software is unable to correct the problem, an output message is generated and maintenance personnel are provided with equipment location, nature of the trouble, and alarm severity.

There are three levels of recovery in the EAGLE 5 ISS:

- Application self recovery
- System maintenance software intervention
- Maintenance personnel intervention.

Application Self Recovery

This is the most desirable method of recovery, as it is nearly transparent to the network, and does not require any system resources. Examples of applications capable of self recovery:

- Link failure
- Link set failure
- Route failure
- Interprocessor message transport (IMT) bus failure.

Failure of a link relies on SS7 maintenance to correct the trouble. This usually entails placing the link out of service (OS), re-aligning the link, then placing the link back in service.

Route failures also rely on SS7 maintenance. Transfer restricted (TFR) and transfer prohibited (TFP) are commonly used to reroute messages around a node.

System Maintenance Software Intervention

The system maintenance software operates at two levels, maintenance and administration subsystem (MAS) and application subsystem (SS7, GLS, DTA, and STPLAN). All troubles detected at the application level are reported to the maintenance and administration subsystem (MAS), which is responsible for generating system alarms and output messages.

Refer to the *Release Documentation* for more detailed information on system software and maintenance.

Maintenance Personnel Intervention

Maintenance personnel intervention is required when hardware fails, or when software is unable to recover. There are few occurrences of maintenance that would require maintenance personnel intervention. Examples include:

- Blown fuses
- Loss of power

  Note:

  Maintenance personnel intervention is required to restore the power. Once power is restored, the EAGLE 5 ISS recovers automatically.

- Card failure

System Maintenance Log

The purpose of the System Maintenance Log is to provide both maintenance personnel and Tekelec *Customer Care Center* with a complete trouble history for a specific site. This history aids in spotting

trouble trends, which, if left unrecorded, would be impossible to detect. Record all maintenance regardless of nature.

On the following page is an example of a system maintenance log. Use this page to generate copies for your site. Tekelec recommends this log be completed after every preventive and corrective maintenance procedure.

This is a troubleshooting aid, and should be filled out completely. Printouts or any other supportive material should be referenced whenever possible. The Tekelec *Customer Care Center* may ask for some of this information at a later time, if a particular trend begins to develop.

The trouble code field in the log is for recording EAGLE 5 ISS trouble messages. All maintenance (regardless of nature) should be recorded on this log for reference when troubleshooting.

Table 4: System Maintenance Log

System Maintenance Log			

System Maintenance Log			

Chapter 2

Preventive Maintenance

Topics:

Introduction

The procedures on the following pages are routine maintenance procedures to be performed on a scheduled basis. These procedures are recommendations that if followed will aid in maintaining system performance and data integrity.

These routines aid in detecting trouble trends and intermittent troubles. As with any maintenance activity, personnel should be encouraged to maintain a log of all routines performed. This aids the maintenance technician as well as the Tekelec *Customer Care Center* in determining the source of system troubles and ways to prevent certain troubles from occurring again.

Instructions for performing required maintenance routines are provided. In the event another document may be required for a specific task, that document is referenced.

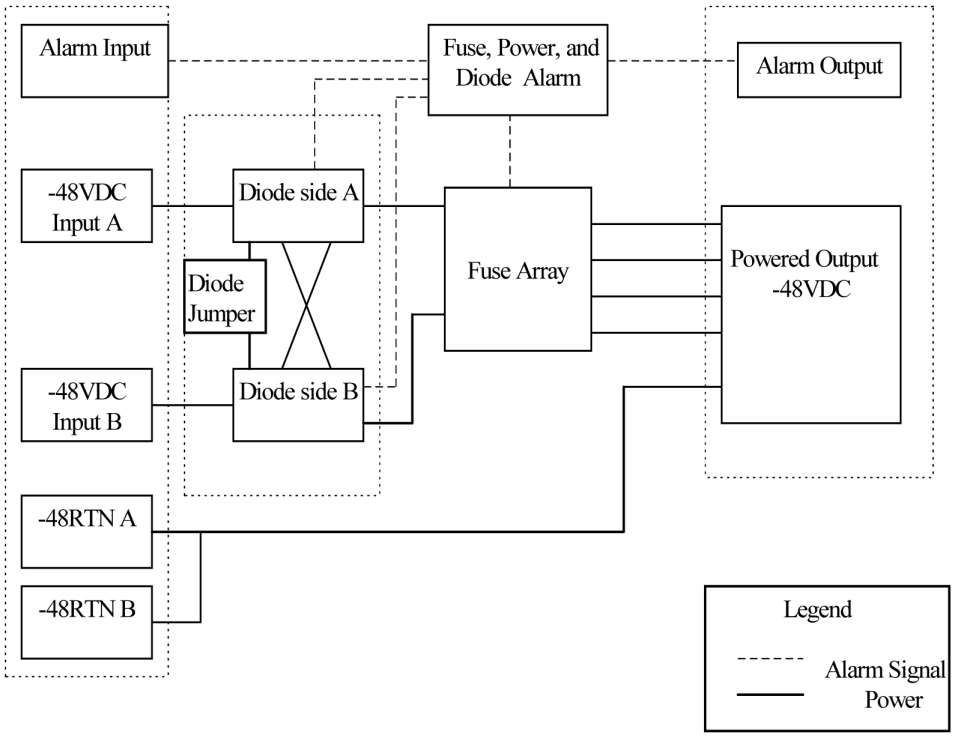
Maintaining the Fuse and Alarm Panel

The Fuse and Alarm Panel (FAP) serves as a central location for identifying a variety of potential problem conditions. However, you may have to occasionally perform corrective maintenance on the FAP, itself.

The FAP consist of five major functions:

- Input connections
- Diodes
- Fuse Arrays
- Alarm circuitry
- Output connections

Figure 1: FAP High-Level Block Diagram



To assist your FAP maintenance efforts, this section provides information about the FAP unit:

- The FAP components
- FAP alarms
- Diode testing and the diode jumper

For more detailed information on the FAP and its components, refer to the FAP *Technical Reference (820-2888-01)*.

1U FAP P/N 870-2804-01

The 1U FAP (P/N 870-2804-01) is a low-profile unit that provides protected distribution of –48VDC power to the shelves in the frame. Allowing for the full population of a frame and for the failure of one primary supply, new installations of Control and Extension frames require two 60A feeds.

FAP Components

The FAP is composed of three field replaceable units, of which two can be hot-swapped.

Table 5: FAP Component Replacement

Component	Replacement Requirements	Part Number
Diode Board	Field replaceable	870-2806-01
Shorting Board	Field replaceable	870-2805-01

Component	Replacement Requirements	Part Number
1U FAP	Field replaceable **(with service interruption)**	870-2804-01 (includes Diode and Shorting Boards)

Diode Board

The diode board in the FAP contains power diodes and circuitry which allow one bus to pick up the entire load when there is a loss of input power on the other bus.

Shorting Board

The Shorting board allows the removal of the diode board without taking down the system. This permits periodic maintenance of the diodes without having to power down or remove the unit from the shelf. In the bypass position, both A and B power is connected to the fuse blocks so the diode board can be safely removed. The Shorting board has an LED which is off when the board is in normal operational mode and is green when in the bypass mode of operation.

Alarms

The FAP provides visual alarms, by means of a lit LED, for a variety of status alarms.

Table 6: FAP Alarm Conditions

Alarm	Alarm Condition	Remote Indications
Critical LED	• EAGLE 5 ISS command through TDM • MDAL not present and MDAL_P jumper off	Dependent on EAGLE 5 ISS software
Major LED	EAGLE 5 ISS command through TDM	Dependent on EAGLE 5 ISS software
Minor LED	EAGLE 5 ISS command through TDM	Dependent on EAGLE 5 ISS software
Fuse LED	• Distribution fuse blown • Alarm circuit board removed (no LED indication) • Jumper on the jumper circuit board is on • Power feed failure	Fuse alarm to EAGLE 5 ISS through TDM
PWR A LED	Power feed A is off, but power is available to B.	Fuse alarm to EAGLE 5 ISS through TDM

Alarm	Alarm Condition	Remote Indications
PWR B LED	Power feed B is off, but power is available to A.	Fuse alarm to EAGLE 5 ISS through TDM
Shorting Board LED	Shorting board in maintenance mode.	Fuse alarm to EAGLE 5 ISS through TDM

A fuse alarm identifies the following problems or conditions within the FAP:

- blown fuse(s)
- power loss for side A or B
- alarm card removed
- maintenance mode

Use the following indicators to determine the nature of the problem:

Table 7: Additional Alarm Indicators

Indicator	Alarm Condition
Fuse alarm and fuse flag down	Blown fuse
Fuse alarm and PWR A LED	Input power loss on A
Fuse alarm and PWR B LED	Input power loss on B
Fuse alarm red and Shorting Board LED is green	Shorting Board in maintenance mode (by-passing diodes)
Fuse alarm red and Shorting Board LED is off	Shorting Board in normal mode, blown fuse

Diode Testing and the Shorting Board

The Diode Board must be tested periodically. To test the Diode Board without powering down the entire EAGLE 5 ISS, peform the following procedures.

Maintenance Mode

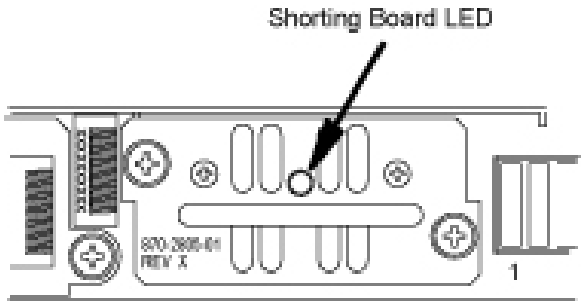
This section describes how to place the Shorting Board into maintenance (bypass) mode. Maintenance mode allows the removal of the Diode Board without taking down the system.

Procedure — Shorting Board Maintenance Mode

1. Check to verify the Shorting Board LED is not on, indicating the FAP is in normal mode.2.

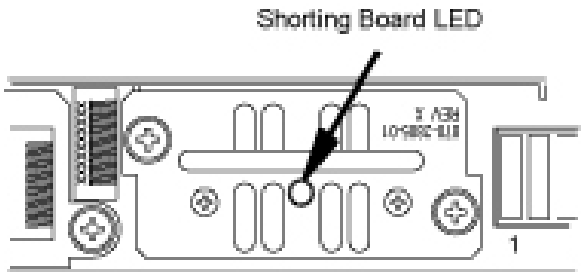
2. Locate two screws securing the Shorting Board in its slot (see *Figure 2: Shorting Board Faceplate, Normal Mode*). Note the orientation of the Shorting Board LED. Turn the screws at each corner of the board to the left until they disengage.

   Figure 2: Shorting Board Faceplate, Normal Mode



3. Pull the board straight out of the FAP until the board is clear of the frame.
4. Turn the Shorting Board over and reinsert the board into its slot. Note the orientation of the Shorting Board LED (see *Figure 3: Shorting Board Faceplate, Maintenance Mode*).

   Figure 3: Shorting Board Faceplate, Maintenance Mode



   The Shorting Board LED turns green and the fuse alarm LEDs turn red.
5. Ensure the board is seated properly and tighten the two screws to secure the board.
6. The Shorting Board is now in the maintenance (bypass) mode of operation.

Diode Board

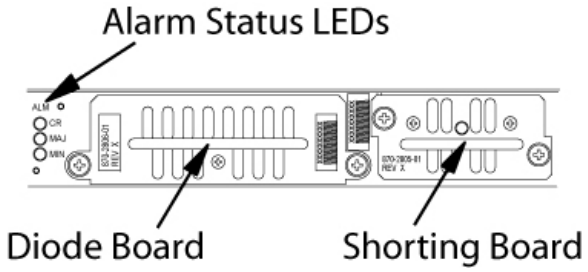
This section describes how to remove and test the Diode Board.

Procedure — Remove the Diode Board

Use this procedure to remove the Diode Board for diode testing.

1. Check to verify the Shorting Board LED is on, indicating the FAP is in maintenance (bypass) mode.
2. Locate two screws securing the Diode Board in its slot. Turn the screws to the left until they disengage.

   Figure 4: Diode Board Faceplate

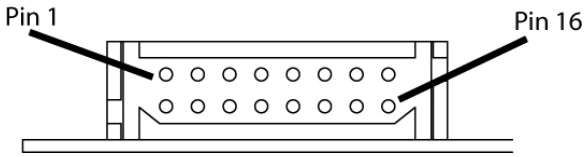


3. Pull the board straight out of the FAP until the board is clear of the frame.

Procedure - Diode Testing

Use this procedure to test the power diodes on the Diode Board. A Digital Volt/Ohm Meter (DVM) with a Diode Setting is required. All testing is performed at the edge connector (J1) on the board.

Figure 5: Diode Board Edge Connector J1



1. Set the DVM to test diodes.
2. Connect the DVM positive (+) lead and negative (-) lead to the pins indicated for each power diode.

Table 8: Power Diode Test Points

Diode	J1 Pin Positive (+) Lead	J1 Pin Negative (-) Lead
CR1 #1	3	16
CR1 #2	6	16
CR2 #1	14	1
CR2 #2	11	1
CR3 #1	4	16
CR3 #2	5	16
CR4 #1	13	1
CR4 #2	12	1

The DVM should indicate a short circuit (>0.1V, <0.2V). Record the measurement.

3. Reverse the leads.

The DVM should indicate an open circuit (OL). Record the measurement.

4. If any measurements are in error, the diode board must be replaced.
5. If the measurements are within acceptable parameters, reinstall the Diode Board.

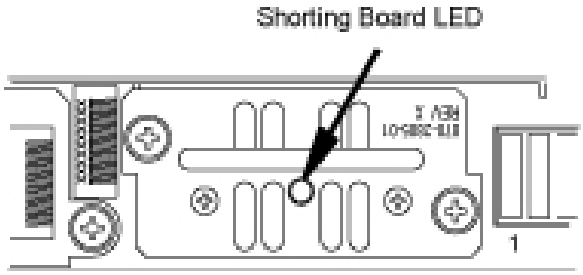
Normal Mode

Use this procedure to place the Shorting board into normal mode. This mode of operation allows one bus to pick up the entire load when there is a loss of input power on the other bus.

Procedure — Shorting Board Normal Mode

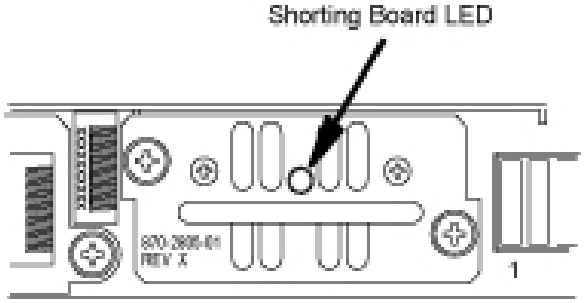
1. Check to verify the Shorting Board LED is green, indicating the FAP is in maintenance mode.
2. Locate two screws securing the Shorting Board in its slot. Note the orientation of the Shorting Board LED (*Figure 6: Shorting Board Faceplate, Maintenance Mode*). Turn the screws at each corner of the board to the left until they disengage.

   Figure 6: Shorting Board Faceplate, Maintenance Mode



3. Pull the board straight out of the FAP until the board is clear of the frame.
4. Turn the Shorting Board over and reinsert the board into its slot. Note the orientation of the Shorting Board LED (see *Figure 7: Shorting Board Faceplate, Normal Mode*).

   Figure 7: Shorting Board Faceplate, Normal Mode



   Note: The Shorting Board LED is off and the fuse alarm LEDs turn green.

5. Ensure the board is seated properly and tighten the two screws to secure the board.
6. The Shorting Board is now in the normal mode of operation.

3U FAP

The 3U FAP is a normal-profile unit that provides protected distribution of –48VDC power to the shelves in the frame. Allowing for the full population of a frame and for the failure of one primary

supply, new installations of Control and Extension frames require two 60A feeds. The 3U FAP may be one of the following:

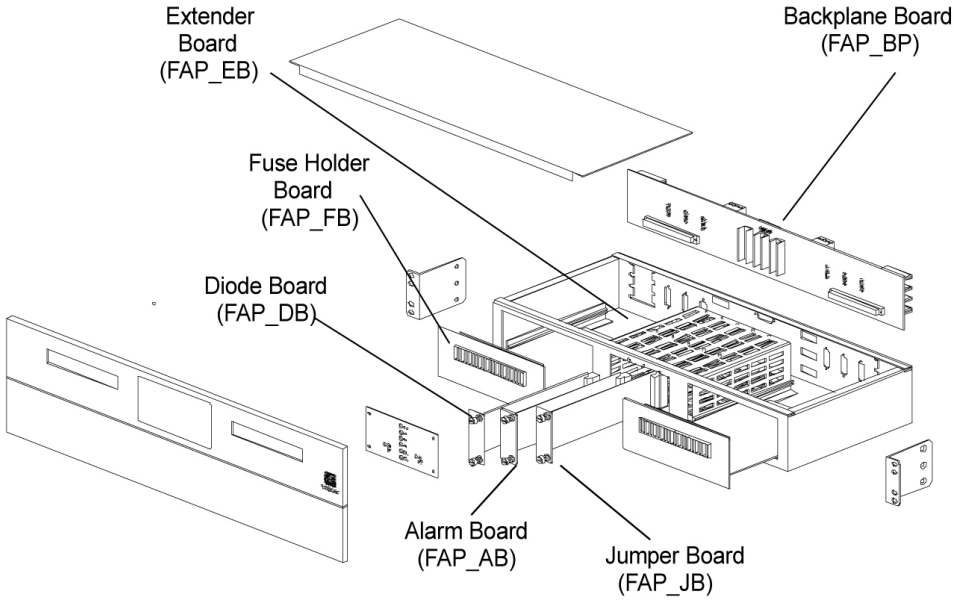
- 870-1606-01 (all revisions)
- 870-1616-02 with a revision G or lower
- 870-2320-01 with a revision B or lower

FAP Components

The FAP consists of nine printed circuit boards, each identified by an acronym on its label (see *Figure 8: Location of FAP Components*):

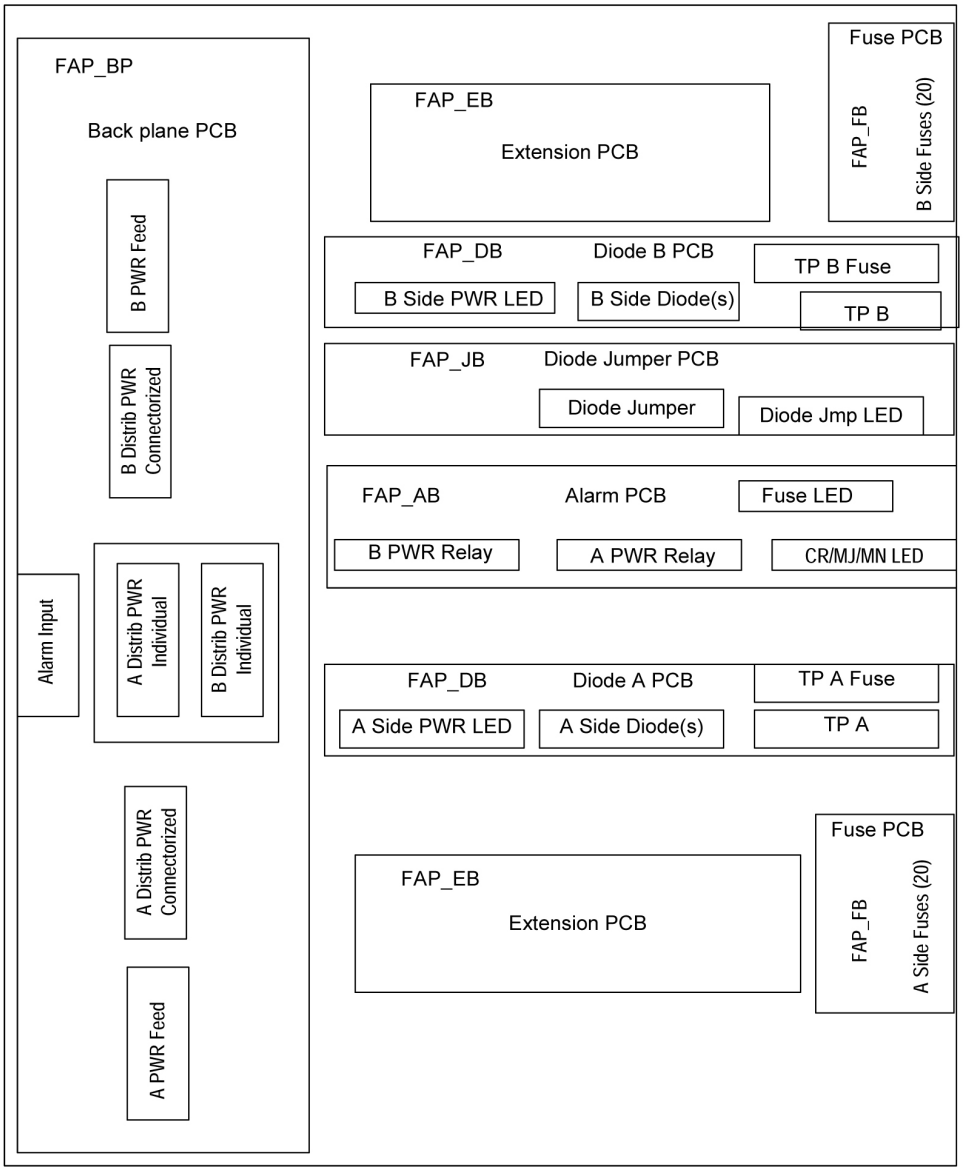
- Backplane (FAP_BP): Located inside the FAP unit, parallel to the back side of the FAP box.
- Alarm board (FAP_AB): Located on the center-right of the front panel, set vertically inside the FAP unit, perpendicular to the front panel.
- Diode boards (FAP_DB): Two boards located on the front panel, flanking the Alarm and Jumper boards on the left and right, and perpendicular to the front panel. Set vertically inside the FAP unit.
- Extender boards (FAB-EB): Two boards located inside the FAP unit, parallel to the bottom of the FAP box, on the far right and left of the unit.
- Fuse holder boards (FAP_FB): Two boards located inside and parallel to the front panel, on the far right and left of the FAP unit.
- Jumper board (FAP_JB): Located on the center-left of the front panel, set vertically in the unit, perpendicular to the front panel.

Figure 8: Location of FAP Components



Each of the FAP components has associated functions.

Figure 9: FAP Component Functions



The FAP is composed of nine circuit boards. Eight of these circuit boards are field replaceable, and can be hot-swapped.

Table 9: FAP Component Replacement

Component	Replacement Requirements	Part Number
FAP Backplane (FAP_BP)	Must be replaced through factory	850-0515-xx
FAP Alarm Board (FAP_AB)	Field replaceable	850-0518-xx (card) 870-1609-xx (assembly)

Component	Replacement Requirements	Part Number
FAP Diode Boards (FAP_DB_A and FAP_DB_B)	Field replaceable (one at a time)	850-0517-xx (card) 870-1608-xx (assembly)
FAP Extender Boards (FAP_EB)	Field replaceable (one at a time **with service interruption**)	850-0519-xx
FAP Fuse Holder Boards (FAP_FB)	Field replaceable (one at a time **with service interruption**)	850-0516-xx
FAP Jumper Board (FAP_JB)	Field replaceable	850-0523-xx (card) 870-1641-xx (assembly)

The following sections describe each type of circuit board:

Backplane Board (FAP_BP)

The backplane circuit board provides all of the external connections for the FAP. It consists primarily of circuit routing and connectors, but also has one pull-down resistor, which provides a default alarm signal for the Fuse Alarm in the event the alarm board is removed from the FAP.

Alarm Board (FAP_AB)

The alarm circuit board provides indicators and relays for the EAGLE status and fuse alarms. This board includes a jumper (JMP50) for future use. This jumper is installed for all existing configurations.

Diode Boards (FAP_DB)

The diode circuit boards provide power diodes and power input test points. Four diode footprints are included: two for Assembly A and two for Assembly B. Only one of the four positions is intended to be populated; the second footprint is provided for future part rating changes or additional heat-dissipation capabilities.

Extender Boards (FAP_EB)

The extender board provides connection between the backpanel board and the fuse holder boards.

Fuse Holder Boards (FAP_FB)

The fuse holder boards provide 20 fuses with a common alarm.

Jumper Board (FAP_JB)

The jumper board provides the capability to by-pass the diode boards with a fuse. Use this board only for maintenance operations.

Alarms

The FAP provides visual alarms, by means of a lit LED, for a variety of status alarms (see *Table 10: FAP Alarm Conditions*).

Table 10: FAP Alarm Conditions

Alarm	Alarm Condition	Remote Indications
Critical LED	• EAGLE 5 ISS command through TDM • MDAL not present and MDAL_P jumper off	Dependent on EAGLE 5 ISS software
Major LED	EAGLE 5 ISS command through TDM	Dependent on EAGLE 5 ISS software
Minor LED	EAGLE 5 ISS command through TDM	Dependent on EAGLE 5 ISS software
Fuse LED	• Distribution fuse blown • Alarm circuit board removed (no LED indication) • Jumper on the jumper circuit board is on • Power feed failure	Fuse alarm to EAGLE 5 ISS through TDM
PWR A LED	Power feed A is off, but power is available to B.	Fuse alarm to EAGLE 5 ISS through TDM
PWR B LED	Power feed B is off, but power is available to A.	Fuse alarm to EAGLE 5 ISS through TDM
OP/MAINT LED	Jumper on the jumper circuit board is on.	Fuse alarm to EAGLE 5 ISS through TDM

A fuse alarm identifies the following problems or conditions within the FAP:

- blown fuse(s)
- power loss for side A or B
- alarm card removed
- maintenance mode

Use the following indicators to determine the nature of the problem:

Table 11: Additional Alarm Indicators

Indicator	Alarm Condition
Fuse alarm and fuse flag down	Blown fuse
Fuse alarm and PWR A LED	Input power loss on A
Fuse alarm and PWR B LED	Input power loss on B
Fuse alarm and OP/MAINT LED is red	Diode jumper is installed (by-passing diodes)

Diode Testing and the Diode Jumper

The diode board must be tested periodically. To test a diode circuit board without powering down the entire EAGLE 5 ISS, perform the procedure listed in *Table 12: FAP Part Numbers and Corresponding Procedures* for the corresponding FAP part number.

Table 12: FAP Part Numbers and Corresponding Procedures

Part Number	FAP Procedure
870-1606-01 (all revisions)	Procedure 1
870-1616-02 revision G or lower	Procedure 1
870-1606-02 revision H or higher	Procedure 2
870-2320-01 revision B or lower	Procedure 1
870-2320-01 revision C or higher (or 870-2320-03)	Procedure 2

Procedure 1.

This procedure to test a diode circuit board without powering down the entire EAGLE 5 ISS applies to the following FAPs:

- 870-1606-01 (all revisions)
- 870-1616-02 with a revision G or lower
- 870-2320-01 with a revision B or lower

1. Check to verify the OP/MAINT LED is green, indicating the FAP is not in maintenance mode.
2. Unscrew the two thumbscrews securing the FAP jumper board and remove the board.

3. On the jumper circuit board, move the jumper (the DB-26 male connector) from P71 to P72. Tighten the thumbscrews connecting the jumper to its mate, to ensure a good connection. This repositioning overrides the diodes, establishing a direct connection between input and fuse panels.

WARNING: If fuses are blown, DO NOT continue with this procedure. Instead, contact *Customer Care Center* at the appropriate number.

4. Make sure the glass fuses are installed and verify they are "good" by using the multimeter to check for continuity across each of the glass fuses.
5. Verify that two glass fuses are behind the P72 connector. If these fuses are not present, install them before continuing.
6. Slide the jumper board back into the FAP and verify both of the following alarms display:
   - the OP/MAINT LED lights red on the FAP
   - an EAGLE 5 ISS fuse alarm displays on the terminal

   You may now remove either or both diode circuit boards without affecting EAGLE 5 ISS service.

   Note: Using the jumper override negates the backpower protection usually provided by the diode board.
7. Locate diode board A and unscrew the two thumbscrews securing the board. Remove the board from the FAP.
8. Locate the diode to be tested. It has three pins and is attached to the large heat sink. The diode is labeled CR43.
9. Set your digital multimeter to measure resistance.
10. Measure the resistance between the center pin of the diode and either of the outside pins. Record this measurement.
11. Measure the resistance between these same pins again, but switch the multimeter leads, so the positive lead is now on the opposite pin. Record this measurement.
12. Compare the two measurements. If the diode is functioning properly, one reading should be less than 10K ohms and the other should be much greater.

    If both readings are above or below 10K ohms, the diode may have failed. Replace the failed board with a spare diode board.
13. Repeat steps 9 through 11, measuring the resistance between the *other* outside pin and the center pin.

    This completes the test for diode board A.
14. Repeat steps 6 through 12, using diode board B. This completes the test for diode board B.
15. Reinsert the two functional diode boards. Tighten the thumbscrews on each board to secure it to the FAP.
16. Unscrew the two thumbscrews securing the FAP jumper board and remove the board.
17. On the jumper circuit board, move the jumper (the DB-26 male connector) back from P72 to its original position on P71. Tighten the thumbscrews connecting the jumper to its mate, to ensure a good connection. This repositioning returns the diodes to their original, non-maintenance position.
18. Slide the jumper board back into the FAP. Verify the OP/MAINT LED lights green. The fuse alarm LED returns to green.

The diode board testing procedure is completed.

Procedure 2.

This procedure to test a diode circuit board without powering down the entire EAGLE 5 ISS applies to the following FAPs:

- 870-1606-02 with revision H or higher
- 870-2320-01 with revision C or higher (or 870-2320-03)

1. Check to verify the OP/MAINT LED is green, indicating the FAP is not in maintenance mode.
2. Unscrew the two thumbscrews securing the FAP jumper board and remove the board.
3. On the jumper circuit board, unclip the 12 pin connector jumper from P71 and re-attach it to P72.

   Insert it until the plastic retaining clips "snap". Note that the jumper has a retaining strap so it won't get dropped or lost. This repositioning overrides the diodes, establishing a direct connection between input and fuse panels.

   WARNING: If fuses are blown, DO NOT continue with this procedure. Instead, contact *Customer Care Center* at the appropriate number.

4. Slide the jumper board back into the FAP and verify both of the following alarms display:

   - the OP/MAINT LED lights red on the FAP
   - an EAGLE 5 ISS fuse alarm displays on the terminal

   You may now remove either or both diode circuit boards without affecting EAGLE 5 ISS service.

5. Locate diode board A and unscrew the two thumbscrews securing the board.

   Remove the board from the FAP.

6. Locate the diode to be tested.

   There are two power diodes, each with three pins. They are labeled CR43 and CR44 for diode board A.

7. Set your digital multimeter to diode check mode..
8. Measure the voltage drop between the center pin of the CR43 diode and either of the outside pins with the ground probe on the center lead.

   Record this measurement.

9. Measure the voltage drop between these same pins again, but switch the multimeter leads, so the positive lead is now on the opposite pin.

   Record this measurement.

10. Compare the two measurements.

    If the diode is functioning properly, the first reading should be between 0.2 and 0.1 volts and the other should be read as an open circuit. Otherwise, replace2 the failed board with a spare diode board.

11. Repeat *Step 9* through *Step 10*, measuring the voltage between the *other* outside pin and the center pin of CR43.
12. Repeat *Step 6* through *Step 10*, using diode board B.

This completes the test for diode board B.

13. Reinsert the two functional diode boards.

    Tighten the thumbscrews on each board to secure it to the FAP.

14. Unscrew the two thumbscrews securing the FAP jumper board and remove the board.
15. On the jumper circuit board, unclip the 12 pin connector jumper back from P72 to its original position on P71.

    Insert it until the plastic retaining clips "snap." This repositioning returns the diodes to their original, non-maintenance position.

16. Slide the jumper board back into the FAP.

    Verify the OP/MAINT LED lights green. The fuse alarm LED returns to green. The diode board testing procedure is completed.

Removable Drives

This section provides information about the removable drives associated with the EAGLE 5 ISS Maintenance Administratrion Subsystem Processor (MASP).

A removable drive is used for two purposes:

- To hold an off-line, backup copy of the administered data and system GPLs
- To hold a copy of the measurement tables

To use a removable drive to hold the system data, it must be formatted for system data. To use a removable drive to hold measurements data, it must be formatted for measurements data. The EAGLE 5 ISS provides the user the ability to format a removable drive for either of these purposes. A removable drive can be formatted on the EAGLE 5 ISS by using the `format-disk` command. For more information on the `format-disk` command refer to the *Commands Manual*.

Removable drives described in this section include:

- *MO Removable Cartridge Description*
- *MO Cartridge Removal Procedure*
- *Removable USB Drive*
- *Fixed SATA Drive*

MO Removable Cartridge Description

The MO removable cartridge drive is located on the Maintenance Disk and Alarm Card (MDAL) in card location 1117.

The removable media cartridge is a magneto-optical (MO) disk used in the MDAL to install and back up customer data.When the cartridge is write protected, no data can be written to the cartridge, nor can the cartridge be erased or formatted. Data can only be read from the cartridge. When the cartridge is write enabled, data can be written to the cartridge, data can be read from the cartridge, and the cartridge can be erased and formatted.

Table 13: Supported MO Cartridges presents supported MO cartridges that can be used.

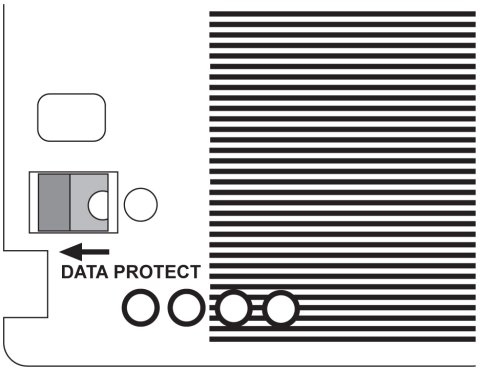
Table 13: Supported MO Cartridges

MDAL		Supported MO Cartridge			
Part Number	**Revision**	**2.3Gb**	**4.1Gb**	**5.2Gb**	**9.1Gb**
870-0773-04	A, B	X			
870-0773-04	C or later	X	X		
870-0773-05	A through F	X			
870-0773-05	G or later	X	X		
870-0773-06	A, B, C	X	X		
870-0773-06	D or later	X	X	X	
870-0773-08	All	X	X	x	X
870-0773-09	All	X	X	X	X
870-0773-10	All	X	X	X	X

The LEDs on the front faceplate indicate critical, major, and minor alarms and card activity.

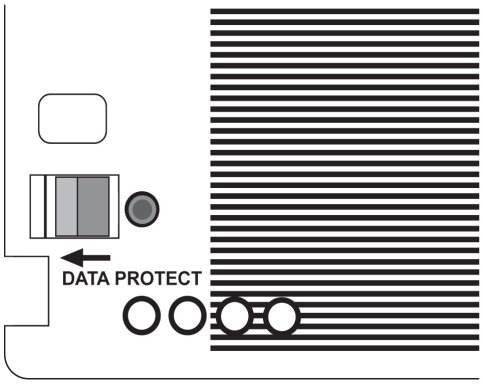
The write protecting mechanism of the MO removable cartridge is a red tab located in the lower left corner of the cartridge. Under the red tab is an arrow pointing toward the left edge of the cartridge; the words “DATA PROTECT” are under the arrow. To write-protect the MO removable cartridge, slide the red tab to the left (the direction of the arrow) until it snaps into place. The hole to the right of the tab should be clear and open. See *Figure 10: Gbyte Write Protected Removable Cartridge*.

Figure 10: Gbyte Write Protected Removable Cartridge



To write-enable the MO removable cartridge, slide the red tab to the right, the opposite direction of the arrow, until it snaps into place. The hole to the right of the tab should be filled with a red dot. See *Figure 11: Gbyte Write Enabled Removable Cartridge*.

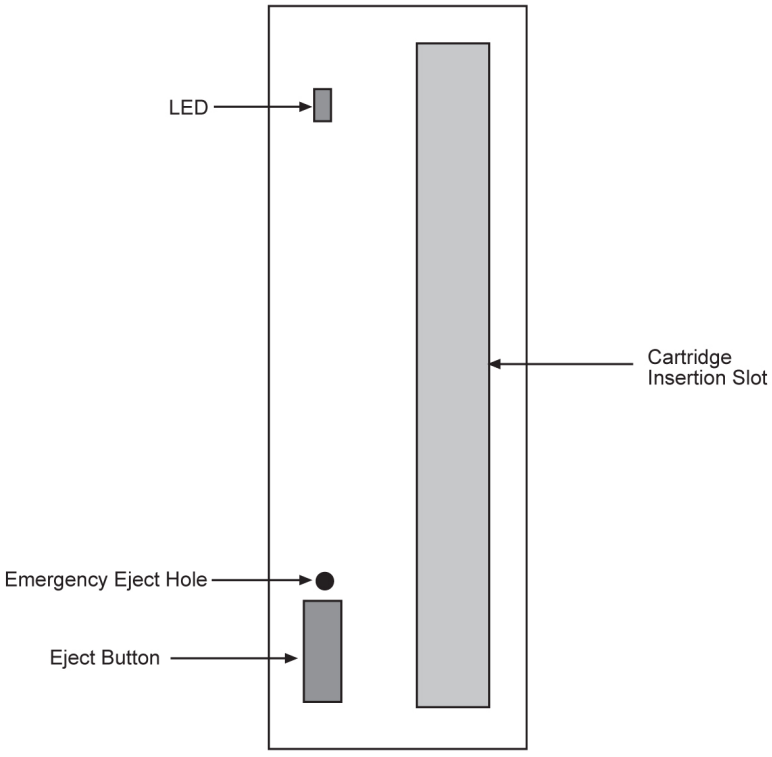
Figure 11: Gbyte Write Enabled Removable Cartridge



The MO removable cartridge is a two-sided cartridge, with sides designated as side A and side B. The MO removable cartridge drive can only access one side of the cartridge at a time; which side is accessed depends on how the cartridge is inserted into the removable cartridge drive. The side indicator is located on the shutter on each side of the removable cartridge.

Figure 12: Gbyte Removable Cartridge Drive Layout shows the layout of the removable cartridge drive.

Figure 12: Gbyte Removable Cartridge Drive Layout



MO Cartridge Removal Procedure

Purpose

This section is referenced in this manual by many procedures requiring the use of the removable cartridge and the removable cartridge drive. The procedures found in this section are recommended procedures for handling the removable cartridges.

Note:

Removable cartridges should never be left unattended in the MDAL.

Requirements

None

1. To insert the removable cartridge to access side A, insert the removable cartridge into the cartridge insertion slot of the drive with the indicator for side A on the shutter facing to the right side of the drive and away from the side with the LED and the eject button.
2. To insert the removable cartridge to access side B, insert the removable cartridge into the cartridge insertion slot of the drive with the indicator for side A on the shutter facing to the left side of the drive and toward the side with the LED and the eject button.
3. When the removable cartridge is inserted into the removable cartridge drive, the LED is yellow. When the cartridge is ready to use, the LED is green.

1. Verify that the LED on the removable cartridge drive is green.

   If the LED is yellow, the drive is being accessed by the Eagle and the cartridge cannot be removed from the drive. Wait until the LED is green before attempting to remove the cartridge from the drive.
2. When the LED is green, push the eject button on the removable cartridge drive.

   While the cartridge is being ejected from the drive, the LED is yellow.
3. The LED is off when the cartridge is fully ejected from the drive.

   The cartridge can now be removed from the drive.

Removable USB Drive

Purpose

This section is referenced in this manual by many procedures requiring the use of the removable USB thumb disk in the E5-MASP card. The procedures found in this section are recommended procedures for handling the removable USB drive in the E5-MASP card.

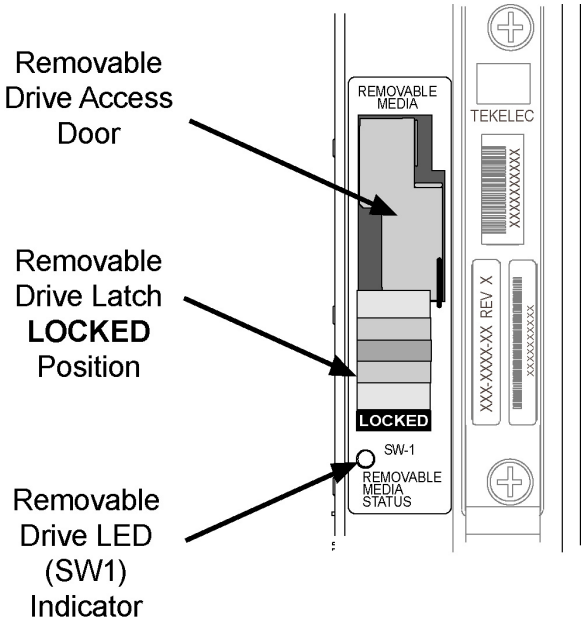
Requirements

None

1. Verify that the removable USB drive is locked in position and in use.

   The removable drive latch (SW1) is in the LOCKED position and the Removable Media Status LED on the E5-MASP is Off. Refer to *Figure 13: Removable USB Drive LOCKED*.

   Figure 13: Removable USB Drive LOCKED



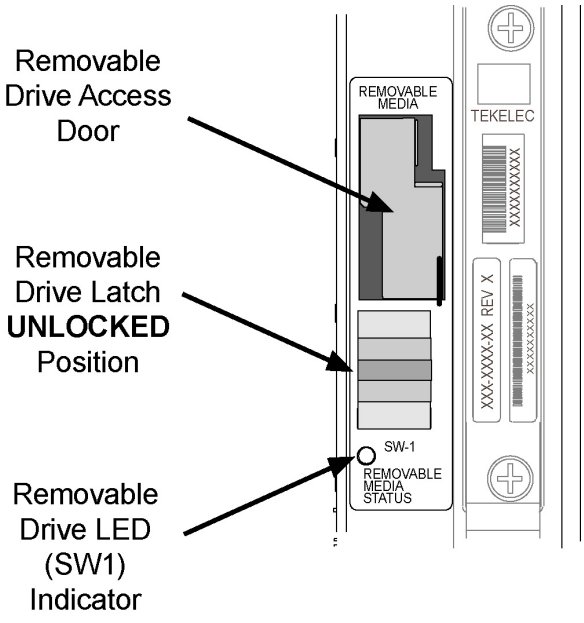
2. Move SW1 from the LOCKED to the unlocked position and wait for the LED to indicate a steady blue state. See *Figure 14: Removable USB Drive UNLOCKED*.

   When SW1 is transitioned from locked to unlocked, the LED will flash blue to indicate the drive is unlocked and in process of shutting down.

   CAUTION

   CAUTION: Removal of the drive prior to the LED indicating steady blue could result in drive corruption.

Figure 14: Removable USB Drive UNLOCKED



3. When the LED indicates a steady blue state, the removable USB drive can be safely removed.The LED is off when the cartridge is fully ejected from the drive.

   The cartridge can now be removed from the drive.

4. Lift the access door up, swing it past the detent position so that the door remains open on its own.
5. Grasp the pull tab of the slide and pull the slide out slowly until it stops (it travels about a half inch).

   CAUTION: The full travel of the slide is less than an inch, do not try to pull the assembly to expose the full length of the thumb drive as this is beyond the slide's designed travel.

6. The USB drive is disengaged and can be taken from the inject eject assembly.
7. Insert a USB drive into the inject-eject assembly.
8. Grasp the pull tab of the slide and push the slide in slowly until you feel the USB drive is seated in its slot (it travels about a half inch).
9. Close the access door.
10. Move SW1 from the unlocked to the LOCKED position.

    When SW1 is transitioned from unlocked to locked, the LED will flash blue to indicate the drive is locked and in process of coming online.

11. When the LED turns Off, the removable USB drive is ready for use.

Fixed SATA Drive

Purpose

This section is referenced in this manual by many procedures requiring the use of the fixed SATA drive in the E5-MASP card. The procedures found in this section are recommended procedures for handling the fixed drive in the E5-MASP card.

Requirements

None

1. Enter the following command to display the card status:

   `rept-stat-card`

   The following is an example of a possible output.

```
e5oam 08-12-01 15:38:32 EST  EAGLE 40.1.0
CARD   VERSION      TYPE      GPL        PST            SST        AST
1108   -----------  MCPM      MCP        OOS-MT-DSBLD   Manual     -----
1109   030-009-000  HIPR      HIPR       IS-NR          Active     -----
1110   030-009-000  HIPR      HIPR       IS-NR          Active     -----
1111   030-010-000  IPSM      IPS        IS-NR          Active     -----
1113   030-010-008  E5MCAP    OAMHC      IS-NR          Standby    -----
1114   -----------  E5TDM                IS-NR          Active     -----
1115   030-010-008  E5MCAP    OAMHC      IS-NR          Active     -----
1116   -----------  E5TDM                IS-NR          Active     -----
1117   -----------  E5MDAL               OOS-MT         Isolated   -----
```

```
   Command Completed.
```

In this sample output, 1113/1114 are standby and 1115/1116 are active.

2. Verify the E5-MASP card containing the fixed SATA drive to be replaced is `Standby` before continuing.

   If the card is not Standby, enter the following command to force the active E5-MASP card to become Standby:

   `init-card:loc=x`

   where *x* is the card location (1113 or 1115) from *Step 1*.

3. Remove the card from service by entering the following command:

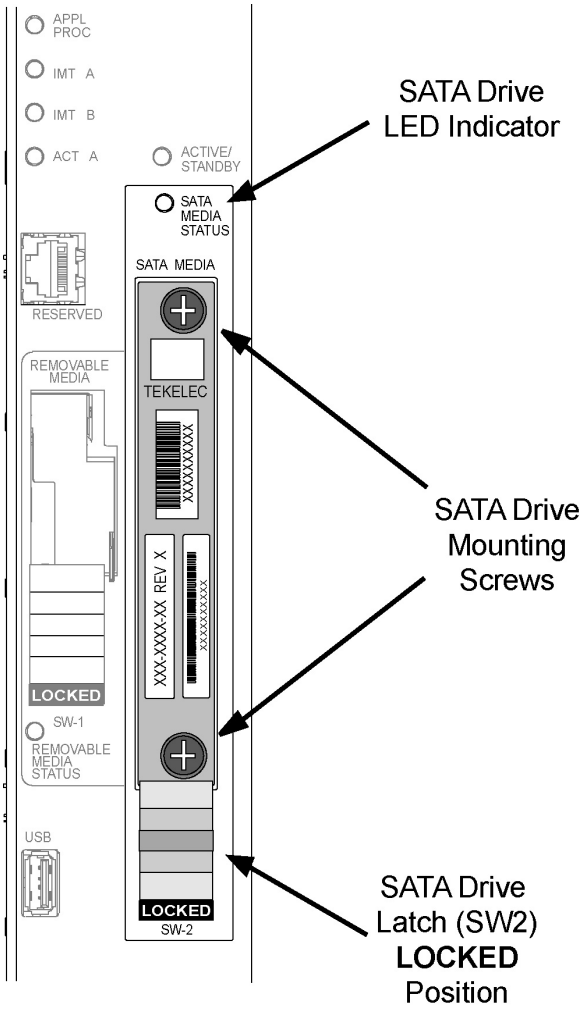
   `rmv card`:loc=*xxxx*

   where *xxxx* is the card location.

4. Verify that the SATA drive is locked in position and in use.

   The SATA drive latch (SW2) is in the LOCKED position and the SATA Media Status LED on the E5-MASP is Off. Refer to *Figure 15: SATA Drive LOCKED*.

   Figure 15: SATA Drive LOCKED



5. Move SW2 from the LOCKED to the unlocked position and wait for the LED to indicate a steady blue state. See *Figure 16: SATA Drive UNLOCKED*.

   When SW2 is transitioned from locked to unlocked, the LED will flash blue to indicate the drive is unlocked and in process of shutting down.

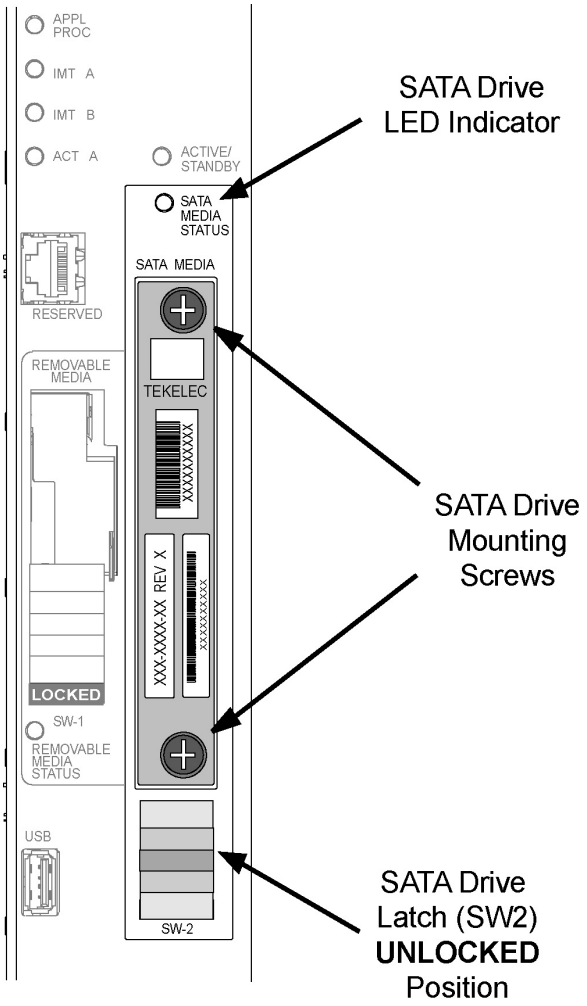
   CAUTION

   CAUTION: Removal of the drive prior to the LED indicating steady blue could result in drive corruption.

   CAUTION

   CAUTION: If SW2 is transitioned from locked to unlocked and the E5-MASP is in service, removal of the SATA drive will result in a card obit. All drive LEDs will blink blue.

Figure 16: SATA Drive UNLOCKED



6. When the LED indicates a steady blue state, the SATA drive can be safely removed.The LED is off when the drive is fully ejected from the drive.

   The drive can now be removed from the slot.

7. Loosen the SATA drive mounting screws.
8. Grasp the screws and pull the drive out slowly until it is free from the card.
9. Slide a SATA drive into the drive slot on the card.
10. Gently push the drive in slowly until it is properly seated.
11. Tighten the mounting screws.
12. Move SW2 from the unlocked to the LOCKED position.

    When SW2 is transitioned from unlocked to locked, the LED will flash blue to indicate the drive is locked and in process of coming online.

13. When the LED turns Off, the SATA drive is ready for use.
14. Enter the following command to put the card that was inhibited in back into service:

    `alw-card:loc=xxxx`

where *xxxx* is the card location used in *Step 3*. Following is an example of a possible output:

```
RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
Card has been allowed.
```

Note: Allow the card to run for 5 minutes before continuing.

15. Enter the following command to verify the card is Standby and in service.

    `rept-stat-card`

    The following is an example of a possible output.

```
e5oam 08-12-01 15:38:32 EST  EAGLE 40.1.0
CARD   VERSION      TYPE      GPL        PST            SST        AST
1108   ----------   MCPM      MCP        OOS-MT-DSBLD   Manual     -----
1109   030-009-000  HIPR      HIPR       IS-NR          Active     -----
1110   030-009-000  HIPR      HIPR       IS-NR          Active     -----
1111   030-010-000  IPSM      IPS        IS-NR          Active     -----
1113   030-010-008  E5MCAP    OAMHC      IS-NR          Standby    -----
1114   ----------   E5TDM                IS-NR          Active     -----
1115   030-010-008  E5MCAP    OAMHC      IS-NR          Active     -----
1116   ----------   E5TDM                IS-NR          Active     -----
1117   ----------   E5MDAL               OOS-MT         Isolated   -----

Command Completed.
```

Daily Procedures

The procedures found in this section are recommended procedures for daily routine preventive maintenance. Some procedures may refer to other chapters within this document.

Backing Up the Database Daily

Purpose

This procedure is used to make a backup of the database on the fixed disk and provide a current copy of the system data to be stored on-site. This procedure can then be used in the event a fixed disk is damaged. This procedure should not be confused with the other database archival procedures. Should the backup removable cartridge created with this procedure become unreadable, the other procedures in this chapter will ensure that a good copy of the database is still available.

Requirements

The databases in the current partitions of both MASPs (FD CRNT) must be coherent.

At least one removable cartridge formatted for system data is needed for this routine. Each removable cartridge should be labeled as "Daily Backup." Each day, select the removable cartridge with this label and perform the backup procedure.

Interval

Daily

1. Enter the following command to check the operational status of the database:

   `rept-stat-db`

If necessary, refer to the *Commands Manual* to interpret the output.

2. Enter the following command to create a backup of the database on the fixed disk:
   `chg-db:action=backup`
   This command should take no longer than 30 minutes to execute. It could take longer depending on other system activity that is in progress when this command is entered. During command execution, these messages appear (the active MASP is displayed first):

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP B - Backup starts on standby MASP.
BACKUP (FIXED) : MASP B - Backup on standby MASP to fixed disk complete.
```

3. Insert the removable cartridge labeled "Daily Backup" into the removable cartridge drive on the MDAL card.
   Reference: *Removable Drives*
4. Enter the following command to create a backup of the database on the removable cartridge:
   `chg-db:action=backup:dest=remove`
   During command execution, these messages should appear.

```
BACKUP (REMOVABLE) : MASP A - Backup starts on active MASP.
BACKUP (REMOVABLE) : MASP A - Backup to removable cartridge complete.
```

5. Verify that the databases on the removable cartridge (RD BKUP) and the current partition of the active MASP (FD CRNT) are coherent by entering the following command:`rept-stat-db`
   If necessary, refer to the *Commands Manual* to interpret the output.
6. Remove the removable cartridge from the removable cartridge drive on the MDAL card.
   Reference: *Removable Drives*
7. Make an entry in the site maintenance log that a backup was performed.
   Place the removable cartridge in a safe place, easily accessible in the event of a catastrophic failure.

System Reports Analysis

Purpose

The purpose of this routine is to inspect the printer outputs for possible trouble messages and routinely check the status of the STP through traffic measurements. By inspecting printouts and measurements on a daily basis, system trends can be detected and resolved.

Requirements

Printer must be configured to receive traffic reports. Measurements collection must be activated before reports containing current data can be printed. Enter the following command to activate measurements collection, if necessary:`chg-meas:collect=on`

Refer to the *Commands Manual* for more information. If measurements are already allowed, an error message indicates this.

Reports Description

Purpose

This includes a system terminal and printer output system related messages as well as network protocol messages. Any abnormal activity (this is network dependent) should be highlighted and saved for later retrieval. Refer to *Corrective Maintenance* for a description of system related messages and procedures for recovery.

Requirements

None

Interval

Daily

Variables

hh = The end half-hour interval (0 - 2330) for requested interval

1. Enter the following command to print a measurements report for the STP entity type:`rept-meas:type=systot:enttype=stp`
2. Enter the following command to print a measurements report for the link entity type (this command requires either the loc and port parameters or the lsn parameter):
   `rept-meas:type=comp:enttype=link`
3. Review the STP report and compare with the link report.

   If excessive errors exist on any one particular link, enter the following command to print a report for the time period the errors occurred:

   `rept-meas:enttype=link:period=specific:hh`

   Refer to the *Commands Manual* for more information on using the `rept-meas` command.
4. From this report, determine what events may have occurred during the 30 minute measurements collection period.

File Transfer for LNP and INP Measurements

Note:

EAGLE 5 ISS systems supporting an ITU network are not configured with the LNP or SEAS features.

Purpose

The purpose of this procedure is to output LNP/INP measurements to the file transfer area (FTA) so the measurements can be collected.

Requirements

A computer with a VT320 or KSR connection to the EAGLE 5 ISS. A communication program that both emulates VT terminals and supports Kermit file transfer. Previous LNP/INP measurement files must have been successfully transferred and deleted (`dlt-fta`) before the start of this procedure. A spreadsheet program that can import Comma Separated Value (CSV) text files. A PC running ProComm© for Windows and Microsoft Excel© can also be used.

Interval

Daily and/or weekly.

1. From the EAGLE 5 ISS VT320 or KSR terminal, enter the following command to display the contents of the FTA:`disp-fta-dir:loc=xxxx`

   Where *xxxx* = the active TDM (1114 or 1116).

2. From the EAGLE 5 ISS VT320 or KSR terminal, enter the following command to delete any existing files from the FTA:`dlt-fta:loc=xxxx:all=yes`

   Where *xxxx* = the active TDM (1114 or 1116)

3. In this example, from the EAGLE 5 ISS VT320 or KSR terminal, enter the following command to send LNP daily measurements to the FTA:`rept-meas:enttype=lnp:type=mtcd`
4. Enter the following command to activate the file transfer:`act-file-trns:loc=xxxx`

   Where*xxxx*= the active TDM (1114 or 1116).

5. Enter the following command to acquire a list of the files transferred to the FTA in step 4:`disp-fta-dir:loc=xxxx`

   Where *xxxx* = the active TDM (1114 or 1116).

6. Transfer the desired files (with .csv suffixes) to the PC by using the get command from within the communications program configured to run Kermit in ASCII mode.

   An example of the Kermit commands to extract the previous day's records are as follows:`> get mon_lnp.csv > get tues_ssp.csv > get thu_lrn.csv > get sat_npa.csv > finish`

7. Run a spreadsheet program and open each of the files collected to view the LNP/INP measurement data.
8. Once all the files are successfully transferred and confirmed, enter the following command to remove the files from the FTA:`dlt-fta:loc=xxxx:all=yes`

   Where *xxxx* = the active TDM (1114 or 1116)

Weekly Procedures

The procedures found in this section are recommended for weekly routine preventive maintenance. Some procedures may refer to other chapters within this document.

Database Archive (Weekly)

Purpose

The purpose of this procedure is to create a copy of the database on a weekly basis over a period of four weeks to be stored in an archive. The copies can then be used in the event a removable cartridge is damaged, and a new copy is required. This routine will generate four copies of the database, all taken at weekly intervals.

Each tape in this cycle should be designated as Week 1, Week 2, Week 3, or Week 4. When all four removable cartridges have been used, repeat the process starting with the Week 1 cartridge.

Requirements

Four removable cartridges formatted for system data are required for this routine. The removable cartridge should be labeled "Week 1" through "Week 4." Once each week, select the removable cartridge with the appropriate label and perform the backup procedure. Each week, select the removable cartridge with the next sequential number and perform this procedure.

Interval

Weekly

1. Enter the following command to check the operational status of the database:

   ```
   rept-stat-db
   ```

   If necessary, refer to the *Commands Manual* to interpret the output.

2. Insert the removable cartridge labeled "Week x" into the removable cartridge drive on the MDAL card.

   Reference: *Removable Drives*.

3. Enter the following command to create a backup of the database on the removable cartridge:

   ```
   chg-db:action=backup:dest=remove
   ```

   During command execution, these messages should appear.

   ```
   BACKUP (REMOVABLE) : MASP A - Backup starts on active MASP.
   BACKUP (REMOVABLE) : MASP A - Backup to removable cartridge complete.
   ```

4. Verify that the databases on the removable cartridge backup partition (RD BKUP) and the current partition of the active maintenance and administration subprocessor system (MASP) fixed disk current partition (FD CRNT) are coherent by entering the following command:

   ```
   rept-stat-db
   ```

   If necessary, refer to the *Commands Manual* to interpret the output.

5. Remove the removable cartridge from the removable cartridge drive on the MDAL card.

   Reference: *Removable Drives*

6. Make an entry in the site maintenance log that a backup was performed for the appropriate week (Week 1, Week 2, Week 3, or Week 4).

   Place the removable cartridge in a safe place, easily accessible in the event of a catastrophic failure.

Printer Inspection

Purpose

This procedure verifies the printer is operational and the ribbon does not need replacement. Should the printer cease operation, system reports and trouble reports would not be printed at the system printer. Use the following procedure to verify the operation of the printer.

Requirements

A printer connected through an RS232 to a serial port on the EAGLE 5 ISS control shelf backplane. Refer to the printer user manual (provided by the printer manufacturer) for detailed specifics on maintaining the printer.

Interval

Weekly

Variables

x = TDM serial port number (1-16)

1. Verify the carriage assembly is free of any debris.

   Remove the top of the printer if necessary.

2. Check that the power indicator is illuminated (on).

If not, verify the power cord is plugged in.

3. Check the online indicator.
   If off, press the select button. Verify the indicator is illuminated.
4. Verify the presence of on-line indicators using the printer *Users Manual*.
5. Enter the following command to send output to the printer: `act-echo:trm=x.`
6. Type the following command at a terminal to verify the printer is operating: `rept-stat-trm`
   If the printer does not print any messages, check the printer cable and verify it is connected to a system terminal. If not, reconnect the printer cable (refer to the *Installation Manual* for cable pinouts).
7. Look at the printout.
   If the ink is faded and difficult to read, replace the ribbon. Refer to the *Users Manual* provided by the manufacturer for ribbon replacement procedures.

Remote Access Verification

Purpose

The purpose of this routine is to verify proper operation of the modem used for remote access of the EAGLE 5 ISS system.

Requirements

Remote terminal and modem.

Interval

Weekly

1. From a remote PC or terminal, dial the telephone number of the modem connected to the Eagle.
2. When connected, verify you are able to log in to the EAGLE 5 ISS system and enter commands.
3. Once you have verified the operation of the modem, logoff from the EAGLE 5 ISS and terminate your connection.

Monthly Procedures

The procedures found in this section are recommended procedures for monthly routine preventive maintenance. Some procedures may refer to other chapters within this document.

Database Archive (Monthly)

Purpose

The purpose of this procedure is to create a copy of the database on a monthly basis over a period of four months to be stored in an archive. The copies can then be used in the event a removable cartridge is damaged, and a new copy is required. This routine will generate four copies of the database, all taken at monthly intervals.

Each tape in this cycle should be designated as Month 1, Month 2, Month 3, or Month 4. When all four removable cartridges have been used, repeat the process starting with the Month 1 cartridge.

Requirements

Four removable cartridges formatted for system data are required for this routine. The removable cartridge should be labeled "Month 1" through "Month 4." Once each month, select the removable cartridge with the appropriate label and perform the backup procedure. Each month, select the removable cartridge with the next sequential number and perform this procedure.

Interval

Monthly

1. Enter the following command to check the operational status of the database:

   ```
   rept-stat-db
   ```

   If necessary, refer to the *Commands Manual* to interpret the output.

2. Insert the removable cartridge labeled "Month x" into the removable cartridge drive on the MDAL card.

   Reference:*Removable Drives*

3. Enter the following command to create a backup of the database on the removable cartridge:

   ```
   chg-db:action=backup:dest=remove
   ```

   ```
   BACKUP (REMOVABLE) : MASP A - Backup starts on active MASP.
   BACKUP (REMOVABLE) : MASP A - Backup to removable cartridge complete.
   ```

4. Verify that the databases on the removable cartridge (RD BKUP) and the current partition of the active MASP (FD CRNT) are coherent by entering the following command:

   ```
   rept-stat-db
   ```

   If necessary, refer to the *Commands Manual* to interpret the output.

5. Remove the removable cartridge from the removable cartridge drive on the MDAL card.

   Reference: *Removable Drives*

6. Make an entry in the site maintenance log that a backup was performed for the appropriate month (Month 1, Month 2, Month 3, or Month 4).

   Place the removable cartridge in a safe place, easily accessible in the event of a catastrophic failure.

FAP Load Balance Verification (PN 870-0243-XX only)

Purpose

This procedure is used to verify the Load Balance Factor (LBF) for the A and B power supplied to each Fuse and Alarm Panel (FAP) in the EAGLE 5 ISS. This procedure applies ONLY to installed FAPs with Tekelec P/N 870-0243-XX.

The LBF is an empirically derived number that provides an indication if a Tekelec STP System Frame has an open power distribution diode. The difference in amperage between the "A" versus "B" battery leads should be within a "typical" range. Values outside of this range should be an indication of a potential problem and requires further investigation.

Requirements

Tekelec recommends that the verification be performed using a Clamping Type Multimeter (Clamp Amp Meter). If the Clamp Meter has different settings or functions than the ones described in this procedure, consult the instruction manual for this meter and determine substitute settings or functions.

Results of this verification should be recorded on the form provided with this procedure and filed with the STP System maintenance records.

CAUTION: This procedure must be performed with the utmost Caution. All safety precautions associated with in service equipment and power must be strictly followed. Any equipment that is below the shelf that is being worked on must be protected from falling tools or debris. All jewelry, rings, watches must be removed before this procedure is started. Read this procedure completely before proceeding.

Interval

Monthly

1. Login to system via a dedicated terminal or connect a PC to an EAGLE 5 ISS terminal port.

   Open a capture log via ProComm Plus or other PC communications program.

2. Enter the following command to determine the status of all the cards in the system.

   ```
   rept-stat-card
   ```

   If necessary, refer to the *Commands Manual* to interpret the output. Save the results to compare with the outputs at the conclusion of this procedure.

3. Enter the following command to verify the status of the signaling links.

   ```
   rept-stat-slk
   ```

   If necessary, refer to the *Commands Manual* to interpret the output. Save the results to compare with the outputs at the conclusion of this procedure.

4. Enter the following command to get a report of all the device trouble notifications that are currently logged in the OAM RAM storage area.

   ```
   rept-stat-trbl
   ```

   If necessary, refer to the *Commands Manual* to interpret the output. Save the results to compare with the outputs at the conclusion of this procedure.

5. Enter the following command to check the status of the IMT.

   ```
   rept-stat-imt
   ```

   If necessary, refer to the *Commands Manual* to interpret the output. Save the results to compare with the outputs at the conclusion of this procedure.

6. Enter the following command to check the status of the SCCP subsystem.

   ```
   rept-stat-sccp
   ```

   If necessary, refer to the *Commands Manual* to interpret the output. Save the results to compare with the outputs at the conclusion of this procedure.

7. Enter the following command to check the operational status of the database.

   ```
   rept-stat-db
   ```

   If necessary, refer to the *Commands Manual* to interpret the output. Save the results to compare with the outputs at the conclusion of this procedure. Verify that FD CRNT and FD BKUP for TDM 1114 and TDM 1116 match. If they do not match, perform *Daily Procedures* before continuing.

WARNING: Do not proceed to the next step if the backup fails.

8. Set the Clamp Amp Meter to measure DC amps.

   Set the dial to the DC 400A setting and zero out/adjust the meter by turning the 0 ADJ control. The meter must read 00.0.

   Note: On the inside of the Clamp Amp Meter there should be an arrow. The arrow must always be pointing towards the frame when clamped around the cable. If the meter cannot be directly observed, the DATA HOLD function can be utilized, if the meter is so equipped, and the reading will hold. The jaws of the meter must be around the cable for the DATA HOLD function to operate.

   Values of less than 1.0 Amp on BOTH the "A" and "B" sides are not applicable. Ignore plus (+) or minus (-) in the meter reading.

9. Measure the current on the **A** side of the EAGLE 5 ISS Frame FAP selected for verification.

   Clamp the meter around the **-48VDC A** battery cable on the FAP. Record the reading on the *Table 14: Tekelec Method of Procedure Test Record*.

10. Depress the DATA HOLD function again, if this option was utilized in *Step 9* Verify the Clamp Amp Meter reading is 00.0.

    The meter must read 00.0 before proceeding with *Step 11*.

11. Measure the current on the **B** side of the EAGLE 5 ISS Frame FAP selected in *Step 9*.

    Clamp the meter around the **-48VDC B** battery cable on the FAP. Record the reading on the *Table 14: Tekelec Method of Procedure Test Record*.

12. Calculate the Load Balance Factor (LBF) and record on the *Table 14: Tekelec Method of Procedure Test Record*.

    a) Compute the difference between **A** and **B** sides (A-B) or (**B-A**).

    b) The difference is divided by the lower of the two (2) measured values (**A** or **B**) and expressed as a percentage.

       This percentage is the LBF.

    c) Enter the LBF in the appropriate space on the Test Record form.

       Refer to *Figure 17: Open Diode Example* and *Figure 18: Steady State Example* for examples of this formula. Data indicates that the acceptable range can be between 0% and 125%. The 125% point is a **Flag** that indicates further investigation is warranted. It indicates the potential for at least one open diode.

       Figure 17: Open Diode Example

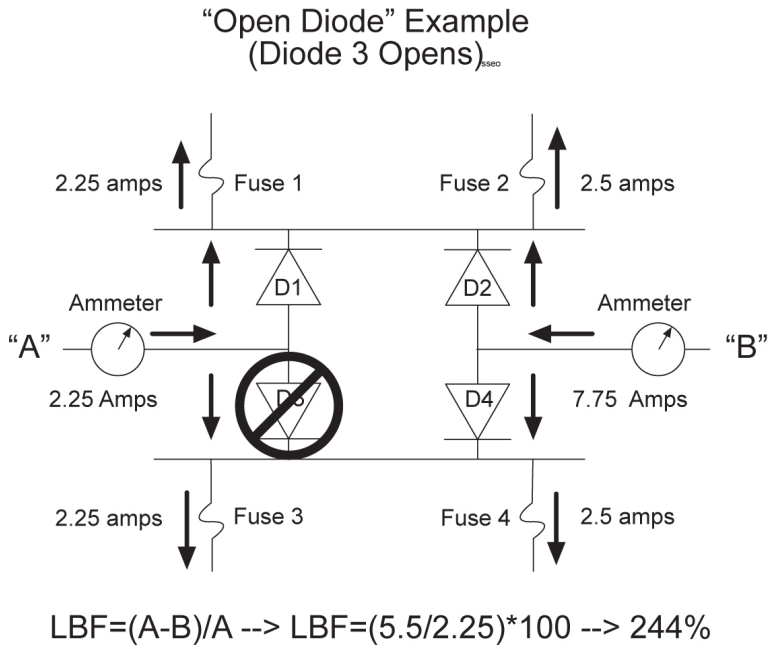
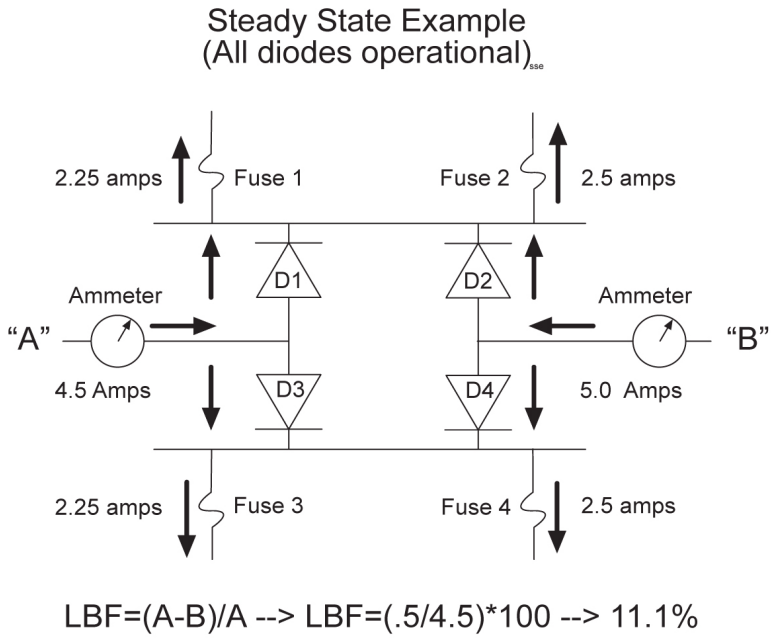


Figure 18: Steady State Example



13. *Customer Care Center*, for values above the 125% threshold.
14. Depress the DATA HOLD function again, if this option was utilized in *Step 9* .
    Verify the Clamp Amp Meter reading is 00.0. The meter must read 00.0 before proceeding with *Step 15*.
15. Repeat Steps *Step 8* through *Step 14* for all EAGLE 5 ISSFAPs.
16. Enter the following command to determine the status of all the cards in the system.

```
rept-stat-card
```

Compare the output with the results from *Step 2*. The outputs should be the same as initially recorded.

17. Enter the following command to verify the status of the signaling links.

```
rept-stat-slk
```

Compare the output with the results from *Step 3*. The outputs should be the same as initially recorded.

18. Enter the following command to get a report of all the device trouble notifications that are currently logged in the OAM RAM storage area.

```
rept-stat-trbl
```

Compare the output with the results from *Step 4*. The outputs should be the same as initially recorded.

19. Enter the following command to check the status of the IMT.

```
rept-stat-imt
```

Compare the output with the results from *Step 5*. The outputs should be the same as initially recorded.

20. Enter the following command to check the status of the SCCP subsystem:

```
rept-stat-sccp
```

Compare the output with the results from *Step 6*. The outputs should be the same as initially recorded.

21. Enter the following command to check the operational status of the database.

```
rept-stat-db
```

Compare the output with the results from *Step 7*. The outputs should be the same as initially recorded.

Table 14: Tekelec Method of Procedure Test Record

TEKELEC Method of Procedure Test Record					
Frame	**A Battery**	**B Battery**	**A-B Delta (Amps)**	**Load Balance Factor (LBF**	**Technician/Date**
CF 00					
EF 00					
EF 01					
EF 02					
EF 03					

TEKELEC Method of Procedure Test Record					
Frame	**A Battery**	**B Battery**	**A-B Delta (Amps)**	**Load Balance Factor (LBF**	**Technician/Date**
EF 04					
OAPF					
MISC					

Note: Complete this test record for all FAP tests. Retain this record in the Tekelec Eagle STP System maintenance files.

Change the Fan Tray Filter

Purpose

The purpose of this routine is to make sure a clean and adequate supply of air is available to cool the HC MIM cards.

Requirements

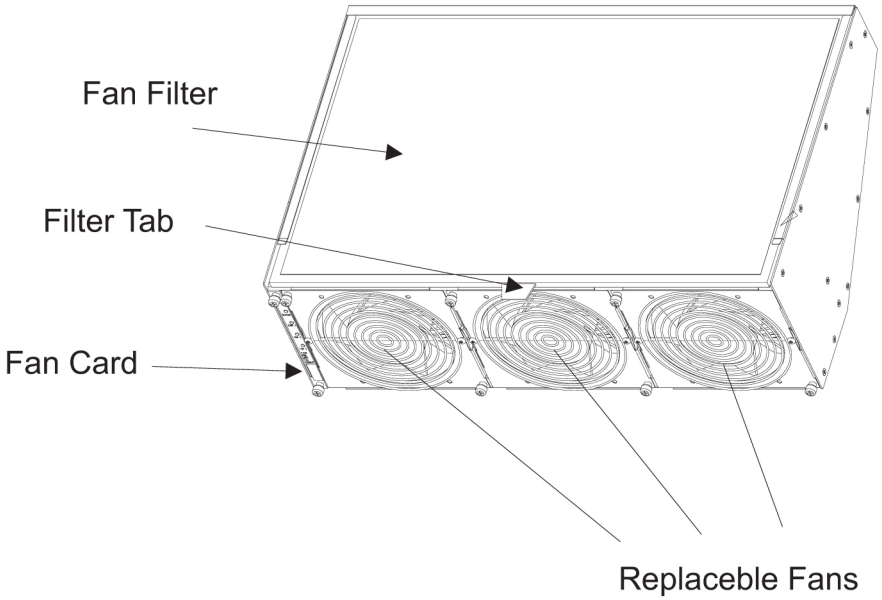
A replacement fan tray filter.

Interval

Monthly.

1. Locate the filter tab on the fan assembly.

   Figure 19: Fan Assembly



2. Pull the filter tab to remove the fan tray filter.
3. Insert the replacement filter into the fan filter slot.
   Align the filter over the replaceable fans.

Changing the Air Supply Filter

Purpose

The purpose of this routine is to prevent dirt and dust from building up around the fan units, hindering them from cooling the shelf effectively.

Requirements

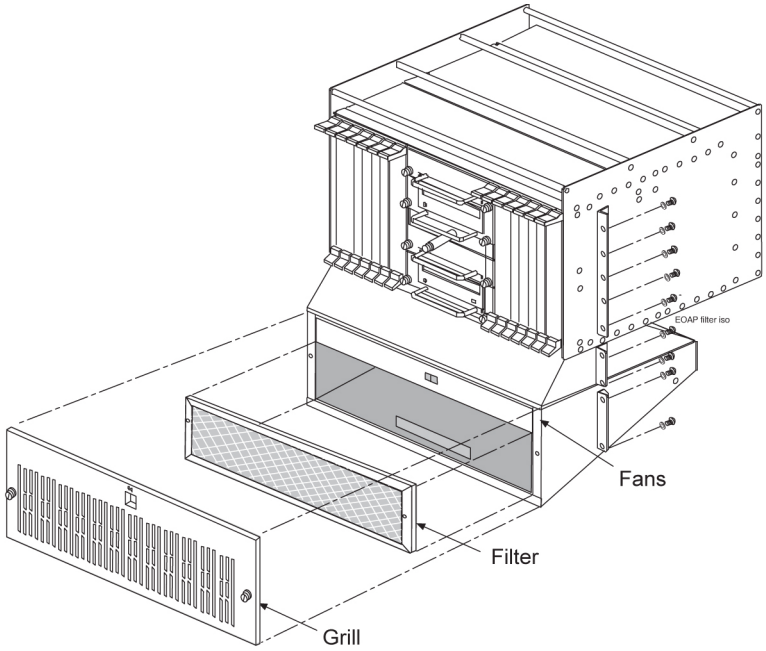
A replacement air filter (P/N 551-0011-01).

Interval

Every 45 days.

1. Turn the fan power switch to the OFF position.
   The *Active* LED under the fans becomes unlit and the fan Alarm LED turns red. The EAGLE 5 ISS generates a UAM indicating a fan failure.
2. Unscrew the two thumbscrews securing the grill and remove it.
   The air filter is now accessible.

   Figure 20: Fan Filter Replacement



3. Remove and discard the old air filter.
4. Position the new air filter so that it covers the opening to the fan assembly.

   Check the bottom edge of the filter to make sure the airflow indicator arrows are pointing away from you and towards the fan assembly.
5. To replace the grill, position it on the fan assembly and screw in the two thumbscrews to secure the grill in place.
6. Turn the fan power switch to the ON position.

   The two LEDs for the fan assembly turn green and the EAGLE 5 ISS generates a UIM to indicate the fan alarm is cleared.

Cleaning Printer

Purpose

The purpose of this routine is to prevent the system printer from building up dirt and dust around the print heads and carriage assemblies, preventing it from operating.

Requirements

Printer cleaning kit, or cleaning solvent. Cotton swabs and damp cloth.

Interval

Monthly

Follow the manufacturer's procedures for cleaning the print head and carriage assembly.

Fuse Spares Inventory

Purpose

This routine verifies ample spare fuses are available. Fuses are used in the fuse and alarm panel (FAP).

Requirements

None

Interval

Monthly

Two types of fuses are used in the EAGLE 5 ISS:

1. Industry standard GMT fuse 1 amp
2. Industry standard GMT fuse 3 amp

   Spare fuses are stored in a fuse tray located on the side of each frame. Check that both types of GMT fuses are in this tray. Tekelec recommends no fewer than five of each fuse type be readily accessible. If the EAGLE 5 ISS is not located at the end of a bay, check your facility's spare fuse storage. GMT fuses are industry standard fuses and are provided by Tekelec during installation of the system. Additional inventory of these fuses should be purchased through Tekelec.

Wrist Strap Test

Purpose

The purpose of this routine is to verify the integrity of the anti-static wrist strap and ground cord used when handling cards from the EAGLE 5 ISS.

Requirements

Ohmmeter, wrist strap (equipped with the EAGLE 5 ISS).

Interval

Monthly

1. Detach the grounding cord from the wrist strap.

DANGER:

If the resistance measured is less than 800 Kohms, you may be electrocuted if the equipment short circuits while you are wearing the wrist strap. If the resistance measured is greater than 1200 Kohms, you may damage your equipment.

2. Using an ohmmeter, measure the resistance between the two ends of the ground cord.
3. If you measure a resistance between 800 Kohms and 1200 Kohms, the ground cord is safe to continue using.
4. If you measure a resistance that is not between 800 Kohms and 1200 Kohms, discard the ground cord and wrist strap.

   They are no longer safe to use.

Quarterly Procedures

The procedures found in this section are recommended procedures for quarterly routine preventive maintenance. Some procedures may refer to other chapters within this document.

Database Archive (Quarterly)

Purpose

The purpose of this routine is to create an archive copy of the EAGLE 5 ISS database. This archive copy should be stored off-site and saved for emergency recovery when all other procedures have failed. This routine will reuse the same removable cartridge each quarter.

Requirements

This procedure requires a removable cartridge formatted for system data.

Interval

Quarterly

1. Enter the following command to check the operational status of the database:
   ```
   rept-stat-db
   ```
   If necessary, refer to the *Commands Manual* to interpret the output.
2. Insert the removable cartridge labeled "Archive" into the removable cartridge drive on the MDAL card.
   Reference:*Removable Drives*
3. Enter the following command to create a backup of the database on the removable cartridge:
   ```
   chg-db:action=backup:dest=remove
   ```
   ```
   BACKUP (REMOVABLE) : MASP A - Backup starts on active MASP.
   BACKUP (REMOVABLE) : MASP A - Backup to removable cartridge complete.
   ```
4. Verify that the databases on the removable cartridge (RD BKUP) and the current partition of the active MASP (FD CRNT) are coherent by entering the following command:
   ```
   rept-stat-db
   ```
   If necessary, refer to the *Commands Manual* to interpret the output.
5. Remove the removable cartridge from the removable cartridge drive on the MDAL card.
   Reference: *Removable Drives*
6. Make an entry in the site maintenance log that a backup was performed on the "Archive" removable cartridge.
   Place the removable cartridge in a safe place off-premise. This copy is for emergency recovery in the event all other methods of database recovery failed.

Preventing Dust Buildups

Purpose

The purpose of this routine is to prevent dust build-up in and around the cabinet. Collection of dust within the EAGLE 5 ISS can allow electrostatic charges to build around circuit cards, possibly damaging cards installed in the system.

Requirements

Damp cloth

Interval

Quarterly

1. Open the cabinet doors on the front of the cabinet(s).

   Note:

   Do not use compressed air. Do not remove the plexiglass panels from the rear of the frame. This procedure is to be used for removing dust from the front of the system and from around the card cages only.

   Using a damp cloth, wipe the dust from the doors and from the front of the card cages.

2. Using the same cloth, wipe the dust from the air intakes and around the exterior of the system frames.

Rectifier Voltage Inspection/Recording

Purpose

The purpose of this routine is to verify that the rectifier is providing adequate voltages and has not become a marginal supply. By identifying power supply problems early, the possibility of failure can be circumvented.

Requirements

Volt meter capable of measuring DC voltages in the range of -20VDC to -60VDC.

Interval

Quarterly

1. Locate the power source for the EAGLE 5 ISS.
2. Using a VOM, measure the -48VDC supply.
3. Verify voltages are between -46VDC and -52VDC.

   (If voltages are higher or lower, refer to the manufacturers maintenance procedures for appropriate action).

Semi-Annual Procedures

The procedure found in this section is recommended for semi-annual (every 6 months) routine preventive maintenance. Some procedures may refer to other chapters within this document.

Spare Inventory Rotation

Purpose

The purpose of this routine is to verify the integrity of spare cards. By rotating spares on a regular basis, their operation can be verified before they are needed as replacements.

Requirements

None

Interval

Semi-annually (every 6 months)

1. Identify the spare cards in your inventory.

WARNING: This procedure may interrupt service. Verify the type of card and service it provides, and only use this routine during the maintenance window.

2. Locate the card in service that matches the configuration of your spare card.
3. Verify the part numbers and revision numbers of the cards are compatible.
4. Refer to *Card Removal/Replacement Procedures* for the proper procedure for each card type.
5. Place the card from your spares inventory into the now empty slot.
   Perform any administrative commands described in *Card Removal/Replacement Procedures*.
6. Make an entry in the site maintenance log and place the card removed from the system into your spares inventory.

Chapter 3

Corrective Maintenance

Topics:

Introduction

The EAGLE 5 ISS trouble detection is distributed throughout the system. Each processor continually monitors its internal subsystems and certain external subsystems. Whenever a trouble condition changes state, the processor analyzes the change and stores the analysis for reporting to the active MASP. The trouble detection software does not affect the service quality of the system.

Each MASP is made up of two cards, the GPSM-II card (General Purpose Service Module II) and the TDM (terminal disk module).

The GPSM-II card contains the communications processor and applications processor and provides connections to the IMT bus. The GPSM-II controls the maintenance and database administration activity.

The TDM contains the fixed disk drive, the terminal processor for 16 serial I/O ports and an interface to the MDAL (maintenance disk and alarm) card which contains the removable cartridge drive and alarm logic. There is only one MDAL card in the maintenance and administration subsystem and it is shared between the two MASPs.

The TDM is associated with a specific GPSM-II card. For example, the TDM in location 1114 is associated with the GPSM-II in location 1113 and the combination of these two cards is designated as MASP A. The TDM in location 1116 is associated with the GPSM-II in location 1115 and the combination of these two cards designated as MASP B. When MASP A is active, the GPSM-II in location 1113 and TDM in location 1114 are active. When MASP A is standby, the GPSM-II in location 1113 and TDM in location 1114 are standby. One MASP is always active and the other MASP is always standby.

To determine which MASP is active either enter the `rept-stat-db` command, or enter the `rept-stat-card` command, or examine the LEDs on both TDM cards. If the LED on the TDM card is green, the associated MASP is active. (If the LED on the TDM card toggles between green and amber, the associated MASP is standby.)

The output of the `rept-stat-db` command shows which MASP is active with the indicator (ACTV) following the TDM card location. The indicator (STDBY) following the TDM card location shows which MASP is standby.

The output of the `rept-stat-card` command shows which MASP is active with the entry ACTIVE in the SST field for the GPSM-II card. The entry STANDBY in the SST field for the GPSM-II card shows which MASP is standby.

The database commands, such as `rept-stat-db`, refer to the TDM because the TDM contains the fixed disk drive for the MASP. The MDAL is only referred to when inserting or removing the removable cartridge because the removable cartridge drive resides on the MDAL.

System Alarm Levels

There are three levels of alarms in the EAGLE 5 ISS system. They are:

Critical A critical alarm is an indication of a severe service affecting problem that can be related to traffic, billing, and maintenance capabilities and requires immediate maintenance attention, regardless of time of day.

Major	A major alarm is an indication of a problem that seriously affects system operation, maintenance and administration, etc. and requires immediate attention. The urgency is less than in critical situations because of a lesser immediate or impending effect on system performance, customers, and operating company operations and revenue.
Minor	A minor alarm is an indication of a problem that does not have a serious impact on service, and does not require immediate maintenance attention.

Trouble Detection

The first step in analyzing a system trouble is to know when a trouble exists. The EAGLE 5 ISS handles this task through:

- Audible alarms
- Visual alarms
- Event/error messages

Audible Alarms

The EAGLE 5 ISS has three types of audible alarms: critical, major and minor. Audible alarms are generated by the maintenance disk and alarm card (MDAL), and can be heard through the electronic sonalert device installed on the card. Each alarm has its own distinct cadence as described in the following:

- Critical - Two tones 0.5 seconds apart, separated by 1.5 seconds of silence.
- Major - Single tone, separated by 1.5 seconds of silence.
- Minor - Single tone of 5 seconds or continuous tone for power plant alarm.

Visual Alarms

The EAGLE 5 ISS has several types of visual alarms. They are:

- MDAL LEDs
- Alarm LEDs on the Fuse and Alarm Panel (FAP)
- Alarms displayed on the system terminal
- LEDs on application cards
- End cabinet alarm indicators

Maintenance personnel usually see the alarm LEDs on the fuse and alarm panel (FAP) and the alarms displayed on the system terminal screen to alert them that a system problem exists. The LEDs on a card help maintenance personnel diagnose where a problem exists.

MDAL LEDs

Following are the five alarm LEDs on the face of the MDAL card. See *Figure 21: MDAL Alarm LEDs*:

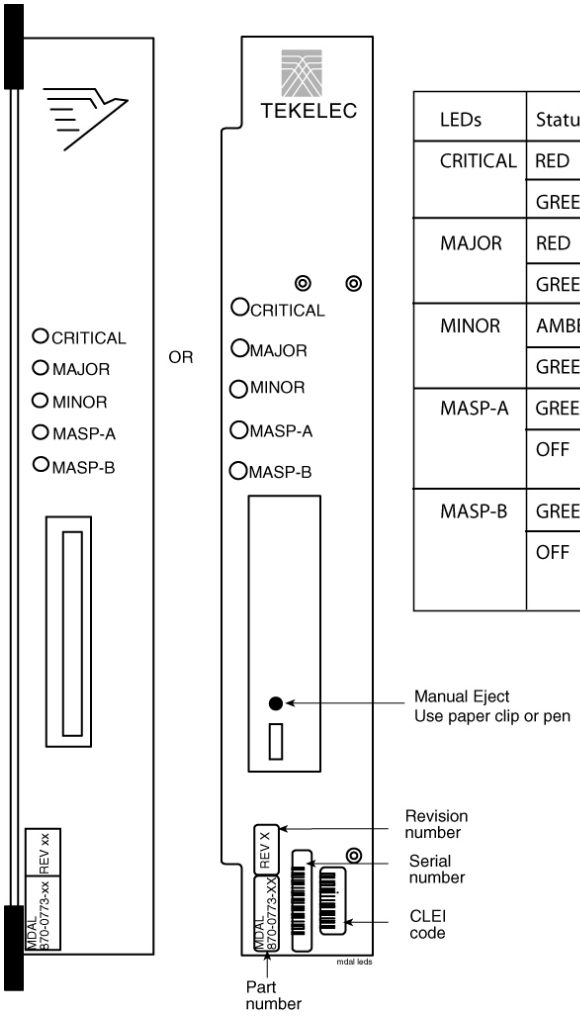
- Critical
- Major

- Minor
- MASP-A
- MASP-B

When the system detects an alarm, the appropriate alarm level and location (MASP-A or MASP-B) LEDs illuminate. See *Figure 21: MDAL Alarm LEDs*.

Note: Verify the state of the MDAL card by observing the LEDs on the face of the MDAL card. The fuse and alarm panel do not reflect any alarms caused by the MDAL card.

Figure 21: MDAL Alarm LEDs



LEDs	Status	Descriptions
CRITICAL	RED	Critical alarm condition detected
	GREEN	No alarm
MAJOR	RED	Major alarm condition detected
	GREEN	No alarm
MINOR	AMBER	Minor alarm condition detected
	GREEN	No alarm
MASP-A	GREEN	MASP-A is the active MASP
	OFF	MASP-A is the standby MASP or is not present
MASP-B	GREEN	MASP-B is the active MASP
	OFF	MASP-B is the standby MASP or is not present

Alarm LEDs on the Fuse and Alarm Panel (FAP)

There are six alarm LEDs on the FAP that indicate:

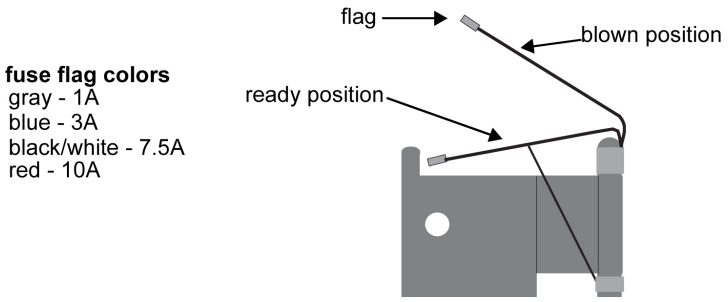
- Power power alarm LEDs (A and B)
- A critical alarm
- A major alarm

- A minor alarm
- A fuse alarm

The FAP provides protected distribution of power to the system. Protection is provided by the fuses placed in the GMT fuse holders used in the panel. The FAP contains a fuse fail alarm circuit that operates when one or more of the panel's fuses fail. An LED changes from green to red when a fuse has failed. The LED remains red until the fuse has been replaced.

The fuse and alarm panel uses GMT fuses for individual circuit protection (see *Figure 22: GMT Fuse*). The EAGLE 5 ISS uses 3A and 1A fuses, depending on the application. When a fuse fails due to an overload condition, a small colored flag on the fuse shows the position of the fuse that has failed. The flag is gray on 1A fuses, blue on 3A fuses, black/white on 7.5A fuses, and red on 10A fuses.

Figure 22: GMT Fuse



The panel contains two separate circuits, A and B. Current flows from the input terminals to the fuse bus. When a fuse is installed in a fuse holder, the circuit is completed to the output connector. The Fuse Fail Alarm LED on the front panel indicates the condition of the panel. Green is indicated if power is applied to the panel and there are no failed fuses. The green LED changes to red when a fuse fails. An unlit LED indicates a failed LED or no power to the fuse and alarm panel.

The fuse and alarm panel is also equipped with frame alarm LEDs that display the critical, major, and minor alarms generated by the EAGLE 5 ISS system.

The fuse and alarm panels have the A and B buses connected through diodes to allow one bus to pick up the entire load when the other bus loses power.

Table 15: Fuse and Alarm Panel Front Items (870-2804-01), *Table 16: Fuse and Alarm Panel Front Items (870-0243-xx)* and *Table 17: Fuse and Alarm Panel Front Items (870-1606-xx/870-2320-xx)* describe the front panel configuration of the fuse and alarm panels.

Table 15: Fuse and Alarm Panel Front Items (870-2804-01)

Fuse Panel Item	Description
Fuse Positions	2 groups of 20 GMT fuses
PWR ALM	LED indicator for A or B diode board input power • Green - input power applied • Red - no input power to board

Fuse Panel Item	Description
FUSE ALM	LED indicator for fuse fail alarm • Green - normal • Red - blown fuse
CR	LED indicator for frame critical alarm
MAJ	LED indicator for frame major alarm
MIN	LED indicator for frame minor alarm
Shorting Board	LED indicator for mode of operation • Off - normal • Green - maintenance

Figure 23: Fuse and Alarm Panel Front Layout (870-2804-01)

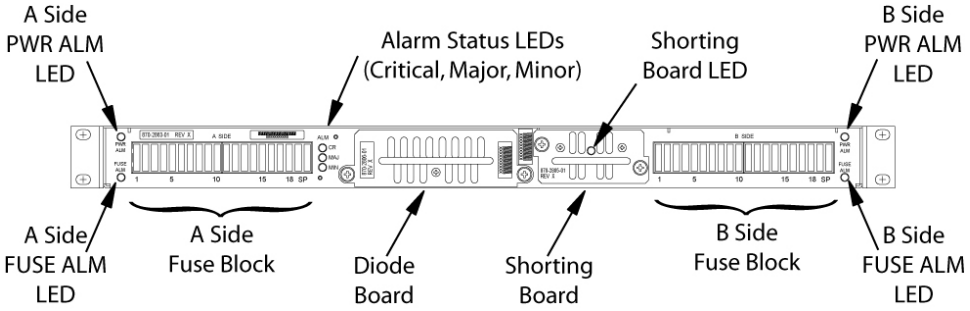


Table 16: Fuse and Alarm Panel Front Items (870-0243-xx)

Fuse Panel Item	Description
Fuse Positions	2 groups of 20 GMT fuses
Card Holder	slide-card holder with 2 designation cards for 20 fuse positions each
Fuse Alarm	LED indicator for fuse fail alarm
Critical Alarm	LED indicator for critical alarm
Major Alarm	LED indicator for major alarm
Minor Alarm	LED indicator for minor alarm

Fuse Panel Item	Description
Power Alarm	LED indicator for lose of power on either A bus or B bus

Figure 24: Fuse and Alarm Panel Front Layout (870-0243-xx)

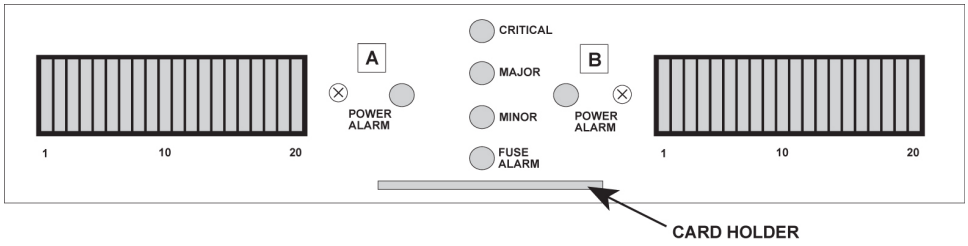
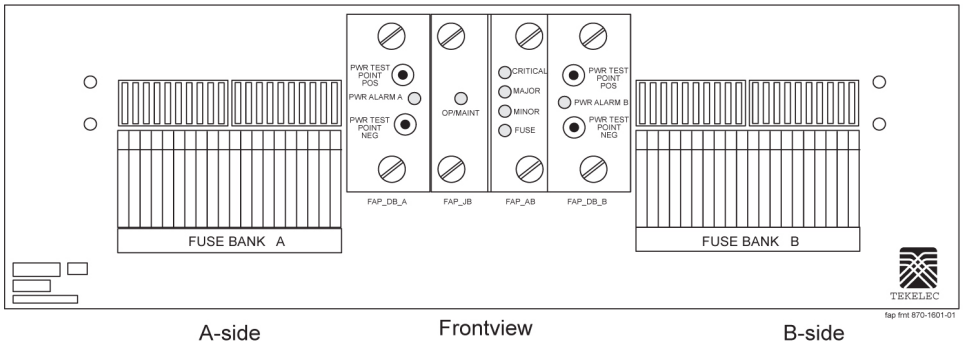


Table 17: Fuse and Alarm Panel Front Items (870-1606-xx/870-2320-xx)

Fuse Panel Item	Description
Fuse Positions	Two groups of 20 GMT fuses
PWR ALARM	LED indicator for A or B diode board input power Green - input power applied Red - no input power to board
OP/MAINT	LED indicator for mode of operation Green - normal Red - maintenance
FUSE	LED indicator for fuse fail alarm Green - normal Red - blown fuse
CRITICAL	LED indicator for frame critical alarm
MAJOR	LED indicator for frame major alarm
MINOR	LED indicator for frame minor alarm

Figure 25: Fuse and Alarm Panel Front Layout (870-1606-xx/870-2320-xx)



Alarms appearing on a terminal screen

Three types of alarms may be displayed on a system terminal screen:

- CRIT - Indicates a critical alarm
- MAJR - Indicates a major alarm
- MINR - Indicates a minor alarm

These appear as three highlighted boxes in the top left corner of a terminal. If an alarm condition exists, it is displayed in one of the highlighted boxes. There is a fourth box next to the three alarm boxes that is not used. To obtain information about the alarm, use the `rept-stat-alm` command at the system terminal, followed by a carriage return.

This command provides all current alarm status. Refer to the *Commands Manual* for more information about the `rept-stat-alm` command.

Alarms on Application Cards

Each application card has LEDs that indicate the condition of the card. Alarm conditions appear on the card if the card has a fault. Refer to the *Installation Manual* for the location and description of the card LEDs.

End Cabinet Alarm Indicators

There are three alarm LEDs on the end cabinet:

- A critical alarm LED
- A major alarm LED
- A minor alarm LED

When an alarm condition is present, one or more of these LEDs illuminate in the signifying the overall system alarm level. Refer to the *Installation Manual* for alarm indicators.

Event/Error Messages

Unsolicited messages are used in the EAGLE 5 ISS for trouble notification and to communicate the status of the system to Operations Services (OS). The EAGLE 5 ISS outputs two types of unsolicited messages.

- Unsolicited Alarm Messages (UAMs) are used to denote a persistent problem with device or object that needs the attention of a craftsperson. Some examples are a link failure, a subsystem being out of service, or a card not receiving a system clock.
- Unsolicited Informational Messages (UIMs) are indications of transient events that have occurred. UIM examples include messages that an MSU contains invalid data or failed a gateway screening function.

The location of a card with a fault is displayed with the event/error message. The location is displayed as a card number. Card numbers are used to locate the card in the EAGLE 5 ISS system. Refer to the *Installation Manual* for card locations.

Following is an example of an event/error message displaying the card location:

```
     RLGHNCXA21W 00-02-07 12:01:43 EST  EAGLE 35.0.0
**  0014.0008  ** CARD 1113 OAM        Active MASP has become isolated
```

The card location always follows the word "CARD" in the message. In this example, the card number is **1113**.

IMT Bus States

The states of the IMT bus are combined from the primary state (PST) and secondary state (SST) for each IMT bus. See the *Commands Manual* for information about PST and SST states and definitions.

The `rept-stat-imt` command is used to report the status of the IMT bus. An example of the output follows:

```
RLGHNCXA03W 00-09-27 16:50:24 EST  EAGLE 31.5.0
IMT   PST            SST        AST
 A    IS-NR           Active     -----
 ALARM STATUS       = No alarms
 IMT   PST            SST        AST
 B    IS-ANR          Fault      -----
 ALARM STATUS       = **  0108 Major IMT Failure Detected
Command Completed.
```

IMT System Alarm Level Determination

The state of the IMT subsystem is determined from the state of each IMT bus. If both buses are IS-NR active, the IMT subsystem is IS-NR active. If only one IMT bus is manually disabled (IS-ANR manual), the IMT subsystem is IS-ANR manual. Otherwise, the IMT subsystem state is IS-ANR fault.

The alarm level of an IMT bus in the IS-ANR fault state is determined by how many bad card connections it has. The number of bad connections required for a major alarm or a minor alarm are as follows:

- 0 failures = no alarm
- 1-2 failures = minor alarm
- 3 or more = major alarm

The alarm levels on the individual buses combine to give the overall alarm level for the IMT subsystem. *Table 18: IMT Bus Alarm Levels* shows the rules that are used to determine the overall alarm level of the system of IMT buses.

Table 18: IMT Bus Alarm Levels

Bus A Alarm Level	Bus B Alarm Level	Overall Alarm Level
Normal	Normal	Normal
Normal	Minor	Normal
Minor	Normal	Normal
Normal	Major	Minor
Major	Normal	Minor
Minor	Minor	Major
Minor	Major	Major
Major	Minor	Major
Major	Major	Critical

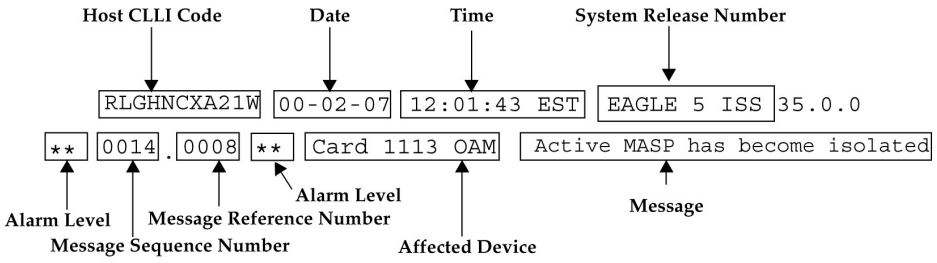
Output Messages

The EAGLE 5 ISS generates output messages in response to command input or fault conditions in the EAGLE 5 ISS or in the network. The format for these messages is generally uniform. Some messages include additional data.

Network messages provide the text description of the event, and on the lines below the text line, any additional information.

The following example shows the general format of an output message.

Figure 26: Output Message Format



The fields in an output message (shown in the figure above) are described next:

- Host CLLI code - a maximum of one alpha character and ten alphanumeric characters. The CLLI code uniquely identifies the system in terms of its physical location. The CLLI code must be unique among all elements in the system.

  The **CLLI** code consists of the following:

  - City = 4 characters
  - State = 2 characters
  - Building = 2 characters
  - Equipment type = 3 characters

- **Date** - year-month-day
- **Time** - hour: minutes: second time zone
- **System Release Number** - contains a system identifier and the version ID number. The system identifier, can be EAGLE or EAGLE5 depending on the product key enabled on the system. The version ID number has the software release specific GPL set that is expected to be installed on the system as approved loads. The format of the version ID number is in the form of **maj.min.maint**, defined as follows:

  - **maj** - the major release ID
  - **min** - the minor release ID
  - **maint** - the maintenance release ID.

- **Alarm Level** - a one or two character indicator of the alarm level, defined as follows:

  - ***C** = Critical Alarm
  - ** = Major Alarm
  - * = Minor Alarm
  - **blank** = No Alarm.

- **Message Sequence Number** - This number is an index for all output messages. The number increments sequentially for every message. The output messages originating from the card in location 1113 has a range from 0001 through 4999. The range for location 1115 is 5000 through 9999.
- **Message Reference Number** - Messages that are associated with a specific action are numbered for reference. These messages are defined in this chapter, along with a corrective action.
- **Affected Device** - The device that caused the message to be generated. This generally describes the card type.

Network messages with additional data display the additional lines below the text string and message reference number (MRN). See individual messages for examples of output.

All network messages are non-alarm and are used to notify the user of network events. There may or may not be a procedure associated with these messages.

Alarm Clearing Procedures

After an audible has sounded, it can be silenced by entering the following command:

`rls-alm:lvl=xxxx`

where *xxxx* can be:

- `minr` - Silences a minor alarm
- `majr` - Silences a major alarm
- `crit` - Silences a critical alarm.

All alarm types can be silenced with the following command:

`rls-alm`

The `rls-alm` command does not clear visual alarms on the terminals or alarm indicators on the fuse and alarm panel (FAP) or frame panels.

Once an audible alarm is silenced, any new alarm conditions cause the alarm to sound again.

Silencing a specific alarm when a lower level alarm is also present results in the next highest audible alarm level being activated. For example, the system has both critical and major alarms present. When the critical alarm is silenced, the audible major alarm begins to sound.

Retrieve Trouble Report

Application maintenance software is responsible for monitoring trouble on a card. There are three types of troubles or faults:

- Abnormal situation is being reported by software.
- An SS7 message has a problem (an invalid DPC, for example)
- A hardware fault is being reported.

Trouble reports are used by Tekelec *Customer Care Center* to help analyze problems with the EAGLE 5 ISS system. To help Tekelec *Customer Care Center*, retain any printouts of the trouble report. The output of the `rtrv-trbl` command should be reviewed with a member of Tekelec *Customer Care Center*. To display the current trouble reports, enter the following command at the system terminal:

`rtrv-trbl:loc=1115:num=1:mode=c`

The **mode=c** parameter provides a continuous output of the trouble reports as they occur. The **loc=** parameter specifies the active GPSM-II. The **num** parameter indicates how many trouble reports you want to display.

A typical trouble report looks similar to this:

```
tekelecstp 00-05-15  19:04:05 EST EAGLE 35.0.0
   Card 1115 Module tc_utl.c Line 1617 Class 1103 Severity 1
     00 02 f6 00 01 23 06 22 05 00
   Report Date 00-05-15  Time19:04:05
```

The trouble reports include:

- Card number
- Module name
- Line number
- Class

- Severity

Hourly Status Message Reports

The system provides hourly reports that include a list of all alarms and any devices that are manually deactivated or inhibited. The report contains the alarms that exist at the time the report is generated. Any alarms that have occurred, and have been cleared in the last hour, are not reported. The hourly status message report is automatically generated at the beginning of each hour (08:00, 09:00, and so forth). The system sends the report to all system terminals that can receive unsolicited program update messages.

The information shown in the hourly status report can also be displayed by entering one or more of the following commands.

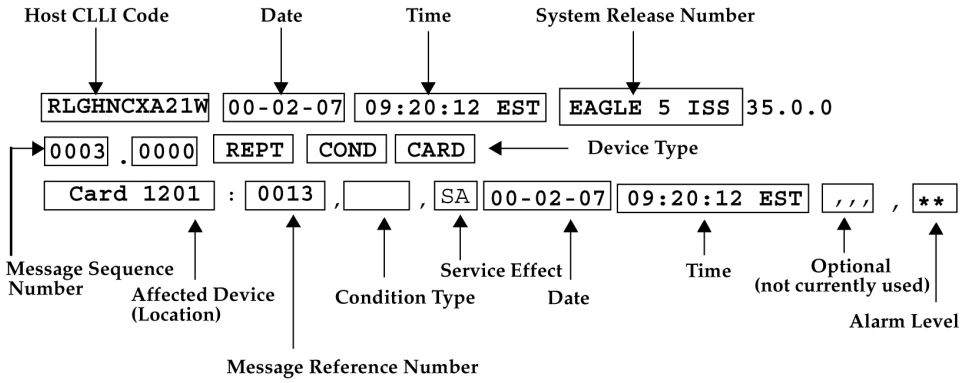
Note: Systems supporting an ITU network are not configured with the LNP or SEAS features.

- `rept-stat-alm`: Displays the summary of all alarm counts.
- `rept-stat-card`: When used with the **stat** parameter, displays all cards with the state specified by the stat parameter. Refer to the *Commands Manual* for additional information on the use of parameters with this command.
- `rept-stat-cdt`: Displays the customer defined troubles.
- `rept-stat-clk`: Displays the status of the clocks.
- `rept-stat-cluster`: Displays the summary status and statistical information for all configured cluster point codes.
- `rept-stat-db`: When used with the `display=except` parameter, displays the status of the system database by displaying the database level of the cards whose database level does not match the active fixed disk current partition. Refer to the *Commands Manual* for additional information on the use of parameters with this command.
- `rept-stat-dlk`: When used with the **:stat** parameter, displays the status of the TCP/IP data links. Refer to the *Commands Manual* for additional information on the use of parameters with this command.
- `rept-stat-dstn`: When used with the **stat** parameter, displays the destination point codes with the state specified by the stat parameter. Refer to the *Commands Manual* for additional information on the use of parameters with this command.
- `rept-stat-dstn`: When used with the **mode=full** parameter, displays the subsystem status. Refer to the *Commands Manual* for additional information on the use of parameters with this command.
- `rept-stat-mps`: Displays in a single report, the overall status of the EPAP (EAGLE 5 ISS Provisioning Application Processor) subsystem.
- `rept-stat-gpl`: Displays the version of the GPL currently being used by an application and which versions of the GPL are the trial and approved versions of that GPL.
- `rept-stat-imt`: Displays the primary, secondary, and associated maintenance states of the IMT buses.
- `rept-stat-lnp`: Displays the status and statistics related to LNP.

- `rept-stat-ls`: When used with the **stat** parameter, displays the linksets that have the state specified by the stat parameter. Refer to the *Commands Manual* for additional information on the use of parameters with this command.
- `rept-stat-sccp`: Displays the status of the TSMs running the SCCP application.
- `rept-stat-seas`: Displays the status of the SEAS subsystem.
- `rept-stat-slan`: Displays the status of the cards that make up the STPLAN subsystem.
- `rept-stat-slk`: When used with the **stat** parameter, displays the signaling links that have the state specified by the stat parameter. Refer to the *Commands Manual* for additional information on the use of parameters with this command.
- `rept-stat-sys`: Displays the status of these items: alarms, IMT buses, signaling links (both SS7 and X.25 signaling links), linksets, destination point codes (DPCs), the maintenance and administration subsystem (MAS), clocks, TSMs loaded with the SCCP or GLS application, security subsystem, and the SEAS subsystem.
- `rept-stat-trbl`: Displays a report of all the device trouble notifications that are currently logged in the OAM RAM storage area. The severity of each alarm is also identified in the report.
- `rept-stat-trm`: Displays the status of the terminal serial ports.
- `rept-stat-xlist`: Displays the statistics related to the storage of exception list (x-list) entries.

If the message reference number (MRN) field has a null value (no field entry), the device has been manually removed from service (through `inh-card, canc-slk`, and so forth). There is no alarm for the device and the condition type is SCMMA (state change due to manual action). The date and time in the report refer to the date and time of the alarm or when the device was removed from service. The format of the output is in *Figure 27: Format of Hourly Status Message Output*.

Figure 27: Format of Hourly Status Message Output



The following is a list of the device types and subsystems (with the ID of the affected device or subsystem) that the hourly status message report displays reports for. For example, if the device type being reported on is CARD, then card locations are displayed. Only those device types and subsystems that have disabled devices or alarm conditions are displayed in the hourly status message report. If there is more than one device type or subsystem to display, they are displayed in the following order.

1. CARD - the card location
2. IMT - the IMT bus A or IMT bus B
3. BITS - the BITS clock
4. TRM - the terminal port

5. SLK - the linkset name and the signaling link code (SLC)
6. DLK - the data links
7. LS - the linkset name
8. DPC - the destination point code
9. CDT - the customer defined trouble number
10. FUSE PNL - the frame ID of the system
11. SYSTEM - system
12. ALM - alarms
13. SYS CLK - system clock
14. SYSIMT - system IMT
15. SCCP SS - SCCP subsystem
16. GLS SS - GLS subsystem
17. GPL_SS - the name of the GPL
18. SLAN SS - STP/LAN subsystem
19. XLIST SS - XLIST subsystem
20. SEAS OAP - the OAP port
21. SEAS SS - SEAS subsystem
22. SECULOG - Security log
23. LNP SS - LNP subsystem
24. LSMS Q.3 Association - Local Services Management System Association
25. LSMS SS - Local Services Management System subsystem
26. HS System CLK - High-Speed system clock
27. EMDC Links - Element Measurement & Data Collection Application Links
28. NDC SS - Network Data Collection subsystem
29. NDC Q.3 Association - Network Data Collection Q.3 association
30. GSM SS - GSM subsystem
31. MPS (ELAP/EPAP) - Multi-Purpose Server
32. DSM Links - Database Services Module
33. INP SS - INP subsystem
34. SECURITY SS - Security subsystem

Within each device type or subsystem being reported, the subsets of the report are displayed in the following order.

1. Disabled Devices
2. Minor Alarms
3. Major Alarms
4. Critical Alarms

The *cond type* field supports five values for this release:

- SCMMA: The device has been disabled due to manual maintenance action. This condition applies regardless of a previous alarm state.
- MTCEINT-0: The reported device is off normal (ANR), but there is no alarm associated with this device. An alarmed condition for another device typically affects the state of this device. For example, out-of-service (OOS) links affect the condition of the linksets.
- MAN: The reported device is off-normal (OOS-MT), but there is no alarm associated with this device. The off-normal condition was caused by manual intervention (by entering the ent-dstn command, for example).
- NULL: No specific cond type is supported. There is sufficient information to ascertain the device condition from the report. You should use a rept-stat command for further information.
- INAUDB: The use has manually inhibited alarms for this device. The time when the device was inhibited is recorded and displayed during the hourly report.

Following is an example of the report:

```
  RLGHNCXA21W 00-07-16 12:20:12 EDT EAGLE 35.0.0
  1240.0000 REPT COND CARD
  "CARD 1101:0013,,SA,00-07-16,10:03:29,,,,**"
  "CARD 1107:,SCMMA,,00-07-16,10:03:29,,,,"
  "CARD 1113:0143,,NSA,00-07-16,10:03:29,,,*"

  RLGHNCXA21W 00-07-16 12:20:12 EDT EAGLE 35.0.0
  1241.0000 REPT COND SLK
  "SLK ls1201-0,,NSA,00-07-16,10:03:29,,,,*"
  "SLK ls1201-1,,NSA,00-07-16,10:03:30,,,,*"
  "SLK ls1202-0,,NSA,00-07-16,10:03:31,,,,*"
  "SLK ls1202-1,,NSA,00-07-16,10:03:32,,,,*"

  RLGHNCXA21W 00-07-16 12:20:12 EDT EAGLE 35.0.0
  1242.0000 REPT COND LS
  "LS ls1201:,MTCEINT-0,,00-07-16,10:03:29,,,,"
  "LS ls1202:0318,,NSA,00-07-16,10:03:29,,,,*"
  "LS ls1203:0318,,00-07-16,10:03:29,,,,*"
  "LS lsx23 :0318,,NSA,00-07-16,10:03:33,,,,*"

RLGHNCXA21W 00-07-16 12:20:12 EDT EAGLE 35.0.0
  1243.0000 REPT COND DPC
  "DPC 001-001-001:0313,,SA,00-07-16,10:03:29,,,,*C"
  "DPC 002-002-002:0313,,SA,00-07-16,10:03:30,,,,*C"
  "DPC 003-003-003:0313,,SA,00-07-16,10:03:31,,,,*C"
  "DPC 001-005-*  :0313,,SA,00-07-16,10:03:32,,,,*C"
  "DPC 006-006-006:,MAN,,00-07-16,10:03:32,,,,"

RLGHNCXA21W 00-07-16 12:20:12 EDT EAGLE 35.0.0
  1244.0000  REPT COND TRM
  "TRM 2:.SCMMA,00-07-16,10:03:29,,,,"
  "TRM 3:0048,,NSA,00-07-16,10:03:29,,,,*"
```

Maintenance System Event Logs

The `rtrv-log` command is used to retrieve records from the active or standby event logs generated by the maintenance system. This command selects these records based on a span of time or a specific

log file index. There are numerous ways to sort and filter the output. Refer to the *Commands Manual* for details on using the `rtrv-log` command. A sample output follows:

```
rtrv-log:sdate=960715:stime=220000:num=50:SNUM=106:ENUM=350
    ncralstp00001 96-07-16 10:15:29 EST  Rel XX.X.X

 Card 1113; SYS REL= XX.X.X; STP CLLI= ncralstp00001; Timezone= EST
    ****96-07-16  00:23:55****
    3161.0200    SLK 1103,B            RCVRY-LKF: link available
    ****96-07-16  01:42:18****
    3162.0155  * DLK 2117,A            STPLAN Exceeded n unavailable
    ****96-07-16  01:43:51****
    3163.0317    LSET A123456789       RCVRY-LKSTO: linkset allowed
    ****96-07-16  03:00:23****
    3165.0108 ** IMT BUS A             Major IMT fault detected
    ****96-07-16  03:37:59****
    3166.0292 *C GLS SYSTEM            GLS is not available
    ****96-07-16  07:22:06****
    3167.0313 *C DPC  021-005-000      DPC is prohibited
    ****96-07-16  09:33:17****
    3168.0348  * SEAS SYSTEM           SEAS is at minimum service
    ****96-07-16  09:34:01****
    3169.0112  * IMT SYSTEM            Major Failures detected on both
    ****96-07-16  09:35:07****
    3170.0160  * CLOCK SYSTEM          1116-S clock failed
    ****96-07-16  09:36:34****
    3171.0160  * CARD 1116 OAM         1116-S clock failed
    ****96-07-16  09:38:12****
    3173.0308 *C SYSTEM                Node isolated due to SLK failure
    ****96-07-16  09:39:56****
    3174.0331 *C SCCP SYSTEM           SCCP is not available
    ****96-07-16  09:41:34****
    3176.0153 *C SLAN SYSTEM           STPLAN not available
    ****96-07-16  09:43:52****
    3178.0344  * SEAS X25 LINK A1      SEAS PVC unavailable
    ****96-07-16  09:44:18****
    3179.0344  * SEAS OAP A            SEAS UAL unavailable
    ****96-07-16  09:45:29****
    3180.0321  * XLIST                 X-LIST occupancy threshold Exceeded
    ****96-07-16  09:48:48****
    3181.0175  * SECURITY 1114         LOGBUFROVL-SECULOG - upload required
;
Report terminated - end of log reached.
    END OF LOG REPORT.
;
```

The `rtrv-trbltx` command is used to retrieve alarm and UIM message information including MRN (message reference number), level (for Alarms), Output Group and text.

The default `rtrv-trbltx` report displays all Alarms (in numerical order), and then all UIMs. Using the optional parameters, the capability exists to display a range of Alarms or UIMs, search for Alarms, UIMs or both message types matching a specific Output Group or sort all entries by Output Group. Refer to the *Commands Manual* for details on using the `rtrv-log` command. A sample output follows:

```
rtrv-trbltx:OUTGRP=all
    ncralstp00001 03-07-16 10:15:29 EST  Rel XX.X.X

    Card 1113; SYS REL= XX.X.X; STP CLLI= ncralstp00001; Timezone= EST
    Alarm Report
            MRN    LEVEL  OUTPUT GROUP    TEXT

 ------------------------------------------------------------------------
       Output Group - SYS
```

```
            0001   MAJR   SYS             Card has reset
            0002   MINR   SYS             Card is not running approved GPL
                            :
            0912   NONE   SYS             Dynamic database is now consistent
        :
        Output Group - LINK
            0155   MINR   LINK            STPLAN connection unavailable
            0156   NONE   LINK            STPLAN connection available
                            :
            0479   NONE   LINK            Link not Monitored
    UIM Report
            MRN            OUTPUT GROUP    TEXT

 ------------------------------------------------------------------------
        Output Group - SYS
            1000           SYS             MTP rcvd UPU - user part is not
 SCCP
            1001           SYS             MTP rcvd Transfer Controlled (TFC)
                            :
            1499           SYS             Invalid MRN detected
        :
        Output Group - LINK
            13nn           LINK            Example text
    END OF RTRV-TRBLTX REPORT.
;
```

Obituaries

An obituary is a set of data that describes the status of the system just before a processor restarted due to a fault in hardware or software. The data includes a register and stack dump of the processor, card location, reporting module number, software code location, and class of the fault detected. In most situations, obituary reports are generated automatically when a card is reset. Obituary reports can also be retrieved manually using the `rtrv-obit` command. Refer to the *Commands Manual* for information on using the `rtrv-obit` command. Obituaries should immediately be reported to the *Customer Care Center*.

To help Tekelec *Customer Care Center*, retain any printouts of the obituary. Tekelec *Customer Care Center* can use the report to analyze the problem. A typical obituary looks like the following:

```
rtrv-obit:loc=1115:num=2
```

```
rlghncxa03w
01-03
-30 08:43:14 EST  EAGLE 35.0.0
------------------------------------------------------------
STH: Received a BOOT 286-obituary reply for 1 restart(s)
    Primary: Card 1203   Module 4608  Mod_loc  1  Class 0080
    Register Dump :
        FL=338e    CS=4a9c    IP=01c0
        AX=0000    CX=0100    DX=21c1    BX=078a
        SP=01a6    BP=01a6    SI=0fe4    DI=3ece
        DS=dce8    ES=21c1    SS=336b
    Stack Dump :
    [SP+1E]=3ece    [SP+16]=46cc    [SP+0E]=0001    [SP+06]=0246
    [SP+1C]=078a    [SP+14]=dce8    [SP+0C]=4608    [SP+04]=338e
    [SP+1A]=078a    [SP+12]=078a    [SP+0A]=0001    [SP+02]=4a9c
    [SP+18]=0100    [SP+10]=336b    [SP+08]=0080    [SP+00]=01c0
STH: Received a BOOT 486-obituary reply for 1 restart(s)
    Primary: Card 1213   Module 0047  Mod_loc  5  Class 0241
```

```
    Register Dump :
        EFL=00000000    CS =0208        EIP=0003e75f    SS =0060
        EAX=0009a90b    ECX=0009a915    EDX=00000000    EBX=00000000
        ESP=000ddaf2    EBP=000ddb6c    ESI=00090241    EDI=00141df8
        DS =0060        ES =0060        FS =0060        GS =0060
    Stack Dump :
    [ESP+2E]=0009    [ESP+28]=1df8    [ESP+22]=0000    [ESP+1C]=a915
    [ESP+2C]=a90b    [ESP+26]=0009    [ESP+20]=0000    [ESP+1A]=0009
    [ESP+2A]=0014    [ESP+24]=a8c0    [ESP+1E]=0009    [ESP+18]=a90b
    User Data Dump :
        0a 06 00 00 46 01 08 04 00 00 00                ....F......
Report Date:
01-03
-04  Time:09:19:59
------------------------------------------------------------------
;
```

Terminal Not Responding

When a terminal is not responding, perform the following procedure:

1. Verify the terminal is connected to the MMI port on the back of the control shelf.
2. Verify the terminal is set up for 7-E-1.
3. From a working terminal, enter the following command to determine the port connected to the faulty terminal:

   `rtrv-trm`

   Note the port number. From the output message, verify the settings are correct. If no working terminal is available, contact the *Customer Care Center*.
4. Enter the following command to inhibit the terminal failing to respond:

   `inh-trm:trm=x`

   where *x* is the terminal that is not responding.
5. Enter the following command to re-activate the terminal failing to respond:

   `alw-trm:trm=x`

   where *x* is the terminal that is not responding. If the terminal fails to respond, go to *Step 6*.
6. Enter the following command to ensure that the other terminal devices are functioning:

   `rept-stat-trm`

   Following is an example of the output:

```
RLGHNCXA03W 00-02-07 09:50:17 EST  EAGLE 35.0.0
TRM  PST            SST           AST
1     IS-NR          Active        -----
2     IS-NR          Active        -----
3     IS-NR          Active        -----
4     OOS-MT-DSBLD   MANUAL        -----
5     IS-NR          Active        -----
6     IS-NR          Active        -----
7     IS-NR          Active        -----
8     IS-NR          Active        -----
9     IS-NR          Active        -----
10    IS-NR          Active        -----
```

```
11    IS-NR          Active        -----
12    IS-NR          Active        -----
13    OOS-MT-DSBLD   MANUAL        -----
14    OOS-MT-DSBLD   MANUAL        -----
15    OOS-MT-DSBLD   MANUAL        -----
16    OOS-MT-DSBLD   MANUAL        -----
Command Completed.
```

7. Verify the problem is not with the terminal by swapping terminals with a known good terminal.

   Make sure the physical connections are firmly seated. If the terminal works, replace the original terminal.

8. If a single terminal is not functioning and you have verified that the terminal is good, the connections are good, and the settings are correct, then from another terminal inhibit the terminal port with the following command:

   `rmv-trm:trm=x`

   where *x* is the terminal port number (1 through 16).

9. Enable the terminal port with the following command:

   `rst-trm:trm=x`

   where *x* is the terminal port number (1 through 16). If this action corrects the problem, you are done with this procedure.

10. If the terminal still does not respond, contact the *Customer Care Center*.

Printer Not Working

Perform the following procedure if the printer is not working.

1. Enter the following command to determine the port connected to the faulty printer:

   `rtrv-trm`

   Note the port number. From the output message, verify the settings are correct.

2. Verify the printer is connected, and the power is on.

   Run a printer test to verify the printer is operational (refer to the printer manual for printer tests). If there is no problem with the printer, continue with *Step 3*. If there is a problem with the printer, go to *Step 4*.

3. Enter the following command to ensure that the other terminal devices are functioning on the TDM in the active MASP:

   `rept-stat-trm`

   Following is an example of the output:

```
RLGHNCXA03W 00-02-07 09:50:17 EST  EAGLE 35.0.0
TRM  PST            SST           AST
1     IS-NR          Active        -----
2     IS-NR          Active        -----
3     IS-NR          Active        -----
4     OOS-MT-DSBLD   MANUAL        -----
5     IS-NR          Active        -----
6     IS-NR          Active        -----
```

```
7     IS-NR          Active        -----
8     IS-NR          Active        -----
9     IS-NR          Active        -----
10    IS-NR          Active        -----
11    IS-NR          Active        -----
12    IS-NR          Active        -----
13    OOS-MT-DSBLD   MANUAL        -----
14    OOS-MT-DSBLD   MANUAL        -----
15    OOS-MT-DSBLD   MANUAL        -----
16    OOS-MT-DSBLD   MANUAL        -----
Command Completed.
```

4. Verify the problem is not with the printer by swapping printers with a known good printer.
   Make sure the physical connections are firmly seated. If the printer works, replace the original.
5. If a single port is not functioning and it has been verified the printer is good, the connections are good, and the settings are correct, inhibit the printer port with the following command:
   `rmv-trm:trm=x`
   where *x* is the printer port number (1 through 16).
6. Enable the printer port with the following command:
   `rst-trm:trm=x`
   where *x* is the terminal port number (1 through 16). If this action corrects the problem, you are done with this procedure.
7. If none of the ports are active, trying resetting and then reseating the TDM card.
8. If the problem persists, replace the TDM card.
   See *Card Removal/Replacement Procedures*.
9. If the terminal still does not respond, contact the *Customer Care Center*.
10. If only the printer port is inactive, inhibit the printer with the following command:
    `rmv-trm:trm=x`
    where *x* is the printer number (1 through 16).
11. Enable the printer with the following command:
    `rst-trm:trm=x`
    If this action corrects the problem, you are done with this procedure. If the problem persists, reseat the TDM card.
12. If reseating the TDM card does not correct the problem, replace the TDM card.
    See *Card Removal/Replacement Procedures*.
13. If the printer still does not respond, contact the *Customer Care Center*.

Modem Not Working

Using Procomm Plus and a modem connected to a serial port on the system, the system can be accessed the remotely. If there are problems connecting to the modem, perform the following procedure:

1. Check the physical connection.

The connector to the modem should be an RS-232 connection and firmly seated in both the serial port of the system and the modem.

2. Verify the flow control is set to hardware.
3. Start Procomm Plus and check the modem settings.

   The following are possible modem settings for the recommended modem, the Motorola UDS. (Other types of modems may have different settings):

   - AT&F0 - Load factory profile and defaults
   - AT&C1 - Make DCD true
   - ATE0 - Disable command echo. If you use this command, you do not see the commands that you enter. Be careful to enter the commands correctly.
   - ATQ1 - Stop the results codes to the terminal
   - AT&W0 - Store profile in memory location 0
   - AT&Y - Select stored profile 0 on power up

Remove Removable Cartridge Stuck in Drive on MDAL

Use this procedure to remove a removable cartridge if it becomes stuck in the drive. Verify the data on the disk is correct after performing this procedure.

WARNING: Before performing any maintenance procedures on the system, make sure you wear a wrist strap connected to the wrist strap grounding point of the system.

1. The card is located in slot 1117.

   Push the inject/eject clamps outward from the card's faceplate (top clamp in the "UP" position, bottom clamp in the "DOWN" position). Pull the levers away from the shelf until they are parallel to the floor. Gently pull the card towards you until the card clears the shelf.

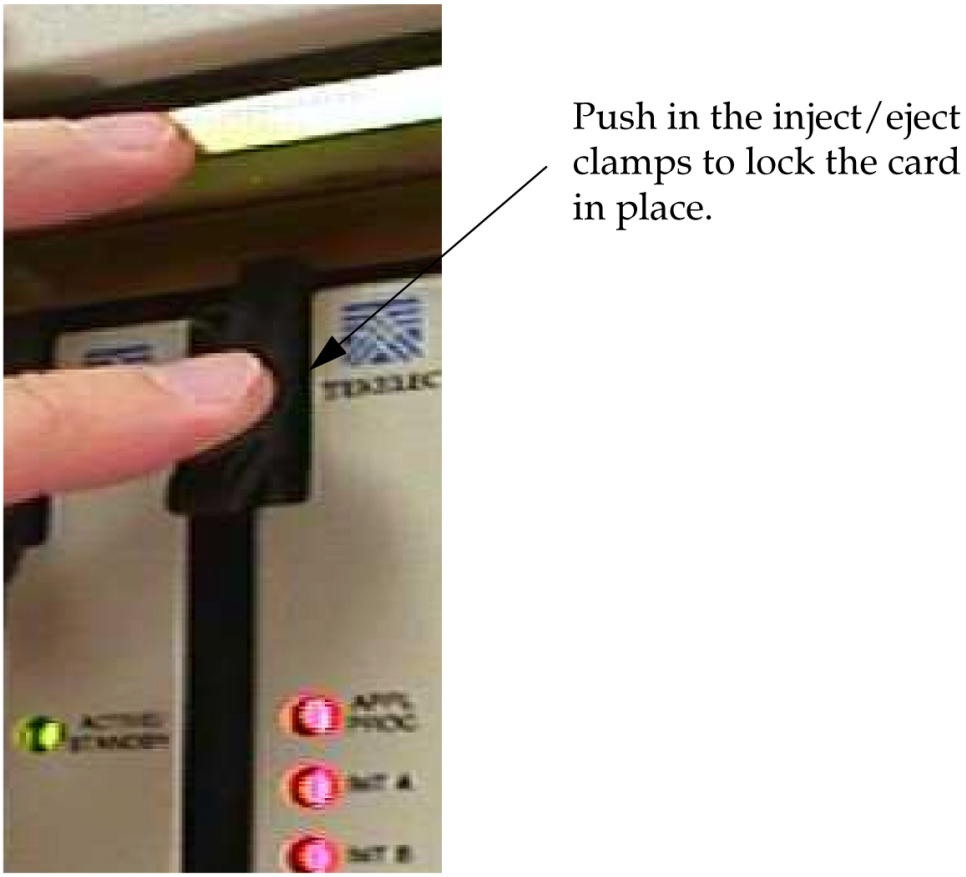
   Figure 28: Push Inject/Eject Clamps Outward

2. Use a paper clip or pin to eject the cartridge.
   Refer to *Figure 21: MDAL Alarm LEDs*.
3. Open the ejector levers on the replacement card.
   Carefully align the card's edges with the top and bottom card guides. Then push the card along the length of the card guides until the rear connectors on the card engage the mating connectors on the target shelf backplane.
4. Press the left edge of the card's faceplate using constant pressure until you feel the card's progress cease.

WARNING: Do not impact the faceplate in order to mate the connectors. Any impact to the card's faceplate can damage the faceplate, the pins, or the connectors.

5. Push in the top and bottom inject/eject clamps.
   This locks the card in place and ensures a strong connection with the pins on the target shelf backplane.

Figure 29: Push in Inject/Eject Clamps



6. Record the activity in the site maintenance log.

Link Maintenance

Link maintenance covers the proper functionality of a signaling link, from an EAGLE 5 ISSMTP card to a remote NE.

Link Fault Sectionalization

The link fault sectionalization (LFS) feature allows maintenance personnel to perform DSOA link fault sectionalization tests, a series of far end loopback tests, from the system and identify faulty segments of an SS7 transmission path up to and including the remote network element.

The point on the signaling link at which each loopback test ends is the far end loopback point. A far end loopback point is achieved when the remote link element sends the received data back to the transmitter, allowing the transmitter to verify the received data. The remote link elements are shown in *Table 19: Remote Link Element types*.

Table 19: Remote Link Element types

Element	Description	Valid for the Latching Link Fault Sectionalization Test?	Valid for the Non-latching Link Fault Sectionalization Test?
DSO	DSO Dataport	yes	no
OCU	OCU Dataport	yes*	yes
CSU	CSU Dataport	yes*	yes
DSU	DSU Dataport	yes*	yes
NEI	Network Element Interface	yes	no
* The OCU, CSU and DSU must be strapped or optioned to support latching link fault sectionalization loopback.			

The loopback point is moved along the signaling link path until the point is in the far end network element. Therefore, each loopback point along the link requires the initiation of one link fault sectionalization test on the SS7 LIM.

The link fault sectionalization test types for loopback tests are shown in *Table 20: Link Fault Sectionalization Test Types* .

Table 20: Link Fault Sectionalization Test Types

Link Fault Sectionalization Test Types	Description
Latching link fault sectionalization test (LLT-auto)	A loopback point is established using signaling commands and remains until it is removed by signaling commands.
Latching link fault sectionalization test (LLT-man)	A loopback point is established by manual means and remains until it is removed by manual means.
Non-latching link fault sectionalization test (NLT)	A loopback command is interleaved with the test data.

The SS7 LIM must be powered up and in service with the signaling link deactivated (OOS-MT-DSBLD) before starting the link fault sectionalization tests. No signaling traffic is on the signaling link by the SS7 LIM while the link is performing a link fault sectionalization test.

The system supports a maximum of 32 remote link elements for each SS7 link.

The system allows a maximum of 1024 SS7 simultaneous LFS tests.

Hardware Configuration

The link fault sectionalization feature requires a LIM hardware configured as shown in *Table 22: Hardware/Card/APPL LFS Support*. The test data is guaranteed to be a continuous data stream, and the commands provide the ability to put any element in the link into latched loopback.

The test data is provided is shown in *Table 21: Link Fault Sectionalization Test Patterns*. The data stream sent is verified against the data stream received and a bit error count is updated. If the bit error count is 255 or greater in one second period, the value of the bit error count remains at 255, does not overflow and the test is terminated.

Table 21: Link Fault Sectionalization Test Patterns

Test Pattern	Data	Description
B2047	N/A	2047-bit Bert pattern sent until it is terminated by software.
B2047 Non Latching	N/A	2047-bit Bert pattern sent interleaved with loopback command until it is terminated by software.
B511	N/A	511-bit Bert pattern sent until it is terminated by software.
B511 Non latching	N/A	511-bit Bert pattern sent interleaved with loopback command until it is terminated by software.
OCTET	default =h'32	A continuous series of the specified octet data is sent until it is terminated by software. (Latching only)
ALTERNATE	default = h'FF	A count of 100 octets of the specified data followed by 100 octets of 0 is sent alternating until it is terminated by software. (Latching only)

LFS tests initiated by the EAGLE 5 ISS are used to test the functionality of a signaling link (SLK) from an EAGLE 5 ISS MTP card through multiple channel banks to a remote Network Element. The number of simultaneous tests that can be run on a specific card are shown in parenthesis () in *Table 22: Hardware/Card/APPL LFS Support*. The maximum number of simultaneous tests for a card is determined by hardware type. *Table 22: Hardware/Card/APPL LFS Support* shows the relationship between hardware type and LFS support. A key for the values follows:

- **NV** indicates APPL is not valid for the given hardware.

- **No** indicates LFS testing is not supported for this combination of hardware, provisioned type, and provisioned application.
- **Yes** indicates LFS testing is supported (max tests per card is shown in parenthesis

Table 22: Hardware/Card/APPL LFS Support

		Provisioned Application	
MPL		Yes (1)	NV
MPL-T		Yes (8)	NV
E1/T1 MIM	LIMT1	Yes (8)	Yes (8)
	LIMCH*	Yes (8)	Yes (8)
HC MIM	LIMT1	Yes (64)	Yes (64)
*If associated parent card is LIMT1			

Test Indicators

Two indicators are used by the `rept-stat-slk` and `rept-stat-ls` commands to show whether the signaling link has a far end loopback condition and if a link fault sectionalization test is in progress.

When the signaling link is in a far end loopback condition:

- The primary state (PST) is OOS-MT-DSBLD .
- The secondary state (SST) is LPBK .
- The associate state (AST) is FE .

When a link fault sectionalization test is in progress:

- The primary state (PST) is OOS-MT-DSBLD .
- The secondary state (SST) is LPBK .
- The associate state (AST) is LFS .

When both the signaling link is in a far end loopback condition and a link fault sectionalization test is in progress:

- The primary state (PST) is OOS-MT-DSBLD .
- The secondary state (SST) is LPBK .
- The associate state (AST) is FE-LFS .

Test Report

Test results are displayed to the terminal when the link fault sectionalization tests have completed. The following is an example of a link fault sectionalization test report.

```
RLGHNCXA03W 96-04-16 16:02:05 EST  EAGLE 35.0.0
LOC = 1205  Port = B  LSN = --------  Start time = 11:10:34
PATTERN = ALTERNATE  DATA= FF  MAXERR = 10  TIME = 00:02:00
TEST STATUS = ERROR, bit error exceeded threshold.
LBP  CLLI         RLE  REP  LFST  BIT_ERROR  ERRORED_SEC   DURATION
2    rlghncxa05w  DSO  0    LLT   0          0             00:02:00
3    ------------ OCU  0    NLT   8          2             00:02:00
5    ------------ NEI  0    LLT   15         1             00:01:20
```

LFS Test Details

EAGLE 5 ISS *Initiated* LFS *Loopback Test Details*

Loopback Test Type:EAGLE 5 ISS initiated Level 1 DS0 LFS test

Link State: Link is down.

Equipment tested: Level 1 element(s) in a signaling path.

Purpose: Test the error rates of a signaling path.

Description: Sends loopback code to establish loopback and then performs BERT test for a specified period of time.

Typical use: To validate signaling path has acceptable error rate.

Testing Limits: 1024 concurrent link tests per system.

Remote Initiated LFS *Loopback Test Details*

Loopback Test Type: Remote Loopback FAR END initiated DS0 LFS test.

Link State: Link can be up or down.

Equipment tested: Near end H/W up to level 2 (LXVR) and far end H/W level 1 interface.

Purpose: Auto-loopback a BERT test to the far end.

Description: When receiving a loopback code, deactivate the link and go into loopback.

Typical use: Used to remotely test the far end with standard DS0 BERT tests.

Testing Limits: No limit on number of cards.

The link fault sectionalization feature uses the following commands:

- `ent-lbp` — add link fault sectionalization test data to the database.
- `chg-lbp` — change existing link fault sectionalization test data in the database.
- `dlt-lbp` — remove link fault sectionalization test data from the database.
- `rtrv-lbp` — display link fault sectionalization test data in the database.
- `act-lbp` — start a link fault sectionalization test.
- `dact-lbp` — stop a link fault sectionalization test.
- `rept-stat-lfs` — generates a report of all links that are under test.

The link fault sectionalization data is configured in the database using the parameters shown in *Table 23: Link Fault Sectionalization Data Entry Parameters*.

Table 23: Link Fault Sectionalization Data Entry Parameters

Link Fault Sectionalization Data Entry Parameters	Description
Card Location	SS7 LIM card location
Port Number	Port a or b, and a1, a2, a3, b1, b2, b3 on the MPL
Loopback Point Number	Identifies the remote link element for setting the loopback point. Value is from 1 to 32.
CLLI	Description of the remote link element
Remote Link Element Type	The remote element type from *Table 19: Remote Link Element types*.
Repetition Count	A repetition of the same element type in the link path. This is needed for configuring the link element as a latched loopback point. The value is from 0 to 31.
Link Fault Sectionalization Test Type	Link fault sectionalization test type from *Table 20: Link Fault Sectionalization Test Types* (LFS-man not supported for the database)

Use the `act-lbp` command to start one or a sequence of link fault sectionalization tests. The data stream sent is verified against the data stream received and the bit error counts and block error counts are displayed when the test completes.

The link fault sectionalization test parameters are described in *Table 21: Link Fault Sectionalization Test Patterns*. If either the remote link element type, repetition count, or link fault sectionalization test type are specified with the `act-lbp` command, they must all be specified and the loopback point number parameter is ignored. Otherwise the values for remote link element type, repetition count, or link fault sectionalization test type are read from the data entered with the `ent-lbp` command using the loopback point number parameter value. The test data parameter is only valid for test patterns OCTET and ALTERNATE.

If all LBPs are selected for the loopback point number parameter, a sequential test of the LBPs, as entered in the database with the `ent-lbp` command for that signaling link, is performed until the entire signaling link has been tested. When performing a test with all LBPs, the test is aborted with the first failed test.

The test is stopped either because the amount of time for the test has expired or if the bit error threshold has been exceeded. The time duration parameter specifies the maximum time duration for one link fault sectionalization loopback point test. The default value is one second (00:00:01) and the maximum value that can be entered is 24 hours (24:00:00). The bit error threshold parameter specifies the maximum

number of bit errors allowed for one link fault sectionalization loopback point test. The default value is 56 errors and the maximum value that can be entered is 4,838,400 (24 hours x 56 errors per second).

Table 24: Link Fault Sectionalization Test Parameters

Parameters	Description
Card Location	SS7 LIM card location
Port /Link Number	Signaling link id a to a31 and b to b31
Loopback Point Number	The remote link element for setting the loopback point. Value is from 1 to 32, or if this parameter is not specified, all LBPs are selected.
Remote Link Element Type	The remote element type from *Table 19: Remote Link Element types*.
Repetition Count	A repetition of the same element type in the link path. The value is from 0 to 31.
Link Fault Sectionalization Test Type	Link fault sectionalization test type from *Table 20: Link Fault Sectionalization Test Types*.
Time duration	Time for one loopback point in hours, minutes, and seconds (hh:mm:ss). The value is from 00:00:01 to 24:00:00. The default value is 1 second (00:00:01).
Error threshold	Bit error threshold. The value is from 0 to 4838400. The default value is 56.
Test pattern	The test pattern from *Table 21: Link Fault Sectionalization Test Patterns*. The default value is B2047.
Test data	The octet to be used for test pattern OCTET or ALTERNATE only.

The `dact-lbp` command stops the link fault sectionalization test in progress and cancels any pending link fault sectionalization tests for the SS7 link. The pending tests are the next sequential LBPs for the SS7 signaling link when an entire link test was initiated.

Link Maintenance Enhancements

The Link Maintenance Enhancements feature covers the following areas:

- Allows the operator to force a card into loopback. Without this enhancement, a card will go in and out of loopback as determined by loopback codes sent by the far end.

- `tst-slk` enhancements for ATM customers. The loopback parameters for ATM cards in the `tst-slk` command act in a similar fashion as the `act-lbp` command for standard DS0 loopbacks. Other `tst-slk` enhancements not specifically related to ATM are also provided.

Command Driven Loopback

Command Driven Loopback (CDL) is the ability to locally drive a signaling link into a manual line loopback. The data received on the signaling link is echoed (transmitted) back. Commands are used to provide this capability on an individual signaling link basis. CDL allows loopback testing of a signaling link when either far-end initiated loopbacks are prevented or when a constant loopback state is desired. This command driven setting of loopback is similar in functionality to a remote initiated loopback. *Table 25: Command Driven Loopback Support* shows a breakdown of support for Command Driven Loopback based on the MTP card type. *Figure 30: Signaling Link Network Connections* shows a conceptual view of a signaling links network connections. Local transceiver (LXVR) is a `tst-slk` initiated test in which the line transmit is looped back to the line receive internal to the card. CDL is "LXVR in reverse", the line receive is looped back to the line transmit.

Table 25: Command Driven Loopback Support

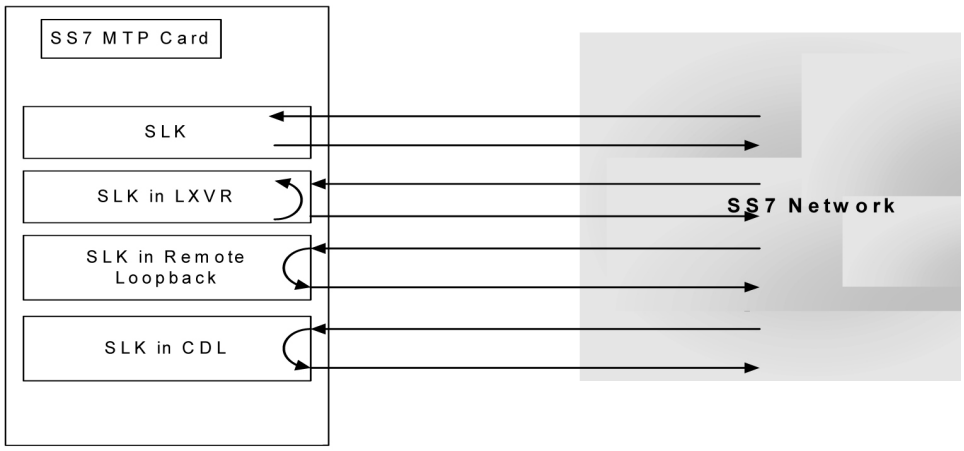
MTP Card Type	Supported	MTP Card Type	Supported
MPL (DSO)	Yes	T1-ATM	Yes
E1-ATM	Yes	T1 MIM (Channel)	Yes
E1MIM (Channel)	Yes	IPLIM	No
		IPGTWY	NO

Test Indicators

If an MTP card boots, then all links on this card, by default, are not in CDL. A link in CDL is persistent across an OAM switchover. Signaling links must be inhibited (OOS-MT-DSBLD) to perform command driven loopback. Signaling links in CDL have the following conditions:

- The primary state (PST) is OOS-MT-DSBLD .
- The secondary state (SST) is LPBK .
- The associate state (AST) is CDL .

Figure 30: Signaling Link Network Connections



Test Signaling Link

The *tst-slk* command is used to flush out intermittent link problems that are not captured with the one shot testing. The *tst-slk* command allows for duration tests up to 24 hours, stopping of an in-progress test, and forcing the execution of a test. The *tst-slk* command is grouped into two categories, message based tests and hardware-based tests.

The SLTC and OAM tests are message based. These tests involve sending a message to the far end and expecting an appropriate reply. The LXVR, LINE, and PAYLOAD tests are hardware-based. These tests involve setting hardware registers and after an appropriate duration resetting hardware registers. To prevent overloading of a signaling link, message based tests are delayed 1 to 10 seconds between receipt of an appropriate reply and sending of the next test message. *Table 26: tst-slk Support* shows a breakdown of support for each *tst-slk* test based on MTP card.

Table 26: tst-slk Support

MTP Card Type	tst-slk Test	tst-slk Test	tst-slk Test	tst-slk Test	tst-slk Test
	SLTC	LXVR	OAM	LINE	PAYLOAD
OCU	Yes	Yes	No	No	No
MPL (DSO)	Yes	Yes	No	No	No
E1-ATM	Yes	Yes	Yes	No	No
T1-ATM	Yes	Yes	Yes	Yes	Yes
T1 MIM (Channel)	Yes	No	No	No	No
E1 MIM (Channel)	Yes	No	No	No	No

MTP Card Type	tst-slk Test	tst-slk Test	tst-slk Test	tst-slk Test	tst-slk Test
	SLTC	LXVR	OAM	LINE	PAYLOAD
IPLIM	Yes	No	No	No	No
IPGTWY	No	No	No	No	No
E1 HC MIM	Yes	No	No	No	No
T1 HC MIM	Yes	No	No	No	No
T1 HC MIM	Yes	No	No	No	No

Test Signaling Links Test (tst-slk) Indicators

Signaling links performing `tst-slk` commands have a secondary state of LPBK, and an associated state corresponding to the type of loopback (SLTC, OAM, LXVR, PAYLOAD, LINE). The link must be OOS-MT-DSBLD for LXVR, PAYLOAD, and LINE tests.

If an OAM switchover occurs, while the `tst-slk` command is running, the test is aborted. If an MTP card with an active test boots then the test is aborted.

Test E1 and T1 Ports

The *tst-e1* and *tst-t1* commands initiate loopback testing of the specified E1 and T1 ports on the HC MIM card. There are 8 physical ports on the HC MIM card. This *tst-e1/t1* command is not used for any other MTP card type. *Table 27: tst-e1/tst-t1 Support* shows a breakdown of support for each *tst-e1/t1* test based on MTP card.

Table 27: tst-e1/tst-t1 Support

MTP Card Type	tst-e1/t1 Test	
E1 HC MIM	Yes	Yes
T1 HC MIM	Yes	Yes

Test E1/T1 Port (tst-e1/t1) Indicators

Signaling links performing *tst-e1/t1* commands have a secondary state of LPBK, and an associated state corresponding to the type of loopback (LXVR, LINE).

If an OAM switchover occurs, while the *tst-e1/t1* command is running, the test is aborted. If an MTP card with an active test boots then the test is aborted.

tst-slk and tst-e1/t1 Loopback Test Details

SLTC Loopback Test Details

Loopback Test Type: SLTC (EAGLE 5 ISS initiated Level 3 SS7 SLT).

Link State: Link is up.

Equipment tested: Near and far end up to Level 3.

Purpose: Test the entire path to the far end at Level 3.

Description: This will send an SLTM out and expects an SLTA back.

Typical use: To validate connectivity of a signaling path.

Testing Limits: 1024 concurrent link tests per system.

OAM Loopback Test Details

Loopback Test Type: OAM (EAGLE 5 ISS initiated Level 1 ATM test).

Link State: Link is down.

Equipment tested: Near and far end level 1 S/W and H/W including all hardware on the cards.

Purpose: Test the entire near and far end level 1 H/W by exchanging ATM cells.

Description: Sends OAM cells out to far end for 60 seconds if no errors, 2 minutes when errors are received.

Typical use: Verifies ATM cells can be exchanged between 2 signaling points.

Testing Limits: 1024 concurrent link tests per system.

LINE Loopback Test Details

Loopback Test Type: LINE (EAGLE 5 ISS initiated Level 1-2 ATM test)

Link State: Link is down.

Equipment tested: Near end H/W up to level 2 (LXVR) and far end H/W level 1 interface.

Purpose: H/W continuity check between near and far end.

Description: The following steps occur:

1. Device under test (DUT) sends T1 bit oriented code (BOC) to remote device.
2. Remote device receives BOC and programs hardware.
3. DUT attempts level 2 alignment.
4. If link aligns (level 2), test passes, else test fails.
5. DUT sends BOC to remote device to remove loopback.
6. Remote device receives BOC and re-programs hardware.

   Note: If the DUT boots in the middle of the sequence, the remote device needs to have the link activated/de-activated and it will return to the original programming.

Typical use: Used for a link in line timing to check continuity from the near end level 2 H/W to the level 1 interface at the far end.

Testing Limits: 1024 concurrent link tests per system.

PAYLOAD Loopback Test Details

Loopback Test Type: PAYLOAD (EAGLE 5 ISS initiated Level 1-2 ATM test)

Link State: Link is down.

Equipment tested: Near end H/W up to level 2 (LXVR) and far end H/W level 1 interface.

Purpose: H/W continuity check between near and far end.

Description: The following steps occur:

1. Device under test (DUT) sends T1 bit oriented code (BOC) to remote device.
2. Remote device receives BOC and programs hardware.
3. DUT attempts level 2 alignment.
4. If link aligns (level 2), test passes, else test fails.
5. DUT sends BOC to remote device to remove loopback.
6. remote device receives BOC and re-programs hardware.

   Note: If the DUT boots in the middle of sequence, the remote device needs to have the link activated/de-activated and it will return to the original programming

Typical use: Used for a link in master timing to check continuity from the near end level 2 H/W to the level 1 interface at the far end.

Testing Limits: 1024 concurrent link tests per system.

LXVR Loopback Test Details

Loopback Test Type: LXVR (EAGLE 5 ISS initiated Level 1 Internal card loopback)

Link State: Link is down.

Equipment tested: Local card.

Purpose: Test the near end card only.

Description: This tests the near end card up through level 2.

Typical use: To validate the Card on the Eagle as good.

Testing Limits: 1024 concurrent link tests per system.

Link Maintenance Enhancements Commands

The link maintenance enhancements feature utilizes the following commands:

- `act-cdl` — this command initiates a command driven loopback for testing a signaling link.
- `dact-cdl` — this command deactivates a previously initiated Command Driven Loopback if active. If not, it will attempt to clear both near-end and far-end latched loopback points.
- `rept-stat-cdl` — this command generates a report of the signaling links currently in command driven loopback (along with the amount of time the link has been in CDL).

```
   tekelecstp 96-04-16 16:02:05 EST  EAGLE 35.0.05
```

```
    SLK         CDL       CDL-TIME
    1102,A1     LINE      00:04:01
    1201,A      PAYLOAD   01:04:11
    1203,A      LINE      00:22:21
    1203,B      LINE      20:04:01
    1208,A      LINE      01:05:22
    1211,A      PAYLOAD   00:14:01
```

- `tst-slk` — this command provides several methods for testing SLKs.
- `rept-stat-tstslk` — this command generates a report of the status of the MTP signaling links currently under test. The report includes the type of test and the elapsed time for the test. A sample output follows:

```
tekelecstp 96-04-16 16:02:05 EST  EAGLE 35.0.0
    SLK         LOOPBACK    MAX-TIME    TEST-TIME
    1102,A1      SLTC       01:00:00    00:04:01
    1201,A       OAM        02:00:00    01:04:11
    1203,A       LXVR       00:50:00    00:22:21
    1203,B       LXVR       24:00:00    20:04:01
    1208,A       PAYLOAD    01:10:00    01:05:22
    1211,A       LINE       21:30:00    00:14:01
;
```

- *tst-e1*— this command initiates the testing of E1 Ports. The loopback parameter on this command is used to select local transceiver (lxvr) and line loopback tests. This command is rejected if a loopback test is not compatible with the port type. This command is only supported on HC MIM hardware.
- *tst-t1*this command initiates the testing of T1 Ports. The loopback parameter on this command is used to select local transceiver (lxvr) and line loopback tests. This command is rejected if a loopback test is not compatible with the port type. This command is only supported on HC MIM hardware.

Power Down of In-Service System

WARNING:

This procedure will isolate the system and put the network in a degraded mode. *Customer Care Center* before any part of this procedure is performed.

To minimize the impact on the rest of the network during power up, proper network planning must be performed. This requires having the MTP Restart Feature configured on the system. This power down procedure does not require any special configuration on the system. This procedure should be performed in emergency situations or with prior planning assistance from Tekelec *Customer Care Center*. Terminal access to the system is required to deactivate the links. If there is no terminal access to the system, proceed to *Step 19*.

1. If this is an emergency power down, proceed with *Step 11* Otherwise continue with *Step 2* .
2. Enter the following command to check the operational status of the database:
   `rept-stat-db`
   If necessary, refer to the *Commands Manual* to interpret the output.
3. Enter the following command to backup the database on the fixed disk:
   `chg-db:action=backup:dest=fixed`

This command takes a minimum of 2 minutes to execute. It may take longer depending on other system activity that is in progress when this command is entered.

4. Verify that the databases of both MASPs are coherent by entering the following command:

   `rept-stat-db`

```
The following is an example of the output from a coherent database.
> rept-stat-db
Command Accepted - Processing
    oflnmoxa11w 00-10-08 15:56:40 CDT EAGLE 35.0.0
    rept-stat-db
    Command entered at terminal #4.
;
    oflnmoxa11w 00-10-08 15:56:40 CDT EAGLE 35.0.0
    DATABASE STATUS: >> OK <<
            TDM 1114 ( STDBY)                 TDM 1116 ( ACTV )
             C   LEVEL    TIME LAST BACKUP     C   LEVEL    TIME LAST BACKUP
             - -------- --------------------  - -------- --------------------
    FD BKUP  Y   342256 00-10-07 00:40:29 CDT  Y   342256 00-10-07 00:40:29 CDT
    FD CRNT  N   342374                        Y   342375
            MDAL 1117
            ---------
```

   If necessary, refer to the *Commands Manual* to interpret the output.

5. Insert a pre-formatted (for system data) removable cartridge into the removable cartridge drive on the MDAL card.

   Refer to *Removable Drives*. Continue with *Step 6*.

6. Enter the following command to create a backup of the database on the removable cartridge:

   `chg-db:action=backup:dest=remove`

7. Verify that the databases on the removable cartridge (RD BKUP) and the current partition of the active MASP (FD CRNT) are coherent by entering the following command:

   `rept-stat-db`

   The following is an example of the output from a coherent database.

```
> rept-stat-db
Command Accepted - Processing
    oflnmoxa11w 00-10-08 15:56:40 CDT EAGLE 35.0.0
    rept-stat-db
    Command entered at terminal #4.
;
    oflnmoxa11w 00-10-08 15:56:40 CDT EAGLE 35.0.0
    DATABASE STATUS: >> OK <<
            TDM 1114 ( STDBY)                 TDM 1116 ( ACTV )
             C   LEVEL    TIME LAST BACKUP     C   LEVEL   TIME LAST BACKUP
             - -------- --------------------  - ------- ------------------
    FD BKUP  Y  32256   00-10-07 00:40:29 CDT  Y  32256  00-10-07 00:40:29 CDT
    FD CRNT  N  32374                          Y  32375
            MDAL 1117
             - --------
```

   If necessary, refer to the *Commands Manual* to interpret the output.

8. Remove the removable cartridge from the removable cartridge drive on the MDAL card.

   Refer to *Removable Drives*.

9. Make an entry in the site maintenance log that a backup was performed.

10. Enter the following command to verify the status of the mate EAGLE 5 ISS:

```
rept-stat-trbl
```

If there is any trouble or abnormal condition, *Customer Care Center*.

11. Enter the following command to retrieve the linksets.

```
rtrv-ls
```

12. Enter the following command to retrieve the links.

```
rtrv-slk
```

13. Enter the following command to deactivate all E-links.

Use the outputs from *Step 11* and *Step 12*.

```
dact-slk:loc=xxxx:port=y
```

where *xxxx* is the card location stenciled on the shelf of the system and *y* is the port number on the card specified in the loc parameter.

14. Enter the following command to deactivate all A-links.

Use the outputs from *Step 11* and *Step 12*..

```
dact-slk:loc=xxxx:port=y
```

where *xxxx* is the card location stenciled on the shelf of the system and *y* is the port number on the card specified in the loc parameter.

15. Enter the following command to deactivate all B-links.

Use the outputs from *Step 11* and *Step 12*.

```
dact-slk:loc=xxxx:port=y
```

where *xxxx* is the card location stenciled on the shelf of the system and *y* is the port number on the card specified in the loc parameter.

16. Enter the following command to deactivate all D-links.

Use the outputs from *Step 11* and *Step 12*.

```
.dact-slk:loc=xxxx:port=y
```

where *xxxx* is the card location stenciled on the shelf of the system and *y* is the port number on the card specified in the loc parameter.

17. Enter the following command to deactivate all C-links.

Use the outputs from *Step 11* and *Step 12*..

```
dact-slk:loc=xxxx:port=y
```

where *xxxx* is the card location stenciled on the shelf of the system and *y* is the port number on the card specified in the loc parameter.

18. Enter the following command to verify all links on the system are OOS-MT.

```
rept-stat-slk
```

Repeat *Step 13* through *Step 17* for any links not having the proper status.

19. Pull the fuses or open the breaker at the customer power distribution frame to turn off power to the system.

Power Up of the System

WARNING: If the reason for the EAGLE 5 ISS Power Off is unknown or if damage to the EAGLE 5 ISS is suspected, do not perform this procedure. contact the *Customer Care Center*.

1. Verify that there is no cartridge in the MDAL card.

   If there is a cartridge in the MDAL, replace the MDAL card with a spare MDAL card without a cartridge. If the spare MDAL card has a cartridge installed, remove the MDAL card. This power up will take place without a MDAL card installed.

2. At the power distribution frame, insert fuses or close the breaker to restore power to the system.

   All frames with the EAGLE 5 ISS shelves must be powered up. Links that were deactivated during the power down are automatically activated during the power up.

3. Enter the following commands to monitor the system during the power-up:

   ```
   rept-stat-card
   rept-stat-slk
   rept-stat-trbl
   ```

   Contact *Customer Care Center* if there is any trouble or abnormal condition during system recovery.

4. Install MDAL card and remove removable cartridge, if necessary.

Appendix A

Card Removal/Replacement Procedures

Topics:

Introduction

This appendix explains how to remove a card from the EAGLE 5 ISS. The procedures include the administrative commands required to take a card out of service and place it back into service.

In the event a numbered event message is encountered, refer to the appropriate procedure in the *Unsolicited Alarm and Information Messages* manual..

Additional information about each command can be found in the *Commands Manual*.

CAUTION: Always wear a wrist strap or other electrostatic protection when handling EAGLE 5 ISS cards.

CAUTION: Always place removed cards into an electrostatic protection bag before sending to Tekelec, or storing in inventory (unless the card is being stored in the optional spare card storage shelf).

EAGLE 5 ISS Replacement Parts List

For a listing of field replaceable parts and cables used in the EAGLE 5 ISS and their part numbers, refer to the tables in *Part Numbers*.

All parts must be replaced through the Return Material Authorization (RMA) process. Contact the *Customer Care Center*, before replacing any parts.

E5-MASP Card Replacement

This procedure is to replace an E5-MASP card. Before the E5-MASP is replaced, it must be verified that is the standby MASP.

The E5-MASP (made up of the E5-MCAP and E5-TDM cards) contains the removable USB drive, the fixed disk drive, the terminal processor for the 16 serial I/O ports, and an interface to the maintenance disk and alarm (E5-MDAL) card.

1. Before beginning this procedure, make sure there is a copy of the current release GPLs on a removable USB cartridge on-hand.
2. If the active E5-MASP card fails, the EAGLE 5 ISS automatically switches activity to the standby MASP.
3. Enter the following command to display the card status:

   `rept-stat-card`

   The following is an example of a possible output.

```
   e5oam 08-12-01 15:38:32 EST  EAGLE 40.1.0
```

```
CARD   VERSION      TYPE     GPL      PST            SST        AST
1108   ----------   MCPM     MCP      OOS-MT-DSBLD   Manual     -----
1109   030-009-000  HIPR     HIPR     IS-NR          Active     -----
1110   030-009-000  HIPR     HIPR     IS-NR          Active     -----
1111   030-010-000  IPSM     IPS      IS-NR          Active     -----
1113   030-010-008  E5MCAP   OAMHC    IS-NR          Standby    -----
1114   ----------   E5TDM               IS-NR          Active     -----
1115   030-010-008  E5MCAP   OAMHC    IS-NR          Active     -----
1116   ----------   E5TDM               IS-NR          Active     -----
1117   ----------   E5MDAL              OOS-MT         Isolated   -----

Command Completed.
```

In this sample output, 1113/1114 are standby and 1115/1116 are active. Perform *Step 5* only if the card to be replaced is not `Standby`.

4. From the output of the rept-stat-card command, executed in *Step 3*, determine the MASP activity.

   Record which E5-MCAP is `Active` and `Standby`. Record the card locations of both sets of E5-MCAPs and E5-TDMs.

   Table 28: Card Locations

Card	Location
Active E5MCAP	
Active E5TDM	
Standby E5MCAP	
Standby E5TDM	

5. Verify the E5-MASP card to be replaced (failing or non-failing) is `Standby` before continuing.
   a) If the E5-MASP card is failing it should already be `Standby`. Go to *Step 7*
   b) If the card is not Standby and needs replacement, enter the following command to verify the database:

      ```
      rept-stat-db:display=all
      ```

      Verify all the cards in the system have the same database count. If the counts do not match, contact the *Customer Care Center*.

   c) Enter the following command to force the active E5-MASP card to become Standby:

      ```
      init-card:loc=x
      ```

      where *x* is the card location (1113 or 1115) from *Step 3*.

6. If *Step 5* was performed, execute the `rept-stat-card` command and verify if the card to be replaced is part of the `Standby` MASP.
7. If a failing E5-TDM card is to be replaced, perform a database backup before replacing the failed card.

Insert the removable USB drive with the current release GPLs into the Active E5-MASP removable USB port. Using *Daily Procedures*, create a backup of the database on the Active removable USB drive. Then go to *Step 9*.

WARNING: Do not proceed to *Step 9* if the backup fails. Contact the *Customer Care Center*.

8. If a non-failing E5-TDM card is to be replaced, insert the removable cartridge containing the copy of the current release GPLs into the Active E5-MASP.
9. Enter the following command to retrieve the terminal types and terminal numbers:

   `rtrv-trm`

   Note: *Step 10* through *Step 11* are only necessary for OAP based EAGLE 5 ISSs.

10. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 9* :

    `inh-trm:trm=x`

    where *x* is the terminal number.

11. Enter the following command for each terminal inhibited in *Step 10* to temporarily change the terminal type from OAP to *none*:

    `chg-trm:trm=x:type=none`

    where *x* is the terminal number.

12. Enter the following command to verify that the security log on the standby MASP contains no entries that must be copied to the FTA area of the fixed disk:

    `rept-stat-seculog`

    The following is an example of a possible output.

```
RLGHNCXA03W 96-10-04 15:59:06 EDT EAGLE 34.0.0
             -- SINCE LAST UPLOAD --  OLDEST   NEWEST   LAST
LOC  ROLE    ENTRIES %FULL OFLO FAIL  RECORD   RECORD   UPLOAD
1114 Active  8312    84    No   No    95-08-12 96-01-04 96-12-16
                                      11:23:56 15:59:06 14:02:22
1116 Standby 693     7     No   No    95-09-12 95-09-30 95-09-30
                                      11:24:12 14:00:06 14:02:13
```

    - If the number shown in the ENTRIES field for the standby MASP (shown with the entry *Standby* in the ROLE field) is 0, go to *Step 15*.
    - If the number shown in the ENTRIES field for the standby MASP is greater than 0, these entries must be copied to the FTA area of the fixed disk.

    To copy these entries, go to the next step.

13. Copy the security log entries on the standby MASP to the FTA area on the fixed disk using the following command:

    `copy-seculog:slog=stb:dloc=act`

    The following is a possible output of the message that should appear (the `copy-seculog:slog=stb` command was used).

```
RLGHNCXA03W 96-10-04 15:59:06 EDT EAGLE 34.0.0
Security log on TDM 1116 copied to file 961004s.log on TDM 1114
```

14. Remove the card from service by entering the following command:

    `rmv card`:loc=*xxxx*

    where *xxxx* is the card location.

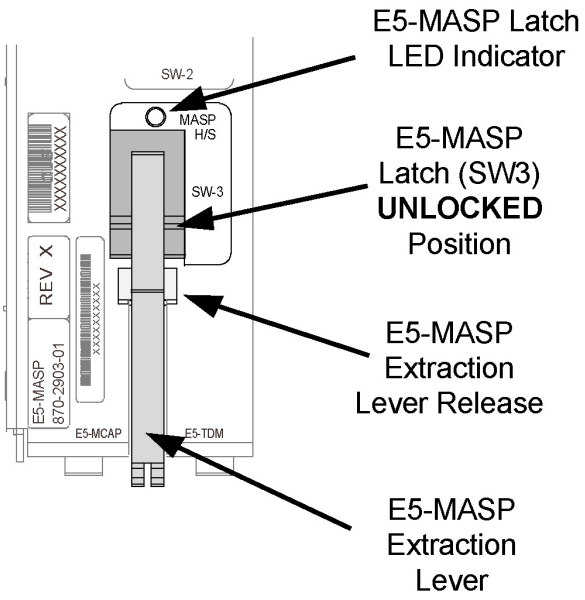
15. Replace the Standby E5-MASP. Refer to *Figure 33: E5-MASP LEDs* for description ofthe E5-MASP LEDs.

    a) On the standby E5-MASP card determined in *Step 9* , slide the MASP H/S switch (SW3) up to the UNLOCKED position (see*Figure 31: E5-MASP Card Inject/Eject Hardware Switch, UNLOCKED*).

    CAUTION

    CAUTION: If SW3 is transitioned from locked to unlocked and the E5-MASP is in service will result in a card obit. All drive LEDs will blink blue.

    Figure 31: E5-MASP Card Inject/Eject Hardware Switch, UNLOCKED



    b) WAIT for the MASP H/S LED to go from blinking blue to a steady blue.

    c) Grasp the upper and lower card Inject/Eject (I/E) lever release interlock, located just underneath the I/E lever, and press it to meet the I/E lever. This is the mechanical interlock for the card.

    d) While holding the I/E interlock and lever, pull the levers away from the shelf until they are parallel to the floor.

    e) Remove the standby E5-MASP card. Gently pull the card towards you until the card clears the shelf.

    Note: UAMs are generated during this step. An audible alarm is generated.

    f) Place the card you have removed in an electrostatic discharge (ESD) protective container, or place the card in the spare card storage shelf.

    g) Be sure that the replacement card has the same Tekelec part number and revision number as the card you have just removed.

    h) Open the ejector levers on the replacement card. Insert the spare E5-MASP card.

Carefully align the card's edges with the top and bottom card guides. Then push the card along the length of the card guides until the rear connectors on the card engage the mating connectors on the target shelf backplane.

Note: UAMs are generated during this step. An audible alarm is generated. Wait for the E5-MASP to come up to standby mode.

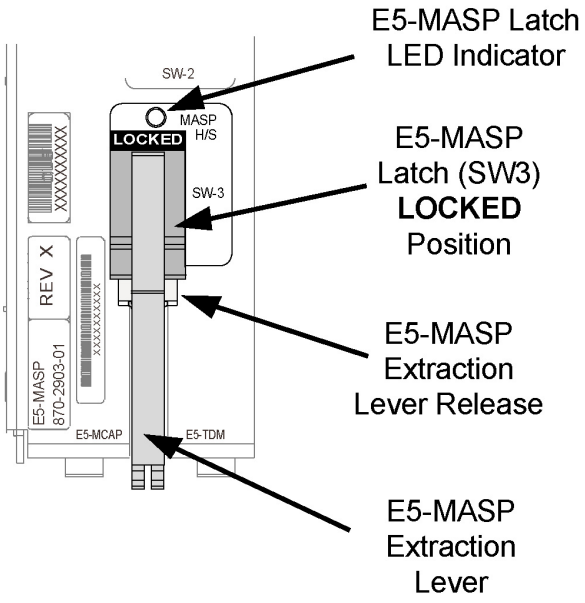
i) Push in the top and bottom inject/eject clamps.

This locks the card in place and ensures a strong connection with the pins on the target shelf backplane.

j) Slide the MASP H/S switch (SW3) down to the LOCKED position (see).

Note: When SW3 is transitioned from UNLOCKED to LOCKED, the MASP H/S LED will be blinking blue as the E5-MASP goes online.

Figure 32: E5-MASP Card Inject/Eject Hardware Switch, LOCKED



k) WAIT for the MASP H/S LED to go from blinking blue to off.

16. Insert the removable USB drive containing the appropriate GPLs from *Step 1* into the newly installed E5-MASP. (Refer to *Removable USB Drive*.)

17. Enter the following command to change the state of the appropriate card to the out of service - maintenance disabled state:

```
inh-card:loc=xxxx:force=yes
```

where *xxxx* is the card location stenciled on the shelf of the EAGLE 5 ISS. Following is an example of a possible output:

```
RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
Card has been inhibited.
```

18. Enter the following command to load and activate the approved GPL onto the inhibited card:

```
flash-card:code=appr:loc=xxxx:force=yes
```

where *xxxx* is the card location used in the previous step. The optional `force=yes` is used to force the command to work on an IS-NR card.

19. Enter the following command to put the card that was inhibited in *Step 17* back into service:

    `alw-card:loc=xxxx`

    where *xxxx* is the card location used in *Step 17*. Following is an example of a possible output:

```
RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
Card has been allowed.
```

    Note: Allow the card to run for 5 minutes before continuing.

20. Enter the following command to verify the database is consistent (same level as the other cards in the system).

    `rept-stat-db:display=version`

    The following is an example of a possible output.

```
RLGHNCXA03W 03-08-27 03:46:39 EST  EAGLE 34.0.0
DATABASE STATUS: >> OK <<
        TDM 1114 ( ACTV )                 TDM 1116 ( STDBY)
        C   LEVEL    TIME LAST BACKUP     C   LEVEL    TIME LAST BACKUP
        - -------- ---------------------- - --------   -------------------
FD BKUP Y       43 03-08-14 03:02:18 EST  Y       43   03-08-14 03:02:18 EST
FD CRNT Y       79                        Y       79
       MDAL 1117
       - --------
RD BKUP Y        1     -        -
CARD/APPL  LOC   C  T  LEVEL       TIME LAST UPDATE   VERSION STATUS
---------  ----  -  -  ----------  -----------------  -------------------
TDM-CRNT   1114  Y  N  79          03-08-27 00:56:30  121-000-000  NORMAL
TDM-BKUP   1114  Y  -  43          03-08-14 01:10:46  121-000-000  NORMAL
TDM-CRNT   1116  Y  N  79          03-08-27 00:56:30  121-000-000  NORMAL
TDM-BKUP   1116  Y  -  43          03-08-14 01:10:46  121-000-000  NORMAL
MDAL       1117  Y  -  79          03-08-27 00:56:30  121-000-000  NORMAL
```

21. Compare the `VERSION STATUS` of the TDM cards in the output of the previous step.

    - If they are identical, continue to the next step.
    - If they are not the same, go to *Step 26*

22. Enter the following command to repair the standby's E5-MASP database:

    `chg-db:action=repair`

    Note: The system requires approximately two minutes after *Step 19* to acquire duplex mode. As a result the system will reject the `chg-db:action= repair` until duplex operation fully returns.

    The following is an example of a possible output.

```
RLGHNCXA03W 03-08-27 03:46:49 EST  EAGLE 34.0.0
chg-db:action=repair
Command entered at terminal #10.
;
RLGHNCXA03W 03-08-27 03:46:50 EST  EAGLE 34.0.0
```

```
REPAIR: MASP A - Repair starts on standby MASP.
;
```

Note: Observe that the command execution time may require approximately 20 to 45 minutes.

```
RLGHNCXA03W 03-08-27 04:15:22 EST  EAGLE 34.0.0
REPAIR: MASP A - Repair from fixed disk complete.
;
```

Wait for the 'repair complete' message to display and for the to MASP return to in-service status. When the 'repair complete' message has displayed, proceed to *Step 23*

Note: Perform this step only if you are coming from *Step 21*.

23. Enter the following command to show the version numbers of the GPLs stored on each fixed disk (E5-TDM).

`rtrv-gpl`

The following is an example of a possible output.

```
    e5oam 08-12-01 12:24:57 EST  EAGLE 40.1.0
    GPL Auditing  ON

    GPL       CARD  RELEASE      APPROVED         TRIAL        REMOVE TRIAL
    EOAM      1114  030-010-000  030-010-000      030-010-000  030-010-000
    EOAM      1116  030-010-000  030-010-000      030-010-000  030-010-000
    EOAM      1115  -----------  -----------      -----------  030-010-000
    SS7ANSI   1114  030-010-000  030-010-000      030-010-000  030-010-000
    SS7ANSI   1116  030-010-000  030-010-000      030-010-000  030-010-000
    SS7ANSI   1115  -----------  -----------      -----------  030-010-000
    SCCP      1114  030-010-000  030-010-000      030-010-000  030-010-000
    SCCP      1116  030-010-000  030-010-000      030-010-000  030-010-000
    SCCP      1115  -----------  -----------      -----------  030-010-000
    GLS       1114  030-010-000  030-010-000      030-010-000  030-010-000
    GLS       1116  030-010-000  030-010-000      030-010-000  030-010-000
    GLS       1115  -----------  -----------      -----------  030-010-000
    ...
    IPSG      1114  030-010-000  030-010-000      030-010-000  030-010-000
    IPSG      1116  030-010-000  030-010-000      030-010-000  030-010-000
    IPSG      1115  -----------  -----------      -----------  030-010-000
    BLROM1    1114  030-010-000  030-010-000      030-010-000  030-010-000
    BLROM1    1116  030-010-000  030-010-000      030-010-000  030-010-000
    BLROM1    1115  -----------  -----------      -----------  030-010-000
```

24. Examine the output of the previous step.

a) If any version is different continue with *Step 25*.

b) If there are no differences, go to *Step 30*.

25. Enter the following command to load the GPLs from the removable USB drive inserted in *Step 16*:

`copy-gpl:sloc=xxxx:dloc=yyyy`

where *xxxx* is the card location used in *Step 17* and *yyyy* is the mated TDM location.

The following is an example of a possible output.

```
    rlghncxa03w 09-01-07 00:57:31 EST  EAGLE 40.1.0
    COPY GPL:  MASP B - COPY STARTS ON REMOVABLE DRIVE
;
```

```
    rlghncxa03w 09-01-07 01:01:27 EST  EAGLE 40.1.0
    COPY GPL:  MASP B - COPY TO STANDBY MASP COMPLETE
```

When the command has completed, go to *Step 30*

26. Enter the following command to verify whether measurement collection is on or off:

`rtrv-meas-sched`

The following is an example of a possible output. The COLLECT field shows whether measurement collection is on or off. In this example, measurement collection is on.

```
RLGHNCXA03W 95-04-03 12:22:55 EST EAGLE 34.0.0
COLLECT        =  on
--------------------
SYSTOT-STP     =  off
SYSTOT-TT      =  off
SYSTOT-STPLAN  =  on
COMP-LNKSET    =  off
COMP-LINK      =  on
MTCD-STP       =  on
MTCD-LINK      =  on
MTCD-STPLAN    =  on
```

- If measurement collection is on, continue with *Step 27*.
- If measurement collection is off, proceed to *Step 28*.

27. Enter the following command to inhibit all measurements:

`chg-meas:collect=off`

CAUTION: Measurements must be inhibited or the `copy-disk` command cannot be executed. The `chg-meas:collect=on` command should not be executed while the `copy-disk` command is in progress. When measurements are inhibited, measurement collection is stopped. For the entire period of time when measurements are inhibited, those measurements will be lost. If possible do not inhibit measurements at midnight since doing so can result in the loss of measurements for an entire day.

The following is an example of a possible output of the message that should appear.

```
RLGHNCXA03W 94-02-07 16:12:50 EST  EAGLE 34.0.0
CHG-MEAS: MASP A - COMPLTD
```

28. Enter the following `copy-disk` command along with the card location of the standby E5-TDM (shown by the indicator STDBY in the command output in *Step 20*) that the data is being copied to.

`copy-disk:dloc=xxxx:format=yes`

Where *xxxx* is the card location of the standby TDM.

This command can take from 33 minutes to 1 hour 46 minutes to execute. It can take even longer depending on other system activity in progress when this command is entered.

The following is an example of a possible output of the message that should appear when the command has executed and completed. For this example, the `copy-disk:dloc=1116` command was entered.

```
Copy-disk (fixed): from active (1114) to standby (1116) started.
Extended processing required, please wait.
```

```
Copy-disk (fixed): from active (1114) to standby (1116) completed.
Measurements collection may be turned on now if desired.
```

The standby MASP is rebooted to load the data when the command completes successfully.

Note: While this command is executing, commands that affect the database configuration cannot be executed. Any attempt to execute such a command will be rejected.

29. If measurement collection was turned off in *Step 27*, enter the following command to turn on the measurements:

    `chg-meas:collect=on`

    The following is an example of a possible output of the message that should appear.

```
RLGHNCXA03W 94-02-07 16:12:50 EST  EAGLE 34.0.0
CHG-MEAS: MASP A - COMPLTD
```

30. Enter the following command to verify that the database counts of both MASPs.

    `rept-stat-db:display=all`

    The following is an example of the possible output for a good database.

```
rept-stat-db
Command Accepted - Processing
    oflnmoxa11w 98-10-08 15:56:40 CDT EAGLE 34.0.0
    rept-stat-db
    Command entered at terminal #4.
;
    oflnmoxa11w 98-10-08 15:56:40 CDT EAGLE 34.0.0
DATABASE STATUS: >> OK <<
    TDM 1114 ( STDBY)                    TDM 1116 ( ACTV )
         C   LEVEL    TIME LAST BACKUP     C   LEVEL    TIME LAST BACKUP
         - -------- --------------------  - -------- --------------------
FD BKUP  Y   342256 98-10-07 00:40:29 CDT  Y   342256 98-10-07 00:40:29 CDT
FD CRNT  N   342374                        Y   342375
       MDAL 1117
         - --------
```

31. Enter the following command to restore the OAP terminals changed in *Step 11*:

    `chg-trm:trm=x:type=oap`

    where *x* is the terminal number.

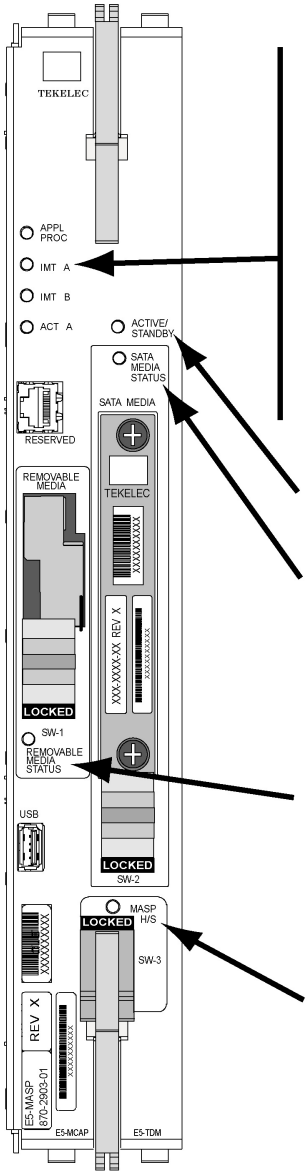
32. Enter the following command to return the OAP terminals inhibited in *Step 10* to the in-service state:

    `alw-trm:trm=x`

    where x is the terminal number.

E5-MASP

Figure 33: E5-MASP LEDs



E5-MASP LEDs

LED	Status	Description
APPL PROC	Off	No power
	Red	Card is booting
	Amber	Card is loading
	Green	Card is running
IMT A	Red	Not connected to bus
	Amber	Testing not complete
	Green	Active and connected to the bus
IMT B	Red	Not connected to bus
	Amber	Testing not complete
	Green	Active and connected to the bus
ACT A	Off	Card not functioning
	Red	No signal detected
	Green	Signal detected
ACTIVE/ STANDBY	Green	This card is the Active MASP
	* Blinking Green/Amber	This card is the Standby MASP
SATA MEDIA STATUS	Off	Media is LOCKED and operating
	Blinking Blue	WAIT Media is UNLOCKED and in process of shutting down OR Media is LOCKED and in process of coming online
	Steady Blue	Media is UNLOCKED, turned off, and ready for removal
REMOVABLE MEDIA STATUS	Off	Media is LOCKED and operating
	Blinking Blue	WAIT Media is UNLOCKED and in process of shutting down OR Media is LOCKED and in process of coming online
	Steady Blue	Media is UNLOCKED, turned off, and ready for removal
MASP H/S	Off	E5-MASP is LOCKED and operating
	Blinking Blue	WAIT - E5-MASP is UNLOCKED and in process of shutting down OR E5-MASP is LOCKED and in process of coming online
	Steady Blue	E5-MASP is UNLOCKED, turned off, and ready for removal

* The LED blinks Green/Amber at a rate of 3 Green to 1 Amber.

E5-MDAL Card Replacement

Description

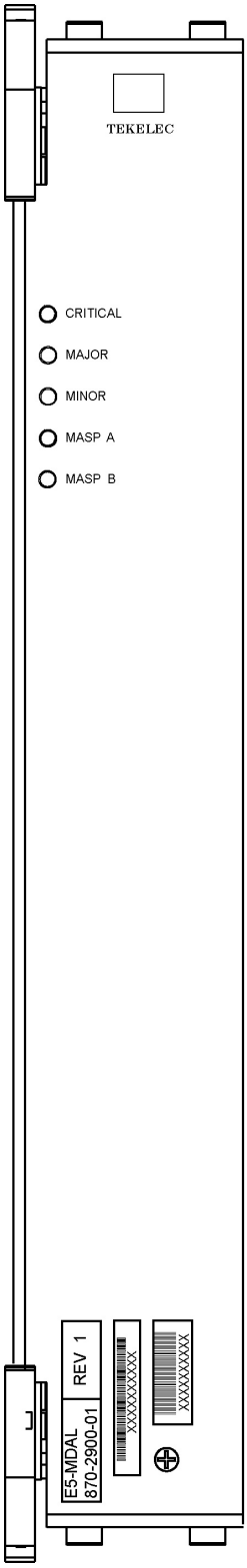
The E5-MDAL (*Figure 34: MDAL LEDs*) provides for external alarm indicators, such as bells, horns and lamp indicators.

Remove the card from service as described in the section titled,*Replacing a Card in the EAGLE 5 ISS* .

Note: Removing the E5-MDAL creates a critical alarm at the Remote Maintenance Center (RMC) as well as the local office.

MDAL Maintenance Disk and Alarm Card

Figure 34: MDAL LEDs



E5-MDAL LEDs

LED	Status	Description
CRITICAL	Red	A critical system alarm has been detected
	Green	No Alarm
MAJOR	Red	A major system alarm has been detected
	Green	No Alarm
MINOR	Amber	A minor system alarm has been detected
	Green	No Alarm
MASP A	Green	This is the master MASP
	Off	This is the standby MASP
MASP B	Green	This is the master MASP
	Off	This is the standby MASP

Maintenance Disk and Alarm (MDAL) Card Replacement

Description

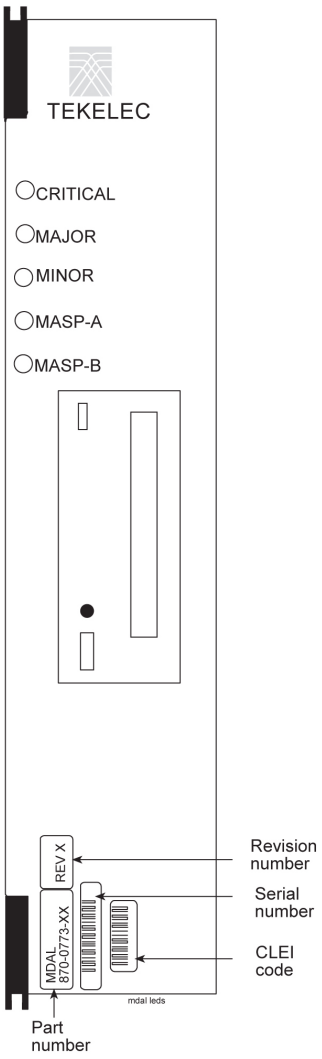
The MDAL (*Figure 35: MDAL LEDs*) provides a dry contact closure for external alarm indicators, such as bells, horns and lamp indicators. The MDAL also contains the removable cartridge drive.

1. Verify the removable cartridge is not in the removable cartridge drive.
   Remove the cartridge if necessary. Reference:*Removable Drives* .
2. Remove the card from service as described in the section titled,*Replacing a Card in the EAGLE 5 ISS* .

   Note: Removing the E5-MDAL creates a critical alarm at the Remote Maintenance Center (RMC) as well as the local office.

MDAL Maintenance Disk and Alarm Card

Figure 35: MDAL LEDs



LEDs	Descriptions
CRITICAL	RED - Critical alarm condition detected GREEN - No alarm
MAJOR	RED - Major alarm condition detected GREEN - No alarm
MINOR	AMBER - Minor alarm condition detected GREEN - No alarm
MASP-A	GREEN - MASP-A is the active MASP OFF - MASP-A is the standby MASP or is not present
MASP-B	GREEN - MASP-B is the active MASP OFF - MASP-B is the standby MASP or is not present

General Purpose Service Module (GPSM-II) Card Replacement

Description

The GPSM-II (*Figure 36: GPSM-II LEDs*) contains the communication processor and applications processor for the operations, administration, and maintenance (OAM) software and provides connections to the IMT bus

The GPSM-II is a member of the EDCM/EDCM-A card family. The GPSM-II is based on the single-slot EDCM/EDMC-A card with the addition of a one GByte expansion memory (UD1G) module.

1. If the active GPSM-II card fails, the EAGLE 5 ISS automatically switches activity to the standby MASP.
2. Enter the following command to retrieve the terminal types and port numbers:`rtrv-trm`

The following is an example of the possible output.

```
RLGHNCXA03W  98-01-01 16:02:08 EST EAGLE 34.0.0
TRM  TYPE    COMM         FC     TMOUT MXINV DURAL
1    VT320    9600-7-E-1 SW    60    5     99:59:59
2    VT320    9600-7-E-1 BOTH  60    5     INDEF
3    KSR      9600-7-E-1 SW    60    0     00:00:00
4    NONE     9600-7-E-1 SW    60    5     00:30:00
5    NONE     9600-7-E-1 SW    60    5     00:00:30
6    SEAS    19200-7-E-1 SW    0     5     INDEF
7    VT320    9600-7-E-1 SW    60    5     99:59:59
8    VT320    9600-7-E-1 SW    60    5     INDEF
9    VT320    9600-7-E-1 SW    60    0     00:00:00
10   VT320    9600-7-E-1 SW    60    5     00:30:00
11   VT320    9600-7-E-1 NONE  60    5     00:00:30
12   NONE    19200-7-E-1 SW    0     5     INDEF
13   VT320    9600-7-E-1 SW    60    5     99:59:59
14   VT320    9600-7-E-1 SW    60    5     INDEF
15   VT320    9600-7-E-1 SW    60    0     00:00:00
16   VT320    9600-7-E-1 SW    60    5     00:30:00
                               LNP LNP
TRM  TRAF LINK SA  SYS PU  DB  DB  SUB
1    YES  YES  YES YES YES YES YES YES
2    YES  YES  YES YES YES YES YES YES
3    YES  YES  YES YES YES YES YES YES
4    YES  YES  YES YES YES YES YES YES
5    YES  YES  YES YES YES YES YES YES
6    YES  YES  YES YES YES YES YES YES
7    YES  YES  YES YES YES YES YES YES
8    YES  YES  YES YES YES YES YES YES
9    YES  YES  YES YES YES YES YES YES
10   YES  YES  YES YES YES YES YES YES
11   YES  YES  YES YES YES YES YES YES
12   YES  YES  YES YES YES YES YES YES
13   YES  YES  YES YES YES YES YES YES
14   YES  YES  YES YES YES YES YES YES
15   YES  YES  YES YES YES YES YES YES
16   YES  YES  YES YES YES YES YES YES
Command Completed
```

3. If your system has the LNP feature, enter the following command to inhibit each OAP terminal displayed in the output from *Step 2*:`inh-trm:trm=x`

   where x is the terminal number.

4. Enter the following command to ensure no OAP updates are inadvertently sent to the database as you continue this procedure:`chg-term:trm=x:type=none`
5. Remove the card from service as described in the section titled, *Replacing a Card in the EAGLE 5 ISS*.
6. Enter the following command to change the state of the appropriate card to the out of service - maintenance disabled state:`inh-card:loc=xxxx:force=yes`

   where *xxxx* is the card location stenciled on the shelf of the EAGLE 5 ISS. Following is an example of the output:

```
RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
Card has been inhibited.
```

7. Enter the following command to load the approved GPL onto the card inhibited.

Refer to the *Commands Manual* to verify additional optional parameter usage for the `init-flash` command.`init-flash:code=appr:loc=xxxx`where *xxxx* is the card location used in *Step 6*Following is an example of the output using card location 1115:

```
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    FLASH Memory Downloading for card 1115 Started.
;
    RLGHNCXA03W  00-06-05  11:11:28 EDT EAGLE 34.0.0
    BPHCAP Downloading for card 1115 Complete.
;
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    Command Completed.
```

When the `init-flash` command has completed successfully, the card specified in the `init-flash` command is rebooted.

8. Enter the following command to put the card that was inhibited in *Step 6* back into service:`alw-card:loc=xxxx`

   where *xxxx* is the card location used in *Step 6*Following is an example of the output:

   ```
   RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
   Card has been allowed.
   ```

   Note: Allow the card to run for 5 minutes before continuing.

9. Enter the following command to activate the approved GPL loaded onto the card in *Step 7*:`act-flash:loc=xxxx`

   where *xxxx* is the card location used in *Step 7* Following is an example of the output using card location 1115:

   ```
       RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
       FLASH Memory Activation for card 1115 Completed.
   ;
       RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
       Command Completed.
   ```

10. After the card has been reloaded (a message appears to confirm completion of the load), enter the following command to verify the database is consistent (same level as the other cards in the system). `rept-stat-card`

    The following is an example of the possible output.

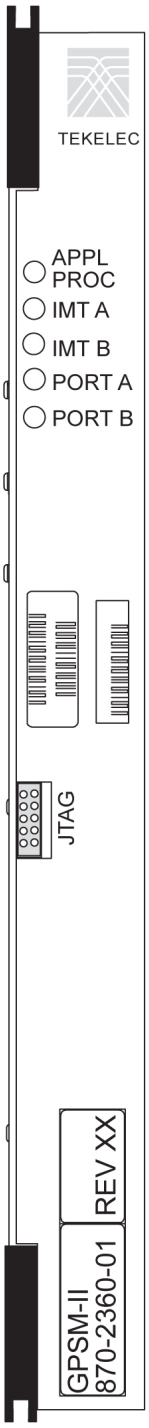
    ```
    RLGHNCXA03W 98-02-04 12:57:21 EST EAGLE 34.0.0
    CARD  VERSION       TYPE    APPL      PST       SST       AST
    1113  023-102-000   MASP    OAM       IS-NR     Active    -----
    1114  -----------   TDM     --------  IS-NR     Active    -----
    1115  ----------   MASP    OAM        IS-NR     Active    -----
    1116  -----------   TDM     --------  IS-NR     Active    -----
    1117  -----------   MDAL    --------  IS-NR     Active    -----
    1201  023-102-000   LIM0CU  CCS7ITU   IS-NR     Active    -----
    1202  023-001-000   LIMDS0  CCS7ITU   IS-NR     Active    M BIP ERR
    1203  023-001-000   LIMDS0  SS7ANSI   IS-NR     Active    -----
    1205  023-001-000   LIMDS0  CCS7ITU   IS-NR     Active    M BIP ERR
    1207  023-001-000   LIMATM  ATMANSI   IS-NR     Active    -----
    1211  023-001-000   LIMATM  ATMANSI   IS-NR     Active    ALMINH
    1212  023-001-000   TSM     SCCP      IS-NR     Active    ALMINH
    Command Completed.
    ```

11. If you have performed *Step 4* , to safeguard against inadvertent OAP updates, enter the following command to remove the allow OAP update capability:`chg-trm:trm=x:type=OAP`
12. Enter the following command to return the OAP terminals to the in-service state:`alw-trm:trm=x` where *x* is the terminal number.
13. Enter the following command to verify the database:`rept-stat-db`
    The following is an example of the possible output for a good database.

```
rept-stat-db
Command Accepted - Processing
    oflnmoxa11w 98-10-08 15:56:40 CDT EAGLE 34.0.0
    rept-stat-db
    Command entered at terminal #4.
;
    oflnmoxa11w 98-10-08 15:56:40 CDT EAGLE 34.0.0
DATABASE STATUS: >> OK <<
    TDM 1114 ( STDBY)                     TDM 1116 ( ACTV )
         C   LEVEL    TIME LAST BACKUP     C   LEVEL    TIME LAST BACKUP
         - -------- --------------------  - -------- --------------------
FD BKUP  Y   342256 98-10-07 00:40:29 CDT  Y   342256 98-10-07 00:40:29 CDT
FD CRNT  N   342374                       Y   342375
       MDAL 1117
         - --------
```

GPSM-II, General Purpose Service Module

Figure 36: GPSM-II LEDs



LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected. GREEN – No alarm
IMT A	RED – Major alarm condition detected. AMBER – Minor alarm condition detected. GREEN – No alarm
IMT B	RED – Major alarm condition detected. AMBER – Minor alarm condition detected. GREEN – No alarm
PORT A	GREEN – PORT A is the active PORT. RED – PORT A is inactive
PORT B	GREEN – PORT B is the active PORT. RED – PORT B is inactive.

HIPR2 Card Replacement

Use this procedure to remove a High-Speed Inter-processor Message Transport Packet Router 2 (HIPR2) card.

Each shelf contains two HIPR2 cards, one for each IMT bus, that provide continuity of the IMT bus signals even with failed or missing circuit modules. LEDs on the HIPR2 (*Figure 37: HIPR2 LEDs*) indicate connectivity to the IMT

1. Enter the following command to verify the status of the IMT buses.

   `rept-stat-imt`

   WARNING: Be sure to inhibit the correct IMT bus. If you inhibit the wrong IMT bus and then remove the HIPR2, total nodal isolation will occur. Wait until the IMT has returned to IS-NR before replacing the other HIPR2.

   The following is an example of the possible output.

```
RLGHNCXA03W 98-09-27 16:50:24 EST  EAGLE 34.0.0
 IMT   PST             SST        AST
  A    IS-NR           Active     -----
  ALARM STATUS       = No alarms
 IMT   PST             SST        AST
  B    IS-ANR          Fault      -----
  ALARM STATUS       = **  0108 Major IMT Failure Detected
Command Completed.
```

2. Enter the following command to inhibit the IMT bus associated with the HIPR2 being removed (top HIPR2 accesses bus A, bottom HIPR2 accesses bus B).

   `rmv-imt:bus=x`

   where *x* is the IMT bus to be inhibited.

3. Perform *Step 4* and *Step 5* only if the OAP is being utilized.

   Otherwise, continue with *Step 6*.

4. Enter the following command to retrieve the terminal types and port numbers:

   `rtrv-trm`

5. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 4*.:

   `inh-trm:trm=x:force=yes`

   where x is the terminal number assigned as type OAP.

6. Remove the HIPR2, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

   Place the new HIPR2 into its place. Be sure the revision numbers are compatible (if in doubt, contact the *Customer Care Center*).

7. Enter the following command to restore the IMT bus.

   `alw-imt:bus=x`

   where *x* is the IMT bus inhibited.

   Note: If UAM 0002 is output, the newly installed HIPR2 card needs to be flashed.

8. Enter the following command to determine if the newly replaced card's memory needs to be flashed:
   `rept-stat-gpl:gpl=xxxxxx`
   where *xxxxxx* is `hipr2`.
   Following is an example of a HIPR2 output:

```
tekelecstp 09-07-09 16:53:23 EST  EAGLE5 41.1
Output:
    GPL        CARD      RUNNING            APPROVED      TRIAL
    HIPR2      1109      128-021-000        128-021-000   128-021-000
    HIPR2      1110      128-021-000        128-021-000   128-021-000

    Command Completed.
;
```

   Note: Mismatched GPLs should occur only during upgrades or running a trial GPL.

9. Examine the output from *Step 8*.
   - If the GPLs match, continue with *Step 18*.
   - If there is a GPL mismatch, continue with *Step 10*.

10. Enter the following command to verify GPL Auditing is **ON** .
    `chg-gpl:audit=on`

11. Enter the following command to load the GPL onto the HIPR2 card.
    `init-flash:code=appr:loc=xxxx`
    where *xxxx* is the card location newly replaced card.
    Following is an example of a HIPR2 output using card location 1309:

```
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    FLASH Memory Downloading for card 1309 Started.
;
    RLGHNCXA03W  00-06-05  11:11:28 EDT EAGLE 34.0.0
    HIPR2 Downloading for card 1309 Complete.
;
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    Command Completed.
```

12. Enter the following command to initialize the HIPR2.

CAUTION: This command boots the HIPR2 processor and brings down the respective IMT bus temporarily (approximately 10 seconds) until the HIPR2 card comes back into service.

    `init-mux:loc=xxxx:bus=y`
    where *xxxx* is the card location used in *Step 11*, and *y* is the bus.

    Note: Allow the card to run for 5 minutes before continuing.

13. Enter the following command to activate the GPL loaded onto the HIPR2 card in *Step 11*:
    `act-flash:loc=xxxx`
    where *xxxx* is the card location used in *Step 11*.

Following is an example of the output using card location 1309:

```
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    FLASH Memory Activation for card 1309 Completed.
;
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    Command Completed.
```

14. Enter the following command to verify the approved GPLs match the running GPLs:

    `rept-stat-gpl:gpl=hipr2`

15. If the GPLs match, continue with *Step 18*.

    If the GPLs do not match, continue with *Step 16*.

16. Enter the following command determine which cards are in alarm condition (indicated by the acronym ALM in the `rept-stat-gpl` display):

    `rept-stat-gpl`

17. Note which cards are in an alarm condition and, if in doubt, *Customer Care Center*.

18. If the the OAP was inhibited in *Step 5*, continue with *Step 19* .

    If *Step 5* was not performed, continue with *Step 20*.

19. Enter the following command to return the OAP terminals to the in-service state:

    `alw-trm:trm=x`

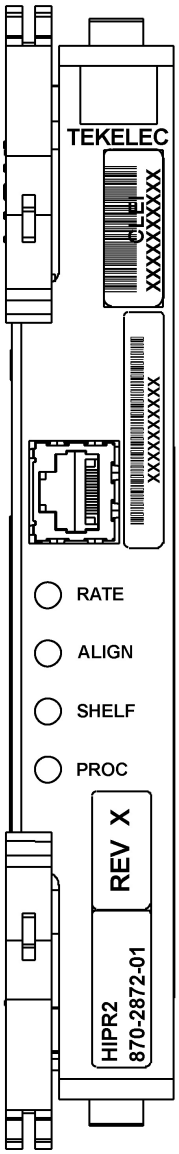
    where *x* is the terminal number of the inhibited OAP terminal.

20. Enter the following command to verify that the HIPR2 card is in service and the IMT bus has been restored.

    `rept-stat-imt`

```
RLGHNCXA03W 98-09-27 16:50:24 EST  EAGLE 34.0.0
 IMT   PST             SST        AST
  A    IS-NR           Active     -----
  ALARM STATUS       = No alarms
 IMT   PST             SST        AST
  B    IS-NR           Active     -----
  ALARM STATUS       = No alarms
Command Completed.
```

Figure 37: HIPR2 LEDs



HIPR2 State	LED			
	RATE	ALIGN	SHELF	PROC
No power	Off	Off	Off	Off
Power on (cold start)	Off	Off	Off	RED
Reset (warm start)	Off	Off	AMBER	RED
Programming (cold start)	Off	Off	Off	AMBER
Programming (warm start)	Off	Off	AMBER	AMBER
Programming Complete	---	AMBER	AMBER	GREEN
Shelf Address Capture: Timer Started Successful Unsuccessful	 --- --- ---	 AMBER GREEN RED	 AMBER AMBER AMBER	 GREEN GREEN GREEN
Code Running	---	GREEN	Note 2	GREEN
IMT is operational at: low-rate (1 Gbps) high-rate (2.5 Gbps)	 GREEN GREEN Blinking			
IMT is rate negotiating or in proving period	AMBER			
IMT is not operational	RED			

Notes:

1. ALIGN and SHELF LEDs are not accessible to software until the FPGA has been programmed. So for the same point in the HIPR bootstrap sequence, the state of these two LEDs can be different depending on whether a warm or cold start is in progress.

2. State depends on the address received from OAM and written to Assigned Shelf Address Register and compared to the value previously read from the Assigned Shelf Address Register.
   - RED - Does Not Match
   - GREEN - Matches

HIPR/HMUX Card Replacement

Description

The HIPR/HMUX card provides access to the IMT bus for all cards in the shelf.

The High-Speed Inter-processor Message Transport Packet Router (HIPR) (*Figure 38: HIPR LEDs*) provides connectivity to the IMT bus by using switched 125 Mbps interfaces to each slot within a shelf. The HIPR card interoperates with the HMUX card and provides connectivity to the 1Gbps inter-shelf bus. The HIPR card transmits data between shelves only when it is necessary. Traffic between EAGLE 5 ISS cards on the same shelf are switched directly to the destination slot and do not transmit to any other cards in the shelf. Traffic between shelves are not required to pass onto an intra-shelf IMT channel if it is not necessary. The HIPR card is required in shelves equipped with high-performance LIMs,

such as the High-Capacity MIM. The HIPR card requires all other shelves within the EAGLE 5 ISS to be equipped with the HMUX card or HIPR card.

The High-Speed Multiplexer (HMUX) (*Figure 39: HMUX LEDs*), is used in EAGLE 5 ISS only. HMUX interoperates with HIPR and provides connectivity to the 1Gbps inter-shelf bus. The intra-shelf low speed IMT bus/ring data rate is 125Mbps. HMUX acts as a gateway between the EAGLE 5 ISS 1 Gbps inter-shelf high speed bus and 125 Mbps intra-shelf IMT bus. HMUX transmits data between shelves only when it is necessary. Traffic between EAGLE 5 ISS intra-shelf cards stay on the shelf IMT bus and are not required to transmit intra-shelf. Traffic between shelves are not required to pass onto an intra-shelf IMT channel if it is not necessary.

Each shelf contains two HIPR or HMUX cards, one for each IMT bus, that provide continuity of the IMT bus signals even with failed or missing circuit modules. A mixture of HMUX and HIPR cards within one IMT ring is possible, provided HIPR is installed on both the IMT A & IMT B bus in a given shelf.

1. Enter the following command to verify the status of the IMT buses.

   `rept-stat-imt`

   WARNING: Be sure to inhibit the correct IMT bus. If you inhibit the wrong IMT bus and then remove the HIPR2, total nodal isolation will occur. Wait until the IMT has returned to IS-NR before replacing the other HIPR2.

   The following is an example of the possible output.

```
RLGHNCXA03W 98-09-27 16:50:24 EST  EAGLE 34.0.0
 IMT   PST             SST        AST
  A    IS-NR            Active     -----
  ALARM STATUS       = No alarms
 IMT   PST             SST        AST
  B    IS-ANR           Fault      -----
  ALARM STATUS       = **  0108 Major IMT Failure Detected
Command Completed.
```

2. Enter the following command to inhibit the IMT bus associated with the HIPR/HMUX being removed (top HIPR/HMUX accesses bus A, bottom HIPR/HMUX accesses bus B).

   `rmv-imt:bus=x`

   where *x* is the IMT bus to be inhibited.

3. Perform *Step 3* and *Step 4* only if the OAP is being utilized.

   Otherwise, continue with *Step 5*. Enter the following command to retrieve the terminal types and port numbers:

   `rtrv-trm`

4. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 3*:

   `inh-trm:trm=x:force=yes`

   where x is the terminal number assigned as type OAP.

5. Remove the HIPR/HMUX, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

   Place the new HIPR/HMUX into its place. Be sure the revision numbers are compatible (if in doubt, contact the *Customer Care Center*).

6. Enter the following command to restore the IMT bus.

`alw-imt:bus=x`

where *x* is the IMT bus inhibited.

Note: If UAM 0002 is output, the newly installed HIPR2 card needs to be flashed.

7. Enter the following command to determine if the newly replaced cards memory needs to be flashed:
   `rept-stat-gpl:gpl=xxxxxx`
   where *xxxxxx* is `hipr` or `bphmux`.
   Following is an example of a bphmux output:

```
tekelecstp 03-07-03 16:53:23 EST  EAGLE5 34.0.0-55.0.0
GPL Auditing  ON
GPL


CARD  RUNNING      APPROVED         TRIAL
BPHMUX    1209  028-005-000  028-005-000
-----------

BPHMUX    1210  028-005-000  028-005-000
-----------

BPHMUX    1309  028-004-000  028-005-000 ALM
-----------

BPHMUX    1310  028-005-000  028-005-000
-----------
```

   Note: Mismatched GPLs should occur only during upgrades or running a trial GPL.

8. Examine the output from *Step 7*.
   - If the GPLs match, continue with *Step 17*.
   - If there is a GPL mismatch, continue with *Step 9*.

9. Enter the following command to verify GPL Auditing is **ON** .
   `chg-gpl:audit=on`

10. Enter the following command to load the GPL onto the HIPR/HMUX card.
    `init-flash:code=appr:loc=xxxx`
    where *xxxx* is the card location newly replaced card.
    Following is an example of a bphmux output using card location 1309:

```
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    FLASH Memory Downloading for card 1309 Started.
;
    RLGHNCXA03W  00-06-05  11:11:28 EDT EAGLE 34.0.0
    BPHMUX Downloading for card 1309 Complete.
;
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    Command Completed.
```

11. Enter the following command to initialize the HIPR/HMUX.

CAUTION: This command boots the HIPR2 processor and brings down the respective IMT bus temporarily (approximately 10 seconds) until the HIPR2 card comes back into service.

`init-mux:loc=xxxx:bus=y`

where *xxxx* is the card location used in *Step 10*, and *y* is the bus.

Note: Allow the card to run for 5 minutes before continuing.

12. Enter the following command to activate the GPL loaded onto the HIPR/HMUX card in *Step 10*:

    `act-flash:loc=xxxx`

    where *xxxx* is the card location used in *Step 9*.

    Following is an example of the output using card location 1309:

```
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    FLASH Memory Activation for card 1309 Completed.
;
    RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
    Command Completed.
```

13. Enter the following command to verify the approved GPLs match the running GPLs:

    `rept-stat-gpl:gpl=xxxxxx`

    where *xxxxxx* is `hipr` or `bphmux` (the `GPL SYSTEM` identified in the output).

14. If the GPLs match, continue with *Step 17*.

    If the GPLs do not match, continue with *Step 15*.

15. Enter the following command determine which cards are in alarm condition (indicated by the acronym ALM in the `rept-stat-gpl` display):

    `rept-stat-gpl`

16. Note which cards are in an alarm condition and, if in doubt, *Customer Care Center*.

17. Perform this step only if the the OAP was inhibited in *Step 4*.

    If *Step 4* was not performed, continue with *Step 18*. Enter the following command to return the OAP terminals to the in-service state:

    `alw-trm:trm=x`

    where *x* is the terminal number of the inhibited OAP terminal.

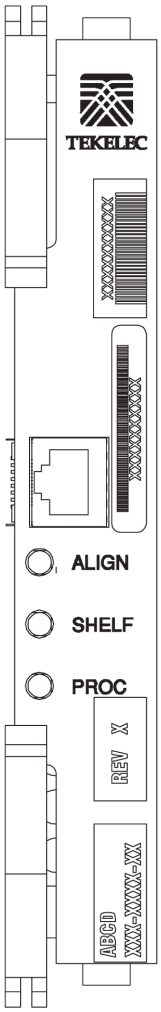
18. Enter the following command to verify that the HIPR/HMUX card is in service and the IMT bus has been restored.

    `rept-stat-imt`

```
RLGHNCXA03W 98-09-27 16:50:24 EST  EAGLE 34.0.0
 IMT   PST            SST        AST
  A    IS-NR           Active     -----
  ALARM STATUS       = No alarms
 IMT   PST            SST        AST
  B    IS-NR          Active     -----
  ALARM STATUS       = No alarms
Command Completed.
```

HIPR, High-Speed Inter-processor Message Transport Packet Router

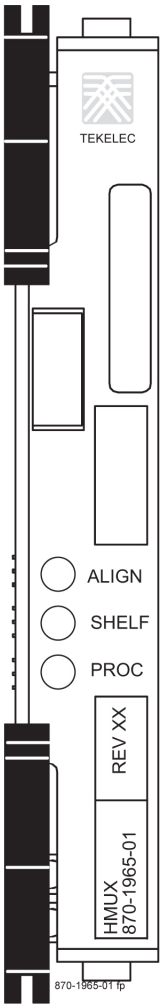
Figure 38: HIPR LEDs



LEDs	Descriptions
ALIGN	**AMBER** – Programming XILINX complete **GREEN** – Complete code initialization (stays Amber until the first valid Shelf ID is received from MASP), Code running
SHELF ID	**AMBER** – Programming XILINX complete, Complete code initialization **RED** – While code running if ID address received from OAM does not match the on-board stored address read from the assigned shelf address register (see first note below) **GREEN** – While code running if ID address received from OAM matches the on-board stored address read from the assigned shelf address register (see second note below)
PROC Health	**RED** – Power on Reset **AMBER** – Programming XILINX **GREEN** – Programming XILINX complete, Complete code initialization, Code running

HMUX, High-Speed Multiplexer (Eagle STP only)

Figure 39: HMUX LEDs



LEDs	Descriptions
ALIGN	AMBER – Programming XILINX complete GREEN – Complete code initialization (stays Amber until the first valid Shelf ID is received from MASP), Code running
SHELF ID	AMBER – Programming XILINX complete, Complete code initialization RED – While code running if ID address received from OAM **does not** match the on-board stored address read from the assigned shelf address register (see first note below) GREEN – While code running if ID address received from OAM matches the on-board stored address read from the assigned shelf address register (see second note below)
PROC Health	RED – Power on Reset AMBER – Programming XILINX GREEN – Programming XILINX complete, Complete code initialization, Code running

NOTE: The LED color state change during power up and reset happens within one second. To determine operating status, wait until reset is over.

NOTE: At start up, each HMUX card receives an ID address from the OAM. The HMUX card stores this address in on-board memory, in register FF. Every five seconds, the OAM re-sends the same addresses to the HMUX cards, which compare the re-send with the address they previously received and stored in memory. If the address sent to an HMUX card by OAM does not match the stored address, the HMUX Illegal Address Error alarm will cause the Shelf LED color to change to RED.

Determine LIM, MIM, and MPL Changeout Time

Description

This procedure assists the customer in deciding if the LIM should be changed immediately or during the Maintenance Window.

1. Replace the LIM immediately if *any* of the following conditions exist:
   - If there is only one link on the card
   - If there is no other in-service link on this card
   - If there is no other in-service link on this card
   - If any destination is prohibited by the current failure.
2. Wait until the maintenance window to replace the card if *all* of the following conditions exist:
   - If the faulty link is not the only in-service link on the card

- If deactivating the link will prohibit a destination
- If no destination is prohibited by the current failure.

SS7 and IP7, LIM, MIM, HC-MIM and MPL Card Replacement

This Link Interface Module (LIM) (*Figure 41: LIM LEDs*) provides access to remote SS7, IP and other network elements, such as a Signaling Control Point (SCP). This card is equipped with an industry-standard ATM, or DS0 interface. The MIM card can also be equipped with an industry-standard DS1 interface.

The types of LIMs currently available are:

- LIM
- Multi-Port LIM (MPL)
- The E1/T1 Multi-Channel Interface Module (MIM)
- High Capacity Multi-Channel Interface Module (HC-MIM)

1. Enter the following command to determine which links are serviced by this card:

   `rept-stat-card:loc=xxxx`

   Where *xxxx* is the card location. The following is an example of the possible output.

```
RLGHNCXA03W 98-09-27 16:43:42 EST  EAGLE 34.0.0
CARD  VERSION      TYPE    APPL      PST           SST       AST
1201  021-002-000  LIMDS0  CCS7ITU   IS-NR         Active    -----
  ALARM STATUS      = *  0022 Clock B for card failed.
  IMT VERSION       = 021-001-000
  PROM VERSION      = 021-001-000
  IMT BUS A         = Conn
  IMT BUS B         = Fault
  SLK A PST         = IS-NR       LS=lsnsspn2  CLLI=-----------
  SLK B PST         = IS-NR       LS=lsnstpi   CLLI=-----------
  SCCP SERVICE CARD = 1212
  SLAN SERVICE CARD = ----
Command Completed.
```

2. Refer to *Determine LIM, MIM, and MPL Changeout Time* procedure to determine when to change the card.

   Note: The `inh-slk` command will be rejected if inhibiting the link would cause a DPC to become unavailable.

3. Enter the following command to inhibit the links on both ports of this card (a and b).

   `inh-slk:loc=xxxx:port=y`

   Where *xxxx* location of the card from *Step 1* and y is the port.

4. Enter the following command to change the status of the link to out of service - maintenance disabled (`oos-mt-dsbld`).

   Enter the same location and ports from *Step 3*

   `dact-slk:loc=xxxx:port=y`

Where *xxxx* location used in *Step 3* and y are the ports used in *Step 3* .

5. Enter the following command to ensure the signaling link status is `oos-mt-dsbld` (out of service - maintenance disabled).

   `rept-stat-slk`

   The following is an example of the possible output.

```
RLGHNCXA03W 98-09-27 17:00:36 EST  EAGLE 34.0.0
rept-stat-slk
SLK    LSN          CLLI        PST          SST       AST
1201,A lsnsspn2     ----------- IS-NR        Avail     ----
1201,B lsnstpi      ----------- OOS-MT-DSBLD LPBK      ----
1202,A lsnstpn      ----------- IS-NR        Avail     ----
1202,B lsnstpi      ----------- IS-NR        Avail     ----
1203,A lsnstpa      ----------- IS-NR        Avail     ----
1203,B lsnscpa      ----------- IS-NR        Avail     ----
1205,A lsnscpi      ----------- IS-NR        Avail     ----
1205,B lsnsspi1     ----------- IS-NR        Avail     ----
1207,A lsnstpa      ----------- IS-NR        Avail     ----
1207,B lsnsspa1     ----------- IS-NR        Avail     ----
1211,A lsnstpn      ----------- IS-NR        Avail     ----
1211,B lsnsspn1     ----------- IS-NR        Avail     ----
Command Completed.
```

6. Enter the following command to inhibit the card and disconnect it from the IMT bus.

   `rmv-card:loc=xxxx`

   Where *xxxx* location used in *Step 3* and *Step 4* .

7. Enter the following command to retrieve the terminal types and port numbers:

   `rtrv-trm`

8. Enter the following command to inhibit each OAP terminal displayed in the output from Step 7:`inh-trm:trm=x:force=yes`

   where *x* is the terminal number assigned as type OAP.

9. Remove the LIM/MIM/MPL, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*..

   Place the new SS7 LIM into its place. Be sure the revision numbers are compatible (if in doubt, contact the *Customer Care Center*).

10. Enter the following command to download generic program loads and database information from the TDM card to the new LIM/MIM/MPL:

    `rst-card:loc=xxxx`

    Where *xxxx* location used in *Step 6* .

11. Enter the following command to determine which links are serviced by this card:

    `rept-stat-card:loc=xxxx`

    Where *xxxx* is the location of the replaced card.

    Note: The signaling link alarms will be present until the links are restored in *Step 13*

12. Examine the output from *Step 11*.

    Refer to *Corrective Maintenance* to clear any GPL related alarms on the newly replaced card before continuing.

13. Enter the following command to return the links to service.

    Make sure this is done on all links:

    `act-slk:loc=xxxx:port=y`

    Where *xxxx* location used in *Step 3* and *Step 4* and *y* are the ports used in *Step 3* and *Step 4*.

14. Enter the following command to change the link status to IS-NR.

    Make sure this is done on both ports, *a* and *b*.

    `unhb-slk:loc=xxxx:port=y`

    Where *xxxx* location used in *Step 3* and *Step 4* and *y* are the ports used in *Step 3* and *Step 4*.

15. Enter the following command to verify the status of the card and its associated links:

    `rept-stat-card:loc=xxxx`

    Where *xxxx* is the card location. The following is an example of the possible output.

```
RLGHNCXA03W 98-09-27 16:43:42 EST  EAGLE 34.0.0
CARD  VERSION      TYPE    APPL      PST           SST       AST
1201  024-002-000  LIMDS0
SS7ANSI
   IS-NR         Active    -----
  ALARM STATUS      = No Alarms.
  IMT VERSION       = 024-001-000
  PROM VERSION      = 024-001-000
  IMT BUS A         = Conn
  IMT BUS B         = Conn
  SLK A PST         = IS-NR       LS=lsnsspn2  CLLI=-----------
  SLK B PST         = IS-NR       LS=lsnstpi   CLLI=-----------
  SCCP SERVICE CARD = 1212
  SLAN SERVICE CARD = ----
Command Completed.
```

16. Enter the following command to verify the links are properly aligned and are returned to full service:

    `rept-stat-slk`

    The following is an example of the possible output.

```
RLGHNCXA03W 98-09-27 17:00:36 EST  EAGLE 34.0.0
rept-stat-slk
SLK    LSN          CLLI        PST          SST       AST
1201,A lsnsspn2     ----------- IS-NR        Avail     ----
1201,B lsnstpi      ----------- OOS-MT-DSBLD LPBK      ----
1202,A lsnstpn      ----------- IS-NR        Avail     ----
1202,B lsnstpi      ----------- IS-NR        Avail     ----
1203,A lsnstpa      ----------- IS-NR        Avail     ----
1203,B lsnscpa      ----------- IS-NR        Avail     ----
1205,A lsnscpi      ----------- IS-NR        Avail     ----
1205,B lsnsspi1     ----------- IS-NR        Avail     ----
1207,A lsnstpa      ----------- IS-NR        Avail     ----
1207,B lsnsspa1     ----------- IS-NR        Avail     ----
1211,A lsnstpn      ----------- IS-NR        Avail     ----
1211,B lsnsspn1     ----------- IS-NR        Avail     ----
Command Completed.
```

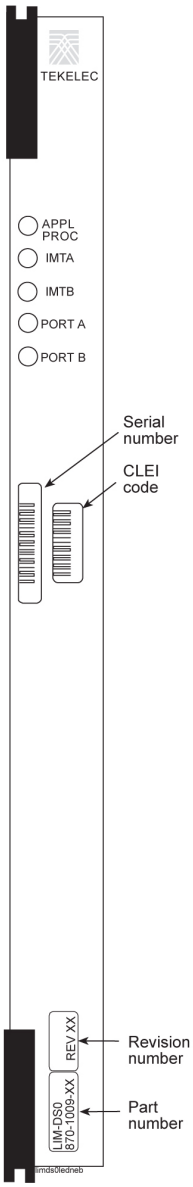
17. Enter the following command to return the OAP terminals to the in-service state:

    `alw-trm:trm=x`

    where *x* is the terminal number of the inhibited OAP terminal.

DS0A-LIM, Digital Signal Level-0 Link Interface Module

Figure 40: DS0A-LIM LEDs

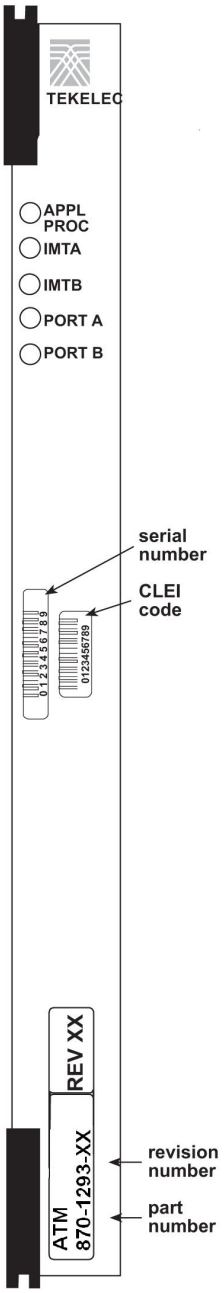


LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – LIM-DS0A is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – LIM-DS0A is running an application.
IMTA	RED – LIM-DS0A is off IMT bus A. AMBER – LIM-DS0A is on IMT bus A, but testing is not complete. GREEN – LIM-DS0A is on IMT bus A. BLANK – Communication processor is not operating.
IMTB	RED – LIM-DS0A is off IMT bus B. AMBER – LIM-DS0A is on IMT bus B, but testing is not complete. GREEN – LIM-DS0A is on IMT bus B. BLANK – Communication processor is not operating.
PORT A	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B	RED – Link is out of service. GREEN – Link is aligned and in service.

LIM-ATM

ATM Link Interface Module

Figure 41: LIM LEDs

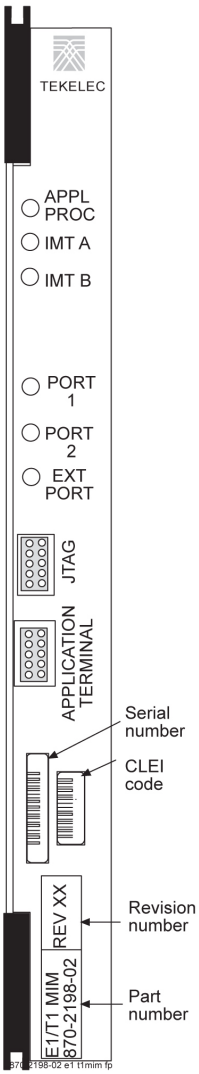


LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – LIM is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – LIM is running an application. RED/GREEN – Operational, no communication with MASP
IMTA	RED – LIM is off IMT bus A. AMBER – LIM is on IMT bus A, but testing is not complete. GREEN – LIM is on IMT bus A. BLANK – Communication processor is not operating.
IMTB	RED – LIM is off IMT bus B. AMBER – LIM is on IMT bus B, but testing is not complete. GREEN – LIM is on IMT bus B. BLANK – Communication processor is not operating.
PORT A	RED – Link is out of service. AMBER – Link is attempting to align GREEN – Link is aligned and in service.
PORT B	RED – Link is out of service. AMBER – Link is attempting to align GREEN – Link is aligned and in service.

E1/T1 MIM, E1/T1 Multichannel Interface Module

European and North American standard for signaling and channels MIM (Multi-channel Interface Module).

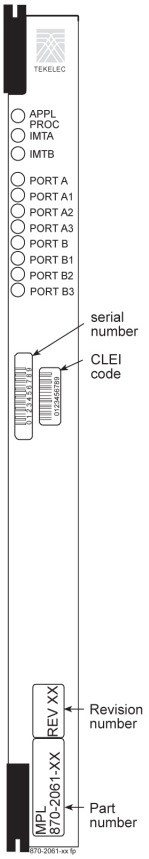
Figure 42: E1/T1 MIM



LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected GREEN – No alarm
IMT A	RED – Major alarm condition detected GREEN – No alarm
IMT B	AMBER – Minor alarm condition detected GREEN – No alarm
PORT 1	AMBER – Card is an E1-T1 Channel Card GREEN – All channels provisioned =ISNR AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
PORT 2	AMBER – Card is an E1-T1 Channel Card GREEN – All channels provisioned =ISNR AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
EXT PORT	AMBER – Card is an E1-T1 Master Card GREEN – All channels provisioned =ISNR AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
OOS - Out of service ISNR - In service normal	

MPL-LIM, Multi-Port Link Interface Module

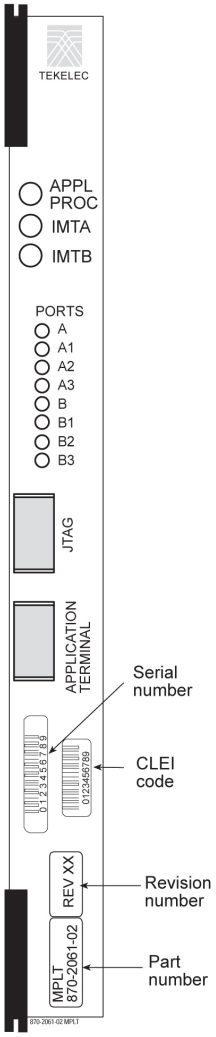
Figure 43: MPL LEDs



LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – MPL is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – MPL is running an application. RED/GREEN (Alternating) Operational but no communication with MASP
IMTA	RED – MPL is off IMT bus A. AMBER – MPL is on IMT bus A, but testing is not complete. GREEN – MPL is on IMT bus A. BLANK – Communication processor is not operating.
IMTB	RED – MPL is off IMT bus B. AMBER – MPL is on IMT bus B, but testing is not complete. GREEN – MPL is on IMT bus B. BLANK – Communication processor is not operating.
PORT A	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT A1	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT A2	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT A3	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT B	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT B1	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT B2	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT B3	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.

MPLT, Multi-Port Link Interface Module with Taxi Component

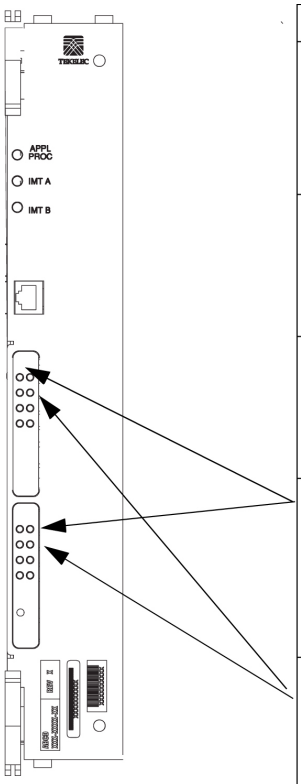
Figure 44: MPLT LEDs



LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – MPL is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – MPL is running an application.
IMTA	RED – MPL is off IMT bus A. AMBER – MPL is on IMT bus A, but testing is not complete. GREEN – MPL is on IMT bus A. BLANK – Communication processor is not operating.
IMTB	RED – MPL is off IMT bus B. AMBER – MPL is on IMT bus B, but testing is not complete. GREEN – MPL is on IMT bus B. BLANK – Communication processor is not operating.
PORT A	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT A1	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT A2	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT A3	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B1	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B2	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B3	RED – Link is out of service. GREEN – Link is aligned and in service.

HC MIM, High Capacity Multi-channel Interface Module

Figure 45: HC MIM LEDs



LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – MPL is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – MPL is running an application.
IMTA	RED – MPL is off IMT bus A. AMBER – MPL is on IMT bus A, but testing is not complete. GREEN – MPL is on IMT bus A. BLANK – Communication processor is not operating.
IMTB	RED – MPL is off IMT bus B. AMBER – MPL is on IMT bus B, but testing is not complete. GREEN – MPL is on IMT bus B. BLANK – Communication processor is not operating.
PORT Status	RED – Port not provisioned. RED BLINKING – Loss of signal and remaining errors. AMBER – Remote alarm condition AMBER BLINKING – Loss of Frame Synchronization. GREEN – No alarms, port has acquired timing and framing synchronization
AGGREGATED CHANNEL STATUS	RED – No channels are provisioned. RED BLINKING – All channels provisioned = OOS. AMBER – Indicates port is the “reflected” port in Channel Bridging mode of operation. Applies only to “even” numbered ports AMBER BLINKING – Any channels provisioned = OOS. GREEN – All channels provisioned =ISNR.

Transaction Service Module (TSM) - SCCP

Description

The Translation Service Module (TSM) provides translation capability and Global Title Translation (GTT) implementation for the Local Number Portability (LNP) function by means of one or more identically configured cards per STP node. If more than one TSM is provided in each shelf, they must be powered from different fuse positions and power feeds. The SCCP identifier signifies that this TSM card (*Figure 46: TSM LEDs*) is being used to provide global title translation (GTT).

The TSM provides additional memory for storage of the GTT tables. These tables are downloaded by the terminal disk module (TDM) to the TSM upon power loss or hard reset.

1. Enter the following command to determine which cards are in service.

   This will indicate which link interface modules (LIMs) will be affected by removal of the TSM.

   `rept-stat-card:loc=xxxx`

   Where *xxxx* is the TSM-SCCP card location. The following is an example of the possible output.

```
RLGHNCXA03W 98-09-27 16:43:42 EST  EAGLE 34.0.0
CARD  VERSION      TYPE    APPL      PST           SST       AST
1212  024-001-000  TSM     SCCP   IS-NR         Active    -----
```

```
  ALARM STATUS      = No Alarms.
  IMT VERSION       = 024-001-000
  PROM VERSION      = 024-001-000
  IMT BUS A         = Conn
  IMT BUS B         = Conn
  SLK A PST         = IS-NR       LS=lsnsspn2  CLLI=-----------
  SLK B PST         = IS-NR       LS=lsnstpi   CLLI=-----------
  SCCP SERVICE CARD = 1212
  SLAN SERVICE CARD = ----
Command Completed.
```

2. Enter the following command to determine the number of TSM-SCCP cards in service providing GTT:

   `rept-stat-sccp:mode=perf`

   The following is an example of the possible output.

```
RLGHNCXA03W  98-02-04 15:10:19 EST EAGLE 34.0.0
SCCP SUBSYSTEM REPORT IS-NR          Ovflw-1    -----
SCCP Cards Configured=4  Cards IS-NR=4  Capacity Threshold = 100%
CARD   CPU      TOTAL     CLASS 0   CLASS 0   CLASS 1
       USAGE    MSU RATE  TVG RATE  LB RATE   LB RATE
------------------------------------------------------------------------
1217   54%      850       770        50        30
1218   31%      490       400        40        50
4118    5%       80         0        40        40
4211    5%       80         0        80         0
------------------------------------------------------------------------
AVERAGE USAGE: CLASS 0 ATM = 34% CLASS 0 LIM =  6%   CLASS 1 LIM =  4%
AVERAGE MSU USAGE = 44%
AVERAGE CPU USAGE = 24%
TOTAL MSUS:   1500
TOTAL ERRORS:    5
Command Completed.
```

3. Enter the following command to remove the ASM-SCCP from service.

   If this is the last TSM-SCCP card in service, the `:force=yes` parameter must be specified:

   `rmv-card:loc=xxxx`

   Where *xxxx* is the TSM-SCCP card location.

4. Enter the following command to retrieve the terminal types and port numbers:

   `rtrv-trm`

5. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 4*:

   `inh-trm:trm=x:force=yes`

   where *x* is the terminal number assigned as type OAP.

6. Remove the ASM-SCCP card, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

   Place the new TSM-SCCP card into its place. Be sure the revision numbers are compatible (if in doubt, *Customer Care Center*).

7. Enter the following command. Use the `rst-card` command to return the TSM-SCCP card into service.

   This causes the MASP to begin downloading tables to the new TSM-SCCP card:

   `rst-card:loc=xxxx`

Where *xxxx* is the TSM-SCCP card location. When the card has been successfully loaded (there will be a response on the terminal that downloading is complete). This can take up to 30 minutes.

8. Enter the following command to verify the card is operational and providing SCCP services:

   `rept-stat-sccp`

   The following is an example of the possible output.

```
RLGHNCXA03W 98-02-07 16:10:50 EST  EAGLE 34.0.0
SCCP SUBSYSTEM REPORT IS-NR          Active     -----
SCCP Cards Configured= 1  Cards IS-NR= 1  Capacity Threshold = 100%
CARD   VERSION     PST         SST         AST       MSU USAGE  CPU USAGE
------------------------------------------------------------------------
1212   024-001-000 IS-NR       Active      ALMINH       47%         32%
------------------------------------------------------------------------
SCCP Service Average MSU Capacity = 47%       Average CPU Capacity = 32%
Command Completed.
```

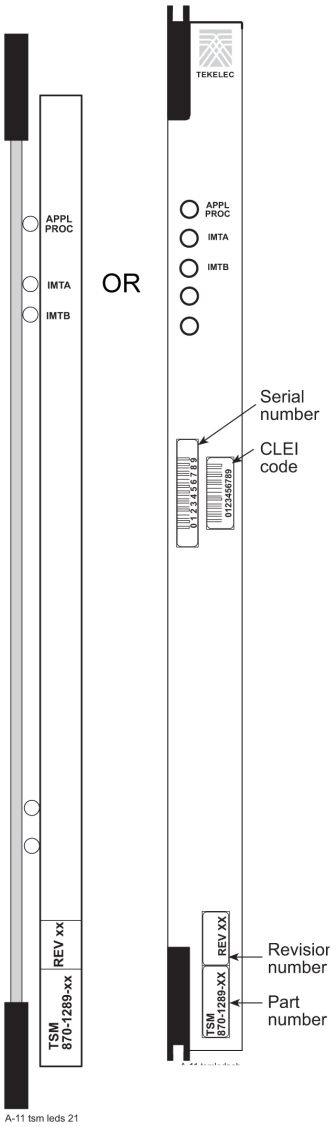
9. Enter the following command to return the OAP terminals to the in-service state:

   `alw-trm:trm=x`

   where *x* is the terminal number of the inhibited OAP terminal.

TSM

Figure 46: TSM LEDs



LEDs	Descriptions
APPL PROC - Applications Processor Status	RED - Application processor is not running or is failing diagnostics. AMBER - TSM is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN - TSM is running an application. RED/GREEN - Operational, no communication with the MASP.
IMT A - IMT Bus A Status	RED - ASM is off IMT bus A. AMBER - TSM is on IMT bus A, but testing is not complete. GREEN - TSM is on IMT bus A. BLANK - Communication processor is not operating.
IMT B - IMT Bus B Status	RED - TSM is off IMT bus B AMBER - TSM is on IMT bus B, but testing is not complete. GREEN - TSM is on IMT bus B. BLANK - Communication processor is not operating.

Transaction Service Module (TSM) - GLS

Description

The GLS identifier signifies that this TSM card (*Figure 46: TSM LEDs*) is used for downloading gateway screening tables to link interface modules (LIMs). This is used to expedite the downloading process and bring links into service much quicker.

The absence of this card will not effect the gateway screening capability, as the screening takes place on the LIMs and TSM-SCCP cards. This only effects the ability to download screening data to the LIMs and TSM-SCCP cards.

1. Enter the following command to identify how many TSM-GLS cards are presently configured for this application:

   `rept-stat-card`

   The following is an example of the possible output.

```
RLGHNCXA03W 98-02-04 12:57:21 EST EAGLE 34.0.0
CARD  VERSION       TYPE    APPL      PST       SST       AST
1113  024-102-000   MASP    OAM       IS-NR     Active    -----
1114  ----------    TDM     --------  IS-NR     Active    -----
1115  ----------    MASP    OAM       OOS-MT    Isolated  -----
1116  ----------    TDM     --------  OOT-MT    Isolated  -----
1117  ----------    MDAL    --------  IS-NR     Active    -----
1201  024-102-000   LIM0CU  CCS7ITU   IS-NR     Active    -----
1202  024-001-000   LIMDS0  CCS7ITU   IS-NR     Active    M BIP ERR
1203  024-001-000   LIMDS0  SS7ANSI   IS-NR     Active    -----
1205  024-001-000   LIMDS0  CCS7ITU   IS-NR     Active    M BIP ERR
1207  024-001-000   LIMATM  ATMANSI   IS-NR     Active    -----
1211  024-001-000   LIMATM  ATMANSI   IS-NR     Active    ALMINH
1212  024-001-000   TSM     SCCP      IS-NR     Active    ALMINH
Command Completed.
```

   This identifies if removing this card will prevent gateway screening from being loaded to LIMs.

2. Enter the following command to remove this card from service.

   If this is the last TSM-GLS card in service, the `:force=yes` parameter must be specified.

   `rmv-card:loc=xxxx`

   Where *xxxx* is the TSM-GLS card location.

3. Enter the following command to retrieve the terminal types and port numbers:

   `rtrv-trm`

4. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 3*:

   `inh-trm:trm=x:force=yes`

   where *x* is the terminal number assigned as type OAP.

5. Remove the TSM-GLS card, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

   Place the new TSM-GLS card into its place. Be sure the revision numbers are compatible (if in doubt, *Customer Care Center*).

6. Enter the following command to begin downloading gateway screening (GWS) data to the new TSM-GLS card:

   `rst-card:loc=xxxx`

   Where *xxxx* is the card location.

7. Enter the following command to verify the successful download of GWS data and to verify that the new card has returned to service:

   `rept-stat-card`

   The following is an example of the possible output.

```
RLGHNCXA03W 98-02-04 12:57:21 EST EAGLE 34.0.0
CARD  VERSION       TYPE    APPL      PST       SST       AST
1113  024-102-000   MASP    OAM       IS-NR     Active    -----
1114  ----------    TDM     --------  IS-NR     Active    -----
```

```
1115  -----------   MASP    OAM       OOS-MT    Isolated  -----
1116  -----------   TDM     --------  OOT-MT    Isolated  -----
1117  -----------   MDAL    --------  IS-NR     Active    -----
1201  024-102-000   LIM0CU  CCS7ITU   IS-NR     Active    -----
1202  024-001-000   LIMDS0  CCS7ITU   IS-NR     Active    M BIP ERR
1203  024-001-000   LIMDS0  SS7ANSI   IS-NR     Active    -----
1205  024-001-000   LIMDS0  CCS7ITU   IS-NR     Active    M BIP ERR
1207  024-001-000   LIMATM  ATMANSI   IS-NR     Active    -----
1211  024-001-000   LIMATM  ATMANSI   IS-NR     Active    ALMINH
1212  024-001-000   TSM     SCCP      IS-NR     Active    ALMINH
Command Completed.
```

8. Enter the following command to return the OAP terminals to the in-service state:

   `alw-trm:trm=x`

   where *x* is the terminal number of the inhibited OAP terminal.

E5-TSM Card Replacement

The E5-TSM card runs the Generic Loading Services application which is a software function that transfers a Binder generated table to the appropriate network card based on screenset to linkset assignment. The GPL is GLSHC, used for downloading gateway screening tables to link interface modules (LIMs). This is used to expedite the downloading process and bring links into service much quicker.

The absence of this card will not effect the gateway screening capability, as the screening takes place on the LIMs and TSM-SCCP cards. This only effects the ability to download screening data to the LIMs and TSM-SCCP cards.

1. Enter the following command to identify how many E5-TSM cards are presently configured for this application:

   `rept-stat-card`

   The following is an example of the possible output.

```
   rlghncxa03w 08-10-04 12:57:21 EST  EAGLE5 40.0.0
   CARD   VERSION      TYPE      GPL        PST            SST       AST
   1101   125-020-000  TSM       GLS        IS-NR          Active    -----
   1102   128-002-000  LIMATM    ATMHC      IS-NR          Active    -----
   1103   125-020-000  DSM       VSCCP      IS-NR          Active    -----
   1105   125-020-000  DSM       VSCCP      IS-NR          Active    -----
   1106   130-001-000  TSM       GLSHC      IS-NR          Active     -----
   1107   125-020-000  STC       EROUTE     IS-NR          Active    -----
   1109   125-020-000  HMUX      BPHMUX     IS-NR          Active    -----
   1110   125-020-000  HMUX      BPHMUX     IS-NR          Active    -----
   1111   125-020-000  IPSM      IPS        IS-NR          Active    -----
   1112   125-020-000  MCPM      MCP        IS-NR          Active    -----
   1113   070-019-002  GPSM      EOAM       IS-NR          Standby   -----
   1114   -----------  TDM                  IS-NR          Active    -----
   1115   070-019-002  GPSM      EOAM       IS-NR          Active    -----
   1116   -----------  TDM                  IS-NR          Active    -----
   1117   -----------  MDAL                 IS-NR          Active    -----
   1201   125-020-000  LIMDS0    SS7ANSI    IS-NR          Active    -----
   1202   -----------  LIMCH     SS7ANSI    OOS-MT-DSBLD   Manual    -----
   1203   125-020-000  LIMCH     SS7ANSI    IS-NR          Active    -----
   1205   125-020-000  EDCM      IPGWI      IS-NR          Active    -----
   1206   125-020-000  EDCM      SS7IPGW    IS-NR          Active    -----
   1207   125-020-000  EDCM      IPLIM      IS-NR          Active    -----
```

```
    1208   125-020-000  EDCM      IPLIMI     IS-NR          Active    -----
    1209   125-020-000  HMUX      BPHMUX     IS-NR          Active    -----
    1210   125-020-000  HMUX      BPHMUX     IS-NR          Active    -----
    1211   125-020-000  LIMATM    ATMANSI    IS-NR          Active    -----
    1213   125-020-000  LIME1ATM  ATMITU     IS-NR          Active    -----
    1301   048-019-022  LIME1     SS7ANSI    IS-NR          Active    -----
    1303   125-022-000  LIME1     SS7ANSI    IS-NR          Active    -----
    1305   125-022-000  LIME1     CCS7ITU    IS-NR          Active    -----
    1309   125-017-000  HIPR      HIPR       IS-NR          Active    -----
    1310   125-017-000  HIPR      HIPR       IS-NR          Active    -----
    1311   125-020-000  STC       EROUTE     IS-NR          Active    -----
    1313   125-020-000  DCM       STPLAN     IS-NR          Active    -----
    1401   104-002-000  LIMV35    CCS7ITU    IS-NR          Active    -----
    1403   128-018-000  DCM       IPLHC      IS-NR          Active     -----
    1407   104-001-000  LIMCH     CCS7ITU    IS-NR          Active    -----
    1408   128-018-000  DCM       SLANHC     IS-NR          Active     -----
    1409   128-016-000  HIPR      HIPR       IS-NR          Active     -----
    1410   128-016-000  HIPR      HIPR       IS-NR          Active     -----
    1411   128-018-000  STC       ERTHC      IS-NR          Active     -----
    1413   053-000-058  E5ENET    IPSG       IS-NR          Active     -----
    Command Completed.
;
```

Note: In the above example, card 1101 is a TSM-256 card and card 1106 is an E5-TSM card.

2. Enter the following command to remove this card from service.

   If this is the last card providing GLS in service, the `:force=yes` parameter must be specified.

   `rmv-card:loc=xxxx`

   Where *xxxx* is the card location.

   The following is an example of the possible output.

```
    rlghncxa03w 08-10-04 13:07:21 EST  EAGLE5 40.0.0
    Card has been inhibited.
;
```

3. Enter the following command to retrieve the terminal types and port numbers:

   `rtrv-trm`

4. Enter the following command to inhibit each OAP terminal displayed in the output from step3:

   `inh-trm:trm=x:force=yes`

   where *x* is the terminal number assigned as type OAP.

5. Remove the E5-TSM card, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

   Place the new E5-TSM card into its place. Be sure the revision numbers are compatible (if in doubt, contact the *Customer Care Center*).

6. Enter the following command to begin downloading gateway screening (GWS) data to the new E5-TSM card:

   `rst-card:loc=xxxx`

   Where *xxxx* is the card location.

7. Enter the following command to verify the successful download of GWS data and to verify that the new card has returned to service:

   `rept-stat-card`

The following is an example of the possible output.

```
    rlghncxa03w 08-10-04 12:57:21 EST  EAGLE5 40.0.0
    CARD   VERSION      TYPE      GPL        PST            SST       AST
    1101   125-020-000  TSM       GLS        IS-NR          Active    -----
    1102   128-002-000  LIMATM    ATMHC      IS-NR          Active    -----
    1103   125-020-000  DSM       VSCCP      IS-NR          Active    -----
    1105   125-020-000  DSM       VSCCP      IS-NR          Active    -----
    1106   130-001-000  TSM       GLSHC      IS-NR          Active     -----
    1107   125-020-000  STC       EROUTE     IS-NR          Active    -----
    1109   125-020-000  HMUX      BPHMUX     IS-NR          Active    -----
    1110   125-020-000  HMUX      BPHMUX     IS-NR          Active    -----
    1111   125-020-000  IPSM      IPS        IS-NR          Active    -----
    1112   125-020-000  MCPM      MCP        IS-NR          Active    -----
    1113   070-019-002  GPSM      EOAM       IS-NR          Standby   -----
    1114   -----------  TDM                  IS-NR          Active    -----
    1115   070-019-002  GPSM      EOAM       IS-NR          Active    -----
    1116   -----------  TDM                  IS-NR          Active    -----
    1117   -----------  MDAL                 IS-NR          Active    -----
    1201   125-020-000  LIMDS0    SS7ANSI    IS-NR          Active    -----
    1202   -----------  LIMCH     SS7ANSI    OOS-MT-DSBLD   Manual    -----
    1203   125-020-000  LIMCH     SS7ANSI    IS-NR          Active    -----
    1205   125-020-000  EDCM      IPGWI      IS-NR          Active    -----
    1206   125-020-000  EDCM      SS7IPGW    IS-NR          Active    -----
    1207   125-020-000  EDCM      IPLIM      IS-NR          Active    -----
    1208   125-020-000  EDCM      IPLIMI     IS-NR          Active    -----
    1209   125-020-000  HMUX      BPHMUX     IS-NR          Active    -----
    1210   125-020-000  HMUX      BPHMUX     IS-NR          Active    -----
    1211   125-020-000  LIMATM    ATMANSI    IS-NR          Active    -----
    1213   125-020-000  LIME1ATM  ATMITU     IS-NR          Active    -----
    1301   048-019-022  LIME1     SS7ANSI    IS-NR          Active    -----
    1303   125-022-000  LIME1     SS7ANSI    IS-NR          Active    -----
    1305   125-022-000  LIME1     CCS7ITU    IS-NR          Active    -----
    1309   125-017-000  HIPR      HIPR       IS-NR          Active    -----
    1310   125-017-000  HIPR      HIPR       IS-NR          Active    -----
    1311   125-020-000  STC       EROUTE     IS-NR          Active    -----
    1313   125-020-000  DCM       STPLAN     IS-NR          Active    -----
    1401   104-002-000  LIMV35    CCS7ITU    IS-NR          Active    -----
    1403   128-018-000  DCM       IPLHC      IS-NR          Active     -----
    1407   104-001-000  LIMCH     CCS7ITU    IS-NR          Active    -----
    1408   128-018-000  DCM       SLANHC     IS-NR          Active     -----
    1409   128-016-000  HIPR      HIPR       IS-NR          Active     -----
    1410   128-016-000  HIPR      HIPR       IS-NR          Active     -----
    1411   128-018-000  STC       ERTHC      IS-NR          Active     -----
    1413   053-000-058  E5ENET    IPSG       IS-NR          Active     -----
    Command Completed.
;
```

8. Enter the following command to return the OAP terminals to the in-service state:

   `alw-trm:trm=x`

   where *x* is the terminal number of the inhibited OAP terminal.

Database Services Module (DSM)

Description

DSM (*Figure 47: DCM LEDs*) cards are related to the TSM/DCM family, but differ by having an AMD K-6 processor and from 1 to 4 GB of memory on an applique board. The DSM card also differs from

the TSM cards by having ethernet ports. The DSMs run a version of the SCCP application that has been ported to the VxWorks OS. To differentiate the DSM-VxWorks-SCCP from the SCCP that runs on the TSM cards, the DSM version has been named VSCCP. The extra memory is required to hold a copy of the RTDB. Ethernet ports are required to connect to the EPAP to download the RTDB. Multiple DSMs are used to provide a means of load balancing in high-traffic situations. Each DSM contains an identical database. Furthermore, the DSM RTDBs need to be identical to the one maintained by the EPAPs.

Note: If there are provisioning scripts, such as LARG data, the DSM replacement activity should be coordinated with the DB/Admin operations to avoid extended provision otherwise RADB resets may occur.

1. Enter the following command to determine which cards are in service.

   `rept-stat-card:loc=xxxx`

   Where *xxxx* is the DSM card location.

   This will indicate which link interface modules (LIMs) will be affected by removal of the DSM card.

2. Enter the following command to determine the number of DSM cards in service providing GTT.

   `rept-stat-sccp`

   The following is an example of the possible output.

```
RLGHNCXA03W  98-02-04 15:10:19 EST EAGLE 34.0.0
SCCP SUBSYSTEM REPORT IS-NR          Active      -----
GSM  SUBSYSTEM REPORT IS-NR          Active      -----
INP  SUBSYSTEM REPORT IS-ANR         Restricted  -----
     ASSUMING MATE'S LOAD
     INPQS: SSN STATUS = Allowed     MATE SSN STATUS  = Prohibited

SCCP Cards Configured= 4  Cards IS-NR= 2  Capacity Threshold = 100%
CARD   VERSION      PST          SST          AST       MSU USAGE  CPU USAGE
   ------------------------------------------------------------------------------
1212   103-001-000  IS-NR        Active       ALMINH       45%         30%
1301 P 103-001-000  IS-NR        Active       ------       35%         40%
1305   -----------  OOS-MT       Isolated     ------        0%          0%
2112   -----------  OOS-MT-DSBLD Manual       ------        0%          0%
   ------------------------------------------------------------------------------
SCCP Service Average MSU Capacity = 40%       Average CPU Capacity = 35%
AVERAGE CPU USAGE PER SERVICE:
  GTT   = 15%  GFLEX =  5%  GPORT = 10%
  INPMR =  2%  INPQS =  3%
TOTAL SERVICE STATISTICS:
  SERVICE    SUCCESS    ERRORS    WARNINGS    FORWARD TO GTT    TOTAL
  GTT:          1995         5           -                 -     2000
  GFLEX:         500         1           4                10      515
  GPORT:         800         0           2                 3      805
  INPMR:          50         5           0                15       70
  INPQS:         499         1           -                 -      500
Command Completed.
```

CAUTION: Inhibiting/removing all DSM cards at one time will cause an SCCP nodal outage.

3. Enter the following command to remove the DSM card from service.

WARNING **CAUTION:** Removing/inhibiting the last IS-NR DSM card will cause an SCCP outage on the affected node. Before removing the last IS-NR DSMP card from service, ensure the mated STP DSM cards are IS-NR and capable of supporting the rerouted SCCP traffic.

`rmv-card:loc=xxxx`

Where *xxxx* is the DSM card location.

If this is the last DSM card in service, the**:force=yes** parameter must be specified.

4. Enter the following command to retrieve the terminal types and port numbers:

   `rtrv-trm`

5. Enter the following command to inhibit each OAP terminal displayed in the output from the previous step:

   `inh-trm:trm=x:force=yes`

   where *x* is the terminal number assigned as type OAP.

   Note: Inhibiting the OAP terminal before removing a DSM card ensures the system will not accept any database updates from the SEAS System via the OAP which may cause database problems

6. Remove the DSM card, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

   Place the new DSM card into its place. Be sure the revision numbers are compatible (if in doubt, *Customer Care Center*).

7. Enter the following command to return the DSM card into service.

   `rst-card:loc=xxxx`

   Where *xxxx* is the DSM card location.

   This causes the MASP to begin downloading tables to the new DSM card. When the card has been successfully loaded (there will be a response on the terminal that downloading is complete). This can take up to 4 hours.

8. Enter the following command to verify the card is operational and providing SCCP services.

   `rept-stat-sccp`

   The following is an example of the possible output.

```
RLGHNCXA03W  98-02-04 15:10:19 EST EAGLE 34.0.0
SCCP SUBSYSTEM REPORT IS-NR          Active      -----
GSM  SUBSYSTEM REPORT IS-NR          Active      -----
INP  SUBSYSTEM REPORT IS-ANR         Restricted  -----
     ASSUMING MATE'S LOAD
     INPQS: SSN STATUS = Allowed     MATE SSN STATUS  = Prohibited

SCCP Cards Configured= 4  Cards IS-NR= 2  Capacity Threshold = 100%
CARD   VERSION      PST          SST          AST       MSU USAGE  CPU USAGE
   ------------------------------------------------------------------------
1212   103-001-000  IS-NR        Active       ALMINH       45%         30%
1301 P 103-001-000  IS-NR        Active       ------       35%         40%
1305   -----------  OOS-MT       Isolated     ------        0%          0%
2112   -----------  OOS-MT-DSBLD Manual       ------        0%          0%
   ------------------------------------------------------------------------
SCCP Service Average MSU Capacity = 40%       Average CPU Capacity = 35%
AVERAGE CPU USAGE PER SERVICE:
  GTT   = 15%  GFLEX =  5%  GPORT = 10%
  INPMR =  2%  INPQS =  3%
```

```
TOTAL SERVICE STATISTICS:
  SERVICE    SUCCESS    ERRORS    WARNINGS    FORWARD TO GTT    TOTAL
  GTT:          1995         5           -                 -     2000
  GFLEX:         500         1           4                10      515
  GPORT:         800         0           2                 3      805
  INPMR:          50         5           0                15       70
  INPQS:         499         1           -                 -      500
Command Completed.
```

9. Enter the following command to return the OAP terminals to the in-service state:

   `alw-trm:trm=x`

   where *x* is the terminal number of the inhibited OAP terminal.

E5-SM4G Card Replacement

The E5-SM4G card is a database service module (DSM) designed to operate in the EAGLE shelf. The E5-SM4G is a replacement for the DSM card (P/N 870-1984-xx). The E5-SM4G is a double-slot EAGLE card that provides 3.1 GB of application processor memory. Ethernet ports connect to the EPAP to download the RTDB. Multiple cards are used to provide a means of load balancing in high-traffic situations. Each card contains an identical database. Furthermore, the E5-SM4G RTDBs need to be identical to the one maintained by the EPAPs.

Note: If there are provisioning scripts, such as LARG data, the E5-SM4G replacement activity should be coordinated with the DB/Admin operations to avoid extended provision otherwise RADB resets may occur.

1. Enter the following command to determine which cards are in service. This will indicate which link interface modules (LIMs) will be affected by removal of the E5-SM4G card.

   `rept-stat-card:loc=xxxx`

   Where xxxx is the E5-SM4G card location.

2. Enter the following command to determine the number of E5-SM4G cards in service providing GTT.

   `rept-stat-sccp`

   The following is an example of the possible output.

```
RLGHNCXA03W  98-02-04 15:10:19 EST EAGLE 34.0.0
SCCP SUBSYSTEM REPORT IS-NR          Active      -----
GSM  SUBSYSTEM REPORT IS-NR          Active      -----
INP  SUBSYSTEM REPORT IS-ANR         Restricted  -----
     ASSUMING MATE'S LOAD
     INPQS: SSN STATUS = Allowed     MATE SSN STATUS  = Prohibited

SCCP Cards Configured= 4  Cards IS-NR= 2  Capacity Threshold = 100%
CARD   VERSION      PST          SST          AST       MSU USAGE  CPU USAGE
   ------------------------------------------------------------------------------
1212   103-001-000  IS-NR        Active       ALMINH       45%         30%
1301 P 103-001-000  IS-NR        Active       ------       35%         40%
1305   -----------  OOS-MT       Isolated     ------        0%          0%
2112   -----------  OOS-MT-DSBLD Manual       ------        0%          0%
   ------------------------------------------------------------------------------
SCCP Service Average MSU Capacity = 40%       Average CPU Capacity = 35%

AVERAGE CPU USAGE PER SERVICE:
```

```
  GTT    = 15%  GFLEX =  5%  GPORT = 10%
  INPMR =  2%  INPQS =  3%

TOTAL SERVICE STATISTICS:
  SERVICE    SUCCESS    ERRORS    WARNINGS    FORWARD TO GTT    TOTAL
  GTT:          1995         5           -                 -     2000
  GFLEX:         500         1           4                10      515
  GPORT:         800         0           2                 3      805
  INPMR:          50         5           0                15       70
  INPQS:         499         1           -                 -      500

Command Completed.
```

CAUTION: Inhibiting/removing all E5-SM4G cards at one time will cause an SCCP nodal outage.

3. Enter the following command to remove the E5-SM4G card from service. If this is the last E5-SM4G card in service, the :force=yes parameter must be specified.

   CAUTION: Removing/inhibiting the last IS-NR E5-SM4G card will cause an SCCP outage on the affected node. Before removing the last IS-NR E5-SM4G card from service, ensure the mated STP E5-SM4G cards are IS-NR and capable of supporting the rerouted SCCP traffic.

   ```
   rmv-card:loc=xxxx
   ```

   Where xxxx is the E5-SM4G card location.

4. Enter the following command to retrieve the terminal types and port numbers:

   ```
   rtrv-trm
   ```

5. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 4*:

   ```
   inh-trm:trm=x:force=yes
   ```

   where x is the terminal number assigned as type OAP.

   Note: Inhibiting the OAP terminal before removing a E5-SM4G card ensures the system will not accept any database updates from the SEAS System via the OAP which may cause database problems.

6. Remove the E5-SM4G card, per the card replacement procedure described in *Replacing a Card in the EAGLE 5 ISS*. Place the new E5-SM4G card into its place. Be sure the revision numbers are compatible (if in doubt, contact the *Customer Care Center*).

7. Enter the following command Use the rst-card command to return the E5-SM4G card into service. This causes the MASP to begin downloading tables to the new E5-SM4G card.

   ```
   rst-card:loc=xxxx
   ```

   Where xxxx is the E5-SM4G card location.

   This causes the MASP to begin downloading tables to the new E5-SM4G card. When the card has been successfully loaded (there will be a response on the terminal that downloading is complete). This can take up to 4 hours.

8. Enter the following command to verify the card is operational and providing SCCP services.

   ```
   rept-stat-sccp
   ```

The following is an example of the possible output.

```
RLGHNCXA03W  98-02-04 15:10:19 EST EAGLE 34.0.0
SCCP SUBSYSTEM REPORT IS-NR          Active      -----
GSM  SUBSYSTEM REPORT IS-NR          Active      -----
INP  SUBSYSTEM REPORT IS-ANR         Restricted  -----
     ASSUMING MATE'S LOAD
     INPQS: SSN STATUS = Allowed     MATE SSN STATUS  = Prohibited

SCCP Cards Configured= 4  Cards IS-NR= 2  Capacity Threshold = 100%
CARD   VERSION      PST          SST          AST       MSU USAGE  CPU USAGE
   ------------------------------------------------------------------------------
1212   103-001-000  IS-NR        Active       ALMINH       45%         30%
1301 P 103-001-000  IS-NR        Active       ------       35%         40%
1305   -----------  OOS-MT       Isolated     ------        0%          0%
2112   -----------  OOS-MT-DSBLD Manual       ------        0%          0%
   ------------------------------------------------------------------------------
SCCP Service Average MSU Capacity = 40%       Average CPU Capacity = 35%

AVERAGE CPU USAGE PER SERVICE:
  GTT   = 15%  GFLEX =  5%  GPORT = 10%
  INPMR =  2%  INPQS =  3%

TOTAL SERVICE STATISTICS:
  SERVICE    SUCCESS    ERRORS    WARNINGS    FORWARD TO GTT    TOTAL
  GTT:          1995         5           -                 -     2000
  GFLEX:         500         1           4                10      515
  GPORT:         800         0           2                 3      805
  INPMR:          50         5           0                15       70
  INPQS:         499         1           -                 -      500

Command Completed.
```

9. Enter the following command to return the OAP terminals to the in-service state:

   `alw-trm:trm=x`

   where x is the terminal number of the inhibited OAP terminal.

E5-IPSM Card Replacement

Description

The E5-IPSM card (P/N 870-2877-01) is a single slot card having two Ethernet interfaces. E5-IPSM can be exchanged with IPSM cards running IPS, without any changes in provisioning information.

When command ENT-CARD is issued for IPSHC, the APPL parameter would be specified as IPS and TYPE would be specified as IPSM. The determination of actual GPL that needs to be loaded on the card is made by OAM based on the hardware board identification provided by the card itself .

1. Enter the following command to retrieve the terminal types and port numbers:

   `rtrv-trm`

   The following is an example of the possible display of the terminal settings with the IP User Interface feature enabled and three IPSM cards equipped.

```
   rlghncxa03w  03-11-01 16:02:08 EST  EAGLE 31.3.0
   TRM   TYPE    COMM        FC    TMOUT MXINV DURAL
   1     VT320   9600 -7-E-1 SW    0     5     00:01:00
   2     VT320   9600 -7-E-1 SW    0     5     00:01:00
   3     VT320   9600 -7-E-1 SW    0     5     00:01:00
```

```
    4     KSR     9600 -7-E-1 SW    0     5     00:01:00
    5     NONE    9600 -7-E-1 SW    30    5     00:01:00
    6     NONE    9600 -7-E-1 SW    30    5     00:01:00
    7     NONE    9600 -7-E-1 SW    30    5     00:01:00
    8     NONE    9600 -7-E-1 SW    30    5     00:01:00
    9     VT320   9600 -7-E-1 SW    0     5     00:01:00
    10    VT320   9600 -7-E-1 SW    0     5     00:01:00
    11    VT320   9600 -7-E-1 SW    0     5     00:01:00
    12    KSR     9600 -7-E-1 SW    0     5     00:01:00
    13    NONE    9600 -7-E-1 SW    30    5     00:01:00
    14    NONE    9600 -7-E-1 SW    30    5     00:01:00
    15    NONE    9600 -7-E-1 SW    30    5     00:01:00
    16    NONE    9600 -7-E-1 SW    30    5     00:01:00

    TRM  TYPE      LOC               TMOUT MXINV DURAL
    17   TELNET    1201              60    5     00:30:00
    18   TELNET    1201              60    5     00:30:00
    19   TELNET    1201              60    5     00:30:00
    20   TELNET    1201              60    5     00:30:00
    21   TELNET    1201              60    5     00:30:00
    22   TELNET    1201              60    5     00:30:00
    23   TELNET    1201              60    5     00:30:00
    24   TELNET    1201              60    5     00:30:00
    25   TELNET    1203              60    5     00:30:00
    26   TELNET    1203              60    5     00:30:00
    27   TELNET    1203              60    5     00:30:00
    28   TELNET    1203              60    5     00:30:00
    29   TELNET    1203              60    5     00:30:00
    30   TELNET    1203              60    5     00:30:00
    31   TELNET    1203              60    5     00:30:00
    32   TELNET    1203              60    5     00:30:00
    33   TELNET    1208              60    5     00:30:00
    34   TELNET    1208              60    5     00:30:00
    35   TELNET    1208              60    5     00:30:00
    36   TELNET    1208              60    5     00:30:00
    37   TELNET    1208              60    5     00:30:00
    38   TELNET    1208              60    5     00:30:00
    39   TELNET    1208              60    5     00:30:00
    40   TELNET    1208              60    5     00:30:00
;
                                     LNP LNP
    TRM  TRAF LINK SA  SYS PU  DB  DB  SUB  UIMRD
    1    YES  YES  YES YES YES YES YES YES  YES
    2    YES  YES  YES YES YES YES YES YES  YES
    3    YES  YES  YES YES YES YES YES YES  YES
    4    YES  YES  YES YES NO  YES YES YES  YES
    5    YES  YES  YES YES YES YES YES YES  YES
    6    NO   YES  YES YES YES YES YES YES  YES
    7    NO   YES  YES YES YES YES YES YES  YES
    8    YES  YES  YES YES YES YES YES YES  YES
    9    YES  YES  YES YES YES YES YES YES  YES
    10   NO   NO   NO  NO  NO  NO  NO  NO   NO
    11   NO   NO   NO  NO  NO  NO  NO  NO   NO
    12   NO   NO   NO  NO  NO  NO  NO  NO   NO
    13   NO   NO   NO  NO  NO  NO  NO  NO   NO
    14   NO   NO   NO  NO  NO  NO  NO  NO   NO
    15   NO   NO   NO  NO  NO  NO  NO  NO   NO
    16   NO   NO   NO  NO  NO  NO  NO  NO   NO
    17   NO   NO   NO  NO  NO  NO  NO  NO   NO
    18   NO   NO   NO  NO  NO  NO  NO  NO   NO
    19   NO   NO   NO  NO  NO  NO  NO  NO   NO
    20   NO   NO   NO  NO  NO  NO  NO  NO   NO
    21   NO   NO   NO  NO  NO  NO  NO  NO   NO
    22   NO   NO   NO  NO  NO  NO  NO  NO   NO
    23   NO   NO   NO  NO  NO  NO  NO  NO   NO
```

```
    24   NO   NO   NO   NO   NO   NO   NO   NO   NO
    25   NO   NO   NO   NO   NO   NO   NO   NO   NO
    26   NO   NO   NO   NO   NO   NO   NO   NO   NO
    27   NO   NO   NO   NO   NO   NO   NO   NO   NO
    28   NO   NO   NO   NO   NO   NO   NO   NO   NO
    29   NO   NO   NO   NO   NO   NO   NO   NO   NO
    30   NO   NO   NO   NO   NO   NO   NO   NO   NO
    31   NO   NO   NO   NO   NO   NO   NO   NO   NO
    32   NO   NO   NO   NO   NO   NO   NO   NO   NO
    33   NO   NO   NO   NO   NO   NO   NO   NO   NO
    34   NO   NO   NO   NO   NO   NO   NO   NO   NO
    35   NO   NO   NO   NO   NO   NO   NO   NO   NO
    36   NO   NO   NO   NO   NO   NO   NO   NO   NO
    37   NO   NO   NO   NO   NO   NO   NO   NO   NO
    38   NO   NO   NO   NO   NO   NO   NO   NO   NO
    39   NO   NO   NO   NO   NO   NO   NO   NO   NO
    40   NO   NO   NO   NO   NO   NO   NO   NO   NO

         APP  APP
    TRM  SERV SS   CARD CLK DBG GTT GWS MEAS MON MPS SEAS SLAN
    1    YES  YES YES  YES YES YES YES YES  YES YES NO   NO
    2    YES  YES YES  YES YES YES YES YES  YES YES NO   NO
    3    YES  YES YES  YES YES YES YES YES  YES YES NO   NO
    4    YES  YES YES  YES YES NO  YES YES  YES YES NO   NO
    5    YES  YES YES  YES YES YES YES YES  YES YES NO   NO
    6    YES  YES YES  YES YES YES YES YES  YES YES NO   NO
    7    NO   YES YES  YES YES YES YES YES  YES YES NO   NO
    8    YES  YES YES  YES YES YES YES YES  YES YES YES  YES
    9    YES  YES YES  YES YES YES YES YES  YES YES YES  YES
    10   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    11   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    12   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    13   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    14   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    15   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    16   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    17   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    18   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    19   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    20   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    21   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    22   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    23   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    24   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    25   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    26   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    27   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    28   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    29   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    30   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    31   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    32   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    33   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    34   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    35   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    36   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    37   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    38   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    39   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
    40   NO   NO  NO   NO  NO  NO  NO  NO   NO  NO  NO   NO
;
```

2. Enter the following command to change the state of the appropriate card to the out of service - maintenance disabled state:

`inh-card:loc=xxxx:force=yes`

where *xxxx* is the card location stenciled on the shelf of the EAGLE 5 ISS. Following is an example of the output:

```
RLGHNCXA03W  00-06-05  11:11:28 EDT  EAGLE 34.0.0
Card has been inhibited.
```

3. Remove and replace the card as described in the section titled, *Replacing a Card in the EAGLE 5 ISS*.
4. Enter the following command to load and activate the approved GPL onto the inhibited card:

   `flash-card:code=appr:loc=xxxx:force=yes`

   where *xxxx* is the card location used in the previous step. The optional `force=yes` is used to force the command to work on an IS-NR card. Links provisioned on the card are inhibited during command execution. The card and inhibited links are restored to their previous state when the command is completed

   Following is an example of the possible output using card location 1201:

```
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Downloading BLDIAG on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 download BLDIAG complete.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Downloading IMTPCI on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 download IMTPCI complete.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Downloading BLVXW on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 download BLVXW complete.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Activating BLDIAG on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 activation BLDIAG complete.

    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Activating IMTPCI on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 activation IMTPCI complete.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Activating BLVXW on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 activation BLVXW complete.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Downloading BLCPLD on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 download BLCPLD complete.
;
```

```
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Activating BLCPLD on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 12015 activation BLCPLD complete.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Command Completed.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Canceling links on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Inhibiting card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 Rel 34.0.0
    Flash Card: Downloading BLBEPM on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 download BLBEPM complete.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Allowing card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Activating BLBEPM on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Card 1201 activation BLBEPM complete.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Flash Card: Activating links on card 1201.
;
    tekelecstp 05-04-11 01:52:11 EST  EAGLE5 34.0.0
    Command Completed.
;
```

5. After the card has been reloaded (a message appears to confirm completion of the load), enter the following command to verify the database is consistent (same level as the other cards in the system).

   `rept-stat-card`

   The following is an example of the possible output.

```
    tekelecstp 07-02-25 10:02:42 EST  EAGLE 37.0.0
    CARD   VERSION      TYPE      GPL        PST           SST        AST
    1201   128-013-026  IPSM      IPS        IS-NR         Active     -----
      ALARM STATUS       = No Alarms.
      BPDCM  GPL version = 128-013-012
      IMT BUS A          = Conn
      IMT BUS B          = Conn

    Command Completed.
```

Database Communications Module (DCM) and EDCM/EDCM-A

The database communication module (DCM) (*Figure 47: DCM LEDs*) provides access to a remote host for use by the STP LAN feature. The DCM consists of a 80486-based main assembly and an ethernet applique. Connection to a host is achieved through an ethernet LAN using the TCP/IP protocol.

If this card is removed, the TCP/IP data link supported by this card becomes out of service. Any data to be transmitted to the remote TCP/IP host connected by this TCP/IP data link is lost.

The DCM can only be inserted in the odd numbered card slots of the shelf. Slot 09 of each shelf contains the IPMX card; thus the DCM cannot be inserted in slot 09. The DCM can be inserted in the control shelf, but only in slots 01, 03, 05, 07, and 11. Slots 13, 15, and 17 refer to the extension shelf only. The DCM occupies two card slots, so the even numbered card slot adjacent to the odd numbered slot where the DCM has been inserted must be empty as shown in *Table 29: DCM Card Locations*. The DCM is connected to the network through the odd numbered card slot connector.

Table 29: DCM Card Locations

Location of the DCM	Empty Card Location	Location of the DCM	Empty Card Location
Slot 01	Slot 02	Slot 11	Slot 12
Slot 03	Slot 04	Slot 13	Slot 14
Slot 05	Slot 06	Slot 15	Slot 16
Slot 07	Slot 08	Slot 17	Slot 18

The Double-Slot Enhanced Database Communications Module is a version of the DCM that includes more main memory and better processing performance. The double-slot EDCM/EDCM-A can be placed in any slot odd or even that is provisioned. Physically the next higher slot can not be provisioned for a card because of the double-slot EDCM/EDCM-A card width.

The Single-Slot EDCM/EDCM-A (*Figure 48: EDCM and EDCM-A Single-Slot LEDs*) is a version of the EDCM which requires only a single frame slot. It can be placed in any slot, odd or even, which has been provisioned for DCM. Otherwise it duplicates the performance of the Double-Slot EDCM/EDCM-A.

1. Enter the following command to determine what TCP/IP data links are configured:`rept-stat-card`
2. Enter the following command to determine the status of the TCP/IP data link assigned to the card to be replaced:`rept-stat-dlk`

   The following is an example of the possible output.

```
RLGHNCXA03W 97-09-27 17:00:36 EST EAGLE 34.0.0
DLK     PST      SST      AST
1104    IS-NR    Avail    ----
1206    IS-NR    Avail    ALMINH
Command Completed.
```

3. If the status of the TCP/IP data link is not out of service - maintenance disabled (OOS-MT-DSBLD), use the `canc-dlk` command to change the status of the TCP/IP data link to OOS-MT-DSBLD.`canc-dlk:loc=xxxx`

   Where *xxxx* is the card location.
4. Enter the following command to inhibit the card and disconnect it from the IMT bus.

If this is the last DCM in the system, the `:force=yes` parameter must be used with this command.`rmv-card:loc=xxxx`Where *xxxx* is the card location.

5. Enter the following command to retrieve the terminal types and port numbers:`rtrv-trm`
6. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 5*:`inh-trm:trm=x:force=yes`

   where *x* is the terminal number assigned as type OAP.
7. Remove the DCM, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

   Place the new DCM into its place. Be sure the revision numbers are compatible (if in doubt, contact the *Customer Care Center*).
8. Enter the following command to put the new DCM card back into service and connect it to the IMT bus:`rst-card:loc=xxxx`

   where *xxxx* = card location.
9. Enter the following command to return the TCP/IP data link to service:`act-dlk:loc=xxxx`

   where *xxxx* = card location.
10. Enter the following command to verify the status of the card and its associated TCP/IP data link:`rept-stat-card`
11. Enter the following command to verify that the TCP/IP data link has returned to full service:`rept-stat-dlk`

    The following is an example of the possible output.

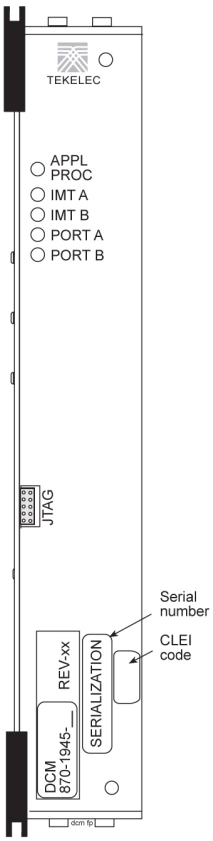
```
RLGHNCXA03W 97-09-27 17:00:36 EST EAGLE 34.0.0
DLK     PST      SST      AST
1104    IS-NR    Avail    ----
1206    IS-NR    Avail    ALMINH
Command Completed.
```

12. Enter the following command to return the OAP terminals to the in-service state:`alw-trm:trm=x`

    where *x* is the terminal number of the inhibited OAP terminal.

DCM, Database Communications Module; DSM, Database Service Module

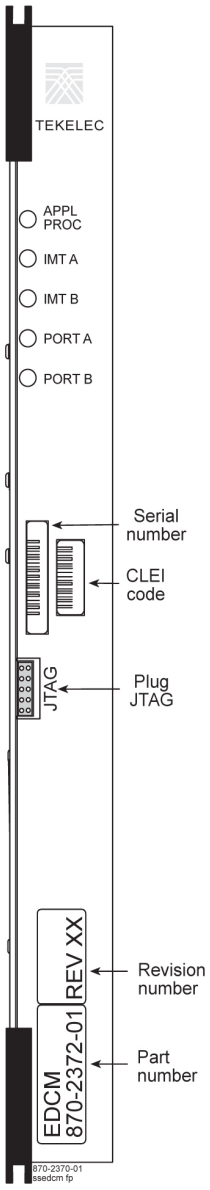
Figure 47: DCM LEDs



LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected. GREEN – No alarm
IMT A	RED – Major alarm condition detected. GREEN – No alarm
IMT B	AMBER – Minor alarm condition detected. GREEN – No alarm
PORT A	GREEN – PORT A is the active PORT. RED – PORT A is inactive
PORT B	GREEN – PORT B is the active PORT. RED – PORT B is inactive.

EDCM and EDCM-A (Single-Slot), Enhanced Database Communications Module (Single-Slot)

Figure 48: EDCM and EDCM-A Single-Slot LEDs



LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected. GREEN – No alarm
IMT A	RED – Major alarm condition detected. GREEN – No alarm
IMT B	AMBER – Minor alarm condition detected. GREEN – No alarm
PORT A	GREEN – PORT A is the active PORT. RED – PORT A is inactive
PORT B	GREEN – PORT B is the active PORT. RED – PORT B is inactive.

Terminal Disk Module (TDM)/TDM-GTI

This procedure is to replace a TDM which is part of a MASP, comprised of a GPSM II and a TDM. Before the TDM is replaced, it must be verified that the TDM belongs to the standby MASP (verify the TDM to be replaced is the STDBY TDM and MASP).

The TDM (*Figure 49: TDM LED*) contains the fixed disk drive, the terminal processor for the 16 serial I/O ports, and an interface to the maintenance disk and alarm (MDAL) card. This procedure will replace the standby TDM.

1. Before beginning this procedure, make sure there is a copy of the current release GPLs on a removable cartridge on-hand.
2. Enter the following command to display the card status:

   `rept-stat-card`

   The following is an example of the possible output.

```
RLGHNCXA03W 03-08-18 12:57:21 EST EAGLE 34.0.0
    CARD   VERSION      TYPE      APPL       PST            SST        AST
    1109   125-016-000  HMUX      BPHMUX     IS-NR          Active     -----
    1110   125-016-000  HMUX      BPHMUX     IS-NR          Active     -----
     1113 125-020-000 GPSM EOAM IS-NR Standby -----
    1114   -----------  TDM                 IS-NR          Active     -----
    1115   125-020-000  GPSM      EOAM       IS-NR          Active     -----
    1116   -----------  TDM                 IS-NR          Active     -----
    1117   -----------  MDAL                IS-NR          Active     -----
    1209   125-016-000  HMUX      BPHMUX     IS-NR          Active     -----
    1210   125-016-000  HMUX      BPHMUX     IS-NR          Active     -----
    1301   125-020-000  LIME1     SS7ANSI    IS-NR          Active     -----
    1303   125-020-000  LIME1     CCS7ITU    IS-NR          Active     -----
    1305   125-020-000  LIME1     SS7ANSI    IS-NR          Active     -----
    1307   125-020-000  LIME1     CCS7ITU    IS-NR          Active     -----
    1309   125-016-000  HIPR      HIPR       IS-NR          Active     -----
    1310   023-018-006  HIPR      HIPR       IS-NR          Active     -----
;
```

   In this sample output, 1113/1114 are standby and 1115/1116 are active. Perform *Step 4* only if the card to be replaced is not `Standby`.

3. From the output of the rept-stat-card command, executed in *Step 2*, determine the MASP activity.

   Record which GPSM is `Active` and `Standby`. Record the card locations of both sets of GPSMs and TDMs.

   Table 30: Card Locations

Card	Location
Active GPSM	
Active TDM	
Standby GPSM	
Standby TDM	

4. Verify card to be replaced (failing or non-failing) is `Standby` before continuing.

   If the card is failing it should already be `Standby`. Enter the following commands to verify the database and force the active GPSM-II card to become Standby:

   `rept-stat-db:display=all`

   Verify all the cards in the system have the same database count. If the counts do not match, contact the *Customer Care Center*.

   `init-card:loc=x`

where *x* is the card location (1113 or 1115) from *Step 2*.

5. If *Step 4* was performed, execute the `rept-stat-card` command and verify if the card to be replaced is part of the `Standby` MASP.
6. If a failing TDM card is to be replaced, perform a database backup before replacing the failed card.

   Insert the removable cartridge with the current release GPLs into the MDAL. Using *Daily Procedures*, create a backup of the database on the removable cartridge. Then go to *Step 8*.

   WARNING: Do not proceed to *Step 8* if the backup fails. Contact the *Customer Care Center*.
7. If a non-failing TDM card is to be replaced, insert the removable cartridge containing the copy of the current release GPLs into the MDAL.
8. Enter the following command to retrieve the terminal types and terminal numbers:

   `rtrv-trm`

   Note: *Step 9* through *Step 11* are only necessary for OAP based EAGLE 5 ISSs.
9. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 8* :

   `inh-trm:trm=x`

   where *x* is the terminal number.
10. Enter the following command for each terminal inhibited in *Step 9* to temporarily change the terminal type from OAP to *none*:

    `chg-trm:trm=x:type=none`

    where *x* is the terminal number.
11. Enter the following command to verify that the databases in the current (FD CRNT) and the backup (FD BKUP) partitions of the active MASP match:

    `rept-stat-db:display=version`

    The following is an example of the possible output.

```
RLGHNCXA03W 03-08-27 03:46:39 EST  EAGLE 34.0.0
DATABASE STATUS: >> OK <<
        TDM 1114 ( ACTV )                 TDM 1116 ( STDBY)
        C   LEVEL    TIME LAST BACKUP     C   LEVEL    TIME LAST BACKUP
        - -------- ---------------------- - --------   -------------------
FD BKUP Y       43 03-08-14 03:02:18 EST  Y       43   03-08-14 03:02:18 EST
FD CRNT Y       79                        Y       79
       MDAL 1117
       - --------
RD BKUP Y        1     -        -
CARD/APPL  LOC   C  T  LEVEL       TIME LAST UPDATE   VERSION STATUS
---------  ----  -  -  ----------  -----------------  ------------------
TDM-CRNT   1114  Y  N  79          03-08-27 00:56:30  121-000-000  NORMAL
TDM-BKUP   1114  Y  -  43          03-08-14 01:10:46  121-000-000  NORMAL
TDM-CRNT   1116  Y  N  79          03-08-27 00:56:30  121-000-000  NORMAL
TDM-BKUP   1116  Y  -  43          03-08-14 01:10:46  121-000-000  NORMAL
MDAL       1117  Y  -  79          03-08-27 00:56:30  121-000-000  NORMAL
```

12. Compare the `VERSION STATUS` of the TDM cards in the output of the previous step.
    - If they are identical, continue to the next step.

- If they are not the same, go to *Step 21*

13. Enter the following command to show the version numbers of the GPLs stored on each fixed disk (TDM).

    `rtrv-gpl`

    The following is an example of the possible output.

```
RLGHNCXA03W 03-08-27 03:46:48 EST  EAGLE 34.0.0
GPL Auditing  ON
APPL      CARD  RELEASE      APPROVED          TRIAL        REMOVE TRIAL
EOAM      1114  121-002-000  121-002-000       121-002-000  121-002-000
EOAM      1116  121-002-000  121-002-000       121-002-000  -----------
SS7ANSI   1114  121-002-000  121-002-000       121-002-000  121-002-000
SS7ANSI   1116  121-002-000  121-002-000       121-002-000  -----------
SCCP      1114  121-002-000  074-002-005 ALM   121-002-000  121-002-000
SCCP      1116  121-002-000  121-002-000       121-002-000  -----------
GLS       1114  121-002-000  121-002-000       121-002-000  121-002-000
GLS       1116  121-002-000  121-002-000       121-002-000  -----------
MPLG      1114  121-002-000  121-002-000       121-002-000  151-002-000
MPLG      1116  121-002-000  121-002-000       121-002-000  -----------
```

14. Examine the output of the previous step.
    a) If any card shows an alarm (ALM), go to *Step 21*.
    b) If no alarms are displayed, continue with *Step 15*.

15. Enter the following command to verify that the security log on the standby MASP contains no entries that must be copied to the FTA area of the fixed disk:

    `rept-stat-seculog`

    The following is an example of the possible output.

```
RLGHNCXA03W 96-10-04 15:59:06 EDT EAGLE 34.0.0
            -- SINCE LAST UPLOAD --  OLDEST   NEWEST   LAST
LOC  ROLE    ENTRIES %FULL OFLO FAIL  RECORD   RECORD   UPLOAD
1114 Active  8312    84    No   No    95-08-12 96-01-04 96-12-16
                                      11:23:56 15:59:06 14:02:22
1116 Standby 693     7     No   No    95-09-12 95-09-30 95-09-30
                                      11:24:12 14:00:06 14:02:13
```

- If the number shown in the ENTRIES field for the standby MASP (shown with the entry *Standby* in the ROLE field) is 0, go to *Step 17*.
- If the number shown in the ENTRIES field for the standby MASP is greater than 0, these entries must be copied to the FTA area of the fixed disk.

To copy these entries, go to the next step.

16. Copy the security log entries on the standby MASP to the FTA area on the fixed disk using the following command:

    `copy-seculog`

    The following is an example of the message that should appear (the `copy-seculog:slog=stb` command was used).

```
RLGHNCXA03W 96-10-04 15:59:06 EDT EAGLE 34.0.0
Security log on TDM 1116 copied to file 961004s.log on TDM 1114
```

17. Replace the Standby TDM, according to the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

    - Unseat the standby GPSM card determined in *Step 8*.
    - Remove the standby TDM card determined in *Step 8*.
    - Insert the spare TDM card.
    - Re-seat the standby GPSM card.

      Note: UAMs are generated during this step. An audible alarm is generated. Wait for the E5-MASP to come up to standby mode.

18. Enter the following command to display the status of the standby GPSM:

    `rept-stat-card:loc=xxxx`

    where *xxxx* is the standby GPSM from the output recorded in *Step 8*.

    The following is an example of the possible output.

```
RLGHNCXA03W 03-08-18 13:10:21 EST EAGLE 34.0.0
CARD  VERSION       TYPE    APPL      PST       SST       AST
xxxx  xxx-xxx-xxx   GPSM    EAOM      IS-NR     Standby   DB-DIFF
  ALARM STATUS       = No Alarms.
  IMT    VERSION     = 025-015-000
  PROM   VERSION     = 023-002-000
  IMT BUS A          = Conn
  IMT BUS B          = Conn
Command Completed.
```

    Note: Verify that backup goes to IS-NR status.

19. Enter the following command to retrieve GPL versions:

    `rtrv-gpl`

    The following is an example of the possible output.

```
   RLGHNCXA03W 03-08-27 03:46:48 EST  EAGLE 34.0.0
   GPL Auditing  ON
   APPL      CARD  RELEASE      APPROVED         TRIAL        REMOVE TRIAL
   EOAM      1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
   EOAM      1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
   SS7ANSI   1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
   SS7ANSI   1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
   SCCP      1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
   SCCP      1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
   GLS       1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
   GLS       1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
   MPLG      1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
   MPLG      1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
```

20. Enter the following command to repair the standby's TDM database:

    `chg-db:action=repair`

    Note: The system requires approximately two minutes after 23 to acquire duplex mode. As a result the system will reject the `chg-db:action= repair` until duplex operation fully returns.

    The following is an example of the possible output.

```
RLGHNCXA03W 03-08-27 03:46:49 EST  EAGLE 34.0.0
chg-db:action=repair
```

```
Command entered at terminal #10.
;
RLGHNCXA03W 03-08-27 03:46:50 EST  EAGLE 34.0.0
REPAIR: MASP A - Repair starts on standby MASP.
;
```

Note: Observe that the command execution time may require approximately 20 to 45 minutes.

```
RLGHNCXA03W 03-08-27 04:15:22 EST  EAGLE 34.0.0
REPAIR: MASP A - Repair from fixed disk complete.
;
```

Wait for the 'repair complete' message to display and for the to MASP return to in-service status. When the 'repair complete' message has displayed, proceed to *Step 26*

Note: Perform this step only if you are coming from *Step 12*or *Step 14*.

21. Enter the following command to verify whether measurement collection is on or off:

`rtrv-meas-sched`

The following is an example of the possible output. The COLLECT field shows whether measurement collection is on or off. In this example, measurement collection is on.

```
RLGHNCXA03W 95-04-03 12:22:55 EST EAGLE 34.0.0
COLLECT        =  on
--------------------
SYSTOT-STP     =  off
SYSTOT-TT      =  off
SYSTOT-STPLAN  =  on
COMP-LNKSET    =  off
COMP-LINK      =  on
MTCD-STP       =  on
MTCD-LINK      =  on
MTCD-STPLAN    =  on
```

- If measurement collection is on, continue with *Step 22*.
- If measurement collection is off, proceed to *Step 23*.

22. Enter the following command to inhibit all measurements:

`chg-meas:collect=off`

CAUTION: Measurements must be inhibited or the `copy-disk` command cannot be executed. The `chg-meas:collect=on` command should not be executed while the `copy-disk` command is in progress. When measurements are inhibited, measurement collection is stopped. For the entire period of time when measurements are inhibited, those measurements will be lost. If possible do not inhibit measurements at midnight since doing so can result in the loss of measurements for an entire day.

The following message should appear.

```
RLGHNCXA03W 94-02-07 16:12:50 EST  EAGLE 34.0.0
CHG-MEAS: MASP A - COMPLTD
```

23. Replace the Standby TDM, according to the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.

- Unseat the standby GPSM card determined in *Step 8*.
- Remove the standby TDM card determined in *Step 8*.

- Insert the spare TDM card.
- Re-seat the standby GPSM card.

  Note: UAMs are generated during this step. An audible alarm is generated. Wait for the standby E5-MASP to come up to standby mode.

24. Enter the following `copy-disk` command along with the card location of the standby TDM (shown by the indicator STDBY in the command output in *Step 11*) that the data is being copied to.

    ```
    rept-stat-db
    ```

    This command can take from 33 minutes to 1 hour 46 minutes to execute. It can take even longer depending on other system activity in progress when this command is entered.

    ```
    copy-disk:dloc=xxxx:format=no
    ```

    Where *xxxx* is the card location of the standby TDM.

    The following is an example of the message that should appear when the command has executed and completed. For this example, the `copy-disk:dloc=1116` command was entered.

    ```
    Copy-disk (fixed): from active (1114) to standby (1116) started.
    Extended processing required, please wait.
    Copy-disk (fixed): from active (1114) to standby (1116) completed.
    Measurements collection may be turned on now if desired.
    ```

    The standby MASP

    Note: While this command is executing, commands that affect the database configuration cannot be executed. Any attempt to execute such a command will be rejected.

    is rebooted to load the data when the command completes successfully.

25. If measurement collection was turned off in *Step 22*, enter the following command to turn on the measurements:

    ```
    chg-meas:collect=on
    ```

    The following message should appear.

    ```
    RLGHNCXA03W 94-02-07 16:12:50 EST  EAGLE 34.0.0
    CHG-MEAS: MASP A - COMPLTD
    ```

26. Enter the following command to verify that the database counts of both MASPs.

    ```
    rept-stat-db:display=all
    ```

27. After the card has been reloaded (a message appears to confirm completion of the load), enter the following command to verify the database is consistent (same level as the other cards in the system).

    ```
    rept-stat-card
    ```

28. Enter the following command to restore the OAP terminals changed in *Step 10*:

    ```
    chg-trm:trm=x:type=oap
    ```

    where *x* is the terminal number.

29. Enter the following command to return the OAP terminals inhibited in *Step 9* to the in-service state:

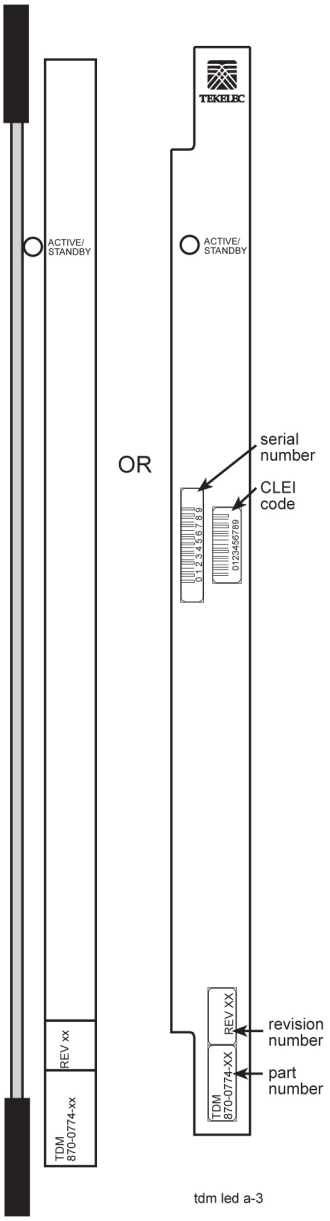
    ```
    alw-trm:trm=x
    ```

    where x is the terminal number.

TDM-GTI, Terminal Disk Module-Global Timing Interface

The Terminal Disk Module supports Global Timing Interface (TDM-GTI).

Figure 49: TDM LED



LED	Descriptions
STATUS	RED - Card is resetting, hardware and software are not currently configured. GREEN - OAM application is running and this MASP is primary. GREEN/AMBER - OAM application is running and this MASP is in standby mode.

Note: LED state is not defined if the associated GPSM-II is resetting, is not installed, or has failed.

Measurement Collection and Polling Module (MCPM)

The primary MCPM card performs all measurements collection and reporting functions and provides on-card RAM storage for collected data and scheduled reports. The Secondary MCPM provides a redundant backup for the Primary card, and assumes collection and reporting responsibilities on the loss of the Primary. TCP/IP connections are used to deliver measurement reports from the Primary MCPM card to the customer via an FTP client. The FTP configuration can be customized to support automatic transfer of scheduled reports from the client to the server.

1. Enter the following command to determine the status of the MCPM cards.
   `rept-stat-meas`
2. Enter the following command to remove the faulty MCPM card from service.
   If this is the last MCPM card in service, the `:force=yes` parameter must be specified:
   `rmv-card:loc=xxxx`
   where *xxxx* is the MCPM card location.
3. Remove the MCPM card, per the card replacement procedure described in the section titled *Replacing a Card in the EAGLE 5 ISS*.
   Place the new MCPM card into its place. Be sure the revision numbers are compatible (if in doubt, *Customer Care Center*).
4. Enter the following command to return the MCPM card into service.
   `rst-card:loc=xxxx`
   Where *xxxx* is the MCPM card location.
   This causes the MASP to begin downloading tables to the new MCPM card. When the card has been successfully loaded (there will be a response on the terminal that downloading is complete). This can take up to 10 minutes.
   Note: If the card has not loaded in 30 minutes, enter the `init-card` command to re-boot the MCPM card.
5. Enter the following command to verify the card is operational: .
   `rept-stat-meas`

Replacing a Card in the EAGLE 5 ISS

This procedure describes the physical removal and replacement of a card in the EAGLE 5 ISS system.

Note: Before removing or reseating a card, the card must be taken out of service.

Card replacement procedures in this section refer to this procedure. Locate and perform the appropriate replacement procedure for the card in order to properly take the card out of service.

WARNING: Failure to follow appropriate removal procedures may result in equipment damage.

WARNING

WARNING: Before performing any maintenance procedures on the EAGLE 5 ISS, make sure you wear a wrist strap connected to the wrist strap grounding point of the EAGLE 5 ISS.

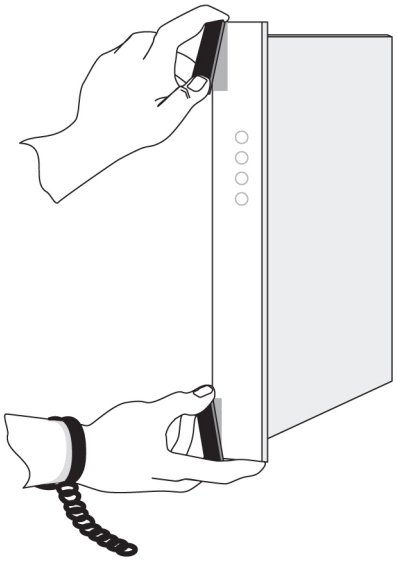
WARNING

WARNING: This procedure may interrupt service. When possible, perform maintenance during low traffic and database provisioning periods, such as the maintenance window.

1. Locate the card to be removed.
2. Use both hands to open injector/ejector module locking tabs out from the faceplate of the card.

   Push the inject/eject clamps outward from the card's faceplate (top clamp in the "UP" position, bottom clamp in the "DOWN" position). Pull the levers away from the shelf until they are parallel to the floor. Gently pull the card towards you until the card clears the shelf.

   Figure 50: Push Inject/Eject Clamps Outward



3. Place the card you have removed in an electrostatic discharge (ESD) protective container, or place the card in the spare card storage shelf.
4. Be sure that the replacement card has the same Tekelec part number and revision number as the card you have just removed (unless this is an upgrade).
5. Open the ejector levers on the replacement card.

   Carefully align the card's edges with the top and bottom card guides. Then push the card along the length of the card guides until the rear connectors on the card engage the mating connectors on the target shelf backplane.
6. Press the left edge of the card's faceplate using constant pressure until you feel the card's progress cease.

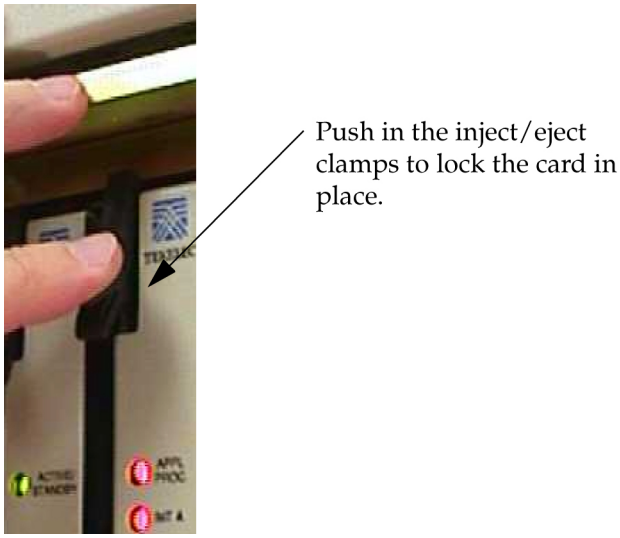
   To ensure proper seating, the tabs must be held in the release position until the locking tabs can engage with the upper and lower flange on the shelf.

WARNING: Do not impact the faceplate in order to mate the connectors. Any impact to the card's faceplate can damage the faceplate, the pins, or the connectors.

7. Push in the top and bottom inject/eject clamps.

   This locks the card in place and ensures a strong connection with the pins on the target shelf backplane.

   Figure 51: Push in Inject/Eject Clamps



8. Verify that both IMT bus LEDs are green.
9. Record the activity in the site maintenance log.
10. Return to the appropriate card removal/replacement procedure to return the card to service (such as initializing, flashing, and allowing).

    Note: If any UAMs are generated in the system after the card comes into service, refer to the *Maintenance Manual* to find the recommended steps in diagnosing and clearing the UAM.

Replacing Cards in the Holdover Clock

Failed Clock Input (CI) Card Replacement

Description

Use this procedure to replace a failed clock input (CI) card in shelves equipped with ST3 clock cards. The input card FAIL lamp should be lit.

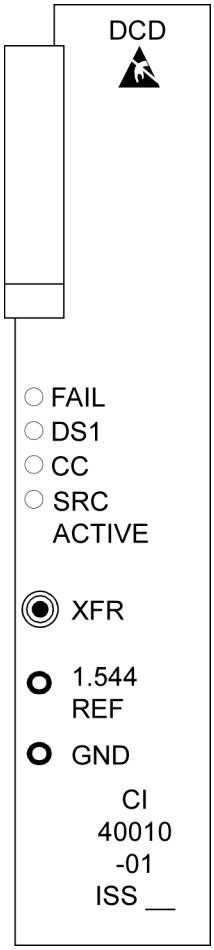
1. If the shelf is equipped with ST3 cards and the input card FAIL lamp is not lit, check the status of the SRC ACT/SRC ACTIVE lamp.

   If lit, press the transfer (XFR) button on either input card. If the input card FAIL lamp is lit, go to Step 3. The SRC ACT/SRC ACTIVE lamp on the other input card lights and the lamp goes off. Enter the following command to retrieve the terminal types and port numbers: `rtrv-trm`

2. Enter the following command to inhibit each OAP terminal displayed in the output from Step 1:`inh-trm:trm=x:force=yes`
   where *x* is the terminal number assigned as type OAP.
3. Remove the failed card or the card to be removed from the shelf.
4. Set the option switches on the replacement card to the correct settings.
   (See the *Installation Manual*.) Wait for the input card to acquire the input reference signal (about 40 seconds). Then, press the XFR button to make the new input card active.
5. Enter the following command to return the OAP terminals to the in-service state:`alw-trm:trm=x`
   where *x* is the terminal number of the inhibited OAP terminal.

CI, Clock Interface Card, Holdover Clock

Figure 52: Holdover Clock CI Card LEDs



LEDs	Descriptions
FAIL	RED - this card or its input has failed. The card's output is disabled and a minor alarm is generated. BLANK - no card or input failure detected.
DS1	GREEN - DS1 source is present. BLANK - DS1 source is not present.
CC	GREEN - CC (composite clock) source is present. BLANK - CC source is not present.
SRC ACTIVE	GREEN - the card is on-line providing a DCD reference to ST3 and output cards. BLANK - card is in standby mode.

Non-Failed Clock Input (CI) Card Replacement

Description

Use this procedure to replace non-failed clock input (CI) cards which have valid input reference signals.

1. Remove the input reference signal to the shelf associated with the clock input card to be removed.

   CAUTION: Removing a non-failed clock input card with a valid input reference signal from a shelf equipped with ST3 cards, causes the DCD system outputs to run and hit all the network elements timed from the DCD system. To properly remove a non-failed clock input card, the input reference must be removed first. This squelches the CI card output. This does not apply to failed input cards.

   Perform one of the following:

   a) If the reference input has a miscellaneous SYNC jack at the DSX-1, insert an open plug or the end of a patch card in the SYNC jack to squelch the input reference signal. If the input reference has an external bridging repeater, insert an open plug or the end of a patch cord in the OUT jack at the bridging repeater to squelch the input reference signal.

   b) If the input reference signal is directly cabled from the source to the DCD shelf, either lift the leads of the TB12 or TB13 wire-wrap terminals on the backplane of the DCD shelf, or short the tip (T) and ring (R) together at TB12 or TB13 on the backplane.

      CAUTION: Use a clip cord that is no longer than two inches. A longer clip cord may not appear as a short to the CI card and the input reference may continue to drive it.

      The DS1 lamp should be off and the FAIL lamp lit on the CI card. If this is not true, do not proceed. This indicates the input reference has not been removed.

2. Enter the following command to retrieve the terminal types and port numbers: `rtrv-trm`
3. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 2*:

   `inh-trm:trm=x:force=yes`

   where *x* is the terminal number assigned as type OAP.
4. Remove the CI card.

   This has no effect on the outputs.
5. Set the option switches on the replacement card to the correct settings.

   (See the *Installation Manual*.) The DS1 lamp should be off and the FAIL lamp lit on the CI card.
6. Restore the input reference by removing the open plug, clip cord, or reconnecting the leads to TB12 or TB13 wire-wrap terminals on the DCD shelf backplane.
7. Wait for the input card to acquire the input reference signal (about 40 seconds).

   If you want the new CI card to be active, press the XFR button.
8. Enter the following command to return the OAP terminals to the in-service state:

   `alw-trm:trm=x`

   where *x* is the terminal number of the inhibited OAP terminal.

ST3 Card Replacement

Description

Use this procedure to replace ST3 cards. The only time an ST3 card should be replaced is if the FAIL lamp is lit, or if it is in the ST A slot and the LOCK or LOCK and FAIL lamps are not lit and the network

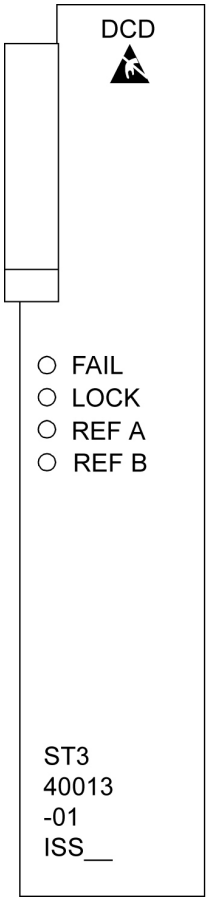
elements receiving timing from the shelf are reporting slips. (However, the second condition is more likely a timing loop rather than a bad ST3 card.)

Note: The ST3 card in slot B (ST B) in shelves equipped with ST3 clock cards may be removed from the shelf without any negative effect to the output, regardless if the ST3 has failed. If an ST3 is installed and not failed in slot A (ST A), it is the preferred source for the output cards. If you remove the card from the shelf, it may cause a hit to the outputs.

1. Enter the following command to retrieve the terminal types and port numbers:
   ```
   rtrv-trm
   ```
2. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 1*:
   ```
   inh-trm:trm=x:force=yes
   ```
   where *x* is the terminal number assigned as type OAP.
3. Remove the ST3 card from the shelf.
   If it is in slot A and has not failed, the ST B clock card automatically become the preferred source for the outputs. The TO cards ST and INPUT lamps should remain green.
   Note: There may be a one-time phase hit to the outputs. If ST A has failed, the ST B clock card is already the preferred source for the outputs. If ST B is being replaced, it is in standby and may be removed without negative effect to the outputs.
4. Insert the replacement card in the shelf.
   Lock it into place by rotating the locking lever downward. The FAIL lamp should remain lit until it has acquired the frequency and phase of the input reference signal and then go off (about one minute). If ST A is being replaced, it automatically becomes the preferred source for the output when the FAIL and LOCK lamps go off. The TO cards ST and INPUT lamps should remain lit.
   Note: If you are replacing both ST3 cards, allow five minutes for the first card to stabilize before replacing the other.
5. Enter the following command to return the OAP terminals to the in-service state:
   ```
   alw-trm:trm=x
   ```
   where *x* is the terminal number of the inhibited OAP terminal.

ST3 P/N 804-0173-01

Figure 53: Holdover clock ST3 card LEDs



LEDs	Descriptions
FAIL	RED - this card has failed. BLANK - no card failure detected.
LOCK	RED - input has failed. BLANK - no input failure detected.
REF A	GREEN - card is tracking the output of clock input card A. BLANK - not tracking output of clock input card A.
REF B	GREEN - card is tracking the output of clock input card B. BLANK - not tracking output of clock input card B.

Note: If the FAIL and LOCK LEDs are both illuminated, the ST3 is in holdover mode and the card has not failed.

MIS Card Replacement

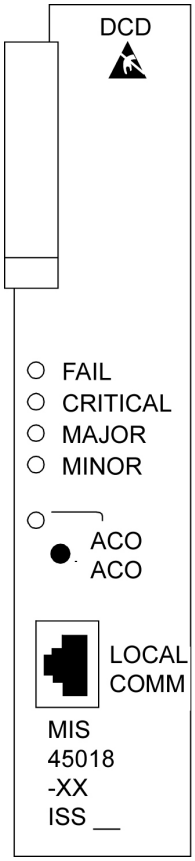
Description

The Maintenance Interface System (MIS) card may be removed or inserted into the shelf at any time without a negative effect to the operation of the shelf. The office alarms and shelf status (except for the battery alarm) do not function while the MIS card is removed from the shelf.

1. Remove the MIS card from the shelf.
2. Insert the replacement card.

MIS, Maintenance Interface System, Holdover Clock

Figure 54: Holdover Clock MIS Card LEDs



LEDs	Descriptions
FAIL	RED - this card or its power supply has failed. BLANK - no card or power supply failure detected.
CRITICAL	RED - holdover clock system has failed. BLANK - no holdover clock system failure detected.
MAJOR	RED - holdover clock system or any holdover clock card has a major alarm. BLANK - no major alarm detected.
MINOR	YELLOW - holdover clock system or any holdover clock card has a minor alarm. BLANK - no minor alarm detected.
ACO	GREEN - the ACO push button has been pressed to silence the alarm during an alarm state.

TOCA Card Replacement

When an MCA-5 is installed in the MCA slot, an HS protection switch automatically activates when the TO FAIL or PORT ALM lamp is lit. If the TO PORT ALM lamp is lit, you must determine whether it is actually a card port failure, or a shorted or unterminated cable external to the shelf. If you determine that the PORT ALM is actually a port failure on the card, replace the TO card.

1. Verify that an HS protection switch has been activated.

   If an automatic protection switch has been activated, the output protection button lamps are lit over the failed card and HS TO card. The MCA-5 AUTO lamp flashes for 6 seconds during the automatic protection switch activation, and then lights steadily.

2. If an HS protection is not activated, manually activate a switch by simultaneously pressing the output protection buttons over the TO card with FAIL or PORT ALM lamp lit and a like HS TO card.

   The output protection button lamps should light over the failed TO card and a like HS TO card, and the MCA-5 MAN lamp flashes until the switch is released.

CAUTION: The TO cards must not be removed without first activating an HS protection switch to minimize the loss of output signals. The possible output loss times are as follows:

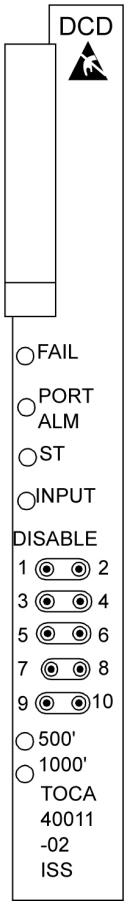
a) TO card removal: up to 6 seconds

b) Port or card failure: up to 3 seconds
c) Manual switch activation/deactivation: approximately one ms.

3. Enter the following command to retrieve the terminal types and port numbers:
   ```
   rtrv-trm
   ```
4. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 3*:
   ```
   inh-trm:trm=x:force=yes
   ```
   where *x* is the terminal number assigned as type OAP.
5. Remove the TO card from the shelf.
   Set the option switches on the replacement card to the correct settings. Insert the replacement card. The FAIL lamp on the replacement card should remain off and the INPUT lamp should light. The ST lamp should also light if the system is equipped with clock cards.
6. Wait 10 seconds after all the lamps normalize to allow the card to warm-up and generate outputs.
7. Press the lit output protection button for the HS TO card slot until the lamp goes out.
   The lamp over the output protection button should go off. This releases the HS protection switch and puts the replacement card online.
8. Enter the following command to return the OAP terminals to the in-service state:
   ```
   alw-trm:trm=x
   ```
   where *x* is the terminal number of the inhibited OAP terminal.

TOCA, Timing Output Composite Automatic, Holdover Clock

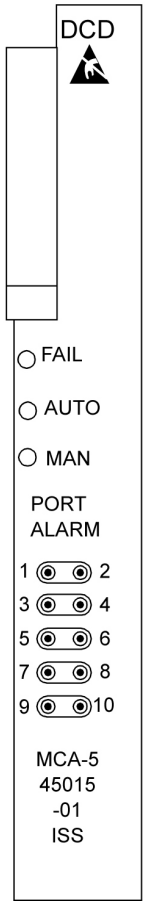
Figure 55: Holdover Clock TOCA Card LEDs



LEDs	Descriptions
FAIL	RED - this card has failed or there is a loss of all input references to this card. BLANK - no card or input reference failure detected.
PORT ALM	RED - if one to five outputs have failed or have been externally shorted. BLANK - no output failures detected.
ST	GREEN - an active clock is supplying the input reference for this card. BLANK - no active clock detected.
INPUT	GREEN - card is receiving a reference signal from one or more of the following: clock input A, clock input B, clock card A, clock card B. BLANK - card is not receiving a reference signal from any of the above sources.
500′	not used
1000′	not used

MCA, Matrix Controller Assembly Card, Holdover Clock

Figure 56: Holdover Clock MCA Card LEDs



LEDs	Descriptions
FAIL	RED - this card has failed or there is a loss of all input references to this card. BLANK - no card or input reference failure detected.
AUTO	GREEN - indicates output failure was protected automatically. BLANK - no failures detected.
MAN	GREEN - indicates output failure was protected manually. BLANK - no failures detected.

Fan Assembly P/N 890-0001-xx

The Fan Assembly P/N 890-0001-xx is used for cooling shelves in the EAGLE frame. The assembly includes 3 fan units and a controller card.

CAUTION: Do not perform procedures to *Replace Fan Assembly* if the Fan Assembly is used to cool shelves with HCMIM or HIPR cards. contact the *Customer Care Center*.

Refer to the following procedures to:

- *Replace the Fan Unit*
- *Replace Fan Controller Card*
- *Replace Fan Assembly*

Replace the Fan Unit

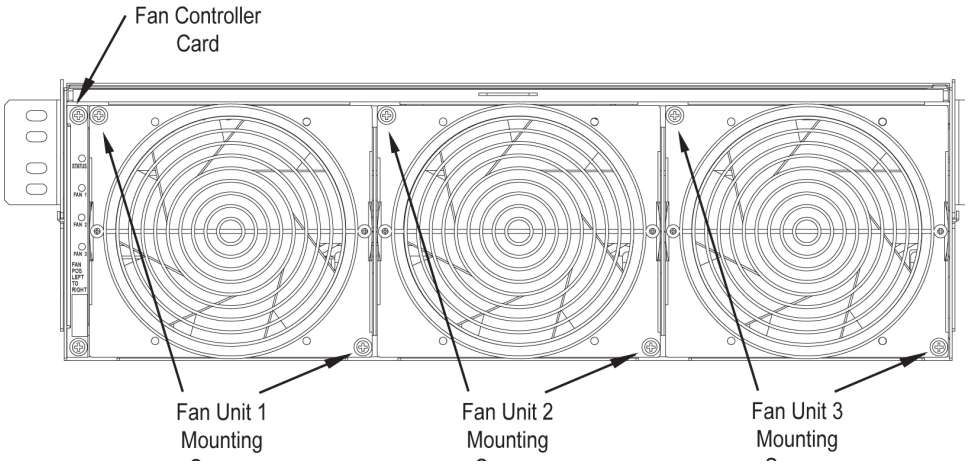
CAUTION

CAUTION: Be careful when removing fans. Fan blades are exposed along the sides and back of the units. The fan blade speeds of remaining fans will increase after any fan is removed.

1. Loosen the two captive screws used to secure the fan to be replaced.

   Fan 1 is located next to the Fan contoller card. .

   Figure 57: Fan Unit Mounting Screws



2. Firmly grasp the fan and pull straight out.

   The corresponding LED on the fan controller card is now red.

3. Insert the replacement fan into the appropriate slot and secure the two captive screws.

   The replaced fan should immediately come up to speed and the speeds of other fans should return to normal. The corresponding LED on the fan controller card is now green.

Replace Fan Controller Card

1. Remove Fan 1 by removing the two captive screws used to secure Fan 1 (Refer to *Replace Fan Assembly*).

   CAUTION

   CAUTION: Be careful when removing fans. Fan blades are exposed along the sides and back of the units. The fan blade speeds of Fan 2 andFAN 3 will increase after FAN 1 is removed.

   Fan 1 is located next to the Fan card. Firmly grasp Fan 1 and pull straight out.

2. Remove the fan controller card by removing the two captive screws used to secure the fan controller card.

   Remove Fan Controller Card by pulling straight out.

3. Insert the replacement fan controller card into the appropriate slot and secure the two captive screws.

4. Insert Fan 1 back into the space next to the fan controller card and secure (finger tighten) using the two captive screws.

   Fan 1 should immediately come up to speed and the speeds of Fans 2 and 3 should return to normal.

Replace Fan Assembly

CAUTION: Do not perform this procedures if the Fan Assembly is used to cool shelves with HCMIM or HIPR cards. contact the Customer Care Center.

The following procedures are used to replace Fan Assembly P/N 890-0001-xx when it is used to cool shelves not populated with HCMIM or HIPR cards.

- *Procedure - Power Down the Fan Assembly*
- *Procedure - Remove Fan Cables and Fan Assembly*
- *Procedure - Install the Fan Assembly*
- *Procedure - Power Up the Fan Assembly*

Procedure - Power Down the Fan Assembly

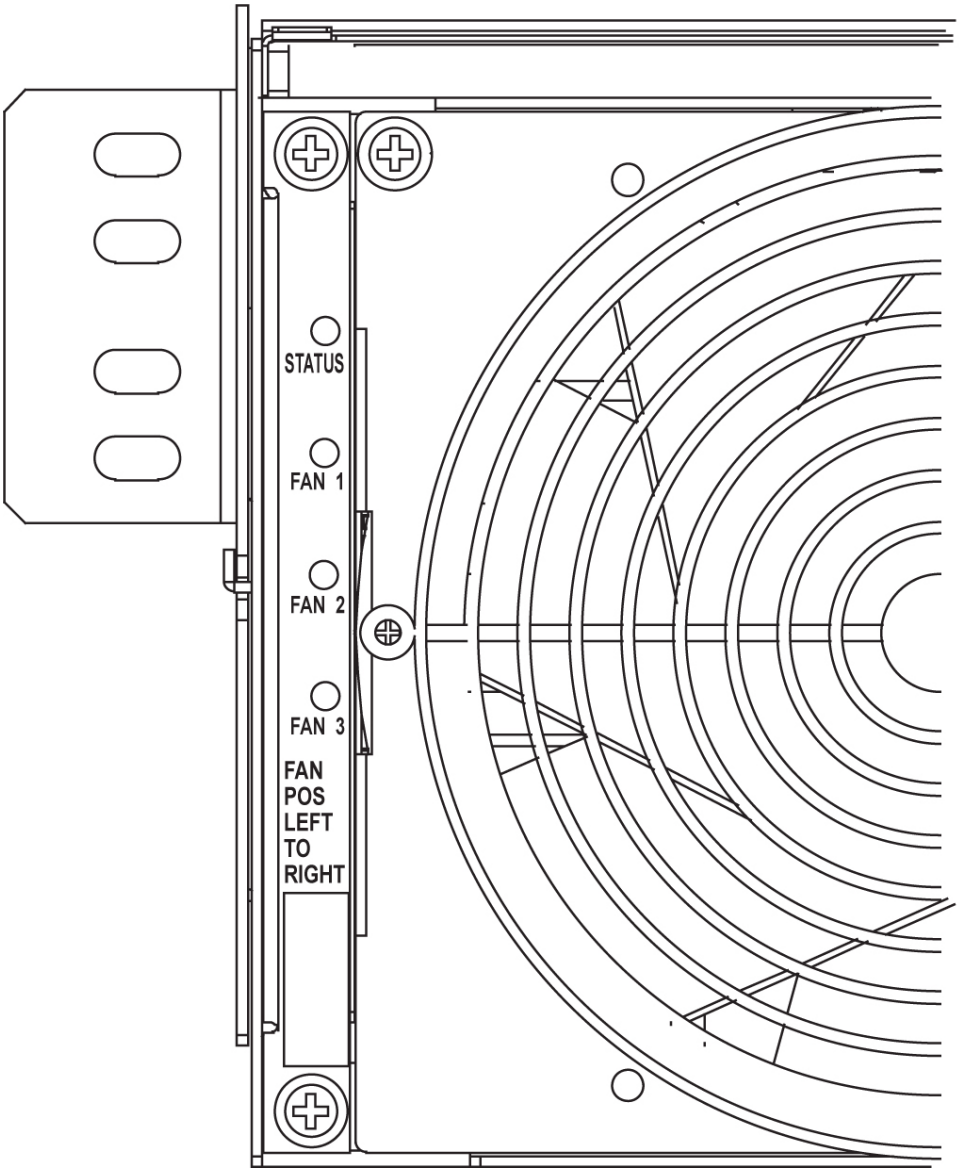
Use the following procedure to power down the fan assembly.

1. The fuse card located on the Fuse and Alarm Panel is marked FAN A and FAN B. Fuse positions 6, 12, and 18 are the correct locations on the FAP faceplate. The fans are fused at 3As, with blue flags per feed. Remove the appropriate fuse for the fan assembly being replaced according to the following:

   - Fuse position 6 is for the fan unit directly below the x100 shelf.
   - Fuse position 12 is for the fan directly below the x200 shelf.
   - Fuse position 18 is for the fan directly below the x300 shelf.

2. When both the A side and B side power is removed from the fan unit, all of the LEDs on the fan controller card (located on the left side of the front of the fan unit) are no longer illuminated and the all fan motors are off.

   Figure 58: Fan card with LEDs on front of fan assembly unit



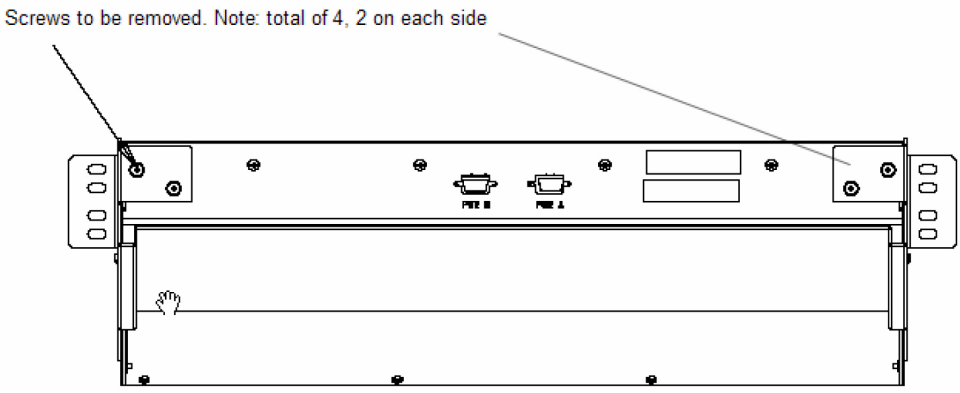
Procedure - Remove Fan Cables and Fan Assembly

Use the following procedure to remove fan cables and fan assembly.

1. At the fan assembly, place fiber paper on the shelf below where the fan is to be replaced. This ensures that nothing drops into the area or equipment below.
2. From the front of the frame remove the fan filter from the fan assembly.
3. From the rear of the fan unit, loosen the screws on the fan unit connector marked FAN A POWER. Remove the connector from the fan unit.
4. From the rear of the fan unit, loosen the screws on the fan unit connector marked FAN B POWER. Remove the connector from the fan unit.

5. Remove the screws from the the left and right sides of the rear of the fan tray bracket. There are two screws on each side. These screws must be removed from the rear of the frame.

   Figure 59: Fan Assembly Rear Bracket Screws.



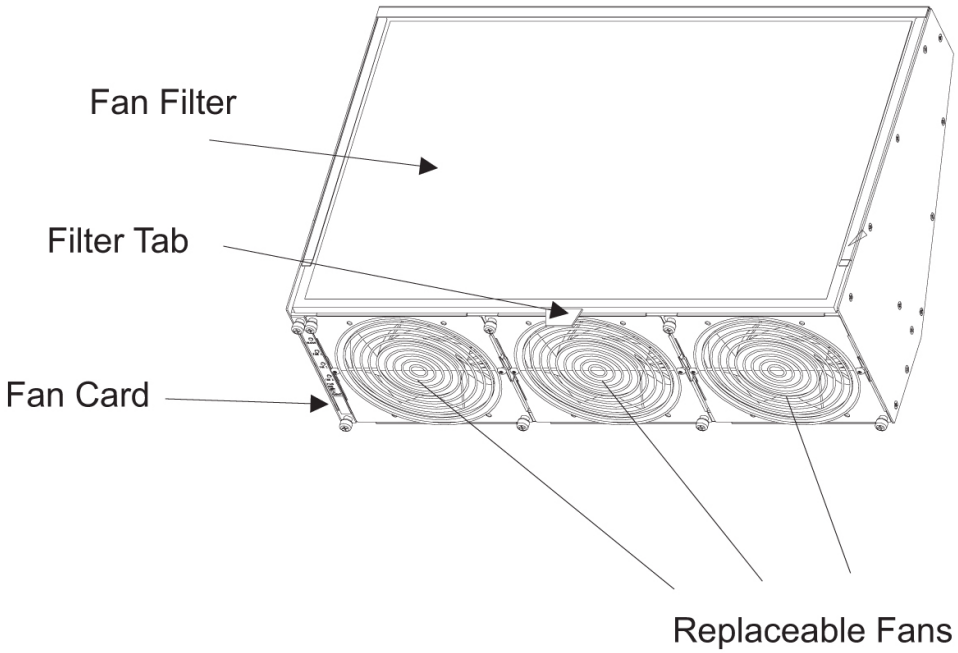
6. With the screws removed, carefully push on the rear of the unit until the fan assembly moves forward about an inch.
7. From the front of the frame remove the fan assembly from the the fan bracket. For easier removal, tilt the unit as it is removed.

Procedure - Install the Fan Assembly

Use the following procedure to install the fan assembly.

1. Remove the new fan unit from the container. The fan unit is shipped with the three fans already installed.

   Figure 60: Fan Assembly

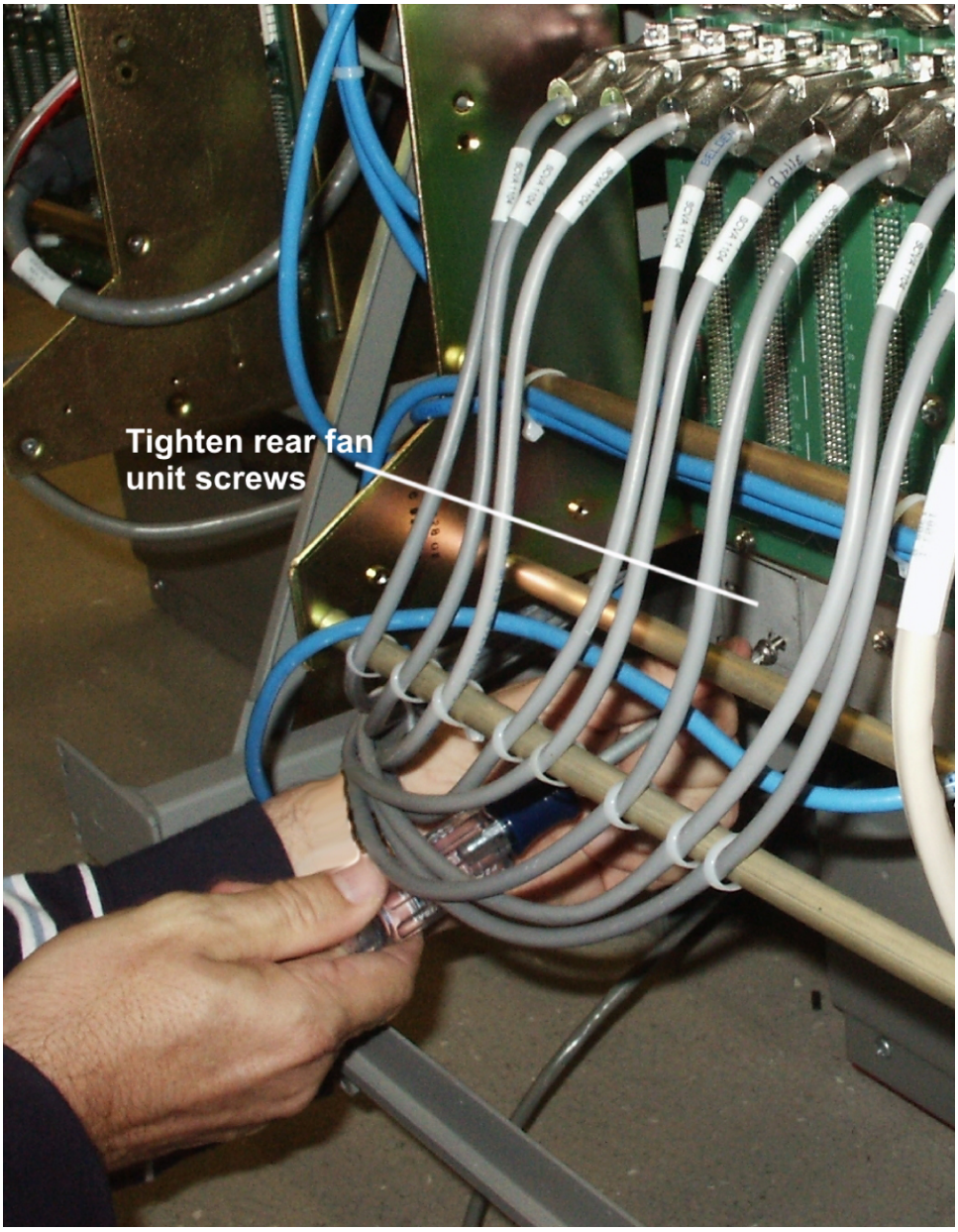


2. Insert the fan unit into the fan bracket. Tilt the unit up as it is pushed in and completely inserted into the bracket. After insertion, be sure the front of the fan unit is recessed about 1/2 inch from the front frame rails to allow the door to close.

Figure 61: Fan tray inserted into fan tray bracket in the frame - front view

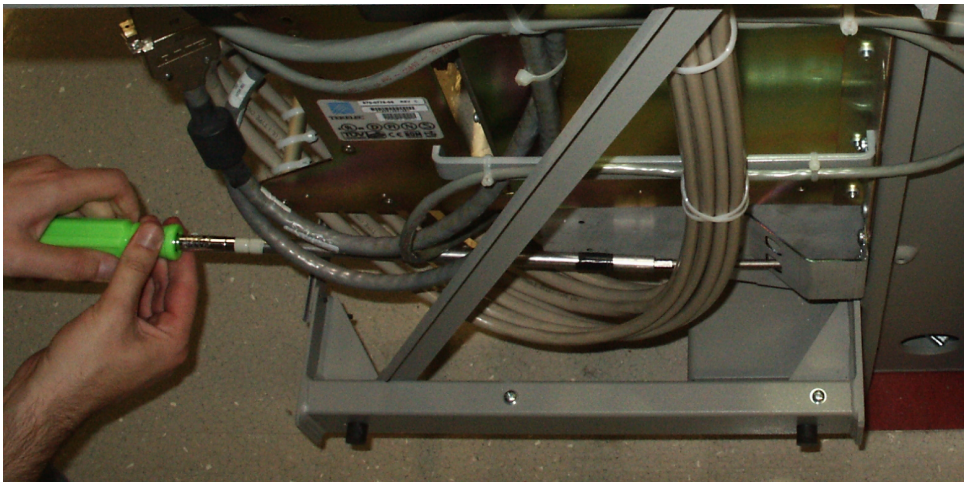
3. When the fan unit is aligned and in place, attach the fan unit to the fan tray bracket by tightening the screws on the left and right sides of the rear of the fan tray bracket. There are two screws on each side. These screws must be tightened from the rear of the frame.

Figure 62: Tighten rear fan tray screws



4. From the front of the frame install the fan filter into the fan assembly.
5. At this time check and tighten all screws, including the screws holding the side brackets to the frame (if necessary). The side bracket screws should be tightened fully from the rear of the frame. Use a long hex driver or flat head screw driver.

Figure 63: Tighten fan side bracket screws



6. Connect the fan cable at the rear of the fan assembly on the J9 connector to the FAN A POWER.
7. Connect the fan cable at the rear of the fan assembly on the J8 connector to the FAN B POWER.
8. Remove the piece of fiber paper on the top of the shelf below where the fan assembly was installed. This procedure is complete.

CAUTION

CAUTION: Before powering up the fans, ensure that the shelf directly above the fan does not contain any empty slots. Install an air management card in any empty slots to ensure proper air flow. These filler cards have no electrical connection to the system. See *Replacing a Card in the EAGLE 5 ISS* for general card installation guidelines.

Procedure - Power Up the Fan Assembly

Use the following procdure to power up the fan assembly.

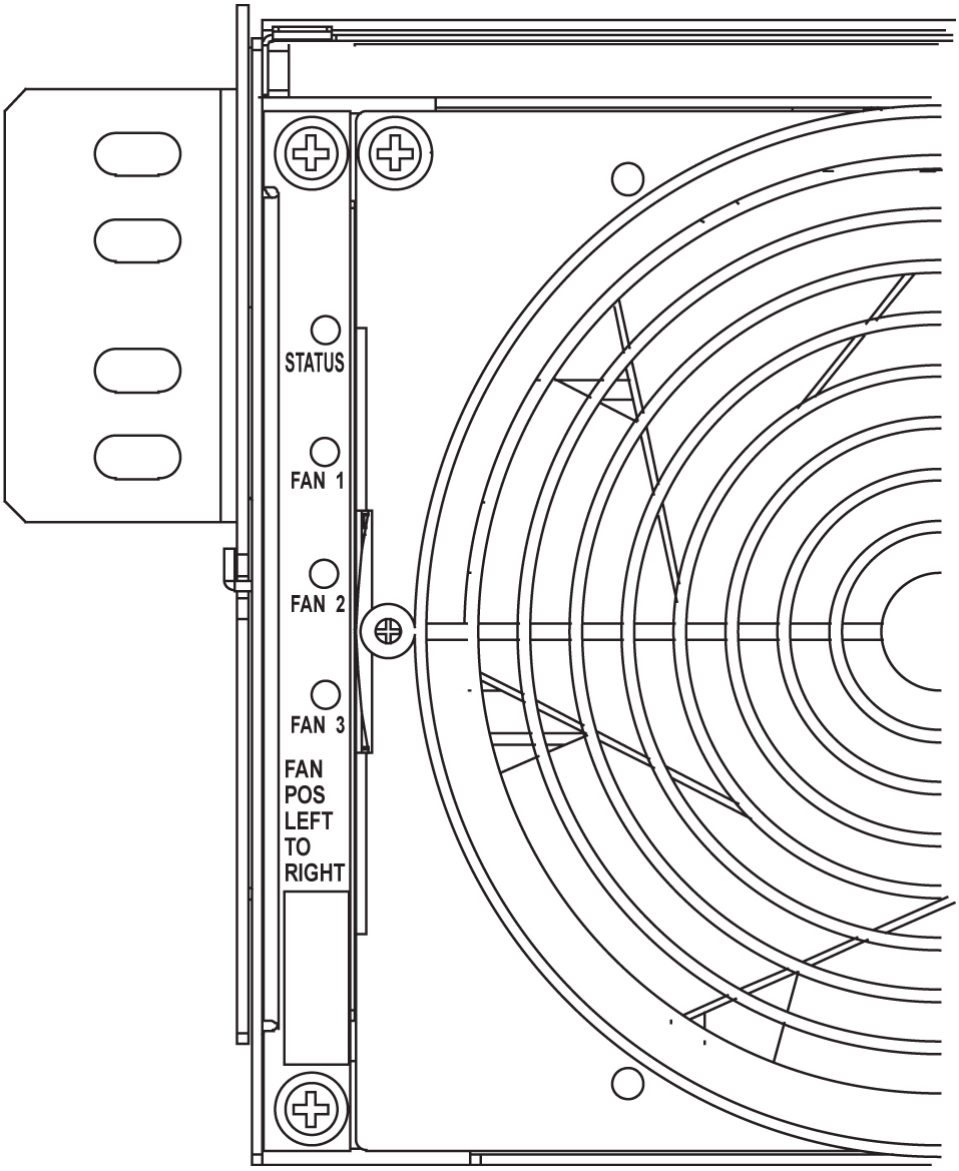
All fans are fused at 3A (blue) per feed.

CAUTION

CAUTION: Before powering up the fans, ensure that the shelf directly above the fan does not contain any empty slots. Install an air management card in any empty slots to ensure proper air flow. These filler cards have no electrical connection to the system. See *Replacing a Card in the EAGLE 5 ISS* for general card installation guidelines.

1. After the fan is installed, the powering up process depends on the shelf location.
   a) The fuse cards located on the Fuse and Alarm Panel are marked FAN A and FAN B, fuse positions 6, 12, and 18 are marked correct locations on the FAP faceplate.
   b) Fuse position 6 is for the fan unit directly below the x100 shelf.
   c) Fuse position 12 is for the fan directly below the x200 shelf.
   d) Fuse position 18 is for the fan directly below the x300 shelf.
   e) All fans are to be fused at 3As, with blue flags, per feed.
   f) Fill out the fuse card completely.
   g) Ensure the FAP fuse location for the fan is properly labeled.
2. Fifteen seconds after both the A side and B side power is connected to the fan assembly all of the LEDs on the fan controller card (located on the left side of the front of the fan assembly) are green.

Figure 64: Fan card with LEDs on front of fan assembly



3. When the fans are powered up and running, a test must be conducted to ensure proper service. Go to the system terminal.
4. Check to see if the fan feature is activated.
   At the terminal, enter the command:
   `rtrv-feat`
   Example output:

```
rlghncxa03w 04-01-28 11:34:04 EST  EAGLE 34.0.0.
   EAGLE FEATURE LIST
   GTT      = on      GWS      = off     NRT      = off
   X25G     = off     LAN      = off     CRMD     = off
   SEAS     = off     LFS      = off     MTPRS    = off
   FAN      = off     DSTN5000 = off     WNP      = off
   CNCF     = off     TLNP     = off     SCCPCNV  = off
```

```
    TCAPCNV  = off     IPISUP   = off     DYNRTK   = off
    X252000  = off     INP      = off     PLNP     = off
    NCR      = off     ITUMTPRS = off     SLSOCB   = off
    EGTT     = off     VGTT     = off     MGTT     = off
    MPC      = off     ITUDUPPC = off     GFLEX    = off
    GPORT    = off     MEASPLAT = off     TSCSYNC  = off
    E5IS     = off
;
```

If the fan feature is off (illustrated in the example), go to *Step 5*. Otherwise, go to *Step 6*.

5. At the terminal, enter the command:`chg-feat:fan=on`
   With this command the user will perform the tests beginning with *Step 7*.
6. At the terminal, enter the command: `rept-stat-trbl`
   Check to see that there are no fan errors. Specifically, check that there are no "#302 Cooling Fan Failure" errors. Next, perform the tests beginning with *Step 7*.
7. Fan Verification (perform *Step 7* through *Step 12* for each fan assembly).
   Move to the rear of the frame and remove the A POWER cable from the FAN unit. Result: Fan 2 and Fan 3 LEDs will blink as the fans speed up to maximum speed. This may take up to 15 seconds. Once maximum speed has been reached Fan 2 and Fan 3 LEDs on the Fan Controller card will be solid green. Fan 1 LED should be red. The controller LED should be blinking green. Fan 1 should stop running and the MINOR LED should be lit.
8. At the system terminal enter the command:`rept-stat-trbl`
   Test each fan to ensure that the alarm and the units are working correctly. The terminal reports:

   ```
   # 302 Cooling Fan Failure
   ```

9. Replace the A POWER cable on the back of the FAN unit and secure the connector.
   Result: All fans are running and the MINOR LED is not lit. The terminal reports:

   ```
   # 303 Cooling Fans Normal
   ```

10. Remove the B POWER cable from the FAN unit.
    Result: Fan 1 and Fan 2 LEDs will blink as the fans speed up to maximum speed. This may take up to 15 seconds. Once maximum speed has been reached Fan 1 and Fan 2 LEDs will be solid green. Fan 3 LEDshould be red. The fan controller LED should be blinking. Fan 3 should stop running and the MINOR LEDshould be lit.
11. At the system terminal enter the command: `rept-stat-trbl`
    Test each fan to ensure that the alarm and the units are working correctly. The terminal reports:

    ```
    # 302 Cooling Fan Failure
    ```

12. Replace the B POWER cable on the back of the FAN unit and secure the connector.
    Result: The fans are running and the MINOR LED is not lit. The terminal reports:

    ```
    # 303 Cooling Fans Normal
    ```

13. Repeat *Step 7* through *Step 12* for each fan unit installed.
    This procedure is complete.

Appendix B

Holdover Clock Troubleshooting Procedures

Topics:

Introduction

Most alarm conditions in the holdover clock are not out-of service or service-affecting conditions. The system is designed with redundant power, reference inputs, clock input cards, stratum clock cards and output card protection switching.

The only true out-of-service condition is when all power is lost to a shelf, or all reference inputs and both stratum clock cards fail. Before taking any action on the system, such as removing cards, first consider the following troubleshooting guidelines:

- Do not touch the shelf until you have analyzed the condition and know the possible result of any planned corrective actions.
- Do not touch the shelf until you have been properly grounded.
- Both major and minor alarms in the shelf require immediate attention. But, very few alarms in the holdover clock system are service affecting. Improper corrective actions could be service affecting.
- Do not remove an ST3 clock card from the shelf, unless you are certain it is the cause of the condition. This is especially true if the ST clock card(s) is (are) in the holdover mode (the HOLD OV/HOLDOVER lamp is lit, or the HOLD OV/HOLDOVER and INP TOL lamps are lit). Removing both ST clock cards in this condition causes total loss of all outputs from the shelf and/or system.
- Write down any alarm and normal lamp conditions in the shelf. These will help you to determine where to look for the cause of the condition.

Interpreting System Alarms, Lamps And Trouble Isolation

Alarms generated by the holdover clock are reported through the Eagle. All alarm conditions are defined in *Corrective Maintenance*.

When troubleshooting, write down all abnormal and normal lamp conditions for the shelf with the alarm lamp lit on the SAI card. This will assist in analyzing and isolating the cause of the condition. Do not start removing or replacing cards to attempt to clear alarms, as it could lead to crashing EAGLE 5 ISS.

Tables to aid in troubleshooting are listed in the following sections. Once the basic trouble has been isolated and it has been determined that an individual card is defective, perform the appropriate card replacement procedure in *Card Removal/Replacement Procedures*.

Table 31: Input and ST3 Alarm Conditions

SAI/MIS LAMPS	ABNORMAL CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (NOTE)
MAJOR and MINOR lit	ST3 A and B = FAIL, LOCK, and REF B lit	Visual = MAJOR and MINOR Shelf Status = MAJSI, MINSI, and CLKL. (HOLDOVER ALARM switch SW3 on backplane is set to MAJ or MIN)	None	1
MAJOR and MINOR lit	Input cards A and B = FAIL lit, frequency/bit rate lamp off, SR FL lit (ACI only) ST3 A and B = FAIL, LOCK, and REF B lit	Visual = MAJOR and MINOR Shelf Status = MAJSI, MINSI, and CLKL. (HOLDOVER ALARM switch SW3 on backplane is set to MAJ or MIN)	None	2
MINOR lit	Input card A or B = FAIL lit, frequency/bit rate lamp off or lit, SR FL lit (ACI only) ST3 A and B = REF (A or B) lamp lit (associated with input card with FAIL lamp off)	Visual = MINOR Shelf Status = MINSI, and CLKL (HOLDOVER ALARM switch SW3 on backplane is set to MAJ or MIN)	None	3
MINOR lit	ST3 A and B = LOCK lit	Visual = MINOR Shelf Status = MINSI (HOLDOVER ALARM switch SW3 on backplane is set to MAJ or MIN)	None	4
MINOR periodically lights, then goes off	Input card A and/or B = FAIL periodically goes on and off. First occurrence only	Visual = Periodic MINOR Shelf Status = Periodic MINSI and CLKL (HOLDOVER ALARM switch SW3 on backplane set to MAJ or MIN)	None	5

SAI/MIS LAMPS	ABNORMAL CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (NOTE)
	the SRC ACT/SRC ACTIVE on FAIL card goes off and lights on the other card.			
MAJOR lit	ST3 A or B = FAIL lit	Visual = MAJOR Shelf Status = MAJSI (HOLDOVER ALARM switch SW3 on backplane is set to MAJ or MIN)	None	6
For the corrective action to take for each condition type, refer to *Table 32: Input and ST3 Corrective Actions*.				

Table 32: Input and ST3 Corrective Actions

CONDITION TYPE # (From *Table 31: Input and ST3 Alarm Conditions*)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTION
1	No input cards installed. Outputs are as accurate as freerunning clock cards. Timed network elements reporting high slip rate.	Install at least one input card.(See Appendix A).
2	Input references A and B have failed (frequency/bit rate lamp off) or have exceeded BPV, OOF, or excessive zeros parameters (frequency/bit rate lamp lit).	Check input reference connections at the shelf and source ends. Reconnect if required. Isolate and repair input reference facilities, if required.
	The input reference facility framing format rearranged from D4 to ESF, or vice versa, and the input card options were not changed to match it.	Change the option switch settings to match the current framing format. See the Installation Manual.
	The input reference has been recently reassigned, and the signal amplitude is too high.	Wire a 100 ohm, 1/4 watt resistor across T and R input terminals on the shelf backplane.

CONDITION TYPE # (From *Table 31: Input and ST3 Alarm Conditions*)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTION
	Both input cards have failed.	Replace both input cards (See Appendix A).
3	Input reference A or B has failed (frequency/bit rate lamp off) or has exceeded BPV, OOF, or excessive zeros parameters (frequency/bit rate lamp lit).	Check input reference connections at the shelf and source ends. Reconnect if required. Isolate and repair input reference A or B facility (if required).
	Input card A or B has failed.	Replace the input card with the FAIL lamp lit (See Appendix A).
	The input reference facility framing format rearranged from D4 to ESF, or vice versa, and the input card options were not changed to match it.	Change the option switch settings to match the current framing format.
	The input reference has been recently reassigned, and the signal amplitude is too high.	Wire a 100 ohm, 1/4 watt resistor across T and R input terminals on the shelf backplane.
4	Active input reference has exceeded pull-in range of ST3 cards. Timed network elements reporting high slip rate.	Press transfer (XFR) pushbutton on either input card to switch SRC (source) ACTIVE lamp to the other input card. ST3 A and B LOCK lamps go off in less than 40 seconds. Isolate source of frequency offset on input reference facility and repair.
5	Input reference facility (A and/or B) line coding rearranged from AMI to B8ZS and input card(s) option switches were not set to match the change. Input card BPV spec periodically exceeded.	Change input card(s) option switch settings from AMI to B8ZS.
6	ST3 A or B card has failed and squelched its outputs. Outputs are receiving their reference from the ST3 with its FAIL lamp off. Outputs are not affected.	Replace the ST3 card (A or B) with the FAIL lamp lit (Appendix A).

Note: For a description of each condition type, refer to *Table 33: Shelf and Output Alarm Conditions - Not Related to Input and ST Conditions*.

Table 33: Shelf and Output Alarm Conditions - Not Related to Input and ST Conditions

SAI/MIS LAMPS	ABNORMAL SHELF AND CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (NOTE)
None lit	All lamps on all cards are off	Visual = CRITICAL (MIS ONLY), MAJOR, and MINOR Shelf Status = CRTSI (MIS only), MAJSI, MINSI, and BATTALM	None	1
MINOR lit	MCA-5 = All 10 PORT ALM lamps lit	Visual = MINOR Shelf Status = MINSI	None	2
MINOR lit	Any TO card = PORT ALM lit Output protection pushbutton lamps = Lamp over TO card with PORT ALM lit, and like HS TO card light for a short period of time (approx 3 seconds) then goes off MCA-5 = AUTO lamp flashes for approx 6 seconds when HS protection switch is activated and released.	Visual = MINOR Shelf Status = MINSI and PRTA (SW1 positions 3 and 5 on MCA-5 set to MAJ or MIN)	None	3
MINOR lit	Shelf fuse A or B = Lamp lit	Visual = MINOR Shelf Status = MINSI, and BATTALM. POWER ALARM switch SW2 on backplane is set to MIN)	None	4

SAI/MIS LAMPS	ABNORMAL SHELF AND CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (NOTE)
MAJOR lit	Any TO, ST, or MCA-5 = FAIL lit	Visual = MAJOR Shelf Status = MAJSI (MCA-5 SW1, positions 3 and 5 set to MAJ)	Visual = MAJOR Shelf Status = MAJSI (MCA-5 SW1, positions 3 and 5 set to MAJ)	5
FAIL and MAJOR lit (MIS only)	MIS = FAIL lit	Visual = MAJOR Shelf Status = MAJSI	None	5
MAJOR and MINOR lit	Shelf fuse A or B = Lamp lit	Visual = MAJOR Shelf Status = MAJSI, MINSI, and BATTALM. (POWER ALARM switch SW2 on backplane is set to MAJ)	None	4
MAJOR and MINOR lit	Any TO card = FAIL lamp lit Output protection pushbutton lamp = Lamps lit over TO with FAIL lamp lit and like HS TO card (HS protection switch activated).	Visual = MAJOR and MINOR Shelf Status = MAJSI and MINSI (MCA-5 SW1, positions 3 and 5 set to MIN)	None	5
MAJOR and MINOR lit or MINOR lit or None lit (MAJOR and MINOR lit if MCA-5 SW1, positions 3 and 5 set to MAJ; if SW1 set to MIN, then	Output protection pushbutton lamps = Lamps over TO cards and HS cards alternately light and then go off.	Visual = MAJOR and MINOR or MINOR or None Shelf Status = MAJSI and MINSI or MINSI or None	None	6

SAI/MIS LAMPS	ABNORMAL SHELF AND CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (NOTE)
MIN lit; if set to NO ALARM, then None lit)		(MAJOR and MINOR if MCA-5 card SW1 set to MAJ; MINOR if SW1 set to MIN; none if SW1 set to NO ALARM)		
MINOR lit or MAJOR and MINOR lit (MINOR if MCA-5 SW1, positions 3 and 5, are set to MIN or NO ALARM; MAJOR and MINOR lit if set to MAJ)	Any TO card = PORT ALM lit Output protection pushbutton lamps = Lamps lit over TO card with PORT ALM lit, and like HS TO card.	Visual = MINOR or MAJOR and MINOR Shelf Status = MINSI and PRTA or MAJSI, MINSI, and PRTA (MINOR if SW1 positions 3 and 5 on MCA-5 set to MIN or NO ALARM; MAJOR and MINOR if set to MAJ)	None	7
MINOR lit or MAJOR lit or None lit (MINOR lit if MCA-5 SW1, positions 3 and 5 set to MIN; if SW1 set to MAJ, then MAJOR is lit; if set to NO ALARM, then None lit)	Output protection pushbutton lamps = Lamps lit over a TO card and like HS TO cards MCA-5 = MAN lamp is flashing	Visual = MINOR or MAJOR or None Shelf Status = MINSI or MAJSI or None (MINOR lit if MCA-5 SW1, positions 3 and 5 set to MIN; if SW1 set to MAJ, then MAJOR is lit; if set to NO ALARM, then None lit)	None	8

Note: For the corrective action to take for each condition type, refer to *Table 34: Shelf and Output Corrective Actions - Not Related to Input and ST Conditions*.

Table 34: Shelf and Output Corrective Actions - Not Related to Input and ST Conditions

CONDITION TYPE # (FROM *Table 33: Shelf and Output Alarm Conditions - Not Related to Input and ST Conditions*)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTIONS
1	Loss of Battery A and B to shelf. All outputs are squelched. Causes could be from operating error, office battery source failure, blown fuses, or a component failure, e.g., isolation diode which shorts battery to battery return.	1. Determine cause of loss of battery and repair. 2. Restore office battery source. 3. Replace blown fuses in battery distribution bays, miscellaneous fuse bays, and panels, and/or on DCD shelf.
2	Communication between MCA-5 and TO cards is not functioning. Microprocessor on the MCA-5 is failed or garbled. Does not affect outputs. Automatic TO protection switching function disabled. Manual TO protection switching function is still operational.	1. No TO cards in shelf. Install at least one TO card. 2. No input references or input cards, and no clock cards installed. Install at least one clock (ST) card (See Appendix A.) 3. MCA-5 communications bus or microprocessor garbled. Remove and reinsert the MCA-5 card to clear bus and microprocessor. 4. MCA-5 microprocessor failed. Replace MCA-5 card (Appendix A).
3	HS protection switch activated, then released because of: • Unterminated cable on TOTA or TOTL output, or, • Shorted cable on TO output. When the condition occurred, an HS protection switch was activated, PORT ALM on TO goes off, and lights on the HS TO card, output protection	1. Press and hold the output protection pushbutton over the TO card with PORT ALM lamp lit. MCA-5 lights PORT ALM lamp(s) of failed TO port. Release pushbutton. 2. Isolate and repair cable or NE connected to that TO port. 3. If port connection is new and not yet terminated at NE, then either insert disabling pin in that port's disabling jack on TO card faceplate, or remove cable from output wire-wrap panel, or place an

CONDITION TYPE # (FROM *Table 33: Shelf and Output Alarm Conditions - Not Related to Input and ST Conditions*)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTIONS
	pushbutton lamps over the TO and HS light, MCA-5 AUTO lamp flashes, HS protection switch releases, PORT ALM on HS TO goes off and lights on TO, output protection pushbutton lamps go off, and MCA-5 AUTO lamp stops flashing (duration = 3 to 6 seconds). Non-failed ports on TO with PORT ALM lit lost output for one millisecond during HS protection switch activation and release. Failed TO port is out of service.	appropriate resistor termination across tip (T) and ring (R) of cable at NE end, until ready to connect cable at NE end.
4	Loss of Battery A or B to shelf. Does not affect outputs. Causes could be from operating error, blown fuse, or a component failure, e.g., isolation diode which shorts battery to battery return.	1. Determine cause of loss of battery and repair. 2. Replace blown fuses in battery distribution bays, miscellaneous fuse bays, and panels, and/or on DCD shelf.
5	Card with FAIL lamp lit has failed, except for input card which causes a MINOR alarm when its FAIL lamp lights. Outputs are not affected if MCA-5 and HS slots are equipped.	Replace the card with the FAIL lamp lit (Appendix A). Release HS protection switch, if activated, by pressing lit HS pushbutton until switch releases.
6	A TO card's microprocessor has lost its ability to process data. The TO cards are alternately being switched to HS protection and then released. One millisecond loss of outputs each time a TO is switched to or released from HS protection.	Manually switch each TO card to the HS, replace the TO card (Appendix A) and release the HS switch. Continue until the malfunctioning TO card is located and removed from the shelf.
7	Output port failed on TO card with PORT ALM lamp lit. HS	1. Press and hold the output protection pushbutton over the TO card with the

CONDITION TYPE # (FROM *Table 33: Shelf and Output Alarm Conditions - Not Related to Input and ST Conditions*)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTIONS
	protection switch activated. Loss of output on failed port. Other output on same TO lost for one millisecond when HS protection switch activated. When condition occurred, an HS protection switch was activated, PORT ALM lamp on TO card remained lit, output protection pushbutton lamps over TO and HS slots lit, and MCA-5 card's AUTO lamp flashes for 6 seconds and then lights steady.	PORT ALM lamp lit. MCA-5 lights PORT ALM lamp(s) of failed TO port. Release pushbutton. 2. Remove TO card with PORT ALM lamp lit. 3. Set option switch settings on the replacement TO card identical to settings on removed TO card. 4. Insert replacement TO card in shelf slot and wait 10 seconds for TO to warm-up. Verify ST, INPUT and OPTION lamps are lit and PORT ALM and/or FAIL lamps are not lit. 5. Press output protection pushbutton over HS TO until pushbutton lamps go out (releases HS switch). MCA-5 card's AUTO lamp flashes for 6 seconds and then lights steady.
8	TO card manually switched to HS TO card	Release the manual HS switch by pressing the lit pushbutton over the HS TO card for 3 seconds.

Note: For a description of each condition type, refer to *Table 33: Shelf and Output Alarm Conditions - Not Related to Input and ST Conditions*.

Appendix C

Part Numbers

Topics:

Overview

This chapter lists the part numbers of Tekelec equipment, components, cables, and miscellaneous parts described in this manual.

Each table provides the item name, part number, and related notes. Items are listed by their name (as described in this manual) in alphabetical order. Shaded part numbers indicate that the item is obsolete or no longer shipped. Unless the item is indicated as obsolete, the item is still supported in the field.

Note: Tekelec reserves the right to ship compatible part numbers or revisions for new installations and replacements. Always check the latest Hardware Baseline for your release. The latest hardware baseline can be found in the Feature Notice of your release.

RoHS 5/6 - As of July 1, 2006, all products that comprise new installations shipped to European Union member countries will comply with the EU Directive 2002/95/EC "RoHS" (Restriction of Hazardous Substances). The exemption for lead-based solder described in the Annex will be exercised. RoHS 5/6 compliant components will have unique part numbers and are identified as the International part number in this manual.

Note: International part numbers will eventually replace North American part numbers to make all part numbers RoHS compliant. The items of either part number are of equivalent function or quality otherwise.

WEEE - All products shipped to European Union member countries comply with the EU Directive 2002/96/EC, Waste Electronic and Electrical Equipment. All components that are WEEE compliant will be appropriately marked. For more information regarding Tekelec's WEEE program, contact your sales representative.

Cables, Adapters

Table 35: EAGLE 5 ISS Cables, Connectors, and Power Cords

Name	Part Numbers		Note
	North America	International	
Adapter, 15-Pin to 26-Pin	830-0425-01	---	
Adapter cables	830-0846-01	830-1183-01	backplanes -03 and -04 for master timing and HS clock cable 830-0873-xx

Name	Part Numbers		Note
	North America	International	
Alarm cable	830-0543-01	---	Holdover Clock
Alarm cable	830-0638-xx	830-1163-xx	see Filtered Rack Alarm cable
Alarm NETRA Server Cable	830-0900-xx	---	
ATM Cable	830-0987-xx	---	SCSI/DB44
ATM E1/T1 cable	830-0959-xx	---	EMS; DB-44 to RJ45 4 Port
B Clock Cable	830-0404-xx	---	replaced by 830-0398-xx (NA) or 830-1150-xx (I) both are for HMUX
B Clock Cable	830-0398-xx	830-1150-xx	
A and B Frame Clock cable	---	---	see B Clock Cable
BITS clock cable	830-0226-xx	830-1146-xx	Backplanes -03 and -04
BITS clock cable	830-0873-xx	---	Backplane -06
BNC pen end cable	830-0625-xx	830-1161-xx	
BNC to BNC cable assembly	830-0624-xx	830-1160-xx	
Breaker-to-Terminal Strip Power Cable	830-0866-xx	830-1236-xx	
CD-ROM Cable	830-0421-xx	---	
Frame Ground cable	830-0715-xx	830-1171-xx	ESP
Clock Connection cable	830-0657-xx	830-1164-xx	Fan, alarm, control
Composite clock cable	---	---	See BITS clock cable
Converter	804-0176-01	---	

Name	Part Numbers		Note
	North America	International	
Crossover (CAT-5) Cable	830-0723-xx	830-1173-xx	
Crossover Patch Panel Cable	830-0789-xx	830-1178-xx	DCM
DB-26 to RJ-45	830-1102-02	830-1102-02	for new installations, with shielded Cat 5E cable; E5-ENET
DB-26 to DB-26	830-1103-02	830-1103-02	for current installations that use DCM cable, 830-0978-xx. Does not support Gigabit Ethernet; E5-ENET
DCM, 100-BASE TX Interface to unterminated -xx	830-0711-xx	---	
DCM_100 BASE TX Interface_DB26 to Non-shielded RJ45	830-0978-xx	---	
DCM 100BASE TX Interface_DB26 to RJ45 Plus to Minus	830-0788-xx	830-1177-xx	
Drive Power Cable	830-0224-xx	---	
DS1 Cable	830-0849-xx	830-1184-xx	
E1 cable	830-0622-xx	830-1233-xx	
E1 patch cable	830-0605-02	830-1116-02	
E1-T1 MIM 22 AWG	830-0932-01	830-1106-xx	
E1/T1 MIM LIM Cable	830-0948-01	830-1197-xx	4 Port 24 AWG
E1/T1 MIM LIM to MPL Adapter	830-0949-01	830-1197-01	
E5-ENET Fast Copy Adapter - Lower	830-1343-01		

Name	Part Numbers		Note
	North America	International	
E5-ENET Fast Copy Adapter - Upper	830-1343-02		
Ethernet cable	830-0788-xx	830-1177-xx	DCM, DSM, EDCM-A, and EDCM
External alarm cable	830-0435-xx	830-1151-xx	
Fan cable	830-0690-01	---	AC power
Fan power/alarm cable	830-0609-01	830-1157-01	incl. with fan assembly
Fifty Position Cable Hard Drive I/O	830-0656-01	---	
Filter Rack Alarm Cable	830-0638-xx	830-1163-xx	
Force Transition Card	850-0496-01	---	
Frame Ground cable	830-0715-xx	830-1171-xx	ESP
Ground Breaker Panel-to-Frame cable	830-0830-01	830-1181-01	ESP
Ground Hub-to-Frame cable	830-0822-xx	---	ESP
Hazard Ground Cable	830-0257-xx	---	
High Speed (BITS) Clock Cable	830-0873-xx	830-1189-xx	
High Speed Master Timing Adapter	830-0846-01	830-1183-01	
HMUX Adapter Cable	830-0857-01	830-1185-01	
1/0 Green Ground Cable	690-0108-07	690-0108-R07	
IMT Cable	830-0221-xx	830-1141-xx	

Name	Part Numbers		Note
	North America	International	
Interface Cable	830-0366-xx	830-1149-xx	
Local Maintenance Center Cable	830-0231-xx	830-1144-xx	
Loop Back Cable Adapter	830-0763-01	830-1176-xx	
MMI Port Cable	830-0708-xx	830-1169-xx	
Modem/Terminal Cable	830-0709-xx	830-1170-xx	
Multi-port LIM Diagnostic Cable	803-0029-0	---	
Multi-port LIM DS0 cable	830-0772-xx	---	26 AWG, inacctive
Multi-port LIM DS0 cable	830-0892-xx	830-1194-xx	24 AWG, inacctive
Multi-Port Power Cable	830-0814-xx	830-1282-xx	
Network Cable	830-0710-xx	830-1257-xx	
Null Modem Cable	830-0759-xx	---	
Null-Modem for Terminal Cable	830-0859-xx	830-1186-xx	
Output panel frame ground cable	690-0009	---	
Pin Protector Assembly	830-0880-01	---	use with clock cable replacement (66 min for 6 shelves)
Power Cable	830-0315-xx	830-1147-xx	
Power Cable, –48V	830-0651-xx	---	
Power Cable, DC, BP to Hub	830-0868-xx	830-1235-xx	

Name	Part Numbers		Note
	North America	International	
Power Cable, DC, Netra 1400	830-0814-xx	830-1282-xx	
Power Cable, MPS	830-0965-xx		
Power Ring	830-0908-xx	---	AXi
Rack Alarm Cable	---	---	see Filtered Rack Alarm cable
RAID Power Cable	830-0872-xx	---	DC
Remote Maintenance Center Cable	830-0233-xx	830-1146-xx	
RJ45/RJ45 Cable (CAT-5) (Yellow)	830-0888-xx	---	
RJ45/RJ45 Cable (CAT-5) (Blue)	830-0889-xx	830-1192-xx	
RJ45 to 9 Pin Adapter	830-0917-01	---	
Row Alarm Cable	830-0232-xx	830-1145-xx	
Router Power Cable	830-0869-xx	830-1188-xx	DC
RS232 Cable	830-0527-xx	830-1152-xx	
ATM Cable	830-0987-xx	---	SCSI/DB44
Serial I/O Transition Card	850-0514-01	---	
Serial Interface Converter Cable	830-0531-01	---	inactive
Serial Interface/Modem Adapter	830-0531-03	830-1153-03	use with 830-0394-xx
Serial Interface/Modem Adapter	830-0531-04	830-1153-04	use with 830-0535-xx

Name	Part Numbers		Note
	North America	International	
Serial DB44 to DB9 (X4) cable	830-0972-01	830-1231-01	36-inch T1x00 AS
Serial Interface, Terminal, Printer Adapter	830-0531-02	830-1153-02	use with 830-0394-xx
Straight Through Cable (CAT-5)	830-0724-xx	---	RJ-45 CAT-5E
Straight Through Cable (Patch Panel)	---	---	see DCM 100BASE TX Interface_DB26 to RJ45 Plus to Minus
Switch-to-Frame Ground Cable	830-0884-01	---	
Terminal/Converter Cable	830-0528-01	---	
Terminal/Printer Cable	830-0535-xx	830-1154-xx	
Tone and Announcement Server Alarm Cable	830-0901-xx	---	
T1 LIM-to-MPL Cable Adapter	830-0895-01	---	
T1 MIM cable	830-0894-xx	---	
Terminal cable adapter	---	---	see Terminal/Printer cable

Components

Table 36: EAGLE 5 ISS Components

Acronym	Name	Part Numbers		Note
		North America	International	

Acronym	Name	Part Numbers		Note
---	Air Management Card	870-1824-01	870-1824-02	single slot, eeded for empty slots when using Fan Tray 890-0001-02
---	Breaker Panel Alarm Card	804-1489-01	804-1489-R01	
CI	Clock Interface Card (Holdover Clock)	804-0165-01	---	
DCM	Database Communications Module	870-1945-038	---	K6-lll, 200 TPS STC card
DCMX	Expandable Database Communications Module	870-1984-01	---	
DSM	Database Service Module	870-1984-07 870-1984-09	870-1984-13 870-1984-15	4GB 1GB
DSM	Database Service Module	870-2371-08	870-2371-13	1GB
E1/T1 MIM	E1-T1 Multichannel Interface Module 02	870-2198-01	870-2198-02	European equivalent of the North American T1
E5-ATM	E5-ATM Interface Module	870-1872-01	---	
E5-E1T1	E5-E1T1 Interface Module	870-1873-02	870-1873-03	
E5-ENET	E5-ENET Interface Module	870-2212-02	870-2212-03	
E5-IPSM	IPSM Module	870-2877-01	---	
E5-MASP	E5 Maintenance Administration Subsystem Processor Card	870-2903-01		
E5-MDAL	E5 Maintenance Disk and Alarm Card	870-2900-01		
E5-SM4G	E5-SM4G DSM Module	870-2860-02	---	

Acronym	Name	Part Numbers		Note
E5-TSM	E5-TSM (Translation Service Module running GLS)	870-2943-03	---	Replaces TSM-256 as of 40.0
EDCM	Enhanced Database Communications Module	870-2197-01	---	double-slot Pre-IP^7 SG 4.0
EDCM	Enhanced Database Communications Module	870-2372-08 870-2372-09	870-2372-13 870-2372-14	single-slot
EDCM-A	Enhanced Database Communications Module A	870-2508-01	870-2508-02	single-slot
GPSM-II	General Purpose Service Module	870-2360-06	870-2360-07	Replaces MCAP as of 30.0
HC MIM	High Capacity Multi-channel Interface Module	870-2671-01	870-2574-02	Replaces IPMX
HIPR	High-Speed IMT Packet Router Module	870-2574-01	870-2574-02	Replaces IPMX
HIPR2	High-Speed IMT Packet Router 2 Module	870-2872-01	870-2872-01	Replaces IPMX, HMUX, HIPR
HMUX	High-Speed Multiplexer	870-1965-01	870-1965-03	Replaces IPMX
IPMX	Interprocessor Message Transport Power and Multiplexer	870-1171-01	---	replaced by HMUX
LIM-ATM	Link Interface Module - Asynchronous Transfer Module	870-1293-10	870-1293-13	
MCA	Matrix Controller Automatic (Holdover Clock)	000-0028-xx	---	
MCAP	Maintenance Administration Subsystem (MAS) Communications Applications Processor	870-1013-xx 870-1307-xx	---	Replaced by GPSM-II as of 30.0
MDAL	Maintenance Disk and Alarm Card	870-0773-10	870-0773-10	

Acronym	Name	Part Numbers		Note
MIS	Maintenance Interface System Card (Holdover Clock)	804-0175-xx	---	
MPL	Multi-Port Link Interface Module	870-2061-04	870-2061-06	
MPS	Multi-purpose Server	890-1287-xx 890-1374-xx	--- ---	OEM Open System
TDM-GTI	Terminal Disk Module - Global Timing Interface	870-0774-15	870-0774-18	As of 31.6 (NA) 35.0 (I)
TOCA	Timing Output Composite Automatic (Holdover Clock)	804-0166-xx	---	
TSM	Translation Service Module	870-1289-04 870-1291-xx 870-1292-xx	870-1289-06 --- ---	TSM-1G TSM-3G TSM-4G

Frames, Backplanes, FAPs, and Fans

Table 37: EAGLE 5 ISS Frames, Backplanes, FAPs, and Fans

Acronym	Name	Part Numbers		Note
		North America	International	
BP	Breaker Panel	804-1423-01	804-1423-R01	
BP	Breaker Panel	870-1814-01	---	
	Control Shelf Backplane -02	850-0330-02	---	inactive
	Control Shelf Backplane -03	850-0330-03	---	inactive

Acronym	Name	Part Numbers		Note
		North America	International	
	Control Shelf Backplane -04	850-0330-04	---	
	Control Shelf Backplane -05	850-0330-05	---	not active
	Control Shelf Backplane -06	850-0330-06	850-0330-07	shelves 6 and 7 no longer supported
	E1 Backplane	850-0459-01	850-0459-02	
	Extension Shelf Backplane	850-0356-01	---	inactive
	Extension Shelf Backplane	850-0356-02	---	inactive
	Extension Shelf Backplane	850-0356-03	---	inactive
	Extension Shelf Backplane	850-0356-04	850-0356-06	
	Fan Assembly	890-0001-02	890-0001-04	All systems with HCMIMs EAGLE 33.0
	Fan Assembly	890-1038-01	890-1038-03 890-1038-04	Standard frame Heavy Duty frame
	Filter, fan tray	551-0032-01	---	
	Fan filter	551-0022-01	---	
FAP	Fuse and Alarm Panel	860-0434-01	860-0434-03 860-0434-04	Heavy Duty Frame
FAP	Fuse and Alarm Panel	870-1606-02 Rev C	---	Standard Frame 60 Amp feeds

Acronym	Name	Part Numbers		Note
		North America	International	
FAP	Fuse and Alarm Panel	870-1606-02 Rev B	---	Standard 40 Amp feeds
FAP	Fuse and Alarm Panel	870-2320-028 Rev J	870-2320-04	Heavy Duty Frame 60 Amp feeds
FAP	Fuse and Alarm Panel	870-2320-01 Rev A - I	870-2320-03	Heavy Duty Frame 40 Amp feeds
FAP	Fuse and Alarm Panel	870-0243-08 Rev C	---	Control/ Extension Frame
FAP	Fuse and Alarm Panel	870-0243-09 Rev C	---	Misc Frame
	FAP Jumper Board	870-1641-01	---	
	FAP Jumper Board	870-1641-02	---	
	Heavy Duty Frame	860-0434-01	---	
	MPS Server	870-2640-01	870-2640-03	T1000 AS
FAP	Fuse and Alarm Panel	870-2804-01	870-2804-01	Control/ Extension Frame
	FAP Shorting Board	870-2805-01	870-2805-01	
	FAP Jumper Board	870-2806-01	870-2806-01	

Labels

Table 38: EAGLE 5 ISS Labels

Name	Part Numbers
Label, Control frame	658-0486-01
Label, Extension frame 00	658-0486-02
Label, Extension frame 01	658-0486-03
Label, Extension frame 02	658-0486-04
Label, Extension frame 03	658-0486-05
Label, Extension frame 04	658-0486-06
Label, Miscellaneous frame 00	658-0374-01
Label, Miscellaneous frame 01	658-0374-02
Label, Heavy Duty Frame	658-0374-01
Label, CF-00, Shelf 1	658-0490-01
Label, CF-00, Shelf 2	658-0490-02
Label, CF-00, Shelf 3	658-0490-03
Label, EF-00, Shelf 1	658-0490-04
Label, EF-00, Shelf 2	658-0490-05
Label, EF-00, Shelf 3	658-0490-06
Label, EF-01, Shelf 1	658-0490-07
Label, EF-01, Shelf 2	658-0490-08
Label, EF-01, Shelf 3	658-0490-09

Name	Part Numbers
Label, EF-02, Shelf 1	658-0490-10
Label, EF-02, Shelf 2	658-0490-11
Label, EF-02, Shelf 3	658-0490-12
Label, EF-03, Shelf 1	658-0490-13
Label, EF-03, Shelf 2	658-0490-14
Label, EF-03, Shelf 3	658-0490-15
Label, EF-04, Shelf 1	658-0490-16
Label, Field Tool Identification	658-0941-01
Label, Field Tool Identification wrap	658-0941-02

Miscellaneous Parts

Table 39: EAGLE 5 ISS Miscellaneous Part Numbers

Name	Part Numbers		Note
	North America	International	
Drives			
Dual CD-RW\DVD-ROM	870-2746-01	870-2746-02	T1x00 AS
Disk Drive, 120GB	804-1804-01	804-1804-R01	ULTRA ATA/100/133_7200RPM
Panels			
Alarm side panel	870-0259-02	---	
Alarm indicator lamps	525-0067-R01	---	

Name	Part Numbers		Note
	North America	International	
Blank side panel	840-0017-02	---	
Gray tinted plastic rear covers	654-0075-01	654-0075-R01	
Brackets, unit separation	652-0609-01	652-0609-02	
Bracket	652-0954-01	652-0954-02	Fan
Kits			
Cable Rack Mounting Kit	804-1571-01	---	Heay duty frame
Cable Rack Mounting Kit	804-0219-01 804-0219-02	804-0219-R01 804-0219-R02	raised floor
External tooth washers	606-0062-01	---	fan bracket
Diode Board A	870-1608-01	---	
Diode Board A	870-1608-03	---	
Diode Board B	870-1608-02	---	
Diode Board B	870-1608-04	---	
Diode Upgrade kit	870-1831-01	---	For 870-1606-02
Diode Upgrade kit	870-1831-02	---	For 870-2320-01
E1 Interface Kit	890-1037-01	890-1037-06	
Mounting hardware kit	840-0092-01	840-0092-03	For heavy duty frame. South America/India only
Brackets, Screws, and other small items			
Brackets, unit separation	652-0609-01	652-0609-02	

Name	Part Numbers		Note
	North America	International	
Bracket	652-0954-01	652-0954-02	Fan
Bracket, fan tray	652-0012-01	652-0012-02	Fan tray
Bracket, side, fan tray	652-0015-01	652-0015-02	Fan tray
Heat-shrink	804-0229-01	---	
Heat-shrink	804-0228-01	---	
Lugs, # 6 two-hole	502-0085-01	502-0085-R01	FAP connector
#6 AWG	690-0131-01	690-0131-R01	
1/0 pink lug	804-0977-01	804-0977-R01	
Pin Protector Assembly	830-0880-01		
Screws (12)	601-0010-01	---	
Screws	600-0193-01	---	12x24 .500 cs zinc fan bracket
Terminal lug	804-0817-02	804-0817-R02	
Terminating resistor	104-0032-01	---	E1 backplane

Power Cords for Peripherals

Table 40: Power Cords for Peripherals

Country	Part Number		
USA	Cord provided	Latvia	804-1185-R01
Argentina	804-1185-R02	Liechtenstein	804-1185-R11

Country	Part Number		
Australia	804-1185-R02	Lithuania	804-1185-R01
Austria	804-1185-R01	Luxembourg	804-1185-R01
Belgium	804-1185-R01	Malaysia	804-1185-R03
Brazil	804-1185-R01	Malta	804-1185-R03
Bulgaria	804-1185-R01	Mexico	Cord provided
Canada	Cord provided	Monaco	804-1185-R01
Chile	804-1185-R01	Netherlands	804-1185-R01
China	804-1185-R09	New Zealand	804-1185-R02
Columbia	Cord provided	Norway	804-1185-R01
Cyprus	804-1185-R03	Peru	804-1185-R01
Czech Republic	804-1185-R01	Philippines	Cord provided
Denmark	804-1185-R04	Poland	804-1185-R01
Egypt	804-1185-R01	Portugal	804-1185-R01
Estonia	804-1185-R01	Romania	804-1185-R01
Finland	804-1185-R01	Russia	804-1185-R01
France	804-1185-R07	Saudi Arabia	Cord provided
Germany	804-1185-R01	Singapore	804-1185-R03
Greece	804-1185-R01	Slovakia	804-1185-R01
Hong Kong	804-1185-R03	South Africa	804-1185-R06
Hungary	804-1185-R01	South Korea	804-1185-R01
Iceland	804-1185-R01	Spain	804-1185-R01

Country	Part Number		
India	804-1185-R06	Sweden	804-1185-R01
Ireland	804-1185-R03	Switzerland	804-1185-R11
Israel	804-1185-R12	Taiwan	Cord provided
Italy	804-1185-R07	Turkey	804-1185-R01
Ivory Coast	804-1185-R01	United Kingdom	804-1185-R03
Japan	804-1185-R10	United Arab	804-1185-R03

Glossary

A

AC	Alternating Current Application Context Authentication Center Area Code
ACT	Activate
ALM	Alarm Card
AMI	Alternate Mark Inversion
AND	AIN Number of Digits (in GTT address for AIN query)
ANSI	American National Standards Institute An organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system. ANSI develops and publishes standards. ANSI is a non-commercial, non-government organization which is funded by more than 1000 corporations, professional bodies, and enterprises.
AS	Application Server A logical entity serving a specific Routing Key. An example of an Application Server is a virtual switch element handling all call processing for a unique range of PSTN trunks, identified by an SS7 DPC/OPC/CIC_range. Another

A

	example is a virtual database element, handling all HLR transactions for a particular SS7 DPC/OPC/SCCP_SSN combination. The AS contains a set of one or more unique Application Server Processes, of which one or more normally is actively processing traffic.
	Application Simulator
	Test tool that can simulate applications and/or SMSCs.
ASCII	American Standard Code for Information Interchange
ASM	Application Services Module
	A card in the EAGLE 5 ISS that provides additional memory to store global translation tables and screening data used for applications such as Global Title Translation (GTT) and Gateway Screening (GWS).
	This card is obsolete as of Release 31.6. The TSM card is used.
Association	An association refers to an SCTP association. The association provides the transport for protocol data units and adaptation layer peer messages.
AST	Associated State
	The associated state of an entity.
AT	Application-terminated
	Short message traffic that terminates at an application.
ATM	Asynchronous Transfer Mode

A

	A packet-oriented transfer mode that uses an asynchronous time division multiplexing technique to multiplex information flow in fixed blocks, called cells. A high-bandwidth, low-delay switching, and multiplexing technology to support applications that include high-speed data, local area network interconnection, multimedia application and imaging, and residential applications such as video telephony and other information-based services.

B

BERT	Bit Error Rate Test
BITS	Building Integrated Timing System The Building Integrated Timing System (BITS) clocks come directly from the central office BITS clock source or indirectly from an optional holdover clock installed in the system.
BP	Board Prom

C

CAT	Cell Attribute Table
CD	Carrier Detect Compact Disk
CF	Control Frame
Channel	A single Time-Division-Multiplexed (TDM) timeslot within a channelized E1/T1 port. Generically, channels can be used for transporting

C

	signaling, digitized voice, or data information. Unused channels typically are filled with defined idle codes designed to maintain sufficient ones density to ensure frame-level synchronization.
CI	Clock Interface Card
CLLI	Common Language Location Identifier The CLLI uniquely identifies the STP in terms of its physical location. It is usually comprised of a combination of identifiers for the STP's city (or locality), state (or province), building, and traffic unit identity. The format of the CLLI is: The first four characters identify the city, town, or locality. The first character of the CLLI must be an alphabetical character. The fifth and sixth characters identify state or province. The seventh and eighth characters identify the building. The last three characters identify the traffic unit.
Control Shelf	The shelf in the EAGLE 5 ISS that contains the Maintenance and Administration Subsystem. The Maintenance and Administration Subsystem contains 5 cards: 2 CAM cards, 2 TDMs (Terminal Disk Modules), and 1 MDAL (Maintenance Disk and Alarm) card. This shelf is designated as Shelf 1100 and cannot be added or removed from the database.
CSU	Channel Service Unit

C

CSV	Comma-separated value The comma-separated value file format is a delimited data format that has fields separated by the comma character and records separated by newlines (a newline is a special character or sequence of characters signifying the end of a line of text).

D

Database	All data that can be administered by the user, including cards, destination point codes, gateway screening tables, global title translation tables, links, LNP services, LNP service providers, location routing numbers, routes, shelves, subsystem applications, and 10 digit telephone numbers.
DB	Database Daughter Board Documentation Bulletin
DC	Direct Current
DCM	Database Communication Module The DCM provides IP connectivity for applications. Connection to a host is achieved through an ethernet LAN using the TCP/IP protocol.
DLK	Data Link TCP/IP Data Link
DO	Derived Object
DPC	Destination Point Code

D

	DPC refers to the scheme in SS7 signaling to identify the receiving signaling point. In the SS7 network, the point codes are numeric addresses which uniquely identify each signaling point. This point code can be adjacent to the EAGLE 5 ISS, but does not have to be.
DS0	Digital Signal Level-0 (64 Kbits/sec or 56 Kbits/sec) A basic digital signaling rate of 64 Kbits/sec, corresponding to the capacity of one voice-frequency-equivalent channel.
DS1	Digital Signal Level-1 (1.544Mbits/sec) A widely used standard in telecommunications in North America and Japan to transmit voice and data between devices. The data transmitted over a physical T1 line.
DSM	Database Service Module. The DSM provides large capacity SCCP/database functionality. The DSM is an application card that supports network specific functions such as EAGLE Provisioning Application Processor (EPAP), Global System for Mobile Communications (GSM), EAGLE Local Number Portability (ELAP), and interface to Local Service Management System (LSMS).
DSO	Fault sectionalization tests, a series of far-end loopback tests to identify faulty segments of an SS7 transmission path up to and including the remote network element.

D

DSU	Data Service Unit
DTA	Database Transport Access A feature in the EAGLE 5 ISS that encapsulates specific MSUs into the data portion of SCCP within a new SS7 MSU and sends the new MSU to the destination using global title translation. The EAGLE 5 ISS uses gateway screening to determine which MSUs are used by the DTA feature.
DUT	Design Under Test
DVD	Digital Versatile Disk

E

E1	The European equivalent of T1 that transmits digital data over a telephone network at 2.048 Mbps.
E5-ENET	EPM-based Ethernet card A high capacity single-slot IP signaling card (EPM card plus Gig Ethernet PMC cards).
EC	External Condition Condition that is passed on the external condition interface.
EDCM	Enhanced Database Communication Module
EF	Extension Frame
ELAP	EAGLE Local Number Portability Application Processor

E

EMDC	Element Measurement and Data Collection Application This application is used by the DCM card for CMIP/OSI measurement collection interface as defined by Telcordia GR-376.
EMS	Element Management System The EMS feature consolidates real-time element management at a single point in the signaling network to reduce ongoing operational expenses and network downtime and provide a higher quality of customer service.
EPAP	EAGLE Provisioning Application Processor
ESF	Extended Super Frame
ESP	Expanded Services Platform The Sentinel system with the hardware and software platform that provides the interface to the Integrated EAGLE and Sentinel monitoring system. The ESP hardware and software platform runs on the model 120 server.
Extension Shelf	See ES.

F

FAN	Cooling fan feature. The EAGLE 5 ISS will report on the alarm conditions of the fan assemblies. Once you have turned on the feature, you cannot turn it off. The feature applies to any and all fans installed within the system. When replacing

F

	a fan assembly, the feature should already be turned on.
FAP	Fuse and Alarm Panel
FD	Feature Description File Descriptor File Duplicator Fixed Disk
FE	Feature Engineer
FTA	File Transfer Area A special area that exists on each OAM hard disk, used as a staging area to copy files to and from the EAGLE 5 ISS using the Kermit file-transfer protocol.
FTP	File Transfer Protocol A client-server protocol that allows a user on one computer to transfer files to and from another computer over a TCP/IP network.

G

GB	Gigabyte — 1,073,741,824 bytes
GLS	Generic Loading Services An application that is used by the TSM cards for downloading gateway screening to LIM cards.
GMT	Greenwich Mean Time
GPL	Generic Program Load

G

	Software that allows the various features in the system to work. GPLs and applications are not the same software.
GPSM	General Purpose Service Module
GSM	Global System for Mobile Communications
GTI	Global Title Indicator
GTT	Global Title Translation A feature of the signaling connection control part (SCCP) of the SS7 protocol that the EAGLE 5 ISS uses to determine which service database to send the query message when an MSU enters the EAGLE 5 ISS and more information is needed to route the MSU. These service databases also verify calling card numbers and credit card numbers. The service databases are identified in the SS7 network by a point code and a subsystem number.
GWS	Gateway Screening Used at gateway STPs to limit access into the network to authorized users. A gateway STP performs inter-network routing and gateway screening functions. GWS controls access to nonhome SS7 networks. Only an MSU that matches predefined criteria in the EAGLE 5 ISS's database is allowed to enter the EAGLE 5 ISS.

H

HC-MIM	High Capacity Multi-Channel Interface Module

H

	A card that provides access to eight E1/T1 ports residing on backplane connectors A and B. Each data stream consists of 24 T1 or 31 E1 DS0 signaling links assigned in a time-division multiplex (TDM) manner. Each channel occupies a unique timeslot in the data stream and can be selected as a local signaling link on the interface card. Each card has 8 E1 or 8 T1 port interfaces with a maximum of 64 signaling links provisioned among the 8 E1/T1 ports.
High-Speed Multiplexer	See HMUX.
HIPR	High-Speed IMT Packet Router A card that provides increased system throughput and traffic capacity. HIPR moves EAGLE from an intra-shelf ring topology to an intra-shelf switch topology. HIPR acts as a gateway between the intra-shelf IMT BUS, running at 125Mbps, and the inter-shelf operating at 1.0625Gbps. The HIPR card will seat in the same slot as an HMUX card (slots xx09 & xx10 of each shelf).
HIPR2	High-Speed IMT Packet Router 2 A card that provides increased system throughput and traffic capacity on the existing Fibre-Channel ring. A high rate Fibre-Channel option of 2.5 Gbps is available when an EAGLE is provisioned with all HIPR2 cards. In a mixed topology where a HIPR2 is used in an EAGLE along with HMUX and HIPR, the Fibre-Channel ring runs at the lower rate of 1.0625 Gbps.

H

HMUX	High-Speed Multiplexer A card that supports the requirements for up to 1500 links, allowing communication on IMT buses between cards, shelves and frames. HMUX cards interface to 16 serial links, creating a ring from a series of point to point links. Each HMUX card provides a bypass multiplexer to maintain the ring's integrity as cards are removed and inserted into an operational shelf. High-Speed IMT Multiplexer, a replacement card for the IPMX.
HS	High Speed

I

ID	Identity, identifier
INP	INAP-based Number Portability Tekelec's INP can be deployed as a stand-alone or an integrated signal transfer point/number portability solution. With Tekelec's stand-alone NP server, no network reconfiguration is required to implement number portability. The NP server delivers a much greater signaling capability than the conventional SCP-based approach. Intelligent Network (IN) Portability
IP	Internet Protocol IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides

I

	packet routing, fragmentation and re-assembly through the data link layer.
IPLIM	The application used by the SSEDCM/E5-ENET card for IP point-to-point connectivity for ANSI point codes.
IPMX	IMT Power and Multiplexer card
IS-ANR	In Service - Abnormal The entity is in service but only able to perform a limited subset of its normal service functions.
IS-NR	In Service - Normal
ISS	Integrated Signaling System
ITU	International Telecommunications Union

K

KSR	Keyboard Send/Receive Mode

L

LAN	Local Area Network A private data network in which serial transmission is used for direct data communication among data stations located in the same proximate location. LAN uses coax cable, twisted pair, or multimode fiber. See also STP LAN.
LED	Light Emitting Diode

L

	An electrical device that glows a particular color when a specified voltage is applied to it.
LFS	Link Fault Sectionalization A feature in the EAGLE 5 ISS that allows the maintenance personnel to perform a series of far end loopback tests, from the EAGLE 5 ISS and identify faulty segments of an SS7 transmission path up to and including the remote network element.
LIM	Link Interface Module Provides access to remote SS7, IP and other network elements, such as a Signaling Control Point (SCP) through a variety of signaling interfaces (DS0, MPL, E1/T1 MIM, LIM-ATM, E1-ATM, IPLIMx, IPGWx). The LIMs consist of a main assembly and possibly, an interface appliqué board. These appliqués provide level one and some level two functionality on SS7 signaling links.
Link	Signaling Link Signaling Link Carries signaling within a Link Set using a specific Association. A Link can belong to only one Link Set and one Association. There is generally one Link per Association in a Link Set.
LLT	Latching LFS Test
LNP	Local Number Portability

L

LS	Link Set A group of signaling links carrying traffic to the same signaling point.
LSMS	Local Service Management System

M

MAN	Metropolitan Area Network
MAS	Maintenance and Administration Subsystem A set of cards located in the Control Shelf, used to provide a central management point for the EAGLE 5 ISS. The MAS provides user interface, maintenance communication, peripheral services, alarm processing, system disk interface, and measurements using the following three subassemblies: GPSM-II, TDM, and MDAL.
MASP	Maintenance and Administration Subsystem Processor The Maintenance and Administration Subsystem Processor (MASP) function is a logical pairing of the GPSM-II card and the TDM card. The GPSM-II card is connected to the TDM card by means of an Extended Bus Interface (EBI) local bus. The MDAL card contains the removable cartridge drive and alarm logic. There is only one MDAL card in the Maintenance and Administration Subsystem (MAS) and it is shared between the two MASPs.
MCA	Matrix Controller Assembly

M

MCAP	Maintenance Communications & Applications Processor
MCPM	Measurement Collection and Polling Module The Measurement Collection and Polling Module (MCPM) provides comma delimited core STP measurement data to a remote server for processing. The MCPM is an EDSM with 2 GB of memory running the MCP application.
MDAL	Maintenance Disk and Alarm
MIM	Multi-Channel Interface Module
MIN	Mobile Identification Number
MMI	Man-Machine Interface
MO	Magneto Optical Managed Object Mobile Originated Refers to a connection established by a mobile communication subscriber. Everything initiated by the mobile station is known as mobile originated.
MPL	Multi-port LIM
MPS	Multi-Purpose Server The Multi-Purpose Server provides database/reload functionality and a variety of high capacity/high speed offboard database functions for

M

applications. The MPS resides in the General Purpose Frame.

MRN — Message Reference Number

An unsolicited numbered message (alarm or information) that is displayed in response to an alarm condition detected by the system or in response to an event that has occurred in the system.

Mated Relay Node

A mated relay node (MRN) group is provisioned in the database to identify the nodes that the traffic is load shared with, and the type of routing, either dominant, load sharing, or combined dominant/load sharing.

MSU — Message Signal Unit

The SS7 message that is sent between signaling points in the SS7 network with the necessary information to get the message to its destination and allow the signaling points in the network to set up either a voice or data connection between themselves. The message contains the following information:

- The forward and backward sequence numbers assigned to the message which indicate the position of the message in the traffic stream in relation to the other messages.
- The length indicator which indicates the number of bytes the message contains.
- The type of message and the priority of the message in the signaling information octet of the message.

M

- The routing information for the message, shown in the routing label of the message, with the identification of the node that sent message (originating point code), the identification of the node receiving the message (destination point code), and the signaling link selector which the EAGLE 5 ISS uses to pick which link set and signaling link to use to route the message.

MTP — The levels 1, 2, and 3 of the SS7 protocol that control all the functions necessary to route an SS7 MSU through the network.

N

NA — North America

Not Applicable

NDC — Network destination code

NE — Network Element

An independent and identifiable piece of equipment closely associated with at least one processor, and within a single location.

Network Entity

NEI — Network Element Interface

Network Element — See NE

NLT — Nonlatching LFS Test

N

NO	Network OAM&P A server that manages a collection of SOs and their corresponding MPs. NO servers are deployed in active/standby pairs.

O

OAM	Operations, Administration, and Maintenance The application that operates the Maintenance and Administration Subsystem which controls the operation of the EAGLE 5 ISS.
OAM switchover	When the Active OAM gives up control (e.g. Init, Isolated, Obit) and either the Standby OAM becomes the Active or the old Active becomes a newly re initialized Active. This is a time when existing maintenance and status information is lost and must be relearned.
OAP	A stand-alone processor that acts as an interface between the EAGLE 5 ISS and OSS (operation support system) devices using standard interfaces and converting the communications to the EAGLE 5 ISS proprietary serial interface.
OAPF	Operations System Support / Applications Processor Frame
OCU	Office Channel Unit The interface used with the LIMOCU card.
OEM	Original Equipment Manufacturer
OOS-MT	Out of Service - Maintenance

O

The entity is out of service and is not available to perform its normal service function. The maintenance system is actively working to restore the entity to service.

OS — Operations Systems

P

PC — Point Code

The identifier of a signaling point or service control point in a network. The format of the point code can be one of the following types:

- ANSI point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**).
- Non-ANSI domestic point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**).
- Cluster point codes in the format network indicator-network cluster-* or network indicator-*-*.
- ITU international point codes in the format **zone-area-id**.
- ITU national point codes in the format of a 5-digit number (**nnnnn**), or 2, 3, or 4 numbers (members) separated by dashes (**m1-m2-m3-m4**) as defined by the Flexible Point Code system option. A group code is required (**m1-m2-m3-m4-gc**) when the ITUDUPPC feature is turned on.
- 24-bit ITU national point codes in the format main signaling area-subsignaling area-service point (**msa-ssa-sp**).

P

PR	Problem Report
PST	Primary State A field in the `rept-stat` command outputs showing the primary state of the specified entity.

R

RAID	Redundant Array of Independent Disks A group of disks presented to clients as one or more large virtual disks, with accesses coordinated among multiple disks concurrently to increase performance, reliability, or both.
RAM	Random Access Memory A type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes.
RD	Receive Data Removable Disk
RJ	Registered Jack
RMA	Return Material Authorization
ROM	Read Only Memory
Route	A signaling path from an LSP to an RSP using a specified Link Set
RS	Requirement Specification

R

RTDB	Real Time Database

S

SCCP	Signaling Connection Control Part
SCP	Service Control Point Service Control Points (SCP) are network intelligence centers where databases or call processing information is stored. The primary function of SCPs is to respond to queries from other SPs by retrieving the requested information from the appropriate database, and sending it back to the originator of the request.
	Secure Copy
SCSI	Small Computer System Interface There are two independent Small Computer System Interface (SCSI) buses, one to the fixed disks on TDM cards and the other to the shared administration SCSI bus that runs on the backplane between TDMs and the MDAL card. Each SCSI bus has a block of memory that allows transfers from memory to occur without delaying the application processor.
SEAS	Signaling Engineering and Administration System An interface defined by Bellcore and used by the Regional Bell Operating Companies (RBOCs), as well as other Bellcore Client Companies (BCCs), to remotely administer and monitor the signaling points in their network from a central location.

S

SLAN	Signaling Transfer Point Local Area Network A feature in the EAGLE 5 ISS that copies MSUs selected through the gateway screening process and sends these MSUs over the Ethernet to an external host computer for further processing.
SLC	Signaling Link Code
SLTA	Signaling Link Test Acknowledgment
SLTC	Signaling Link Test Controller
SLTM	Signal Link Test Message
SR	Screening Reference
SS	Subsystem
SS7	Signaling System #7
SST	Secondary State The secondary state of the specified entity. Subsystem Status Test network management message.
STC	Signaling Transport Card The Signaling Transport Card (STC) is a member of the DCM card family with an “eroute” generic program load (GPL) installed. The STCs provide the IP interface between the LIM cards on the IMT bus and the

S

	Signaling Extended Services Platform (ESP) subassembly. The STC is used for sending MSU data to the ESP/IMF.
STP	Signal Transfer Point STPs are ultra-reliable, high speed packet switches at the heart of SS7 networks, which terminate all link types except F-links. STPs are nearly always deployed in mated pairs for reliability reasons. Their primary functions are to provide access to SS7 networks and to provide routing of signaling messages within and among signaling networks.
STP LAN	Signaling Transfer Point Local Area Network. A feature in the EAGLE 5 ISS that copies MSUs selected through the gateway screening process and sends these MSUs over the Ethernet to an external host computer for further processing.
STPLAN	Signaling Transfer Point Local Area Network The application used by the SLAN card and E5-SLAN card to support the STP LAN feature. This application does not support 24-bit ITU-N point codes.

T

T1	Transmission Level 1 A T1 interface terminates or distributes T1 facility signals for the purpose of processing the SS7 signaling links carried by the E1 carrier.

T

	A leased-line connection capable of carrying data at 1,544,000 bits-per-second.
TCP/IP	Transmission Control Protocol/Internet Protocol
TDM	Terminal Disk Module Time Division Multiplexing
TFP	TransFer Prohibited (Msg) A procedure included in the signaling route management (functionality) used to inform a signaling point of the unavailability of a signaling route.
TFR	Transfer Restricted
TO	Timing Output
TOCA	Timing Output Composite Automatic
TPS	Transactions Per Second
TRM	Termination Response Mode
TSM	Translation Services Module Provides translation capability and Global Title Translation (GTT) implementation for the Local Number Portability (LNP) function and is used for downloading gateway screening tables to link interface modules (LIMs).

T

TX	Transmit

U

UAM	Unsolicited Alarm Message A message sent to a user interface whenever there is a fault that is service-affecting or when a previous problem is corrected. Each message has a trouble code and text associated with the trouble condition.
UIM	Unsolicited Information Message A message sent to a user interface whenever there is a fault that is not service-affecting or when a previous problem is corrected. Each message has a trouble code and text associated with the trouble condition.

V

VOM	Volt Ohm Meter
VSCCP	VxWorks Signaling Connection Control Part The application used by the Service Module card to support EPAP-related features and LNP features. If an EPAP-related or LNP feature is not turned on, and a Service Module card is present, the VSCCP application processes normal GTT traffic.