Tekelec EAGLE® 5 ISS
Collector Application Processor

Feature Notice - ECAP 1.0

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TEKELEC

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Introduction

Feature notices are distributed to customers with each new release of software.

The *Feature Notice* includes a brief feature overview, lists new hardware required if any, provides the hardware baseline for this release, and explains how to find the *Release Notice* and other customer documentation on the Customer Support Site for ECAP Release 1.0 (see "How to Locate Documentation on the Customer Support Site" on page FN-23).

Important Operational Changes

Critical platform alarms are listed in Table FN-1 on page FN-8

Major platform alarms are listed in Table FN-2 on page FN-8

Minor platform alarms are listed in Table FN-3 on page FN-9

New UAMs are listed in Table FN-5 on page FN-10

Feature Overview

The EAGLE Collector Application Processor (ECAP) is an adjunct system added to the Tekelec portfolio of products that work in conjunction with the EAGLE 5 ISS and other systems to convert raw MSU data into usable accounting records.

This system uses the STPLAN feed from the EAGLE 5 ISS to collect specific information from each MSU. In general, the information consists of OPC, DPC, SI, SCCP CdPA, SCCP CgPA, and MAP Opcode. These values are organized and written to files and then "pushed" to an external system for final analysis.

The ECAP is a dedicated stand-alone platform for the collection of EAGLE 5 ISS traffic statistics data. A single ECAP server can process a maximum of 5000 MSUs per second[1], providing precise measurements of MSUs and octets transmitted. To increase capacity, up to six ECAP servers can be added to an EAGLE 5 ISS.

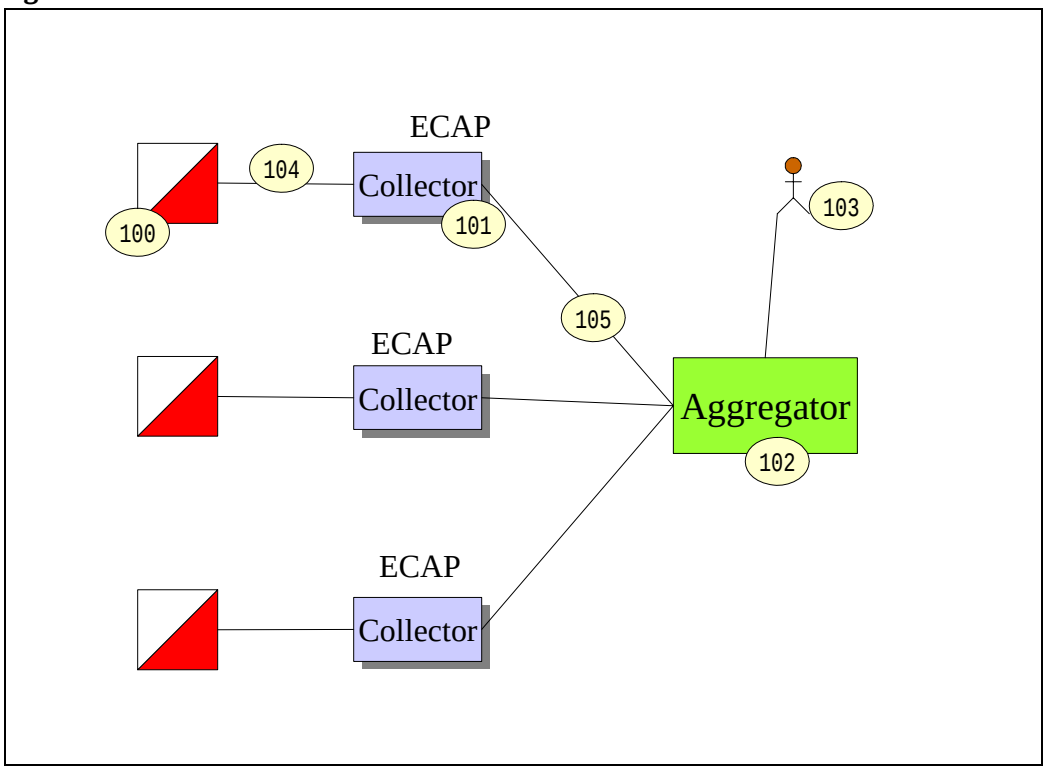
The ECAP generates periodic traffic data files which are transferred to a configured Aggregator, allowing for detailed usage reports to be compiled across all monitored links in the system.

The ECAP includes a user interface for configuration and application control, and can generate log files for monitoring the system and maintenance purposes.

[1] If over 50% of the message traffic consisits of MSUs that are greater than 200 bytes, the 5000 MSUs per second process rate cannot be achieved.

Figure FN-1 on page FN-2 depicts the information flow for the ECAP. The EAGLE 5 ISS (100) connects to the Collector (101) via a direct connected Ethernet cable (104). The actual data feed from the EAGLE 5 ISS to the Collector is the STPLAN. The Collector application process runs on a Tekelec T1100 Application Server. The set of Collector hardware and software (the Integrated Accounting Feed application) comprises the ECAP system. You can have up to six Collectors per EAGLE 5 ISS node. Several EAGLE 5 ISS nodes' worth of Collectors can connect to the same Aggregator (102) via a WAN Ethernet connection (105). The Aggregator collects all the data and performs any processing decided by the customer (103).

Figure FN-1. ECAP Information Flow



EAGLE Collector Application Processor

Description

The Eagle Collector Application Processor (ECAP) is a dedicated standalone platform for the collection of traffic data on the EAGLE 5 SAS.

On a periodic basis, the ECAP transfers the collected traffic data files (see “Peg Count Files” on page FN-7) to a configured third party Aggregator. This allows for subsequent data analysis and the generation of detailed usage reports across all monitored links in the system.

The ECAP provides a user interface for configuration and application control, and generates log files for monitoring and maintenance purposes.

Operating System

The ECAP server operates on the Tekelec Platform Development (TPD) 2.0 32-bit (i686/i386) Linux distribution operating system with the NORAID option. The operating system is installed via the **tpdnoraid** command when booted off of a TPD boot CD.

TPD 2.0 SNMP Traps

TPD 2.0 provides a method for trapping platform Alarm conditions. By default, the Simple Network Management Protocol (SNMP) agent is turned off. ECAP installation turns on the TPD **snmpAgent**, and enables configuration of the agent via the **platcfg** menu.

ECAP installation also provides an **ecapuser** account. This is a limited account that can NOT control or configure the ECAP application via **ecapcfg**.

For additional information regarding the ECAP server's architecture, processor type, and nodename, execute the **uname -a** command on each server to generate an output such as the following:

Output Example

```
# uname -a
Linux ecap1 2.4.21-32.0.1.ELprerel2.0.0_50.9.0 #1 SMP Thu Jul 7 13:19:20
EDT 2005 i686 i686 i386 GNU/Linux
```

ECAP Configuration

Configuration tasks need to be performed on the Aggregator, NMS, ECAP network, Integrated Accounting Feed application, and EAGLE 5 ISS. It is recommended that these tasks be performed in the following sequence:

1. Configure the Aggregator (customer-specific)
2. Configure the ECAP Network Interfaces
3. Configure file transfer from the ECAP server to the Aggregator
4. Configure NTP to synchronize time between the ECAP server and the Aggregator
5. Configure the NMS on the NMS system (customer specific) and configure the ECAP server to send SNMP traps to the NMS
6. Configure the Integrated Feed Application
7. Configure the EAGLE 5 ISS SLAN card
8. Configure Gateway Screening on EAGLE 5 ISS.
9. Configure the Measurements Platform on EAGLE 5 ISS

The procedures for performing the configuration tasks listed above can be found in the ECAP Configuration section of the *Feature Manual - ECAP*.

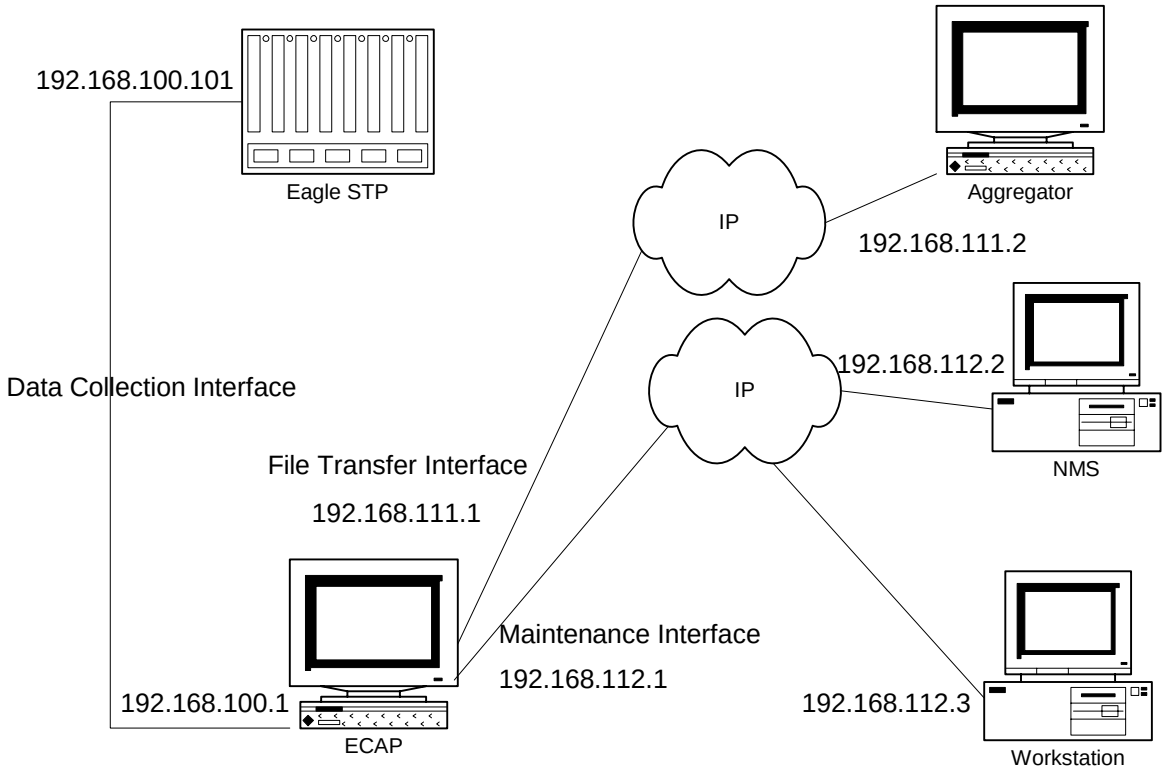
Network Interfaces

Each ECAP server requires three operational network interfaces. See Figure FN-2 on page FN-5. All interfaces consist of standard 100 Mbps IP connections. All ECAP servers in an ECAP frame must use the same protocol, either ITU or ANSI, but not both.

1. The Data Collection Interface connects an ECAP server to the EAGLE 5 ISS SLAN card via a direct IP connection. Each ECAP server interfaces with one and only one SLAN card.
2. The File Transfer Interface connects an ECAP server to the Aggregator. This is a secure interface that transfers files via SFTP. While the ECAP connects to only one Aggregator, the Aggregator may receive measurements data from multiple ECAPs.
3. The Maintenance Interface supports secure remote login via SSH, and the monitoring of alarms by a remote NMS.

Both the Maintenance and the File Transfer Interfaces use channel bonding to provide IP link redundancy and failover.

Figure FN-2. Sample ECAP network configuration.



Hardware Requirements

Hardware requirements for the Integrated Accounting Feed application are as follows:

- The ECAP Server is a T1100 server.
- The number of ECAP Servers per frame is two-to-six.
- The EAGLE 5 ISS system used with the Integrated Accounting Feed application must be equipped with SSEDCM card types running the VXWSLAN application. The VXWSLAN application cards must be provisioned with 100 Mbps links in order to achieve 5000 MSUs / second to the Integrated Accounting Feed application.

Memory and Disk Space

The ECAP server comes configured with 8 GB of RAM, and a 250 GB hard drive. Memory and disk requirements for the ECAP application are due to the massive amounts of data that can be collected from the EAGLE 5 ISS. The ECAP installation takes about 6 MB of disk space.

Enhanced Commands

The following commands or command families are used to configure the EAGLE 5 ISS for support of the ECAP feature. For a complete description of these commands, refer to the *Commands Manual* of your current documentation set.

Command	Parameters	Description
ent-dlk	loc=XXXX	Location of the SLAN card
	ipaddr=192.168.100.x	Locally allocated static IP address of the SLAN card; the guideline for allocating the particular IP address is as follows: ECAP IP connected to SLAN IP 192.168.100.1 (1A) ====> 192.168.100.101 192.168.100.2 (1B) ====> 192.168.100.102 192.168.100.3 (1C) ====> 192.168.100.103 192.168.100.4 (1D) ====> 192.168.100.104 192.168.100.5 (1E) ====> 192.168.100.105 192.168.100.6 (1F) ====> 192.168.100.106
	speed=100	Sets the port speed to 100 Mbps
ent-ip-node	loc=XXXX	Location of the SLAN card
	ipaddr=192.168.100.z	IP address of the ECAP Data Collection Interface.
	ipappl=stplan	Sets the application that will be using the interface
	cap=100	The maximum percentage of ethernet capacity allocated to this connection.
	ipport=[1024..5000]	The port through which the EAGLE 5 ISS and ECAP communicate. The value entered must match the "SLAN feed port" parameter in the ECAP configuration.

Peg Count Files

A Peg Count File is the XML data set that is transfered from the Collector to the Aggregator FTP directory. Normally this involves a push file transfer. Under abnormal conditions, (e.g. for missed periods due to failure in the communications between the Collector and the Aggregator), a pull is used. Each Peg Count File contains the following information:

- The time period in which the measurements were made.
- The Signaling Node that made the measurements.
- The ECAP Server that made the measurements.
- Reference data to identify the individual measurement.

All XML files are transferred over the Secure Shell protocol between the ECAP and the Aggregator are encrypted and secure. When the complete Peg Counts File for a given retrieve request have been transferred to the Aggregator, the filemover log records a “transfer successful” message.

Disaster Recovery

The following failures could lead to disaster if allowed to persist for an ECAP server.

1. Aggregator and/or both File Transfer Interfaces to Aggregator down or misconfigured:

   This could eventually lead to a disk full condition on the ECAP server if not corrected within a week due to an accumulation of data files. If the Aggregator is down or in fault condition, this must be corrected according to methods and procedures described by Aggregator documentation. When the link becomes active, all accumulated data files will be sent to the Aggregator at the next File Transfer interval.

   NOTE: If a significant amount of data is sent to the Aggregator in one 30-minute interval, it could result in a degraded performance level for the ECAP server during the transfer.

2. Dead ECAP application processes or Data Collection Interface from SLAN down or misconfigured:

   Other ECAP servers in the ECAP system will now have to handle the load that would normally be sent to the ECAP server whose Data Collection Interface is down. If another ECAP server goes down or its Data Collection Interface goes down or is misconfigured, this could cause the ECAP/SLAN system to go into overload and lose data packets.

   In the event of a catastrophic failure where ECAP hardware fails, contact the Tekelec Customer Care Center (see “Tekelec Customer Care Center” on page FN-24).

Alarms

The Integrated Accounting Feed application monitors platform and EAGLE 5 ISS alarms. In addition, certain conditions related to the application itself may impact operation although they will not generate alarms. These alarms and conditions are discussed in the following sections.

Platform Alarms

All standard alarming and monitoring services for the platform running the Integrated Accounting Feed application are provided. Additional alarming services include breaker panel alarms; ECAP process alarms; and alarms on the Data Collection, File Transfer, and Maintenance Interfaces.

These alarms are monitored by an NMS. SNMP traps are generated to the NMS, which has been provisioned in **platcfg**. The NMS must be connected to the Maintenance Interface for monitoring to occur.

Table FN-1 through Table FN-3 list the Critical, Major, and Minor platform alarms for the Integrated Accounting Feed application.

Table FN-1. Critical Platform Alarms

Alarm Text	Range of Values	Alarm Data String Value
Breaker Panel Feed Unavailable	on or off	1000000000000001
Breaker Panel Breaker Failure	on or off	1000000000000002
Breaker Panel Monitoring Failure	on or off	1000000000000004
Power Feed Unavailable	on or off	1000000000000008
Power supply #1 Failure	on or off	1000000000000010
Power supply #2 Failure	on or off	1000000000000020
Power supply #3 Failure	on or off	1000000000000040

Table FN-2. Major Platform Alarms

Alarm Text	Range of Values	Alarm Data String Value
Device Interface Error	on or off	3000000000100000
Server Fan Failure	on or off	3000000000000001
Server Internal Disk Error	on or off	3000000000000002
Server Platform Error	on or off	3000000000000008
Server File System Error	on or off	3000000000000010

Table FN-2. Major Platform Alarms (Cont'd)

Alarm Text	Range of Values	Alarm Data String Value
Server Platform Process Error **NOTE: This alarm means that one of the processes is dead.**	on or off	3000000000000020
Server Ram Shortage Failure	on or off	3000000000000040
Server Swap Space Shortage Failure	on or off	3000000000000080
Server Provisioning Network Error	on or off	3000000000000100
Server Eagle Network A Error	on or off	3000000000000200
Server Eagle Network B Error	on or off	3000000000000400
Server Sync network Failure	on or off	3000000000000800
Server Disk Space Shortage Error	on or off	3000000000001000
Server Default Route Network Error	on or off	3000000000002000
Server Temperature Error	on or off	3000000000004000
Server Mainboard Voltage Error	on or off	3000000000008000
Server Power Feed Unavailable	on or off	3000000000010000
Server Disk Health Test Error	on or off	3000000000020000
Server Disk Unavailable Error	on or off	3000000000040000

Table FN-3. Minor Platform Alarms

Alarm Text	Range of Values	Alarm Data String Value
Device Interface Warning	on or off	5000000000002000
Server Disk Space Warning	on or off	5000000000000001
Server Application Process Error	on or off	5000000000000002
Warning Server Hardware Configuration Error	on or off	5000000000000004
Server Software Configuration Error	on or off	5000000000000010
Server Swap Space Shortage warning	on or off	5000000000000020
Server Temperature Warning	on or off	5000000000000080
Server NTP Daemon Not Synchronized	on or off	5000000000000200
Server CMOS Battery Voltage Low	on or off	5000000000000400
Server Disk Self Test Warning	on or off	5000000000000800

Connectivity problems can occur on the Data Collection Interface between the EAGLE 5 ISS and the ECAP server or on the File Transfer Interface between the ECAP server and the Aggregator. Connectivity problems between the EAGLE 5 ISS and ECAP are raised as UAMs on the EAGLE 5 ISS. See Table FN-5 on page FN-10 for a list of these UAMs. Connectivity problems between the ECAP and Aggregator are raised as alarms on the Aggregator because the Aggregator is responsible for monitoring the ECAP-Aggregator IP link. Refer to the Aggregator documentation for a list of these alarms. Refer to the Maintenance Manual for more information and corrective procedures for the EAGLE 5 ISS related alarms.

ECAP Log Files

The ECAP application generates five separate sets of log files as described in Table FN-4. By default, the log files are limited to informational and error events to improve ECAP data processing performance.

Table FN-4. ECAP Log Files

Log Name	Content
`MeasServer.log`	This is the primary log file for the ECAP application. This log normally contains errors encountered during the processing of the Eagle data feed. It can optionally include diagnostic information that can be used for fault isolation.
`TimeServer.log`	Log file for the TimeServer process, which provides time-of-day to the Eagle SLAN card for timestamping the MSU data packets.
`Logd.log`	Log file for the ECAP application log daemon.
`FileMover.log`	Log file for the FileMover process, which periodically transfers measurement peg count files to the Aggregator.
`FileScrubber.log`	Log file for the FileScrubber process, which periodically removes old measurement peg count files from the ECAP system.

UAMs

New Unsolicited Alarm Messages (UAMs) neccessary to support ECAP Release 1.0 are defined in Table FN-5.

Table FN-5. New UAMs - ECAP Release 1.0

UAM	Message Text	Explanation
0152	LIM(s) have been denied STPLAN service.	The SLAN subsystem cannot process all of the MSUs from the LIM and SCCP cards MSUs have been discarded.
0153	STPLAN not available.	There are no SLAN cards in the IS-NR state.
0155	STPLAN connection unavailable.	SLAN link has been canceled or ECAP application MeasServer or TimeServer process terminated.

EAGLE 5 ISS Card Overview Table

Table FN-6 is a resource table that provides an overview of information for cards that can be provisioned in the EAGLE 5 ISS. For a detailed description of all hardware supported by Release 37.0, see Appendix B. Hardware Baseline.

This table lists the following card information:

- The name of the card on the card label
- The card part number
- The provisioned card type
- The number of shelf slots that the card occupies (1 or 2)
- The number of physical ports on the card
- The maximum number of links that can be assigned to the card
- The GPLs and applications that can run on the card

Table FN-6. EAGLE 5 ISS Card Overview Table

Card Name as shown on card label	Part Number	Provisioned Card Type	Per Card Slots/Ports		Links per Card	Card GPLs	Card Applications
ACM	870-1008-02 870-1008-03 870-1008-04 870-1008-05	**acmenet**	2	1	1 IP Service	**stplan** **imt**	**stplan**
DCM	870-1945-01 870-1945-02 870-1945-03 870-1984-01	**dcm**	2	2 2	1 IP Service 1 IP Service	**bpdcm** **ebdadcm** **vwxslan**	**ebdadcm** **stplan**
				2	2	**bpdcm** **iplim** **iplimi**	**iplim** **iplimi**
				2	1	**bpdcm** **ss7ipgw** **ipgwi**	**ss7ipgw** **ipgwi**
		stc	2	2	2 IP Service	**bpdcm** **eroute**	**eroute**

Table FN-6. EAGLE 5 ISS Card Overview Table (Cont'd)

Card Name as shown on card label	Part Number	Provisioned Card Type	Per Card Slots/Ports		Links per Card	Card GPLs	Card Applications
EDCM (SSEDCM)	870-2372-01 870-2372-08 870-2372-13^	**dcm**	1	2	1 IP Service	**bpdcm vwxslan**	**stplan**
					8	**bpdcm iplim iplimi**	**iplim iplimi**
					1	**bpdcm ss7ipgw ipgwi**	**ss7ipgw ipgwi**
	870-2372-01 870-2372-13^	**stc**	1	2	2 IP Service	**bpdcm eroute**	**eroute**
EDCM-A (SSEDCM)	870-2508-01 870-2508-02^	**dcm**	1	2	1 IP Service	**bpdcm vwxslan**	**stplan**
		stc	1	2	2 IP Service	**bpdcm eroute**	**eroute**
DSM†	1 GB MEM 870-1984-02 870-1984-08 870-1984-09 870-1984-15^ 2 GB MEM 870-1984-03 4 GB MEM 870-1984-05 870-1984-06 870-1984-07 870-1984-13^	**dsm**	2	2	2 IP service	**bpdcm vsccp gls**	**vsccp gls**
DSM-1G	870-2371-02 870-2371-06 870-2371-08 870-2371-13^	**ipsm**	1	2 (use only A)	1 IP service	**bpdcm ips**	**ips**
EDSM-2G*	870-2372-03 870-2372-07 870-2372-09 870-2372-14^	**mcpm**	1	2 (use only A)	1 IP service	**bpdcm mcp**	**mcp**
E1/T1 MIM††	870-2198-01 870-2198-02 870-2198-03 870-2198-04 870-2198-07^	**lime1 limt1 limch**	1	2	8	**ss7ml bpmplt**	**ss7ansi ccs7itu**
E1-ATM	870-2455-01 870-2455-02 870-2455-03 870-2455-05^	**lime1atm**	1	2	1	**atmitu bphcap bphcapt**	**atmitu**

Table FN-6. EAGLE 5 ISS Card Overview Table (Cont'd)

Card Name as shown on card label	Part Number	Provisioned Card Type	Per Card Slots/Ports		Links per Card	Card GPLs	Card Applications
E5-E1T1	870-1873-02 870-1873-03^	**lime1** **limt1**	1	8	32	**ss7epm** **blbepm** **bldiag6** **blvxw6**	**ss7ansi** **ccs7itu**
		lime1 (for SE-HSL)	1	8	1		**ccs7itu**
E5-ENET	870-2212-02 870-2212-03^	**dcm**	1	2	16	**bpdcm** **bldiag6** **blbepm** **iplhc**	**iplim** **iplimi**
			1	2	1	**bpdcm** **bldiag6** **blbepm** **ipghc**	**ss7ipgw** **ipgwi**
			1	2	1	**slanhc** **bldiag6** **blbepm** **blvxw6** **imtpci** **blcpld**	**stplan**
		stc	1	2	2 IP Service	**erthc** **bldiag6** **blbepm** **blvxw6** **imtpci** **blcpld**	**eroute**
E5-SM4G	870-2860-01	**dsm**	2	2	2 IP Service	**sccphc**	**vsccp**
EILA	870-2049-01 870-2049-02	**limds0** **limocu** **limv35**	1	2 2 2	1 1 1	**ss7ansi** **ss7gx25** **ccs7itu** **imt**	**ss7ansi** **ss7gx25** **ccs7itu**
EILA-T	870-2049-03	**limds0** **limocu** **limv35**	1	2 2 2	1 1 1	**ss7ansi** **ss7gx25** **ccs7itu** **imt**	**ss7ansi** **ss7gx25** **ccs7itu**
GPSM-II	870-2360-01 870-2360-05 870-2360-06 870-2360-08^	N / A	1	N / A	N / A	**eoam** **bpdcm**	**oam**

Table FN-6. EAGLE 5 ISS Card Overview Table (Cont'd)

Card Name as shown on card label	Part Number	Provisioned Card Type	Per Card Slots/Ports		Links per Card	Card GPLs	Card Applications
HC-MIM††	870-2671-01 870-2671-03^ 870-2671-02	**lime1** **limt1**	2	8	64	**ss7hc** **blbios** **blcpld** **blvxw** **bldiag** **blcpld** **pldpmc1** **imtpci**	**ss7ansi** **ccs7itu**
		lime1 (for SE-HSL)		8	2		**ccs7itu**
HIPR	870-2574-01 870-2574-02^	N / A	1	N / A	N / A	**hipr**	**hipr**
HMUX	870-1965-01 870-1965-03^	N / A	1	N / A	N / A	**bphmux**	**bphmux**
ILA	870-1484-01 870-1484-02	**limds0** **limocu** **limv35**	1	2 2 2	1 1 1	**ss7ansi** **ss7gx25** **ccs7itu** **imt**	**ss7ansi** **ss7gx25** **ccs7itu**
LIM-AINF**	870-1014-01 870-1014-02 870-1014-03 870-1014-04 870-1014-05 870-1014-06 870-1488-01 870-1488-02 870-1488-03 870-1488-04 870-1488-05 870-1488-06	**limds0** **limocu** **limv35**	1	2 2 2	1 1 1	**ss7ansi** **ss7gx25** **ccs7itu** **imt**	**ss7ansi** **ss7gx25** **ccs7itu**
LIM-ATM	870-1293-02 870-1293-03 870-1293-06 870-1293-07 870-1293-08 870-1293-10 870-1293-13^	**limatm**	1	2	1	**atmansi** **bphcap** **bphcapt**	**atmansi**
LIM-DS0	870-1009-02 870-1009-03 870-1009-04 870-1485-01 870-1485-02 870-1485-03	**limds0**	1	2 2 2	2 1 2	**ss7ansi** **ss7gx25** **ccs7itu** **imt**	**ss7ansi** **ss7gx25** **ccs7itu**
LIM-E1††	870-1379-01	**lime1** **limch**	1	2 2	1 1	**ss7ansi** **ccs7itu** **imt**	**ss7ansi,** **ccs7itu**

Table FN-6. EAGLE 5 ISS Card Overview Table (Cont'd)

Card Name as shown on card label	Part Number	Provisioned Card Type	Per Card Slots/Ports		Links per Card	Card GPLs	Card Applications
LIM-OCU	870-1010-03 870-1010-04 870-1010-05 870-1486-02 870-1486-03 870-1486-04	**limocu**	1	2 2 2	1 1 1	**ss7ansi** **ss7gx25** **ccs7itu** **imt**	**ss7ansi** **ss7gx25** **ccs7itu**
LIM-V.35	870-1012-02 870-1012-03 870-1012-04 870-1487-01 870-1487-02 870-1487-03	**limv35**	1	2 2 2	1 1 1	**ss7ansi** **ss7gx25** **ccs7itu** **imt**	**ss7ansi** **ss7gx25** **ccs7itu**
MDAL	870-0773-04 870-0773-05 870-0773-06 870-0773-08 870-0773-09^	N / A	2	N / A	N / A	N / A	N / A
MPL MPL-T	870-2061-01 870-2061-03 870-2061-04 870-2061-06^ 870-2061-02	**limds0**	1	2	8	**bpmpl** **bpmplt** **ss7ml**	**ss7ansi**
TDM	870-0774-10 870-0774-11	N / A	1	N / A	N / A	N / A	N / A
TSM-256	870-1289-02 870-1289-03 870-1289-04 870-1289-06^	**tsm**	1	N / A	N / A	**sccp** **gls** **ebdablm**	**sccp** **gls** **ebdablm**
TSM-512	870-1290-02 870-1290-03 870-1290-04	**tsm**	1	N / A	N / A	**sccp** **gls** **ebdablm**	**sccp** **gls** **ebdablm**
TSM-768	870-1291-02 870-1291-03 870-1291-04	**tsm**	1	N / A	N / A	**sccp** **gls** **ebdablm**	**sccp** **gls** **ebdablm**

Table FN-6. EAGLE 5 ISS Card Overview Table (Cont'd)

Card Name as shown on card label	Part Number	Provisioned Card Type	Per Card Slots/Ports		Links per Card	Card GPLs	Card Applications
TSM-1024	870-1292-02 870-1293-03 870-1294-04	**tsm**	1	N / A	N / A	**sccp** **gls** **ebdablm**	**sccp** **gls** **ebdablm**

*Though the system allows 250 MCPM cards, practical usage is 2.

**A LIM, EILA, or ILA is a link interface module using the AINF interface and can be installed in place of the LIM-DS0A, LIM-OCU, or LIM-V.35. It is configured in the database as either a LIM-DS0A, LIM-OCU, or LIM-V.35 card.

†DSMs are required for the LNP, 50,000 GTT, G-Port, G-Flex, EIR, or INP feature. For more information about turning these features on, refer to the appropriate manual.

††For the E1 or T1 interface, SS7 application (SS7ANSI or CCS7ITU) can be assigned to these cards. For more information on the E1 or T1 interface go to Chapter 3 "System Administration Procedures" in the Database Administration Manual - SS7.

^This part number is the ROHS equivalent of the immediately preceding part number.

Customer Documentation

Documentation Set

The ***ECAP Feature Notice*** is part of the EAGLE 5 ISS documentation set and may refer to one or more of the following manuals:

- The *Commands Manual* contains procedures for logging into or out of the EAGLE 5 ISS, a general description of the terminals, printers, the disk drive used on the system, and a description of all the commands used in the system.
- The *Commands Pocket Guide* is an abridged version of the *Commands Manual*. It contains all commands and parameters, and it shows the command-parameter syntax.
- The *Commands Quick Reference Guide* contains an alphabetical listing of the commands and parameters. The guide is sized to fit a shirt-pocket.
- The *Commands Error Recovery Manual* contains the procedures to resolve error message conditions generated by the commands in the *Commands Manual*. These error messages are presented in numerical order.
- The *Database Administration Manual – Features* contains procedural information required to configure the EAGLE 5 ISS to implement these features:
  - X.25 Gateway
  - STP LAN
  - Database Transport Access
  - GSM MAP Screening
  - EAGLE 5 Integrated Monitoring Support.
- The *Database Administration Manual - Gateway Screening* contains a description of the Gateway Screening (GWS) feature and the procedures necessary to configure the EAGLE 5 ISS to implement this feature.
- The *Database Administration Manual – Global Title Translation* contains procedural information required to configure an EAGLE 5 ISS to implement these features:
  - Global Title Translation
  - Enhanced Global Title Translation
  - Variable Length Global Title Translation
  - Global Title Translation Modification
  - Intermediate GTT Load Sharing

— ANSI-ITU-China SCCP Conversion

— Flexible GTT Load Sharing

— Origin-Based SCCP Routing

— Hex Digit Support for GTT

— Weighted GTT Load Sharing

— Transaction-Based GTT Load Sharing.

- The *Database Administration Manual - IP^7 Secure Gateway* contains procedural information required to configure the EAGLE 5 ISS to implement the SS7-IP Gateway.
- The *Database Administration Manual – SEAS* contains the EAGLE 5 ISS configuration procedures that can be performed from the Signaling Engineering and Administration Center (SEAC) or a Signaling Network Control Center (SNCC). Each procedure includes a brief description of the procedure, a flowchart showing the steps required, a list of any EAGLE 5 ISS commands that may be required for the procedure but that are not supported by SEAS, and a reference to optional procedure-related information, which can be found in one of these manuals:

  — *Database Administration Manual – Gateway Screening*

  — *Database Administration Manual – Global Title Translation*

  — *Database Administration Manual – SS7*.
- The *Database Administration Manual – SS7* contains procedural information required to configure an EAGLE 5 ISS to implement the SS7 protocol.
- The *Database Administration Manual – System Management* contains procedural information required to manage the EAGLE 5 ISS database and GPLs, and to configure basic system requirements such as user names and passwords, system-wide security requirements, and terminal configurations.
- The *Dimensioning Guide for EPAP Advanced DB Features* is used to provide EPAP planning and dimensioning information. This manual is used by Tekelec personnel and EAGLE 5 ISS customers to aid in the sale, planning, implementation, deployment, and upgrade of EAGLE 5 ISS systems equipped with one of the EAGLE 5 ISS EPAP Advanced Database (EADB) Features.
- The *ELAP Administration Manual* defines the user interface to the EAGLE 5 ISS LNP Application Processor on the MPS/ELAP platform. The manual defines the methods for accessing the user interface, menus, screens available to the user and describes their impact. It provides the syntax and semantics of user input and defines the output the user receives, including information and error messages, alarms, and status.

- The *EPAP Administration Manual* describes how to administer the EAGLE 5 ISS Provisioning Application Processor on the MPS/EPAP platform. The manual defines the methods for accessing the user interface, menus, and screens available to the user and describes their impact. It provides the syntax and semantics of user input and defines the output the user receives, including messages, alarms, and status.
- The *Feature Manual - A-Port* provides an overview of a feature providing the capability for IS41 mobile subscribers to change service provider while retaining their original Mobile Directory Number (MDN). This manual gives the instructions and information on how to install, use, and maintain the A-Port feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 SAS.
- The *Feature Manual - ECAP* provides instructions and information on how to install, use, and maintain the Integrated Accounting Feature Application feature on the Eagle Collector Application Processor (ECAP). This feature collects raw MSU data from the EAGLE 5 ISS, categorizes the data into groups, and feeds those groups to another system for accounting activities. Additional features will be added to this manual at a later date.
- The *Feature Manual - EIR* provides instructions and information on how to install, use, and maintain the EIR feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS. The feature provides network operators with the capability to prevent stolen or disallowed GSM mobile handsets from accessing the network.
- The *Feature Manual - G-Flex C7 Relay* provides an overview of a feature supporting the efficient management of Home Location Registers in various networks. This manual gives the instructions and information on how to install, use, and maintain the G-Flex feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS.
- The *Feature Manual - A-Port* provides an overview of a feature providing the capability for IS41 mobile subscribers to change service provider while retaining their original Mobile Directory Number (MDN). This manual gives the instructions and information on how to install, use, and maintain the A-Port feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 SAS.
- The *Feature Manual - G-Port* provides an overview of a feature providing the capability for mobile subscribers to change the GSM subscription network within a portability cluster while retaining their original MSISDNs. This manual gives the instructions and information on how to install, use, and maintain the G-Port feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS.

- The *Feature Manual - INP/AINPQ* provides the user with information and instructions on how to implement, utilize, and maintain either the INAP-based Number Portability (INP) feature or the ANSI-41 INP Query (AINPQ) feature or both features on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS.
- The *Feature Manual - Migration* provides an overview of a feature providing the capability for IS41 subscribers to migrate to a GSM network and GSM mobile subscribers to migrate to an IS41 network. This manual gives the instructions and information on how to install, use, and maintain the Migration feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 SAS.
- The *FTP-Based Table Retrieve Application (FTRA) User Guide* describes how to set up and use a PC to serve as the offline application for the EAGLE 5 ISS FTP Retrieve and Replace feature.
- The *Hardware Manual****Hardware Manual -*** EAGLE 5 ISS provides an overview of each system and its subsystems, details of standard and optional hardware components in each system, and basic site engineering. These include the EAGLE 5 ISS, OEM-based products such as the ASi 4000 Service Control Point (SCP), and the Netra-based Multi-Purpose Server (MPS).
- The *Hardware Manual - Tekelec 1000 Application Server* provides general specifications and a description of the Tekelec 1000 Applications Server (T1000 AS). This manual also includes site preparation, environmental and other requirements, procedures to physically install the T1000 AS, and troubleshooting and repair of Field Replaceable Units (FRUs).
- The *Hardware Manual - Tekelec 1100 Application Server* provides general specifications and a description of the Tekelec 1100 Applications Server (T1100 AS). This manual also includes site preparation, environmental and other requirements, procedures to physically install the T1100 AS, and troubleshooting and repair of Field Replaceable Units (FRUs).
- The *Installation Manual* - EAGLE 5 ISS contains cabling requirements, schematics, and procedures for installing the EAGLE 5 ISS along with LEDs, connectors, cables, and power cords to peripherals. Refer to this manual to install components or the complete systems.
- The *LNP Database Synchronization Manual - LSMS with* EAGLE 5 ISS describes how to keep the LNP databases at the LSMS and at the network element (the EAGLE 5 ISS is a network element) synchronized through the use of resynchronization, audits and reconciles, and bulk loads. This manual is contained in both the LSMS documentation set and in the EAGLE 5 ISS documentation set.

- The *LNP Feature Activation Guide* contains procedural information required to configure the EAGLE 5 ISS for the LNP feature and to implement these parts of the LNP feature on the EAGLE 5 ISS:
  - LNP services
  - LNP options
  - LNP subsystem application
  - Automatic call gapping
  - Triggerless LNP feature
  - Increasing the LRN and NPANXX Quantities on the EAGLE 5 ISS
  - Activating and Deactivating the LNP Short Message Service (SMS) feature.
- The *Maintenance Manual* contains procedural information required for maintaining the EAGLE 5 ISS and the card removal and replacement procedures. The *Maintenance Manual* provides preventive and corrective maintenance procedures used in maintaining the different systems.
- The *Maintenance Pocket Guide* is an abridged version of the Maintenance Manual and contains all the corrective maintenance procedures used in maintaining the EAGLE 5 ISS.
- The *Maintenance Emergency Recovery Pocket Guide* is an abridged version of the Maintenance Manual and contains the corrective maintenance procedures for critical and major alarms generated on the EAGLE 5 ISS.
- The *MPS Platform Software and Maintenance Manual* - EAGLE 5 ISS *with Tekelec 1000 Application Server* describes the platform software for the Multi-Purpose Server (MPS) based on the Tekelec 1000 Application Server (T1000 AS) and describes how to perform preventive and corrective maintenance for the T1000 AS-based MPS. This manual should be used with the EPAP-based applications (EIR, G-Port, G-Flex, A-Port, Migration, AINPQ, and INP).
- The *MPS Platform Software and Maintenance Manual* - EAGLE 5 ISS *with Tekelec 1100 Application Server* describes the platform software for the Multi-Purpose Server (MPS) based on the Tekelec 1100 Application Server (T1100 AS) and describes how to perform preventive and corrective maintenance for the T1100 AS-based MPS. This manual should be used with the ELAP-based application (LNP).

- The *Provisioning Database Interface Manual* defines the programming interface that populates the Provisioning Database (PDB) for the EAGLE 5 ISS features supported on the MPS/EPAP platform. The manual defines the provisioning messages, usage rules, and informational and error messages of the interface. The customer uses the PDBI interface information to write his own client application to communicate with the MPS/EPAP platform.
- The *Previously Released Features Manual* summarizes the features of previous EAGLE, EAGLE 5 ISS, and IP^7 Secure Gateway releases, and it identifies the release number of their introduction.
- The *Release Documentation* contains the following documents for a specific release of the system:
  - — *Feature Notice* - Describes the features contained in the specified release. The Feature Notice also provides the hardware baseline for the specified release, describes the customer documentation set, provides information about customer training, and explains how to access the Customer Support website.
  - — *Release Notice* - Describes the changes made to the system during the lifecycle of a release. The Release Notice includes Generic Program Loads (GPLs), a list of PRs resolved in a build, and all known PRs.

    NOTE: The *Release Notice* is maintained solely on Tekelec's Customer Support site to provide you with instant access to the most up-to-date release information.
  - — *Systems Overview* - Provides high-level information on SS7, the IP^7 Secure Gateway, system architecture, LNP, and EOAP.
  - — *Master Glossary* - Contains an alphabetical listing of terms, acronyms, and abbreviations relevant to the system.
  - — *Master Index* - Lists all index entries used throughout the documentation set.
- The *SEAS Commands Error Messages Manual* lists the error messages generated by the EAGLE 5 ISS that are specific to the Signaling Engineering and Administration System (SEAS). It includes the SEAS commands that trigger the error messages, the equivalent system error messages and commands, and the explanatory text.
- The *SS7-over-IP Networks Using SIGTRAN* manual examines the reasons for transitioning to an SS7-over-IP network, the considerations that go into planning and dimensioning, and helpful information for implementing the network using EAGLE 5 ISS.

- The *System Manual – EOAP* describes the Embedded Operations Support System Application Processor (EOAP) and provides the user with procedures on how to implement the EOAP, replace EOAP-related hardware, device testing, and basic troubleshooting information.

How to Locate Documentation on the Customer Support Site

Access to Tekelec's Customer Support area is restricted to current Tekelec customers. This section describes how to log into Tekelec's Customer Support site and how to locate customer documentation. Viewing these files requires Adobe Acrobat Reader.

1 Go to Tekelec's Customer Support login page at **https://support.tekelec.com/index.asp**

2 Enter your assigned username and chosen password, then click **Go.**

Or, if you do not have access to the Customer Support site, click **Need an Account?**

Follow the instructions on the screen.

NOTE: After 20 minutes of inactivity, you will be logged off, and you must repeat this step to regain access.

3 After successful login, select a product from the Product Support drop-down menu.

4 Select a release number from the Product Support Release drop-down menu.

5 Locate the appropriate documentation section (i.e., a Feature Notice would be under **Notices,** and user documentation would be under **Manuals**).

6 To open the documentation in the same window, double click the document name. To open the documentation in a new window, right-click the document name and select **Open in New Window**.

7 To download the document, right-click the document name and select **Save Target As**.

Customer Training

Tekelec offers a variety of technical training courses designed to provide the knowledge and experience required to properly provision, administer, operate and maintain the EAGLE 5 SAS. To enroll in any of the courses or for schedule information, contact the Tekelec Training Center at (919) 460-3064 or E-mail **eagletrain@tekelec.com**.

A complete list and schedule of open enrollment can be found at **www.tekelec.com**.

Tekelec Customer Care Center

The Tekelec Customer Care Center offers a point of contact through which customers can receive support for problems that may be encountered during the use of Tekelec's products. The Tekelec Customer Care Center is staffed with highly trained engineers to provide solutions to your technical questions and issues seven days a week, twenty-four hours a day. A variety of service programs are available through the Tekelec Customer Care Center to maximize the performance of Tekelec products that meet and exceed customer needs.

Technical Assistance

To receive technical assistance, call the Tekelec Customer Care Center at one of the following locations:

- Tekelec, Europe and UK
  Phone: +44 1784 467 804
  Fax: +44 1784 477 120
  Email: ecsc@tekelec.com

- Tekelec, USA
  Phone (within the continental US) 1 888-FOR-TKLC
  (outside the continental US) +1 919-460-2150
  Fax: +1 919 460 0877
  Email: support@tekelec.com

When your call is received, the Tekelec Customer Care Center issues a Customer Service Report (CSR). Each CSR includes an individual tracking number. When a CSR is issued, the Tekelec Customer Care Center determines the classification of the trouble. The CSR contains the serial number of the system, problem symptoms, and messages. The Customer Care Center assigns the CSR to a primary engineer, who will work to solve the problem. The Tekelec Customer Care Center closes the CSR when the problem is resolved.

If a critical problem exists, the Customer Care Center initiates emergency procedures (see the following topic, "Emergency Response").

Emergency Response

If a critical service situation occurs, the Tekelec Customer Care Center offers emergency response twenty-four hours a day, seven days a week. The emergency response provides immediate coverage, automatic escalation, and other features to ensure a rapid resolution to the problem.

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

- Failure in the system that prevents transaction processing
- Reduction in system capacity or in system traffic-handling capability

- Inability to restart the system
- Corruption of the database
- Inability to perform maintenance or recovery operations
- Inability to provide any required critical or major trouble notification
- Any other problem severely affecting service, capacity, traffic, and billing. Maintenance capabilities may be defined as critical by prior discussion and agreement with the Tekelec Customer Support Center.

Appendix A. Acronyms and Terminology

Aggregator—The server function that accepts the data feed from multiple ECAPs within the customer's network, and compiles the user defined accounting reports into billable form.

ANSI—American National Standards Institute

CdPA—Called Party Address

CgPA—Calling Party Address

Channel Bonding—The software bonding of two physical IP links to provide automatic failover and redundancy.

Collector—Collector is the function that receives the STPLAN MSU feed, parses the MSUs in the feed into categories based on provisioning rules and as defined in this specification. The Collector function provides the interface to the Aggregator function. The Collector function can run on one or more servers.

Data Collection Interface—Incoming MSU data network interface from the EAGLE 5 SAS SLAN card.

DPC—Deferred Process Call

DTD—Document Type Definition

ECAP—EAGLE Collector Application Processor

ecapcfg—ECAP server configuration tool

File Mover—ECAP process that moves XML files to the Aggregator; then, archives the files on the ECAP.

File Scrubber—ECAP process that cleans out old XML files (> 48 hrs old)

File Transfer Interface—Network interface to securely transfer XML output files to Aggregator.

FTP—File Transport Protocol

FTR—File Transfer Region

Interface or Network Interface—A physical Ethernet port on the ECAP server that must be configured properly in software to communicate on the network for its intended purpose/function. Interfaces include the Data Collection Interface, File Transfer Interface, and Maintenance Interface.

IPSM—Internet Protocol Services Module

IS-41—International Standard 41, same as ANSI-41

ISUP—ISDN User Part

ITU—International Telecommunications Union

Logd—ECAP process that manages all ECAP logging.

Maintenance Interface—OAM network interface that allows monitoring of alarms by a remote NMS or user to configure an ECAP server.

MAP—Mobile Application Part or Mated application

MCP—Measurements Collection and Polling application

MeasServer—ECAP process that receives and decodes EAGLE 5 SAS SLAN packets, and stores to an XML file

MIB—Management Information Base

MSU—Message Signaling Unit

MTP—Message Transfer Part

NMS—Network Management System

NTP—Network Time Protocol

OAM—Operation, Administration, and Maintenance

OPC—Origination Point Code

Peg Count File—The data set that is passed from the Collector to the Aggregator across the Aggregator Interface.

SCCP—Signalling Connection Control Part

SCMG —SCCP Management

SCP—Service Control Point

SFTP—SSH file transfer protocol, a network protocol designed to provide secure file transfer and manipulation facilities over the secure shell (SSH) protocol.

SI—Service Indicator

SLAN—Secure Local Area Network

SNMP—Simple Network Management Protocol

Solution—The total functionality afforded by the ECAP system to provide Q.752 Section 7 Measurements to the customer.

SP—Switching Point

SSEDCM—Single Slot Enhanced Database Communication Module

SSH—Secure Shell protocol

TimeServer—ECAP process that responds to time queries from the EAGLE 5 SAS SLAN card.

VSCCP—VxWorks Signaling Connectin Control Part

VXWSLAN—VXWorks SLAN Card

XML—Extensible Markup Language

XML DTD—Extensible Markup Language Document Type Definition

Appendix B. Hardware Baseline

The following hardware baseline supports this release. This list shows top-level part numbers (in bold) and assembly part numbers (if applicable).

- Control Shelf **870-2321-02 Rev A** or **870-2321-08 Rev A (R)**[1] [2]
  Control Shelf **870-2321-04 Rev A**[3] or
  Control Shelf **870-2377-01 Rev A** or **870-2377-02 Rev A (R)**[2] [4]
- Control Shelf Backplane **870-0775-03 Rev E**
- Extension Shelf **870-2378-01 Rev A** or **870-2378-02 Rev A (R)**[2] [5]
  Extension Shelf **870-0776-02 Rev C**[6]
  Extension Shelf **870-0776-03 Rev D**
  Extension Shelf **870-0776-06 Rev A**
  Extension Shelf **870-0776-07 Rev A**
- Extension Shelf Backplane **870-0776-08 Rev A** or
  Extension Shelf Backplane **870-0776-11 Rev A**
- ACM **870-1008-02 Rev D** or
  ACM **870-1008-03 Rev A** or
  ACM **870-1008-04 Rev A** or
  ACM **870-1008-05 Rev A**
- Air Management Card **870-1824-01 Rev A** or **870-1824-02 Rev A (R)**[2] [7]
- DCM **870-1945-01 Rev A**
  DCM **870-1945-02 Rev A**
  DCM **870-1945-03 Rev A**
- EDCM (single-slot) **870-2372-01 Rev E**
  EDCM **870-2372-08 Rev A** or **870-2372-13 Rev A (R)**[2]
- EDCM-A (single-slot) **870-2508-01 Rev A** or **870-2508-02 Rev A (R)**[2]
- DCMX **870-1984-01 Rev A**
- DSM, 1GB MEM **870-1984-02 Rev A** or

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[1] Required for HMUX.
[2] ROHS equivalent of immediately preceding part number
[3] Required for HMUX, Standard Frame
[4] Required for HMUX, Heavy Duty Frame
[5] Required for Heavy Duty Frame
[6] Required for Standard Frame
[7] Required for Shelves with HC-MIM Cards

• DSM, 1GB MEM	**870-1984-08 Rev A or**
DSM, 1GB MEM	**870-1984-09 Rev A** or
	870-1984-15 Rev A (R)[1] or
DSM, 2GB MEM	**870-1984-03 Rev A** or
DSM, 4GB MEM	**870-1984-05 Rev A**[2] or
DSM, 4GB MEM	**870-1984-06 Rev A** or
DSM, 4GB MEM	**870-1984-07 Rev A** or
	870-1984-13 Rev A (R)[1]
• DSM-1G	**870-2371-02 Rev A**
DSM-1G	**870-2371-06 Rev A**
DSM-1G	**870-2371-08 Rev A** or
	870-2371-13 Rev A (R)[1]
• EDSM-2G (MCPM)	**870-2372-03 Rev A**
EDSM-2G (MCPM)	**870-2372-07 Rev A**
EDSM-2G (MCPM)	**870-2372-09 Rev A** or
	870-2372-14 Rev A (R)[1]
• E1/T1 MIM	**870-2198-01 Rev G** or
E1/T1 MIM	**870-2198-02 Rev A**
E1/T1 MIM	**870-2198-03 Rev A**
E1/T1 MIM	**870-2198-04 Rev A** or
	870-2198-07 Rev A (R)[1]
• E1-ATM	**870-2455-01 Rev B**
E1-ATM	**870-2455-02 Rev B**
E1-ATM	**870-2455-03 Rev A** or
	870-2455-05 Rev A (R)[1]
• E5-E1T1	**870-1873-02 Rev A** or
	870-1873-03 Rev A (R)[1 2]
• E5-ENET	**870-2212-02 Rev A** or
	870-2212-03 Rev A (R)[1]
• E5-SM4G	**870-2860-01 Rev A**
• EILA	**870-2049-01 Rev A** or
EILA w/ DIMM	**870-2049-02 Rev A**
• EILA-T	**870-2049-03 Rev A**
• FAP	**870-1606-01 Rev A** or
FAP	**870-1606-02 Rev A**[3 4]
	870-2320-01 Rev A or
FAP	**870-2320-03 Rev A (R)**[1 5 6]
FAP	**870-1823-01 Rev A**
• FAP-CF/EF	**870-0243-08 Rev C**
FAP-MISC	**870-0243-09 Rev C**
FAP Fuse and Alarm Panel	**870-2804-01 Rev A**
FAP Jumper Board	**870-2805-01 Rev A**
FAP Diode Board	**870-2806-01 Rev A**

[1] ROHS equivalent of immediately preceding part number
[2] Required for 192 Million LNP Numbers
[3] Required for Standard Frame
[4] Required for Frames with HC-MIMs
[5] Required for Heavy Duty Frame
[6] Required for Frames with HC-MIMs

- GPSM-II **870-2360-01 Rev E**
  GPSM-II **870-2360-05 Rev A**
  870-2360-06 Rev A or
  GPSM-II **870-2360-08 Rev A (R)**[1]
- HC-MIM **870-2671-01 Rev P** or
  HC-MIM **870-2671-02 Rev B** or
  870-2671-03 Rev A (R)[1]
- HIPR **870-2574-01 Rev D** or
  870-2574-02 Rev A (R)[1]
- HMUX **870-1965-01 Rev A** or
  870-1965-03 Rev A (R)[1]
- LIM-AINF **870-1014-01 Rev D** or
  LIM-AINF **870-1014-02 Rev A** or
  LIM-AINF **870-1014-03 Rev B** or
  LIM-AINF **870-1014-04 Rev A** or
  LIM-AINF **870-1014-05 Rev A** or
  LIM-AINF **870-1014-06 Rev A** or
  LIM-AINF w/ DIMM **870-1488-01 Rev A** or
  LIM-AINF w/ DIMM **870-1488-02 Rev A** or
  LIM-AINF w/ DIMM **870-1488-03 Rev A** or
  LIM-AINF w/ DIMM **870-1488-04 Rev A** or
  LIM-AINF w/ DIMM **870-1488-05 Rev A** or
  LIM-AINF w/ DIMM **870-1488-06 Rev A**
- LIM-ATM **870-1293-02 Rev A** or
  LIM-ATM **870-1293-03 Rev A**
  LIM ATM **870-1293-06 Rev A**
  LIM ATM **870-1293-07 Rev A**
  LIM-ATM **870-1293-08 Rev B**
  LIM-ATM **870-1293-10 Rev A** or
  870-1293-13 Rev A (R)[1]
- LIM-DS0 **870-1009-02 Rev D** or
  LIM-DS0 **870-1009-03 Rev A** or
  LIM-DS0 **870-1009-04 Rev A** or
  LIM-DS0 w/ DIMM **870-1485-01 Rev A** or
  LIM-DS0 w/ DIMM **870-1485-02 Rev A** or
  LIM-DS0 w/ DIMM **870-1485-03 Rev A**
- LIM-E1 **870-1379-01 Rev A**
- LIM-ILA **870-1484-01 Rev E** or
  LIM-ILA w/ DIMM **870-1484-02 Rev C**
- LIM-OCU **870-1010-03 Rev D** or
  LIM-OCU **870-1010-04 Rev A** or
  LIM-OCU **870-1010-05 Rev A** or
  LIM-OCU w/ DIMM **870-1486-02 Rev A** or
  LIM-OCU w/ DIMM **870-1486-03 Rev A** or
  LIM-OCU w/ DIMM **870-1486-04 Rev A**

[1] ROHS equivalent of immediately preceding part number

• LIM-V.35	**870-1012-02 Rev D**
LIM-V.35	**870-1012-03 Rev A**
LIM-V.35	**870-1012-04 Rev A**
LIM-V.35 w/ DIMM	**870-1487-01 Rev A** or
LIM-V.35 w/ DIMM	**870-1487-02 Rev A** or
LIM-V.35 w/ DIMM	**870-1487-03 Rev A**
• MDAL	**870-0773-04 Rev B** or
MDAL	**870-0773-05 Rev A** or
MDAL	**870-0773-06 Rev A** or
MDAL	**870-0773-08 Rev A** or
	870-0773-09 Rev A (R)[1]
• MPL	**870-2061-01 Rev A**
MPL	**870-2061-03 Rev A**
MPL	**870-2061-04 Rev A** or
	870-2061-06 Rev A (R)[1]
MPL-T	**870-2061-02 Rev C**
• MPS DC Frame Assembly	**890-1843-01 Rev C** or
	890-1843-02 Rev A (R)[1]
• MPS EPAP	**890-1801-01 Rev E**
	890-1801-02 Rev A (R)
• TDM	**870-0774-10 Rev A** or
TDM	**870-0774-11 Rev A**
• TDM GTI	**870-0774-15 Rev B** or
	870-0774-18 Rev A (R)[1]
• TSM-256	**870-1289-02 Rev A**
TSM-256	**870-1289-03 Rev A** or
TSM-256	**870-1289-04 Rev A** or
	870-1289-06 Rev A (R)[1]
• TSM-512	**870-1290-02 Rev A**
TSM-512	**870-1290-03 Rev A** or
TSM-512	**870-1290-04 Rev A**
• TSM-768	**870-1291-02 Rev A**
TSM-768	**870-1291-03 Rev A** or
TSM-768	**870-1291-04 Rev A**
• TSM-1024	**870-1292-02 Rev A**
TSM-1024	**870-1292-03 Rev A** or
TSM-1024	**870-1292-04 Rev A**
• Single EOAP	**890-1050-03 Rev H**
• Dual EOAP	**890-1050-01 Rev K**
• Kit, E1	**890-1037-01 Rev A** or
	890-1037-06 Rev A (R)[1]
• Kit, Holdover Clock Assy	**890-1013-01 Rev B**
• Fan Assy (Standard Frame)	**890-1038-01 Rev D**
• Fan Assy (Shelves with HC-MIM cards)	**890-0001-01 Rev A**
Fan Assy (Shelves with HC-MIM cards)	**890-0001-02 Rev A** or
	890-0001-04 Rev A (R)[1]

[1] ROHS equivalent of immediately preceding part number

• T1000 Application Server	**870-2640-01 Rev F** **870-2640-03 Rev A (R)**
• Dual Port G-Bit E-Net Card	**870-2706-02 Rev A** or **870-2706-04 Rev A (R)**[1]
• Quad Serial Exp. Card	**870-2708-01 Rev B** **870-2708-02 Rev A (R)**
• 120 GB Hard Drive Assy	**870-2721-02 Rev B** **870-2721-04 Rev A (R)**
• T1100 (Application Server - DC)	**870-2754-01 Rev P** **870-2807-01 Rev A** **870-1893-03 Rev A (R)**
• PCI Card - Dual Port Ethernet	**870-2706-04 Rev A**
• Hard Disc Drive - 250 GB SATA	**870-2787-02 Rev A**
• Upgrade kit, MPS Netra-to-T1000 Application Server	**870-2735-02 Rev A**