Tekelec EAGLE® 5 Integrated Signaling System

Feature Manual - A-Port

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This product is covered by one or more of the following U.S. and foreign patents:
U.S. Patent Numbers:
5,732,213; 5,953,404; 6,115,746; 6,167,129; 6,324,183; 6,327,350; 6,456,845; 6,606,379; 6,639,981; 6,647,113; 6,662,017; 6,735,441; 6,745,041; 6,765,990; 6,795,546; 6,819,932; 6,836,477; 6,839,423; 6,885,872; 6,901,262; 6,914,973; 6,940,866; 6,944,184; 6,954,526;6,954,794; 6,959,076; 6,965,592; 6,967,956; 6,968,048; 6,970,542; 6,987,781; 6,987,849; 6,990,089; 6,990,347; 6,993,038; 7,002,988; 7,020,707; 7,031,340; 7,035,239; 7,035,387; 7,043,000; 7,043,001; 7,043,002; 7,046,667; 7,050,456; 7,050,562; 7,054,422; 7,068,773; 7,072,678; 7,075,331; 7,079,524; 7,088,728; 7,092,505; 7,108,468; 7,110,780; 7,113,581; 7,113,781; 7,117,411; 7,123,710; 7,127,057; 7,133,420; 7,136,477; 7,139,388; 7,145,875; 7,146,181; 7,155,206; 7,155,243; 7,155,505; 7,155,512; 7,181,194; 7,190,702; 7,190,772; 7,190,959; 7,197,036; 7,206,394; 7,215,748; 7,219,264; 7,222,192; 7,227,927; 7,231,024; 7,242,695; 7,254,391; 7,260,086; 7,260,207; 7,283,969; 7,286,516; 7,286,647; 7,286,839; 7,295,579; 7,299,050; 7,301,910; 7,304,957; 7,318,091; 7,319,857; 7,327,670
Foreign Patent Numbers:
EP1062792; EP1308054; EP1247378; EP1303994; EP1252788; EP1161819; EP1177660; EP1169829; EP1135905; EP1364520; EP1192758; EP1240772; EP1173969; CA2352246

Ordering Information

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Chapter 1

Introduction

Topics:

This chapter provides a brief description of the A-Port feature of the EAGLE 5 Integrated Signaling System. The chapter also includes the scope, audience, and organization of the manual; how to find related publications; and how to contact Tekelec for assistance.

Overview

This manual provides a description, along with commands, maintenance, measurements, and configuration details associated with the ANSI-41 Mobile Number Portability (A-Port) feature of the EAGLE 5 Integrated Signaling System (ISS) and other features for which the A-Port feature is a prerequisite. A-Port provides IS41 number portability functionality using a triggerless solution. In response to governmental mandates for telecommunication networks, this feature focuses on service provider number portability on IS41 networks.

A-Port minimizes the challenges for IS41 network operators while enabling them to meet their regulatory obligations. A-Port supports the Signaling Relay Function (SRF) for direct and indirect routing. SRF-based MNP processing examines MAP messages for ported numbers. For call-related messages, A-Port acts as an "NP HLR" for exported number by responding with a MAP SRI message; A-Port performs a message relay function for calls to imported numbers and non-call related messages.

A-Port is an optional feature on the EAGLE 5 ISS, and can be enabled and turned on, but not off, via a feature access key. Note that A-Port requires the Global Title Translation (GTT) feature and that A-Port and North American LNP (Local Number Portability) are mutually exclusive on an EAGLE 5 ISS node.

Scope and Audience

This manual is intended for anyone responsible for installing, maintaining, and using the A-Port feature in the EAGLE 5 ISS. Users of this manual and the others in the EAGLE 5 ISS family of documents must have a working knowledge of telecommunications and network installations.

Manual Organization

This document is organized into the following chapters:

- *Introduction* on page 1 contains general information about the A-Port documentation, the organization of this manual, and how to request technical assistance.
- *Feature Description* on page 9 provides a functional description of the A-Port and MT-Based IS41 SMS NP features, including network perspectives, assumptions and limitations, a database overview, Service Module card provisioning and reloading, A-Port user interface, and an audit overview.
- *Commands* on page 47 describes the commands that support the A-Port and MT-Based IS41 SMS NP features.
- *Feature Activation* on page 71 describes how to activate the A-Port and MT-Based IS41 SMS NP features.
- *Maintenance and Measurements* on page 123 describes maintenance and measurements, including EPAP status and alarms, hardware verification messages, TSM emulation mode, A-Port system status reports and commands, code and application data loading, and alarms.

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*.)

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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.

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

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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:

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  Phone:

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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.

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.

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 as a set or individually. Exceptions to printed documentation are:

- Hardware or Installation manuals are printed only 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 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

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1. Log into the Tekelec **new** Customer Support site at *support.tekelec.com*.

   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**.

Chapter 2

Feature Description

Topics:

This chapter describes the A-Port feature and the MT-Based IS41 SMS NP feature.

Introduction

Throughout the world, an increasing number of governments are mandating that telecommunications network operators support service provider number portability. Number portability is primarily intended to promote competition among service providers, and applies to both wireline and mobile phone networks. In particular, the A-Port (IS41 Mobile Number Portability) feature provides the ability for IS41 subscribers to change service providers while retaining their current Mobile Directory Number (MDN).

A-Port utilizes the EPAP database to derive the portability status of a subscriber. This feature supports LOCREQ messages as well as SMSREQ messages, if the option is selected, for number portability handling. LOCREQ messages generate a LOCREQ response if the MDN is ported and also relays the LOCREQ if the MDN is not ported. Non-ported or ported in are handled the same way.

A-Port MNP is based on the EAGLE 5 ISS platform. It is deployed in a node that is also performing the STP function.

MTP Msgs for SCCP Apps

If the MTP Msgs for SCCP Apps feature is turned on, all MTP routed UDT/non-segmented XUDT SCCP messages are routed to Service Module cards. The Service Module cards then perform SCCP decode/verification on MTP routed messages. If the MTP routed messages have CDPA GTI = 0 and the A-Port feature is turned on, then the message is sent for A-Port processing. If the MTP routed messages have CDPA GTI ≠ 0, then SRVSEL lookup is performed using the SCCP CDPA information. If the result of the lookup is MNP service, the MTP routed messages are sent to MNP handling. MNP begins A-Port general TCAP/ MAP verification if the message is ANSI TCAP and A-Port feature is turned on.

MNP Circular Route Prevention

The MNP Circular Route Prevention (MNPCRP) feature is an extension of the A-Port feature which helps in cases of circular routing caused by incorrect information in one or more of the network number portability databases. For example, a subscriber may have ported from network A to network B. Network A has the correct routing information, indicating the subscriber now belongs to network B. However, network B may have incorrect routing information, indicating that the subscriber still belongs to network A. Based on its portability data, network A routes the call to network B, but network B routes the call back to network A, based on the incorrect data of network B. This results in a circular route. The MNP CRP feature provides the logic to prevent this scenario. This feature is enabled and turned on using Feature Key Control commands.

DigitAction Expansion

The DigitAction Expansion feature provides more flexibility to formulate the SCCP Called Party Address (SCCP) Global Title Address (GTA) field of the MAP messages relayed by A-Port. DigitAction Expansion is provisioned via the PDBI Enter Network Entity or Update Network Entity commands. DigitAction Expansion can also be modified via the Add an NE and Update an NE GUI screens.

MNP SCCP Service Re-Route

The MNP SCCP Service Re-Route feature is used when the A-Port subscriber database is incoherent with MPS data and the GTT data is valid. The A-Port SCCP Service Re-Route feature provides the capability to re-route the traffic from the EAGLE 5 ISS to other A-Port subscriber database nodes and inform the originating nodes to re-route the A-Port service related traffic to other A-Port service nodes.

The MNP SCCP Service Re-Route feature is designed to handle and control re-routing of A-Port traffic from an affected node to alternate nodes within the network of an operator. This feature is an optional feature and does not affect the normal A-Port functionality. This feature also provides the option to mark A-Port OFFLINE to perform a controlled re-routing during this state.

MO-Based IS41 SMS NP

The Mobile Originated Based IS41 SMS NP (MO-Based IS41 SMS NP) feature allows wireless operators to route Short Message Service (SMS) messages originating from a mobile subscriber within a Number Portability (NP) environment. For additional information about the MO-Based IS41 SMS NP feature, refer to *Feature Manual - MO SMS*.

MT-Based IS41 SMS NP

The Mobile Terminated Based IS41 SMS NP (MT-Based IS41 SMS NP) feature allows wireless operators to route Short Message Service (SMS) messages destined to mobile subscribers within a Number Portability (NP) environment. If the MT-Based IS41 SMS NP feature is not enabled and turned on, then messages are processed by the A-Port feature.

Two types of messages occur with respect to number portability: call related and non-call related. The call-related messages (LOCREQ) query the HLR in real time for delivering the call to the subscriber. The A-port feature handles these.

Non-call related messaging involves the short message service center (SMSC) querying the HLR for the destination subscriber for SMS delivery. For SMS, these query messages are called SMSREQ. The HLR responds to these messages with routing information that can be used by the querying node (SMSC) to deliver the SMS message. In this feature, the Eagle 5 ISS intercepts these SMSREQ messages destined to the HLR and replies with routing information for out-of-network destination subscribers.

The MT-Based SMS feature with A-Port functionality will:

- Intercept SMS routing information request from the SMSC before it reaches the HLR (A-Port function).
- Extract message destination address (SCCP Called Party GTA), condition the digits and perform lookup in the Real Time Database (RTDB) (A-Port function).
- For destination address/subscribers belonging to foreign networks, send reply message to the SMSC with routing information. This information can be used by the SMSC to route the message to their recipient networks.
- For in-network destination addresses, the SMS routing information request is relayed to the HLR according to the options set for normal A-Port routing.

Signaling Relay Function

Standards are defined such that carriers can choose to implement either Signaling Relay Function (SRF)-based (using MAP protocol) MNP or IN-based (using INAP protocol) MNP. A-Port supports

only the SRF-based solution for MNP. INAP-based MNP processing is similar to wireline networks; this function is supported by the INP feature.

SRF-based MNP processing involves the "intercepting" of existing MAP messages to check for ported numbers. For call-related messages, A-Port acts as a number portability home location register (HLR) when the number has been exported by responding to the switch with a LOCREQ ACK message. For calls to imported numbers and non-call related messages not selected for MT-Based IS41 SMS NP, A-Port performs message relay.

Routing Options

The ETSI standards for SRF-based MNP define two routing options, direct routing and indirect routing. A-Port supports both options:

- With direct routing, the network where the call is originated is responsible for determining whether the called party has ported and routing the call to the new subscription network.
- With indirect routing, this is the responsibility of the network that originally owned the number.

Number Length Differences

Number lengths vary between countries and may even vary within a country. As a result, the A-Port subscriber database structure supports numbers of varying length in a flexible way without necessitating software modifications. A maximum number length of 15 digits for ported numbers is supported.

A-Port Considerations

1. GTT must be on before the A-Port feature can be enabled.
2. The A-Port feature cannot be enabled if any TSM cards running the SCCP application are in the system.
3. The A-Port feature requires 4 GB Service Module cards.
4. A-Port can be turned on, but not turned off.
5. The A-Port, IGM, G-Port MNP, G-Flex C7 Relay, AINPQ, and INP features can run concurrently on an EAGLE 5 ISS node.
6. When A-Port and G-Flex are run on the same node, interactions between the two features must be addressed.
7. A-Port and North American LNP are mutually exclusive on an EAGLE 5 ISS node.

MPS/EPAP Platform

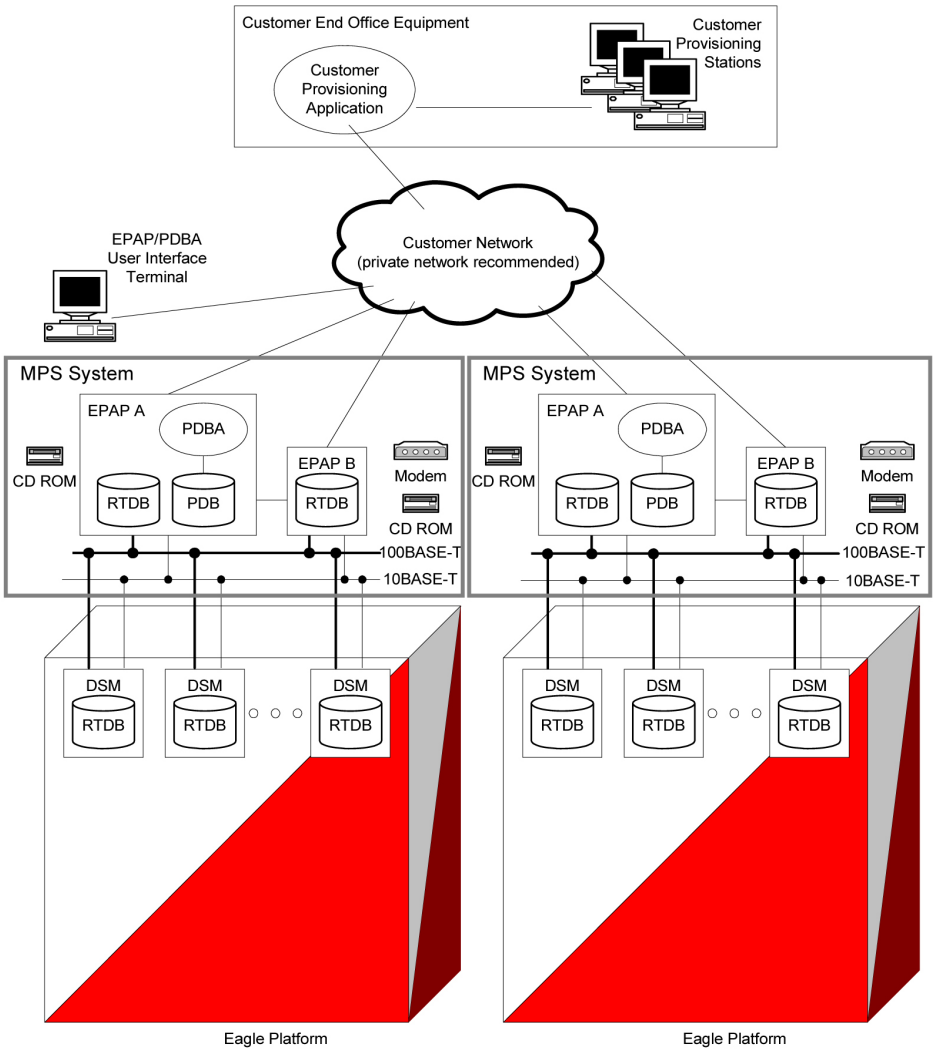
Tekelec provides the MPS (Multi-Purpose Server) platform as a subsystem of the EAGLE 5 ISS. The MPS provides support for the AINPQ, A-Port, EIR , G-Flex, G-Port, IGM, and INP features.

The MPS is composed of hardware and software components that interact to create a secure and reliable platform. (For details about the MPS hardware, refer to the *Tekelec 1000 Application Server Hardware Manual*.) The MPS provides the means of interfacing the customer provisioning application with the EAGLE 5 ISS. It connects the customer with the EAGLE 5 ISS and accepts the customer number portability data, while accommodating numbers of varying lengths.

The EAGLE Provisioning Application Processor (EPAP) is software that runs on the MPS hardware platform. It collects and organizes customer provisioning data, and forwards it to the EAGLE 5 ISS Service Module cards. *Figure 1: MPS/EPAP Platform Architecture* on page 13 shows the overall system architecture, providing a graphic overview of MPS/EPAP platform from customer provisioning through the MPS subsystem to the EAGLE 5 ISS Service Module card databases.

Note: In this Manual, Service Module Card refers to either a DSM card or an E5-SM4G card unless a specific card is required. For more information about the supported cards, refer to the *EAGLE 5 ISS Hardware Manual*.

Figure 1: MPS/EPAP Platform Architecture



Design Overview and System Layout

Figure 1: MPS/EPAP Platform Architecture on page 13 illustrates the overall system architecture and identifies the different tasks, databases and interfaces involved. The system consists of two mated MPS servers. Each MPS contains two EPAP platforms, EPAP A and EPAP B, each containing a RealTime Database (RTDB), a Provisioning Database (PDB), servers, optical media, modems, and network hubs. Each MPS and its EPAPs may be thought of as an 'EPAP system'; the EPAP

system and the mated EAGLE 5 ISS is referred to as the 'mated EPAP system'. Each EPAP system is a T1000 AS system with a total of four Ethernet interfaces: one from each EPAP to the 100Base-T Ethernet and one from each EPAP to the 10Base-T Ethernet.

On the EAGLE 5 ISS platform side, a set of Service Module cards, which hold the RTDB database, is part of the STP. Two high-speed Ethernet links connect the Service Module cards and the EPAPs. One of the links is a 100BASE-T Ethernet bus, and the other is a 10BASE-T Ethernet bus.

The RTDB database is provisioned and maintained through the EPAPs. EPAP A and EPAP B act as the active EPAP and the standby EPAP. One link serves as the active link, and the other as the standby link. At any given time, there is only one active EPAP and one active link. The database is provisioned through the active link by the active EPAP; the other EPAP provides redundancy.

In case of failure of the active EPAP, the standby EPAP takes over the role of active EPAP and continues to provision the subscriber database. In the case where the active link fails, the active EPAP switches to the standby link to continue provisioning the Service Module cards. The two Ethernet links are part of the DSM network.

Another 100BASE-T Ethernet link exists between the EPAPs; that link is called the EPAP sync network.

The major modules on the EPAP are:

- Service Module card provisioning module
- Maintenance module
- RTDB module
- PDB module

The Service Module card provisioning module is responsible for updating subscriber databases on the EAGLE 5 ISS Service Module cards using the Reliable Multicast Transport Protocol (RMTP) multicast. The maintenance module is responsible for the proper functioning of the EPAP platform. The PDB module is responsible for preparing and maintaining the Real Time Database, which is the "golden copy" of the subscriber database. The PDB module can run on one of the EPAPs of either of the mated EAGLE 5 ISSs.

Functional Overview

The main function of the MPS / EPAP platform is to provision the data from the customer network to the Service Module cards on the EAGLE 5 ISS. Subscriber database records are continuously updated from the customer network to the PDB. The PDB module communicates with the maintenance module and the RTDB task over a TCP/IP connection to provision the Service Module cards on the EAGLE 5 ISS. The maintenance module is responsible for the overall stability and performance of the system.

It is possible for the current copy of the RTDB database on the Service Module cards to get out-of-sync due to missed provisioning or card rebooting. Therefore, the RTDB on the EPAP contains a coherent, current copy of the subscriber database. The EPAP-Service Module card provisioning task sends database information out on the provisioning link. The Service Module cards act as the receivers and are reprovisioned.

EPAP/PDBA Overview

The EAGLE Provisioning Application Processor (EPAP) platform and the Provisioning Database Application (PDBA), coupled with the Provisioning Database Interface (PDBI) facilitate the user database required for EAGLE 5 ISS EPAP-based features. The following functions are supported:

- Accept and store subscription data provisioned by the customer
- Update and reload subscriber databases on the Service Module cards

The PDBA operates on the master Provisioning Database (PDB). The EPAP and PDBA are both installed on the MPS hardware platform.

The EPAP platform performs the following:

- Maintains an exact copy of the real time database (RTDB) on the EPAP
- Distributes the subscription database to the Service Module cards
- Maintains a redundant copy of the RTDB database

The EPAP platform is a mated pair of processors (the upper processor, called EPAP A, and the lower processor, EPAP B) contained in one frame.

During normal operation, information flows through the EPAP/PDBA software with no intervention. Subscription data is generated at one or more operations centers and is delivered to the PDBA through a TCP socket interface (PDBI). The PDBA software stores and replicates data on EPAP A on the mated EPAP system. The data is then transmitted by the EPAPs across a private network to the Service Module cards located in the EAGLE 5 ISS frame.

The primary interface to the PDBA consists of machine-to-machine messages. The interface is defined by Tekelec and is described in the Provisioning Database Interface Manual. Provisioning software compatible with the EPAP socket interface can be created or updated using the interface described in that manual.

Additionally, a direct user interface is provided on each EPAP to allow for configuration, maintenance, debugging, and platform operations. A direct user interface is also provided by the PDBA for configuration and database maintenance.

The MPS/EPAP is an open-systems platform and easily accommodates the required high provisioning rates. Compared to the traditional OAM platform, the persistent database and provisioning in an open systems platform provides these benefits:

- Variety of hardware components and vendors
- Availability of third party communication and database tools
- Standard communication protocols
- Availability of personnel with related experience

Each EPAP server maintains a copy of the Real Time Database (RTDB) in order to provision the EAGLE 5 ISS Service Module cards. The EPAP server must comply with the hardware requirements in the *MPS Hardware Manual*. *Figure 1: MPS/EPAP Platform Architecture* on page 13 illustrates the EPAP architecture contained in the MPS subsystem.

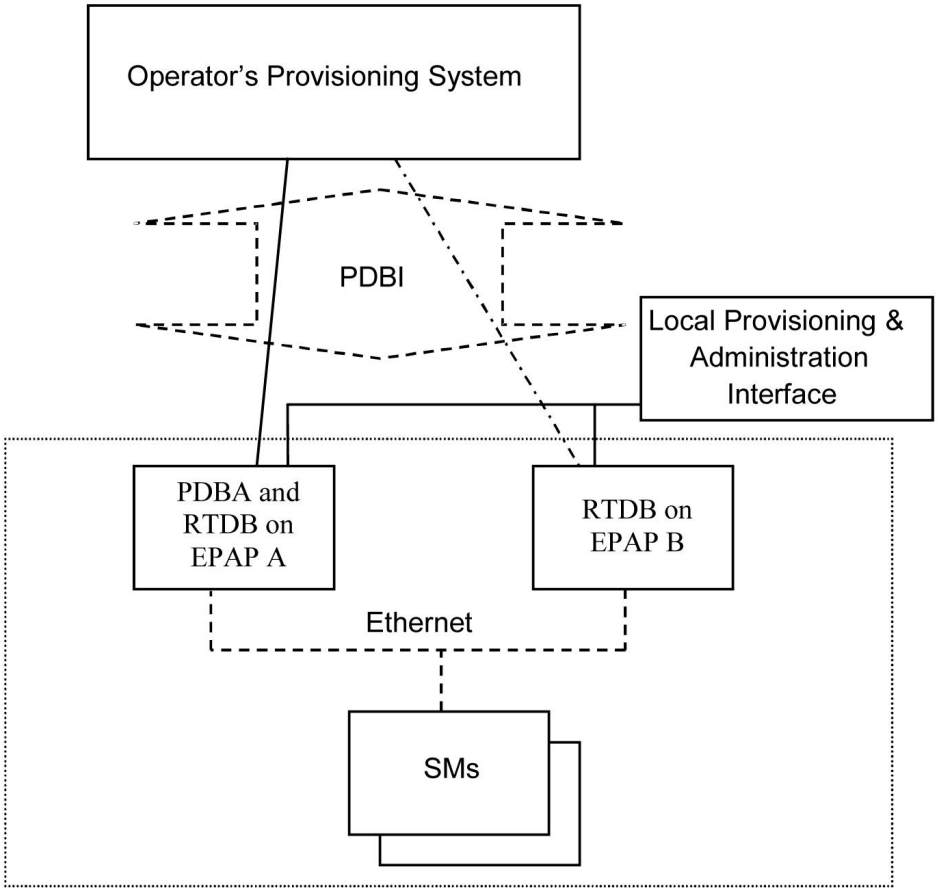
Each EPAP has a dedicated optical media drive. One EPAP per EAGLE 5 ISS platform has a modem capable of supporting remote diagnostics, configuration, and maintenance. These remote operations are performed through EPAP login sessions and are accessible across the customer network as well as through a direct terminal connection to the EPAP using an RS232 connection. Refer to the

Tekelec T1000 Application Server Hardware Manual for details about the hardware devices and network connections.

Subscriber Data Provisioning

Figure 2: Subscriber Data Provisioning Architecture (High Level) on page 16 shows the current high-level view of the subscriber data provisioning architecture. Only those parts of the EAGLE 5 ISS platform that are relevant to subscriber data provisioning are shown. This section defines requirements for the Provisioning Database Interface (PDBI) between the EPAP and the operator's provisioning system (OPS). Provisioning clients connect to the EPAPs via the PDBI. This interface contains commands that allow all of the provisioning and retrieving of subscription data. The PDBI is used for real-time provisioning of subscriber and network entity data only. Refer to the *Provisioning Database Interface Manual* for more details.

Figure 2: Subscriber Data Provisioning Architecture (High Level)



A pair of active/standby EPAP servers provides the interface between the Real Time Database (RTDB) of the EAGLE 5 ISS Service Module cards and the OPS. EPAP A is equipped with both the PDB (Provisioning Database) and the RTDB, and EPAP B has just the RTDB. An EPAP with just the RTDB must be updated by the EPAP that has the PDB.

For more information about the EPAP, refer to the *EPAP Administration Manual*. For more information about the MPS hardware, refer to the *Tekelec 1000 Application Server Hardware Manual*.

Distributed Administrative Architecture

This section describes, at a high level, the distributed administrative architecture for the EAGLE 5 ISS, including the EPAP.

Databases requiring high update and retrieval rates, such as the EPAP RTDB, are populated using redundant Ethernet connections to Service Module cards from an EPAP MPS platform.

An EPAP consists of a combined Provisioning (MySQL) and Real Time Database (RTDB). The Provisioning Database (PDB) responds to requests for updates by the active and standby RTDBs on both mated EAGLE 5 ISSs. The active EPAP RTDB is responsible for initiating multi-cast updates of changed database records to the Service Module cards after the data has been committed to the EPAP disks. Furthermore, the PDB may accept and commit more database updates while the RTDBs are completing their previous updates.

It is this overlapping of database updates, coupled with an RTDB transactional database engine and fast download time, that allows larger amounts of data at a time to be transferred from the PDB. Committing larger amounts of data at a time to the RTDB (versus a single update at a time) allows faster overall transaction rates to be achieved. The boundaries of the transaction rates become more closely related to cache size and disk cache flush time than the disk access time of a single update. Thus, successful completion of EPAP database updates only guarantees that the PDB has been updated, but it does *not* mean the RTDB has completed the update and sent the new subscription data to the Service Module card.

The EPAP architecture contains a local provisioning terminal and a modem for remote access, as well as other functions. A backup device can be used to back up or restore the provisioning database. The local provisioning terminal is used to manually repair the standby EPAP RTDB or to turn the subscriber database audit on or off. For additional information, refer to the *Tekelec T1000 Application Server Hardware Manual* and *EPAP Administration Manual*.

EPAP (EAGLE Provisioning Application Processor)

As shown in *Figure 1: MPS/EPAP Platform Architecture* on page 13, a single MPS system contains two EPAP (EAGLE Provisioning Application Processor) servers. At any given time, only one actively communicates with the Service Module cards. The other EPAP server is in standby mode. In addition, two MPS systems can be deployed in a mated-pair configuration.

The primary purpose of the EPAP systems is to maintain the RTDB and PDB and to download copies of the RTDB to the Service Module cards on the EAGLE 5 ISS.

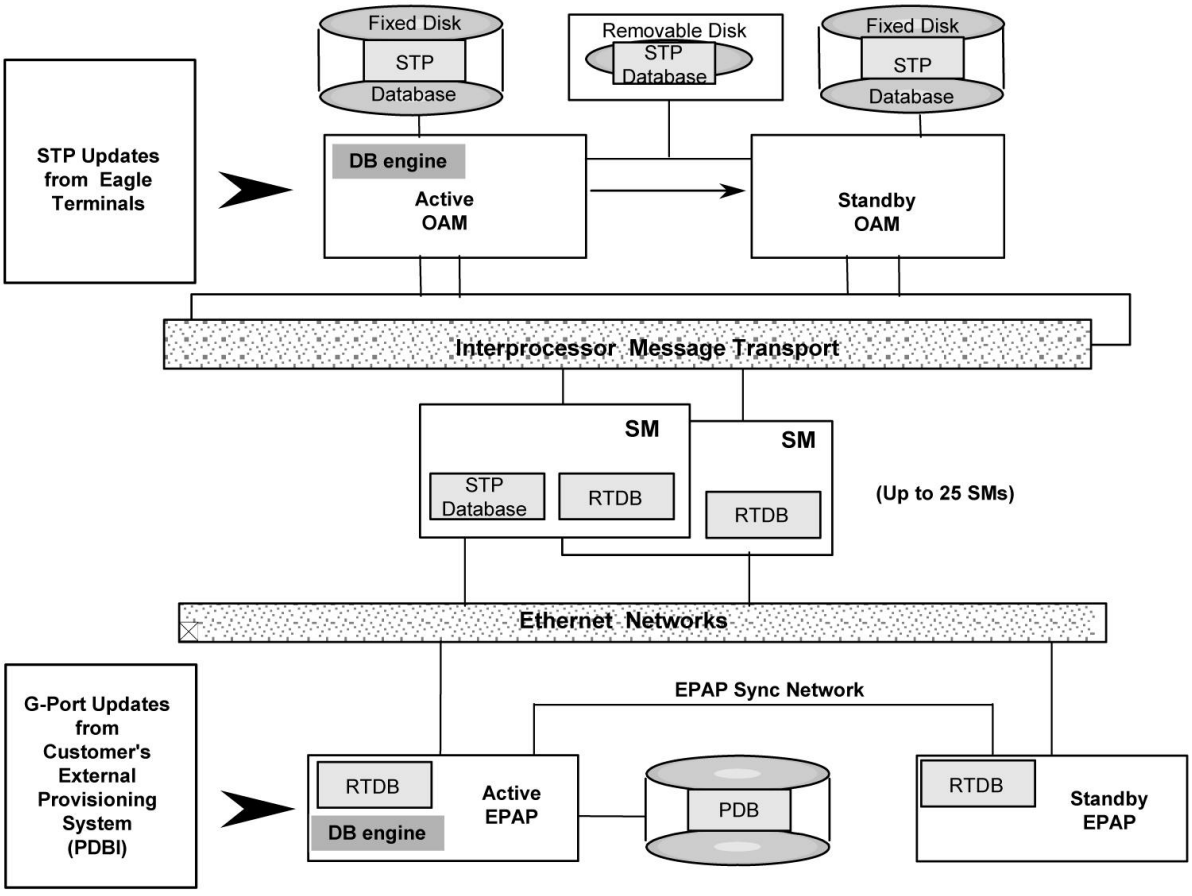
The PDB on the active EPAP receives subscription data from the customer network through the PDBI, the external source of provisioning information. The PDBA continually updates the active EPAP's PDB. The PDB uses MySQL database software. Once an update is applied to the active PDB, it is sent to the RTDBs on the active and standby EPAPs.

Both the active and standby EPAPs maintain copies of the RTDB. Periodically, the Service Module card polls the active EPAP RTDB for any new updates. The active EPAP downloads the updates to the Service Module for its own resident copy of the RTDB.

In a mated-pair configuration, there are two mated MPS Systems, as shown in *Figure 1: MPS/EPAP Platform Architecture* on page 13. The PDB on the active EPAP automatically updates the PDB on the mate platform. The PDB on the mate platform then updates its EPAP RTDBs, which in turn update the RTDBs on the associated Service Module cards.

Provisioning of the EAGLE 5 ISS's Service Module cards is performed through two interfaces, using two different sets of commands. Provisioning is accomplished by the STP updates from EAGLE 5 ISS terminals and by updates from the customer's external provisioning system. This system of dual provisioning is illustrated in *Figure 3: Database Administrative Architecture* on page 18.

Figure 3: Database Administrative Architecture



Service Module Cards

From 1 to 25 Service Module cards can be provisioned with the A-Port feature enabled. The A-Port feature requires that all Service Module cards contain 4 GB of memory. *Figure 3: Database Administrative Architecture* on page 18 illustrates each Service Module card having two Ethernet links, the main Service Module network on the 100BASE-T link and the backup Service Module network on the 10BASE-T link.

The extra memory holds a copy of the RTDB. The Service Module Ethernet ports are linked to the EPAP systems to receive the downloaded RTDBs. The Service Module cards run a version of the SCCP software application that has been ported to the VxWorks operating system. To differentiate the Service Module-VxWorks-SCCP application from the SCCP that runs on Translation Services Module (TSM) cards, the Service Module version is named 'VSCCP'.

Multiple Service Module cards provide a means of load balancing in high-traffic situations. The Service Module card database is in a format that facilitates rapid lookups. Each Service Module

card contains an identical database. Furthermore, all Service Module A-Port subscriber databases are identical to the RTDB maintained by the EPAPs.

However, the various databases may not be identical at all times for several reasons. First of all, when a Service Module card is initialized, it downloads the current copy of the database from the EPAP. While that card is being loaded, it cannot receive new updates that have arrived at the EPAP since reload began. Another condition that can result in databases being out-of-sync occurs when the EPAP receives updates from its provisioning source, but it has not yet sent them down to the Service Module cards. Updates are applied to the Provisioning Database (PDB) as they are received.

Two possible scenarios contribute to a condition where a Service Module card may not have enough memory to hold the entire database. In the first case, the database is downloaded successfully to the Service Module card, but subsequent updates eventually increase the size of the database beyond the capacity of the Service Module card memory. In this situation, it is desirable to continue processing A-Port transactions, even though the database may not be as up-to-date as it could be.

The other case occurs when a Service Module card is booted. If it is determined then that the card does not have enough memory for the entire database, the database is not loaded on that card. Each Service Module card is responsible for recognizing and reporting its out-of-memory conditions by means of alarms.

Overview of EPAP to Service Module Card Communications

Before discussing Service Module card status reporting or EPAP status reporting, it is helpful to understand the communications between the Service Module cards and the EPAP in broad terms.

- UDP - sending Service Module card status messages

  The Service Module cards and EPAPs create a UDP (User Datagram Protocol) socket which is used for status messages. One of the last things a Service Module card does when it is initialized is to send a status message to the EPAP, containing the Service Module ID, database level, and memory size. The EPAP maintains tables containing the last known status of each Service Module card. EPAP uses these to determine whether or not the Service Module card needs to download the database.

- IP - reporting EPAP maintenance data

  The Service Module cards create an TCP socket when they are initialized, and listen for connection requests. During initialization or after a loss of connectivity, the active EPAP chooses one of the Service Module cards and issues a *Connect* to establish the TCP/IP connection with that Service Module card (referred to as the primary Service Module). The purpose of this link is to provide a path for reporting EPAP alarms and to forward maintenance blocks to the Service Module card.

- IP Multicast - downloading GSM database

  Because of the large size of the database and the need to download it quickly on up to 25 Service Module cards, A-Port uses a technique known as IP multicasting. This technique is based on Reliable Multicast Transport Protocol-II (RMTP-II), a product of Globalcast Communications. IP multicasting downloads the RTDB and database updates to all of the Service Module cards simultaneously.

  The administration of IP multicasting is based on the concept of a “tree”, or stream of data, which is constantly being broadcast by the EPAP. Service Module cards that need to download

the real time database or to receive database updates “join the tree”. Service Module cards can also “leave the tree”, typically when the database fills their available memory.

Service Module Card Provisioning and Reload

One of the core functions of the EPAP is to provision the Service Module cards with the Real Time Database (RTDB) updates. In order to provide redundancy for this feature, separate RMTP channels are created on each interface from each EPAP:

- EPAP A, Link A (on the main DSM network, 100BASE-T)
- EPAP A, Link B (on the backup DSM network, 10BASE-T)
- EPAP B, Link A (on the main DSM network, 100BASE-T)
- EPAP B, Link B (on the backup DSM network, 10BASE-T)

Provisioning and other data is broadcast on one of these channels to all of the Service Module cards. Provisioning is done by database level in order to leave tables coherent between updates.

The Service Module cards do the following:

- Detect the need for incremental updates and send a status message to the EPAP.
- Discriminate between the various streams according to the database level contained in each message and accept updates based on the Service Module card database level.

Service Module Card Reload Model

Service Module cards may require a complete database reload in the event of reboot or loss of connectivity for a significant amount of time. The EPAP provides a mechanism to quickly load a number of Service Module cards with the current database. The database on the EPAP is large and may be updated constantly. The database sent to the Service Module card or cards will likely be missing some of these updates making it corrupt, in addition to being "back level."

EPAP Continuous Reload

It is important to understand how the EPAP handles reloading of multiple Service Module cards from different starting points. Reload begins when the first Service Module card requires it. Records are read sequentially from the Real Time Database (RTDB) from an arbitrary starting point, wrapping back to the beginning. If another Service Module card requires reloading at this time, it uses the existing record stream and notifies the Service Module card provisioning task of the first record it read. This continues until all Service Module cards are satisfied.

Service Module Card Database Levels and Reloading

The current database level when the reload started is of special importance during reload. When a Service Module card detects that the last record has been received, it sends a status message back to the EPAP indicating the database level at the start of reload. This action starts incremental loading. The Service Module card continues to reload until it is completely caught up with the current level of the RTDB. As database records are sent to the Service Module cards during reload, normal provisioning can *change* those records. All records changed between the start and end of reloading must be incrementally loaded before the database is coherent and usable by the Service Module card.

The following terminology is used here for the stages of database reload for a given Service Module card.

- **Stage 1 loading**: The database is being copied record for record from the golden RTDB in the EPAP to the Service Module card RTDB. The database is incoherent during stage 1 loading.
- **Incremental update**: The database is receiving all of the updates missed during stage 1 loading or some other reason (e.g., network outage, processor limitation, lost communication, etc.). The database is coherent, but back-level during incremental update.
- **Current**: The database is receiving current updates from the Service Module card provisioning task.
- **Coherent:** The database is at a whole database level, that is, not currently updating records belonging to a database level.

EPAP Status and Error Reporting via Maintenance Blocks

The EPAPs forward all status and error messages to the Service Module cards in maintenance blocks. Maintenance blocks are asynchronously sent whenever the EPAP has something to report. The maintenance blocks eventually update EPAP Device Control Blocks (DCBs) located on the EAGLE 5 ISS. The DCBs provide the status information that is received when a `rept-stat-mps` command is issued.

Network Connections

Several customer and Tekelec-installed private networks are *required* to support the provisioning of subscription data. These networks are:

- *Customer Provisioning Network* on page 21
- *EPAP Sync Network* on page 22
- *DSM Networks* on page 23
- *Dial-Up PPP Network* on page 24

The following discussion is an overview of these private networks. It expands on the networks in the architecture diagram shown in *Figure 4: Customer Provisioning Network* on page 21. (For details about configuring these networks, refer to the EPAP *Administration Manual*.)

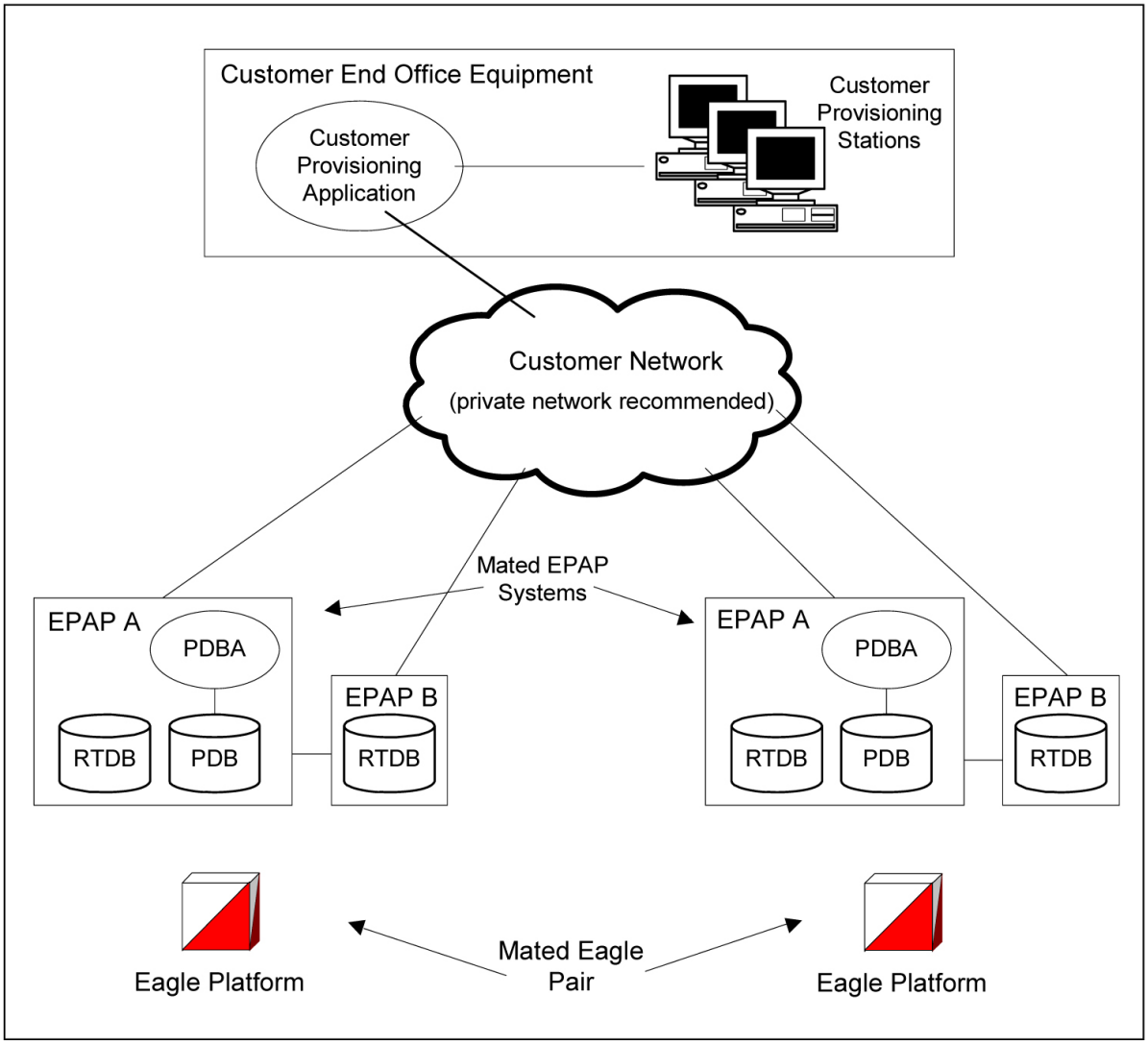
Customer Provisioning Network

The customer network carries the following traffic:

- Customer queries and responses to the PDB via the PDBI from the customer provisioning network
- Updates between PDBs of a mated EAGLE 5 ISS pair
- Updates between a PDB on one EAGLE 5 ISS and RTDBs on a mated EAGLE 5 ISS
- PDBA import/export (file transfer) traffic
- Traffic from a PDBA reloading from its mate
- EPAP and PDBA user interface traffic.

A typical customer network is shown in *Figure 4: Customer Provisioning Network* on page 21.

Figure 4: Customer Provisioning Network

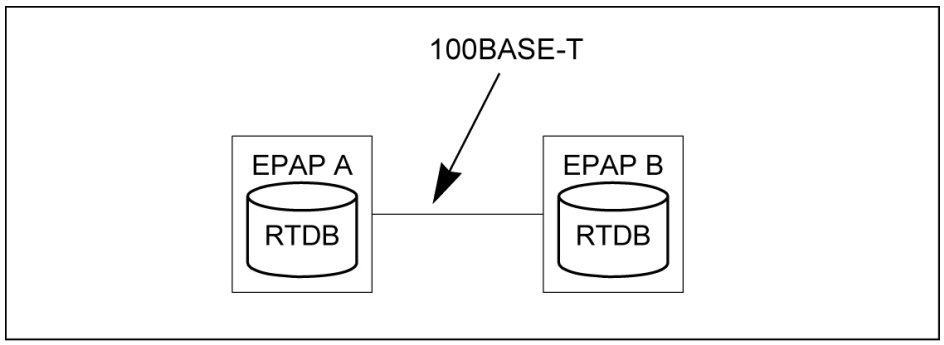


Although a dedicated network is recommended, it is possible that unrelated customer traffic can use the network as well. The determination, either to have a dedicated network or to allow other customer traffic, should be based on available external Ethernet bandwidth and network performance considerations.

EPAP Sync Network

The EPAP sync network carries RTDB and maintenance application traffic between active and standby EPAP servers on an MPS system. It synchronizes the contents of the RTDBs of both EPAP A and B. The EPAP Sync network is a single Ethernet connection between EPAP A and EPAP B running at 100BASE-T, as shown in *Figure 5: EPAP Sync Network* on page 22.

Figure 5: EPAP Sync Network

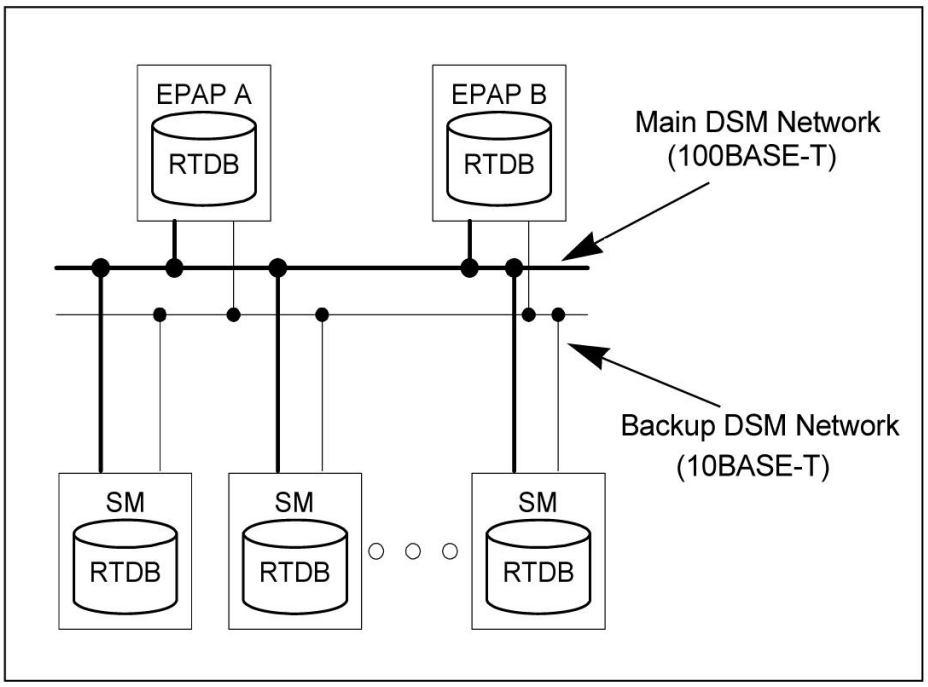


DSM Networks

The DSM networks are shown in *Figure 6: DSM Networks* on page 23. They carry provisioning data from the active EPAP RTDB to the Service Module cards. They also carry reload and maintenance traffic to the Service Module cards.

The DSM networks consist of two Ethernet networks: the main DSM network running at 100BASE-T, and the backup DSM network running at 10BASE-T. Both Ethernet networks connect EPAP A and EPAP B with every Service Module card on a single EAGLE 5 ISS platform.

Figure 6: DSM Networks



Maintenance information is sent from the active EPAP to an arbitrarily selected Service Module card. The selected Service Module card is known as the primary Service Module card. Static information is exchanged across this interface at initialization, and dynamic information is exchanged on occasion.

While much of the traditional OAM provisioning and database functionality is implemented on the EPAP, the maintenance reporting mechanism is still the OAM.

The first and second octets of the EPAP network addresses for this network are 192.168. (The first two octets for private class C networks are defined in RFC 1918.)

The third octet is customer specifiable for each DSM network. It is important to select values that do not interfere with the customer's network addressing scheme.

The fourth octet of the address is specified as follows:

- If the EPAP is configured as “EPAP A”, the fourth octet has a value of 100.
- If the EPAP is configured as “EPAP B”, the fourth octet has a value of 200.

Table 2: EPAP IP Addresses in the DSM Network on page 24 summarizes the contents of each octet.

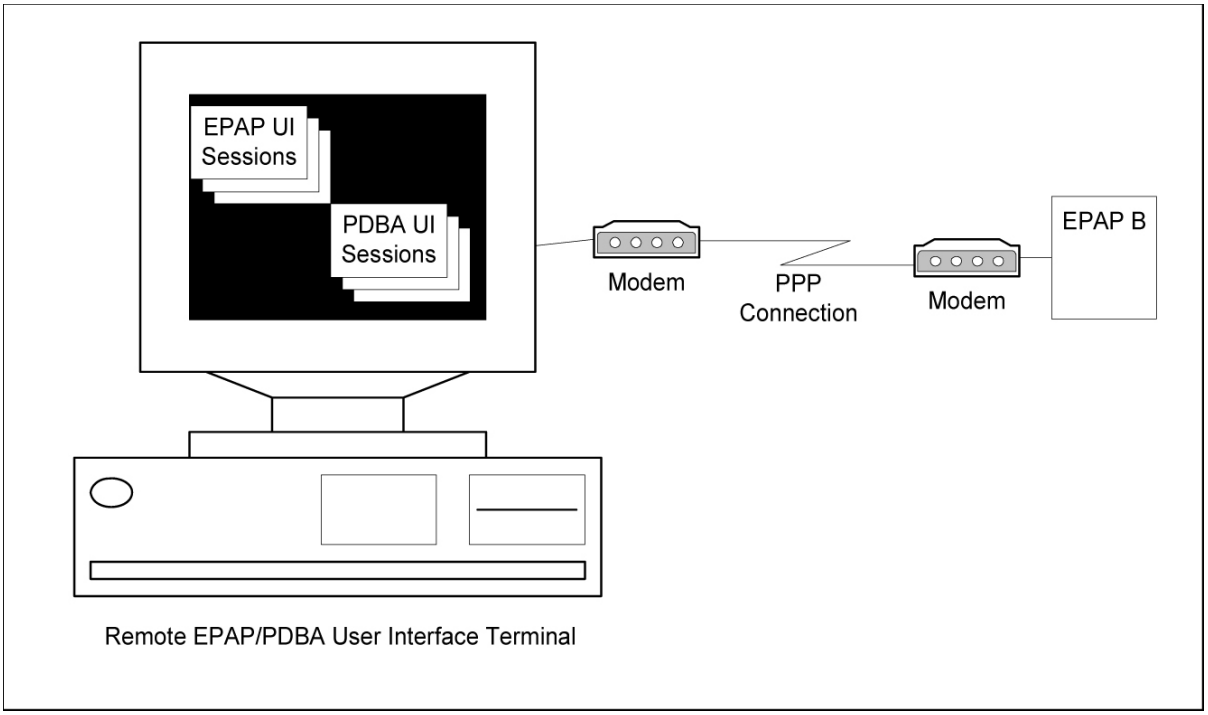
Table 2: EPAP IP Addresses in the DSM Network

Octet	Value
1	‘192’
2	‘168’
3	One customer-provisioned value for DSM network A, and another for DSM network B
4	‘100’ for EPAP A‘200’ for EPAP B

Dial-Up PPP Network

The dial-up PPP network allows multiple user-interface sessions to be established with the EPAP. The network connects a remote EPAP/PDBA user interface terminal with the EPAP in the EAGLE 5 ISS’s MPS subsystem. The dial-up PPP network is illustrated in *Figure 7: Dial-Up PPP Network* on page 24.

Figure 7: Dial-Up PPP Network



Serviceability Hints

The following hints are offered to aid in the serviceability of A-Port databases:

- *Mated Application Considerations* on page 25
- *Entity Point Codes and Routes* on page 25

Mated Application Considerations

An EPAP-administered entity data can possibly become out-of-sync with the EAGLE 5 ISS mated application table because the creation of entity point codes (and/or subsystem numbers) in the mated application table is not performed at database administration time.

If this mismatch is discovered in real-time operations, a UIM message (such as “SCCP did not route - DPC not in MAP tbl” or “SCCP did not route - SS not in MAP tbl”) is sent to the EAGLE 5 ISS maintenance terminal. This message means the MSU was discarded.

For this reason, it is recommended that the entity (SP or RN) not be administered until the entity point code (and/or subsystem number) has been entered into the EAGLE 5 ISS mated application (MAP) table.

Entity Point Codes and Routes

Verification that an entity point code exists in the route table and has a route is not performed at database administration time. Therefore, it is possible for the EPAP entity data to be out-of-sync with the EAGLE 5 ISS route table.

If an out-of-sync condition is discovered during real-time operation, a UIM is sent to the EAGLE 5 ISS maintenance terminal, indicating one of these conditions:

- Destination point code is not in the route table.
- Destination point code exists in the route table but is not assigned a route.
- Destination point code exists in the route table and has been assigned a route, but it is out of service.

A-Port Considerations

The following list should be considered before installing and operating the A-Port feature.

1. SRI responses are routed by both MTP and Global Title Translation.
2. The maximum length of the Application Context Name Object Identifier is 32 digits.
3. For A-Port Message Relay messages with E.164 numbers in the SCCP CdPA, it is assumed that no truncation occurred if and when the routing number was prepended and that SCCP CdPA contains the full Directory Number of the subscriber.
4. A-Port Message Relay to the EAGLE 5 ISS local subsystem is not supported.
5. Only the first 21 digits of the CdPA are decoded for A-Port Message Relay. For example, if the CdPA contains an RN prefixed to a DN, the RN is seven digits, and the DN is 15 digits, then the total is 22 digits. The DN used for processing will be only 14 digits (21 total digits less 7 RN digits).
6. With the Hex Digit Support for GTT feature enabled and turned on, Message Signaling Units (MSUs) containing either decimal or hexadecimal digits in the Called Party Address (CdPA) are processed. Unless the Hex Digit Support for GTT feature is enabled and turned on, GTT processes decimal digits only.

   If the Hex Digit Support for GTT feature is not enabled and not turned on and an operator or country is using hexadecimal digits A through F in RNs and the operator is providing GTT to messages that have RN prefixes other than its own prefixes, then the operator must enter the RN + DN number ranges as DN ranges in the A-Port subscriber database. The beginning and ending DNs can be only 15 digits, which may not be sufficient for an RN + DN.
7. MNP applies within a single portability cluster. This is defined as a set of networks in a country or multi-country region having a common numbering plan and across which a subscriber, who is already inside the cluster, can port. Any individual A-Port node is required to support only an MNP within such a portability cluster.
8. The routing number found in the NP database is either prefixed to the dialed number to form a new concatenated Roaming Number that is returned to the switch, or is sent on its own as the Roaming Number.
9. All non-call related messages impacted by MNP contain the MSISDN number in the SCCP CdPA. In the case of the SRI message, A-Port may get the number from the MAP level.
10. TCAP operation codes uniquely distinguish Loc_req messages and do not change from one phase (or version) of MAP to another.
11. PCs and/or PC + SSNs that are in the entity table of the database and referenced by subscriber entries do not necessarily have the required data present on the EAGLE 5 ISS to route messages to them. For example, the point code may not have a route or the PC + SSN may not be in the MAP table for a final GTT. In this event, a UIM is output only when a message is discarded because of the lack of data.
12. The parameters of the SRI ACK message generated by A-Port are solely based on the provisioned data/options; they are not based on the MAP phase of the SRI message. For example, if the

message received is phase 1 or 2, “MSRNDIG=RN”, and the portability status is “NotKnowntobePorted”, A-Port generates an SRI ACK contains IMSI, MSRN, MDN, and NPS parameters, despite the MDN and NPS parameters not being defined for phase 1 or 2.

13. If SRF IMSI is not provisioned with an RN entity and an incoming message is an SRI message, A-Port sets IMSI parameter as zero digits when the MAP phase is 1 or 2.
14. A-Port uses the MTP route for the SRI ACK response, even when the final GTT is performed on the response.
15. When the concatenated number (RN + MDN) option is selected for encoding the Routing Info (MSRN) in SRI ACK, A-Port encodes the complete concatenated number, because the concatenated number length may otherwise exceed 16 digits, which is the maximum allowed in MSRN.

General Numbering Requirements

Incoming called party numbers, from the SCCP portion, destined for A-Port processing are conditioned to fit the GDB requirements where possible. The following factors are used to condition the SCCP numbers.

- Based on provisioning: If the GTT selectors available in the incoming message match an entry in the A-Port selector table, then the service numbering plan from the selector table entry uses that number's numbering plan. Further conditioning is applied based on this new numbering plan.
- Based on configurable options: If the GTT selectors available in the incoming message match an entry in the A-Port selector table, then the service nature of address from the selector table entry uses that number's nature of address. Further conditioning is applied based on this new nature of address.
- If the nature of address is Subscriber, the default CC + default NC (network code for E.164) are prepended to the number. The default codes to be used by the EAGLE 5 ISS must be previously provisioned by the EAGLE 5 ISS operator. If not, a UIM is issued, and the message falls through to GTT.

Numbers with fewer than five digits after the above conditioning are not used for A-Port. In this case, a UIM is issued, and the message falls through to GTT.

Numbers with more than fifteen digits after the above conditioning are not used for A-Port. In this case, a UIM is issued, and the message falls through to GTT.

Maintenance

The following sections describe the maintenance consideration for A-Port, as follows:

Validation of A-Port Hardware Configuration

Service Module card loading has been modified to verify the validity of the hardware configuration for the Service Module cards. Hardware verification includes the following:

- **Service Module card Verification**

  An AMD-K6 (or better) main board is required to support the A-PortVSCCP application on the Service Module card. EAGLE 5 ISS maintenance stores the validity status of the main board configuration of the Service Module card.

  Note:

  The system does not allow the A-Port feature to be turned on if the hardware configuration is invalid.

  When the VSCCP application is initializing, it determines the main board type. The SCCP maintenance block is the mechanism used to relay the main board information to OAM. This requires that the application software be loaded to the Service Module card and then the main board information received in the SCCP maintenance block must be verified. If the main board is determined to be invalid for the A-Port application, loading of the Service Module card is automatically inhibited.

- **Service Module card Applique Memory Verification**

  The VSCCP application performs two types of memory validation to determine whether or not a Service Module card has sufficient memory to run A-Port:

  CAUTION:

  A-Port cannot be enabled if any of the Service Module cards have less than 4 GB of memory installed. Refer to the *Dimensioning Guide for* EPAP *Advanced* DB *Features* Technical Reference for important information on the dimensioning rules and the DSM database capacity requirements.

  - *Local Memory Validation*. When the A-Port feature is first enabled, or any time the A-Port feature is enabled and the Service Module card is initializing, VSCCP checks to see if the Service Module card has at least 4 GB of memory installed.
  - *Real-Time Memory Validation (during card initialization)*. Once communications between the Service Module card and EPAP have been established, and the Service Module card has joined the RMTP Tree, the EPAP starts downloading the RTDB to the Service Module card. After the Service Module card has downloaded the RTDB, it continues to receive database updates as necessary. The EPAP includes the size of the current RTDB in all records sent to the Service Module card. The Service Module card compares the size required to the amount of memory installed, and issues a minor alarm when the database exceeds 80% of the Service Module card memory. If the database completely fills the Service Module card memory, a major alarm is issued, the Service Module card leaves the RMTP tree, and the status of the Service Module card changes to IS-ANR/Restricted. The Service Module card continues to carry traffic.

- **Actions Taken When Hardware is Determined to be Invalid**

  When the hardware configuration for a Service Module card is determined to be invalid for the A-Port application, SCM automatically inhibits loading for that specific Service Module card. A major alarm is generated indicating that card loading for that Service Module card has failed and has been automatically inhibited, which means it is prevented from reloading. Refer to *Maintenance and Measurements* on page 123 for the specific alarm that is generated. When card loading has been inhibited, the primary state of the card is set to `oos-mt-dsbld`, and the secondary state of the card is set to MEA (Mismatch of Equipment and Attributes).

  The following constraints apply to a Service Module card that is determined to be invalid:

- The Service Module card will not download the EAGLE 5 ISS databases.
- The Service Module card will not download the real-time RTDB from the EPAP.
- The Service Module card will not accept RTDB updates (including add, change, or delete) from the EPAP, nor will it accept STP database updates.

To activate loading of a Service Module card that has been automatically inhibited, the craftsperson must enter the `alw-card` command (`alw-card:loc=xxxx`).

- **Unstable Loading Mode**

  At some point, having a number of invalid Service Module cards results in some of the LIMs (Link Interface Module) being denied SCCP services. A threshold must be monitored; if the number of valid Service Module cards is insufficient to provide service to at least 80% of the IS-NR LIMs, the system is said to be in an unstable loading mode. For other reasons why an EAGLE 5 ISS might be in an unstable loading mode, refer to *Loading Mode Support Status Reporting* on page 126.

Maintenance Commands

The following commands are used for A-Port maintenance.

- The debug command `ent-trace` traps A-Port MSUs (Message Signaling Units) based on the point code of the switch that generated the MSU (SSP), a particular DN and entity ID. For MDN and entity ID, the comparison is based on the search key built from the CdPA GTAI (Global Title Address Information) after any conditioning. The existing GT SCCP trigger also applies to A-Port messages.
- The command `rept-stat-sccp` reports current A-Port statistics. An MSU is considered to be an A-Port MSU after SRVSEL. This command reports A-Port statistics on a single Service Module card basis or on an A-Port system basis.

For more information, refer to *Maintenance and Measurements* on page 123.

A-Port Loading Mode Support

Loading mode support is not applicable for RTDB updates, since Service Module cards use incremental loading from the EPAP. STP Administrative updates are allowed while a Service Module card is loading and the system is above the 80% card stability threshold. If it is below the 80% threshold, loading mode support allows STP administrative updates to be rejected while cards finish loading and cross the 80% or greater threshold.

For A-Port, loading mode support is applicable for database updates originating from the EAGLE 5 ISSGPSM-II cards (General Purpose Service Module II cards) destined for the Service Module cards.

Audit Requirements

The A-Port audit does not change EAGLE 5 ISS compliance to STP audit requirements, to whichEAGLE 5 ISS currently adheres. A-Port subscriber database tables residing on the EAGLE 5 ISSTDM fixed disks are audited by the existing STP audit, which only verifies tables on the EAGLE 5 ISS active and standby TDMs. Audit mechanisms for A-Port tables residing on the EPAP platform are downloaded to the Service Module cards. The audit mechanisms consist of the following.

- On each Service Module card and on the standby EPAP, a background audit calculates checksums for each A-Port RTDB table record and compares the calculated checksum against the checksum value stored in each record. If the checksums are not the same, then a *database corrupt* alarm is issued.
- A process that runs approximately every five seconds or less on the active EPAP sends the latest RTDB database level to all the Service Module cards and the standby EPAP. If the database levels do not match, the standby EPAP or Service Module card issues a *diff level* alarm.

For more information on the audit mechanisms, refer to the *EPAP Administration Manual.*

A-Port Protocol

A-Port supports both Message Transfer Part (MTP) routed, if enabled, and Global Title (GT) routed messages. Service selection (SRVSEL) lookup is performed on GT-routed messages after Signaling Connection Control Part (SCCP) verification. GT routed messages support Unit Data Transfer (UDT) and non-segmented Extended Unit data (XUDT) message types.

Main Functions

A-Port and MNPCRP provide the following main functions:

- *Message Discrimination* on page 30
- *RN Prefix Deletion - SCCP* on page 30
- *RN Prefix Deletion - TCAP* on page 31
- *Number Conditioning* on page 31
- *Database Lookup* on page 31
- *Message Relay* on page 33
- *Returning Acknowledgement* on page 34

Message Discrimination

Because A-Port provides translation of ported numbers, it provides a method to identify which messages should receive A-Port and which should receive GTT processing. This task of identification is provided via a service selector table (SRVSEL) in which the user can define A-Port service for messages matching a combination of selectors. If a selector match is not found, then the message falls through to GTT- or MTP- routing (in case of MTP routing).

RN Prefix Deletion - SCCP

The decoded SCCP CdPA digits can have a Routing Number (RN) concatenated with the Mobile Directory Number (MDN) number in two forms:

- RN + DN
- CC+RN+DN (where CC is the Country Code)

When the Service Nature of Address Indicator (SNAI) is one of the following, A-Port compares the decoded MDN number with the list of provisioned home RN prefixes defined in the Real Time Database (RTDB).

- RNIDN (Routing Number, International Directory Number)
- RNNDN (Routing Number, National Directory Number)
- RNSDN (Routing Number, Subscriber Directory Number)
- CCRNDN (Country Code, Routing Number, National Directory Number)

If a match is found, A-Port strips off the RN digits from the number. Number conditioning, if required, is performed after deleting the RN.

When the SNAI is CCRNDN, A-Port first compares the CC to the DEFCC (Default Country Code) list:

- If CC is not equal to the DEFCC, the message falls through to GTT.
- If CC=DEFCC, then A-Port compares the digits after CC with the list of provisioned Home RN prefixes that are defined in the RTDB. If a match is found, then A-Port strips off the RN digits from the number. If no match is found, the no-prefix deletion is performed and A-Port processing continues.

RN Prefix Deletion - TCAP

The decoded MAP MDN digits can have a RN concatenated with the MDN number in two forms:

- RN + DN
- CC+RN+DN

The MAP NAI (Nature of Address Indicator) is used to determine the type: International, National, or Subscriber. If MNPCRP is OFF, RN prefix deletion is not attempted. If MNPCRP is ON, then RN prefix deletion is attempted on all MDNs. If the MAP NAI indicates International, then a check is performed for the DEFCC prefix on the MDN, as follows:

- If DEFCC is detected, then Home RN deletion is attempted using the CC+RN+DN format.
- All other MDNs will use the RN+DN format.

A-Port compares the decoded MDN number with the list of provisioned home RN prefixes defined in the RTDB. If a match is found, the A-Port strips off the RN digits from the number. If no match is found, then no prefix deletion is performed and A-Port processing continues with number conditioning.

Number conditioning, if required, is performed after deleting the RN.

Number Conditioning

The RTDB stores international MDNs only. The received MDN number or SCCP CdPA digits may need to be converted to an international number to perform a database lookup.

A-Port performs number conditioning upon successful decode and verification of the message. Home RN and IEC (International Escape Code) or NEC (National Escape Code) prefixes are removed. The MDN is conditioned to international number format based on the service Nature of Address Indicator: SNAI for SCCP, TCAP SNAI for TCAP, or MTP Location Request Message (LOCREQ) NAI for MTP.

Database Lookup

A-Port performs database lookup using the conditioned DN digits encoded in Called Party. The database lookup yields one of four possible outcomes:

- Match is Found with Network Entity (NE) Assigned

  For subscriber entries with a RN and Portability Type (PT)≠ **0** (DN is ported or prepaid service), LOCREQ and any IS41 messages are relayed. GTT is applied to any GSM or non-TCAP message .

  For subscriber entries with a Signalling Point (SP), or a RN and PT= **0** (DN not known to be ported), LOCREQ and any IS41 messages are relayed. GTT is applied to any GSM or non-TCAP message.

- Match is Found Without NE

  A data entry in the database is found if a subscriber entry in database (either an individual DN entry or a DN block) matches the conditioned Called Party.

  If an entry is found without an NE assigned and PT= **1**, **2**, (number ported out) or no PT, the LOCREQ is returned without an NE.

  The LOCREQ is routed via GTT if an entry is found without an NE assigned and PT= **0** or **5** (not known to be ported or migrated to GSM). GTT is applied to any IS41 message if an entry is found without an NE assigned. The EAGLE only modifies the MTP and SCCP information as required by standard GTT and keeps the TCAP portion of the message intact.

- Number conditioning fails. The DN is not found in the RTDB, or the DN is found with non-A-Port data.

  Either the number has never been ported or it is an unknown number. The EAGLE 5 ISS routes the message by normal GTT/MTP routing. The EAGLE 5 ISS only modifies the MTP and SCCP information as required by normal GTT/MTP routing, if required, as follows:

  - Perform GTT if the incoming message is sent to the EAGLE 5 ISSSelf Point Code.
  - Route the message to the MTP Destination Point Code (DPC) if the incoming message is MTP-routed. (The MTP DPC of the message is not the EAGLE 5 ISS Self Point Code.)

  The TCAP portion of the message remains intact.

  Normal routing is performing GTT if the incoming message is sent to the EAGLE 5 ISSSelf Point Code. Normal routing is routing the message to the MTPDPC if the incoming message is MTP-routed. (The MTPDPC of the message is not the EAGLE 5 ISSSelf Point Code.)

- A-Port modifies the TCAP information for LOCREQ messages only when a HomeRN was deleted from the TCAP DN and LOCREQ RMHRN = **YES**. Any gaps in the data caused by a change in field length will be resolved by shifting the remaining information up. Any IEC or NEC code is left.

  Since a DN may be the target of the A-Port, G-Port, or Migration message processing in a hybrid network where an operator owns both GSM and IS41 network, message processing call disposition is based on which applications are turned on. *Table 3: A-Port Message Processing* on page 32 summarizes A-Port message processing.

Table 3: A-Port Message Processing

NE/ PT	LOCREQ	Any IS41	Any GSM or non-TCAP
RN and PT ≠ 0	ACK (RN from EPAP)	Relay	GTT

NE/ PT	LOCREQ	Any IS41	Any GSM or non-TCAP
SP or (RN and PT= 0)	Relay	Relay	GTT
No NE and PT= 1, 2, or No PT	ACK (no NE)	GTT	GTT
No NE and PT= 1 or 5	GTT	GTT	GTT
No DN entry found	GTT	GTT	GTT

Database lookup results in the following:

1. Applying GTT or
2. Relaying the message to the destination as noted in the database or
3. Returning an acknowledge message to the originating switch.

Message Relay on page 33 describes how the EAGLE 5 ISS formulates a relayed message or a returned ACK.

Message Relay

The rules for formatting the SCCP CdPA GTA field are based on the value specified in the DigitAction field. When a received IS41 message is relayed, the EAGLE formulates the SCCP CdPA GTA field of the outgoing message according to DigitAction specified:

- If DigitAction = none, the EAGLE 5 ISS does not overwrite the SCCP CdPA GTA.
- For all other values, the EAGLE 5 ISS formats the SCCP CdPA GTA according to the value assigned to DigitAction.

Table 4: DigitAction Applications on page 33 identifies the required DigitAction options as well as examples of how the SCCP CdPA GTA of an outgoing message is formatted for each of the options. The example assumes the RN / SP ID is 1404 and default country code is 886.

Table 4: DigitAction Applications

DigitAction	Value in Incoming CdPA GTA	Value in Outgoing CdPA GTA	Meaning
none	886944000213	886944000213	No change to the Called Party GTA (default)
prefix	886944000213	1404886944000213	Prefix Called Party GTA with the entity id
replace	886944000213	1404	Replace Called Party GTA with the entity id

DigitAction	Value in Incoming CdPA GTA	Value in Outgoing CdPA GTA	Meaning
insert	886944000213	8861404944000213	Insert entity id after country code. (CC + Entity Id + NDC + SN)
delccprefix	886944000213	1404944000213	Delete country code and add prefix
delcc	886944000213	944000213	Delete country code
spare1	886944000213	treated as none	No change to the Called Party GTA (default)
spare2	886944000213	treated as none	No change to the Called Party GTA (default)

Returning Acknowledgement

When a LOCREQ response/ACK is returned, the EAGLE 5 ISS follows the LOCREQ encoding rules along with the following enhancements for added flexibility:

1. Allow users to specify which TCAP LOCREQ parameter (the TCAP Outgoing Called Party parameter) encodes the RN (and/or DN) information
2. Allow users to specify the Digit Type value to encode the TCAP Outgoing Called Party parameter
3. Allow users to specify the value to encode the Nature of Number field of the TCAP Outgoing Called Party parameter
4. Allow users to specify the value to encode the Numbering Plan field of the TCAP Outgoing Called Party parameter
5. Allow users to specify the digit encoding format of the LOCREQ TCAP Outgoing Called Party parameter;
6. Allow users to specify the MSCID values to be encoded in the LOCREQ message
7. Allow users to specify the Electronic Serial Number (ESN) values to be encoded in the LOCREQ message
8. Allow users to specify how the digits of the LOCREQ MIN parameter shall be encoded

MNP SCCP Service Re-Route Capability

This feature is designed to handle and control re-routing of MNP traffic from an affected node to alternate nodes within an operator's network. This feature is an optional feature and does not affect the normal MNP functionality. This feature consists of these main functions:

- *Service State Management* on page 35
- *MNP Re-Routing* on page 35
- *MNP Capability Point Codes* on page 35

Service State Management

Service state management is part of the MNP SCCP Service Re-Route Capability. Service state is used to indicate the current state of MNP, either *ONLINE* or *OFFLINE*. Service state also gives the user the option to mark MNP as *OFFLINE* or *ONLINE* based on the current behavior. If a MNP problem is identified, MNP can be marked *OFFLINE* to initiate the re-routing procedure. When Service Module cards need to be reloaded, MNP can be marked *OFFLINE* until enough cards are in-service and then bring MNP *ONLINE* in a controlled fashion.

When the MNP feature is turned on and the MNP service state is set to *OFFLINE*, the user can change the service to *ONLINE* at any point. Once the feature is turned *ONLINE*, MNP will start processing messages if at least one Service Module card is IS-NR (In Service - Normal).

The MNP service can be set to *OFFLINE* at any point. This causes the EAGLE 5 ISS to stop processing MNP traffic and re-routing is performed.

The MNP service state is persistent. Booting the OAM or all Service Module cards will not change the service state. Commands must be used to change the service state.

MNP Re-Routing

MNP Re-Routing is an optional feature and is enabled by defining a list of alternate PCs or by defining the GTT option. MNP re-routing is activated by marking MNP *OFFLINE*. When MNP is *OFFLINE* and alternate PCs are provisioned, any messages destined for MNP are re-routed to the available alternate PCs that are defined for MNP. If alternate PCs are not provisioned or none are available, then the GTT option is used. If the GTT option is set to YES, then messages destined for MNP will fall through to GTT as part of the re-routing procedure.

Re-Routing is applied to all MNP messages (based on SRVSEL). There is no distinction of Destination Point Code (DPC) of the messages. The DPC of the message can be either True, Secondary, or Capability Point code.

MNP Capability Point Codes

Capability Point Codes (CPC) are supported for MNP. The use of MNP capability point code allows the adjacent nodes to know about MNP outages. When MNP is taken offline though administrative commands, all traffic destined to that MNP node will result in a Transfer Prohibited (TFP) message being sent to the adjacent node about the MNP CPC. The TFP response to the adjacent node causes the traffic originating nodes to stop sending MNP traffic to this node. All MNP traffic coming into this node is sent to the alternate MNP nodes. Adjacent nodes will initiate route-set-test procedures after receipt of the TFP response.

If the messages are destined to the EAGLE 5 ISS true point code, then TFP messages are not generated when the MNP service is *OFFLINE*. The originator would not be aware of the outage.

Once MNP is back in service on the EAGLE 5 ISS, a Transfer Allowed (TFA) message is sent to the traffic adjacent nodes in response to route-set-test message. The traffic originating nodes will then start sending MNP traffic to the original MNP node.

MNP Capability point codes can be provisioned when the MNP feature is ON. There can be more than one Capability Point Code assigned to MNP CPC Type.

MNP supports up to 7 alternate PCs per domain. All 6 domains (ANSI, ITU-I, ITUN14, ITUN14 spare , ITU-I spare and ITUN24) are supported. An entire set of alternate PCs are considered as a re-route set. A GTT option is supported for MNP re-route. When the MNP service is *OFFLINE*, MNP messages fall though to GTT based on the GTT option. This option is set to YES by default.

MNP SCCP Service Re-Route Capability Summary

If the MNP service is not normal (because the RTDB is not in sync with MPS or if cards are misrouting MNP messages) then the MNP service state should be changed to *OFFLINE*.

Before changing MNP service to *OFFLINE*, it should be decided what kind of re-routing will be used during the outage. The EAGLE 5 ISS supports re-routing data to alternate point codes or falling through to GTT as two possible options. Rerouting to alternate point code has priority over falling though to GTT. Examples of these two options follow:

Option 1

Define alternate point codes to re-route MNP traffic. This is the recommended option. Up to 7 alternate MNP nodes can be provisioned to re-route all the incoming MNP traffic. Once provisioned, the MNP service can be changed to *OFFLINE*. This example has any incoming being MNP traffic being load-shared to point codes based on the relative cost.

```
chg-sccp-serv:serv=mnp:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pci3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
chg-sccp-serv:serv=mnp:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pci3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
chg-sccp-serv:serv=mnp:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pci3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
chg-sccp-serv:serv=mnp:pci1=5-5-5:rc1=10:pci2=6-6-6:rc2=10:pci3=7-7-7:rc3=10:pci4=8-8-8:rc4=10
 chg-sccp-serv:serv=mnp:state=offline
```

Option 2

With this option, default GTT translations are provisioned for MNP service. Then the chg-sccp-serv command is used to provision GTT=YES. All MNP messages will fall through to GTT. An example command follows:

```
chg-sccp-serv:serv=mnp:gtt=yes
```

Once the MNP re-routing data is provisioned, MNP service can be changed to *OFFLINE*. At this point all MNP traffic will be re-routed. The user can take necessary steps to correct the MNP service on the node. Until all the cards or enough cards are in active state with valid MNP database, MNP service should not be changed to *ONLINE*.

Table 5: MNP SCCP Service Re-Route Capability Summary on page 36 shows the actions taken when the MNP service is offline, a message arrives at the affected node requiring MNP service, and Service Module cards are available.

Table 5: MNP SCCP Service Re-Route Capability Summary

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
MNP	MNP Capability PC	Yes	N/A	Re-Route to alternate point code based on relative cost	TFP concerning CPC
MNP	MNP Capability PC	No	Yes	Fall through to GTT and perform GTT	TFP concerning CPC

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
MNP	MNP Capability PC	No*	No	Generate UDTS (return cause = network failure)	TFP concerning CPC
MNP	MNP Capability PC	Not Defined	Yes	Fall through to GTT and perform GTT	TFP concerning CPC
MNP	MNP Capability PC	Not Defined	No	Generate UDTS (return cause = no translation for this addr)	TFP concerning CPC
Not MNP	MNP Capability PC	N/A	N/A	Perform appropriate Service / GTT	None
MNP	True or Secondary PC or non-MNPCPC	Yes	N/A	Re-Route to alternate point code based on relative cost	None
MNP	True or Secondary PC or non-MNPCPC	No*	No	Generate UDTS (return cause = network failure)	None
MNP	True or Secondary PC or non-MNP CPC	No	Yes	Fall through to GTT and perform GTT	None
MNP	True or Secondary PC or non-MNPCPC	Not Defined	Yes	Fall through to GTT and perform GTT	None
MNP	True or Secondary PC or non-MNP CPC	Not Defined	No	Generate UDTS (return cause = no translation for this addr)	None

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
Not MNP	True or Secondary PC or non-MNP CPC	N/A	N/A	Perform appropriate Service/GTT	None
*Alternate point codes are defined and unavailable (prohibited or congested).					

MTP-Routed SCCP Traffic for A-Port

A-Port supports MTP-routed SCCP messages. LOCREQ messages are supported. This feature cannot be turned on unless at least one of the following is turned on:

- A-Port
- IGM
- G-Flex

Use of the "MTP Msgs for SCCP Apps" feature adversely affects the SCCP capacity, as all of these messages are counted under SCCP capacity.

After this feature is turned on, all SCCP messages are routed to Service Module cards. The Service Module card then performs SCCP decode/verification. If the MTP-routed messages have CdPA GTI = 0 and A-Port is turned on, then the message is sent for A-Port processing. If MNP service is OFFLINE, then MTP routing is performed on the messages.

If the MTP routed messages have CdPA GTI ≠ 0, then a service selection (SRVSEL) lookup is performed using the SCCP CdPA information. If the result of the lookup indicates MNP service, then the message is sent to MNP handling. If a service selector is not defined or does not match, or if the service is OFFLINE, then MTP routing is performed on the messages. MNP SCCP Service re-route (see *MNP SCCP Service Re-Route Capability* on page 34) is not performed on MTP-routed messages.

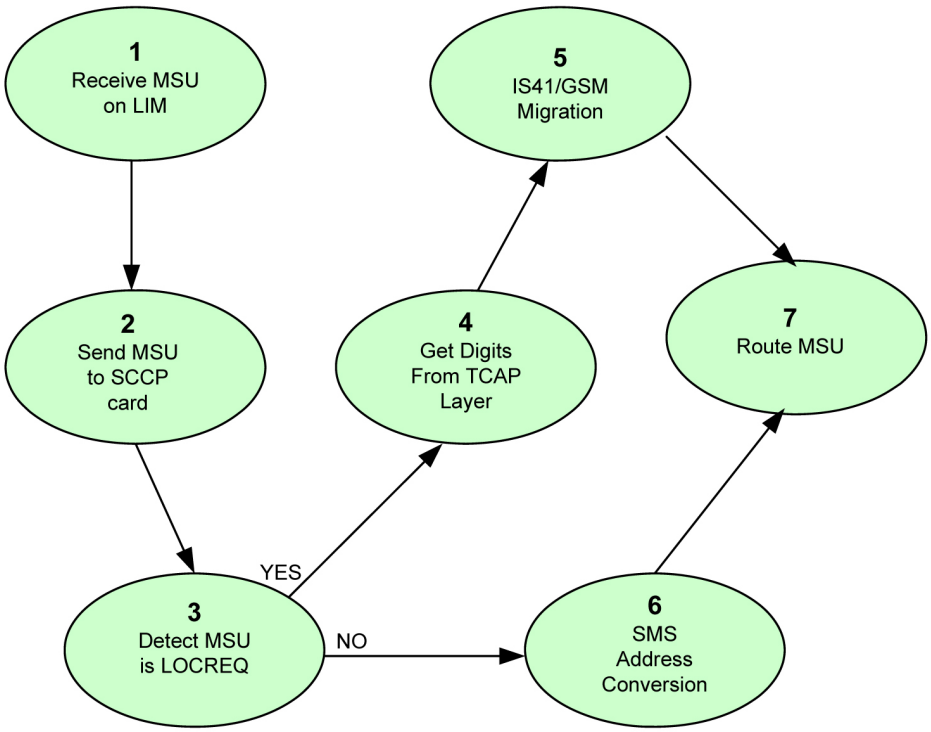
MNP handling checks to see if the TCAP portion of the message is ITU or ANSI. If it is an ITU TCAP message, then normal routing (or G-Flex, if provisioned) is performed on the message. If the message is an ANSI TCAP message, then A-Port general TCAP/MAP verification is performed, if A-Port or IGM is turned on.

SMS Address conversion is not affected by the MTP Msgs for SCCP Apps feature; SMS conversion handles only Registration Notification and SMS Notification messages.

A feature access key (FAK) for part number 893017401 is required to enable the MTP Msgs for SCCP Apps feature.

Figure 8: Message Control Flow on page 38 depicts the message control flow for the MTP Msgs for SCCP Apps feature.

Figure 8: Message Control Flow



1. The MSU is received by the EAGLE 5 ISS.
2. The MSU is sent to the SCCP Function.
3. The Service Module card examines the MSU and determines if it is a LOCREQ message.
4. For LOCREQ, the TCAP Digit Parameter contains the digits to apply to Migration. This is a mandatory parameter. The digits are in encoded.
5. IS41/GSM Migration is applied to the digits to determine if the subscriber is migrated. If so, a LOCREQ Return Result is generated to the OPC. If not, the LOCREQ is routed.
6. If the message is not a LOCREQ, ITUN-ANSI SMS Address Conversion is applied. SMS Address conversion feature does not have any impact because on this feature because SMS conversion handles only Registration Notification and SMS Notification messages.
7. The MSU is routed. MTP and SCCP conversion are performed if crossing a network boundary.

MT-Based IS41 SMS NP

The Mobile Terminated (MT)-Based IS41 SMS NP feature allows wireless operators to route short message service (SMS) messages destined to mobile subscriber within a number portability (NP) environment. If the MT-Based IS41 SMS NP feature is not enabled and turned on, then messages are processed by the A-Port feature.

The MT-Based IS41 SMS NP feature acts as follows:

1. Intercepts an SMSREQ message from the SMSC before the message reaches the home location register (HLR).

2. Extracts the message destination address (SCCP Called Party GTA), conditions the digits, and performs a lookup in the NP database.
3. If the destination address/subscribers belongs to a foreign network, then a reply message is sent to the SMSC with routing information. If the destination address/subscribers belongs to a local network, then the SMSREQ message is relayed to the HLR according to the options set for normal A-Port routing.

Options

The MT-Based IS41 SMS NP feature provides the following configurable options for controlling processing of SMS routing request messages and the content of the response:

- Selecting the Short Message Service Center (SMSC) response message type and digit format
- Specifying when an NP database lookup is considered to be successful
- Specifying the format of digits encoded in the response message.

Feature Control Requirements

The MT-Based IS41 SMS NP feature has the following control requirements:

- The defcc parameter in the `chg-stpopts` command must be set to a value other than **none** before the feature can be turned on.
- A FAK for part number 893-0199-01
- The A-Port feature must be enabled before the MT-Based IS41 SMS NP feature can be enabled.
- The A-Port feature must be turned on before the MT-Based IS41 SMS NP feature can be turned on.
- The feature cannot be enabled if the LNP feature is enabled.
- A temporary FAK cannot be used to enable the feature.
- The feature cannot be turned off after it has been turned on.

Hardware Requirements

The MT-Based IS41 SMS NP feature cannot be enabled if TSM cards running the **sccp** application are present in the system. A TSM card that is running the **sccp** application cannot be provisioned after the feature is enabled.

System Options for MT-Based IS41 SMS NP

The system level options that control the MT-Based IS41 SMS NP feature are stored in the IS41SMSOPTS database table. The MT-Based IS41 SMS NP feature must be enabled before the IS41SMSOPTS table can be provisioned.

The content of the IS41SMSOPTS table is used to help perform number conditioning, response generation, and other feature-specific options. *Table 6: MT-Based IS41 SMS NP Options* on page 41 shows the options stored in the IS41SMSOPTS table, their possible values, and the action taken for each value.

Table 6: MT-Based IS41 SMS NP Options

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSDNFMT	RN	This setting specifies the required format of digits which will be encoded in the "SMS_Address" parameter of the SMSREQ ACK return result response. **Note:** **1.** This feature requires STPOPTS:DefCC to be set before it can be activated. Also, DefCC is not be allowed to change to "NONE" as long as this feature is active. **2.** MTSMSDNFMT is only used to handle digits if MTSMSPARM = DIGIT and MTSMSACKN = ACK.
	RNDN (default)	
	CCRNDN	
	SRFIMSI	SMS_Address is encoded from the "SRFIMSI" parameter from the NPDB entity.
MTSMSTYPE	SP	When the lookup in the NPDB has entitytype=SP, then the lookup is considered successful.
	RN (default)	When the lookup in the NPDB has entitytype=RN, then the lookup is considered successful.
	SPRN	When the lookup in the NPDB has entitytype=SP or RN, then the lookup is considered successful.
	ALL	When the lookup in the NPDB has entitytype=SP or RN or no_entity, then the lookup is considered successful.
	NONSP	When the lookup in the NPDB has entitytype!=SP (not SP), then the lookup is considered successful.

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSPARM	DIGIT (default)	This specifies that the encoding of the SMS_ADDRESS parameter is in DIGIT format, as follows: Digit type=E164 NAI=International NP=E164 Encoding=BCD
	PCSSN	This specifies that the encoding of the SMS_ADDRESS parameter is in PCSSN format. The PCSSN is taken from the entity_data (point code). If no data is present or if the entity data has a non-ANSI point code, then the EAGLE 5 ISS ANSI Point Code is encoded, if available. If no ANSI SID is available, the point code will be encoded as 0 (0-0-0). If SSN is not available from entity data, then the SSN is encoded as MTSMSSSN .
MTSMSDLTR	NO (default)	This option specifies if delimiter digit(s) need to be inserted in the MTSMSDNFMT digits. A value of NO means that no delimiter is inserted.
	PRERN	This option specifies if delimiter digit(s) need to be inserted in the MTSMSDNFMT digits. A value of PRERN means that this delimiter is inserted before the RN. That is, RN is considered as being DLT+RN.
	POSTRN	This specifies if a delimiter needs to be inserted in the MTSMSDNFMT digits. POSTRN means that this delimiter is inserted after the RN. That is, RN is considered as being RN + DLT.

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSDLTRV	1-5 hex digits	This specifies the delimiter digit string that is inserted in the MTSMSDNFMT digits. This value can consist of 1-5 hexadecimal digits. A value must be defined here before MTSMSDLTR can be set to PRERN or POSTRN. The system default is "NONE". Once set, the MTSMSDLTRV can never be configured to "NONE" again.
MTSMSACKN	ACK (default)	This indicates that when the SMSREQ lookup is considered successful, a SMSREQ ACK is returned.
	NACK	This indicates that when SMSREQ look is considered successful, a SMSREQ NACK is returned.
MTSMSESN	NO (default)	This indicates that NO ESN parameter be encoded when generating the SMSREQ return result message
	YES	This indicates that the ESN parameter should be encoded when generating the SMSREQ return result message. The ESN is obtained from IS41OPTS:ESNMFG and IS41OPTS:ESNSN. **Note:** The default value of the ESNMFG (0x00) and ESNSN options is 0 (0x00,00,00).
MTSMSSSN	2-255	This specifies the SSN to be encoded if the MTSMSPARM is set to PCSSN. The default value is 6. **Note:** SSN 0 is considered to be invalid. SSN 1 is reserved for SCCP management.

IS41SMSOPTS Option	Value	Action in the EAGLE 5 ISS
MTSMSNAKERR	0-255 (default value is 5)	This specifies the TCAP Access Denied Reason to be included in the SMSREQ NACK generated by SMS-MT. The default value is 0x5 (Reserved).
MTSMSDIGTYPE	0-255 (default value is 6)	This specifies the Type of Digits to be encoded in the SMS_ADDRESS parameter "Type of Digits" field in the SMSREQ ACK message. The default value is 6 (Destination Number).
MTSMSCHKSRC	YES (default value is NO)	This specifies that the SCCP CgPA GTA of the message will be used to determine whether the source of the message is a Home SMSC. If this option is YES and SCCP CgPA GTA is absent, then the source is assumed to be the Home SMSC. This is the recommended setting if it is necessary to ensure that the MT-Based SMS NP responses are received only by in-network SMSCs.
	NO	This specifies that Eagle will not validate the SCCP CgPA GTA. Effectively, the source of the message is considered to be Home SMSC without checking SCCP CgPA GTA. This may be used by the service provider to disable SCCP CgPA checking, if the service provide ensures that only in-network nodes will send SMSREQ and receive the response generated by this feature.

MT-Based IS41 SMS NP Call Flows

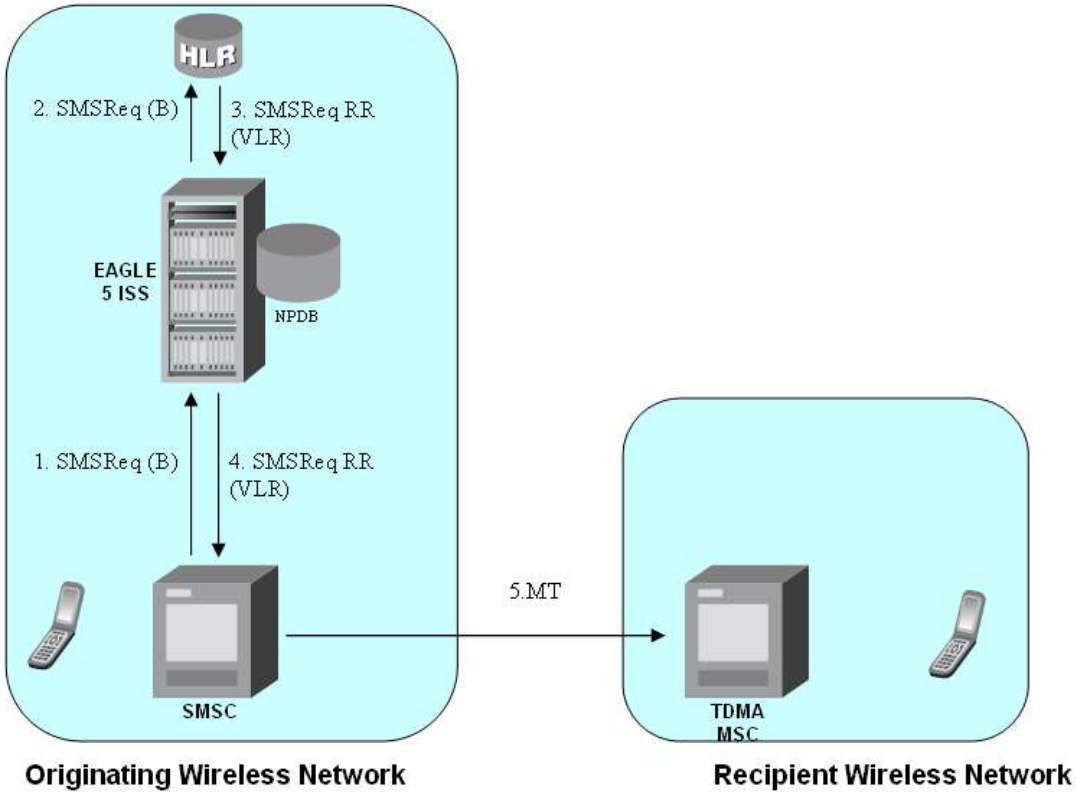
This section illustrates the sequence of messages that occur in the processing of SMS messages destined for mobile-terminated subscribers in a number portability environment. Two scenarios exist:

- The called subscriber who is in the same network as the calling subscriber
- The called subscriber who is in a different network from the calling subscriber

MT-Based IS41 SMS NP Call Flow for In-Network Subscriber

Figure 9: MT-Based IS41 SMS NP Call Flow for In-Network Subscriber on page 45 depicts the message and control flows for a called subscriber who is in the same network as the calling subscriber.

Figure 9: MT-Based IS41 SMS NP Call Flow for In-Network Subscriber



Call considerations:

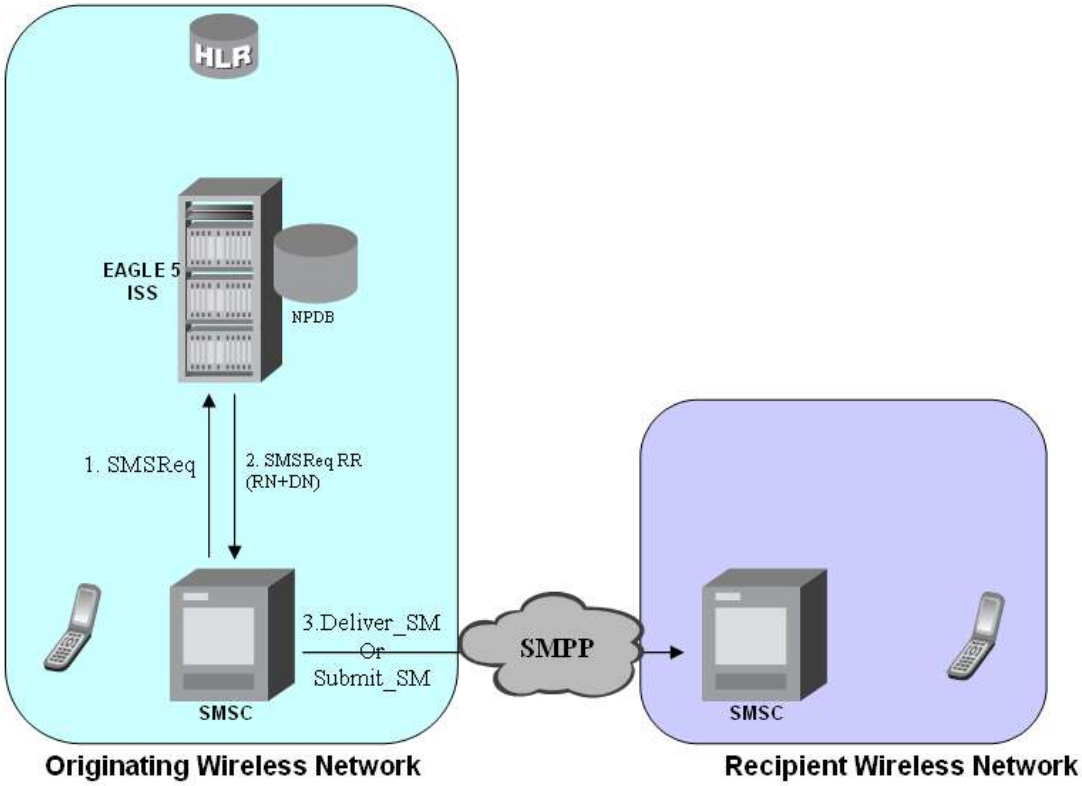
- The TCAP calling party is a wireless IS41 subscriber.
- The TCAP called party is a non-ported or ported-in wireless subscriber that belongs to the same carrier as the TCAP calling party.
- The call type is SMS.

- SMSC has to be reconfigured to generate SMSReq to the HLR, regardless of called subscriber number being in or out of its own numbering range.
- If the called subscriber is ported-in, it has to be provisioned individually.
- If the called subscriber is GSM, Eagle Migration feature ensures that the message is delivered in the GSM network.

MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber

Figure 10: MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber on page 46 depicts the message and control flows for a called subscriber who is in a different network from the calling subscriber.

Figure 10: MT-Based IS41 SMS NP Call Flow for Other-Network Subscriber



Call considerations:

- The TCAP calling party is a wireless TDMA subscriber.
- The TCAP called party is a non-ported or ported-out wireless subscriber that belongs to a different carrier from the TCAP calling party.
- The call type is SMS.
- The SMSC (Short Message Service Center) has to be configured to associate the RNs to their respective carriers.
- The called subscriber must be provisioned individually.

Chapter 3

Commands

Topics:

This chapter contains brief descriptions of the EAGLE 5 ISS commands that are used for the configuration, control, maintenance, and measurements of the A-Port feature and the MT-Based IS 41 SMS NP feature.

Introduction

This chapter describes the commands for maintenance, measurements, and administration of the A-Port features. EAGLE 5 ISS A-Port commands provide for the provisioning, operations, and maintenance activities of the EAGLE 5 ISS Service Module cards and associated network connections.

EAGLE 5 ISS Commands for A-Port

This section includes the EAGLE 5 ISS commands that are either entirely new or modified for the A-Port feature. This chapter contains a brief description of the functions they provide and appropriate examples of their use. User commands are listed in *Table 7: Commands for EAGLE 5 ISS A-Port* on page 48.

The command examples in this chapter illustrate the requirements and provide suggestions for suitable names and output. Complete descriptions of these commands are presented in the Commands Manual, including parameter names, valid values, and output examples for the commands.

Table 7: Commands for EAGLE 5 ISS A-Port

EAGLE 5 ISS Commands for A-Port Feature			
act-gpl	copy-gpl	inh-alm	rept-stat-trbl
alw-card	dlt-map	inh-card	rtrv-ctrl-feat
chg-ctrl-feat	dlt-card	rept-ftp-meas	rtrv-card
chg-db	dlt-sccp-serv	rept-meas	rtrv-gpl
chg-gpl	dlt-srvsel	rept-stat-alm	rtrv-is41opts
chg-is41opts	dlt-sid	rept-stat-db	rtrv-measopts
chg-measopts	enable-ctrl-feat	rept-stat-gpl	rtrv-sccp-serv
chg-sccp-serv	ent-card	rept-stat-meas	rtrv-sid
chg-sid	ent-map	rept-stat-mps	rtrv-srvsel
chg-srvsel	ent-srvsel	rept-stat-sccp	unhb-alm
		rept-stat-sys	

EAGLE 5 ISS IS41 Options Commands

The A-Port system options (is41opts) commands are used to change and report on the values of one or more of the STP node level processing option indicators maintained in the IS41option tables.

All values are assigned initially to system defaults at STP installation time. The values can be updated later using the `chg-is41opts` command.

- **chg-is41opts: Change IS41 Options Command** – The `chg-is41opts` command changes IS41-specific options in the database. This command updates the IS41OPTS table. The default parameter values are always overwritten when specified. Refer to the *Commands Manual* for details of this command

Table 8: `chg-is41opts` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
esnmfg	Optional	0-255, none	TCAP LOCREQ ESN Manufacturer Code. This parameter specifies the value to be encoded in the TCAP LOCREQ ESN parameter in manufacturer code section.
esnsn	Optional	0-16777215	TCAP LOCREQ ESN Serial Number. This parameter specifies the value to be encoded in the TCAP LOCREQ ESN parameter in serial number section.
iec	Optional	digit string 1-5 digits, none	International escape code.
locreqdn	Optional	tcap, sccp	This parameter specifies whether the Called Party will be obtained from the SCCP layer or the TCAP layer of a received LOCREQ for database lookup.
locreqrmhrn	Optional	yes, no	LOCREQ RM HRN. This parameter specifies if HomeRN is to be removed from the TCAP Outgoing Called party for a relayed LOCREQ message.
mscmktid	Optional	0-65535	LOCREQ MSCID Market ID. This

Parameter	Optional/ Mandatory	Range	Description
			parameter specifies the value to be encoded in LOCREQ MSCID parameter for Market ID.
mscswitch	Optional	0-255	LOCREQ MSCID Market ID Switch. This parameter specifies the value to be encoded in LOCREQ MSCID parameter in the market id switch section.
mtplocreqlen	Optional	5-15	The parameter specifies the number of terminating called party digits to extract from the LOCREQ message.
mtplocreqnai	Optional	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub}, none	Message Translation Part LOCREQ Nature of Address Indicator. This parameter defines how Called Party obtained from the TCAP layer of a received MTP-routed LOCREQ message is interpreted.
nec	Optional	digit string 1-5 digits, none	National escape code
rspcdpapcp	Optional	off, on, frmsg	Response called party point present. This parameter specifies the point code present bit that will encode the SCCP CdPA GTA of a LOCREQ response message.
rspcdpari	Optional	frmsg, gt, ssn	Response Called Party Routing Indicator. This parameter specifies the value of the Routing Indicator

Parameter	Optional/ Mandatory	Range	Description
			bit to encode the SCCP CdPA GTA of a returned LOCREQ message.
rspcgpanai	Optional	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub}, none	Response calling party nature of address indicator. This parameter specifies a new NAI value to override the NAI value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspcgpanp	Optional	0-15, none	Response calling party numbering plan. This parameter specifies a new Numbering Plan value to override the Numbering Plan value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspcgpapcp	Optional	frmsg, included, notincluded	Response Calling Party Point Code Present. This parameter specifies the value of the Point Code Present bit to encode the SCCP CgPA GTA of a returned LOCREQ message.
rspcgpari	Optional	frmsg, gt, ssn	Response Calling Party Routing Indicator. This parameter specifies the value of the Routing Indicator bit to encode the SCCP

Parameter	Optional/ Mandatory	Range	Description
			CgPA GTA of a returned LOCREQ message.
rspcgpatt	Optional	0-255, none	Response calling party translation type. This parameter specifies a new TT value to override the TT value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspdig	Optional	ccrndn, hrnrndn, rn, rndn	Routing number. This parameter specifies the digit encoding format of the LOCREQ TCAP Outgoing Called Party parameter on a per EAGLE 5 ISS node basis.
rspdigtype	Optional	0-255	Response digit type. This parameter specifies DigitType value to encode the TCAP Outgoing Called Party parameter.
rspmin	Optional	homern, nothomern, tendelhomern, tenhomern, tenzero	Response LOCREQ min parameter encoding. This parameter specifies how the digits of the LOCREQ MIN parameter are to be encoded.
rspnon	Optional	0-255, none	MSRN nature of number. This parameter specifies the Nature of Number value of the TCAP Outgoing Called Party parameter.

Parameter	Optional/ Mandatory	Range	Description
rspnp	Optional	0-15, none	MSRN numbering plan. This parameter specifies the Numbering Plan values of the TCAP Outgoing Called Party parameter.
rspparm	Optional	ddigit, rtdigit, tlist	Response parameter. This parameter specifies which TCAP LOCREQ parameter (TCAP Outgoing Called Party) will encode the RN and/or DN information.
smsreqbypass	Optional	yes, no	This parameter specifies whether a received SMSREQ that passes the MNP Service Selector (serv=mnp parameter is specified) will be subject to A-Port message processing.
tcapsnai	Optional	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub}, none	This parameter specifies how Called Party, obtained from the TCAP layer of a received LOCREQ message shall be interpreted, either based on the Nature of Number encoded in the TCAP Digits[Dialed] parameter, or based on the selection specified by the mtplocreqnai parameter.

- **rtrv-is41opts: Retrieve IS41 Options Command** – The `rtrv-is41opts` command displays the IS41 option indicators maintained in the IS41OPTS table.

  The following IS41 options are displayed.

```
rtrv-is41opts
```

```
    tekelecstp 06-08-15 10:33:44 EST  EAGLE 39.0.0

    IS41 OPTIONS
    ----------------------
    SMSREQBYPASS    = NO
    LOCREQDN        = SCCP
    IEC             = NONE
    NEC             = NONE
    RSPCGPARI       = FRMSG
    RSPCGPAPCP      = FRMSG
    RSPCDPARI       = FRMSG
    RSPCDPAPCP      = OFF
    RSPCGPANAI      = NONE
    RSPCGPANP       = NONE
    RSPCGPATT       = NONE
    MTPLOCREQNAI    = FRMSG
    RSPPARM         = TLIST
    RSPDIG          = RNDN
    RSPNON          = NONE
    RSPNP           = 2
    RSPMIN          = HOMERN
    MSCMKTID        = 0
    MSCSWITCH       = 0
    ESNMFG          = 0
    ESNSN           = 0
    RSPDIGTYPE      = 6
    LOCREQRMHRN     = NO
    TCAPSNAI        = FRMSG
    MTPLOCREQLEN    = 15

;
```

EAGLE 5 ISS IS41 SMS Options Commands

The IS41 SMS options (`is41smsopts`) commands change and display SMS options in the EAGLE 5 ISS database for the MT-based IS41 SMS NP feature. The following sections describe the two variations: `chg-is41smsopts` and `rtrv-is41smsopts`. For details about these commands, refer to *Commands Manual*.

chg-is41smsopts

Change IS41 SMS Options Command - The chg-is41smsopts command changes the IS41 SMS system options in the database. This command updates the IS41SMSOPTS table. The default parameters are always overwritten when specified.

```
Command: chg-is41smsopts          Class = DATABASE
```

Table 9: `chg-is41smsopts` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
mtsmsackn	Optional	ack, nack	MT-based SMS acknowledgement
mtsmschksrc	Optional	yes, no	MT-based SMS check source
mtsmsdigtype	Optional	0-255	MT-based SMS digit type

Parameter	Optional/ Mandatory	Range	Description
mtsmsdltr	Optional	no, prern, postrn	MT-based SMS delimiter
mtsmsdltrv	Optional	1-5 digits	MT-based SMS delimiter value
mtsmsdnfmt	Optional	rn, rndn, ccrndn, dn, srfimsi	MT-based SMS DN format
mtsmsesn	Optional	no, yes	MT-based SMS electronic serial number
mtsmsnakerr	Optional	0-255	MT-based SMS negative acknowledgement error
mtsmsparm	Optional	digit, pcssn	MT-based SMS parameter
mtsmsssn	Optional	2-255	MT-based SMS subsystem number
mtsmstype	Optional	sp, rn, sprn, all, nonsp	MT-based SMS type

The following command examples set the IS41 SMS options when the MT-based IS41 SMS NP feature is enabled.

- `chg-is41smsopts:mtsmsdnfmt=dn:mtsmstype=sp`
- `chg-is41smsopts:mtsmsdltr=no:mtsmsparm=digit`
- `chg-is41smsopts:mtsmssn=2:mtsmsnakerr=55:mtsmsdigtype=25`

rtrv-is41smsopts

Retrieve IS41 SMS Options Command - The rtrv-is41smsopts command displays all IS41 SMS options from the database.

The following IS41 SMS options are displayed if the MT-based IS41 SMS NP feature is enabled.

```
   tekelecstp 08-04-08 19:38:30 EST  EAGLE 39.0.0

   IS41 SMS OPTIONS
   ----------------------
   MTSMSDNFMT    = RNDN
   MTSMSTYPE     = RN
   MTSMSPARM     = DIGIT
   MTSMSDLTR     = NO
   MTSMSDLTRV    = NONE
   MTSMSACKN     = ACK
   MTSMSESN      = NO
   MTSMSSSN      = 6
   MTSMSNAKERR   = 5
   MTSMSDIGTYPE  = 6
   MTSMSSCHKSRC  = NO
;
```

EAGLE 5 ISS A-Port Service Selector Commands

The A-Port service selector (srvsel) commands are used to provision, remove, change, and report on the applicable service selectors required to change a service entry for Service Module card services. These commands provide flexibility when provisioning the type of messages that require A-Port processing. Four variants of the service selector commands are described in the following sections: `ent-srvsel`, `chg-srvsel`, `dlt-srvsel`, and `rtrv-srvsel`. For further details on the EAGLE 5 ISS service selector commands, such as command rules and output format, refer to the *Commands Manual*.

- **ent-srvsel: Enter A-Port Service Selectors Command**

  The `ent-srvsel` command specifies that the applicable A-Port service selectors indicating A-Port processing are required. The A-Port feature must be enabled before entering this command. The available parameters are:

  Table 10: `ent-srvsel` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
serv	Mandatory	mnp	Service Module card service
ssn	Mandatory	0-255, *	Subsystem number
tt	Mandatory	0-255	Translation Type
nai	Optional	1sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	1e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value
snai	Optional	1sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	Service Nature of Address Indicator
snp	Optional	1e164, e212, e214	Service Numbering Plan

- **chg-srvsel: Change A-Port Service Selector Command**

  The `chg-srvsel` command specifies the applicable A-Port selectors required to change an existing A-Port selector entry. The available parameters are:

Table 11: `chg-srvsel` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
ssn	Mandatory	0-255, *	Subsystem number
tt	Mandatory	0-255	Translation Type
nai	Optional	1sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	1e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value
nserv	Mandatory	eir, gflex, gport, inpq, inpmr, smsmr, idps, idpr, mnp	New Service Module card service to be selected
nsnai	Optional	1sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	New Service Nature of Address Indicator
nsnp	Optional	1e164, e212, e214	New Service Numbering Plan

- **dlt-srvsel: Delete A-Port Service Selector Command**

  The `dlt-srvsel` command deletes a A-Port service selector. The available parameters are:

  Table 12: dlt-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
tt	Mandatory	0-255	Translation Type
ssn	Mandatory	0-255, *	Subsystem number
nai	Optional	1sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	1e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan

Parameter	Optional/ Mandatory	Range	Description
npv	Optional	0-15	Numbering Plan Value

- **rtrv-srvsel: Retrieve A-Port Service Selector Command**

  The `rtrv-srvsel` command displays a list of administered A-Port service selector combinations. All output is sorted first by service, then by global title domain (ANSI first, followed by ITU), GTI, translation type, numbering plan, and by the nature of address indicator. The output can be filtered by specifying any optional parameter. The available parameters are:

  Table 13: rtrv-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Optional	2, 4	Global Title Indicator
nai	Optional	sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value
serv	Optional	mnp	Service Module card service
snai	Optional	1sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	Service Nature of Address Indicator
snp	Optional	1e164, e212, e214	Service Numbering Plan
ssn	Mandatory	0-255, *	Subsystem number
tt	Optional	0-255	Translation Type

EAGLE 5 ISS Feature Key Control Commands

These commands are used to enable, update, view, and control the A-Port feature. A Feature Access Key is used to turn the A-Port feature on. This feature must be purchased to have access to the Feature Access Key, which must be used when enabling these features.

No temporary key is associated with the A-Port feature. After the feature is on, it cannot be turned off. Two steps are needed to turn on the A-Port feature. The first step is to enable the feature. The second step is to set the status to **on**.

Additional verifications are performed to ensure the correct hardware is present in the system. These checks include verifying that the GTT bit is on and that no TSM cards running the SCCP application are provisioned. Refer to *Commands Manual* for details of this command.

- **enable-ctrl-feat: Enable Control Feature Command**

  The `enable-ctrl-feat` command is used for the permanent enabling of the A-Port feature. An example of the command using the A-Port part number follows:

  ```
  enable-ctrl-feat:partnum=893016601:fak=<Feature Access Key>
  ```

- **chg-ctrl-feat: Change Control Feature Command**

  The `chg-ctrl-feat` command is used to activate the A-Port feature. This command requires the A-Port feature to be enabled as a prerequisite. The A-Port feature cannot be enabled if any TSMs are in the system.

  ```
  chg-ctrl-feat:partnum=893016601:status=on
  ```

- **rtrv-ctrl-feat: Retrieve Control Feature Command**

  The `rtrv-ctrl-feat` command is used display the status of the features (on/off) and to show the trial period remaining if temporarily enabled.

EAGLE 5 ISS MNP SCCP Service Commands

The **sccp-serv** commands allow for services to be taken online and offline, and their processing load to be shifted to other designated nodes. These commands also support the assignment of PCs to PC groups used for MNP re-route assignment. Three variants of these commands are described in the following sections:

- `chg-sccp-serv`
- `dlt-sccp-serv`
- `rtrv-sccp-serv`

Entries using the **chg-sccp-serv** command are provisioned in the SCCP-SERV table, and are shown by the **rtrv-sccp-serv** command output. This reduces the maximum number of entries that the MRN table can contain by the number of entries shown in the **rtrv-sccp-serv** command output. For more information on provisioning MRN tables, refer to the Database *Administration Manual - Global Title Translations* manual.

For further details on the EAGLE 5 ISS MNP SCCP service commands, such as command rules and output format, refer to the *Commands Manual*.

- **chg-sccp-serv: Change MNPSCCP Service Command**

  The `chg-sccp-serv` command is used to add point codes to an existing service group or to change the Relative Cost (RC) of existing point codes in a group. SCCP Service groups are organized by service (G-Flex, G-Port, MNP) and point code network type (ANSI, ITU-I, Spare ITU-I, ITU-N, Spare ITU-N, or ITUN-24). Up to seven PCs may be in a network type grouping for service re-route load sharing. This command allows for additions/modifications of up to 4 PCs at one time. The point code parameters support the Spare Point Code subtype prefix **s-** for ITU-I and ITU-N point codes. The available parameters are:

Table 14: chg-sccp-serv Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
serv	Mandatory	gport, gflex, mnp	Service
state	Optional	offline, online	Status
gtt	Optional	no, yes	Global Title Translation
pc1, pca1, pci1, pcn1, pcn241	Optional	Refer to Commands Manual	Post GTT-translated PC
rc1	Optional	00-99	Relative Cost
pc2, pca2, pci2, pcn2, pcn242	Optional	Refer to Commands Manual	Post GTT-translated PC
rc2	Optional	00-99	Relative Cost
pc3, pca3, pci3, pcn3, pcn243	Optional	Refer to *Commands Manual*	Post GTT-translated PC
rc3	Optional	00-99	Relative Cost
pc4, pca4, pci4, pcn4, pcn244	Optional	Refer to *Commands Manual*	Post GTT-translated PC
rc4	Optional	00-99	Relative Cost

- **dlt-sccp-serv: Delete MNP SCCP Service Command**

  The `dlt-sccp-serv` command is used to remove entries from the SCCP Service table. A single command may either remove a PC from a group or remove the entire group. The available parameters are:

  Table 15: dlt-sccp-serv Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
serv	Mandatory	gport, gflex, mnp	Service
pc1, pca1, pci1, pcn1, pcn241	Optional	Refer to Commands Manual	Post GTT-translated PC
pc2, pca2, pci2, pcn2, pcn242	Optional	Refer to Commands Manual	Post GTT-translated PC
pc3, pca3, pci3, pcn3, pcn243	Optional	Refer to Commands Manual	Post GTT-translated PC
pc4, pca4, pci4, pcn4, pcn244	Optional	Refer to Commands Manual	Post GTT-translated PC
all	Optional	No, Yes	**Yes** will delete the entire group

- **rtrv-sccp-serv: Retrieve MNP SCCP Service Command**

  The `rtrv-sccp-serv` command is used to display the SCCP Service application relationship information maintained by the EAGLE 5 ISS. Point Codes are grouped by service. The sample output that follows indicates that the MNP service is online, and ANSI and ITU-I point codes are in the service set.

```
   tekelecstp 05-12-20 08:51:53 EST  36.0.0-55.43.0
   rtrv-sccp-serv
   Command entered at terminal #4.
      --------------------------------------
      Service     : GFLEX
      State       : Offline
      GTT Option  : Yes
      --------------------------------------
      --------------------------------------
      Service     : MNP
      State       : Online
      GTT Option  : Yes
      --------------------------------------
      ANSI PC         RC
      001-001-001    10
      002-002-002    20
      003-003-003    30
      004-004-004    40
      ITUI PC         RC
      2-002-2        10
      3-003-3        10
;
```

Maintenance and Measurements User Interface Commands

This section provides a description of the user interface for maintenance and measurements for the A-Port feature. The commands that follow allow provisioning, operations, and maintenance activities for Service Module cards.

The command examples shown illustrate the requirements and provide suggestions for suitable names and output. The commands are described in detail in the *Commands Manual*, where the actual parameter names, valid values, and output for the commands are provided.

Commands described include:

chg-sid / dlt-sid

These commands are used to change and report on the self-identification of the EAGLE 5 ISS. The self-identification identifies the EAGLE 5 ISS to other signaling points in the network. The CPC type `mnp` is used for A-Port. Refer to the *Commands Manual* for details of these command.

ent-map / dlt-map

These commands are used to provision, remove, change, and report on the mate point code and subsystem number and its attributes. A mate point code defines an adjacent signaling point, which is considered the mated signal transfer point (STP) to the EAGLE 5 ISS.

These commands are updated to allow both ITU-N and ITU-I true point codes to be defined for the same SSN. Refer to the *Commands Manual* for details of these commands.

rept-stat-sys

This command is used to determine the location of problems in the MNP subsystem. The display shows the number of items that are in service (IS-NR) and the how many are in another state (IS-ANR, OOS-MT, OOS-MT-DSBLD). Refer to the *Commands Manual* for details of this command.

A sample output is:

```
eagle10605 01-07-25 02:32:46 EST  Rel 36.0.0-49.10.0
    MAINTENANCE STATUS REPORT
       Maintenance Baseline established.
       Routing Baseline established.
       SCCP Baseline established.
       ALARMS:     CRIT=    9     MAJR=  10   MINR=   3     INH=    2
       OAM 1113    IS-NR          Active                    INH=    0
       OAM 1115    IS-NR          Standby                   INH=    0
       LIM  CARD   IS-NR=   3     Other=        0           INH=    0
       X25  CARD   IS-NR=   0     Other=        0           INH=    0
       SCCP CARD   IS-NR=   1     Other=        0           INH=    0
       GLS  CARD   IS-NR=   0     Other=        0           INH=    0
       SLAN CARD   IS-NR=   0     Other=        0           INH=    0
       EMDC CARD   IS-NR=   2     Other=        0           INH=    0
       MCPM CARD   IS-NR=   2     Other=        0           INH=    0
       IMT         IS-NR=   2     Other=        0
       HMUX        IS-NR=   2     Other=        0           INH=    0
       HIPR        IS-NR=   2     Other=        0           INH=    0
       SLK         IS-NR=   0     Other=        6           INH=    0
       DLK         IS-NR=   0     Other=        0           INH=    0
       LINK SET    IS-NR=   0     Other=        4           INH=    0
       NDC IP LK   IS-NR=   4     Other=        0           INH=    0
       MCPM IP LK  IS-NR=   2     Other=        0           INH=    0
       SS7 DPC     IS-NR=   0     Other=        6           INH=    0
       X25 DPC     IS-NR=   0     Other=        0           INH=    0
```

```
      CLUST DPC   IS-NR=   0     Other=        1          INH=    0
      XLIST DPC   IS-NR=   0     Other=        0
      DPC  SS     Actv =   0     Other=        0
      SEAS SS     IS-NR=   0     Other=        0
      SEAS  X25   IS-NR=   0     Other=        0          INH=    0
      LSMS SS     IS-NR=   0     Other=        0
      LSMS Conn   IS-NR=   0     Other=        0          INH=    0
      NDC SS      IS-NR=   1     Other=        0
      NDC  Q.3    IS-NR=   0     Other=        2          INH=    1
      TERMINAL    IS-NR=   2     Other=       14          INH=    0
      MPS         IS-NR=   2     Other=        0
      EIR SS      IS-NR=   1     Other=        0
```

rept-stat-sccp

The output for the `rept-stat-sccp` command displays the states of and statistics for the Service Module cards and the GTT, G-Flex, MNP, INP , and EIR services executing on those cards. This command also displays any cards that are denied SCCP service. When turned on, the A-Port and IGM features share statistics/status with the G-Port feature. If only the G-Port feature is on, the display title is GPORT. If the A-Port or IGM feature are on, with or without the G-Port feature, the display title for the statistic status changes from GPORT to MNP.

The loc parameter displays detailed view of the status of SCCP services provided by a specific Service Module card or TSM card running the SCCP application. Fields are omitted if an associated feature is not turned on.

The mode parameter targets the general SCCP traffic performance for both Service Module cards and TSM cards running the SCCP application. The report supplies message rates for group ticket voucher (TVG) performance.

SMSREQ NACK is counted as a success for both the Migration and MT-Based IS41 SMS NP features.

Refer to the *Commands Manual* for details of this command.

The following sample output shows the output of the `rept-stat-sccp` command with the G-Flex, G-Port, INP, and A-Port features on. The EIR feature is not enabled, and the ansigflex system option is disabled.

```
tekelecstp 000623 13:34:22 EST  EAGLE5 35.0.0
    SCCP SUBSYSTEM REPORT IS-NR          Active
         SCCP ALARM STATUS = No Alarms
    INPQ SUBSYSTEM REPORT IS-ANR         Restricted  -----
         ASSUMING MATE'S LOAD
         INPQ: SSN STATUS = Allowed     MATE SSN STATUS  = Prohibited
         INPQ ALARM STATUS = No Alarms
    GFLEX SERVICE REPORT IS-ANR         Active
         GFLEX ALARM STATUS = No Alarms
    MNP SERVICE REPORT   IS-ANR         Active
         MNP ALARM STATUS   = No Alarms

    SCCP Cards Configured=4  Cards IS-NR=2
    System TPS Alarm Threshold = 100% Total Capacity
    System Peak SCCP Load = 3000 TPS
    System Total SCCP Capacity = 5000 TPS

    CARD   VERSION      PST          SST         AST       MSU USAGE  CPU USAGE

    -------------------------
    1212   101-001-000  IS-NR        Active      ALMINH       45%         30%
    1301 P 101-001-000  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%  MNP = 10%
      INPMR =  2%  INPQ  =  3%

    TOTAL SERVICE STATISTICS:
                                      FAIL     REROUTE\      FORWARD
      SERVICE    SUCCESS    ERRORS   RATIO     WARNINGS        TO GTT     TOTAL

      GTT:          1995         5      0%            -             -      2000

      GFLEX:         500         1      0%            4            10       515
      MNP:           800         0      0%            2             3       805
      INPMR:          50         5      0%            0            15        70
      INPQ:          499         1      0%            -             -       500
    Command Completed.
;
```

rept-stat-mps

This command is used to display the overall status of the application running on the MPS (Multi-Purpose Server).

If the G-Port, G-Flex, A-Port, or Migration feature is turned on, the status of the Service Module card and EPAP is displayed.

Refer to the *Commands Manual* for details of this command.

A sample output of the `rept-stat-mps` command is:

```
Integrat40 00-06-24 10:37:22 EST  Rel 36.0.0-49.10.0

                      VERSION       PST            SST        AST
    EPAP A            027-015-000   IS-NR          Active     -----
        CRITICAL PLATFORM    ALARM DATA = No Alarms
        MAJOR    PLATFORM    ALARM DATA = No Alarms
        MINOR    PLATFORM    ALARM DATA = No Alarms
        CRITICAL APPLICATION ALARM DATA = No Alarms
        MAJOR    APPLICATION ALARM DATA = No Alarms
        MINOR    APPLICATION ALARM DATA = No Alarms
              ALARM STATUS = No Alarms

                      VERSION       PST            SST        AST


 EPAP B            027-015-000

 OOS-MT         Fault

Standby


     CRITICAL PLATFORM    ALARM DATA = No Alarms
        MAJOR    PLATFORM    ALARM DATA = h'0123456789ABCDEF
        MINOR    PLATFORM    ALARM DATA = h'0123456789ABCDEF
        CRITICAL APPLICATION ALARM DATA = No Alarms
        MAJOR    APPLICATION ALARM DATA = h'0123456789ABCDEF
        MINOR    APPLICATION ALARM DATA = No Alarms
              ALARM STATUS = ** 0371  Major Platform Failure(s)
```

```
    CARD   PST          SST       EIR STAT
    1106 P IS-NR        Active    ACT
    1201   IS-ANR       Active    SWDL
    1205   OOS-MT-DSBLD Manual    -------
    1302   OOS-MT       Isolated  -------
    1310   IS-ANR       Standby   SWDL

    CARD 1106 ALARM STATUS = No Alarms
      DSM PORT A:      ALARM STATUS       = No Alarms
      DSM PORT B:      ALARM STATUS       = No Alarms

    CARD 1201 ALARM STATUS = No Alarms
      DSM PORT A:      ALARM STATUS       = **  0084 IP Connection Unavailable
      DSM PORT B:      ALARM STATUS       = **  0084 IP Connection Unavailable
    CARD 1205 ALARM STATUS = No Alarms
      DSM PORT A:      ALARM STATUS       = **  0084 IP Connection Unavailable
      DSM PORT B:      ALARM STATUS       = **  0084 IP Connection Unavailable
    CARD 1302 ALARM STATUS = ** 0013 Card is isolated from the system
      DSM PORT A:      ALARM STATUS       = **  0084 IP Connection Unavailable
      DSM PORT B:      ALARM STATUS       = **  0084 IP Connection Unavailable
    CARD 1310 ALARM STATUS = No Alarms
      DSM PORT A:      ALARM STATUS       = **  0084 IP Connection Unavailable
      DSM PORT B:      ALARM STATUS       = **  0084 IP Connection Unavailable
    Command Completed.
;
```

rept-ftp-meas

This command provides on-demand measurements reporting capabilities. This command initiates generation and FTP transfer of a measurements report from the Measurement Collection and Polling Module (MCPM) to the FTP server. The `enttype=np` supports A-Port measurements. The combination of this enttype and a report type determines which on-demand A-Port report is generated. Only two report types are accepted in conjunction with enttype=eir: MTCH and MTCD. The A-Port enttype is only valid with the A-Port feature enabled. Refer to the *Commands Manual* for details of this command.

rept-meas

This command includes A-Port measurements in the output sent to the EAGLE 5 ISS Terminal. Refer to the *Commands Manual* for details of this command.

rept-stat-meas

This command reports the status of the measurements subsystem including card location and state, alarm level, and subsystem state. Refer to the *Commands Manual* for details of this command.

rtrv-measopts / chg-measopts

The `chg-measopts` command provides the user with the capability to enable and disable measurement options related to the Measurements Platform. Use this command for the following functions:

- Enable the Measurements Platform collection function
- Turn on or turn off the 15 Minute Measurements collection function
- Enable or disable the automatic generation and FTP transfer of scheduled measurements reports to the FTP server
- Turn on or off the CLLI-based file name option for measurements reports files

The `rtrv-measopts` command displays the current state of the Measurements Platform options.

Refer to the *Commands Manual* for details of these commands.

rept-stat-trbl

This command displays a summary the device trouble notifications. The severity of each alarm is indicated in the output report. Refer to the *Commands Manual* for details of this command.

A sample output is:

```
eagle10207 02-08-23 10:09:59 EST  Rel 36.0.0-49.10.0

    SEQN UAM  AL DEVICE    ELEMENT       TROUBLE TEXT
    0001.0013 ** CARD 1201 GLS           Card is isolated from the system
    0002.0013 ** CARD 1211 SS7ANSI       Card is isolated from the system
    0011.0013 ** CARD 1101 SCCP          Card is isolated from the system
    0013.0013 ** CARD 1103 GLS           Card is isolated from the system
    0015.0013 ** CARD 1105 VSCCP         Card is isolated from the system
    0018.0013 ** CARD 1115 OAM           Card is isolated from the system
    0019.0236 ** SLK 1211,B   ls1134     REPT-LKF: not aligned
    0020.0236 ** SLK 1311,A   ls1134567  REPT-LKF: not aligned
    0021.0236 ** SLK 1312,A   ls113456   REPT-LKF: not aligned
    0022.0236 ** SLK 1313,A   ls11345    REPT-LKF: not aligned
    0023.0236 ** SLK 1314,A   ls113467   REPT-LKF: not aligned
    0024.0236 ** SLK 1315,A   ls11234567 REPT-LKF: not aligned
    0025.0236 ** SLK 1316,A   ls11345678 REPT-LKF: not aligned
    0026.0318 ** LSN ls11234567          REPT-LKSTO: link set prohibited
    0027.0318 ** LSN ls11345678          REPT-LKSTO: link set prohibited
    0028.0318 ** LSN ls1134567           REPT-LKSTO: link set prohibited
    0029.0318 ** LSN ls113456            REPT-LKSTO: link set prohibited
    0030.0318 ** LSN ls11345             REPT-LKSTO: link set prohibited
    0035.0318 ** LSN ls113467            REPT-LKSTO: link set prohibited
    0032.0318 ** LSN ls1134              REPT-LKSTO: link set prohibited
    0033.0336 ** SCCP SYSTEM             LIM(s) have been denied SCCP service
    0034.0349 *C SEAS SYSTEM             SEAS unavailable
    0035.0356 *C LSMS SYSTEM             LSMS unavailable
    0036.0455 *C EIR SYSTEM              EIR Subsystem is not available
    0019.0236 *C T1PORT 1301,1           REPT-T1F:FAC-T1   LOS failure
    Command Completed.
;
```

rept-stat-alm

This command includes the alarm totals of the A-Port subsystem and Service Module/EPAPIP links. Refer to the *Commands Manual* for details of this command. An example of the command and its output is:

```
rept-stat-alm
Command Accepted - Processing
    eagle10605 99-06-24 23:59:39 EAGLE 35.0.0
    rept-stat-alm
    Command entered at terminal #10.
;

    eagle10605 99-06-24 23:59:39 EAGLE 35.0.0
    ALARM  TRANSFER= RMC
    ALARM  MODE      CRIT= AUDIBLE     MAJR= AUDIBLE     MINR= AUDIBLE
    ALARM  FRAME 1     CRIT=   9         MAJR=  12         MINR=   2
    ALARM  FRAME 2     CRIT=   0         MAJR=   0         MINR=   0
    ALARM  FRAME 3     CRIT=   0         MAJR=   0         MINR=   0
    ALARM  FRAME 4     CRIT=   0         MAJR=   0         MINR=   0
```

```
    ALARM  FRAME 5     CRIT=   0         MAJR=   0         MINR=   0
    ALARM  FRAME 6     CRIT=   0         MAJR=   0         MINR=   0
    ALARM  FRAME GPF   CRIT=   1         MAJR=   2         MINR=   1
    PERM. INH. ALARMS  CRIT=   0         MAJR=   0         MINR=   0
    TEMP. INH. ALARMS  CRIT=   0         MAJR=   0         MINR=   0
    ACTIVE ALARMS      CRIT=  10         MAJR=  14         MINR=   3
    TOTAL ALARMS       CRIT=  10         MAJR=  14         MINR=   3
    Command Completed.
;
```

chg-db

The `chg-db` commands copies the EAGLE 5 ISS TDM-resident A-Port database tables during database backup, restore, and repair.

rept-stat-db

This command displays the status information for the EAGLE 5 ISS databases. This status information includes the level information for each Service Module card, and for the active and standby EPAP databases. The command reports database exception status such as corrupted, incoherent, or inconsistent, as well as providing the birthdates and levels. The command output is enhanced to show the status of the PDB and RTDB databases if the A-Port feature is activated. For details about this command, refer to the *Commands Manual*.

inh-card / alw-card

The inh-card command is used to change the state of the card from in-service normal (IS-NR) to Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD). A craftsperson can then test the DCM/LIM/ACM/Service Module card/GPSM-II/MIM card or physically remove it from the shelf.

The alw-card command is used to change the card from OOS-MT-DSBLD (out-of-service maintenance-disabled) to IS-NR (in-service normal) if the loading is successful.

Refer to the *Commands Manual* for details of these commands.

ent-card / rtrv-card / dlt-card

The `ent-card` command is used to add a card to the database. The card type and application specifies the function assigned to the card. This command verifies that if the A-Port feature is turned on, the Generic Program Load (GPL) being provisioned is a VSCCP GPL; if it is, an error is displayed and the `ent-card` command is rejected.

Note: A TSM card running the SCCP application cannot be provisioned when the MT-Based IS41 SMS NP feature is enabled.

The `rtrv-card` command is used to display the information about a card. This command displays the card type, the application the card is running, the linkset name, the signaling links, and the signaling link codes.

The `dlt-card` command is used to remove a card entry from the system database.

Refer to the *Commands Manual* for details on using these commands.

ent/dlt/rtrv-home-smsc

The ent-home-smsc command is used to enter home Short Message Service Center (SMSC) addresses in the database. An example of the command and its output is:

ent-home-smsc : smsc=256489

```
    rlghncxa03w 04-02-28 08:50:12 EST  EAGLE 31.3.0
    ENT-HOME-SMSC: MASP A - COMPLTD
;
```

The dlt-home-smsc command is used to delete home Short Message Service Center (SMSC) addresses in from the database. An example of the command and its output is:

dlt-home-smsc:smsc=552611646

```
    rlghncxa03w 04-02-28 08:50:12 EST  EAGLE 31.3.0
    DLT-HOME-SMSC: MASP A - COMPLTD
;
```

The rtrv-home-smsc command is used to retrieve HOME SMSC specific addresses currently used to identify SMSCs in the database. An example of the command and its output is:

rtrv-home-smsc

```
rlghncxa03w 03-03-28 08:50:12 EST  EAGLE 31.3.0
    SMSC ADDRESS

    13214564894498
    55231465465434
    5465455655656456

    HOME SMSC ADDRESS TABLE IS   1 % FULL    (3 of 500)

;
```

Refer to the *Commands Manual* for details of using these commands.

chg-gpl / act-gpl / rtrv-gpl / rept-stat-gpl / copy-gpl

The command-handling and scroll area output for these commands include the VSCCP GPL. Refer to the *Commands Manual* for details of these commands.

Here are samples of the reports produced by these commands.

```
chg-gpl:appl=vsccp:ver=101-3-0
    Command entered at terminal #3.
;
    tekelecstp 99-10-24 06:54:39 EAGLE 35.0.0
    VSCCP upload to 1114 completed
    VSCCP upload to 1116 completed
;

act-gpl:appl=vsccp:ver=101-3-0
    Command entered at terminal #3.
;
    tekelecstp 99-10-24 06:54:39 EAGLE 35.0.0
    VSCCP activate on 1114 completed
    VSCCP activate on 1116 completed
;

rtrv-gpl:appl=vsccp
    Command entered at terminal #3.
;
    tekelecstp 99-10-04 07:01:08 EAGLE 35.0.0
```

```
    GPL Auditing  ON
    APPL  CARD  RELEASE      APPROVED         TRIAL        REMOVE TRIAL
    VSCCP 1114  101-001-000  101-003-000      101-001-000  101-003-000
    VSCCP 1116  101-001-000  101-003-000      101-003-000  -----------
;

rept-stat-gpl:appl=vsccp
    Command entered at terminal #3.
;
    tekelecstp 99-10-04 12:55:50 EAGLE 35.0.0
    APPL  CARD      RUNNING            APPROVED      TRIAL
    VSCCP 1205      101-003-000 ALM    101-003-000   101-003-000
    VSCCP 1211      101-001-000 ALM+   101-003-000   -----------
    Command Completed.
;
```

inh-alm / unhb-alm

These commands allow both Port A and Port B to be specified for the dev=dlk. This allows alarms to be inhibited on the DSM ports. Refer to the *Commands Manual* for details of these commands.

Chapter 4

Feature Activation

Topics:

This chapter describes the prerequisites, considerations, and steps to activate the A-Port feature. This chapter also includes the feature activation procedure for MT-Based IS41 SMS NP.

Introduction

CAUTION:

For an in-service environment, contact the *Customer Care Center* on page 3 before continuing to activate A-Port. For an environment that is not yet in-service, you may continue with this procedure.

The A-Port feature cannot be turned on if any of the Service Module cards have less than 4 GB of memory installed. Refer to the *Dimensioning Guide for* EPAP *Advanced* DB *Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

This chapter identifies prerequisites for the A-Port feature activation procedure, an overview of the activation steps, and the detailed step descriptions to turn on the A-Port feature. The A-Port feature activation is performed at the EAGLE 5 ISS.

The A-Port features optimizes the use of subscriber numbers and number ranges in a IS-41 Mobile Network by providing a Mobile Directory Number (MDN) and any International Mobile Station Identifier (IMSI). This feature allows subscribers to be moved easily from one Home Location Register (HLR) to another. The A-Port feature applies to ITU-N ANSI networks.logical link between any

The A-Port feature and other related features are optional and can be purchased from Tekelec. If you are not sure whether you have purchased a specific feature, contact your Tekelec Sales or Account Representative.

CAUTION:

After a feature has been turned on with the enable-ctrl-feat command, it cannot be turned off. Because features may overwrite other features or create changes in the database, ensure that you have a license and full technical support from Tekelec before turning on this or any other feature.

The A-Port feature requires a Service Module card running the VSCCP application. Systems with TSM cards running the SCCP application need to be upgraded to 4 GB Service Module cards prior to turning on the A-Port feature.

Refer to the Dimensioning Guide for EPAP Advanced DB Features Technical Reference for important information on the dimensioning rules and the DSM database capacity requirements.

Procedures described in the remainder of this section apply to only the A-Port feature and can only be performed if the A-Port feature is enabled.

The following features are related to the A-Port feature (see your Tekelec Sales or Account Representative for additional information):

- Global Title Translation (GTT)
- Enhanced Global Title Translation (EGTT)
- Variable-Length Global Title Translation (VGTT)
- Mobile Number Portability Circular Route Prevention (MNPCRP)

Prerequisites

The A-Port feature activation assumes that at least one of the following features is provisioned.

- Global Title Translation (GTT)
- Enhanced Global Title Translation (EGTT)
- Variable-Length Global Title Translation (VGTT)

Refer to *Database Administration Manual - Features* for provisioning procedures.

The A-Port feature activation assumes that the EPAP software is already configured; refer to *EPAP Administration Manual*, EPAP Software Configuration.

The NT serial number (`ent-serial-num`) must be entered and locked before A-Port can be enabled and turned-on.

The A-Port feature activation assumes that Service Module cards with 4 GB need to be installed and TSM cards to be removed are identified.

- Note installed Service Module card locations if any.
- Note available odd-even card slots for Service Module card installation.
- Note installed TSM card locations.
- Note adjacent odd-even TSM card slot number positions for Service Module card replacement.

  Note:

  TSM cards use one card slot; Service Module cards require two card slots, odd-even.

  The A-Port feature cannot be turned on until the TSM cards running the SCCP application are removed from the system.

- Determine Service Module card IP addresses and have them available during the activation procedure.

For in-service systems, schedule Service Module card replacement in a maintenance window that allows the reboot of Service Module cards (`init-card:loc=<Service Module card location>`) one at a time.

CAUTION:

In an in-service environment and when replacing TSM cards with Service Module cards, initialize one Service Module card at a time. Verify its return to the IS-NR state before initializing another Service Module card. This precaution keeps cards in service and prevents an interruption of SCCP services.

For in-service systems with TSM cards running SCCP traffic, one Service Module card must be installed in an available double-slot odd-even location and provisioned for VSCCP prior to inhibiting the TSM card running the SCCP application. The Service Module card running the VSCCP application will take over the SCCP traffic (`alw-card`) after the TSM card running the SCCP application becomes inhibited.

CAUTION:

SCCP traffic redundancy will be lost if inhibiting two TSM cards running the SCCP application at a time with only one Service Module card is available in their place. Redundancy will be re-established after the two TSM cards running the SCCP application are replaced with a second Service Module card.

For in-service systems that already have the G-Port, G-Flex and/or INP feature enabled, perform only *Step 6* on page 77 to turn on the A-Port feature. With the G-Port, G-Flex and/or INP feature enabled, the Service Module cards already contain the Real Time Database (RTDB).

For new systems, Service Module cards may be rebooted all at one time using the `init-card:appl=vsccp` command.

For new systems, GTT, EGTT, and VGTT features may be turned on prior to or immediately following the reboot of all Service Module cards.

Feature Activation Overview

This section provides an overview of the A-Port feature activation procedure. The procedure is described in detail in *A-Port Feature Activation Procedure* on page 78.

The feature activation consists of these sections:

- Configure system for HLR destinations in *Step 1* on page 74 and *Step 2* on page 75.

  These steps configure the system to be able to communicate with the HLR database system. This route may already be configured. Perform these steps to verify that you have entered all HLR destinations for A-Port and make configuration changes as needed.
- Install Service Module cards in available slots and configure for VSCCP in *Step 3* on page 76.
- Replace TSM cards configured for SCCP with Service Module cards configured for VSCCP and inhibit/remove any remaining TSM cards running the SCCP application in *Step 4* on page 76 through *Step 5* on page 77.
- Turn on and configure the A-Port feature in *Step 6* on page 77.

1. Display and note current system settings for point codes (PCs) and capability point codes (CPCs), destination point codes (DPCs), routes, and linksets using *Substep a* on page 74 through *Substep f* on page 74.

a) Use `rtrv-sid` command to display current PCs and CPCs.
b) Use `rtrv-dstn` command to display current DPCs.
c) Use `rtrv-rte` command to display current route configurations.
d) Identify PCs and CPCs; determine new PC and CPC to be entered in *Substep a* on page 75.
e) Use `rtrv-stpopts` command to display PC or CPC format if ITU-N network.
f) Use `rtrv-map` command to display PCs of mated applications in database; remove system PC from table if necessary (refer to *Database Administration Manual - Features*, Removing A Mated Application).

CAUTION:

Changing a point code of a system requires a system reboot using the `init-sys` command to fully implement the changes. The `init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures that the updated self identification information is loaded onto all cards, but does interrupt service.

2. Change PC, CPC, DPC, route, linkset, and LIM card configurations for the HLR database using *Substep a* on page 75 through *Substep t* on page 76.
   a) Use `chg-sid` command to configure PC and CPC by network type.
   b) Use `init-sys` command to initialize system if changes were made in *Substep a* on page 75 to any `pca/pci/pcn` parameter.

CAUTION:

The `init-sys` command causes a complete system reload and should be used only in an environment that is not in-service. Using this command ensures the updated self identification information is loaded onto all cards, but does interrupt service.

When the `init-sys` command executes, the system does not retain the manually initiated state (for example, OOS-MT-DSBLD) for the signaling link, card, or terminal. After the command executes, the system attempts to bring all provisioned links, cards, and terminals on-line, including those that were previously out of service. After the system is again on-line, manually return each device to its previous state. Print or electronically capture the output of the `rept-stat-slk`, `rept-stat-card`, and `rept-stat-trm` commands for reference prior to issuing the command. To restore a device to its previous state, issue the appropriate inhibit/deactivate command listed in *Commands Manual*. in the Related Commands section for each of the above rept-stat commands.

   c) Use `rtrv-sid` command to display new PC and CPC.
   d) Use `ent-dstn` command to enter DPC for HLR destinations.
   e) Use `rtrv-dstn` command to display new HLRDPC.
   f) Use `ent-ls` command to enter linkset and assign DPC for HLR destinations.
   g) Use `rtrv-ls` command to display new linkset and assigned DPC for HLR destinations.
   h) Use `ent-card` command to enter LIM cards into the database.
   i) Use `rtrv-card` command to display new LIM cards in the database.
   j) Use `ent-slk` command to assign signaling links to LIM cards.
   k) Use `rtrv-slk` command to display new signaling links assigned to LIM card(s).
   l) Use `ent-rte` command to assign route to new DPC.
   m) Use `rtrv-rte` command to display route assigned to new DPC.
   n) Use `ent-map` command to enter mated application into database.
   o) Use `rtrv-map` command to display new mated application in database.
   p) Use `alw-card` command to allow LIM cards.
   q) Use `rept-stat-card` command to display status of new LIM cards in database.
   r) Use `act-slk` command to activate new signaling links for LIM cards.
   s) Use `rept-stat-slk` command to display IS-NR status of signaling links.

t) Use `rtrv-card` command to confirm the new LIM cards and identify Service Module cards running the VSCCP application and TSM cards running the SCCP application.

CAUTION: When adding Service Module cards to an in-service environment, take precautions to not interrupt traffic. Before replacing TSM cards running the SCCP application with Service Module cards, first install a Service Module card in an available odd-even double-slot prior to removing TSM cards running the SCCP application to make additional room for other Service Module cards.

3. Install and configure Service Module card(s) in available odd-even slots as needed using *Substep a* on page 76 through *Substep o* on page 76.
   a) Install Service Module cards in available odd-even slots and verify green IMT bus LEDs.
   b) Use `ent-card` command to enter Service Module cards running the VSCCP application into the database.
   c) Use `rtrv-card` command to display new Service Module cards in the database.
   d) Use `rtrv-ip-lnk` command to display current link parameters associated with the Service Module card.
   e) Use `chg-ip-lnk` command to set the IP address port and speed associated with the Service Module card.
   f) Use `rtrv-ip-lnk` command to display changed link parameters.
   g) Use `rtrv-ip-host` command to display current IP host information in database.
   h) Use `ent-ip-host` command to add host name and IP address for each VSCCP link.
   i) Use `rtrv-ip-host` command to display changed IP host information.
   j) Use `chg-ip-card` command to set local domain and IP router address if necessary.
   k) Use `rtrv-ip-card` command to display changed Service Module card information.
   l) Use `alw-card` command to boot Service Module card in TSM emulation mode.
   m) Use `rept-stat-card` command to display IS-NR status of Service Module card.
   n) Use pass command to test presence of EPAP hosts on network.
   o) Repeat *Substep a* on page 76 through *Substep n* on page 76 to add all Service Module cards (N+1) to be installed in available slots.
4. Replace TSM card(s) with Service Module cards if applicable, and add Service Module card(s) to database using *Substep a* on page 76 through *Substep w* on page 77.
   a) Use `rtrv-card` command to display TSM cards running the SCCP application in the database.
   b) Use `rept-stat-card` command to display TSM cards running the SCCP application in IS-NR status.
   c) Use `inh-card` command to inhibit TSM cards running the SCCP application.
   d) Use `rept-stat-card` command to display OOS-MT-DSBLD status of TSM cards running the SCCP application.
   e) Use `dlt-card` command to delete TSM cards running the SCCP application from database.
   f) Use `rtrv-card` command to verify removal of TSM cards running the SCCP application from database.
   g) Remove first TSM card from shelf.
   h) Remove second TSM card from shelf.
   i) Install Service Module card in shelf and verify green IMT bus LEDs.
   j) Use `ent-card` command to enter the Service Module card running the VSCCP application into the database.

k) Use `rtrv-card` command to display new Service Module card running the VSCCP application in the database.
l) Use `rtrv-ip-lnk` command to display current link parameters associated with Service Module card running the VSCCP application.
m) Use `chg-ip-lnk` command to set the IP address port and speed associated with the Service Module card running the VSCCP application.
n) Use `rtrv-ip-lnk` command to display changed link parameters associated with the Service Module card running the VSCCP application.
o) Use `alw-card` command to boot Service Module card in TSM emulation mode.
p) Use `rtrv-ip-host` command to display IP host information in database.
q) Use `ent-ip-host` command to add host name and IP address for VSCCP link.
r) Use `rtrv-ip-host` command to display changed IP host information in database.
s) Use `chg-ip-card` command to set local domain and IP router address if necessary.
t) Use `rtrv-ip-card` command to display changed information for the Service Module card running the VSCCP application.
u) Use `rept-stat-card` command to display IS-NR status of the Service Module card running the VSCCP application.
v) Use `pass` command to test presence of EPAP hosts on network.
w) Repeat *Substep a* on page 76 through *Substep v* on page 77 to replace all adjacent TSM cards identified in the prerequisites and to be replaced with Service Module cards.

5. Repeat *Substep c* on page 76 through *Substep g* on page 76 to inhibit any remaining TSM cards running the SCCP application and remove them from database and shelf.

   Note:

   The A-Port feature cannot be turned on until all TSM cards running the SCCP application are removed from the system.

   CAUTION:

   Contact the *Customer Care Center* on page 3 at this step for assistance in completing this A-Port activation procedure. Do not proceed without consulting with the *Customer Care Center* on page 3.

6. Turn on and configure the A-Port feature using steps *Substep a* on page 77 through *Substep r* on page 78.
   a) Use `enable-ctrl-feat` command to enable the A-Port feature.
   b) Use `chg-ctrl-feat` command to turn on the A-Port feature.

      Note:

      Substep e on page 78 through *Substep m* on page 78 describe the commands that administer the A-Port protocol flow to support:

      - A-Port LOCREQ (Ported-out MDNs)
      - A-Port LOCREQ (Foreign MDNs not known to be ported)
      - A-Port Message Relay (Ported-in, non-ported MDNs)

   c) Use `enable-ctrl-feat` command to enable the optional MTP MSGS for SCCP Apps feature, if required.
   d) Use `chg-ctrl-feat` command to turn on the optional MTP MSGS for SCCP Apps feature, if required.

e) Use `chg-stpopts` command to enter default country code (CC) and default network destination code (NDC) if handling non-international numbers.
f) Use `rtrv-stpopts` command to verify changes of CC and NDC.
g) Use `chg-is41opts` command to change IS41 options.
h) Use `rtrv-is41opts` command to verify changes to IS41 options.
i) Use the `ent-homern` command to enter any Home RNs that are prefixed to DNs for incoming A-Port MR messages.
j) Use `rtrv-homern` command to verify routing number prefixes.
k) Use the `rtrv-srvsel` command to read the service selector combinations.
l) Use `ent-srvsel` command to enter MNP service selectors.
m) Use `rtrv-srvsel` command to verify changes to MNP service selectors.

CAUTION:

When you have an in-service environment and you are replacing TSM cards with Service Module cards, initialize one Service Module card at a time. Verify its return to IS-NR state before initializing another card. This precaution keeps cards in service and precludes an interruption of SCCP services.

n) Use `init-card:loc=<Service Module card>` command to load RTDB, OAM, GPL, and GTT data to the Service Module card running the VSCCP application.
o) Use `rept-stat-card` command to display IS-NR status of the Service Module card running the VSCCP application.
p) Repeat *Substep n* on page 78 and *Substep o* on page 78 to reboot each Service Module card

Note:

After the A-Port feature is turned on, always boot the Service Module cards with the `init-card:loc=`<Service Module card location> command.

q) Use `chg-sccp-serv:serv=mnp:state=online` to set the MNP service to on-line.
r) Confirm success of activation procedure with `rept-stat-sccp`, `rept-stat-mps`, and `rept-stat-db:display=all` commands.

EPAP can now administer A-Port entity objects and A-Port subscribers. For the details about performing these actions, refer to *EPAP Administration Manual*.

A-Port Feature Activation Procedure

Refer to the *Commands Manual* for details about the commands used in this procedure.

CAUTION:

Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

1. Before changing a true point code (PC) and adding a capability point code (CPC) for the A-Port feature, display the current values of the self-identification configuration (shown in *Step 2* on

page 79), the destination point codes (DPCs) (shown in *Step 3* on page 79), and the routes and linksets assigned to the DPCs (shown in *Step 4* on page 80).

The A-Port feature applies to ITU-N and ANSI networks.

2. Display the current self identification of the system (PC and CPC) using the `rtrv-sid` command.

   This is an example of the possible output:

```
tklc1081301 06-10-05 11:43:02 EST  EAGLE5 36.0.0
      PCA             PCI          PCN               CLLI        PCTYPE
      006-010-006     5-010-5      5-010-5-aa        tklc1081301   ANSI
      CPCA (MNP)
      006-012-000
      CPCI (MNP)
      5-012-0
      CPCN (MNP)
      5-012-0-aa        5-012-0-ms
      CPCN24 (MNP)
      006-012-000
;
```

   This example retrieved all capability point codes with `cpctype=mnp`.

3. Display the current destination point codes in the Destination Table (`dpc/dpca`) using the `rtrv-dstn` command.

   This is an example of the possible output:

```
  tklc1191001 06-05-11 08:02:13 EST  EAGLE5 36.0.0
     DPCA         CLLI        BEI ELEI   ALIASI          ALIASN/N24  DOMAIN
     008-030-008  stpa038a    no  ---  ----------      --------------   SS7
     006-010-006  stpc016a    no  ---  ----------      --------------   SS7
     042-052-012  tklca4212a2 no  ---    4-075-2         4-075-2-aa    SS7
     042-054-012  tklca4212a4 no  ---    4-077-2         4-077-2-aa    SS7
     042-056-012  tklca4212a6 no  ---    4-079-2         4-079-2-aa    SS7
     255-*-*      mobrncr001a --- ---  ----------      --------------   SS7
     255-225-*    mobrncr002a no  no   ----------      --------------   SS7
     225-225-199  mobrrte001a no  ---    7-255-7         7-255-7-aa    SS7

     DPCI         CLLI        BEI ELEI   ALIASA          ALIASN/N24  DOMAIN
     7-030-7      stpa037i    no  ---  --------------  --------------   SS7
     7-030-7      ----------- no  ---  --------------  --------------   SS7
     5-010-5      stpc015i    no  ---  --------------  --------------   SS7
     DPCN24       CLLI        BEI ELEI   ALIASA          ALIASI      DOMAIN
     008-030-008  stpa038c    no  ---  --------------  ----------       SS7
     006-010-006  stpc016c    no  ---  --------------  ----------       SS7
```

```
      006-090-006   stpd096c    no  --- --------------  ----------       SS7

      006-132-002   sc3a040i00  no  --- --------------  ----------       SS7

   DESTINATION ENTRIES ALLOCATED:   6000
       FULL DPC(s):                  664
       EXCEPTION DPC(s):            5272
       NETWORK DPC(s):                 1
       CLUSTER DPC(s):                 1
       TOTAL DPC(s):                5938
       CAPACITY (% FULL):             99%
   ALIASES ALLOCATED:              12000
       ALIASES USED:                1185
       CAPACITY (% FULL):             10%
   X-LIST ENTRIES ALLOCATED:         500
```

The example shows a truncated display of all provisioned destinations.

4. Display the current route configuration using the `rtrv-rte` command.

   This is an example of the possible output:

```
rlghncxa03w 01-03-07 11:43:04 GMT  EAGLE 36.0.0
DPCA          ALIASI     ALIASN      CLLI    LSN         RC APCA
-----------   -------   -------     -----    --------   -- -----------
DPCI        ALIASN      ALIASA      CLLI     LSN         RC APCI
2-100-1     121111      --------    idp1     ls100001    10 1-234-5
                                             ls100002    10 1-234-6
                                             ls100003    20 1-234-7
                                             ls100004    30 1-234-1
                                             ls100005    40 1-234-2
                                             ls100006    50 1-234-3
DPCN        ALIASA      ALIASI      CLLI     LSN         RC APCN
21111       --------    0-001-1     ndp1     ls200001    10 11111
                                             ls200002    10 11112
                                             ls200003    20 11113
                                             ls200004    30 11114
                                             ls200005    40 11115
                                             ls200006    50 11116
```

5. If the system point code (`pc/pca`) or capability point code (`cpc/cpca`) to be configured in this procedure is shown in *Step 2* on page 79, *Step 3* on page 79, or *Step 4* on page 80, choose another point code to configure with this procedure (*Step 9* on page 81).

6. If configuring the system point code or capability point code (`pc` or `cpca`) of an ANSI network, view the current value of the ANSI point code format.

   Otherwise go to *Step 7* on page 81. Enter the `rtrv-stpopts` command and specify the point code format option `npcfmti`. The `npcfmti` option identifies how the point code is entered into the database and how it is displayed in any outputs. The value is shown in the `NPCFMTI` field. This is an example of the possible output:

```
rlghncxa03w 01-03-17 16:02:05 GMT  EAGLE 36.0.0
STP OPTIONS
----------------------
MTPT31CTL            1
MTPLTI             yes
MTPLTCTDPCQ          3
MTPLTST          10000
MTPXLQ             500
MTPXLET           0100
MTPXLOT            90%
MTPDPCQ           1750
```

```
TFATFRPR          1000
MTPRSI             yes
MTPRSIT           5000
MTPLPRST           yes
MTPT10ALT        30000
SLSCNV           perls
UIMRD              yes
CRITALMINH          no
DISPACTALMS         no
NPCFMTI        4-4-4-2
DEFCC                49
DEFNDC              177
DSMAUD               on
```

To change the format of the ANSI point code, go to the "ANSIPoint Code" section in the EAGLE 5 ISSDatabase *Administration Manual* - SS7. Then continue with *Step 7* on page 81.

7. Display the mated applications in the database using the `rtrv-map` command.

   These are examples of possible output:

```
rlghncxa03w 04-01-07 11:43:04 EST  EAGLE 36.0.0
 MAP TABLE IS   1 % FULL    (1 of 3000)
    PCA          SSN  RC MPCA        SSN MATERC MULT SRM MRC GRP NAME SSO
    002-002-002   10  10                             YES YES -------- ON
                          002-002-003  20    10  SHR  YES YES -------- ON
```

   - If the system point code is shown in the `rtrv-map` command output (in the `PCA`, `PCI`, `PCN`, `MPCA`, `MPCI`, or `MPCN` fields), remove the system point code from the mated application table. Refer to procedure "Removing a Mated Application" in the *EAGLE 5 ISS Database Administration Manual - Features*.
   - If the system point code or capability point code is a destination point code of a route, select a point code that is not the destination point code of a route (see output of the `rtrv-rte` command in *Step 4* on page 80) and not in the Destination table (see output of the `rtrv-dstn` command in *Step 3* on page 79).

8. Change PC, CPC, DPC, route, linkset, and LIM card configurations for the HLR database using *Step 9* on page 81 through *Step 28* on page 89.

   CAUTION:

   Changing a system point code requires a system reboot using the `init-sys` command to fully implement the changes. The `init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures the updated self identification information is loaded onto all cards but does interrupt service.

9. Configure the system point code (`pc/pca`) and capability point code (`cpc/cpca`) by network type using the `chg-sid` command.

   For example, enter one of these commands:

   `chg-sid:pc=002-002-002:pca=003-002-002`

   `chg-sid:cpc=10-20-30:cpca=20-20-30`

   where:

   pc/pca

   The point code used to uniquely identify the system.

cpc/cpca

The point code used by the SS7 protocol to identify a group of functionally related EAGLE 5 ISSs in the signaling network to which the EAGLE 5 ISS belongs.

After successful completion of this command, the system returns the following output:

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
CHG-SID: MASP A - COMPLTD
```

When any of the `pc/pca` parameters have changed, the system needs to be reinitialized. The following caution message is displayed:

```
CAUTION: SYSTEM SITE ID HAS BEEN CHANGED, MANUAL RE-INITIALIZATION IS NEEDED
```

CAUTION:

The `init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures the updated self identification information is loaded onto all cards, but does interrupt service.

When the `init-sys` command executes, the system does not retain the manually initiated state (for example, OOS-MT-DSBLD) for the signaling link, card, or terminal. After the command executes, the system attempts to bring all provisioned links, cards, and terminals on line, including those that were previously out of service. Each device will need to be manually put back into its previous state after the system is back on line. Print or electronically capture the output of the `rept-stat-slk`, `rept-stat-card`, and`rept-stat-trm` commands for reference prior to issuing the `init-sys` command. To restore a device to its previous state, issue the appropriate inhibit/deactivate command listed in the EAGLE 5 ISS Commands Manual in the Related Commands section for each of the above `rept-stat` commands.

10. Reinitialize the system by entering the `init-sys` command if changes were made in *Step 9* on page 81 to any pc/pca parameter.

Note:

The `init-sys` command must be entered twice within 30 seconds for the system to re-initialize. If the `init-sys` command is not executed twice within 30 seconds, the attempt to re-initialize the system is aborted.

When the `init-sys` command is first entered, this message should appear.

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
CAUTION: This command causes a complete system reload, and
will result in traffic loss.
Re-enter command within 30 seconds to confirm.
```

When the `init-sys` command is re-entered within the 30 second time limit, this message should appear.

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
Init System command issued at terminal #3
```

From the time that the `init-sys` command is accepted, approximately two minutes must elapse before *Step 11* on page 83 (logging into the system) can be performed. If the terminal is

in the VT-100/VT-320 mode, the terminal display will be refreshed with non-zero alarm counts. During this two-minute interval, an intermediate screen refresh occurs, which is caused by the role of the MASP (Maintenance and Administration Subsystem Processor) change from active to standby and from standby to active. This screen refresh is typically a partial refresh and the alarm indicators are set to zero.

If logged into the system in the KSR (Keyboard Send/Receive) mode, the message 'UAM 0009, MASP became active' is the only response indicating a successful login to the system. UAM 0009 could be issued twice due to a possible transient MASP role change (switching from active to standby). Following the execution of the `init-sys` command, the MASP that was active before the `init-sys` command was entered will be the active MASP again when the system has finished reinitializing.

11. Verify the SID changes using the `rtrv-sid` command.

This is an example of the possible output:

```
tekelecstp 04-06-14 15:18:11 EST  EAGLE 36.0.0
    PCA             PCI          PCN               CLLI           PCTYPE
    003-002-002     1-023-4      01234             tekelecstp     ANSI
                    s-1-023-4    s-01234
      CPCI
    s-4-056-0
     CPCN
    s-00456
```

12. Enter a destination point code for the location in the Destination table by network type using the `ent-dstn`command. HLR

For example, enter one of these commands:

`ent-dstn:dpc=002-100-002`

`ent-dstn:dpca=002-111-002`

where:

dpci/dpcn

The destination point code being added to the database

The system returns this message:

```
rlghncxa03w 01-03-17 15:35:05 GMT EAGLE 36.0.0
Destination table is (40 of 4000) 1% full
ENT-DSTN: MASP A - COMPLTD
```

13. Verify the changes using the `rtrv-dstn` command and specifying the DPC that was entered in *Step 12* on page 83.

For example, enter one of these commands:

`rtrv-dstn:dpci=002-100-002`

`rtrv-dstn:dpca=002-111-002`

This is an example of the possible output **for DPC** s.

```
rtrv-dstn:dpc=002-100-002
RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0
DPC         CLLI        BEI ELEI  ALIASA      ALIASN          DOMAIN
002-100-002 --------    no  ---   --------    002-111-002     SS7
```

```
            SPC          NCAI
            -----------  no
Destination table is (20 of 2000) 1% full
```

This is an example of the possible output **for DPCAs**.

```
rtrv-dstn:dpcn=002-111-002
RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0
DPCA             CLLI        BEI ELEI  ALIASA       ALIASI       DOMAIN
002-111-002      --------    no  ---   --------     002-100-002  SS7
            SPC          NCAI
            -----------  no
Destination table is (20 of 2000) 1% full
```

14. Enter a linkset with the `ent-ls` command, and assign it to the destination point code by network type.

For example, enter one of these commands:

`ent-ls:lsn=ls400001:apc=002-200-002:lst=c`

`ent-ls:lsn=ls500001:apca=002-112-002:lst=c`

where:

lsn

The name of the linkset

apc/apca

Adjacent point code – the point code identifying the node that is next to the system

lst

The linkset type of the specified linkset

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-17 16:23:21 GMT  EAGLE 36.0.0
Link set table is ( 114 of 1024)  12% full
ENT-LS: MASP A - COMPLTD
```

15. Verify the changes using the `rtrv-ls` command and specifying the linkset name.

For example, enter one of these commands:

`rtrv-ls:lsn=ls400001`

`rtrv-ls:lsn=ls500001`

For lsn400001, the system returns output similar to the following:

```
                                L3T SLT              GWS GWS GWS
LSN          APC    (SS7)  SCRN  SET SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls400001     002-200-002   scr1  1   1   yes a   1    off off off ---   off
           CLLI         TFATCABMLQ  MTPRSE  ASL8
           -----------  --          ---     ----
           IPGWAPC MATELSN    IPTPS   LSUSEALM  SLKUSEALM
           no      ---------- ---     ---       ---
                                L2T         L1               PCR  PCR
           LOC   LINK SLC TYPE     SET  BPS    MODE TSET  ECM   N1   N2
```

```
          1205  a    0   LIMV35   1    56000  ---  ---   BASIC ---  -----
Link set table is (114 of 1024) 12% full
```

For lsn500001, the system returns output similar to the following:

```
                                L3T SLT             GWS GWS GWS
LSN          APC    (SS7)  SCRN  SET SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls500001     002-112-002   scr3  1   1   yes a   1    off off off ---   off
          CLLI         TFATCABMLQ  MTPRSE  ASL8
          -----------  --          ---     ----
          IPGWAPC MATELSN    IPTPS   LSUSEALM  SLKUSEALM
          no      ---------- ---     ---         ---
                                L2T         L1              PCR  PCR
          LOC   LINK SLC TYPE     SET  BPS    MODE TSET  ECM   N1   N2
          1205  a    0   LIMV35   1    56000  ---  ---   BASIC ---  -----
Link set table is (114 of 1024) 12% full
```

16. Add the LIM cards to the database using the `ent-card` command.

    For this example, enter these commands:

    `ent-card:loc=1105:type=limocu:appl=ccs7itu`

    `ent-card:loc=1106:type=limocu:appl=ccs7itu`

    where:

    loc

    Specifies the slot number for the card

    type

    Specifies that the card is a LIMOCU card

    appl

    Specifies that the application is CCS7ITU

    After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-12 09:12:36 GMT  EAGLE 36.0.0
ENT-CARD: MASP A - COMPLTD
```

17. Verify the changes using the `rtrv-card` command with the card location specified.

    For this example, enter these commands:

    `rtrv-card:loc=1105`

    `rtrv-card:loc=1106`

    These are examples of the possible output:

```
RLGHNCXA03W 01-03-30 09:12:36 GMT EAGLE 36.0.0
CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1105   LIMOCU    CCS7ITU   ------------  A    --  ------------  B    --


RLGHNCXA03W 01-03-30 09:12:36 GMT EAGLE 36.0.0
CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1106   LIMOCU    CCS7ITU   ------------  A    --  ------------  B    --
```

18. Assign signaling links to the LIM cards using the `ent-slk` command.

Signaling links are the only elements in the database directly supported by a hardware device. When a link is added to a linkset, the link remains in the state OOS-MT-DSBLD (out of service maintenance disabled) until it is activated; see *Step 26* on page 89.

For example, enter these commands:

```
ent-slk:loc=1105:link=a:lsn=ls400001:slc=0:l2tset=1
```

```
ent-slk:loc=1106:link=a:lsn=ls500001:slc=0:l2tset=1
```

where:

loc

The card location of the LIM that the SS7 signaling link will be assigned to.

link

The signaling link ID assigned on the card specified in the loc parameter.

lsn

The name of the linkset that will contain the signaling link.

slc

The signaling link code. The slc must be unique within the linkset. It must be the same at both the system location and the distant node

l2tset

The level 2 timer set table. A signaling link may be assigned to any of the twenty tables

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-07 08:29:03 GMT  EAGLE 36.0.0
ENT-SLK: MASP A - COMPLTD
```

19. Verify the changes using the `rtrv-slk` command, specifying the card location and port of the signaling link entered in *Step 18* on page 85.

```
rtrv-slk:loc=1105:link=a
```

```
rtrv-slk:loc=1106:link=a
```

This is an example of the possible output.

```
RLGHNCXA03W 01-03-19 21:16:37 GMT EAGLE 36.0.0
                                  L2T          L1                PCR  PCR
LOC   LINK LSN       SLC TYPE     SET  BPS     MODE TSET  ECM    N1   N2
1105  A    ls400001  0   LIMOCU   1    56000   ---  ---   BASIC  ---  -----


RLGHNCXA03W 01-03-19 21:16:37 GMT EAGLE 36.0.0
                                  L2T          L1                PCR  PCR
LOC   LINK LSN       SLC TYPE     SET  BPS     MODE TSET  ECM    N1   N2
1106  A    ls500001  0   LIMOCU   1    56000   ---  ---   BASIC  ---  -----
```

20. Add a route for the new DPC by network type using the `ent-rte` command.

For example, enter one of these commands:

```
ent-rte:dpc=002-100-002:lsn=ls400001:rc=10
```

```
ent-rte:dpca=002-111-002:lsn=ls500001:rc=10
```

where:

dpc/dpca

Destination point code of the node that the traffic is bound for

lsn

The name of the linkset that will carry the traffic bound for the node specified by the destination point code.

rc

The relative cost (priority) for this route.

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-07 08:28:30 GMT  EAGLE 36.0.0
ENT-RTE: MASP A - COMPLTD
```

21. Verify the changes using the `rtrv-rte` command and specifying the destination point code of the route.

This is an example of the possible output:

```
rlghncxa03w 01-03-07 11:43:04 GMT  EAGLE 36.0.0
DPCA         ALIASI      ALIASN      CLLI        LSN      RC    APCA
-----------  -------     -------     -----       -------- --    -----------
DPC          ALIASN      ALIASA      CLLI        LSN      RC APC
002-100-001  121111      240-111-111 idp1        ls100001 10 1-234-5
                                                 ls100002 10 1-234-6
                                                 ls100003 20 1-234-7
                                                 ls100004 30 1-234-1
                                                 ls100005 40 1-234-2
                                                 ls100006 50 1-234-3
002-100-002 121111      240-111-111 idp1        ls400001 10 1-200-2

DPCA        ALIASA      ALIASI        CLLI      LSN      RC APCA
21111       011-222-111 0-001-1       ndp1      ls200001 10 11111
                                                ls200002 10 11112
                                                ls200003 20 11113
                                                ls200004 30 11114
                                                ls200005 40 11115
                                                ls200006 50 11116 21112
   011-222-111 0-001-1       ndp1       ls500001 10 11122
```

22. Add a mated application to the database by network type using the `ent-map` command.

For this example, enter this command:

```
ent-map:pci=2-100-1:ssn=12:rc=20:mpci=3-200-1:mssn=50
:materc=99:grp=grp03
```

```
ent-map:pcn=11112:ssn=12:rc=10:mpcn=11114:mssn=250:materc=99 :grp=grp07
```

where:

pci/pcn

The point code of the primary signaling point that is to receive the message.

ssn

Subsystem number – the subsystem address of the primary point code that is to receive the message.

rc

The relative cost

mpc/mpca/mpci/mpcn

The point code of the backup signaling point that is to receive the message.

mssn

Mate subsystem number – the subsystem address of the backup point code that is to receive the message.

materc

Mate relative cost.

grp

The name of the concerned signaling point code group that contains the point codes that should be notified of the subsystem status. This parameter applies to both RPCs/SSNs.

When each of these commands have successfully completed, this message should appear.

```
RLGHNCXA03W  01-03-07 00:28:31 GMT EAGLE 36.0.0
ENT-MAP:  MASP A - COMPLTD
```

23. Verify the changes using the `rtrv-map` command.

These are examples of possible output.

```
rlghncxa03w 01-03-07  11:43:04  GMT  EAGLE 36.0.0
PCN            SSN  RC  MPCN          MSSN MATERC SRM MRC GRP NAME
11111            5  20  12347          250      99 --- --- GRP07
11112           12   0  12347          250      99 --- --- GRP07
rlghncxa03w 01-03-07  11:43:04  GMT  EAGLE 36.0.0
PCI            SSN  RC  MPCI          MSSN MATERC SRM MRC GRP NAME
1-100-1          5   0  3-200-1        250      99 --- --- GRP03
2-100-1         12  20  3-200-1         50      99 --- --- GRP03
```

24. Allow the LIM cards that were entered in *Step 16* on page 85 by using the `alw-card` command.

For example, enter these commands:

`alw-card:loc=1105`

`alw-card:loc=1106`

This message appears:

```
RLGHNCXA03W  01-03-30 21:20:37 GMT EAGLE 36.0.0
Card has been allowed.
```

25. Verify the In-Service Normal (IS-NR) status of the cards using the `rept-stat-card` command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION            TYPE    APPL      PST          SST       AST 1101
 100-000-00003-000  TSM     SCCP      IS-NR         Active    --- 1102
100-000-00003-000  TSM     SCCP      IS-NR         Active    --- 1103
100-000-00003-000  ACMENET STPLAN    IS-NR         Active    --- 1104
100-000-00003-000  ACMENET GLS       IS-NR         Active    --- 1105
100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    --- 1106
100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    --- 1113
100-000-00002-000  MCAP    OAM       IS-NR         Active    --- 1114
```

```
100-000-00002-000  TDM                IS-NR         Active    --- 1115
100-000-00002-000  MCAP    OAM        IS-NR         Active    --- 1116
100-000-00002-000  TDM                IS-NR         Active    --- 1117
100-000-00002-000  MDAL               IS-NR         Active    --- 1201
100-000-00003-000  LIMDS0  SS7ANSI    IS-NR         Active    --- 1202
100-000-00002-000  LIMV35  SS7GX25    IS-NR         Active    --- 1203
100-000-00003-000  LIMV35  SS7ANSI    IS-NR         Active    --- 1204
100-000-00003-000  LIMATM  ATMANSI    IS-NR         Active    --- 1205
100-000-00001-000  DCM     IPLIM      IS-NR         Active    --- 1207
100-000-00001-000  DCM     SS7IPGW    IS-NR         Active    --- 1303
100-000-00001-000  DCM     IPLIM      IS-NR         Active    --- 1305
100-000-00001-000  DCM     SS7IPGW    IS-NR         Active    ---
```

26. Activate the signaling links entered in *Step 18* on page 85 using the `act-slk` command.

For example, enter these commands:

`act-slk:loc=1105:port=a`

`act-slk:loc=1106:port=a`

The link changes its state from OOS-MT-DSBLD (out-of-service maintenance-disabled) to IS-NR (In-Service Normal).

The output confirms the activation.

```
RLGHNCXA03W 01-03-07 11:11:28 GMT EAGLE 36.0.0
Activate Link message sent to card
```

27. Verify the In-Service Normal (IS-NR) status of the signaling link using the `rept-stat-slk` command.

For example, enter these commands:

`rept-stat-slk:loc=1105`

`rept-stat-slk:loc=1106`

This message should appear:

```
RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0
SLK      LSN        CLLI        PST          SST     AST
1105,A   ls400001   ----------- IS-NR        Avail   ----
Command Completed.

RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0
SLK      LSN        CLLI        PST          SST     AST
1106,A   ls500001   ----------- IS-NR        Avail   ----
Command Completed.
```

28. Display the new LIM cards in the database using the `rtrv-card` command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-15 16:34:56 GMT EAGLE 36.0.0
CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1101   TSM       SCCP      --------      A    --  --------      B    --
1102   TSM       SCCP      --------      A    --  --------      B    --
1103   ACMENET   STPLAN    --------      A    --  --------      B    --
1104   ACMENET   GLS       --------      A    --  --------      B    --
1105   LIMOCU    CCS7ITU   ls400001      A    00  --------      B    --
1106   LIMOCU    CCS7ITU   ls500001      A    00  --------      B    --
1113   MCAP      OAM1114   TDM
```

```
1115   MCAP      OAM
1116   TDM
1117   MDAL
1201   LIMDS0    SS7ANSI   lsn1          A    00  lsn2          B   01
1202   LIMV35    SS7GX25   lsngwy        A    00  --------      B    --
1203   LIMV35    SS7ANSI   lsn2          A    00  lsn1          B    01
1204   LIMATM    ATMANSI   atmgwy        A    00  --------      B    --
1205   DCM       IPLIM     ipgwy1        A    00  ipgwy3        B    01
1207   DCM       SS7IPGW   ipgwy2        A    00  --------      B    --
1303   DCM       IPLIM     ipgwy1        A    00  ipgwy3        B    01
1305   DCM       SS7IPGW   ipgwy4        A    00  --------      B    --
```

Determine a location where the dual-slot Service Module card can be inserted. Also determine adjacent (odd-even slots of TSM cards running the SCCP application for later card replacements. The output shows slots 1107 and 1108 are not occupied.

CAUTION:

When adding Service Module cards to an in-service environment, take precautions to not interrupt traffic. Before replacing TSM cards running the SCCP application with Service Module cards, first install a Service Module card in an available odd-even double-slot prior to removing TSM cards running the SCCP application to make additional room for other Service Module cards.

29. Install and configure Service Module cards as needed in available odd-even slots using *Step 30* on page 90 through *Step 44* on page 95.

For the example, install a Service Module card in slots 1107 and 1108.

30. Install the Service Module card in slots 1107 and 1108.

The Service Module card requires two slots and must be installed in an odd slot with an adjacent empty even slot on its right side.

a) Open the ejector levers on the Service Module card. Carefully align the card edges with the top and bottom card guides. 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.

b) Press the left edge of the card faceplate using constant pressure until the card progress ceases.

warning: Do not impact the faceplate to mate the connectors. Any impact to the card faceplate can damage the faceplate, the pins, or the connectors.

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

d) Verify that both IMT bus LEDs are illuminated green.

e) Install the cabling required to connect the Service Module card to the MPS.

Refer to the *Installation Manual* for details.

31. Add the Service Module card to the database and configure it as a Service Module card running the VSCCP application using the ent-card command.

For this example, enter this command.

```
ent-card:loc=1107:type=dsm:appl=vsccp
```

where:

loc

Specifies the slot number for the card. The slot number must be an odd number.

type

Specifies that the card is a Service Module card.

appl

Specifies that the application is VSCCP.

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-12 09:12:36 GMT  EAGLE 36.0.0
ENT-CARD: MASP A - COMPLTD
```

32. Verify the Service Module card using the `rtrv-card` command with the card location specified.

For this example, enter this command:

```
rtrv-card:loc=1107
```

This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 09:12:36 GMT EAGLE 36.0.0
CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1107   DSM       VSCCP     --------      A    --  --------      B    --
```

33. Display the current link parameters associated with the Service Module card in the database by entering the `rtrv-ip-lnk` command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 21:14:37 GMT EAGLE 36.0.0
LOC   PORT IPADDR          SUBMASK          DUPLEX SPEED MACTYPE AUTO MCAST
1107  A    -----------     -----------      HALF   10    DIX     NO   NO
1107  B    -----------     -----------      HALF   10    DIX     NO   NO
```

34. Enter the IP address port and speed associated with the Service Module card in the database using the `chg-ip-lnk` command.

where: `loc` –

For this example, enter these commands:

```
chg-ip-lnk:loc=1107:port=a:duplex=half:ipaddrr=192.168.122.1
:mactype=dix:speed=100:mcast=yes:submask=255.255.255.0
```

```
chg-ip-lnk:loc=1107:port=b:duplex=half:ipaddrr=192.168.123.1
:mactype=dix:speed=10:mcast=yes:submask=255.255.255.0
```

where:

loc

The odd card location of the Service Module card within the EAGLE 5 ISS.

port

The port ID. The port parameter of the `chg-ip-lnk` command specifies the physical interface of the Service Module card.

ipaddr

IP address assigned to the port. This is a TCP/IP address expressed in standard "dot notation." IP addresses consist of the system network number and the machine's unique host number.

duplex

This is the mode of operation of the interface.

speed

This is interface bandwidth in megabits per second (Mbps). The speed is either 100 Mbps for main DSM network or 10 Mbps for backup DSM network.

mactype

This is the Media Access Control Type of the interface. Specify dix for the Digital/Inter/Xerox de facto standard for the Ethernet.

mcast

This is the Multicast Control of the interface.

submask

The subnet mask of the IP interface, in the form of an IP address with a restricted range of values.

When this command has successfully completed, the following message appears:

```
RLGHNCXA03W 01-03-30 21:18:37 GMT EAGLE 36.0.0
CHG-IP-LNK: MASP A - COMPLTD
```

35. Verify the IP address port and speed associated with the Service Module card in the database by entering the`rtrv-ip-lnk` command.

    This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 21:14:37 GMT EAGLE 36.0.0
LOC   PORT IPADDR           SUBMASK          DUPLEX SPEED MACTYPE AUTO MCAST
1107  A    192.168.122.1    255.255.255.0    HALF   100   DIX     NO   YES
1107  B    192.168.123.1    255.255.255.0    HALF   10    DIX     NO   YES
```

36. Display the current IP host information in the database by entering the `rtrv-ip-host` command.

    This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 21:17:37 GMT EAGLE 36.0.0
IPADDR          HOST
192.1.1.32      KC_HLR2
192.1.1.50      DN_MSC1
192.1.1.52      DN_MSC2
```

37. Add the host name and IP address for each Service Module card using the ent-ip-host command.

    For example, enter these commands:

    `ent-ip-host:host=vsccp_1107_a:ipaddr=192.168.122.1`

    `ent-ip-host:host=vsccp_1107_b:ipaddr=192.168.123.1`

    where:

    host

Specifies the host name. Each Service Module card must be specified separately.

ipaddr

Specifies the IP network address for each EPAP. The first three octets of the IP address must be the same as MPS A and B ports, respectively. The fourth octet identifies the Service Module card and must have a a unique octet identifier for the card's IP address; we recommend numbering the Service Module cards sequentially, using values 1 to 25. (This example shows the assignment of the first Service Module card.)

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-30 21:18:37 GMT EAGLE 36.0.0
ENT-IP-HOST: MASP A - COMPLTD
```

38. Verify the new IP host information in the database by entering the `rtrv-ip-host` command.

```
RLGHNCXA03W 01-03-30 21:19:37 GMT EAGLE 36.0.0
IPADDR          HOST
192.1.1.32      KC_HLR2
192.1.1.50      DN_MSC1
192.1.1.52      DN_MSC2
192.168.122.1   VSCCP_1107_A
192.168.123.1   VSCCP_1107_B
```

39. If the network configuration does require a default router to connect the Service Module card to the EPAP, then only one default router is assignable to each Service Module card. Assign the default router address to each Service Module card by entering a local domain and IP router address for the Service Module card using the `chg-ip-card` command.

Note: Most A-Port customer private networks do not require setting up a default router for the Service Module card.

For this example, enter this command:

```
chg-ip-card:loc=1107:domain=nc.tekelec.com :defrouter=192.168.122.250
```

where:

loc

The odd card location of the Service Module card within the EAGLE 5 ISS.

domain

The domain name of domain server.

defrouter

Default router address. The IP address for default router. This is a TCP/IP address expressed in standard "dot notation". IP addresses consist of the system network number and the unique host number.

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-30 21:20:37 GMT EAGLE 36.0.0
CHG-IP-CARD: MASP A - COMPLTD
```

40. Verify the new TCP/IP parameters associated with the Service Module card in the database by entering the `rtrv-ip-card` command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 21:21:37 GMT EAGLE 36.0.0
   LOC  1107
     SRCHORDR  LOCAL
     DNSA      -----------
     DNSB      -----------
     DEFROUTER  192.168.122.250
     DOMAIN     NC.TEKELEC.COM
```

41. Boot the Service Module card that was added in *Step 31* on page 90 in TSM emulation mode by using the `alw-card` command.

    For example, enter this command:

    `alw-card:loc=1107`

42. Verify the In-Service Normal (IS-NR) status of the Service Module card using the `rept-stat-card` command.

    This is an example of the possible output.

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION            TYPE    GPL       PST           SST       AST
1101  100-000-00003-000  TSM     SCCP      IS-NR         Active    ---
1102  100-000-00003-000  TSM     SCCP      IS-NR         Active    ---
1103  100-000-00002-000  ACMENET STPLAN    IS-NR         Active    ---
1104  100-000-00003-000  TSM     GLS       IS-NR         Active    ---
1105  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    ---
1106  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    ---
1107  100-000-00003-000  DSM     VSCCP     IS-NR         Active    ---
1113  100-000-00002-000  MCAP    OAM       IS-NR         Active    ---
1114  100-000-00002-000  TDM               IS-NR         Active    ---
1115  100-000-00002-000  MCAP    OAM       IS-NR         Active    ---
1116  100-000-00002-000  TDM               IS-NR         Active    ---
1117  100-000-00002-000  MDAL              IS-NR         Active    ---
1201  100-000-00003-000  LIMDS0  SS7ANSI   IS-NR         Active    ---
1202  100-000-00002-000  LIMV35  SS7GX25   IS-NR         Active    ---
1203  100-000-00003-000  LIMV35  SS7ANSI   IS-NR         Active    ---
1204  100-000-00003-000  LIMATM  ATMANSI   IS-NR         Active    ---
1205  100-000-00001-000  DCM     IPLIM     IS-NR         Active    ---
1207  100-000-00001-000  DCM     SS7IPGW   IS-NR         Active    ---
1303  100-000-00001-000  DCM     IPLIM     IS-NR         Active    ---
1305  100-000-00001-000  DCM     SS7IPGW   IS-NR         Active    --
```

43. Test the presence of the EPAP hosts on the network using the `pass` command with the `ping` parameter.

    This command is invoked with a destination (either a hostname or IP address).

    For example, enter the following command:

    `pass:loc=1107:cmd="ping 192.168.122.100".`

    `pass:loc=1107:cmd="ping 192.168.122.200".`

    `pass:loc=1107:cmd="ping 192.168.123.100".`

    `pass:loc=1107:cmd="ping 192.168.123.200".`

After successful completion of each command, the system returns output similar to the following:

```
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
pass: loc=1107: cmd="ping 192.168.122.100"
Command entered at terminal #1.
;
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
PASS: Command sent to card
;
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
PING command in progress
;
rlghncxa03w 00-06-27 08:30:46 GMT EAGLE 36.0.0
PING 192.168.122.100: 56 data bytes
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=0.time=5. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=1.time=0. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=2.time=0. ms
----192.168.100.3 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/1/5
PING command complete
```

If the `pass` commands with the ping parameter is not successful, verify the the correct connection of the hardware cabling and try again. If the command fails again, contact the *Customer Care Center* on page 3.

44. Repeat *Step 30* on page 90 through *Step 43* on page 94 to add all Service Module cards (N+1) to be installed in available slots.

Go to *Step 45* on page 95 to start replacing TSM cards with Service Module cards.

45. Replace TSM cards with Service Module cards if applicable and add Service Module cards to the database using *Step 46* on page 95 through *Step 68* on page 104.

In this procedure, two existing adjacent TSM cards are removed and replaced with a dual-slot Service Module card in slots 1101 and 1102.

Note:

When adding Service Module cards in an in-service environment, take precautions to not interrupt traffic. Before replacing TSM cards with Service Module cards, first install a Service Module card in an available dual-slot.

46. Determine the cards to be removed from the database by displaying the TSM cards running the SCCP application in the database using the `rtrv-card` command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-15 16:34:56 GMT EAGLE 36.0.0
CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1101   TSM       SCCP      --------      A    --  --------      B    --
1102   TSM       SCCP      --------      A    --  --------      B    --
1103   ACMENET   STPLAN    --------      A    --  --------      B    --
1104   ACMENET   GLS       --------      A    --  --------      B    --
1105   LIMOCU    CCS7ITU   ls300001      A    00  --------      B    --
1106   LIMOCU    CCS7ITU   ls400001      A    00  --------      B    --
1107   DSM       VSCCP     ls300001      A    00  --------      B    --
1113   MCAP      OAM
1114   TDM
1115   MCAP      OAM
1116   TDM
```

```
1117   MDAL
1201   LIMDS0    SS7ANSI   lsn1          A    00  lsn2          B    01
1202   LIMV35    SS7GX25   lsngwy        A    00  --------      B    --
1203   LIMV35    SS7ANSI   lsn2          A    00  lsn1          B    01
1204   LIMATM    ATMANSI   atmgwy        A    00  --------      B    --
1205   DCM       IPLIM     ipgwy1        A    00  ipgwy3        B    01
1207   DCM       SS7IPGW   ipgwy2        A    00  --------      B    --
1303   DCM       IPLIM     ipgwy1        A    00  ipgwy3        B    01
1305   DCM       SS7IPGW   ipgwy4        A    00  --------      B    --
```

In this procedure, the TSM cards in card locations 1101 and 1102 are removed.

47. Display the TSM cards that are in-service with the `rept-stat-card:stat=nr` command.

    For this example, enter the following command:

    `rept-stat-card:stat=nr`

    This is an example of the possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION            TYPE    GPL       PST           SST       AST
1101  100-000-00003-000  TSM     SCCP      IS-NR         Active    ---
1102  100-000-00003-000  TSM     SCCP      IS-NR         Active    ---
1103  100-000-00003-000  ACMENET STPLAN    IS-NR         Active    ---
1104  100-000-00003-000  ACMENET GLS       IS-NR         Active    ---
1105  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    ---
1106  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    ---
1107  100-000-00003-000  DSM     VSCCP     IS-NR         Active    ---
1113  100-000-00002-000  MCAP    OAM       IS-NR         Active    ---
1114  100-000-00002-000  TDM               IS-NR         Active    ---
1115  100-000-00002-000  MCAP    OAM       IS-NR         Active    ---
1116  100-000-00002-000  TDM               IS-NR         Active    ---
1117  100-000-00002-000  MDAL              IS-NR         Active    ---
1201  100-000-00003-000  LIMDS0  SS7ANSI   IS-NR         Active    ---
1202  100-000-00002-000  LIMV35  SS7GX25   IS-NR         Active    ---
1203  100-000-00003-000  LIMV35  SS7ANSI   IS-NR         Active    ---
1204  100-000-00003-000  LIMATM  ATMANSI   IS-NR         Active    ---
1205  100-000-00001-000  DCM     IPLIM     IS-NR         Active    ---
1207  100-000-00001-000  DCM     SS7IPGW   IS-NR         Active    ---
1303  100-000-00001-000  DCM     IPLIM     IS-NR         Active    ---
1305  100-000-00001-000  DCM     SS7IPGW   IS-NR         Active    ---
```

48. Inhibit the TSM cards using the `inh-card` command and specifying the card locations.

    `inh-card:loc=1101`

    `inh-card:loc=1102`

    After each command has successfully completed, this message appears:

```
RLGHNCXA03W 01-03-12 09:12:36 GMT  EAGLE 36.0.0
Card has been inhibited.
```

49. Verify that the TSM cards are in the Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD) state with the`rept-stat-card` command.

    This is an example of the possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION            TYPE    GPL       PST           SST       AST
1101  100-000-00003-000  TSM     SCCP      OOS-MT-DSBLD  Isolated  ---
1102  100-000-00003-000  TSM     SCCP      OOS-MT-DSBLD  Isolated  ---
1103  100-000-00002-000  ACMENET STPLAN    IS-NR         Active    ---
```

```
1104  100-000-00002-000  ACMENET STPLAN    IS-NR         Active    ---
1105  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    ---
1106  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    ---
1107  100-000-00003-000  DSM     VSCCP     IS-NR         Active    ---
1113  100-000-00002-000  MCAP    OAM       IS-NR         Active    ---
1114  100-000-00002-000  TDM               IS-NR         Active    ---
1115  100-000-00002-000  MCAP    OAM       IS-NR         Active    ---
1116  100-000-00002-000  TDM               IS-NR         Active    ---
1117  100-000-00002-000  MDAL              IS-NR         Active    ---
1201  100-000-00003-000  LIMDS0  SS7ANSI   IS-NR         Active    ---
1202  100-000-00002-000  LIMV35  SS7GX25   IS-NR         Active    ---
1203  100-000-00003-000  LIMV35  SS7ANSI   IS-NR         Active    ---
1204  100-000-00003-000  LIMATM  ATMANSI   IS-NR         Active    ---
1205  100-000-00001-000  DCM     IPLIM     IS-NR         Active    ---
1207  100-000-00001-000  DCM     SS7IPGW   IS-NR         Active    ---
1303  100-000-00001-000  DCM     IPLIM     IS-NR         Active    ---
1305  100-000-00001-000  DCM     SS7IPGW   IS-NR         Active    ---
```

50. Remove the TSM cards from the database using the `dlt-card` command.

The `dlt-card`command has only one parameter, `loc`, which is the location of the card.

For this example, enter these commands:

```
dlt-card:loc=1101
```

```
dlt-card:loc=1102
```

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-12 09:12:36 GMT  EAGLE 36.0.0
DLT-CARD: MASP A - COMPLTD
```

51. Verify that the TSM cards are removed from the database using the `rtrv-card` command and specifying the cards that were removed in *Step 50* on page 97.

For this example, enter these commands:

```
rtrv-card:loc=1101
```

```
rtrv-card:loc=1102
```

After successful completion of this command, the system returns the following message:

```
E2144 Cmd Rej: Location invalid for hardware configuration
```

52. Locate the TSM card to be removed from the shelf.

Because the TSM card fills only one slot and the Service Module card requires two slots, the Service Module card must be installed in an odd slot that is adjacent to an even slot on its right side. In this procedure, two TSM cards from slots 1101 and 1102 are removed to provide empty slots for one Service Module card.

a) Push the inject/eject clamps outward from the card faceplate (top clamp in the “UP” position, bottom clamp in the “DOWN” position). Pull the levers away from the shelf until parallel to the floor. Gently pull the card toward you until the card clears the shelf.

Figure 11: Push Inject/Eject Clamps Outward

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

53. Repeat *Step 52* on page 97 to remove the second TSM card.

54. Install the Service Module card in slots 1101 and 1102.

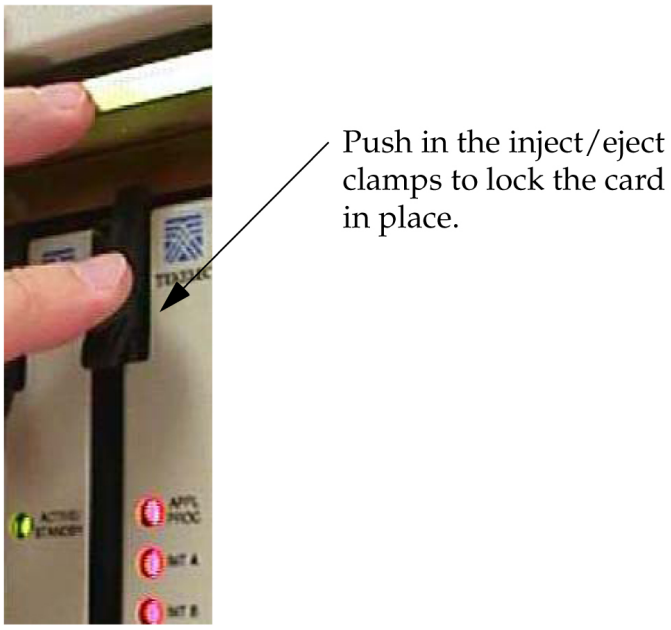
a) Open the ejector levers on the Service Module card. Carefully align the card edges with the top and bottom card guides. Push the card along the length of the card guides until the rear connectors on the card engage the mating connectors on the target shelf backplane.

b) Press the left edge of the card faceplate using constant pressure until the card progress ceases.

warning: Do not impact the faceplate to mate the connectors. Any impact to the card faceplate can damage the faceplate, the pins, or the connectors.

c) Push in the top and bottom inject/eject clamps to lock the card in place and ensure a strong connection with the pins on the target shelf backplane.

Figure 12: Push in Inject/Eject Clamps



d) Verify that both IMT bus LEDs are illuminated green.
e) Install the cabling required to connect the Service Module card to the MPS. Refer to the *EAGLE 5 ISS Installation Manual* for details.

55. Add the Service Module card to the database and assign the VSCCP application using the `ent-card` command.

For this example, enter this command:

```
ent-card:loc=1101:type=dsm:appl=vsccp
```

where:

loc

Specifies the slot number for the card. The slot number must be an odd number.

type

Specifies that the card is a Service Module card.

appl

Specifies that the application is VSCCP.

After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-12 09:12:36 GMT  EAGLE 36.0.0
ENT-CARD: MASP A - COMPLTD
```

56. Display the new Service Module card using the `rtrv-card` command with the card location specified.

For this example, enter this command:

```
rtrv-card:loc=1101
```

This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 09:12:36 GMT EAGLE 36.0.0
```

```
CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1101   DSM       VSCCP     --------      A    --  --------      B    --
```

57. Display the current link parameters associated with the Service Module card in the database by entering the `rtrv-ip-lnk` command.

    This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 21:14:37 GMT EAGLE 36.0.0
LOC   PORT IPADDR          SUBMASK          DUPLEX SPEED MACTYPE AUTO MCAST
1101  A    -----------     -----------      HALF   10    DIX     NO   NO
1101  B    -----------     -----------      HALF   10    DIX     NO   NO
1107  A    -----------     -----------      HALF   10    DIX     NO   NO
1107  B    -----------     -----------      HALF   10    DIX     NO   NO
```

58. Change the link parameters associated with the Service Module card in the database using the `chg-ip-lnk` command.

    For this example, enter these commands:

    ```
    chg-ip-lnk:loc=1107:port=a:duplex=half:ipaddrr=192.168.122.1
    :mactype=dix:speed=100:mcast=yes:submask=255.255.255.0
    ```

    ```
    chg-ip-lnk:loc=1107:port=b:duplex=half:ipaddrr=192.168.123.1
    :mactype=dix:speed=10:mcast=yes:submask=255.255.255.0
    ```

    where:

    loc

    The card location of the Service Module card within the EAGLE 5 ISS.

    port

    The port ID. The port parameter of the `chg-ip-lnk` command specifies the physical interface of the Service Module card.

    ipaddr

    IP address assigned to the port. This is a TCP/IP address expressed in standard "dot notation." IP addresses consist of the system network number and the unique host number of the machine.

    duplex

    This is the mode of operation of the interface.

    speed

    This is interface bandwidth in megabits per second. The speed is either 100 Mbps for main DSM network or 10 Mbps for backup DSM network.

    mactype

    This is the Media Access Control Type of the interface. Specify `dix` for the Digital/Inter/Xerox de facto standard for the Ethernet.

    mcast

    This is the Multicast Control of the interface.

    submask

    The subnet mask of the IP interface, in the form of an IP address with a restricted range of values.

After this command has successfully completed, the following message is displayed.

```
RLGHNCXA03W 01-03-30 21:18:37 GMT EAGLE 36.0.0
CHG-IP-LNK: MASP A - COMPLTD
```

59. Verify the new link parameters associated with the Service Module card in the database by entering the `rtrv-ip-lnk` command.

    The following is an example of the possible output.

```
RLGHNCXA03W 01-03-30 21:14:37 GMT EAGLE 36.0.0
LOC   PORT IPADDR           SUBMASK          DUPLEX SPEED MACTYPE AUTO MCAST
1101  A    192.168.122.2    255.255.255.0    HALF   100   DIX     NO   YES
1101  B    192.168.123.2    255.255.255.0    HALF   10    DIX     NO   YES
1107  A    192.168.122.1    255.255.255.0    HALF   100   DIX     NO   YES
1107  B    192.168.123.1    255.255.255.0    HALF   10    DIX     NO   YES
```

60. Display the current IP host information in the database by entering the `rtrv-ip-host` command.

    The following is an example of the possible output.

```
RLGHNCXA03W 01-03-30 21:17:37 GMT EAGLE 36.0.0
IPADDR          HOST
192.1.1.32      KC_HLR2
192.1.1.50      DN_MSC1
192.1.1.52      DN_MSC2
192.168.122.1   VSCCP_1107_A
192.168.123.1   VSCCP_1107_B
```

61. Add the host name and IP address for each Service Module card link using the `ent-ip-host` command.

    For example, enter these commands:

    `ent-ip-host:host=vsccp_1101_a:ipaddr=192.168.122.2`

    `ent-ip-host:host=vsccp_1101_b:ipaddr=192.168.123.2`

    where:

    host

    Specifies the host name. Each Service Module card link must be specified separately.

    ipaddr

    Specifies the IP network address for each EPAP. The first three octets of the IP address must be the same as MPS A and B ports, respectively. The fourth octet identifies the Service Module card and must have a a unique octet identifier for the card IP address; numbering the Service Module cards sequentially is recommended, using values 1 to 25. This example shows the assignment of the second Service Module card.

    After successful completion of this command, the system returns the following message:

```
RLGHNCXA03W 01-03-30 21:18:37 GMT EAGLE 36.0.0
ENT-IP-HOST: MASP A - COMPLTD
```

62. Verify the new IP host information in the database by entering the `rtrv-ip-host` command.

This is an example of the possible output:

```
RLGHNCXA03W 01-03-30 21:19:37 GMT EAGLE 36.0.0
IPADDR          HOST
192.1.1.32      KC_HLR2
192.1.1.50      DN_MSC1
192.1.1.52      DN_MSC2
192.168.122.1   VSCCP_1107_A
192.168.123.1   VSCCP_1107_B
192.168.122.2   VSCCP_1101_A 192.168.123.2 VSCCP_1101_B
```

63. If the network configuration requires a default router to connect the Service Module card to the EPAP, then only one default router is assignable to each Service Module card. Assign the default router address to each Service Module card by entering the local domain and IP router address for the Service Module card using the `chg-ip-card` command.

    Note: Most A-Port customer private networks do not require setting up a default router for the Service Module card. However, if your network configuration does require a default router to connect the Service Module card to the EPAP, then only one default router is assignable to each Service Module card. Assign the default router address to each Service Module card as shown in this step.

    For this example, enter this command:

    ```
    chg-ip-card:loc=1107:domain=nc.tekelec.com :defrouter=192.168.122.250
    ```

    where:

    loc

    The card location of the card within the EAGLE 5 ISS.

    domain

    The domain name of domain server.

    defrouter

    Default router address. The IP address for default router. This is a TCP/IP address expressed in standard “dot notation”. IP addresses consist of the system network number and unique host number of the machine.

    After successful completion of this command, the system returns the following message:

    ```
    RLGHNCXA03W 01-03-30 21:20:37 GMT EAGLE 36.0.0
    CHG-IP-CARD: MASP A - COMPLTD
    ```

64. Verify the local domain and IP router address associated with the Service Module card in the database by entering the`rtrv-ip-card`command.

    This is an example of the possible output:

    ```
    RLGHNCXA03W 01-03-30 21:21:37 GMT EAGLE 36.0.0
       LOC  1101
         SRCHORDR  LOCAL
         DNSA      -----------
         DNSB      -----------
         DEFROUTER  192.168.122.250
         DOMAIN     NC.TEKELEC.COM
    ```

65. Boot the Service Module card that was inhibited in *Step 48* on page 96 in TSM emulation mode by using the `alw-card` command.

For example, enter this command:

```
alw-card:loc=1101
```

This message appears:

```
RLGHNCXA03W  01-03-30 21:20:37 GMT EAGLE 36.0.0
Card has been allowed
```

66. Verify the In-Service Normal (IS-NR) status of the Service Module card using the `rept-stat-card` command.

    This is an example of the possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION            TYPE    APPL      PST          SST       AST
1101  100-000-00003-000  DSM     VSCCP     IS-NR        Active    ---
1103  100-000-00002-000  ACMENET STPLAN    IS-NR        Active    ---
1104  100-000-00003-000  TSM     GLS       IS-NR        Active    ---
1105  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR        Active    ---
1106  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR        Active    ---
1107  100-000-00003-000  DSM     VSCCP     IS-NR        Active    ---
1113  100-000-00002-000  MCAP    OAM       IS-NR        Active    ---
1114  100-000-00002-000  TDM               IS-NR        Active    ---
1115  100-000-00002-000  MCAP    OAM       IS-NR        Active    ---
1116  100-000-00002-000  TDM               IS-NR        Active    ---
1117  100-000-00002-000  MDAL              IS-NR        Active    ---
1201  100-000-00003-000  LIMDS0  SS7ANSI   IS-NR        Active    ---
1202  100-000-00002-000  LIMV35  SS7GX25   IS-NR        Active    ---
1203  100-000-00003-000  LIMV35  SS7ANSI   IS-NR        Active    ---
1204  100-000-00003-000  LIMATM  ATMANSI   IS-NR        Active    ---
1205  100-000-00001-000  DCM     IPLIM     IS-NR        Active    ---
1207  100-000-00001-000  DCM     SS7IPGW   IS-NR        Active    ---
1303  100-000-00001-000  DCM     IPLIM     IS-NR        Active    ---
1305  100-000-00001-000  DCM     SS7IPGW   IS-NR        Active    ---
```

67. Test the presence of the EPAP hosts on the network using the`pass` command with the ping parameter.

    This command is invoked with a destination (either a hostname or IP address).

    For example, enter the following commands:

```
pass:loc=1101:cmd=”ping 192.168.122.100”.
```

```
pass:loc=1101:cmd=”ping 192.168.122.200”.
```

```
pass:loc=1101:cmd=”ping 192.168.123.100”.
```

```
pass:loc=1101:cmd=”ping 192.168.123.200”.
```

    After successful completion of each command, the system returns output similar to the following:

```
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
pass: loc=1101: cmd="ping 192.168.122.100"
Command entered at terminal #1.
;
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
PASS: Command sent to card
;
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
PING command in progress
```

```
;
rlghncxa03w 00-06-27 08:30:46 GMT EAGLE 36.0.0
PING 192.168.122.100: 56 data bytes
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=0.time=5. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=1.time=0. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=2.time=0. ms
----192.168.100.3 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/1/5
PING command complete
```

If the `pass` command with the ping parameter is not successful, verify the the correct connection of the hardware cabling and repeat the command. If the command fails again, contact the *Customer Care Center* on page 3.

68. Repeat *Step 46* on page 95 through *Step 67* on page 103 to replace all adjacent TSM cards identified in the prerequisites and to be replaced with Service Module cards.
69. Repeat *Step 48* on page 96 through *Step 52* on page 97 to inhibit any remaining TSM cards running the SCCP application and remove them from database and shelf.

    Note: The A-Port feature cannot be turned on until TSM cards running the SCCP application are removed from the system.

    CAUTION: At this point in the procedure, contact the *Customer Care Center* on page 3 for assistance in completing this A-Port activation procedure. Do not proceed without consulting with the *Customer Care Center* on page 3.

70. Turn on and configure the A-Port feature using *Step 71* on page 104 through *Step 84* on page 107.
71. Enter the `enable-ctrl-feat` command to enable the A-Port feature.

    ```
    enable-ctrl-feat:partnum=893016601:fak=<Feature Access Key>
    ```

72. Enter the `chg-ctrl-feat` command to turn on the A-Port feature.

    ```
    chg-ctrl-feat:partnum=893016601:status=ON
    ```

73. Enter the `enable-ctrl-feat` command to enable the MTP MSGS for SCCP Apps feature.

    ```
    enable-ctrl-feat:partnum=893017401:fak=<Feature Access Key>
    ```

74. Enter the `chg-ctrl-feat` command to turn on the MTP MSGS for SCCP Apps feature.

    ```
    chg-ctrl-feat:partnum=893017401:status=ON
    ```

75. Change the IS41 system options in the database for the A-Port feature, if desired.

    For example, enter this command:

    ```
    chg-is41opts:rspcgpanai=7:rspcgpanp=15:rspdig=ccrndn
    ```

    where:

    rspcgpanai

    Specifies a new NAI value to override the NAI value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.

    rspcgpanp

    Defines the numbering plan value of the MNP_SRF.

    rspdig

Specifies the digit encoding format of the LOCREQ TCAP Outgoing Called Party parameter on a per EAGLE 5 ISS node basis.

The system returns the following message:

```
rlghncxa03w 00-08-20 09:04:14 GMT EAGLE 36.0.0
CHG-IS41OPTS: MASP A - COMPLTD
```

76. Add routing number prefixes for the operating network using the `ent-homern` command.

Use this command to enter any Home RNs that are prefixed to DNs for incoming A-Port messages. Use this command to enter up to 100 routing number prefixes for the operating network into the HOMERN table.

For example, enter this command:

`ent-homern:rn=34`

where:

rn

The home routing number prefix. The range is 1 to 15 hex digits (0-F).

When this command has successfully completed, this message appears:

```
RLGHNCXA03W  01-03-07 00:28:31 GMT EAGLE 36.0.0
HOMERN table is (1 of 100) 1% full
ENT-HOMERN:  MASP A - COMPLTD
```

77. Verify the changes using the `rtrv-homern` command.

This command retrieves a list of routing number prefixes that belong to the operating network.

Here is an example of the possible output.

```
rlghncxa03w  01-03-28  00:29:31 GMT EAGLE 36.0.0.0
RN
----------------
216780909087654
76345098
c10234567
c222
cabade
abc
abc123
HOMERN table is (6 of 100) 6% full
```

78. View the list of service selector combinations using the `rtrv-srvsel` command.

This command retrieves a list of administered service selector combinations.

This is an example of the possible output:

```
rlghncxa03w 00-06-20 09:09:14 GMT EAGLE 36.0.0
GTII  TT   NP       NAI   NPV  NAIV  SSN  SNP   SNAI   SERV
4     1    e214     intl  ---  ---   3    ---   ---    gport
```

79. Use the `ent-srvsel` command to enter the A-Port service selectors by network type.

This command assigns applicable service selectors required to specify the service entry for Service Module services.

For example, enter the following command:

```
ent-srvsel:gtia=2:tt=1:snp=e164:snai=intl:serv=mnp:nai=intl:np=e164:ssn=9
```

where:

gtia

Specifies the global title translation indicator (2 = ANSI, ITU; 4 = ITU)

tt

Specifies the translation type.

snp

Defines the service numbering plan (e164, e212, or e214).

snai

Specifies the international Service Nature of Address Indicator.

serv

Specifies the service feature. This must be set to mnp for A-Port.

nai

Specifies the nature of address indicator.

np

Specifies the numbering plan.

ssn

Defines the subsystem number.

The system returns the following message:

```
rlghncxa03w  01-03-07 00:28:31 GMT EAGLE 36.0.0
Service Selector table is (114 of 1024) 11% full
ENT-SRVSEL:  MASP A - COMPLTD
```

80. Verify the changes using the `rtrv-srvsel` command.

This command retrieves a list of administered service selector combinations. Avoid lengthy output by filtering the list using various parameter combinations. (The selector table can have over 1,000 entries.)

For example, enter this command:

```
rtrv-srvsel:gtai=2
```

After successful completion of this command, the system returns output similar to the following:

```
GTAI  TT   NP        NAI    NPV  NAIV  SNP  SNAI  SERV
2     0    e164      intl   ---  ---   e164 intl  mnp
2     1    e164      intl   ---  ---   e164 intl  mnp
```

81. Reload a Service Module card using the `init-card` command.

CAUTION:

When the environment is in-service and TSM cards are being replaced with Service Module cards, initialize one Service Module card at a time. Verify its return to IS-NR state before initializing another Service Module card. This precaution keeps cards in service and precludes an interruption of SCCP services.

GTT, EGTT, and VGTT traffic are routed based on the global titles in the OAM database while G-Flex, A-Port, and INP traffic is routed based on the global title in the RTDB. Rebooting a DSM card running the VSCCP application causes both the OAM and RTDB databases on the Service Module card to reload.

For example, enter this command:

`init-card:loc=1101`

The system returns the following message:

```
rlghncxa03w  01-03-07 00:28:31 GMT EAGLE 36.0.0
Command entered at terminal #3.
Init Card command issued to card 1101
```

82. Verify its return to IS-NR state with the `rept-stat-card` command.

(Wait until in-service state is restored.)

This is an example of the possible output:

```
RLGHNCXA03W 01-03-07 00:30:42 GMT  EAGLE 36.0.0
CARD  VERSION            TYPE    APPL      PST           SST       AST 1101
100-000-00003-000 DSM VSCCP IS-NR
         Active    ---
1103  100-000-00002-000  ACMENET STPLAN    IS-NR         Active    ---
1104  100-000-00003-000  TSM     GLS       IS-NR         Active    ---
1105  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    ---
1106  100-000-00003-000  LIMOCU  CCS7ITU   IS-NR         Active    ---
1107  100-000-00003-000  DSM     VSCCP     IS-NR         Active    ---
1113  100-000-00002-000  MCAP    OAM       IS-NR         Active    ---
1114  100-000-00002-000  TDM               IS-NR         Active    ---
1115  100-000-00002-000  MCAP    OAM       IS-NR         Active    ---
1116  100-000-00002-000  TDM               IS-NR         Active    ---
1117  100-000-00002-000  MDAL              IS-NR         Active    ---
1201  100-000-00003-000  LIMDS0  SS7ANSI   IS-NR         Active    ---
1202  100-000-00002-000  LIMV35  SS7GX25   IS-NR         Active    ---
1203  100-000-00003-000  LIMV35  SS7ANSI   IS-NR         Active    ---
1204  100-000-00003-000  LIMATM  ATMANSI   IS-NR         Active    ---
1205  100-000-00001-000  DCM     IPLIM     IS-NR         Active    ---
1207  100-000-00001-000  DCM     SS7IPGW   IS-NR         Active    ---
1303  100-000-00001-000  DCM     IPLIM     IS-NR         Active    ---
1305  100-000-00001-000  DCM     SS7IPGW   IS-NR         Active    ---
```

83. After the `init-card` and the `rept-stat-card` commands show that service is successfully restored, repeat *Step 79* on page 105 and *Step 82* on page 107 for each Service Module card in the system.
84. Enter the `chg-sccp-serv:serv=mnp:state=online` command to set the MNP service state online.
85. Confirm that essential activation procedures are successful.
    a) Use `rept-stat-sccp` to verify all the Service Module cards are loaded and are IS-NR (In-Service Normal) status.
    b) Use `rept-stat-mps` to verify all the Service Module cards are connected to the EPAP and are operational.
    c) Use `rept-stat-db:display=all` to verify database levels are identical for the EPAP PDB and RTDB and the RTDBs on the Service Module cards.

The A-Port feature is now enabled, turned on, and operating in the system.

MT-Based IS41 SMS NP Feature Activation Procedure

This procedure is used to activate the MT-Based IS41 SMS NP feature.

Before this feature can be enabled, the A-Port feature must be enabled.
Before the MT-Based IS41 SMS NP feature can be turned on, the A-Port Feature must be turned on.
The MT-Based IS41 SMS NP feature can be enabled before the A-Port feature is turned on.

For details about the commands used in this procedure, see the *Commands Manual*.

1. Verify that the A-Port feature is enabled using the `rtrv-ctrl-feat` command.
2. If the A-Port feature is not enabled, enable it using *A-Port Feature Activation Procedure* on page 78 before proceeding to *Step 3* on page 108.
3. Enter the `enable-ctrl-feat` command to enable the MT-Based IS41 SMS NP feature.

   ```
   enable-ctrl-feat:partnum=893019901:fak=<Feature Access Key>
   ```

4. Enter the the `chg-stpopts` command to set the default country code to convert the nature of address indicator (NAI) of MDNs to the international format (`nai=intl`).

   The parameters in this command are used for number conditioning.

   For example, enter this command:

   ```
   chg-stpopts:defcc=49
   ```

   where:
   defcc
   The default country code.

5. Verify the new country code using the `rtrv-stpopts` command.
6. Enter the `rtrv-is41smsopts` command to view the values of the IS41SMSOPTS options.
7. If desired, change the IS41 SMS options in the database for the MT-Based IS41 SMS NP feature using the `chg-is41smsopts` command.

   Note: MTSMSDLTRV must be set to a value other than NONE before MTSMSDLTR can be set to either PRERN or POSTRN. Details about the parameters that can be changed using this command can be found in the *Commands Manual*.

   For example, enter this command:

   ```
   chg-is41smsopts:mtsmsdnfmt=rn:mtsmstype=rn
   ```

   where:
   mtsmsdnfmt
   Specifies the format of the SMS_Address parameter of the SMSREQ ACK response.

   mtsmstype
   Indicates the entity type for which a database lookup is considered successful.

8. Verify the changes using the `rtrv-is41smsopts` command.
   This command displays all IS41 SMS options from the database.

This is an example of the possible output:

```
tekelecstp 08-04-08 19:38:30 EST  EAGLE 39.0.0

    IS41 OPTIONS
    ----------------------
    MTSMSDNFMT      = RNDN
    MTSMSTYPE       = RN
    MTSMSPARM       = DIGIT
    MTSMSDLTR       = NO
    MTSMSDLTRV      = NONE
    MTSMSACKN       = ACK
    MTSMSESN        = NO
    MTSMSSSN        = 6
    MTSMSNAKERR     = 5
    MTSMSDIGTYPE    = 6
    MTSMSCHKSRC     = NO
```

9. If the value of IS41SMSOPTS:MTSMSCHKSRC=YES, then provision the Home SMSC Table entries using the `ent-home-smsc` command.

   For example, enter this command:

   `ent-home-smsc:smsc=552611646`

10. Verify the SMSC table contents using the `rtrv-home-smsc` command.

    This command retrieves the HOME SMSC specific addresses currently used to identify Short Message Service Centers in the database.

    This is an example of the possible output:

```
rtrv-home-smsc

    rlghncxa03w 03-03-28 08:50:12 EST  EAGLE 31.3.0
    SMSC ADDRESS

    13214564894498
    55231465465434
    5465455655656456

    HOME SMSC ADDRESS TABLE IS   1 % FULL    (3 of 500)
```

11. Verify that the A-Port feature is turned on using the `rtrv-ctrl-feat` command.
12. If the A-Port feature is not turned on, see *Step 74* on page 104 of the *A-Port Feature Activation Procedure* on page 78 before proceeding to *Step 13* on page 109.
13. Enter the `chg-ctrl-feat` command to turn on the MT-Based IS41 SMS NP feature.

    `chg-ctrl-feat:partnum=893019901:status=ON`

The MT-Based IS41 SMS NP feature is now enabled, turned on, and operating in the system.

The 1100 TPS/Service Module Card for ITU NP Feature

This procedure is used to enable and turn on the 1100 TPS/Service Module card for ITU NP feature. This feature provides up to 26,400 transactions per second when the maximum number of Service Module cards are installed in the EAGLE 5 ISS and one or more EPAP-related features (such as G-Port, G-Flex, A-Port, INP, EIR, Migration) are enabled and turned on.

This feature can be enabled only for Service Module cards that are rated at 850 transactions per second (TPS).

CAUTION: The increase of the Service Module card capacity, 1100 TPS per Service Module card, assumes incoming traffic consists of at least 30% of GTT routed traffic that does not require EPAP based lookup. If more than 70% of incoming traffic requires EPAP based lookup, Group Ticket Voucher (TVG) may shutdown and overall TVG capacity of 1100 for the card may not be met.

The feature access key is based on the feature's part number and the serial number of the EAGLE 5 ISS, making the feature access key site-specific.

The `enable-ctrl-feat` command enables the 1100 TPS/Service Module card for ITU NP feature by inputting the feature's access key and the feature's part number with these parameters:

:fak

The feature access key provided by Tekelec. The feature access key contains 13 alphanumeric characters and is not case sensitive.

:partnum

The Tekelec-issued part number of the 1100 TPS/Service Module card for ITU NP feature, 893018001.

After the 1100 TPS/Service Module card for ITU NP feature has been enabled, the feature must be turned on with the `chg-ctrl-feat` command. The `chg-ctrl-feat` command uses these parameters:

:partnum

The Tekelec-issued part number of the 1100 TPS/Service Module card for ITU NP feature, 893018001.

:status=on

Used to turn the 1100 TPS/Service Module card for ITU NP feature on.

Activating the 1100 TPS/Service Module Card for ITU NP Feature

The 1100 TPS/Service Module card for ITU NP feature cannot be enabled with a temporary feature access key.

The 1100 TPS/Service Module card for ITU NP feature cannot be enabled if:

- The EAGLE 5 ISS does not contain any Service Module cards.
- The LNP feature is enabled.

  The status of the LNP feature is shown with the `rtrv-ctrl-feat` command output.
- The ANSI G-Flex STP Option is enabled.

  The status of the ANSI G-Flex STP Option is shown in the `rtrv-stpopts` command output.
- The GTT feature is not turned on.

  The status of the GTT feature is shown in the `rtrv-feat` command output.

The `enable-ctrl-feat` command requires that the database contain a valid serial number for the EAGLE 5 ISS, and that this serial number is locked. This can be verified with the `rtrv-serial-num` command. The EAGLE 5 ISS is shipped with a serial number in the database, but the serial number is not locked. The serial number can be changed, if necessary, and locked

once the EAGLE 5 ISS is on-site, with the `ent-serial-num` command. The `ent-serial-num` command uses these parameters:

:serial

The serial number assigned to the EAGLE 5 ISS. The serial number is not case sensitive.

:lock

Specifies whether or not the serial number is locked. This parameter has only one value, yes, which locks the serial number. Once the serial number is locked, it cannot be changed.

Note: To enter and lock the serial number of the EAGLE 5 ISS, the `ent-serial-num` command must be entered twice, once to add the correct serial number to the database with the serial parameter, then again with the serial and the lock=yes parameters to lock the serial number. Verify that the serial number in the database is correct before locking the serial number. The serial number can be found on a label affixed to the control shelf (shelf 1100).

The 1100 TPS/Service Module card for ITU NP feature increases the processing capacity of SCCP traffic for an EAGLE 5 ISS processing EPAP-based traffic to 26,400 transactions per second. To achieve this increase in SCCP processing capacity, a maximum of 25 Service Module cards must be provisioned and installed in the EAGLE 5 ISS.

1. Display the status of the 1100 TPS/Service Module card feature by entering the `rtrv-ctrl-feat` command.

   The following is an example of the possible output:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0

The following features have been permanently enabled:
   Feature Name              Partnum    Status  Quantity
   TPS                       893000110  on      1000
   ISUP Normalization        893000201  on      ----
   Prepaid SMS Intercept Ph1 893006701  on      ----
   MNP Circ Route Prevent    893007001  on      ----
   1100 TPS/DSM for ITU NP   893018001  on      ----

   The following features have been temporarily enabled:
   Feature Name   Partnum    Status  Quantity  Trial Period Left
   TPS            893000140  on      4000      20 days 8 hrs 57 mins

   The following features have expired temporary keys:
   Feature Name              Part Num
   OnOffFeatV                893492401
```

2. Based on the output from the previous step, do one of the following:

   - If the `rtrv-ctrl-feat` output shows that the 1100 TPS/Service Module card for ITU NP feature is enabled, shown by the entry 1100 TPS/Service Module card for ITU NP, and its status is *on*, no further action is necessary.
   - If the feature is enabled and its status is *off*, go to *Step 13* on page 114.
   - If the rtrv-ctrl-feat output shows that the LNP feature is enabled, this procedure cannot be performed. The 1100 TPS/Service Module card for ITU NP feature cannot be enabled if the LNP feature is enabled.
   - If the 1100 TPS/Service Module card for ITU NP and LNP features are not enabled, go to the next step.

3. Determine whether the G-Flex feature is turned on by entering the `rtrv-ctrl-feat` .

   (If the G-Flex feature is off, then the ANSIGFLEX option is not displayed in the `rtrv-stpopts` output in the next step.)

   The status of the G-Flex feature is shown by the entry *G-Flex* in the `rtrv-ctrl-feat` output.

   - If the G-Flex feature is turned off, skip to *Step 5* on page 112.
   - If the G-Flex feature is turned on, go to the next step.

4. Verify that the ANSI G-Flex option is not enabled or turned on by entering the `rtrv-stpopts` command.

   The 1100 TPS/Service Module card ITU NP feature cannot be enabled if the ANSI G-Flex option is turned on.

   The ANSI G-Flex option is shown by the entry *ANSIGFLEX* in the `rtrv-stpopts` output. If the *ANSIGFLEX* entry is displayed in the `rtrv-stpopts` output, both the G-Flex and the GTT features are turned on.

   - If the ANSIGFLEX value is *yes* in the `rtrv-stpopts` output , the ANSI G-Flex option is enabled and the remainder of this procedure cannot be performed.
   - If the ANSIGFLEX value is *no* in the `rtrv-stpopts` output, the ANSI G-Flex option is *not* enabled. Go to *Step 6* on page 112.

5. Determine whether the GTT feature is turned on by examining the output of the `rtrv-feat` command.

   The 1100 TPS/Service Module card ITU NP feature cannot be enabled unless the GTT feature is turned on. The GTT feature is shown by the entry *GTT* in the `rtrv-feat` output executed in *Step 3* on page 112.

   - If the GTT feature is turned on, go to the next step.
   - If the GTT feature is turned off, perform "Adding a Service Module" in the *Database Administration Manual - Global Title Translation* manual to turn the GTT feature on and to add the required number of Service Module cards to the database. After "Adding a Service Module" has been performed, go to *Step 11* on page 113.

6. Verify the number of Service Module cards that are provisioned in the database using the `rept-stat-gpl:gpl=sccphc` command:

   This is an example of the possible output:

```
rlghncxa03w 07-05-01 11:40:26 GMT EAGLE5 37.5.0
GPL    CARD   RUNNING      APPROVED     TRIAL
VSCCCP 1201  126-002-000  126-002-000  126-003-000
VSCCCP 1203  126-002-000  126-002-000  126-003-000
VSCCCP 1207  126-002-000  126-002-000  126-003-000
VSCCCP 1213  126-002-000  126-002-000  126-003-000
VSCCCP 1215  126-002-000  126-002-000  126-003-000
VSCCCP 1305  126-002-000  126-002-000  126-003-000
VSCCCP 1313  126-002-000  126-002-000  126-003-000
VSCCCP 2103  126-002-000  126-002-000  126-003-000
Command Completed
```

7. Based on the output shown in the previous step, do one of the following:

   - If the required number of Service Module cards are provisioned in the database, go to the next step.

- If the required number of Service Module cards are not provisioned in the database, perform "Adding a Service Module" in the *Database Administration Manual - Global Title Translation* to add the required number of Service Module cards to the database. After "Adding a Service Module" has been performed, go to the next step.

8. Display the serial number in the database with the `rtrv-serial-num` command.

   This is an example of the possible output:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0

System serial number = nt00001231

System serial number is not locked
.
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0 Command Completed
```

9. Compare the actual serial number (located on a label affixed to the control shelf, shelf 1100) to the output shown in the previous step, and do one of the following:

   - If the serial number is correct and locked, go to *Step 13* on page 114.
   - If the serial number is correct but not locked, go to *Step 12* on page 113.
   - If the serial number is not correct, but is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact the *Customer Care Center* on page 3 to get an incorrect and locked serial number changed.

10. Enter the correct serial number into the database using the `ent-serial-num` command with the serial parameter.

    For this example, enter this command:

```
ent-serial-num:serial=<EAGLE 5 ISS's correct serial number>
```

    When this command has successfully completed, the following message appears:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
ENT-SERIAL-NUM: MASP A - COMPLTD
```

11. Verify that the serial number entered into *Step 7* on page 112 was entered correctly:

    a) Enter the `rtrv-serial-num` command.

    This is an example of the possible output:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
System serial number = nt00001231

System serial number is not locked.

rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
Command Completed
```

    b) If the serial number was not entered correctly, repeat *Step 10* on page 113 and *Step 11* on page 113 and re-enter the correct serial number.

12. Lock the serial number in the database by entering the `ent-serial-num` command with the serial number shown in *Step 8* on page 113 (if the serial number shown in *Step 8* on page 113 is correct) or with the serial number shown in *Step 10* on page 113 (if the serial number was changed in *Step 10* on page 113), and with the lock=yes parameter.

    For this example, enter this command:

```
ent-serial-num:serial=<EAGLE 5 ISS's serial number>:lock=yes
```

When this command has successfully completed, a message similar to the following should appear.

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
ENT-SERIAL-NUM: MASP A - COMPLTD
```

13. Enable the 1100 TPS/Service Module card for ITU NP feature with the permanent key by entering the `enable-ctrl-feat` command.

    For this example, enter this command:

    ```
    enable-ctrl-feat:partnum=893018001:fak=<1100 TPS/Service Module card for ITU NP feature access key>
    ```

    Note: The values for the feature access key (the fak parameter) are provided by Tekelec. If you do not have the feature access key for the 1100 TPS/Service Module card for ITU NP feature, contact your Tekelec Sales Representative or Account Representative.

    When the `enable-crtl-feat` command has successfully completed, a message similar to the following should appear.

    ```
    rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
    ENABLE-CTRL-FEAT: MASP B - COMPLTD
    ```

14. Do one of the following:

    - If you do not wish to turn the 1100 TPS/Service Module card for ITU NP feature on, skip this step and go to *Step 16* on page 114. If you do not turn this feature on, the transaction rate will remain at 850 TPS/Service Module card.
    - If you do wish to turn on the 1100 TPS/Service Module card for ITU NP feature, enter the `chg-ctrl-feat` command, specifying the 1100 TPS/Service Module card for ITU NP feature part number used in *Step 13* on page 114 and the status=on parameter and enter the command again as shown in the next step.

    For this example, enter this command:

    ```
    chg-ctrl-feat:partnum=893018001:status=on
    ```

    The following output message appears:

    ```
    CAUTION: Rated TPS for this feature supports an engineered GTT traffic mix of
     no more than 70 percent EPAP-based traffic. Re-enter the command within 30
    seconds to confirm change.
    ```

    CAUTION: If the EPAP-based traffic is higher than 70% of all traffic on the EAGLE 5 ISS, the Service Module card's performance may not reach 1100 TPS per Service Module card.

15. Re-enter the chg-ctrl-feat command to turn the feature ON.
    For example `chg-ctrl-feat:partnum=893018001:status=on`

    When this command has successfully completed, a message similar to the following should appear:

    ```
    rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
    CHG-CTRL-FEAT: MASP B - COMPLTD
    ```

16. Verify the changes by entering the `rtrv-ctrl-feat` command with the 1100 TPS/Service Module card for ITU NP feature part number specified in *Step 14* on page 114 or *Step 15* on page 114.

```
rtrv-ctrl-feat:partnum=893018001
```

The following is an example of the possible output:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
The following features have been permanently enabled:
 Feature Name              Partnum   Status Quantity
 TPS                       893000110 on     1000
 ISUP Normalization        893000201 on     ----
 Prepaid SMS Intercept Ph1 893006701 on     ----
 MNP Circ Route Prevent    893007001 on     ----
 1100 TPS/DSM for ITU NP   893018001 on     ----

 The following features have been temporarily enabled:
 Feature Name              Partnum Status Quantity Trial Period Left
 TPS                       893000140 on     4000 20 days 8 hrs 57 mins

 The following features have expired temporary keys:
 Feature Name               Part Num
 OnOffFeatV                 893492401
```

17. Backup the new changes by entering:

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

These messages should appear; the active Maintenance and Administration Subsystem Processor (MASP) appears 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 A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

18. If you wish to turn off TPS/Service Module card for ITU NP feature, enter the `chg-ctrl-feat` command, specifying the 1100 TPS/Service Module card feature part number used in *Step 14* on page 114and the status=off parameter.

For this example, enter this command:

```
chg-ctrl-feat:partnum=893018001:status=off
```

The following output message appears:

```
CAUTION: This command decreases the total TPS of the SCCP system from 1100 to
 850 TPS for each DSM card.
```

19. Confirm that you wish to turn off TPS/Service Module card for ITU NP feature by re-entering the command, as shown below, within 30 seconds:

```
chg-ctrl-feat:partnum=893018001:status=off
```

When this command has successfully completed, the following message should appear:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.5.0
CHG-CTRL-FEAT: MASP B - COMPLTD
```

Activating the E5-SM4G Throughput Capacity Feature

This procedure is used to enable and turn on the E5-SM4G Throughput Capacity feature. This feature provides up to 75,000 transactions per second when the maximum number of Service

Module cards are installed in the EAGLE 5 ISS and one or more EPAP-related features (such as G-Port, A-Port, G-Flex) are enabled and turned on.

The feature access key is based on the feature's part number and the serial number of the EAGLE 5 ISS, making the feature access key site-specific.

The `enable-ctrl-feat` command enables the E5-SM4G Throughput Capacity feature by inputting the feature's access key and the feature's part number with these parameters:

:fak

The feature access key provided by Tekelec. The feature access key contains 13 alphanumeric characters and is not case sensitive.

:partnum

The Tekelec-issued part number of the E5-SM4G Throughput Capacity feature, 893019101.

This feature cannot be enabled with a temporary feature access key.

The E5-SM4G Throughput Capacity feature cannot be enabled if:

- The LNP feature is enabled.
- The STPLAN feature is turned on.
- The GTT feature is not turned on.

The E5-SM4G Throughput Capacity feature cannot be enabled unless the EAGLE 5 ISS contains Service Module cards, and Service Module cards cannot be installed in the EAGLE 5 ISS unless HIPR cards are installed in all shelves containing Service Module cards. Enter the `rept-stat-gpl:gpl=hipr` command to verify if HIPR cards are installed in all shelves containing Service Module cards.

The status of the LNP feature is shown with the `rtrv-ctrl-feat` command output.

The status of the GTT is shown in the `rtrv-feat` command output.

The `enable-ctrl-feat` command requires that the database contain a valid serial number for the EAGLE 5 ISS, and that this serial number is locked. This can be verified with the `rtrv-serial-num` command. The EAGLE 5 ISS is shipped with a serial number in the database, but the serial number is not locked. The serial number can be changed, if necessary, and locked once the EAGLE 5 ISS is on-site, with the `ent-serial-num` command. The `ent-serial-num` command uses these parameters.

:serial

The serial number assigned to the EAGLE 5 ISS. The serial number is not case sensitive.

:lock

Specifies whether or not the serial number is locked. This parameter has only one value, yes, which locks the serial number. Once the serial number is locked, it cannot be changed.

Note:

To enter and lock the serial number of the EAGLE 5 ISS, the `ent-serial-num` command must be entered twice, first to add the correct serial number to the database with the serial parameter, then again with the serial and the `lock=yes` parameters to lock the serial number. Before locking the serial number, insure that the serial number in the database is correct. The serial number can be found on a label affixed to the control shelf (shelf 1100).

Once the E5-SM4G Throughput Capacity feature has been enabled, the feature must be turned on with the `chg-ctrl-feat` command. The `chg-ctrl-feat` command uses these parameters:

:partnum

The Tekelec-issued part number of the E5-SM4G Throughput Capacity feature, 893019101

:status=on

used to turn the E5-SM4G Throughput Capacity feature on.

This feature increases the processing capacity of SCCP traffic for an EAGLE 5 ISS processing EPAP-based traffic to 75,000 transactions per second. To achieve this increase in SCCP processing capacity, a maximum of 25 Service Module cards must be provisioned and installed in the EAGLE 5 ISS.

1. Display the status of the E5-SM4G Throughput Capacity feature by entering the `rtrv-ctrl-feat` command.

   `Possible output of this command follows:`

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
The following features have been permanently enabled:

Feature Name              Partnum    Status  Quantity
IPGWx Signaling TPS       893012814   on      20000
ISUP Normalization        893000201   on      ----
Command Class Management  893005801   on      ----
Intermed GTT Load Sharing 893006901   off     ----
XGTT Table Expansion      893006101   off     ----
XMAP Table Expansion      893007710   on      3000
Large System # Links      893005910   on      2000
Routesets                 893006401   on      6000
HC-MIM SLK Capacity       893012707   on      64

The following features have been temporarily enabled:

Feature Name              Partnum    Status  Quantity     Trial Period Left
Zero entries found.

The following features have expired temporary keys:

Feature Name              Partnum
Zero entries found.
MNP Circ Route Prevent    893007001 On        ----  20 days 8 hrs 57 mins
```

   If the `rtrv-ctrl-feat` output shows that the E5-SM4G Throughput Capacity feature is enabled, shown by the entry E5-SM4G Throughput Cap, and its status is on, no further action is necessary.

   If the `rtrv-ctrl-feat` output shows that the LNP feature is enabled, this procedure cannot be performed. The E5-SM4G Throughput Capacity feature cannot be enabled if the LNP feature is enabled.

   If the feature is enabled, and its status is off, go to *Step 9* on page 119 (skip *Step 2* on page 117 through *Step 8* on page 119).

   If the E5-SM4G Throughput Capacity and LNP features are not enabled, go to *Step 2* on page 117.

2. Enter the `rtrv-feat` command to verify the status of the STPLAN feature.

To enable the E5-SM4G Throughput Capacity feature, the STPLAN feature cannot be turned on.

The STPLAN feature is shown by the entry LAN in the `rtrv-feat` output.

If the STPLAN feature is turned on, this procedure cannot be performed.

If the STPLAN feature is turned off, go to *Step 3* on page 118

3. Verify that the GTT feature is turned on.

   To enable the E5-SM4G Throughput Capacity feature, the GTT feature must be turned on. The GTT feature is shown by the entry GTT in the rtrv-feat output executed in *Step 2* on page 117. If the GTT feature is turned on, go to *Step 4* on page 118. If the GTT feature is turned off, perform "Adding a Service Module" in the *Database Administration Manual* - Global Title Translation in order to:

   - Turn the GTT feature
   - add the required number of Service Module cards to the database

   After "Adding a Service Module" has been performed, go to *Step 5* on page 118 (skip *Step 4* on page 118).

4. Verify the number of Service Module cards that are provisioned in the database using the `rept-stat-gpl:gpl=sccphc` command.

   This is an example of the possible output:

```
rlghncxa03w 07-05-01 11:40:26 GMT EAGLE5 37.0.0
GPL     CARD   RUNNING       APPROVED      TRIAL
SCCPHC  1201   126-002-000   126-002-000   126-003-000
SCCPHC  1203   126-002-000   126-002-000   126-003-000
SCCPHC  1207   126-002-000   126-002-000   126-003-000
SCCPHC  1213   126-002-000   126-002-000   126-003-000
SCCPHC  1215   126-002-000   126-002-000   126-003-000
SCCPHC  1305   126-002-000   126-002-000   126-003-000
SCCPHC  1313   126-002-000   126-002-000   126-003-000
SCCPHC  2103   126-002-000   126-002-000   126-003-000
Command Completed
```

   If the required number of Service Module cards are provisioned in the database, go to *Step 5* on page 118.

   If the required number of Service Module cards are not provisioned in the database, perform "Adding a Service Module" in the *Database Administration Manual* - Global Title Translation to add the required number of Service Module cards to the database. After the required number of Service Module cards are provisioned in the database, go to *Step 5* on page 118.

5. Verify whether HIPR cards are installed on all the EAGLE 5 ISS shelves containing Service Module cardService Module cards using the `rept-stat-gpl:gpl=hipr` command.

```
the rept-stat-gpl:gpl=hipr command.
rlghncxa03w 07-05-01 11:40:26 GMT EAGLE5 37.0.0
GPL     CARD   RUNNING       APPROVED      TRIAL
HIPR    1109   126-002-000   126-002-000   126-003-000
HIPR    1110   126-002-000   126-002-000   126-003-000
HIPR    1209   126-002-000   126-002-000   126-003-000
HIPR    1210   126-002-000   126-002-000   126-003-000
HIPR    1309   126-002-000   126-002-000   126-003-000
HIPR    1310   126-002-000   126-002-000   126-003-000
HIPR    2109   126-002-000   126-002-000   126-003-000
HIPR    2110   126-002-000   126-002-000   126-003-000
Command Completed
```

If HIPR cards are installed in all shelves containing Service Module cards , go to *Step 6* on page 119.

If HIPR cards are not installed on all shelves containing E5-SM4G cards, refer to the *Installation Manual - EAGLE 5 ISS* and install the HIPR cards on each of the shelves. Once the HIPR cards have been installed, go to *Step 6* on page 119.

6. Display the serial number in the database with the `rtrv-serial-num` command.

   An example of output from this command follows:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
System serial number = nt00001231

System serial number is not locked.

rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
Command Completed
```

   If the serial number is correct and locked, go to *Step 10* on page 120 (skip *Step 7* on page 119, *Step 8* on page 119, and *Step 9* on page 119). If the serial number is correct but not locked, go to *Step 9* on page 119 (skip *Step 7* on page 119 and *Step 8* on page 119). If the serial number is not correct, but is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact the *Customer Care Center* on page 3 to get an incorrect and locked serial number changed. The serial number can be found on a label affixed to the control shelf (shelf 1100).

7. Enter the correct serial number into the database using the `ent-serial-num` command with the serial parameter .

   For this example, enter this command:

```
ent-serial-num:serial=<EAGLE 5 ISS's correct serial number>
```

   When this command has successfully completed, the following message appears.

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
ENT-SERIAL-NUM:  MASP A - COMPLTD
```

8. Verify that the serial number entered into *Step 7* on page 119 was entered correctly using the `rtrv-serial-num` command.

   An example of output from this command follows:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
System serial number = nt00001231

System serial number is not locked.

rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
Command Completed
```

   If the serial number was not entered correctly, repeat *Step 7* on page 119 and *Step 8* on page 119 and re-enter the correct serial number.

9. Lock the serial number in the database by entering the `ent-serial-num` command with the serial number shown in *Step 6* on page 119, if the serial number shown in *Step 6* on page 119 is correct, or with the serial number shown in *Step 8* on page 119, if the serial number was changed in *Step 7* on page 119, and with the `lock=yes` parameter.

   For this example, enter this command:

```
ent-serial-num:serial=<EAGLE 5 ISS's serial number>:lock=yes
```

When this command has successfully completed, the following message appears:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
ENT-SERIAL-NUM:  MASP A - COMPLTD
```

10. Enable the E5-SM4G Throughput Capacity feature with the permanent key by entering the `enable-ctrl-feat` command.

    For this example, enter the following command:

    ```
    enable-ctrl-feat:partnum=893019101:fak=<E5-SM4G Throughput Capacity feature access key>
    ```

    Note: The values for the feature access key (the fak parameter) are provided by Tekelec. If the feature access key for the E5-SM4G Throughput Capacity feature is not known, contact your Tekelec Sales Representative or Account Representative.

    When the `enable-crtl-feat` command has successfully completed, this message appears:

    ```
    rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
    ENABLE-CTRL-FEAT: MASP B - COMPLTD
    ```

    Note: If you do not wish to turn the E5-SM4G Throughput Capacity feature on, go to *Step 12* on page 120 (and skip *Step 11* on page 120) .

11. Turn the E5-SM4G Throughput Capacity feature using the `chg-ctrl-feat` command, specifying the E5-SM4G Throughput Capacity feature part number used in *Step 10* on page 120 and the `status=on` parameter.

    For example, enter the following command:

    ```
    chg-ctrl-feat:partnum=893019101:status=on
    ```

    Note: Once this feature is turned on, it cannot be turned off.

    When this command has successfully completed, the following message appears:

    ```
    rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
    CHG-CTRL-FEAT: MASP B - COMPLTD
    ```

12. Verify the changes by entering the rtrv-ctrl-feat command with the E5-SM4G Throughput Capacity feature part number specified in *Step 10* on page 120 or *Step 11* on page 120.

    For example, enter the following command:

    ```
    rtrv-ctrl-feat:partnum=893019101
    ```

    An example of output from this command follows:

    ```
    rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
    The following features have been permanently enabled:

    Feature Name             Partnum   Status Quantity
    E5-SM4G Throughput Cap   893019101   on      ----

    The following features have been temporarily enabled:

    Feature Name             Partnum    Status  Quantity     Trial Period Left
    Zero entries found.
    G-Port Circ Route Prevent 893007001 On        ----  20 days 8 hrs 57 mins

    The following features have expired temporary keys:
    Feature Name             Partnum
    Zero entries found.
    ```

13. Backup the new changes using the `chg-db:action=backup:dest=fixed` command.

    The following messages appear, with the active Maintenance and Administration Subsystem Processor (MASP) appearing first, as shown.

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

Chapter 5

Maintenance and Measurements

Topics:

This chapter describes the maintenance and measurements information available from the EAGLE 5 ISS for the A-Port feature. The information includes status, alarms (UAMs), information messages (UIMs), and reports from the Measurements Platform.

Hardware Requirements

The EAGLE 5 ISS may be equipped with from 1 to 25 Service Module cards to support A-Port. The A-Port feature requires Service Module cards to run the VSCCP GPL.

CAUTION:

A mix of TSM cards running the SCCP application and Service Module cards running the VSCCP applaction is not permitted with the A-Port feature enabled. These card types cannot coexist in a system operating the A-Port feature. Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

The A-Port feature also requires a T1000-based Multi-Purpose Server (MPS) system.

EPAP Status and Alarms

Because EPAP has no direct means of accepting user input or displaying output messages on EAGLE 5 ISS terminals, maintenance, measurements, and status information are routed through a Service Module card. EPAP sends two types of messages to the Service Module card: *EPAP Maintenance Blocks* on page 124 and *DSM Status Requests* on page 125. Each message type is discussed in the following sections.

EPAP Maintenance Blocks

The active EPAP generates and sends maintenance blocks to the primary Service Module card. One maintenance block is sent as soon as the IP link is established between the active EPAP and the primary Service Module card. Additional maintenance blocks are sent whenever the EPAP needs to report any change in status or error conditions. The information returned in maintenance blocks is included in the output of the `rept-stat-mps` and `rept-stat-sccp` commands.

The EPAP sends maintenance blocks that contain at least the following information:

- Status of EPAP 'A' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be forwarded to the EPAP A Device Control Block (DCB), where it is available for the output of the `rept-stat-mps` command.
- Status of EPAP 'B' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be forwarded to the EPAP B DCB, where it is available for the output of the `rept-stat-mps` command.
- Identification of Active EPAP - a field to identify the active EPAP.
- Congestion Indicator - an indicator showing provisioning link congestion. The link between the EPAPs and the external source of provisioning data can become congested in high-provisioning traffic situations. When this occurs and subsequently as the congestion clears, the EPAP sends maintenance blocks to the Service Module card. The EPAP must ensure that no more than one maintenance block per second is sent to the primary Service Module card if the only reason is to report a change in congestion status.

- Alarm Conditions - an error code field. If the EPAP needs to report an alarm condition, it puts an appropriate UAM identifier in this field.
- Current MPS Database Size - a field indicating the current RTDB size. The Service Module card uses this information to calculate the percentage of memory utilized by the RTDB.

DSM Status Requests

When the EPAP needs to know the status of a Service Module card, it sends a DSM status request to that Service Module card. Because status messages are sent over UDP, the EPAP broadcasts the DSM status request (to all Service Module cards) and each Service Module card returns its status to the EPAP.

DSM Status Reporting to the EPAP

The sections that follow describe the DSM status reporting for the EPAP.

DSM Status Messages – When Sent

Service Module cards send a DSM status message to the EPAP when any the following events occur in the Service Module card:

- The Service Module card is booted.
- The Service Module card receives a DSM Status Request message from the EPAP
- The Service Module card determines that it needs to download the entire database, for example, if the Service Module card determines that the RTDB needs to be downloaded (for instance, if the database is totally corrupted), or if a craftsperson requests that the database be reloaded.
- The Service Module card starts receiving database downloads or database updates. When a Service Module card starts downloading the RTDB or accepting database updates, it sends a DSM Status Message informing the EPAP of the first record received. This helps the EPAP keep track of downloads in progress.

DSM Status Messages Fields

The DSM Status Message provides the following information to the EPAP:

- **DSM Memory Size**. When the Service Module card is initialized, it determines the amount of memory present. The EPAP uses the value to determine if the Service Module card has enough memory to hold the RTDB.

  Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.
- **Load Mode Status**. This indicator indicates whether or not 80% of the IS-NR (In-Service Normal) LIMs have access to SCCP services.

A-Port System Status Reports

Status reporting described here includes the following:

System Status Reporting

The `rept-stat-sys` command supports the Service Module cards running the VSCCP application.

The `rept-stat-sccp` command supports the Service Module cards running the VSCCP application and reports A-Port statistics.

A-Port Status Reporting

The `rept-stat-mps` command supports A-Port system reporting concentrated on reporting the status of the A-Port provisioning system. See "*Maintenance and Measurements User Interface Commands* on page 61", for details. A-Port statistics are placed in the `rept-stat-sccp` command as described in *System Status Reporting* on page 126.

Service Module Card Memory Capacity Status Reporting

As described in the *DSM Status Reporting to the EPAP* on page 125, the Service Module card sends a message to the EPAP reporting the amount of memory on the Service Module card. The EPAP determines whether the Service Module card has enough memory to store the RTDB and sends a positive or negative acknowledgement back to the Service Module card indicating whether or not the Service Module card has an adequate amount of memory. Refer to the *Dimensioning Guide for* EPAP *Advanced* DB *Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.

When the EPAP sends database updates to the Service Module cards, the update messages include a field that contains the new database memory requirements. Each Service Module cards monitors the database size requirements, and issues a minor alarm if the size of the database exceeds 80% of its memory. If a database increases to the point that there is insufficient Service Module card memory, a major alarm is issued.

The `rept-stat-mps:loc=xxxx` command shows the amount of memory used by the RTDB as a percent of available Service Module card memory.

Loading Mode Support Status Reporting

The OAM application determines whether or not the system is in an unstable loading mode because it knows the state of all LIM, TSM , and Service Module cards in the system. When the loading mode is unstable, the `rept-stat-sys` command reports the existence of the unstable loading mode and the specific conditions that caused it. Refer to *Loading Mode Support* on page 127, for details.

Code and Application Data Loading

In general, administrative updates can occur while a Service Module card is loading. The Service Module card should also remain in an in-transition state if the STP portion of the database has completed loading and is waiting for the RTDB to download.

Service Module Code Loading

The EAGLE 5 ISS OAM performs code loading of the Service Module card.

EPAP Application Data Loading

The A-Port feature requires that new TDM-resident data tables be loaded in addition to those currently supported by EAGLE 5 ISS. The GPL and data loading support this additional table loading while maintaining support for loading the existing EAGLE 5 ISS tables.

In order to support both RTDB and EAGLE 5 ISS data loading, the Service Module card GPL verifies its hardware configuration during initialization to determine if it has the capacity to support the RTDB.

The Service Module card GPL application data loader registers all tables for loading, independent of the A-Port feature provisioning and main board / applique hardware configuration. As a result, load requests are always identical. During loading, multiple Service Module card load requests are combined into a single download, reducing the overall download time. The Service Module card stores or discards RTDB table data based on whether or not it has RTDB-capable hardware for features like G-Port, G-Flex, INP, and EIR.

The OAM, on the other hand, downloads or sets memory boundaries for the A-Port options, HOMERN, and service selector tables only if the A-Port feature is provisioned. When the A-Port feature is not provisioned, the OAM does not attempt to read these tables from disk. Instead, empty tables (i.e., tables without entries) are downloaded. All other tables requested for loading are read from disk and downloaded routinely.

Non A-Port Data Initialization

If the Service Module card's hardware configuration cannot support the RTDB, the A-Port tables are marked as absent during Service Management System initialization. Memory is not reserved for the A-Port table data. A-Port tables are registered with the application data loader (ADL), specifying a data discard function. A-Port table data is discarded during loading by the ADL discard function, rather than storing it in memory.

A-Port Data Initialization

If the Service Module card detects A-Port-capable hardware, the A-Port tables are registered with ADL, specifying a data load function. Any A-Port table data downloaded are stored in memory during loading.

EPAP-Service Module Card Loading Interface

The Service Module card must convey to the EPAP that it needs to download the RTDB. This occurs when the Service Module card sends a Full Download Request message to the EPAP.

Loading Mode Support

No more than 16 LIMs can be serviced by each TSM card running the SCCP application (or Service Module card).

80% Threshold of Support

Loading mode is based on the ability of the system to provide TSM card running the SCCP application service to at least 80% of the LIMs.

Service Module card Capacity

An insufficient number of Service Module cards that are in the is-nr (In Service - Normal) or oos-mt-dsbld (Out of Service - Maintenance Disabled) relative to 80% of the number of provisioned LIMs is called a "failure to provide adequate TSM card running the SCCP application capacity."

Insufficient TSM Card Running the SCCP Application Service

It is also possible for LIMs or Service Module cards to be inhibited or to have problems that prevent them from operating normally. If enough Service Module cards are out of service, it may not be possible for the remaining is-nr Service Module cards to service at least 80% of the number of is-nr LIMs. This is called "insufficient TSM card running the SCCP application service." When this occurs, some of the LIMs are denied TSM card running the SCCP application service. It is possible to inhibit LIMs to bring the ratio back to 16:1 (or better).

Conditions That Create an Unstable Loading Mode

The current system implementation interrupts and aborts card loading upon execution of an STP database `chg` command. Loading mode support denies the execution of EAGLE 5 ISS database `chg` commands when the system is in an unstable loading mode. An unstable loading mode exists when any of the following conditions are true:

- The system's maintenance baseline has not been established.
- Less than 80% of the number of LIMs provisioned are is-nr or oos-mt-dsbld.
- The number of is-nr and oos-mt-dsbld TSM card running the SCCP application is insufficient to service at least 80% of all provisioned LIMs.
- Insufficient TSM card running the SCCP application service occurs when an insufficient number of is-nr Service Module cards are available to service at least 80% of the number of is-nr LIMs.
- LIM cards are being denied TSM card running the SCCP application service and any Service Module cards are in an abnormal state (oos-mt or is-anr).

Effects of System in an Unstable Loading Mode

- No affect on RTDB downloads or updates.

  Unstable loading mode has no impact on RTDB downloads or the stream of RTDB updates.
- `rept-stat-sys` reports unstable loading mode.

  When the loading mode is unstable, the `rept-stat-sys` command response reports the existence of the unstable loading mode and the specific trigger that caused it.
- No STP database updates allowed.

  When in an unstable loading mode, the EAGLE 5 ISS does not accept STP database updates. When updates are rejected, the reason is given as:

  > E3112 Cmd Rej: Loading Mode unstable due to TSM card running the SCCP application service is deficient.

  The `inh-card` and `alw-card` commands can be used to alter TSM card running the SCCP application service levels to achieve the 80% threshold. This can be repeated for each card until the system is able to supply TSM card running the SCCP application services to at least 80% of the is-nr LIMs. The remaining 20% LIM or supporting Service Module cards may remain

out of service until the stream of database updates ceases. This stream of updates can be temporarily interrupted to allow the remaining 20% of the system to come in service.

Once an STP database has been loaded, that database can be updated (as long as the system is not in an unstable loading mode). However, if an STP update arrives during STP database loading, the Service Module card aborts the current loading, issues a class 01D7 obit, and reboots. *Figure 13: Obit Message for Abort of Card Loading* on page 129 shows an example.

Figure 13: Obit Message for Abort of Card Loading

```
tekelecstp 97-04-08 12:29:04 EAGLE 35.0.0
------------------------------------------------------------------------
     Card 1317   Module RADB_MGR.C  Line  337  Class 01d7
        Card 1317   Module RADB_MGR.C  Line  337  Class 01d7
        Register Dump :
            EFL=00000246    CS =0058        EIP=0000808d    SS =0060
            EAX=000a6ff3    ECX=000a0005    EDX=00000000    EBX=000a6fa0
            ESP=00108828    EBP=0010882c    ESI=001f1e10    EDI=00000000
            DS =0060        ES =0060        FS =0060        GS =0060

        Stack Dump :
        [SP+1E]=001f    [SP+16]=0000    [SP+0E]=000a    [SP+06]=0010
        [SP+1C]=1e10    [SP+14]=0004    [SP+0C]=6fa0    [SP+04]=8850
        [SP+1A]=0010    [SP+12]=001f    [SP+0A]=0004    [SP+02]=0001
        [SP+18]=886c    [SP+10]=4928    [SP+08]=7ec3    [SP+00]=504b

        User Data Dump :

        14 02 fa ed 01 01 1d 01 5a 01 00                    ........Z..

    Report Date:97-04-08  Time:12:29:04
```

Using the force Option

Use the force option to force the execution of commands that would put the system in unstable loading mode. If executing the `ent-card` or `inh-card` commands would cause the system to enter an unstable loading mode, use the force option on the command.

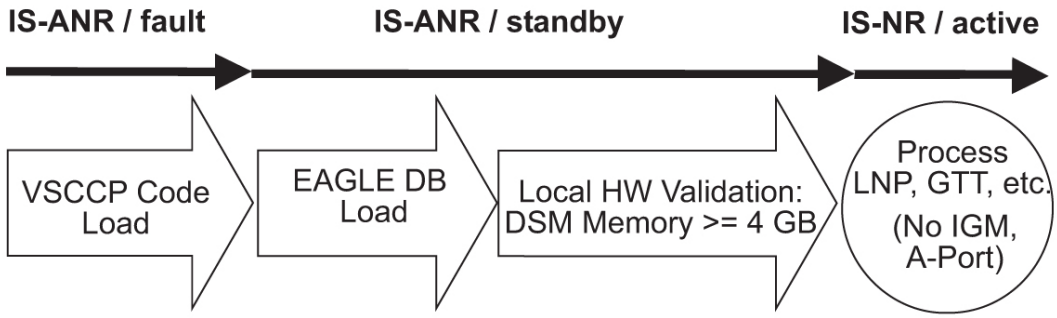
State Transitions during Start-Up

Figures *Figure 14: A-Port Not Enabled, Service Module card Running in TSM Emulation* on page 130 through *Figure 20: A-Port Activation Unsuccessful Due to Insufficient Database* on page 132 show the transitions of a Service Module card when booting, loading code and data, and running various VSCCP services. These figures do not illustrate every possible situation, but they include the most common scenarios involving the A-Port feature.

A-Port Not Enabled, Service Module Card Running in TSM Emulation

In *Figure 14: A-Port Not Enabled, Service Module card Running in TSM Emulation* on page 130, the A-Port feature is not enabled, and the Service Module card can operate in TSM emulation mode, although it does not provide A-Port operation.

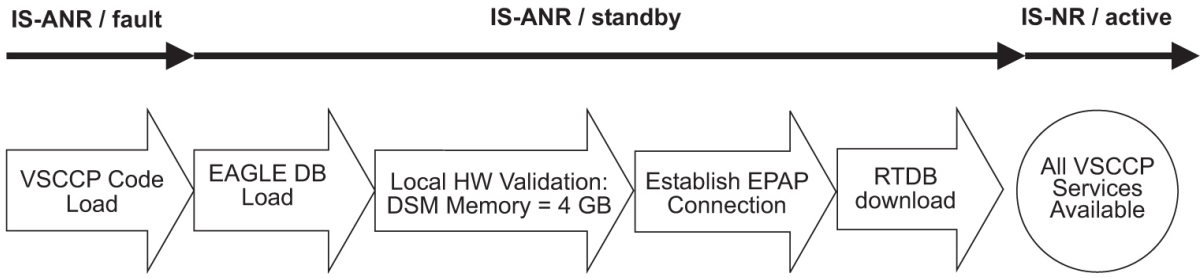
Figure 14: A-Port Not Enabled, Service Module card Running in TSM Emulation



A-Port Enabled, Normal Operating Sequence

In *Figure 15: A-Port Enabled, Normal Operating Sequence* on page 130, the A-Port feature is enabled, and the Service Module card memory is 4 GB and is connected to the EPAP. A normal Service Module card operating sequence occurs, providing A-Port service.

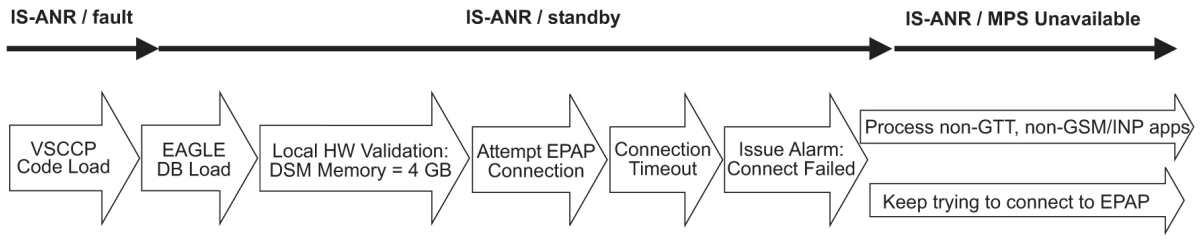
Figure 15: A-Port Enabled, Normal Operating Sequence



A-Port Enabled, Service Module card Not Connected to EPAP

In *Figure 16: A-Port Enabled, Service Module Card Not Connected to EPAP* on page 130, the A-Port feature is enabled, the Service Module card memory is 4 GB, but the Service Module card is unable to connect EPAP; thus A-Port cannot begin operation.

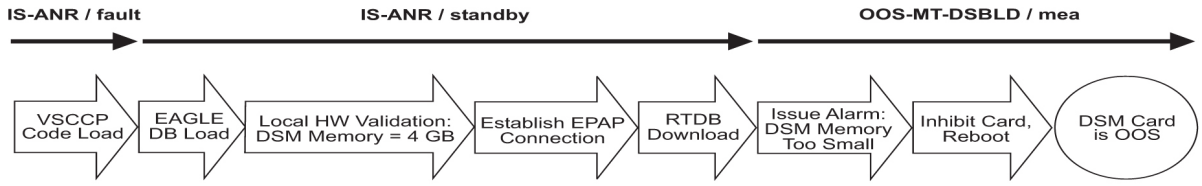
Figure 16: A-Port Enabled, Service Module Card Not Connected to EPAP



A-Port Enabled, Service Module Card Memory Insufficient for Database

In *Figure 17: A-Port Enabled, Service Module card Memory Insufficient for Database* on page 131, the A-Port feature is enabled, the Service Module card has the required 4 GB memory and is connected to the EPAP, but the Service Module card is too small for the required database; thus A-Port cannot begin operation. Refer to the *Dimensioning Guide for* EPAP *Advanced* DB *Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.

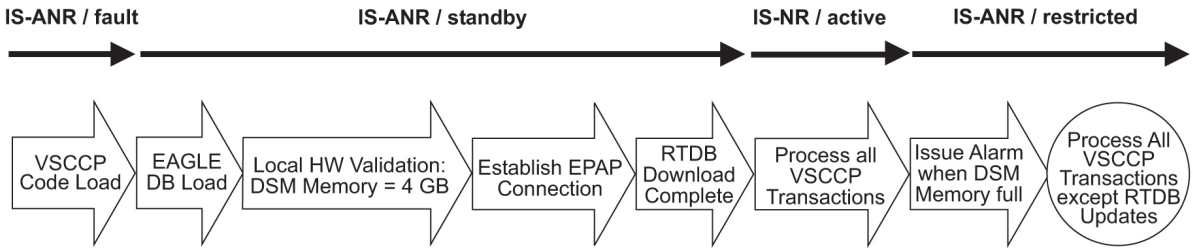
Figure 17: A-Port Enabled, Service Module card Memory Insufficient for Database



A-Port Enabled, Database Exceeds Service Module Card Memory

In *Figure 18: A-Port Enabled, Database Exceeds Service Module Card Memory* on page 131, the A-Port feature is enabled, the Service Module card is connected to the EPAP, but the RTDB grows eventually to exceed the capacity of the Service Module card memory, despite its memory size of 4 GB. An alarm is issued when the Service Module card memory becomes full from the RTDB update. The A-Port cannot begin operation. Refer to the *Dimensioning Guide for* EPAP *Advanced* DB *Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.

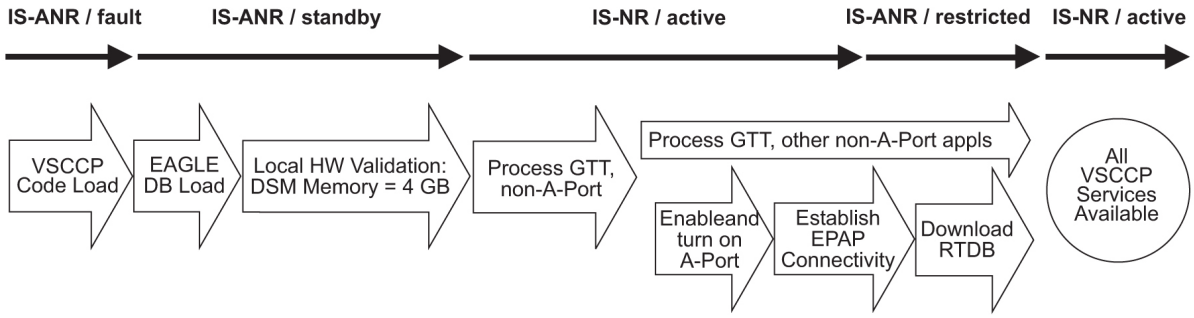
Figure 18: A-Port Enabled, Database Exceeds Service Module Card Memory



A-Port Not Enabled at First, but then Activated on Service Module Card

In *Figure 19: A-Port Not Enabled at First, but then Activated on Service Module Card* on page 131, the A-Port feature is not initially enabled; the Service Module card memory is 4 GB, but no EPAP connection; the Service Module card is running other applications when the A-Port feature is enabled and turned on. The Service Module card has sufficient memory to provide A-Port service.

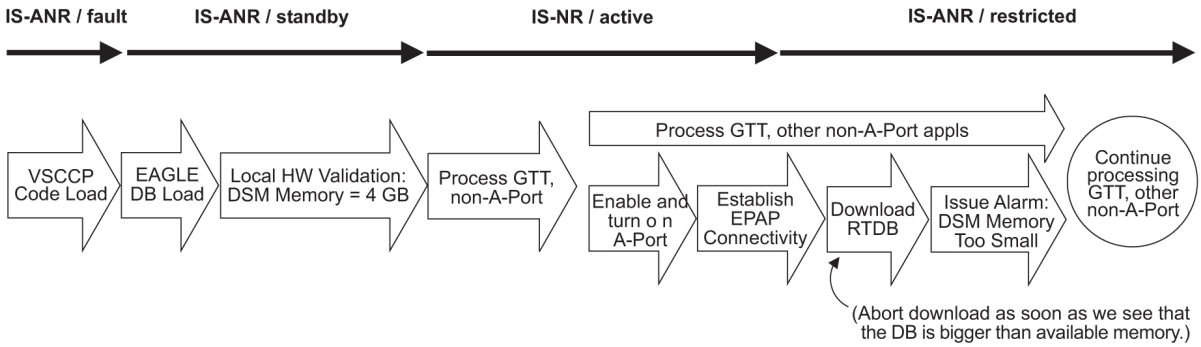
Figure 19: A-Port Not Enabled at First, but then Activated on Service Module Card



A-Port Activation Unsuccessful Due to Insufficient Database

In *Figure 20: A-Port Activation Unsuccessful Due to Insufficient Database* on page 132, the A-Port feature is not initially enabled; the Service Module card memory is 4 GB, but no EPAP connection, and is running other applications when the A-Port feature is turned on. However, the Service Module card memory is insufficient for the needed database, and cannot provide A-Port operation. Refer to the *Dimensioning Guide for* EPAP *Advanced* DB *Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.

Figure 20: A-Port Activation Unsuccessful Due to Insufficient Database



A-Port Alarms

All A-Port related UAMs are output to the Maintenance Output Group. EAGLE 5 ISS *Unsolicited Alarm and Information Messages Manual* contains a complete description of all UAMs. *Table 16: A-Port Related UAMs* on page 133 contains a listing of UAMs used to support the A-Port feature.

Refer to *Unsolicited Alarm and Information Messages Manual* for more information and corrective procedures for the EAGLE 5 ISS related alarms. Refer to MPS *Platform Software and Maintenance Manual* for more information and corrective procedures for the MPS related alarms.

Table 16: A-Port Related UAMs

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0013	Major	Card is isolated from system	EAGLE 5 ISS
0084	Major	IP Connection Unavailable	EAGLE 5 ISS
0085	None	IP Connection Available	EAGLE 5 ISS
0099	Major	Incompatible HW for provisioned slot	EAGLE 5 ISS
0250	None	MPS available	MPS
0261	Critical	MPS unavailable	MPS
0328	None	SCCP is available	EAGLE 5 ISS
0329	None	SCCP capacity normal, card(s) abnormal	EAGLE 5 ISS
0330	Major	SCCP TPS Threshold exceeded	EAGLE 5 ISS
0331	Critical	SCCP is not available	EAGLE 5 ISS
0335	None	SCCP is removed	EAGLE 5 ISS
0336	Major	LIM(s) have been denied SCCP service	EAGLE 5 ISS
0370	Critical	Critical Platform Failure(s)	MPS
0371	Critical	Critical Application Failure(s)	MPS
0372	Major	Major Platform Failure(s)	MPS

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0373	Major	Major Application Failure(s)	MPS
0374	Minor	Minor Platform Failure(s)	MPS
0375	Minor	Minor Application Failure(s)	MPS
0422	Major	Insufficient extended memory	EAGLE 5 ISS
0423	None	Card reload attempted	EAGLE 5 ISS
0441	Major	Incorrect MBD - CPU	EAGLE 5 ISS
0442	Critical	RTDB database capacity is 95% full	EAGLE 5 ISS
0443	Major	RTDB database is corrupted	EAGLE 5 ISS
0444	Minor	RTDB database is inconsistent	EAGLE 5 ISS
0445	None	RTDB database has been corrected	EAGLE 5 ISS
0446	Major	RTDB Database capacity is 80% full	EAGLE 5 ISS
0447	None	RTDB database capacity alarm cleared	EAGLE 5 ISS
0448	Minor	RTDB database is incoherent	EAGLE 5 ISS
0449	Major	RTDB resynchronization in progress	EAGLE 5 ISS
0451	Major	RTDB reload is required	EAGLE 5 ISS

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0526	None	Service is available	EAGLE 5 ISS
0527	Minor	Service abnormal	EAGLE 5 ISS
0528	Critical	Service is not available	EAGLE 5 ISS
0529	Critical	Service is disabled	EAGLE 5 ISS
0530	None	Service is removed	EAGLE 5 ISS

Service Module card-EPAP Link

Two alarms are used to indicate the Service Module card-to-EPAP link status. Refer to *Unsolicited Alarm and Information Messages Manual* for more information and corrective procedures for the following alarms.

- **UAM 0084** - IP *Connection Unavailable*

  This message indicates that an IP application socket is out of service due to a IP link down (Ethernet problem) or because the Service Module card is not operational.

```
   station1234 00-09-30 16:28:08 EAGLE 36.0.0
**  5676.0084 ** DSM B   1101            IP Connection Unavailable
```

- **UAM 0085** - IP *Connection Available*

  This message indicates that a previously broken link between the EPAP and Service Module card is now functioning properly.

```
   station1234 00-09-30 16:28:08 EAGLE 36.0.0
   5676.0085    DSM B   1101            IP Connection Available
```

MPS (EPAP) Alarms

The following alarms are output on the EAGLE 5 ISS and include an alarm data string in the output. Refer to MPS *Platform Software and Maintenance Manual* (except where noted) for more information and corrective procedures for the following MPS related alarms.

- **UAM 0261** - MPS unavailable

  This message indicates that the EAGLE 5 ISS is unable to communicate with the MPS or the MPS has an internal failure. Refer to *Unsolicited Alarm and Information Messages Manual* for the corrective action procedure.

  For example:

```
   station1234 00-09-30 16:28:08 EAGLE 36.0.0
*C  0259.0261 *C MPS   B               MPS unavailable
```

- **UAM 0370** - Critical Platform Failure (s)

This message indicates the application running in the MPS server has detected a critical platform failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'1xxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

For example:

```
   station1234 00-09-30 16:28:08 EAGLE 36.0.0
*C  0259.0370 *C MPS   B               Critical Platform Failure(s)
                ALARM DATA = h'1000000000000008'
```

- **UAM 0371** - Critical Application Failure (s)

  This message indicates the application running in the MPS server has detected a critical application failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'2xxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

  For example:

```
   station1234 00-09-30 16:28:08 EAGLE 36.0.0
*C   0259.0371 *C MPS   B               Critical Application Failure(s)
                ALARM DATA = h'2000000000000001'
```

- **UAM 0372** - Major Platform Failure (s)

  This message indicates the application running in the MPS server has detected a major platform failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'3xxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

  For example:

```
   station1234 00-09-30 16:28:08 EAGLE 36.0.0
**  0259.0372 ** MPS   B               Major Platform Failure(s)
                ALARM DATA = h'3000000000000002'
```

- **UAM 0373** - Major Application Failure (s)

  This message indicates the application running in the MPS server has detected a major application failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'4xxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

  For example:

```
    station1234 00-09-30 16:28:08 EAGLE 36.0.0
**   0259.0373 ** MPS   B               Major Application Failure(s)
                ALARM DATA = h'4000000000000008'
```

- **UAM 0374** - Minor Platform Failure (s)

  This message indicates the application running in the MPS server has detected a minor platform failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'5xxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

  For example:

```
   station1234 00-09-30 16:28:08 EAGLE 36.0.0
*   0259.0374 *  MPS   B               Minor Platform Failure(s)
                ALARM DATA = h'5000000000000004'
```

- **UAM 0375** - Minor Application Failure (s)

  This message indicates the application running in the MPS server has detected a minor application failure. The Alarm Data in the message contains a 16-character hexadecimal string in the format of h'6xxxxxxxxxxxxxx'. This alarm will be reset when UAM #250 (MPS Available) is issued.

  For example:

```
   station1234 00-09-30 16:28:08 EAGLE 36.0.0
*   0259.0375 *  MPS   B               Minor Application Failure(s)
                 ALARM DATA = h'6000000000000001'
```

Card Related MPS Alarms

The following alarms are output on the EAGLE 5 ISS. Refer to *Unsolicited Alarm and Information Messages Manual* for more information and corrective procedures for the following card related MPS alarms.

- **UAM 0013** - Card is isolated from system

  This indicates a card has become isolated and is unable to communicate to other cards in the system. This could be caused by a defective card, a power failure occurred on the card, or the system software has ordered a reset.

  This also appears when the card has been manually reset by a command.

  For example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0013 ** CARD 1101 SCCP          Card is isolated from the system
                 ASSY SN:  102199815a1234
```

- **UAM 0099** - Incompatible HW for provisioned slot

  This indicates a DCM or Service Module card does not have an extended memory. This card is automatically inhibited.

  For example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0099 ** CARD 1101 VSCCP  Incompatible hardware for provisioned slot
                 ASSY SN:  102199815a1234
```

- **UAM 0422** - Insufficient extended memory

  At least one TSM card running the SCCP application does not have enough memory for the A-Port application. Loading of the TSM card running the SCCP application is automatically inhibited.

  For example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0422 ** CARD 1108  SCCP       Insufficient extended memory
```

- **UAM 0423** - Card reload attempted

  Card loading is no longer inhibited. The once inhibited card is now attempting to load.

For example:

```
station1234 00-04-30 16:28:08 EAGLE 36.0.0
0012.0423    CARD 1108  SCCP       Card reload attempted
```

- **UAM 0441** - Incorrect main board - CPU

  A Service Module card does not have the required hardware configuration for the A-Port application.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0441 ** CARD 1108  VSCCP       Incorrect MBD - CPU
```

- **UAM 0442** - Insufficient RTDB database capacity

  At least one Service Module card does not have at least 4 GB of memory or does not have enough capacity for the RTDB. Loading of the Service Module card is automatically inhibited.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*C  0012.0442 *C CARD 1108  VSCCP        RTDB database capacity is 95% full
```

- **UAM 0443** - RTDB database is corrupted

  A RTDB database is corrupt. The calculated checksum did not match the checksum value stored for one or more records.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0443 **  CARD 1108  VSCCP       RTDB database is corrupted
```

- **UAM 0444** - RTDB database is inconsistent

  The real time database of one or more Service Module cards is not identical to the current real time database on the active EPAP fixed disks.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*   0012.0444 *  CARD 1108  VSCCP       RTDB database is inconsistent
```

- **UAM 0445** - RTDB database has been corrected

  This message indicates that a problem with the RTDB has been corrected.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
0012.0445    CARD 1108  VSCCP       RTDB database has been corrected
```

- **UAM 0446** - RTDB Database capacity is 80% full

  This message is displayed when a Service Module card detects that its daughterboard memory is at least 80% full.

For example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
**   0012.0446 **  CARD 1108  VSCCP       RTDB Database capacity is 80% full
```

- **UAM 0447** - RTDB Database capacity alarm cleared

  This message indicates that a problem with the RTDB memory has been corrected.

  For example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
0012.0447    CARD 1108  VSCCP       RTDB database capacity alarm cleared
```

- **UAM 0448** - RTDB database is incoherent

  This message indicates that the RTDB database download is in-process.

  Example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
*   0012.0448 *  CARD 1108  VSCCP       RTDB database is incoherent
```

- **UAM 0449** - RTDB resynchronization in progress

  This message indicates that the MPS database resynchronization is in-process.

  For example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0449 ** CARD 1108  VSCCP       RTDB resynchronization in progress
```

- **UAM 0451** - RTDB reload is required

  The RTDB database on the Service Module card needs to be reloaded because the resynch log does not contain all of the required updates.

  For example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
**  0012.0451 ** CARD 1108  VSCCP       RTDB reload is required
```

A-Port Subsystem Alarms

The following alarms are output on the EAGLE 5 ISS for the A-Port subsystem.

- **UAM 0526** - Service is available

  A problem with the specified SCCP service has been corrected. All TSM cards running the SCCP application are IS-NR and have a service status of Active.

  For example:

```
   station1234 00-04-30 16:28:08 EAGLE 36.0.0
   0056.0526    MNP SERVICE          Service is available
```

- **UAM 0527** - Service abnormal

  One or more of the cards providing the specified SCCP service do not have a service status of Active.

For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*   0056.0527 *  MNP SERVICE           Service abnormal
```

- **UAM 0528** - Service is not available

  The A-Port service is not available. No IS-NR TSM card running the SCCP application cards are associated the A-Port service. No TSM cards running the SCCP application and providing the A-Port service have a service status of Active.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*C  0056.0528 *C MNP SERVICE             Service is not available
```

- **UAM 0529** - Service is disabled

  The A-Port service has been manually disabled with the chg-sccp-serv command. All IS-NR cards providing the A-Port have service status of Offline.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
*C  0056.0529 *C MNP SERVICE             Service is disabled
```

- **UAM 0530** - Service is removed

  The A-Port SCCP service is not equipped. No TSM cards running the SCCP application are configured with the A-Port service.

  For example:

```
    station1234 00-04-30 16:28:08 EAGLE 36.0.0
    0056.0530    MNP SERVICE           Service is removed
```

A-Port UIMs

EAGLE 5 ISS *Unsolicited Alarm and Information Messages Manual* contains a complete description of all UIM text and formats. If A-Port is provisioned, the following UIMs (*Table 17: A-Port UIMs* on page 140) are used.

Table 17: A-Port UIMs

UIM	Text	Description	Action	Output Group (UI Output Direction)
1035	SCCP rsp did not route - invalid GTI	The SCCP response did not route due to an invalid GTI	Use a valid GTI in the CGPA part of the query	gtt

UIM	Text	Description	Action	Output Group (UI Output Direction)
1036	SCCP rsp did not route - invalid TT	The SCCP response did not route due to an invalid TT	Provision the CGPA TT in the GTT TT table	gtt
1037	SCCP rsp did not route - bad Xlation	The SCCP response did not route due to a bad translation	Provision the CGPA GTA address in the GTT database	gtt
1038	SCCP rsp did not route - SSP not True PC	The SCCP response did not route due to SSP is not true point code	Use the true point code in the CGPA point code or OPC of the query	gtt
1039	SCCP rsp did not route - bad Selectors	The SCCP response did not route due to invalid selectors	Provision the CGPA GTI, TT, NP, and NAI in the EGTT selector table	gtt
1130	LOCREQ rcvd - IS412GSM not provisioned	The IS-41 to GSM Migration prefix (specified by the IS412GSM parameter) is not provisioned on this system.	The IS412GSM prefix must be specified in the GSMOPTS table.	gtt
1131	Invalid digits in IS41 MAP Digits parms	The EAGLE 5 ISS encountered an error in decoding the digits parameter in the LocationRequest message.	Correct the digits parameter	gtt
1169	SCCP rcvd inv TCAP portion	This indicates that SCCP discarded a message because the TCAP provided in the called party	No action is necessary.	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
		address is invalid in the EAGLE 5 ISS.		
1227	SCCP did not route - DPC not in MAP tbl	This message indicates that SCCP did not route a message because the destination point code was not in the mated application (MAP) table. The message was discarded.	If the DPC indicated in the message should not be routed to, no further action is necessary.	gtt
1230	SCCP did not route - SS not in MAP tbl	This message indicates that SCCP did not route a message because the destination subsystem was not in the Mated Application (MAP) table. The message was discarded.	No action is necessary.	gtt
1242	Conv to intl num - Dflt CC not found	Conversion to international number failed because default CC was not found	Define the default CC with `chg-stpopts :defcc=xxx`	application subsystem
1243	Conv to intl num - Dflt NC not found	Conversion to international number failed because default NC was not found	Define the default NDC with `chg-stpopts :defndc=xxxxx`	application subsystem
1246	Invalid length of conditioned digits	Invalid length of condition- ed digits (length of	Use an international number with	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
		conditioned international number is less than 5 or greater than 15)	length in the acceptable range	
1256	MNP Circular Route Detected	This message indicates the network has incorrect number portability data for a subscriber.	Verify and update number portability data.	application subsystem
1294	Invalid digits in MAP MSISDN parameter	No digits found in MAP MSISDN parameter	Specify valid digits in the MSISDN	application subsystem
1295	Translation PC is EAGLE's	PC translation is invalid because it is one of EAGLE 5 ISS's PCs	Change the point code	application subsystem
1296	Translation PC type is ANSI	PC translation is invalid because it is an ANSI point code	Change the point code	application subsystem
1297	Invalid length of prefix/suffix digits	Attempted digit action of prefixing entity ID is invalid because combined length of entity ID and GT digits was greater than 21 digits	Change the attempted digit action or decrease the length of the entity ID and/or GT digits	application subsystem
1341	SRI rcvd - GSM2IS41 not provisioned	MIGRPFX=SINGLE and GSM2IS41 prefix is NONE. The GSM to IS-41 Migration prefix is not provisioned on this system.	The GSM2IS41 prefix must be specified in the GSMOPTS table.	gtt

UIM	Text	Description	Action	Output Group (UI Output Direction)
1374	SMS NP destination address decode failed	An error was detected during decode of SMS message destination address.	The message should be analyzed to determine the error, and the originating node should be contacted to send corrected message.	application subsystem
1375	SMS NP failed to modify TCAP message	The formatted outbound digit string length generated by SMS NP for encoding the TCAP message exceeded system limits.	The message and outbound digits formatting options should be analyzed to determine the error and the originating node or the requested outbound digit formatting option should be modified to correct the encoding error.	application subsystem
1376	SMS NP outbound digits leng exceed limit	During processing of SMS message, the formatted outbound digit string length exceeded limit for number of digits.	The message and the digit format provisioning should be analyzed to determine the error and the originating node or the requested outbound digit formatting option should be modified to correct the encoding error.	application subsystem

A-Port Related Measurements

Refer to EAGLE 5 ISS *Unsolicited Alarm and Information Messages Manual* for for detailed measurement usage information.

OAM Based Measurements

A-Port measurements are available via the File Transfer Area (FTA) feature and not directly via EAGLE 5 ISS terminals. The File Transfer Area feature supports the transfer of file data between an EAGLE 5 ISS and a remote computer. It provides the capability to download files from the EAGLE 5 ISS via a data communications link. The data communications link is accessed through a dial-up modem using one of the EAGLE 5 ISS's RS-232 I/O ports. The link is illustrated in *Figure 7: Dial-Up PPP Network* on page 24.

See *Commands Manual* for details about using FTA commands, which are:

- Activate File Transfer: `act-file-trns`
- Copy to or from Transfer Area: `copy-fta`
- Delete Entry from File Transfer Area: `dlt-fta`
- Display File Transfer Area: `disp-fta-dir`

Measurements Platform

The Measurements Platform (MP) is reqiured for an EAGLE 5 ISS with more than 700 links. It provides a dedicated processor for collecting and reporting EAGLE 5 ISS, LNP, INP, G-FLEX, EIR, Migration, A-Port, and G-PORT measurements data. The interface to the customer's network supports the FTP transfer of Measurements reports to an FTP server. Following collection, scheduled reports are automatically generated and transferred to the customer's FTP server via the FTP interface.

Note:

Existing FTP file server reports are overwritten by subsequent requests that produce the identical file name.

Reports can be scheduled or printed on-demand. Scheduled and on-demand reports are accessible by the following administrative commands:

- `chg-measopts` - Used to enable or disable the automatic generation and FTP transfer of scheduled measurement reports to the FTP server.
- `rept-stat-meas` - Reports the status of the measurements subsystem including card location and state, Alarm level, and Subsystem State.
- `rept-ftp-meas` - Manually initiates generation and FTP transfer of a measurements report from the MCPM to the FTP server.
- `rtrv-measopts` - Generates a user interface display showing the enabled/disabled status of all FTP scheduled reports.

Table 18: Pegs for Per System A-Port Measurements on page 146 lists the Peg counts (of MSUs - Message Signalling Units) supported *per-system* by the A-Port feature.

Table 18: Pegs for Per System A-Port Measurements

Event Name	Description	Type	Unit
APSMSREL	Number of SMS Request messages relayed	System	Peg count
APSMRQREP	Number of SMSREQ messages received that result in SMSREQ ACK or SMSREQ NACK responses **Note:** This count will include any SMSREQ NACKs generated by the Migration feature.	System	Peg count
APSMRQERR	Number of SMSREQ messages received that resulted in error. **Note:** This count is only applicable when the incoming message is SMSREQ . The peg count is incremented only when the MT-Based IS-41 SMS NP feature is turned on. If the IGM feature is also turned on and the IGM feature handles the message resulting in an error, this peg count will be incremented.	System	Peg count
GPSRRCV	Number of call-related SRI messagesreceived	System	Peg count
GPSRGTT	Number of call-related SRI messages that fell through to GTT	System	Peg count
GPSRREP	Number of call-related SRI messages that received A-Port service	System	Peg count
GPSRERR	Number of call-related messages that cause errors and SRI Negative ACK	System	Peg count

Event Name	Description	Type	Unit
IS41LRERR	Number of IS-41 Location Request - Error response messages sent.	System	Peg count
IS41LRMRCV	Number of IS-41 Location Requestmessages received.	System	Peg count
IS41LRRTRN	Number of IS-41 Location Request - Return Result messages sent	System	Peg count

Table 19: Pegs for Per SSP A-Port Measurements on page 147 lists the Peg counts (of MSUs - Message Signalling Units) supported *per-SSP* by the A-Port feature.

Table 19: Pegs for Per SSP A-Port Measurements

Event Name	Description	Type	Unit
APLRACK	Number of call related LOCREQ messages acknowledged.	Point Code	Peg count
APLRRLY	Number of call related LOCREQ messages relayed	Point Code	Peg count
APNOCL	Number of non-call non-LOCREQ related messages relayed	Point Code	Peg count
APNOCLGT	Number of non-call non-LOCREQ related messages that fell through to GTT	Point Code	Peg count
APSMRQREP	Number of SMSREQ messages received from a specific SSP that resulted in SMSREQ ACK or SMSREQ NACK repsonses. **Note:** This count will include any SMSREQ NACKs generated by the IGM feature.	Point Code	Peg count

Event Name	Description	Type	Unit
APSMRQERR	Number of SMSREQ messages received from a specific SSP that resulted in error. **Note:** This count is only applicable when the incoming message is SMSREQ . The peg count is incremented only when the MT-Based IS-41 SMS NP feature is turned on. If the IGM feature is also turned on and the IGM feature handles the message resulting in an error, this peg count will be incremented.	Point Code	Peg count
GPSRACK	Number of call-related SRI responses	Point Code	Peg count
GPSRRLY	Number of call-related SRI messages relayed	Point Code	Peg count

Table 20: Pegs for Per System and Per SSP A-Port Measurements on page 148 lists the Peg counts (of MSUs - Message Signalling Units) supported for both *per-system* and *per-SSP* by the A-Port feature.

Table 20: Pegs for Per System and Per SSP A-Port Measurements

Event Name	Description	Type	Unit
APSMSRCV	Number of SMS Request messages received	System, Point Code	Peg count
GPNOCL	Number of non-call-related messages relayed by G-Port	System, Point Code	Peg count
GPNOCLGT	Number of non-call-related messages that fell through to GTT	System, Point Code	Peg count

Measurement Reports

Measurements are available with these report commands. Refer to *Commands Manual* for detailed usage information.

The commands are specified as follows, where **xxx** is a three-letter abbreviation for a day of the week (MON, TUE, WED, THU, FRI, SAT, or SUN) and yy is an hour of the day:

- OAM Daily `rept-meas:type=mtcd:enttype=np`
- OAM hourly: `rept-meas:type=mtch:enttype=np`
- MP daily: `rept-ftp-meas:type=mtcd:enttype=np`
- MP hourly: `rept-ftp-meas:type=mtch:enttype=np`

Glossary

A

ACK	Data Acknowledgement
ACM	Application Communications Module A card in the EAGLE 5 ISS that provides a communications interface to a remote host across an Ethernet LAN.
ADL	Application Data Loader
AINPQ	ANSI-41 INP 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.
A-Port	ANSI-41 Mobile Number Portability
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

A

DPC/OPC/CIC_range. Another 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.

C

CC — Country Code

CCS7ITU — The generic program load and application for the ITU SS7 signaling links that is used with card types `limds0, limch, limocu, limv35, lime1, and limt1`.

CdPA — Called Party Address

The portion of the MSU that contains the additional addressing information of the destination of the MSU. Gateway screening uses this additional information to determine if MSUs that contain the DPC in the routing label and the subsystem number in the called party address portion of the MSU are allowed in the network where the EAGLE 5 ISS is located.

Circular Route Prevention — See CRP.

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

C

	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.
CPC	Capability Point Code A capability point code used by the SS7 protocol to identify a group of functionally related STPs in the signaling network.
CPU	Central Processing Unit

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
DCB	Device Control Block

D

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.
DEFCC	Default Country Code
Destination	The node to which the signaling link traffic is routed. This destination is identified by a point code, either a full point code or a cluster point code.
DN	Directory number A DN can refer to any mobile or wireline subscriber number, and can include MSISDN, MDN, MIN, or the wireline Dialed Number.
DPC	Destination Point Code 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.
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),

D

	and interface to Local Service Management System (LSMS).

E

EGTT	Enhanced Global Title Translation A feature that is designed for the signaling connection control part (SCCP) of the SS7 protocol. The EAGLE 5 ISS uses this feature to determine to which service database to send the query message when a Message Signaling Unit (MSU) enters the system.
EIR	Equipment Identity Register A network entity used in GSM networks, as defined in the 3GPP Specifications for mobile networks. The entity stores lists of International Mobile Equipment Identity (IMEI) numbers, which correspond to physical handsets (not subscribers). Use of the EIR can prevent the use of stolen handsets because the network operator can enter the IMEI of these handsets into a 'blacklist' and prevent them from being registered on the network, thus making them useless.
Enhanced Global Title Translation	See EGTT.
EPAP	EAGLE Provisioning Application Processor
ESD	Electro-Static Discharge
ESN	Electronic Serial Number

E

ETSI	European Technical Standards Institute

F

FAK	Feature Access Key The feature access key allows the user to enable a controlled feature in the system by entering either a permanent feature access key or a temporary feature access key. The feature access key is supplied by Tekelec.
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
G-Flex	GSM Flexible numbering A feature that allows the operator to flexibly assign individual subscribers across multiple HLRs and route signaling messages, based on subscriber numbering, accordingly.
GPL	Generic Program Load Software that allows the various features in the system to work.

G

	GPLs and applications are not the same software.
G-Port	GSM Mobile Number Portability A feature that provides mobile subscribers the ability to change the GSM subscription network within a portability cluster, while retaining their original MSISDN(s).
GPSM	General Purpose Service Module
GPSM-II	General Purpose Service Module Contains the communications processor and applications processor and provides connections to the Interprocessor Message Transport (IMT) bus. The GPSM-II card can run on the OAM, IPS, or MCP applications.
GSM	Global System for Mobile Communications
GT	Global Title Routing Indicator
GTA	Global Title Address
GTAI	Global Title Address Information
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

G

	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.
GUI	Graphical User Interface The term given to that set of items and facilities which provide the user with a graphic means for manipulating screen data rather than being limited to character based commands.

H

HLR	Home Location Register
HOMERN	Home Network Routing Number Prefix
HRN	Home Routing Number
HW	Hardware

I

ID	Identity, identifier
IEC	International Escape Code
IGM	IS41 GSM Migration
IMSI	International Mobile Subscriber Identity

I

IMT	Inter-Module-Transport The communication software that operates the inter-module-transport bus on all cards except the LIMATM, DCM, DSM, and HMUX.
IN	Intelligent Network A network design that provides an open platform for developing, providing and managing services.
INAP	Intelligent Network Application Protocol
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 packet routing, fragmentation and re-assembly through the data link layer.

I

IS-41	Interim Standard 41, same as and interchangeable with ANSI-41. A standard for identifying and authenticating users, and routing calls on mobile phone networks. The standard also defines how users are identified and calls are routed when roaming across different networks.
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

LIM	Link Interface Module Provides access to remote SS7, X.25, IP and other network elements, such as a Signaling Control Point (SCP) through a variety of signaling interfaces (V.35, OCU, 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.

L

Link	Signaling Link
LNP	Local Number Portability
LOCREQ	Location Request Message A TDMA/CDMA MSC query to an HLR for retrieving subscription/location information about a subscriber to terminate a voice call.

M

MAP	Mobile Application Part
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.
Mated Application	The point codes and subsystem numbers of the service databases that messages are routed to for global title translation.
MCPM	Measurement Collection and Polling Module The Measurement Collection and Polling Module (MCPM) provides

M

	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.
MDN	Mobile Dialed Number Mobile Directory Number
MEA	Memory Extension Applique Mismatch of Equipment and Attributes
MIM	Multi-Channel Interface Module
MIN	Mobile Identification Number
MNP	Mobile Number Portability
MP	Measurement Platform Message Processor The role of the Message Processor is to provide the application messaging protocol interfaces and processing. However, these servers also have OAM&P components. All Message Processors replicate from their System OAM's database and generate faults to a Fault Management System.
MPS	Multi-Purpose Server The Multi-Purpose Server provides database/reload functionality and a variety of high capacity/high speed offboard database functions for applications. The MPS resides in the General Purpose Frame.

M

MR	Message Relay
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.
MSISDN	Mobile Station International Subscriber Directory Number The MSISDN is thenetwork specific subscriber number of a mobile communications subscriber. This is normally the phone number that is used to reach the subscriber.
MSRN	Mobile Station Roaming Number
MSU	Message Signaling 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

M

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.
- 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.

MT	Mobile Terminated All transmissions that reach the mobile station and are accepted by it, such as calls or short messages.
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.
MTP Msgs for SCCP Apps	A feature that supports MTP-routed SCCP messages for the ANSI-41 Mobile Number Portability feature and the IS41 GSM Migration feature. The feature supports both LOCREQ and SMSREQ messages.

N

N

NAI	Nature of Address Indicator Standard method of identifying users who request access to a network.
NC	Network Cluster Network Code
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.
NEC	National Escape Code
NP	Number Plan

O

OAM	Operations, Administration, and Maintenance The generic load program (application) that operates the Maintenance and Administration Subsystem which controls the operation of the EAGLE 5 ISS.
OOS-MT	Out of Service - Maintenance 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.
OPC	Originating Point Code

O

OPS — Operator Provisioning System

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**).

The EAGLE 5 ISS LNP uses only the ANSI point codes and Non-ANSI domestic point codes.

PDB — Provisioning Database

P

PDBA	Provisioning Database Application There are two Provisioning Database Applications (PDBAs), one in EPAP A on each EAGLE 5 ISS. They follow an Active/Standby model. These processes are responsible for updating and maintaining the Provisioning Database (PDB).
PDBI	Provisioning Database Interface The interface consists of the definition of provisioning messages only. The customer must write a client application that uses the PDBI request/response messages to communicate with the PDBA.
PPP	Point-to-Point Protocol
PT	Portability Type

R

RC	Relative Cost
Restricted	The network management state of a route, link set, or signaling link that is not operating properly and cannot carry all of its traffic. This condition only allows the highest priority messages to sent to the database entity first, and if space allows, followed by the other traffic. Traffic that cannot be sent on the restricted database entity must be rerouted or the traffic is discarded.
RFC	Request for Comment

R

RMTP	Reliable Multicast Transport Protocol
RN	Routing Number
RNIDN	Routing Number - International DN
RNNDN	Routing Number - National DN
RNSDN	Routing Number - Subscriber DN
Route	A path to another signaling point.
RTDB	Real Time Database

S

SAT	Supervisory Audio Tone
SCCP	Signaling Connection Control Part
SCM	System Configuration Manager System Configuration Matrix.
Self Point Code	The True, Secondary, or Capability Point Code of the EAGLE.
Service Nature of Address Indicator	See SNAI.
SMS	Short Message Service
SMSC	Short Message Service Center
SMSREQ	SMS Request Message

S

SNAI	Service Nature of Address Indicator An internal G-Port parameter that allows a user to specify how to interpret the signaling connection control part (SCCP) called party address (CdPA) GTA of a LOCREQ/SMSREQ message.
SP	Service Provider Signaling Point
Spare Point Code	The EAGLE ITU International/National Spare Point Code feature allows a network operator to use the same Point Codes across two networks (either ITU-I or ITU-N). The feature also enables National and National Spare traffic to be routed over the same linkset. The EAGLE uses the MSU Network Indicator (NI) to differentiate the same point code of one network from the other. In accordance with the SS7 standard, unique Network Indicator values are defined for Point Code types ITU-I, ITU-N, ITU-I Spare, and ITU-N Spare.
SRF	Signaling Relay Function The SRF determines the HLR of the destination mobile station. If the mobile station is not ported, the original HLR is queried. If the mobile station is ported, the recipient HLR is queried.
SRI	Send_Route_Information Message
SS	Subsystem

S

SS7	Signaling System #7
SSN	Subsystem Number The subsystem number of a given point code. The subsystem number identifies the SCP application that should receive the message or the subsystem number of the destination point code to be assigned to an X.25 address or the LNP subsystem of the EAGLE 5 ISS. A value of the routing indicator portion of the global title translation data commands indicating that no further global title translation is required for the specified entry.
SSP	Subsystem Prohibited network management message. Subsystem Prohibited SCCP (SCMG) management message. (CER)
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.

T

TCAP	Transaction Capabilities Application Part

T

TCP	Transfer Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TDM	Terminal Disk Module The MAS card that contains the fixed disk drive (hard disk storage), the terminal processor for the 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. Time Division Multiplexing
TFA	TransFer Allowed (Msg)
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.
TPS	Transactions Per Second
TSM	Translation Services Module Provides SCCP functionality or GLS functionality for Local Number Portability (LNP)/SCCP (GTT). The SCCP software allows the TSM to be used as a memory board for Global Title Translation (GTT).
TT	Translation Type.

T

	Resides in the Called Party Address (CdPA) field of the MSU and determines which service database is to receive query messages. The translation type indicates which Global Title Translation table determines the routing to a particular service database.
TVG	Group Ticket Voucher

U

UAM	Unsolicited Alarm Message.
UDP	User Datagram Protocol
UDT	Unit Data Transfer
UDTS	Unit Data Transfer Service
UI	User Interface
UIM	Unsolicited Information Message

V

VGTT	Variable Length GTT A feature that provides the ability to provision global title entries of varying lengths to a single translation type or GTT set. Users are able to assign global title entries of up to 10 different lengths to a single translation type or GTT set.
VSCCP	VxWorks Signaling Connection Control Part

V

The application used by the Service Module card to support the G-Flex, G-Port, INP, AINPQ, EIR, A-Port, IGM, V-Flex, and LNP features. If the G-Flex, G-Port, INP, AINPQ, EIR, A-Port, IGM, V-Flex, or LNP feature is not turned on, and a Service Module card is present, the VSCCP GPL processes normal GTT traffic.

X

XUDT Extended User Data

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