

Tekelec EAGLE[®] 5 ISS
with T1100 AS

MPS Platform Software and Maintenance Manual

910-2712-001 Revision G

June 2007



TEKELEC

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Introduction

This manual describes the T1100-based Multi-Purpose Server (MPS). Each time this manual is published, the Revision level is changed. For example, the first time this manual is published, it uses Revision A; the second time it is published, it uses Revision B.

Where to Find Information in This Manual

Table 1-1 on page 1-2 shows how this manual is organized.

Table 1-1. Manual Organization

Chapter Number and Title	Description
Chapter 1, “About This Manual”	Describes contents of the manual and conventions used, where to find other information about this product, what’s new in this product release and in this manual, and how to contact the Customer Care Center.
Chapter 2, “Platform Overview”	Describes the Tekelec 1100 AS core platform features and the MPS customization features that make up the MPS platform software.
Chapter 3, “MPS Maintenance”	Describes how to perform preventive maintenance, how problems are detected and reported, and an overview of how to recover from problems.
Chapter 4, “MPS Platform and Application Alarms”	Describes how to recover from reported problems.
Chapter 5, “MPS Field Replaceable Units”	Describes how to replace the MPS Field Replaceable Units
Appendix A, “General Procedures.”	Contains general, commonly used procedures that are referred to by other procedures.
“Glossary”	Defines acronyms and terms used in this book and in other related publications.
“Index”	Index entries.

Where to Find Other Information

This manual is delivered on a compact disk (CD) that also contains the following documentation:

- Related publications (see “Related Publications” on page 1-4): These documents can also be accessed from the introductory page of the documentation CD.
- Linked documents: This manual contains links to the following documents. To display one of these documents, click anywhere in the highlighted area.

NOTE: If multiple T1100-based products are documented on the same CD, the links below open another document where you select the product you need information about.

For information about software needed to open these links, see “Programs Needed to View Linked Documents” on page 1-3.

- [AssemblyDrawing.pdf](#), a drawing of the maximum configuration possible in a frame in a DC environment
- [Interconnect.pdf](#), a diagram that shows how the elements in a frame should be connected
- [BreakerSettings.pdf](#), information that shows mapping of breakers to hardware components.
- [804-1198-01.pdf](#), information about the hubs used in an MPS.

NOTE: Documentation about hardware components supplied by other companies is shipped with the product. When unpacking a frame or individual components, be sure to obtain this documentation and store it where it can be accessed later.

Programs Needed to View Linked Documents

To view the linked documents, the workstation on which this manual is being viewed needs to have the following programs:

- Most of the linked documents are in Portable Document Format (PDF), which has a file type of .pdf. PDF is also the format of this manual. When a PDF link is clicked, the linked document is opened in the same window as this manual. To return to this manual, click the Back button on the PDF display window.
- A document with a .doc file type can be viewed with Microsoft® Word. The linked document may open in a minimized window.
- A document with an .mpg file type can be viewed with a variety of video programs. Two commonly used programs are:
 - Microsoft Windows® Media Player (this program is usually included with Microsoft Internet Explorer)
 - RealOne™ Player

Related Publications

The *EAGLE 5 ISS with T1100 AS MPS Platform Software and Maintenance Manual* 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 ISS Support for Integrated Sentinel
- 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
 - Interim Global Title 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 - IP⁷ 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 LNP Application Processor (ELAP) 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 Multi-Purpose Server (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 ISS.
- 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 MPS/EPAP 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 G-Flex features on the MPS/EPAP platform of the EAGLE 5 ISS.
- 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 G-Port features on the MPS/EPAP 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 MPS/EPAP 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 ISS.
- 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 - 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 Application 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 Application 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 IP⁷ 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.

 - *System Overview* - Provides high-level information on SS7, the IP⁷ 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.

Documentation Packaging and Updates

Customer documentation is upgraded whenever significant changes are made that affect system operation or configuration are made.

The document part number is shown on the title page along with the current revision of the document, the date of publication, and, if applicable, the software release that the document covers. The bottom of each page contains the document part number and the date of the publication.

Documentation Admonishments

Admonishments are icons and text that may appear in this and other Tekelec manuals. Admonishments alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

The following admonishments, listed in descending order of priority, are used in Tekelec manuals.



TOPPLE: This icon and text indicate the possibility of equipment damage and personal injury from toppling.



DANGER: This icon and text indicate the possibility of *personnel injury*.



WARNING: This icon and text indicate the possibility of *equipment damage*.



CAUTION: This icon and text indicate the possibility of *service interruption*.

Customer Care Center

The Tekelec Customer Care Center 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 Customer Care Center can connect customers to the Tekelec Technical Services department, which is staffed with highly trained engineers to provide solutions to technical questions and issues seven days a week, twenty-four hours a day. A variety of service programs are available through the Tekelec Technical Services department to maximize the performance of Tekelec products that meet and exceed customers' needs.

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

Table 1-2. Contacting Customer Care Center

Tekelec Service Center Location	Calling From:	Numeric Dialing
Tekelec, United Kingdom email: ecsc@tekelec.com	Inside or outside the UK	+44 1784 467 804 (phone) +44 1784 477 120 (fax)
Tekelec, United States of America email: support@tekelec.com	Within the continental US	+1 888-FOR-TKLC (+1 888-367-8552) +1 919-460-0877 (fax)
	Outside the continental US	+1 919-460-2150 +1 919-460-0877 (fax)

Platform Overview

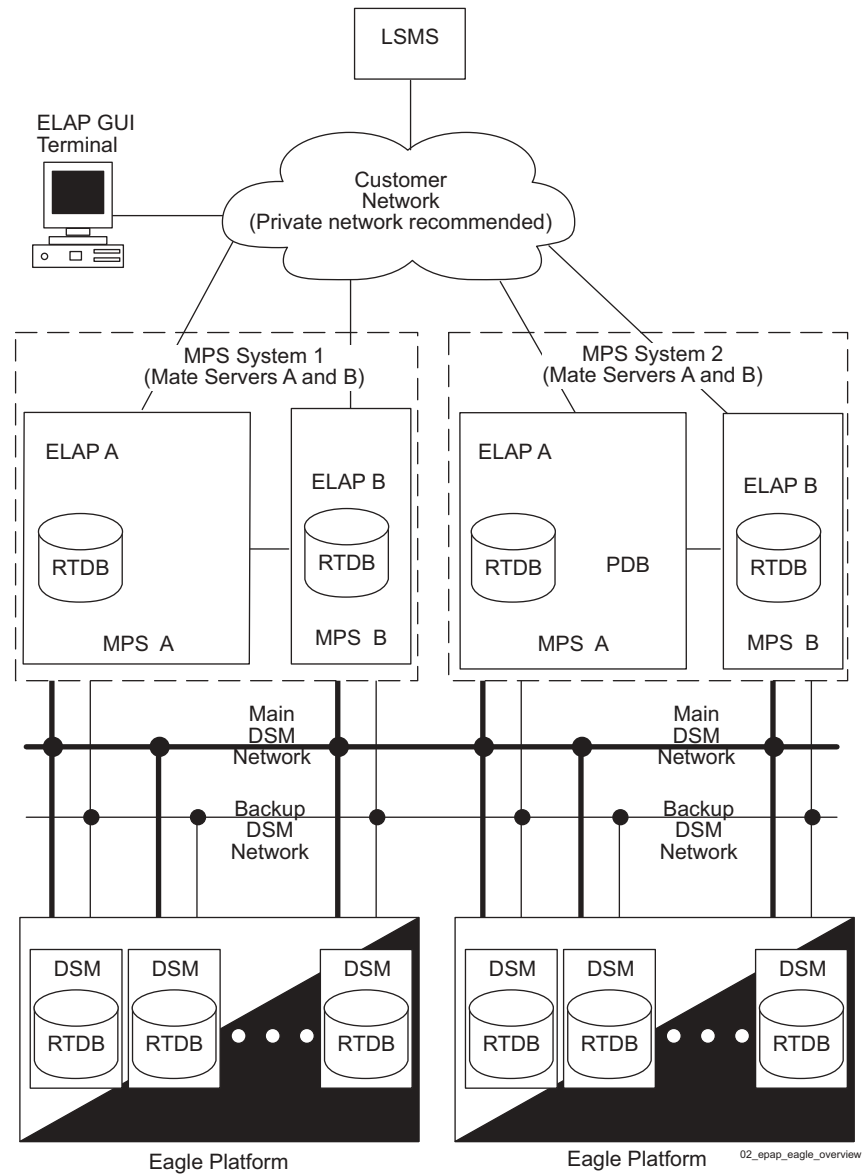
Introduction	2-2
MPS Terminology	2-3
Tekelec 1100 AS Terminology	2-4
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Introduction

The Multi-Purpose Server (MPS) supports high speed provisioning of large databases for the EAGLE 5 Integrated Signaling System (ISS). The MPS is composed of hardware and software components that interact to create a secure and reliable platform.

MPS platform supports the Eagle LNP Application Processor (ELAP). The ELAP application includes support for the 228 Million number LNP solution. In addition to the software application, additional third-party software might be required to support the software application. Figure 2-1 on page 2-3 shows an overview of how the MPS is used with the EAGLE 5 ISS system.

This chapter provides an overview of the hardware and platform software that comprises the MPS. For information about the ELAP application and how it interacts with the EAGLE 5 ISS, refer to the *ELAP Administration Manual*.

Figure 2-1. MPS/EAGLE 5 ISS Overview

MPS Terminology

Table 2-1 on page 2-4 defines the terminology used for MPS and the ELAP application.

Table 2-1. MPS Terminology

Term	Definition
MPS Server	The Tekelec 1100 AS hardware and the MPS platform software comprise one MPS server.
Mate servers	The two MPS servers located at one EAGLE 5 ISS location. From one MPS, the other MPS server in the frame is referred to as its mate.
Upper server (also known as Server A)	MPS server installed above its mate.
Lower server (also known as Server B)	MPS server installed below its mate.
MPS system	Two MPS servers and associated hardware located at one EAGLE 5 ISS site. For more information about associated hardware, see “MPS System Hardware Configuration” on page 2-5.
Mated MPS systems	The two MPS systems located at mated EAGLE 5 ISS sites.
ELAP A	The ELAP application running on MPS server A (the upper server)
ELAP B	The ELAP application running on MPS server B (the lower server)

Tekelec 1100 AS Terminology

The following table shows the terms used in describing the Tekelec 1100 AS platform.

Table 2-2. Tekelec 1100 AS Platform Terminology

Term	Definition
IPM	Initial Product Manufacture, the process of installing Tekelec 1100 AS software platform on a “bare” server (which has no software installed) resulting in a state in which the server is ready to have one or more applications installed.
Tekelec 1100 AS platform	Combination of Tekelec 1100 AS hardware and Tekelec 1100 AS platform software.
TPD	Tekelec Platform Distribution, a common platform Operating System packaged and distributed by Tekelec that is the base installation for all products built on the Tekelec 1100 AS platform.

MPS System Hardware Configuration

To view the hardware required for each MPS system, refer to the MPS configuration in the [AssemblyDrawing.pdf](#). Table 2-3 describes the MPS hardware components in more detail.

Table 2-3. MPS Hardware Components

Qty	Hardware Item	For more detail, see:	To replace, see:
2	Tekelec 1100 AS main unit; each unit has the following cards added during manufacturing: • One dual-port gigabit Ethernet Peripheral Component Interconnect (PCI) card • One quad-port gigabit Ethernet PCI Express card • One Out-of-Band-Management (OOBM) PCI card that contains: — One serial port — One modem interface — One Ethernet port — One interface for alarm relays Each Tekelec 1100 AS main unit has eight gigabytes of Random Access Memory (RAM) installed and available.	<i>Tekelec 1100 Application Server Hardware Manual</i>	<i>Tekelec 1100 Application Server Hardware Manual</i>
4	Ethernet hubs: • Two for main DSM network • Two for backup DSM network	“Hubs” on page 2-5	“Hub Replacement Procedure” on page 5-6
1	Breaker panel	“Breaker Panel” on page 2-6	“Breaker Panel Replacement Procedure” on page 5-5

The MPS system does not support any additional peripheral devices, such as printers or tape drives.

Hubs

An MPS system contains four hubs, two to support the main DSM network and two to support the backup DSM network. Figure 2-2 shows a front view of a hub, and Figure 2-3 shows a rear view.

For more information about the hubs, refer to:

- [804-1198-01.pdf](#) for a front view and description of the hubs
- Detail G of the ELAP [Interconnect.pdf](#) for a rear view

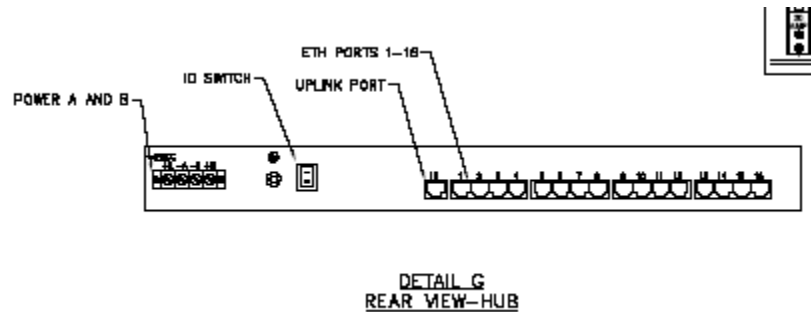
Figure 2-2. Hubs Front View

**Magnum DS8000
Domain-Switched
Dual-Speed Hubs**

100Mb/s
and
10Mb/s

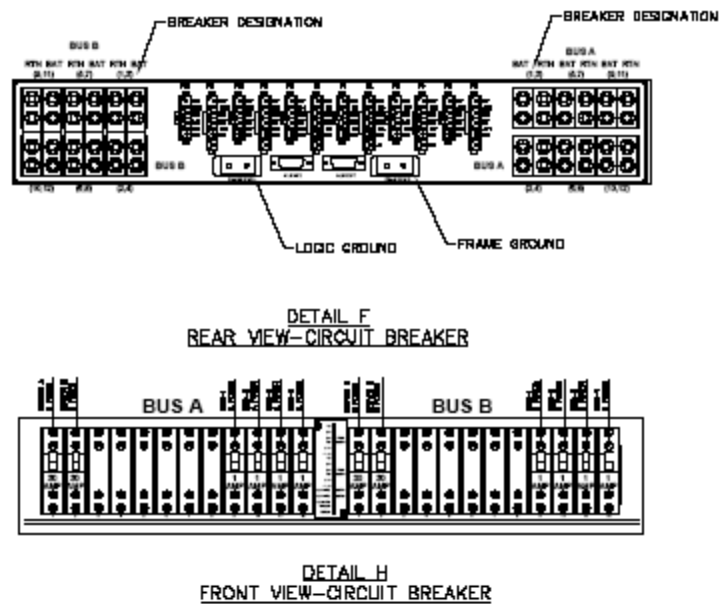


Figure 2-3. Hubs, Rear View



Breaker Panel

A breaker panel with two sides (called BUS A and BUS B) provides redundant power paths to the MPS hardware.

Figure 2-4. T1100 MPS Breaker Panel Front and Rear Views

Breaker Panel LEDs

Figure 2-5 shows a close-up of the Indicator Panel in the center of the front of each breaker panel. Table 2-4 shows the possible LED settings and what each setting indicates.

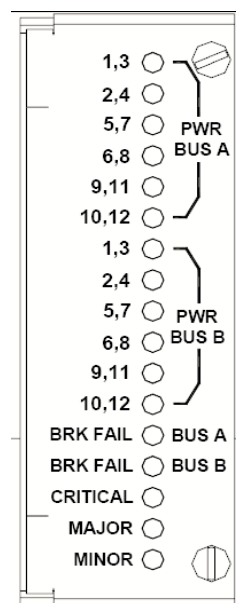
Figure 2-5. Breaker Panel LEDs

Table 2-4. Breaker Panel LED Settings

LED Position (from top)	Label on left side:	Label on right side:	Color	Indicates:
Top 6 LEDs	1,3 through 10,12	PWR BUS A	Green	Power is supplied from source A to breakers indicated by numbers on left
			Red	No power is supplied from source A to breakers indicated by numbers on left
			Off	Breakers indicated by numbers on left are not used
Next 6 LEDs	1,3 through 10,12	PWR BUS B	Green	Power is supplied from source B to breakers indicated by numbers on left
			Red	No power is supplied from source B to breakers indicated by numbers on left
			Off	Breakers indicated by numbers on left are not used
13th LED	BRK FAIL	BUS A	Green	No breakers on side A have tripped
			Red	One or more breakers on side A have tripped
14th LED	BRK FAIL	BUS B	Green	No breakers on side B have tripped
			Red	One or more breakers on side B have tripped
15th LED	CRITICAL	No label	Green	No critical platform alarms are reported ¹
			Red	One or more critical platform alarms are reported ¹
16th LED	MAJOR	No label	Green	No major platform alarms are reported ¹
			Red	One or major platform alarms are reported ¹
17th LED	MINOR	No label	Green	No minor platform alarms are reported ¹
			Red	One or minor platform alarms are reported ¹

¹ Both servers may send alarm information to the breaker panel for critical, major, or minor platform alarms. A **CRITICAL**, **MAJOR**, or **MINOR** LED is illuminated when one or more alarm of that type is reported from either or both servers. For more information about platform alarms, see “Critical Platform Alarms” on page 4-4, “Major Platform Alarms” on page 4-5, and “Minor Platform Alarms” on page 4-41.

Breaker Panel Power

The breakers receive power from the input circuit on their respective side. Each breaker controls the power to its corresponding power feed on the back of the breaker panel. The power feeds connect to the individual hardware devices in the frame.

Power comes into each breaker panel on side A and on side B. Each input power line connects to the input power feeds in the rear of the breaker panel. Each input power feed has an input circuit breaker beside it that ensures that the power is within an acceptable range.

Mapping Breakers to Devices

On each side of the breaker panel, six breakers control power to the two servers and the four hubs.

Figure 2-6 and Table 2-5 show each active breaker and the device it controls.

Figure 2-6. T1100 MPS Breakers

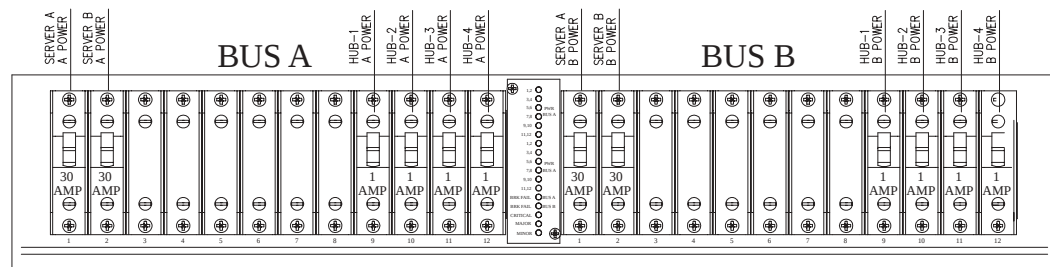


Table 2-5. Mapping of Active (Closed) Breakers to Devices

Breaker Panel Side	Breaker Position	Device
A	1	MPS A
	2	MPS B
	9	Hub 1
	10	Hub 2
	11	Hub 3
	12	Hub 4
B	1	MPS A
	2	MPS B
	9	Hub 1
	10	Hub 2
	11	Hub 3
	12	Hub 4

The table shows only end-to-end connectivity from the breaker panel breakers to the MPS.

MPS Platform Software Configuration

MPS platform software is packaged and distributed as a Tekelec Platform Distribution (TPD). The following sections describe the features of the MPS platform software:

- “Remote Access” on page 2-11
- “Installation and Upgrade” on page 2-12
- “Diagnostics, Monitoring, and Alarming” on page 2-13
- “Disaster Recovery” on page 2-14
- “Security” on page 2-14

Serial Communication

The MPS provides the serial communication interfaces shown in Figure 2-7 on page 2-10 and described in Table 2-6 on page 2-11:

Figure 2-7. MPS Serial Port Connections

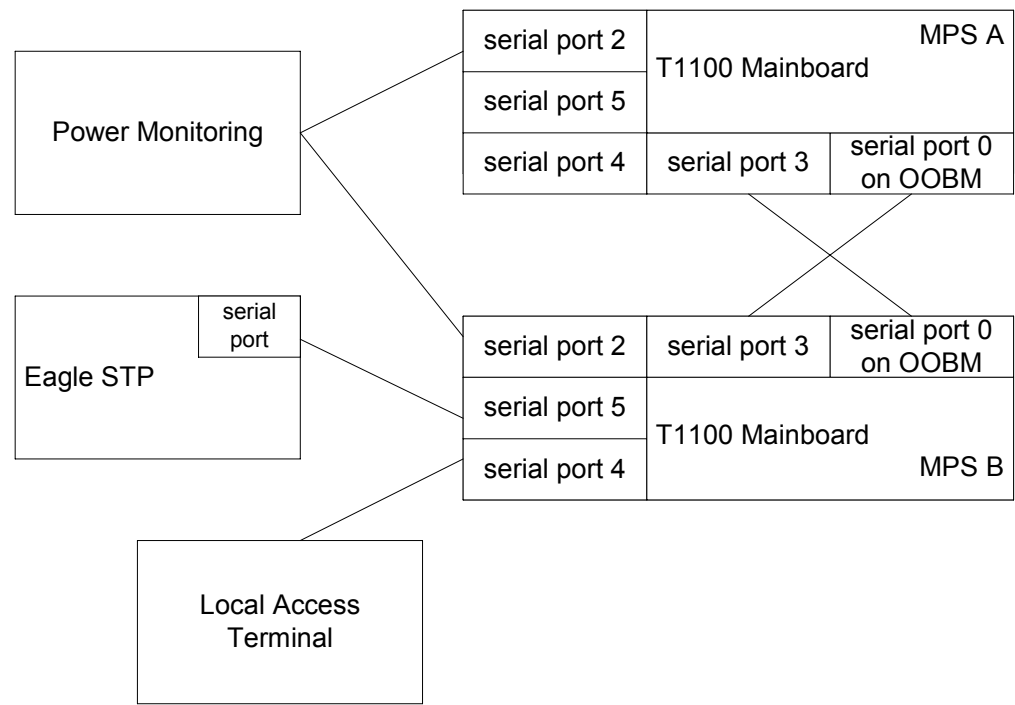


Table 2-6. MPS Serial Port Assignments

Serial Port Name	Serial Port Description
Serial port (top port on Out-of-Band Management (OOBM) card in PCI slot 8)	Configured as the console port, cable-crossed to mate: • 115200 baud • 8 data bits • 1 stop bit • No parity
Serial port 1 on rear of T1100 chassis	Not used
Serial port 2 on rear of T1100 chassis	Power monitoring port
Serial port 3 on rear of T1100 chassis	Cable from mate's serial port 0 on OOBM card, configured as: • 115200 baud • 8 data bits • 1 stop bit • No parity
Serial port 4 on rear of T1100 chassis	Local access terminal port, configured by the MPS as: • 9600 baud • Parity 7E1 • Logins enabled
Serial port 5 on rear of T1100 chassis	Serial EAGLE 5 ISS connection port, configured by the MPS as: • 9600 baud • Parity 7E1 • Logins enabled

Remote Access

The MPS system provides the following remote access features.

- Remote network access is available through two Ethernet interfaces connected to the customer network (one of these is optional). For more information about these interfaces, see Table 2-7 on page 2-16.
- A web server provides hypertext transfer protocol (HTTP) access over Ethernet.

- The MPS does not support incoming connections that use services such as **rlogin**, **rsh**, **rexec**, **ftp**, and **telnet**. Any incoming connections using these services are dropped. Instead, the MPS supports secure protocols that provide similar features. The MPS enables the use of the following secure programs instead of the indicated non-secure programs:

- The **ssh** program instead of **rlogin** and **telnet**
- The **scp** program instead of **rcp**
- The **sftp** program instead of **ftp**

The MPS enables the use of secure protocols to access the MPS for troubleshooting. These secure protocols ensure that all traffic (including passwords) is encrypted, effectively eliminating eavesdropping, connection hijacking, and other network-level attacks. Additionally, a myriad of secure tunneling capabilities, as well as a variety of authentication methods, are provided.

- Dial-in modems, one in each OOBM card, provide access for both Microsoft® Windows® and Linux® clients using the Point to Point Protocol (PPP). The modems are for use only by Tekelec Technical Services.

Installation and Upgrade

This section provides an overview of MPS installation and upgrade.

Installation and upgrade of both the MPS platform software and applications that run on the MPS are coordinated by Tekelec Technical Services. Contact them to schedule an installation or upgrade (see “Customer Care Center” on page 1-10).

Installation and Upgrade Media

The MPS operating system is easy to install or upgrade from either of the following:

- Locally, from a CD-ROM (Compact Disk-Read Only Memory) that includes a checksum so that the contents are verified before loading. The mate server cannot be installed or upgraded from the CD-ROM in the local server; either the CD-ROM must also be inserted into the mate server, or an International Standards Organization (ISO) image of the CD-ROM must be transmitted to the hard disk of the mate server.
 - For initial installation, two CD-ROMs are provided. One CD-ROM contains the platform software and one CD-ROM contains application software.
 - For upgrade, one CD-ROM contains all the software that needs to be upgraded (platform software or application software or both)

- Remotely, from an ISO image of the CD-ROM that has been transmitted to and stored on the local hard disk.
 - For initial installation, two images are provided. One image contains the platform software and one image contains application software.
 - For upgrade, one image contains all the software that needs to be upgraded (platform software or application software or both)

For an installation, two images are provided: one for the operating system and one for applications. An upgrade contains only one image which combines all necessary updates.

Upgrade Features

The upgrade design permits platform and /or application software upgrades to be performed simply and with minimal interruption of service. The following platform upgrade features are supported:

- Each server is upgraded independently and is brought offline during its upgrade (during its upgrade, the other server remains online).
- If any package is not installed successfully during an upgrade, the entire upgrade is automatically backed out, leaving the server in the same state that it had before the upgrade was initiated.
- A rollback mechanism is provided which can be executed at any time after a successful upgrade. The rollback of a server upgrade will undo all changes made to the server by the upgrade, leaving the server in the same state that it had before the upgrade was initiated.

Diagnostics, Monitoring, and Alarming

The MPS provides the following diagnostic, monitoring, and alarming functions:

- Network diagnostic tools
- Monitoring of the following items:
 - Power
 - Fans
 - Hard drives for free capacity and faults
 - Logical integrity of meta-devices and filesystems
 - IP network's core components
 - Whether core processes that should be running are running
 - Virtual Memory (VM) subsystem
 - Temperature
- Alarms, in the form of Light-Emitting Diodes (LEDs) or messages, to report problems found by monitoring

For more information about MPS diagnostics, monitoring, and alarming, see “Detecting and Reporting Problems” on page 3-10.

Disaster Recovery

This section describes how the MPS platform is designed to prevent disastrous problems and to recover from them as efficiently as possible.

- The system disks are mirrored so that a single disk failure does not cause system operation to stop.
- Installation is designed so that it does not overwrite existing application partitions.
- Journaling filesystems are used for all general-purpose file system disk partitions. In addition to its meta-data, a journaling filesystem contains a log (called a journal) of changes to meta-data. Before any meta-data changes, the change to be attempted is written to this journal. If a non-clean shutdown occurs, upon reboot this journal is played back so that the meta-data changes take place.
- The hard drives are warm-swappable.

Security

The MPS includes security features at a number of levels:

- Network access control:
 - Only the network ports necessary for remote access or application use are enabled.
 - To reduce the risk of spoofing, all network name resolution occurs only through local files.
- Secure access for user accounts:
 - The ELAP GUI shows a banner that explains that the system is for authorized users only, and authentication is required for all accounts.
 - When stored, passwords are encrypted.
 - All connection attempts are logged.
 - The customer can assign users to different account types with varying levels of accessibility. For example, some users may be assigned access to only configuration data while others may be assigned access to both configuration data and diagnostic utilities.
- Remote administrative access always uses an encrypted protocol.

MPS System Network Configuration

The following sections describe the MPS system network configuration.

MPS Network Interfaces

Each MPS server has a dual-port Ethernet PCI (Peripheral Component Interconnect) card and a quad-port gigabit Ethernet PCI Express card to support network interfaces (refer to the ELAP [Interconnect.pdf](#)). The MPS software configures the Ethernet interfaces and modifies files to make the network interfaces available to the ELAP application.

Figure 2-8 shows the network connections for an MPS system.

Figure 2-8. MPS Network Connections

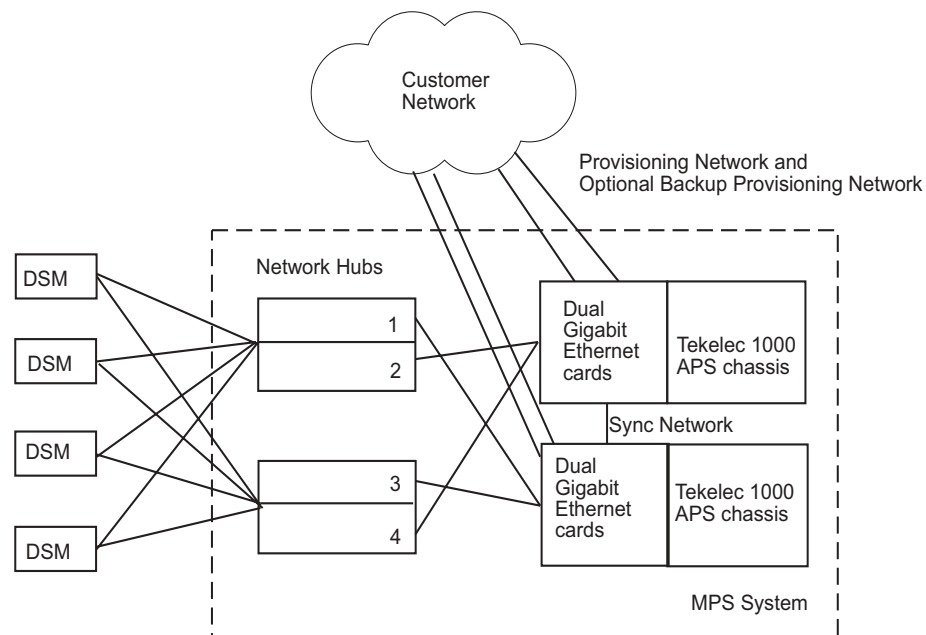


Table 2-7 on page 2-16 describes the network interfaces and how they are used.

Table 2-7. MPS Network Interfaces

Hardware Identifier	Software Identifier	Interface Function	Speed and Routing	Network Description
eth0 on server	eth91	Provisioning network	1000BaseT auto-sensing device: - Automatically runs as fast as the customer's equipment allows - Precise bandwidth requirements are determined by the customer's system configuration and performance requirements	This port is available for remote access and carries: - All provisioning information from the customer's provisioning system - All traffic required to keep the Real-Time Databases (RTDBs) of the remote MPS systems synchronized
eth1 on server	eth92	Main DSM network (A ports only)	1000BaseT half-duplex - Internal to EAGLE 5 ISS; not routed.	Most of the traffic on this network is Reliable Multicast Transport Protocol (RMTP) II multicast traffic used to keep the Database Services Module (DSM) databases loaded and synchronized. This is the DSM A network.
eth2 on server	eth93	Backup DSM network (B ports only)	1000BaseT: - DSM cards run at 10BaseT - MPS interfaces run at 100BaseT - Ethernet hubs carry out the required rate conversion - Internal to EAGLE 5 ISS; not routed.	Very little traffic travels across this network unless the main DSM network fails, in which case this network will carry all traffic normally carried by the main DSM network. This is the DSM B network.
eth3 on server	eth94	Sync network	- Full-duplex Gigabit Ethernet - Point-to-point network between MPS servers	This network provides a high-bandwidth dedicated communication channel for MPS data synchronization.
eth0 Ethernet port on OOBM	N / A	Miscellaneous	10 / 100BaseT; supports DHCP (Dynamic Host Configuration Protocol)	Available for attachment by customer or Tekelec Technical Services.

NOTE: The MPS software identifies Ethernet ports differently from the way they are identified in the [Interconnect.pdf](#) and on the labels on the MPS frame.

Configuring Network Time Protocol

This section describes the network time protocol (NTP) features and how they are set up for the MPS platform.

Network Time Protocol Overview

Network Time Protocol (NTP) is an Internet protocol used to synchronize clocks of computers to Universal Time Coordinated (UTC) as a time reference. NTP reads a clock provided by a timeserver and transmits the reading to one or more clients; each client adjusts its clock as required. If left unchecked, the system time of a server will drift out of synchronization with other equipment that it communicates with.

Understanding Universal Time Coordinated

Universal Time Coordinated (UTC) is an official standard for determining current time. The UTC second is based on the quantum resonance of the cesium atom. UTC is more accurate than Greenwich Mean Time (GMT), which is based on solar time.

The term universal in UTC means that this time can be used anywhere in the world; it is independent of time zones. To convert UTC to your local time, add or subtract the same number of hours as is done to convert GMT to local time. The term coordinated in UTC means that several institutions contribute their estimate of the current time, and the UTC is calculated by combining these estimates.

Understanding Network Time Protocol

The Network Time Protocol (NTP) is an Internet protocol used to synchronize clocks of computers using UTC as a time reference. NTP primary servers provide their clients time that is accurate within a millisecond on a Local Area Network (LAN) and within a few tens of milliseconds on a Wide Area Network (WAN). This first level of accuracy is called stratum-1. At each stratum, the client can also operate as a server for the next stratum.

A hierarchy of NTP servers is defined with strata to indicate how many servers exist between the current server and the original time source external to the NTP network, as follows:

- A stratum-1 server has access to an external time source that explicitly provides a standard time service, such as a UTC receiver.
- A stratum-2 server receives its time from a stratum-1 server.
- A stratum-3 server receives its time from a stratum-2 server.
- And so on; the NTP network supports up to stratum-15.

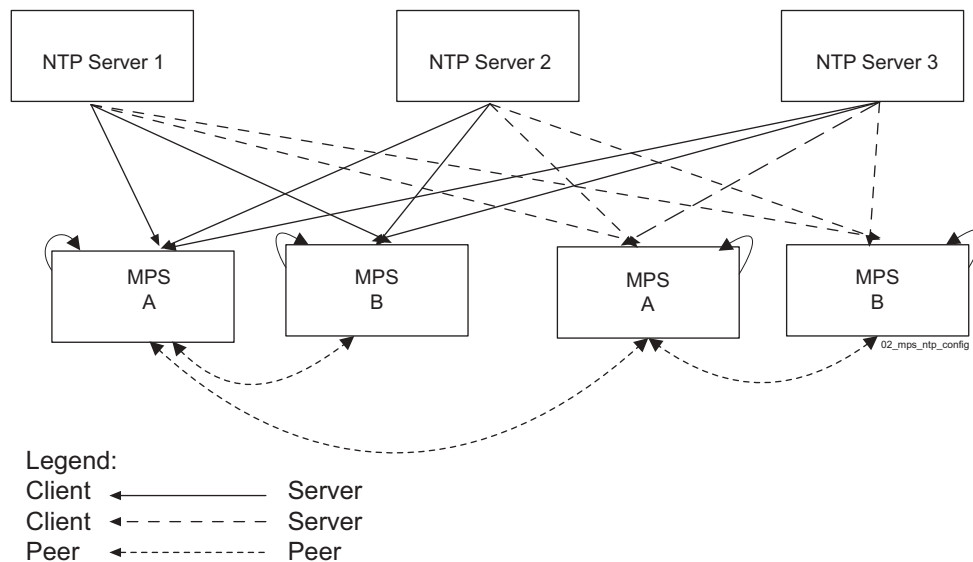
Normally, client workstations do not operate as NTP servers. NTP servers with a relatively small number of clients do not receive their time from a stratum-1 server. At each stratum, it is usually necessary to use redundant NTP servers and diverse network paths in order to protect against broken software, hardware, or network links. NTP works in one or more of the following association modes:

- Client/server mode, in which a client receives synchronization from one or more servers, but does not provide synchronization to the servers
- Symmetric mode, in which either of two peer servers can synchronize to the other, in order to provide mutual backup
- Broadcast mode, in which many clients synchronize to one or a few servers, reducing traffic in networks that contain a large number of clients. IP multicast can be used when the NTP subnet spans multiple networks.

Network Time Protocol in the MPS

By default, the MPS A server of each mated MPS pair is configured as a "free-running" Network Time Protocol (NTP) server that communicates with the mate MPS servers on the provisioning network. (The term "free-running" refers to a system that is not synchronized to UTC; it runs off of its own clocking source.) This allows mated MPS servers to synchronize their time. Figure 2-9 on page 2-18 shows the NTP configuration used by MPS.

Figure 2-9. MPS NTP Configuration



All MPS servers running the ELAP application have the option to be configured, through the ELAP GUI, to communicate and synchronize time with a customer-defined external NTP time server.

For information about defining an external NTP time server, refer to the *ELAP Administration Manual*.

User and Group Administration

The following groups are created during the IPM process:

- `syscheck`
- `tklcppp` (for use only by Tekelec Technical Services)

The following users are created during the IPM process:

- `syscheck`

This account is used to execute the **syscheck** utility. The password is `syscheck`. When you log in as the `syscheck` user, the **syscheck** utility is executed in normal mode; when **syscheck** completes, the session is immediately logged out. This account does not have shell access.

- `tklcppp` (not used)

Fault Tolerance and High Availability

The MPS architecture is designed with the following features so that there is no single point of failure:

- The MPS system uses two MPS servers in an active / standby configuration. If the active server fails, the standby server can service all functions.
- Each frame in which the MPS servers are mounted has four power feeds, and each powered item in the frame has dual power feeds.
- Each MPS server is connected to the EAGLE 5 ISS with redundant networks.
- The EAGLE 5 ISS is replicated by a mate EAGLE 5 ISS, which has its own MPS system, consisting of two MPS servers. These MPS servers are synchronized with the mate EAGLE 5 ISS's MPS servers.

MPS Maintenance

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Introduction

This chapter provides preventive and corrective maintenance information. Customers need to perform only a few preventive maintenance tasks. The MPS system and the ELAP application automatically monitor themselves and report problems in a variety of ways.

This chapter also presents an overview of how you can recover from reported problems. Detailed information about recovery procedures is contained in the remaining chapters of this manual.

Preventive Maintenance

This section describes the following recommended periodic maintenance:

- Daily maintenance procedures:
 - Procedure 3-1, “Backing Up the RTDB,” on page 3-2
 - Procedure 3-2, “Transferring RTDB Backup File,” on page 3-8
- Monthly maintenance procedures:
 - Replace fan filters (refer to the *T1100 Application Server Hardware Manual*)
 - Procedure 3-3, “Verifying Modem Availability,” on page 3-9

Daily Maintenance

Tekelec strongly recommends that all the procedures in this section be performed once a day. Having database backups stored in a secure off-site location ensures the ability to recover from system failures.

Backing Up the RTDB

Perform this procedure once a day. Estimated time of completion is one hour.

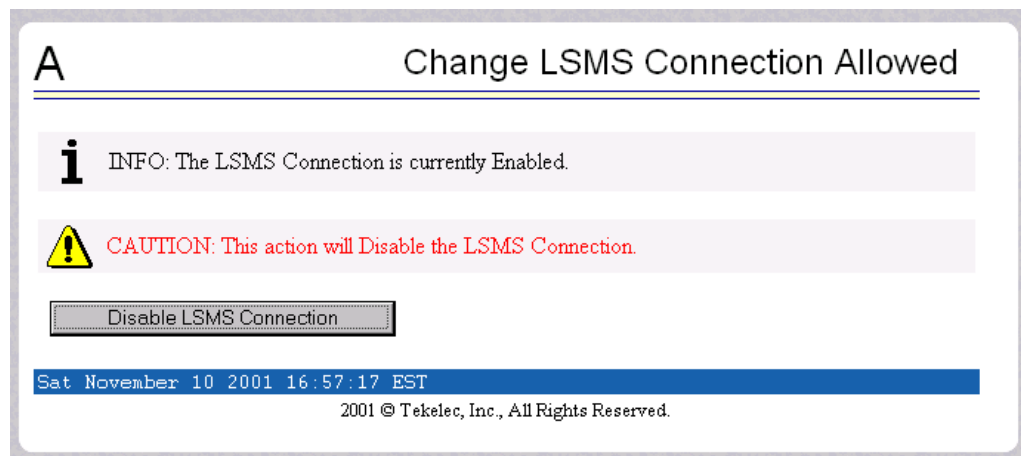
Procedure 3-1. Backing Up the RTDB

1. Log into the ELAP GUI on MPS A as the **elapall** user. For information about how to log in to the ELAP GUI, refer to the *ELAP Administration Manual*.

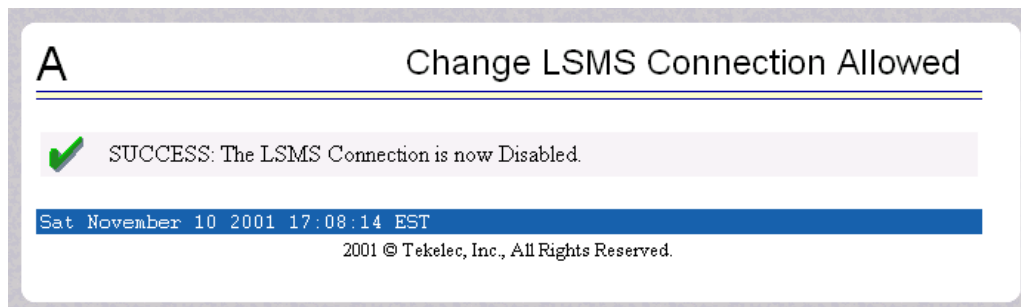
2. If you are not logged into ELAP A, select the **Select Mate** option.

3. From the ELAP Menu, select **Maintenance>LSMS Connection>Change Allowed**.

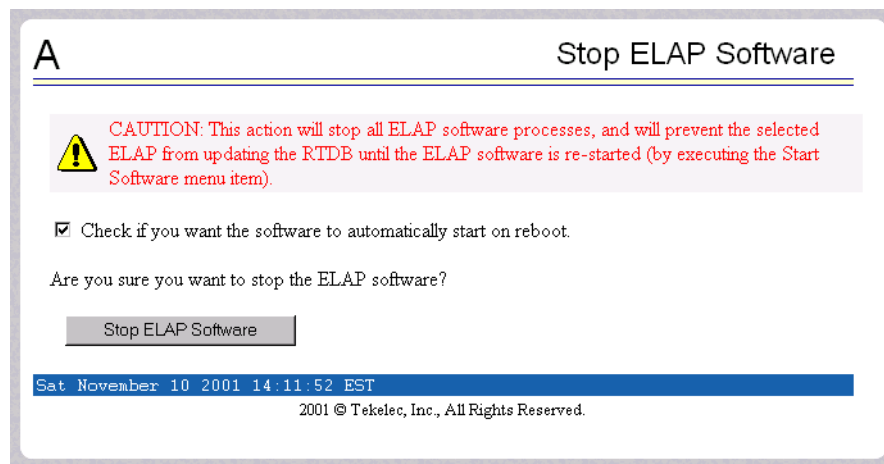
4. Click the **Disable LSMS Connection** button to disable the LSMS connection. Figure 3-1 shows the Change LSMS Connection Allowed screen.

Figure 3-1. Change LSMS Connection Allowed Screen

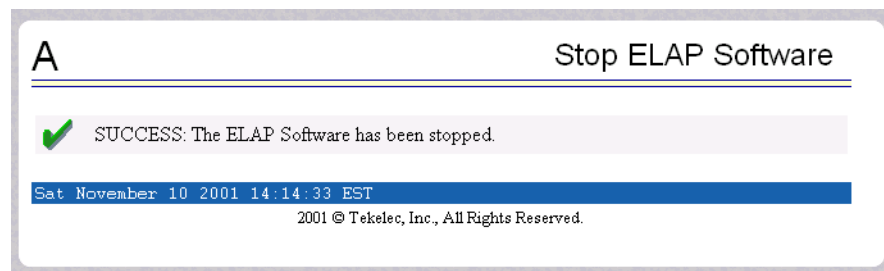
-
5. Figure 3-2 shows the LSMS connection disabled.

Figure 3-2. Successfully Disabled LSMS Connection

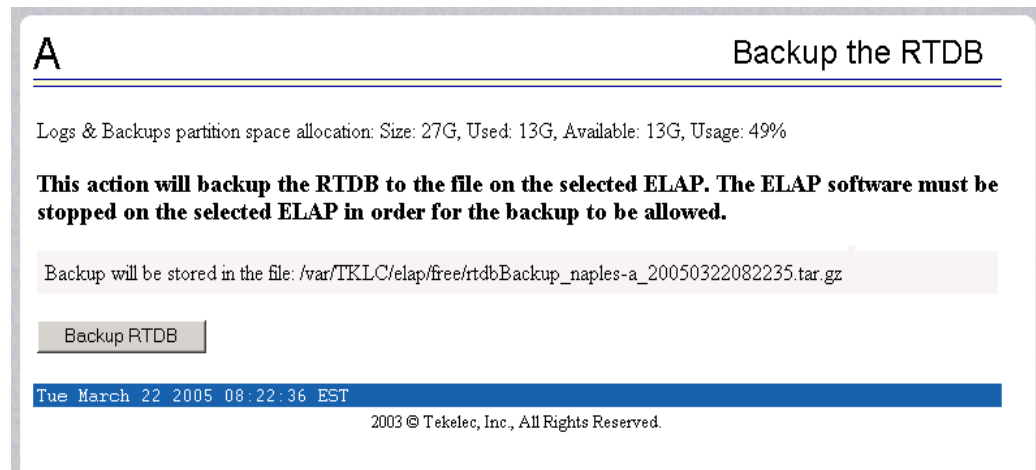
-
6. From the ELAP Menu, select **Process Control>Stop Software**.
-
7. On the Stop ELAP Software screen as shown in Figure 3-3, click **Stop ELAP Software**.

Figure 3-3. Stop ELAP Software

-
8. When the ELAP software has stopped successfully, the screen shown in Figure 3-4 displays:

Figure 3-4. ELAP Software Successfully Stopped

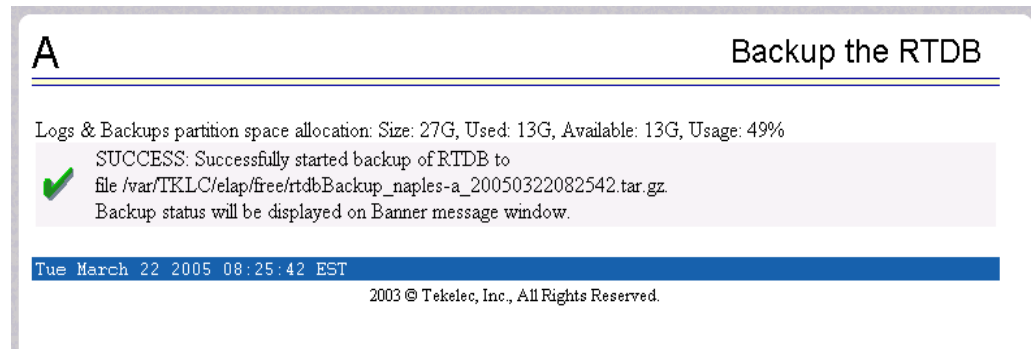
-
9. From the ELAP menu, select **RTDB>Maintenance>Backup RTDB**. The screen shown in Figure 3-5 displays:

Figure 3-5. Backup the RTDB

10. Click **Backup RTDB**. The screen in Figure 3-6 displays a request for confirmation:

Figure 3-6. Backup the RTDB Confirmation

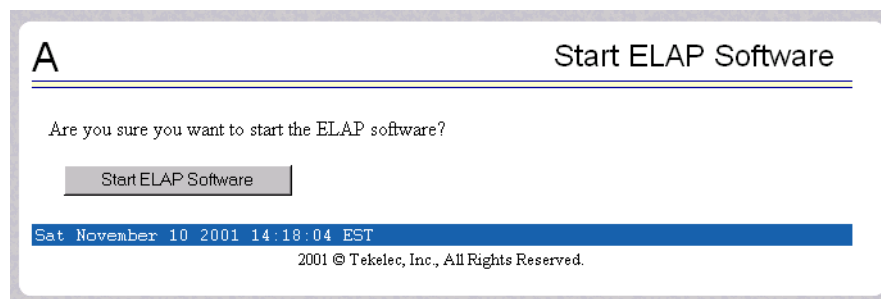
11. Click **Confirm RTDB Backup**.
12. If the backup starts successfully, the following message will scroll through the GUI banner:
Backup RTDB in progress.
13. When the backup completes successfully, the screen in Figure 3-7 displays:

Figure 3-7. Backup the RTDB - Success

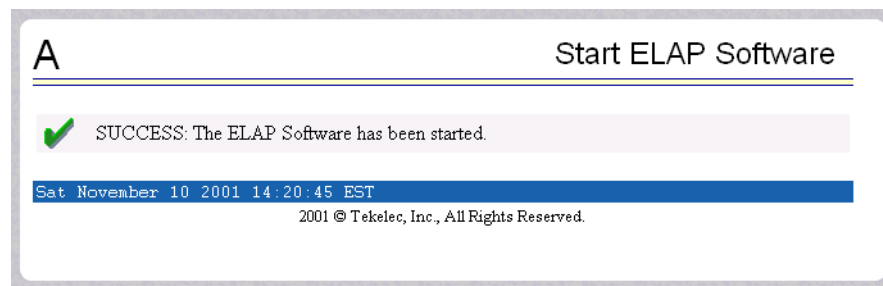
-
- 14.** Make a note of the file name as shown in this example:
`/var/TKLC/elap/free/rtdbBackup_naples_a20050322082542.tar.gz`
-

- 15.** Select **Process Control>Start Software** from the ELAP Menu.
-

- 16.** On the Start ELAP Software screen as shown in Figure 3-8, click **Start ELAP Software**.

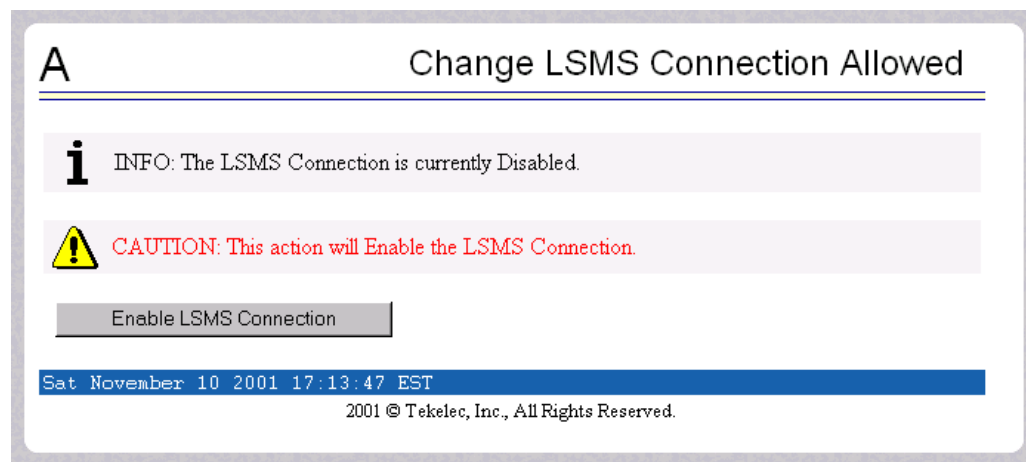
Figure 3-8. Start ELAP Software

-
- 17.** When the ELAP software has started successfully, the screen in Figure 3-9 displays:

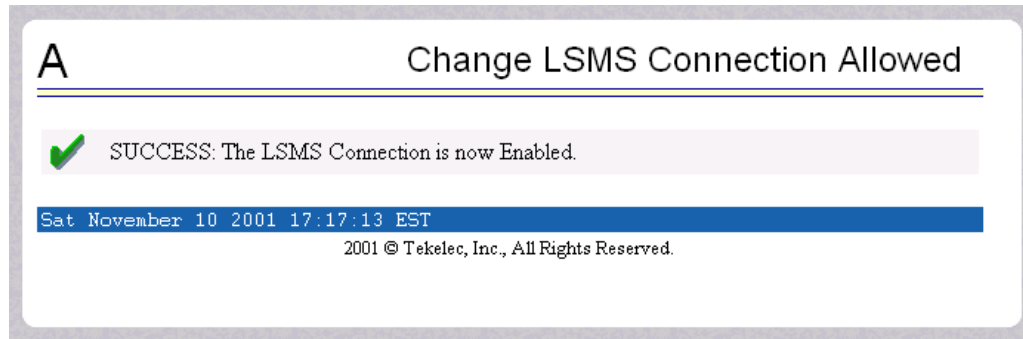
Figure 3-9. Start ELAP Software - Success

-
18. Select **Maintenance>LSMS Connection>Change Allowed** from the ELAP Menu.
-

19. Click the **Enable LSMS Connection** button to enable the LSMS connection. Figure 3-10 shows the Change LSMS Connection Allowed screen with the LSMS connection disabled.

Figure 3-10. Change LSMS Connection Allowed Screen

-
20. When the LSMS Connection is successfully enabled, the screen in Figure 3-11 displays:

Figure 3-11. Successfully Enabled LSMS Connection

21. This procedure is now complete.

Transferring RTDB Backup File

Perform this procedure once a day. Estimated time of completion depends on network bandwidth. File sizes may be several gigabytes for each database.

Procedure 3-2. Transferring RTDB Backup File

1. Log into the ELAP command line interface with user name `elapdev` and the password associated with that name.
 2. Use the Secure File Transfer Protocol (`sftp`) to transfer the RTDB backup file, whose name was recorded in step 14 on page 3-6 to a remote, safe location:
 3. This procedure is now complete.
-

Monthly Maintenance

Tekelec recommends that you perform the procedures in this section once a month.

Replacing Fan Filters

Tekelec recommends replacing filters once a month (or more often, depending on the operating environment). Use the procedure described in the *T1100 Application Server Hardware Manual*.

Verifying Modems

Once a month, use the following procedure to verify that the modems are operational. Operability of the modems is necessary in case a problem occurs that requires the attention of Tekelec Technical Services; they need to be able to dial in to the MPS system.

Procedure 3-3. Verifying Modem Availability

1. Using dial-in / terminal emulation software, initiate a session to each server that contains a modem by dialing the access number that has been assigned to the analog line connected to the modem in the Out-of-Band Management (OOBM) card.

2. Log in with username **syscheck** and password **syscheck** (see Procedure A-7, "Running syscheck Using the syscheck Login," on page A-9).
 - If the modem is operational, this login executes the System Health Check utility (**syscheck**). When **syscheck** completes, it immediately logs out and disconnects the dial-up session.
 - If the login does not work, contact the Customer Care Center (see page 1-10).

3. Shut off your terminal emulation software.

Detecting and Reporting Problems

Problems are detected and reported by both of the following:

- The MPS platform constantly monitors its operational status using a health check (**syscheck**) utility. This utility can also be initiated by the user. For more detail about **syscheck**, see “System Health Check Overview” on page 3-14.
If **syscheck** detects some fault or error, it notifies the user through these actions:
 - Lights the appropriate alarm LED on the front of the MPS server (see “MPS Alarm LEDs” on page 3-10).
 - Sends an alarm message to the MPS application. The MPS application:
 - Displays the alarm on the application GUI (see “Displaying Errors on ELAP GUI” on page 3-12)
 - Sends the alarm message to the EAGLE 5 ISS. The EAGLE 5 ISS, in turn, notifies the operator by sending a UAM to the operator screen (see “MPS UAMs” on page 3-13)
 - Logs the results of the **syscheck** test in a file available for Tekelec Technical Services use. You may be requested to save logs to send to Tekelec Technical Services; to do so, see “Savelogs Procedure” on page A-9.
- The ELAP application that runs in the MPS server can detect application errors. When an application problem is detected, the user is notified through these actions:
 - Lights the appropriate alarm LED on the front of the MPS server (see “MPS Alarm LEDs” on page 3-10).
 - Displays the error on the graphical user interface (GUI) banner (see “Displaying Errors on ELAP GUI” on page 3-12)
 - Forwards the error to the EAGLE 5 ISS, which reports it as a UAM alarm (see “MPS UAMs” on page 3-13).
 - Logs the error in an application log file. You may be requested to save logs to send to Tekelec Technical Services; to do so, see “Savelogs Procedure” on page A-9.

MPS Alarm LEDs

The front of the MPS server has three LEDs to indicate alarms, as shown in Figure 3-12 on page 3-11.

Figure 3-12. MPS Alarm LEDs

The alarms indicate the state of the MPS, as indicated in Table 3-1 on page 3-11.

Table 3-1. T1100 Alarm LED Indications

Alarm LED	Color	Indicates:
Critical	Green	No critical platform or application alarms currently exist.
	Red	One or more critical platform or application alarms currently exist.
Major	Green	No major platform or application alarms currently exist.
	Red	One or more major platform or application alarms currently exist.
Minor	Green	No minor platform or application alarms currently exist.
	Amber	One or more minor platform or application alarms currently exist.

An alarm LED remains red or amber as long as an error condition remains active for that severity. If alarm conditions are active for more than one platform alarm level, every applicable LED is illuminated red or amber, as appropriate (not just the most severe).

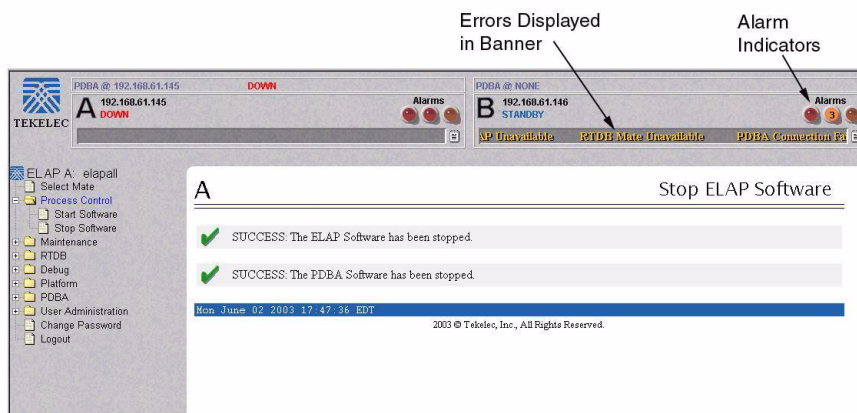
Displaying Errors on ELAP GUI

When the ELAP application detects an application error or receives an alarm message from the MPS platform layer, it displays the error in the following ways on the graphical user interface (GUI):

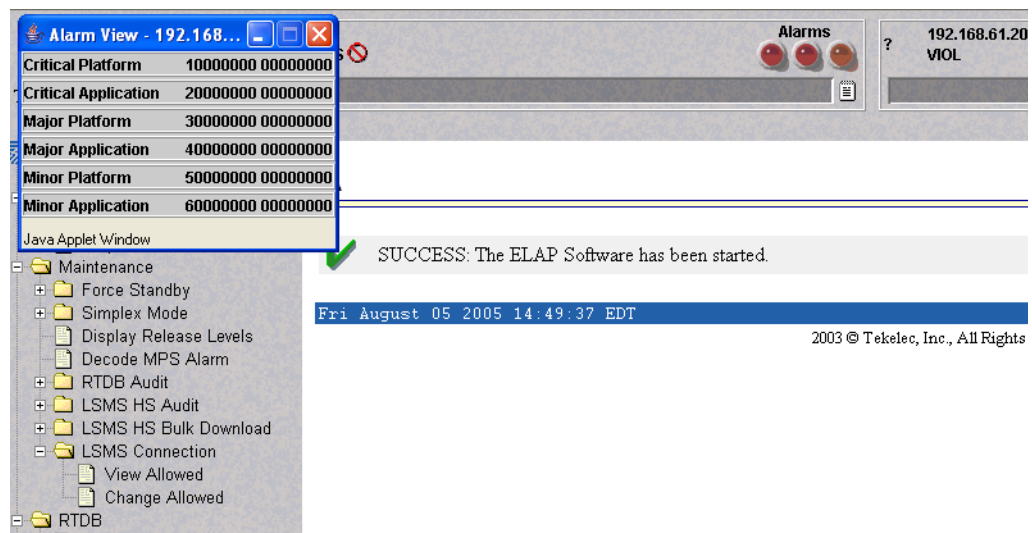
- With a text message running across the banner.
- By lighting one of the alarm level indicators on the GUI that corresponds to the alarm level of the error (if that level indicator is already lighted, it increments the number shown on that indicator). If you want to see details about the alarms represented by this indicator, click the alarm button.

Figure 3-13 shows an example of errors displayed on the ELAP GUI.

Figure 3-13. Errors Displayed on ELAP GUI



You can obtain additional information about the alarms by clicking any lighted alarm indicator. A pop-up window displays, showing the number of each type of alarm and listing the text of each existing alarm in each type. Figure 3-14 shows an example.

Figure 3-14. Viewing Alarm Details

Alarm values reported in the Alarm View popup window may represent multiple alarms. To determine which alarms are indicated, perform Procedure 3-5 on page 3-24. After you have determined which alarms have been reported, you can look up the individual alarm numbers in “MPS Alarm Recovery Procedures” on page 4-4.

MPS UAMs

The EAGLE 5 ISS displays only one alarm per ELAP at a time, based on the highest priority. If a single error is detected, the ELAP application sends an error message to the EAGLE 5 ISS terminal to report the active alarm category. If multiple errors are detected, the ELAP application sends an error message to the EAGLE 5 ISS terminal to report the most severe active alarm category.

If multiple alarms exist of the same severity and that severity is of the highest severity existing at the time, a combination alarm code is sent to the EAGLE 5 ISS. The EAGLE 5 ISS then issues the appropriate UAM to the operator.

Errors detected in the MPS hardware and software are reported by the following UAMs, which are described in greater detail in the *Signaling Products Maintenance Manual*.

- Critical Platform Alarms are reported by the EAGLE 5 ISS in UAM 0370.
- Critical Application Alarms are reported to the EAGLE 5 ISS in UAM 0371.
- Major Platform Alarms are reported to the EAGLE 5 ISS in UAM 0372.
- Major Application Alarms are reported to the EAGLE 5 ISS in UAM 0373.
- Minor Platform Alarms are reported to the EAGLE 5 ISS in UAM 0374.
- Minor Application Alarms are reported to the EAGLE 5 ISS in UAM 0375.

When all error conditions are corrected for all MPS platform errors and application errors, the operator receives this UAM:

UAM 0250 MPS available.

For information about the alarm data contained in UAMs, see Chapter 4, “MPS Platform and Application Alarms.”

System Health Check Overview

In order to monitor itself, the MPS runs a self-diagnostic utility program called **syscheck**. The system health check (**syscheck**) utility tests the server hardware and platform software. For each test, checks and balances verify the health of the MPS server and platform software as well as verifying the presence of required application software.

When the **syscheck** utility detects a problem, it generates an alarm code. The alarm code is a 16-character data string in hexadecimal format. All alarm codes are ranked by severity: critical, major, and minor. Table 4-1 on page 4-2 lists the platform alarms and their alarm codes.

The **syscheck** output can be in either of the following forms (for examples of output, see “Health Check Outputs” on page 3-16.):

- Normal—a summary of the results of the checks performed by **syscheck**.
- Verbose—detailed results for each check performed by **syscheck**.

The **syscheck** utility can be run in the following ways:

- The operator can invoke **syscheck** in either of the following ways:
 - From the ELAP GUI Platform Menu (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7). The user can request either Normal or Verbose output
 - By logging in as a **syscheck** user (see Procedure A-7, “Running syscheck Using the syscheck Login,” on page A-9). Only Normal output is produced.
- In addition, **syscheck** runs automatically by timer at the following frequencies:
 - Tests for critical platform errors run automatically every 30 seconds.
 - Tests for major and minor platform errors run automatically every 60 seconds.

Functions Checked by syscheck

Table 3-2 summarizes the functions checked by **syscheck**.

Table 3-2. System Health Check Operation

System Check	Function
Disk Access	Verify disk read and write functions continue to be operable. This test attempts to write test data in the file system to verify disk operability. If the test shows the disk is not usable, an alarm is reported to indicate the file system cannot be written to.
Smart	Verify that the smartd service has not reported any problems.
File System	Verify the file systems have space available to operate. Determine what file systems are currently mounted and perform checks accordingly. Failures in the file system are reported if certain thresholds are exceeded, if the file system size is incorrect, or if the partition could not be found. Alarm thresholds are also reported similarly.
Swap Space	Verify that disk swap space is sufficient for efficient operations.
Memory	Verify that 8 Gb of RAM is installed.
Network	Ping each network connection (provisioning, sync, and DSM networks) to verify that all ports are functioning. Check the configuration of the default route.
Process	The following critical processes are checked to verify that they are running. If a program is not running the minimum required number of processes, an alarm is reported. If more than the recommended processes are running, an alarm is also reported. • sshd (Secure Shell daemon) • ntpd (NTP daemon) • syscheck (System Health Check daemon)
Hardware Configuration	Verify that the processor is running at appropriate speed and that it matches what is required on the server. Alarms are reported when a processor is not available as it should be.
Cooling Fans	Verify that all fans are running within the expected rpm (revolutions per minute) range. Cooling fans ensure the components on the server operate at the optimum temperature. There are six fans per server. All cooling fans are checked for fan failure (that is, rotating too slowly).
Main Power Feeds	Verify that: • Main power is fed to both server power inputs • Power supplies are working properly

Table 3-2. System Health Check Operation (Continued)

System Check	Function
Power Relay Unit	Verify that all configured power feeds are within specification. Verify that no breakers have been tripped. The breaker panel has a set of relays that allow information about the breaker panel status to be sent to all attached servers. The syscheck utility monitors this information. The following error conditions can be detected: • Breaker Panel Breaker Error: To recover, verify all breakers and power feeds (see “3000000002000000” on page 4-30). • Breaker Panel Feed Error: To recover, verify that the breaker panel monitoring cable is installed correctly and is not damaged (see “3000000001000000” on page 4-30) .
Voltages	Measure all monitored voltages on the server mainboard and verify that they are all within the normal expected operating range.
Temperature	Measure the following temperatures and verify that they are within a specified range. • Air temperature • Processors’ internal temperature
MPS Platform	Provide alarm if internal diagnostics detect any other error, such as MPS syscheck script failures.

Health Check Outputs

Depending on how the **syscheck** utility was initiated, system health check output can be either Normal (brief) or Verbose (more detailed), as shown in the following examples.

Normal Output

Following is an example of normal output:

```
Running modules in class disk...           OK
Running modules in class hardware...       OK
Running modules in class net...            OK
Running modules in class proc...           OK
Running modules in class system...         OK

The log is available at:
-->/var/TKLC/log/syscheck/fail_log
```

Verbose Output Containing Errors

In the event that an error occurs, system health check provides alarm data strings and diagnostic information for platform errors in its output. The following portion of verbose output contains detected errors with the breaker panel and with the numbers of running modules.

```
Running modules in class disk...
fs: Current file space use in "/" is 26%.
fs: Current Inode used in "/" is 36%.
fs: Current file space use in "/boot" is 8%.
fs: Current Inode used in "/boot" is 1%.
fs: Current file space use in "/usr" is 25%.
fs: Current Inode used in "/usr" is 9%.
fs: Current file space use in "/var" is 20%.
fs: Current Inode used in "/var" is 3%.
fs: Current file space use in "/var/TKLC" is 19%.
fs: Current Inode used in "/var/TKLC" is 1%.
fs: Current file space use in "/tmp" is 4%.
fs: Current Inode used in "/tmp" is 1%.
fs: Current file space use in "/var/TKLC/elap/rt" is 41%.
fs: Current Inode used in "/var/TKLC/elap/rt" is 1%.
fs: Current file space use in "/var/TKLC/elap/db" is 1%.
fs: Current Inode used in "/var/TKLC/elap/db" is 1%.
fs: Current file space use in "/var/TKLC/elap/logs" is 3%.
fs: Current Inode used in "/var/TKLC/elap/logs" is 1%.
fs: Current file space use in "/var/TKLC/elap/free" is 1%.
fs: Current Inode used in "/var/TKLC/elap/free" is 1%.
Return string: "OK"
meta: Checking md status on system.
meta: md Status OK, with 11 active volumes.
meta: Checking md configuration on system.
meta: Server md configuration OK.
Return string: "OK"
swap: Checking amount of swap space on server.
swap: Swap space is OK.
swap: Swap available: 16736200
swap: /sbin/swapon -s output ->
swap: Filename                                     Type      Size      Used      Priority
swap: /dev/md3                                     partition 2056248   0         1000
swap: /var/TKLC/swap/swap.1                         file      2097136   0         1
swap: /var/TKLC/swap/swap.2                         file      2097136   0         2
swap: /var/TKLC/swap/swap.3                         file      2097136   0         3
swap: /var/TKLC/swap/swap.4                         file      2097136   0         4
swap: /var/TKLC/swap/swap.5                         file      2097136   0         5
swap: /var/TKLC/swap/swap.6                         file      2097136   0         6
swap: /var/TKLC/swap/swap.7                         file      2097136   0         7
Return string: "OK"
write: Successfully read from file system "/".
write: Successfully read from file system "/boot".
write: Successfully read from file system "/usr".
write: Successfully read from file system "/var".
write: Successfully read from file system "/var/TKLC".
write: Successfully read from file system "/var/TKLC/swap".
write: Successfully read from file system "/tmp".
write: Successfully read from file system "/var/TKLC/elap/rt".
write: Successfully read from file system "/var/TKLC/elap/db".
write: Successfully read from file system "/var/TKLC/elap/logs".
write: Successfully read from file system "/var/TKLC/elap/free".
Return string: "OK"
smart: Finished examining logs for disk: sda.
smart: Finished examining logs for disk: sdb.
smart: SMART status OK.
Return string: "OK"
OK
Running modules in class hardware...
fancontrol: Checking Server Fan Controls.
fancontrol: Saving current DCC and manual control values before proceeding.
fancontrol: Recording fan speeds at 100%.
fancontrol: Device: mon0,Fan_C1: 2960 RPM (div = 8, min = 1394 RPM), CHIP: lm87-i2c-0-2d
fancontrol: Device: mon0,Fan_C2: 3068 RPM (div = 8, min = 1394 RPM), CHIP: lm87-i2c-0-2d
fancontrol: Device: mon1,Fan_A1: 2928 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
fancontrol: Device: mon1,Fan_A2: 2890 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
fancontrol: Device: mon1,Fan_B1: 2848 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
fancontrol: Device: mon1,Fan_B2: 2973 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
```

```

fancontrol: Testing fan controls at 0% with delta of 1000.
fancontrol: Device: mon0,Fan_C1: 1721 RPM (div = 8, min = 1394 RPM), CHIP: lm87-i2c-0-2d OK.
Delta: 1239.
fancontrol: Device: mon0,Fan_C2: 1757 RPM (div = 8, min = 1394 RPM), CHIP: lm87-i2c-0-2d OK.
Delta: 1311.
fancontrol: Device: mon1,Fan_A1: 1739 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e OK. Delta:
1189.
fancontrol: Device: mon1,Fan_A2: 1732 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e OK. Delta:
1158.
fancontrol: Device: mon1,Fan_B1: 1755 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e OK. Delta:
1093.
fancontrol: Device: mon1,Fan_B2: 1778 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e OK. Delta:
1195.
fancontrol: Server Fan Controls OK.
Return string: "OK"
    breaker: No breaker alarm on /dev/ttyS2 breaker panel.
    breaker: No power feed alarm on /dev/ttyS2 breaker panel.
Return string: "OK"
cmosbattery: Checking CMOS battery voltage.
cmosbattery: CMOS Voltage OK. mon1,battv_mon: +3.14 V (min = +2.00 V, max = +3.30 V), CHIP:
lm93-i2c-0-2e
cmosbattery: ALL CMOS Battery Voltages OK.
Return string: "OK"
    fan: Checking Status of Server Fans.
    fan: Fan is OK. mon0,Fan_C1: 1834 RPM (div = 8, min = 1394 RPM), CHIP: lm87-i2c-0-2d
    fan: Fan is OK. mon0,Fan_C2: 1896 RPM (div = 8, min = 1394 RPM), CHIP: lm87-i2c-0-2d
    fan: Fan is OK. mon1,Fan_A1: 1739 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
    fan: Fan is OK. mon1,Fan_A2: 1732 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
    fan: Fan is OK. mon1,Fan_B1: 1755 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
    fan: Fan is OK. mon1,Fan_B2: 1778 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
    fan: Server Fan Status OK.
Return string: "OK"
    psu: Checking status of Server Power Feeds.
    psu: Power feed OK. powera: ON, CHIP: Power Monitor
    psu: Power feed OK. powerb: ON, CHIP: Power Monitor
    psu: Checking status of Server Supplies.
    psu: Power supply OK. Status: OK, CHIP: pcf8574-i2c-0-22
    psu: Power supply OK. Status: OK, CHIP: pcf8574-i2c-0-23
Return string: "OK"
    temp: Checking server temperature.
    temp: Server Temp OK. mon0,AmbT: +29 C (high = +60°C, warn = +57°C, low = +0°C), CHIP:
lm87-i2c-0-2d
    temp: Server Temp OK. mon0,amb_cpu0_temp: +35 C (high = +60°C, warn = +57°C, low =
+0°C), CHIP: lm87-i2c-0-2d
    temp: Server Temp OK. mon0,amb_ddr_temp: +32 C (high = +65°C, warn = +61°C, low = +0°C),
CHIP: lm87-i2c-0-2d
    temp: Server Temp OK. mon1,cpu0: +40 C (high = +80°C, warn = +76°C, low = +0°C), CHIP:
lm93-i2c-0-2e
    temp: Server Temp OK. mon1,cpu1: +38 C (high = +80°C, warn = +76°C, low = +0°C), CHIP:
lm93-i2c-0-2e
    temp: Server Temp OK. mon1,AmbT: +33 C (high = +65°C, warn = +61°C, low = +0°C), CHIP:
lm93-i2c-0-2e
    temp: Server Temp OK. !Prochot #1: Throttle Percent = 0, Throttle Percent Average = 0,
CHIP: lm93-i2c-0-2e
    temp: Server Temp OK. !Prochot #2: Throttle Percent = 0, Throttle Percent Average = 0,
CHIP: lm93-i2c-0-2e
    temp: Server Temp OK. !VRD Hot #1: 0, CHIP: lm93-i2c-0-2e
    temp: Server Temp OK. !VRD Hot #2: 0, CHIP: lm93-i2c-0-2e
Return string: "OK"
    voltage: Checking server voltages.
    voltage: Voltage is OK. mon0,+V1_8: +1.80 V (min = +1.72 V, max = +1.88 V), CHIP:
lm87-i2c-0-2d
    voltage: Voltage is OK. mon0,+V3_3: +3.30 V (min = +3.16 V, max = +3.44 V), CHIP:
lm87-i2c-0-2d
    voltage: Voltage is OK. mon0,+V5_pci: +5.00 V (min = +4.74 V, max = +5.26 V), CHIP:
lm87-i2c-0-2d
    voltage: Voltage is OK. mon0,+V12: +12.00 V (min = +11.38 V, max = +12.63 V), CHIP:
lm87-i2c-0-2d
    voltage: Voltage is OK. mon1,+V1.5: +1.49 V (min = +1.42 V, max = +1.57 V), CHIP:
lm93-i2c-0-2e
    voltage: Voltage is OK. mon1,VCC_CPU0: +1.30 V (min = +1.16 V, max = +1.35 V), CHIP:
lm93-i2c-0-2e
    voltage: Voltage is OK. mon1,VCC_CPU1: +1.30 V (min = +1.16 V, max = +1.35 V), CHIP:
lm93-i2c-0-2e
    voltage: Voltage is OK. mon1,+V5_0: +5.02 V (min = +4.76 V, max = +5.25 V), CHIP:
lm93-i2c-0-2e
    voltage: Voltage is OK. mon1,VTT: +1.20 V (min = +1.13 V, max = +1.26 V), CHIP:
lm93-i2c-0-2e

```

```

voltage: Voltage is OK. mon1,+V3_3: +3.33 V (min = +3.14 V, max = +3.46 V), CHIP:
lm93-i2c-0-2e
voltage: Voltage is OK. mon1,CPU0_VID: +1.337 V, CHIP: lm93-i2c-0-2e
voltage: Voltage is OK. mon1,CPU1_VID: +1.337 V, CHIP: lm93-i2c-0-2e
voltage: Server Voltages OK.
Return string: "OK"
Return string: "OK"

                                OK
Running modules in class net...
defaultroute: Module is disabled.
ping: prova-ip network connection OK
ping: provb-ip network connection OK
ping: dsmm-a network connection OK
ping: dsmm-b network connection OK
ping: dsmb-a network connection OK
ping: dsmb-b network connection OK
ping: sync-a network connection OK
ping: sync-b network connection OK
Return string: "OK"

                                OK
Running modules in class proc...
ntp: *LOCAL(0)          LOCAL(0)          13 1    62    64  377    0.000    0.000    0.008
Return string: "OK"
run: Checking smartd...
run: Found 1 instance(s) of the smartd process.
run: Checking atd...
run: Found 1 instance(s) of the atd process.
run: Checking crond...
run: Found 1 instance(s) of the crond process.
run: Checking sshd...
run: Found 2 instance(s) of the sshd process.
run: Checking syscheck...
run: Found 1 instance(s) of the syscheck process.
run: Checking syslogd...
run: Found 1 instance(s) of the syslogd process.
run: Checking jrs...
* run: ::MINOR:: 5000000000000002 -- Server Application Process Error
run: Only 0 instance(s) of jrs running. 1 instance(s) required!
run: Checking maint...
* run: ::MINOR:: 5000000000000002 -- Server Application Process Error
run: Only 0 instance(s) of maint running. 1 instance(s) required!
run: Checking rtldb...
* run: ::MINOR:: 5000000000000002 -- Server Application Process Error
run: Only 0 instance(s) of rtldb running. 1 instance(s) required!
run: Checking topnode...
* run: ::MINOR:: 5000000000000002 -- Server Application Process Error
run: Only 0 instance(s) of topnode running. 2 instance(s) required!
run: Checking prov...
* run: ::MINOR:: 5000000000000002 -- Server Application Process Error
run: Only 0 instance(s) of prov running. 1 instance(s) required!
run: Checking provRMTP...
* run: ::MINOR:: 5000000000000002 -- Server Application Process Error
run: Only 0 instance(s) of provRMTP running. 4 instance(s) required!
run: Checking provRcvr...
* run: ::MINOR:: 5000000000000002 -- Server Application Process Error
run: Only 0 instance(s) of provRcvr running. 4 instance(s) required!
run: Checking exinit...
run: Found 1 instance(s) of the exinit process.
run: Checking gs...
run: Found 1 instance(s) of the gs process.
run: Checking mysqld...
run: Found 1 instance(s) of the mysqld process.
run: Checking httpd...
run: Found 1 instance(s) of the httpd process.
Return string: "Absolute threshold of running processes was not met."
One or more module in class "proc" FAILED
Running modules in class system...
cpu: Found "4" CPU(s)... OK
cpu: CPU 0 is on-line... OK
cpu: CPU 0 speed: 3200.227 MHz... OK
cpu: CPU 1 is on-line... OK
cpu: CPU 1 speed: 3200.227 MHz... OK
cpu: CPU 2 is on-line... OK
cpu: CPU 2 speed: 3200.227 MHz... OK
cpu: CPU 3 is on-line... OK
cpu: CPU 3 speed: 3200.227 MHz... OK
Return string: "OK"
mem: Expected memory found

```

```

mem: Skipping minimum expected memory check.
mem: 8400478208 bytes (~8011.3203125 Mb) of RAM installed.
Return string: "OK"
Return string: "OK"
OK
No modules selected in class: services...

Failures occurred during system check. The failure log is available at:
-->/var/TKLC/log/syscheck/fail_log

MI::Unable to connect to maint process.
Alarm dispatch utility No such file or directory is not functioning. No message was sent.
Will turn lights on|off only. Server alarm string = 1000000000000000.
MI::Unable to connect to maint process.
Alarm dispatch utility No such file or directory is not functioning. No message was sent.
Will turn lights on|off only. Server alarm string = 2000000000000000.
MI::Unable to connect to maint process.
Alarm dispatch utility No such file or directory is not functioning. No message was sent.
Will turn lights on|off only. Server alarm string = 3000000000000000.
MI::Unable to connect to maint process.
Alarm dispatch utility No such file or directory is not functioning. No message was sent.
Will turn lights on|off only. Server alarm string = 4000000000000000.
MI::Unable to connect to maint process.
Alarm dispatch utility No such file or directory is not functioning. No message was sent.
Will turn lights on|off only. Server alarm string = 5000000000000002.
MI::Unable to connect to maint process.
Alarm dispatch utility No such file or directory is not functioning. No message was sent.
Will turn lights on|off only. Server alarm string = 6000000000000000.

```

NOTE: When errors occur, the syscheck output also includes the alarm number and text that is generated. The example above highlights the alarms in bold text. For the explanation of alarm codes in the alarm strings and how to respond to them, refer to Chapter 4, “MPS Platform and Application Alarms.”

Recovering from Problems

This section describes the following:

- “Restoring Databases from Backup Files” on page 3-20
- “Recovering From Alarms” on page 3-23

Restoring Databases from Backup Files

This section describes how to restore the RTDB from backup files.

Restoring the RTDB from Backup Files

To restore the ELAP’s RTDB from a backup file, contact the Customer Care Center (see page 1-10).

NOTE 1: Tekelec recommends that the RTDB be backed up daily (see section, “Daily Maintenance” on page 3-2).

NOTE 2: The RTDB for ELAP Release 4.0 and later CANNOT be restored from backups made on an ELAP release earlier than 4.0.

Use the following procedure to restore the RTDB from a previously prepared backup file.



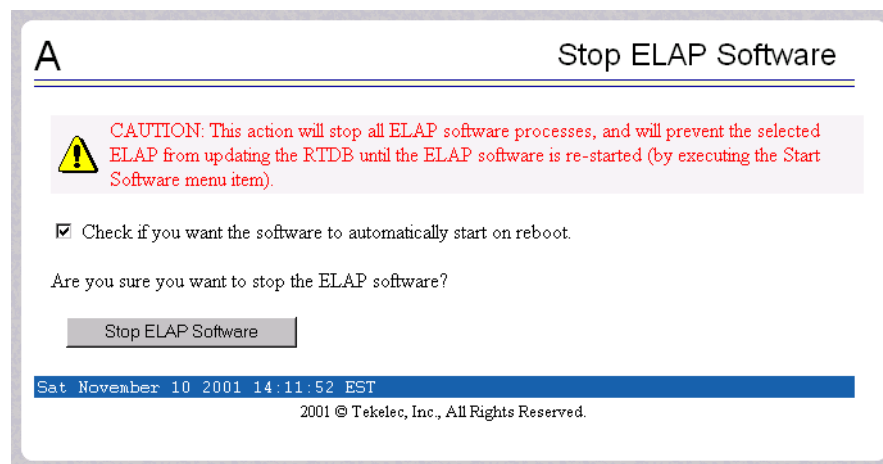
CAUTION: Contact Customer Care Center before performing this procedure.

Procedure 3-4. Restoring the RTDB

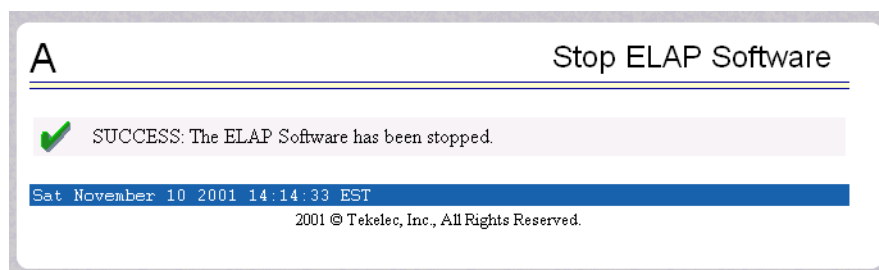
1. Log into the ELAP command line interface with user name **elapdev** and the password associated with that name.
2. Use the Secure File Transfer Protocol (**sftp**) to transfer the RTDB backup file (whose name was recorded in step 14 on page 3-6) to the following location:

```
/var/TKLC/elap/free/
```
3. Log into the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
4. Select **Process Control>Stop Software** to ensure that no other updates are occurring. The screen in Figure 3-11 displays:

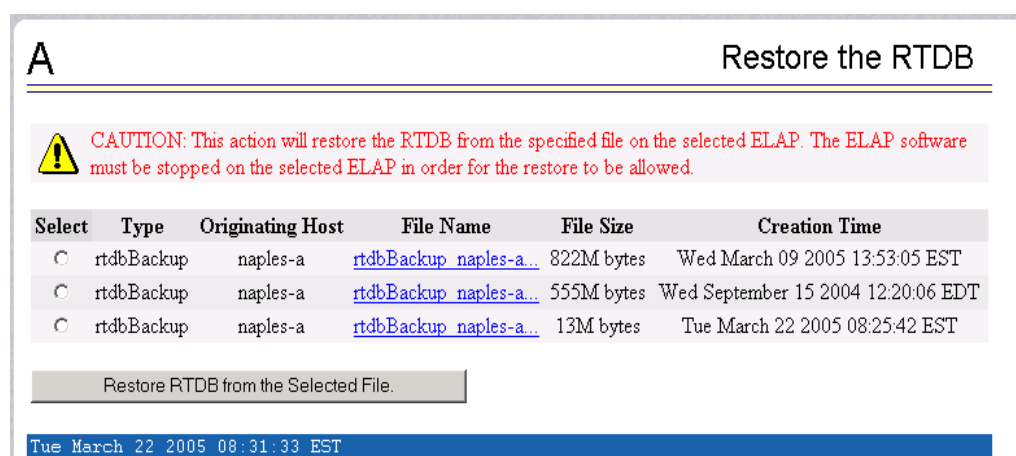
Figure 3-15. Stop ELAP Software



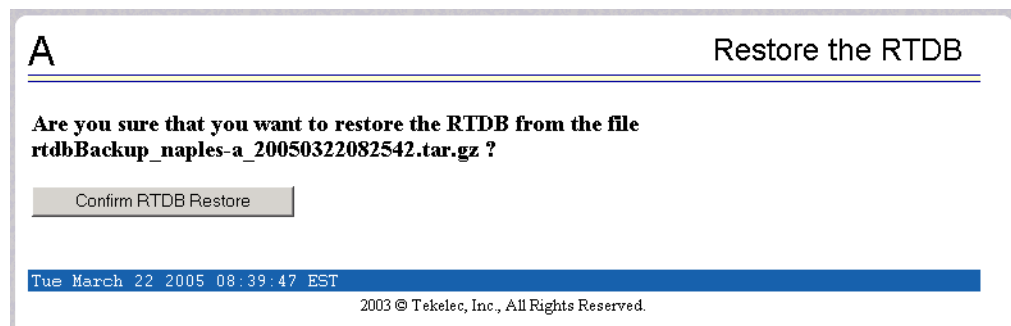
5. When the software on the selected ELAP has stopped, the screen in Figure 3-12 displays:

Figure 3-16. Stop ELAP Software - Success

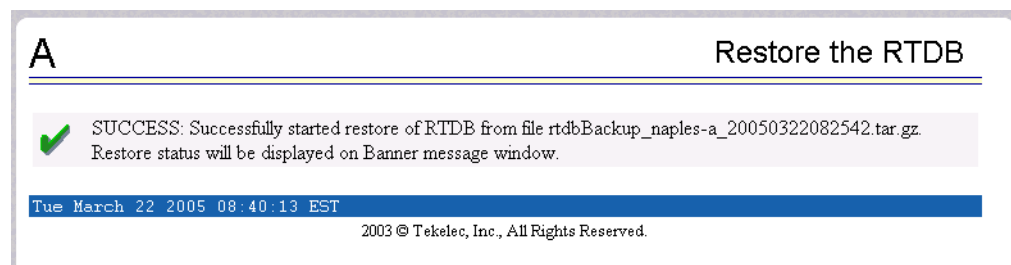
6. Select **RTDB>Maintenance>Restore RTDB**. The screen shown in Figure 3-17 displays:

Figure 3-17. Restoring the RTDB

7. On the screen shown in Figure 3-17, select the file that was transferred in step 2. Click **Restore the RTDB from the Selected File**.
8. To confirm restoring a file, click **Confirm RTDB Restore** shown in the screen for RTDB in Figure 3-18:

Figure 3-18. Restore the RTDB Confirm

9. When restoring the file is successful, the screen shown in Figure 3-19 displays:

Figure 3-19. Restore the RTDB - Success

10. This procedure is complete.

Recovering From Alarms

Alarms should be resolved based on severity from highest to lowest.

When combination alarms are decoded into their individual component alarms, the customer can decide in which order to resolve the alarms, because all alarms are of equal severity.

For assistance in deciding which alarm to resolve first or how to perform a recovery procedure, contact the Tekelec Customer Care Center (see “Customer Care Center” on page 1-10).

Evaluate the following problems to find the appropriate recovery procedure:

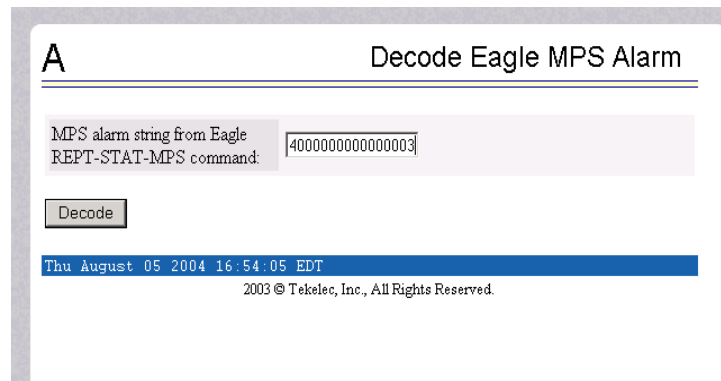
- If you are investigating a problem that is no longer displayed on the ELAP GUI, perform the following procedures:
 1. Procedure 3-5, “Decode MPS Alarm Strings Reference,” on page 3-24
 2. Procedure 3-6, “Determine Alarm Cause; Find Recovery Procedure,” on page 3-26
 3. Recovery procedure to which you are directed by Procedure 3-6, “Determine Alarm Cause; Find Recovery Procedure,” on page 3-26
- If you are investigating a problem that is being reported currently on the ELAP GUI, perform the following procedures:
 1. Procedure 3-6, “Determine Alarm Cause; Find Recovery Procedure,” on page 3-26.
 2. Recovery procedure to which you are directed by Procedure 3-6, “Determine Alarm Cause; Find Recovery Procedure,” on page 3-26

Decoding Alarm Strings

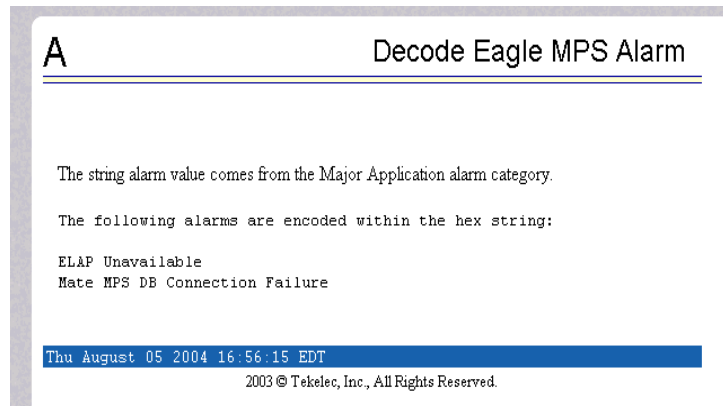
Use the following procedure to decode alarm strings that consist of multiple alarms.

Procedure 3-5. Decode MPS Alarm Strings Reference

1. Log in to the **User Interface** screen of the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
2. When you are logged into the ELAP, select **Maintenance>Decode MPS Alarm** from the menu.
3. Enter the 16-digit alarm string into the window on the **Decode MPS Alarm** screen, as shown in Figure 3-20.

Figure 3-20. Decode MPS Alarm Screen

-
4. Click the **Decode** button.
-
5. The system returns information on the Alarm Category (Critical Application, Major Platform) and error text, as shown in Figure 3-21 on page 3-25.

Figure 3-21. Decoded MPS Alarm Information

-
6. Find the alarm text string shown on the GUI in Table 4-1 on page 4-2, note the corresponding alarm number change, and perform Procedure 3-6 on page 3-26.

NOTE: For combination errors, multiple procedures might have to be used to solve the problem.

Finding Recovery Procedure Based on Alarm

Use the following procedure to determine where to find information about how to recover from the problem.

Procedure 3-6. Determine Alarm Cause; Find Recovery Procedure

1. Record the alarm data string as shown in the banner or the Alarm View on the ELAP GUI or as decoded from Procedure 3-5, “Decode MPS Alarm Strings Reference,” on page 3-24.

2. Run **syscheck** in verbose mode (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).

3. Examine the **syscheck** output for specific details about the alarm.

4. Find the recovery procedure for that alarm in the procedures shown in Chapter 4, “MPS Platform and Application Alarms.” The alarms are ordered by ascending alarm number. You may also be referred to other procedures:
 - Some alarm recovery procedures may instruct you to replace Field Replaceable Units (FRUs). Procedures for replacing FRUs are described in Chapter 5, “MPS Field Replaceable Units.”
 - General procedures that are used in a number of recovery procedures are described in Appendix A, “General Procedures.”

5. After performing the appropriate procedure, if the alarm persists, contact the Customer Care Center (see page 1-10).

MPS Platform and Application Alarms

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MPS Alarm Recovery Procedures	4-4
Critical Platform Alarms	4-4
Critical Application Alarms	4-5
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Minor Application Alarms	4-50

Introduction

This chapter describes recovery procedures you can use when an alarm condition or other problem exists on the MPS system. For information about how and when alarm conditions are detected and reported, see “Detecting and Reporting Problems” on page 3-10.

When an alarm code is reported, locate the alarm in Table 4-1, “Platform and Application Alarms,” on page 4-2. The procedures for correcting alarm conditions start on “MPS Alarm Recovery Procedures” on page 4-4.

NOTE: Sometimes the alarm string may consist of multiple alarms and will have to be decoded in order to use the MPS Alarm Recovery Procedures in this manual. If the alarm code is not listed in Table 4-1 on page 4-2, “Platform and Application Alarms,” see Procedure 3-5, “Decode MPS Alarm Strings Reference,” on page 3-24.

Platform and application errors are grouped by category and severity. The categories are listed from most to least severe:

- Critical Platform Alarms
- Critical Application Alarms
- Major Platform Alarms
- Major Application Alarms
- Minor Platform Alarms
- Minor Application Alarms

Table 4-1 on page 4-2 shows the alarm numbers and alarm text for all alarms generated by the MPS platform and the ELAP application. The order within a category is not significant.

Table 4-1. Platform and Application Alarms

Alarm Codes	Error Descriptor	UAM Number
Critical Platform Errors		
1000000000000200	Uncorrectable ECC Memory Error	0370
Critical Application Errors		
2000000000000001	LSMS DB Maintenance Required	0371
Major Platform Errors		
3000000000000001	Server Fan Failure	0372
3000000000000002	Server Internal Disk Error	0372
3000000000000008	Server Platform Error	0372
3000000000000010	Server File System Error	0372
3000000000000020	Server Platform Process Error	0372
3000000000000080	Server Swap Space Shortage Failure	0372
3000000000000100	Server Provisioning Network Error	0372
3000000000000200	Server Eagle Network A Error	0372
3000000000000400	Server Eagle Network B Error	0372
3000000000000800	Server Sync Network Error	0372
3000000000001000	Server Disk Space Shortage Error	0372
3000000000002000	Server Default Route Network Error	0372
3000000000004000	Server Temperature Error	0372
3000000000008000	Server Mainboard Voltage Error	0372
NOTE: The order within a category is not significant.		

Table 4-1. Platform and Application Alarms (Continued)

Alarm Codes	Error Descriptor	UAM Number
3000000000010000	Server Power Feed Unavailable	0372
3000000000020000	Server Disk Health Test Error	0372
3000000000040000	Server Disk Unavailable Error	0372
3000000000200000	Correctable ECC Memory Error	0372
3000000000400000	Server Power Supply 1 Error	0372
3000000000800000	Server Power Supply 2 Error	0372
3000000001000000	Breaker Panel Feed Error	0372
3000000002000000	Breaker Panel Breaker Error	0372
3000000004000000	Breaker Panel Monitoring Error	0372
Major Application Errors		
4000000000000001	Mate ELAP Unavailable	0373
4000000000000002	RTDB Mate Unavailable	0373
4000000000000004	Congestion	0373
4000000000000020	RMTP Channels Down	0373
4000000000000040	Fatal Software Error	0373
4000000000000080	RTDB Corrupt	0373
4000000000000100	RTDB Inconsistent	0373
4000000000000200	RTDB Incoherent	0373
4000000000000400	JRS to RTDB Connection Down	0373
4000000000000800	Transaction Log Full	0373
4000000000001000	RTDB 100% Full	0373
4000000000002000	RTDB Resynchronization in Progress	0373
4000000000004000	RTDB Reload Is Required	0373
4000000000004000	RTDB DMS Over-Allocation	0375
4000000000008000	RTDB Maximum Depth Reached	0375
Minor Platform Errors		
5000000000000001	Server Disk Space Shortage Warning	0374
5000000000000002	Server Application Process Error	0374
5000000000000004	Server Hardware Configuration Error	0374
5000000000000020	Server Swap Space Shortage Warning	0374
NOTE: The order within a category is not significant.		

Table 4-1. Platform and Application Alarms (Continued)

Alarm Codes	Error Descriptor	UAM Number
5000000000000040	Server Default Router Not Defined	0374
5000000000000080	Server Temperature Warning	0374
5000000000000100	Server Core File Detected	0374
5000000000000200	Server NTP Daemon Not Synchronized	0374
5000000000000400	Server CMOS Battery Voltage Low	0374
5000000000000800	Server Disk Self Test Warning	0374
5000000000004000	Server Reboot Watchdog Initiated	0374
Minor Application Errors		
6000000000000001	RMTP Channel A Down	0375
6000000000000002	RMTP Channel B Down	0375
6000000000000008	RTDB 80% Full	0375
6000000000000020	Standby PDBA Falling Behind	0375
6000000000000040	RTDB Tree Error	0375
NOTE: The order within a category is not significant.		

MPS Alarm Recovery Procedures

This section provides recovery procedures for the MPS and ELAP alarms, listed by alarm category and Alarm Code (alarm data string) within each category.

Critical Platform Alarms

Critical platform alarms are issued if uncorrectable memory problems are detected.

1000000000000200 - Uncorrectable ECC Memory Error

This alarm indicates that chipset has detected an uncorrectable (multiple-bit) memory error that the ECC (Error-Correcting Code) circuitry in the memory is unable to correct.

Procedure 4-1. Recovery from Uncorrectable ECC Memory Error

1. Contact the Customer Care Center (see page 1-10) to request hardware replacement.
-

Critical Application Alarms

This section describes the critical application alarms.

2000000000000001 - LSMS DB Maintenance Required

This alarm indicates that database maintenance is required.

Procedure 4-2. Recovery from LSMS DB Maintenance Required

1. Call Customer Care Center for assistance. See page 1-10.
-

Major Platform Alarms

Major platform alarms involve MPS hardware components, memory, and network connections.

3000000000000001 - Server Fan Failure

This alarm indicates that one or more of the fans in the system has failed.

NOTE: In order for this alarm to clear, the underlying failure condition must be consistently undetected for a number of polling intervals. Therefore, the alarm may continue to be reported for several minutes after corrective actions are completed.

Procedure 4-3. Recovery from Server Fan Failure

1. Refer to the procedure for replacing a fan assembly in the *Tekelec 1100 Application Server Hardware Manual*. After you have opened the front lid to access the fan assemblies, determine whether any objects are interfering with the fan rotation. If some object is interfering with fan rotation, remove the object and skip to step 3.
 2. If visual inspection does not indicate the presence of physical interference, perform the following substeps to determine which of the server's fan assemblies needs replacing and to replace the fan assembly:
-

- a. Run **syscheck** in Verbose mode (see “Running the System Health Check” on page A-6). Find the section of **syscheck** output about fans, which looks similar to the following:

```
fan: Checking Status of Server Fans.
fan: Fan is OK. mon0,Fan_C1: 1896 RPM (div = 8, min = 1394 RPM), CHIP: lm87-i2c-0-2d
fan: Fan is OK. mon0,Fan_C2: 2191 RPM (div = 8, min = 1394 RPM), CHIP: lm87-i2c-0-2d
fan: Fan is OK. mon1,Fan_A1: 1867 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
fan: Fan is OK. mon1,Fan_A2: 1867 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
* fan: ::MAJOR:: 3000000000000001 -- Server Fan Failure
fan: Fan RPM is too low, mon1,Fan_B1: 0 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
* fan: ::MAJOR:: 3000000000000001 -- Server Fan Failure
fan: Fan RPM is too low, mon1,Fan_B2: 0 RPM (min = 1398 RPM), CHIP: lm93-i2c-0-2e
Return string: "One or more fans failed status check."
```

- b. Use the **syscheck** output and Table 4-2 to determine the location of the fan assembly that contains the failed fan. For example in the sample **syscheck** output above, the fans labeled as **Fan_B1** and **Fan_B2** are shown as failed; therefore, the right rear fan assembly needs to be replaced.

Table 4-2. Mapping Fan Assembly Name to Location

Fan Assembly Name Used by syscheck	Fan Assembly Location
A	Right front fan assembly
B	Right rear fan assembly
C	Left fan assembly

- c. Replace the indicated fan tray (using the procedure for replacing a fan assembly in the *Tekelec 1100 Application Server Hardware Manual*) and proceed to step 3.
-
3. Run **syscheck** (see “Running the System Health Check” on page A-6).
- If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.
-
4. If the problem has not been resolved, contact the Customer Care Center (see page 1-10)).
-

3000000000000002 - Server Internal Disk Error

This alarm indicates the server is experiencing issues replicating data to one or more of its mirrored disk drives. This could indicate that one of the server’s disks has either failed or is approaching failure.

Procedure 4-4. Recovery from Server Internal Disk Error

1. Run **syscheck** in Verbose mode (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).

2. Call Customer Care Center and provide the system health check output. See page 1-10.

3000000000000008 - Server Platform Error

This alarm indicates a major-class platform error such as a corrupt system configuration or missing files, or indicates that **syscheck** itself is corrupt.

Procedure 4-5. Recovery from Server Platform Error

1. Run **syscheck** in Verbose mode (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).

2. Call Customer Care Center and provide the system health check output. See page 1-10.

3000000000000010 - Server File System Error

This alarm indicates that **syscheck** was unsuccessful in writing to at least one of the server’s file systems.

Procedure 4-6. Recovery from Server File System Error

1. Call Customer Care Center for assistance. See page 1-10.

3000000000000020 - Server Platform Process Error

This alarm indicates that either the minimum number of instances for a required process are not currently running or too many instances of a required process are running.

Procedure 4-7. Recovery from Server Platform Process Error

1. Contact Customer Care Center for recovery procedures (see page 1-10).
-

3000000000000080 - Server Swap Space Shortage Failure

This alarm indicates that the server's swap space is in danger of being depleted. This is usually caused by a process that has allocated a very large amount of memory over time.

NOTE: In order for this alarm to clear, the underlying failure condition must be consistently undetected for a number of polling intervals. Therefore, the alarm may continue to be reported for several minutes after corrective actions are completed.

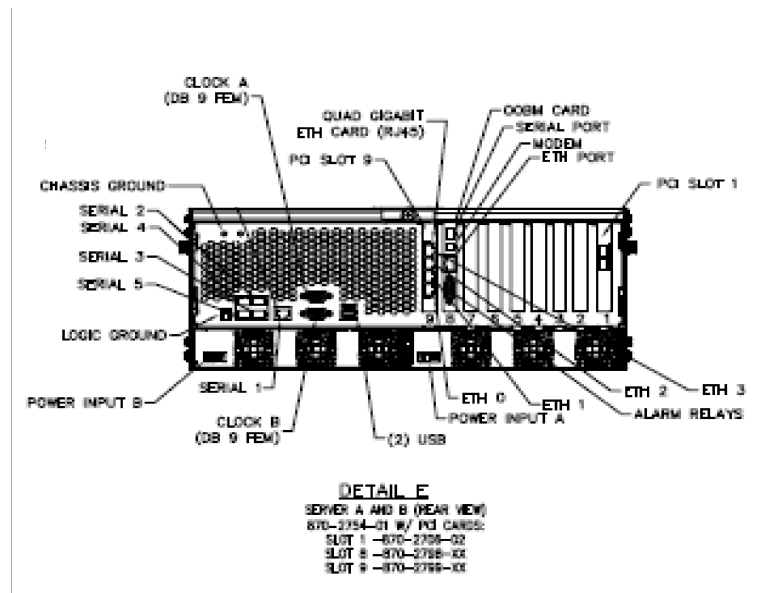
Procedure 4-8. Recovery from Server Swap Space Shortage Failure

1. Call Customer Care Center for assistance (see page 1-10).
-

3000000000000100 - Server Provisioning Network Error

This alarm indicates that the connection between the server's **eth0** interface and the customer network is not functioning properly. The **eth0** interface is at the bottom of the Quad gigabit Eth Card in PCI slot 9, as shown in Figure 4-1.

NOTE: The interface identified as **eth0** on the hardware is identified as **eth91** by the software (in `syscheck` output, for example).

Figure 4-1. T1100 MPS Server Rear View

Procedure 4-9. Recovery from Server Provisioning Network Error

1. Perform the following substeps to verify that the network configuration is set set:

- a. Log in as elapconfig on the MPS console. Enter option 1, Display Configuration, from the ELAP Configuration Menu.

```

/-----ELAP Configuration Menu-----\
/-----\
| 1 | Display Configuration              |
|-----|
| 2 | Configure Network Interfaces Menu |
|-----|
| 3 | Set Time Zone                     |
|-----|
| 4 | Exchange Secure Shell Keys        |
|-----|
| 5 | Change Password                   |
|-----|
| 6 | Platform Menu                     |
|-----|
| 7 | Configure NTP Server               |
|-----|
| e | Exit                              |
\-----/
Enter Choice: 1

```

Output similar to the following displays. The network configuration information related to the provisioning network is highlighted in bold..

```
MPS Side A:  hostname: bahamas-a  hostid: a8c0ca3d
              Platform Version: 2.0.2-4.0.0_50.26.0
              Software Version: ELAP 1.0.1-4.0.0_50.31.0
              Wed Sep  7 15:05:55 EDT 2005
```

```
ELAP A Provisioning Network IP Address = 192.168.61.202
ELAP B Provisioning Network IP Address = 192.168.61.203
Provisioning Network Netmask         = 255.255.255.0
Provisioning Network Default Router   = 192.168.61.250
ELAP A Backup Prov Network IP Address  = Not configured
ELAP B Backup Prov Network IP Address  = Not configured
Backup Prov Network Netmask            = Not configured
Backup Prov Network Default Router     = Not configured
ELAP A Sync Network Address            = 192.168.2.100
ELAP B Sync Network Address            = 192.168.2.200
ELAP A Main DSM Network Address        = 192.168.120.100
ELAP B Main DSM Network Address        = 192.168.120.200
ELAP A Backup DSM Network Address      = 192.168.121.100
ELAP B Backup DSM Network Address      = 192.168.121.200
ELAP A HTTP Port                       = 80
ELAP B HTTP Port                       = 80
ELAP A HTTP SuExec Port                = 8001
ELAP B HTTP SuExec Port                = 8001
ELAP A Banner Connection Port          = 8473
ELAP B Banner Connection Port          = 8473
ELAP A Static NAT Address               = Not configured
ELAP B Static NAT Address               = Not configured
ELAP A LSMS Connection Port            = 7483
ELAP B LSMS Connection Port            = 7483
ELAP A EBDA Connection Port            = 1030
ELAP B EBDA Connection Port            = 1030
Time Zone                              = America/New_York
```

Press return to continue...

- b. Verify that the provisioning network IP address, netmask, and network default router IP address for the server reporting this alarm are correct. If configuration changes need to be made, refer to the *ELAP Administration Manual*.
-
2. Verify that a customer-supplied cable labeled **TO CUSTOMER NETWORK** is securely connected to the lower port of the quad-port card in PCI slot 9 (the port is labeled **eth0** in Figure 4-1). Follow the cable to its connection point on the local network and verify this connection is also secure.
-
3. Test the customer-supplied cable labeled **TO CUSTOMER NETWORK** with an Ethernet Line Tester. If the cable does not test positive, replace it.
-
4. Have your network administrator verify that the network is functioning properly.
-

5. If no other nodes on the local network are experiencing problems and the fault has been isolated to the server or the network administrator is unable to determine the exact origin of the problem, contact Customer Care Center for assistance. See page 1-10.
-

3000000000000200 - Server Eagle Network A Error

NOTE: If all three alarms, 3000000000000200-Server Eagle Network A Error, 3000000000000400-Server Eagle Network B Error, and 3000000000000800-Server Sync Network Error exist, the mate server is probably down.

This alarm indicates that there is an error in the Main DSM network, which connects to the DSM A ports. The error may be due to one or more of the following conditions:

- One or both of the servers is not operational
- One or both of the hubs is not powered on
- The link between the hubs is not working
- The connection between MPS server A and MPS server B is not working

To view the connections between the servers and the hubs of the DSM networks (both main and backup), refer to the ELAP [Interconnect.pdf](#).

- The **eth1** interface is second port from the bottom of the quad-port card in PCI slot 9 on the server.
- Port 2 of hub 1 connects to the **eth1** interface on Server B.
- Port 2 of hub 2 connects to the **eth1** interface on Server A.

NOTE: The interface identified as eth1 on the hardware is identified as eth92 by the software (in syscheck output, for example).

- Ports 4 through 16 on hubs 1 and 2 connect to the Main DSM ports (DSM A ports) on the EAGLE 5 ISS.

Procedure 4-10. Recovery from Server Eagle Network A Error

1. Perform the following:
 - a. Verify that both servers are powered on by ensuring that the **POWER** LEDs on both servers are illuminated green.
 - b. Verify that the hub is powered on.
 - c. Verify that the hub does not have any fault lights on.
 2. Perform the following substeps to verify that the network configuration is set set:
-

- a. Log in as elapconfig on the MPS console. Enter option 1, Display Configuration, from the ELAP Configuration Menu.

```

/-----ELAP Configuration Menu-----\
/-----\
| 1 | Display Configuration |
|---|-----|
| 2 | Configure Network Interfaces Menu |
|---|-----|
| 3 | Set Time Zone |
|---|-----|
| 4 | Exchange Secure Shell Keys |
|---|-----|
| 5 | Change Password |
|---|-----|
| 6 | Platform Menu |
|---|-----|
| 7 | Configure NTP Server |
|---|-----|
| e | Exit |
\-----/
Enter Choice: 1

```

Output similar to the following displays. The network configuration information related to the EAGLE Network A (the Main DSM network) is highlighted in bold..

```

MPS Side A:  hostname: bahamas-a  hostid: a8c0ca3d
              Platform Version: 2.0.2-4.0.0_50.26.0
              Software Version: ELAP 1.0.1-4.0.0_50.31.0
              Wed Sep  7 15:05:55 EDT 2005

```

```

ELAP A Provisioning Network IP Address = 192.168.61.202
ELAP B Provisioning Network IP Address = 192.168.61.203
Provisioning Network Netmask           = 255.255.255.0
Provisioning Network Default Router    = 192.168.61.250
ELAP A Backup Prov Network IP Address = Not configured
ELAP B Backup Prov Network IP Address = Not configured
Backup Prov Network Netmask            = Not configured
Backup Prov Network Default Router     = Not configured
ELAP A Sync Network Address            = 192.168.2.100
ELAP B Sync Network Address            = 192.168.2.200
ELAP A Main DSM Network Address      = 192.168.120.100
ELAP B Main DSM Network Address      = 192.168.120.200
ELAP A Backup DSM Network Address      = 192.168.121.100
ELAP B Backup DSM Network Address      = 192.168.121.200
ELAP A HTTP Port                       = 80
ELAP B HTTP Port                       = 80
ELAP A HTTP SuExec Port                = 8001
ELAP B HTTP SuExec Port                = 8001
ELAP A Banner Connection Port          = 8473
ELAP B Banner Connection Port          = 8473
ELAP A Static NAT Address               = Not configured
ELAP B Static NAT Address               = Not configured
ELAP A LSMS Connection Port            = 7483
ELAP B LSMS Connection Port            = 7483
ELAP A EBDA Connection Port            = 1030

```

```
ELAP B EBDA Connection Port      = 1030
Time Zone                        = America/New_York
```

Press return to continue...

- b.** Verify that the Main DSM Network IP address for the server reporting this alarm is correct. If configuration changes need to be made, refer to the *ELAP Administration Manual*.
-

- 3.** Check the cable labeled from **HUB-X PORT 2 TO SERVER Y SLOT 9 ETH1** (where X is 2 and Y is A or X is 1 and Y is B, depending on whether server A or server B is reporting this alarm), as follows:
 - Verify that the cable is securely connected to the **eth1** port (second port from the bottom of the quad-port card in PCI slot 9) on the server that is reporting the error.
 - Follow the cable to the hub and verify that it is securely connected at port 2 on the hub.

- 4.** Verify that the cable connecting the hubs is securely connected at both hubs. This cable is labeled **FROM HUB 3 PORT 1 TO HUB 4 PORT 1X**.

- 5.** Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.

- 6.** Verify that the cable going from **eth1** on the server reporting the error to the hub tests positive with an Ethernet Line Tester and replace any faulty cables.

- 7.** If the problem persists, contact Customer Care Center for assistance. See page 1-10.

3000000000000400 - Server Eagle Network B Error

NOTE: If all three alarms, 3000000000000200-Server Eagle Network A Error, 3000000000000400-Server Eagle Network B Error, and 3000000000000800-Server Sync Network Error exist, the mate server is probably down.

This alarm indicates that there is an error in the Backup DSM network, which connects to the DSM B ports. The error may be due to one or more of the following conditions:

- One or both of the servers is not operational
- One or both of the hubs is not powered on

- The link between the hubs is not working
- The connection between MPS server A and MPS server B is not working

To view the connections between the servers and the hubs of the DSM networks (both main and backup), refer to the ELAP [Interconnect.pdf](#).

- The **eth2** interface is second port from the top of the quad-port card in PCI slot 9 on the server.
- Port 2 of hub 3 connects to the **eth2** interface on Server B.
- Port 2 of hub 4 connects to the **eth2** interface on Server A.

NOTE: The interface identified as eth2 on the hardware is identified as eth93 by the software (in syscheck output, for example).

- Ports 4 through 16 on hubs 3 and 4 connect to the Backup DSM ports (DSM B ports) on the EAGLE 5 ISS.

Procedure 4-11. Recovery from Server Eagle Network B Error

1. Perform the following:
 - a. Verify that both servers are powered on by ensuring that the **POWER** LEDs on both servers are illuminated green.
 - b. Verify that the hub is powered on.
 - c. Verify that the hub does not have any fault lights on.
2. Perform the following substeps to verify that the network configuration is set properly:
 - a. Log in as elapconfig on the MPS console. Enter option 1, Display Configuration, from the ELAP Configuration Menu.

```

/-----ELAP Configuration Menu-----\
/-----\
|  1  | Display Configuration           |
|-----|-----|
|  2  | Configure Network Interfaces Menu |
|-----|-----|
|  3  | Set Time Zone                   |
|-----|-----|
|  4  | Exchange Secure Shell Keys       |
|-----|-----|
|  5  | Change Password                 |
|-----|-----|
|  6  | Platform Menu                   |
|-----|-----|
|  7  | Configure NTP Server             |
|-----|-----|
|  e  | Exit                             |
\-----/
Enter Choice: 1

```

Output similar to the following displays. The network configuration information related to the EAGLE Network B (the Backup DSM network) is highlighted in bold..

```
MPS Side A:  hostname: bahamas-a  hostid: a8c0ca3d
              Platform Version: 2.0.2-4.0.0_50.26.0
              Software Version: ELAP 1.0.1-4.0.0_50.31.0
              Wed Sep  7 15:05:55 EDT 2005

ELAP A Provisioning Network IP Address = 192.168.61.202
ELAP B Provisioning Network IP Address = 192.168.61.203
Provisioning Network Netmask           = 255.255.255.0
Provisioning Network Default Router    = 192.168.61.250
ELAP A Backup Prov Network IP Address  = Not configured
ELAP B Backup Prov Network IP Address  = Not configured
Backup Prov Network Netmask            = Not configured
Backup Prov Network Default Router     = Not configured
ELAP A Sync Network Address            = 192.168.2.100
ELAP B Sync Network Address            = 192.168.2.200
ELAP A Main DSM Network Address        = 192.168.120.100
ELAP B Main DSM Network Address        = 192.168.120.200
ELAP A Backup DSM Network Address    = 192.168.121.100
ELAP B Backup DSM Network Address    = 192.168.121.200
ELAP A HTTP Port                       = 80
ELAP B HTTP Port                       = 80
ELAP A HTTP SuExec Port                = 8001
ELAP B HTTP SuExec Port                = 8001
ELAP A Banner Connection Port          = 8473
ELAP B Banner Connection Port          = 8473
ELAP A Static NAT Address              = Not configured
ELAP B Static NAT Address              = Not configured
ELAP A LSMS Connection Port            = 7483
ELAP B LSMS Connection Port            = 7483
ELAP A EBDA Connection Port            = 1030
ELAP B EBDA Connection Port            = 1030
Time Zone                              = America/New_York
```

Press return to continue...

- b.** Verify that the Backup DSM Network IP address for the server reporting this alarm is correct. If configuration changes need to be made, refer to the *ELAP Administration Manual*.

- 3.** Check the cable labeled from **HUB-X PORT 2 TO SERVER Y SLOT 9 ETH2** (where X is **4** and Y is **A** or X is **3** and Y is **B**, depending on whether server A or server B is reporting this alarm), as follows:
 - Verify that the cable is securely connected to the **eth2** port (third port from the bottom of the quad-port card in PCI slot 9) on the server that is reporting the error.
 - Follow the cable to the hub and verify that it is securely connected at port 2 on the hub.

4. Verify that the cable connecting the hubs is securely connected at both hubs. This cable is labeled **FROM HUB 3 PORT 1 TO HUB 4 PORT 1X**.

5. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.

6. Verify that the cable going from **eth2** on the server to the hub tests positive with an Ethernet Line Tester and replace any faulty cables.

7. If the problem persists, contact Customer Care Center for assistance. See page 1-10.

3000000000000800 - Server Sync Network Error

NOTE: If all three alarms, 3000000000000200-Server Eagle Network A Error, 3000000000000400-Server Eagle Network B Error, and 3000000000000800-Server Sync Network Error exist, the mate server is probably down.

This alarm indicates that the **eth3** connection between the two servers is not functioning properly. This is the network over which the servers synchronize data with one another. The **eth3** interface is the upper port of PCI 9 on the server.

NOTE: The interface identified as eth3 on the hardware is identified as eth94 by the software (in syscheck output, for example).

A direct connection is made between the two servers (no hub is used in this connection). A straight-through Ethernet cable must be used for this connection (all pairs are required).

Procedure 4-12. Recovery from Server Sync Network Error

1. Verify that both servers are booted up by ensuring that the **POWER** LEDs on both servers are illuminated green.

2. Perform the following substeps to verify that the network configuration is set properly:
 - a. Log in as **elapconfig** on the MPS console. Enter option 1, Display Configuration, from the ELAP Configuration Menu.

```

/-----ELAP Configuration Menu-----\
/-----\
|  1 | Display Configuration             |
|----|-----|
|  2 | Configure Network Interfaces Menu |

```

3	Set Time Zone
4	Exchange Secure Shell Keys
5	Change Password
6	Platform Menu
7	Configure NTP Server
e	Exit

Enter Choice: 1

Output similar to the following displays. The network configuration information related to the Sync Network is highlighted in bold..

```

MPS Side A:  hostname: bahamas-a  hostid: a8c0ca3d
              Platform Version: 2.0.2-4.0.0_50.26.0
              Software Version: ELAP 1.0.1-4.0.0_50.31.0
              Wed Sep  7 15:05:55 EDT 2005

ELAP A Provisioning Network IP Address = 192.168.61.202
ELAP B Provisioning Network IP Address = 192.168.61.203
Provisioning Network Netmask           = 255.255.255.0
Provisioning Network Default Router    = 192.168.61.250
ELAP A Backup Prov Network IP Address  = Not configured
ELAP B Backup Prov Network IP Address  = Not configured
Backup Prov Network Netmask            = Not configured
Backup Prov Network Default Router     = Not configured
ELAP A Sync Network Address           = 192.168.2.100
ELAP B Sync Network Address           = 192.168.2.200
ELAP A Main DSM Network Address        = 192.168.120.100
ELAP B Main DSM Network Address        = 192.168.120.200
ELAP A Backup DSM Network Address      = 192.168.121.100
ELAP B Backup DSM Network Address      = 192.168.121.200
ELAP A HTTP Port                       = 80
ELAP B HTTP Port                       = 80
ELAP A HTTP SuExec Port                = 8001
ELAP B HTTP SuExec Port                = 8001
ELAP A Banner Connection Port          = 8473
ELAP B Banner Connection Port          = 8473
ELAP A Static NAT Address              = Not configured
ELAP B Static NAT Address              = Not configured
ELAP A LSMS Connection Port            = 7483
ELAP B LSMS Connection Port            = 7483
ELAP A EBDA Connection Port            = 1030
ELAP B EBDA Connection Port            = 1030
Time Zone                             = America/New_York

```

Press return to continue...

- b.** Verify that the Sync Network IP address for the server reporting this alarm is correct. If configuration changes need to be made, refer to the *ELAP Administration Manual*.

3. Verify that the cable labeled **FROM SERVER A SLOT 9 ETH3 TO SERVER B SLOT 9 ETH 3** is securely connected to the **eth3** port (upper port of the quad-port card in PCI slot 9) on both Server A and Server B.

4. Test this cable with an Ethernet Line Tester that is set to test a straight-through cable. If the cable does not test positive, replace it.

5. If the problem persists, contact Customer Care Center for assistance. See page 1-10.

3000000000001000 - Server Disk Space Shortage Error

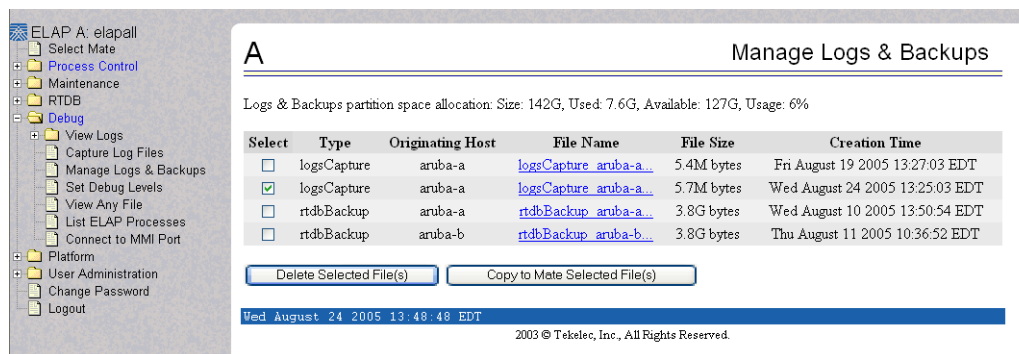
This alarm indicates that one of the following conditions has occurred:

- A filesystem has exceeded a failure threshold, which means that more than 90% of the available disk storage has been used on the filesystem.
- More than 90% of the total number of available files have been allocated on the filesystem.
- A filesystem has a different number of blocks than it had at install.

Procedure 4-13. Recovery from Server Disk Space Shortage Error

1. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7). Examine the syscheck output to determine if the filesystem `/var/TKLC/elap/free` is the one that is low on space, if so, continue to the next step, otherwise skip to step 3.

2. You may be able to free up space on the free partition by deleting unnecessary files. Do the following:
 - a. Log in to the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
 - b. Select **Debug>Manage Logs & Backups**. A screen similar to Figure 4-11 displays. This screen displays the information about the total amount of space allocated for, and the amount of space currently used by, logs and backups, and it lists logs and backup files that you might choose to delete, freeing up additional disk space.

Figure 4-2. Manage Logs and Backups

- c. Click the checkbox of each file that you want to delete and then click **Delete Selected File(s)**.

3. Contact Customer Care Center for assistance. See page 1-10..

3000000000002000 - Server Default Route Network Error

This alarm indicates that the server's default network route is experiencing a problem. Running syscheck in verbose mode will provide information about which type of problem.

Procedure 4-14. Recovery from Server Default Route Network Error



CAUTION: When changing the server's network routing configuration it is important to verify that the modifications will not impact the method of connectivity for the current login session. It is also crucial that this information not be entered incorrectly or set to improper values. Incorrectly modifying the server's routing configuration may result in total loss of remote network access.

1. Run **syscheck** in verbose mode. The output should indicate one of the following errors:

- The default router at <IP_address> cannot be pinged.

This error indicates that the router may be down or unreachable. When the **syscheck** verbose output returns this error, go to step 2.

- The default route is not on the provisioning network.

This error indicates that the default route has been defined in the wrong network. When the **syscheck** verbose output returns this error, go to step 3.

- An active route cannot be found for a configured default route.

This error indicates that a mismatch exists between the active configuration and the stored configuration. When the **syscheck** verbose output returns this error, go to step 4.

NOTE: If the verbose output does not indicate one of the errors above, contact Customer Care Center (see page 1-10) for further assistance. Make the syscheck output available to them.

2. Perform the following substeps when **syscheck verbose output indicates:**

The default router at <IP_address> cannot be pinged

- Verify the network cables are firmly attached to the server and the network switch, router, hub, etc.
 - Verify that the configured router is functioning properly. Check with the network administrator to verify the router is powered on and routing traffic as required.
 - Check with the router administrator to verify that the router is configured to reply to pings on that interface.
 - Rerun **syscheck**.
 - If the alarm has been cleared, the problem is solved.
 - If the alarm has not been cleared, contact Customer Care Center (see page 1-10) for further assistance. Make the **syscheck** output available to them.
 - Go to step 5.
-

3. Perform the following substeps when **syscheck verbose output indicates:**

The default route is not on the provisioning network

- Obtain the proper Provisioning Network netmask and the IP address of the appropriate Default Route on the provisioning network. These are maintained by the customer network administrators.
- Log in to the MPS with username **elapconfig** (see Procedure A-5, “Accessing the ELAP Text-Based User Interface,” on page A-6). The server designation at this site is displayed as well as **hostname**, **hostid**, **Platform Version**, **Software Version**, and the date. Ensure that the side displayed is the MPS that is reporting the problem. In this example, it is MPS A. Enter option 2, Configure Network Interfaces Menu, from the ELAP Configuration Menu.

```
MPS Side A:  hostname: mpsa-d1a8f8  hostid: 80d1a8f8
              Platform Version: x.x.x-x.x.x
              Software Version: ELAP x.x.x-x.x.x
              Wed Jul 17 09:51:47 EST 2005
```

```

/-----ELAP Configuration Menu-----\
|-----|
| 1 | Display Configuration |
|-----|
| 2 | Configure Network Interfaces Menu |
|-----|
| 3 | Set Time Zone |
|-----|
| 4 | Exchange Secure Shell Keys |
|-----|
| 5 | Change Password |
|-----|
| 6 | Platform Menu |
|-----|
| 7 | Configure NTP Server |
|-----|
| e | Exit |
|-----|
\-----/

Enter Choice: 2

```

- c.** Enter option **1**, Configure Provisioning Network from the Configure Network Interfaces Menu. This displays the submenu for configuring communications networks and other information.

```

/-----Configure Network Interfaces Menu-----\
|-----|
| 1 | Configure Provisioning Network |
|-----|
| 2 | Configure Sync Network |
|-----|
| 3 | Configure DSM Network |
|-----|
| 4 | Configure Backup Provisioning Network |
|-----|
| 5 | Configure Forwarded Ports |
|-----|
| 6 | Configure Static NAT Addresses |
|-----|
| e | Exit |
|-----|
\-----/

```

Enter choice: 1

- d.** The following warning appears; type **Y** and press Enter:

```
ELAP software is running. Stop it? [N] Y
```

- e.** If the LSMS Connection has not been previously disabled, the following prompt appears; type **Y** and press Enter:

```
The LSMS Connection is currently enabled. Do you want to disable
it? [Y] Y
```

- f.** The following confirmation appears:

```
The LSMS Connection has been disabled.
```

- g.** The ELAP A provisioning network IP address displays:

```
Verifying connectivity with mate ...
```

Enter the ELAP A provisioning network IP Address [192.168.61.90]:

- h.** Press Enter after each address is displayed until the Default Route address displays:

Verifying connectivity with mate ...

Enter the ELAP A provisioning network IP Address [192.168.61.90]:

Enter the ELAP B provisioning network IP Address [192.168.61.91]:

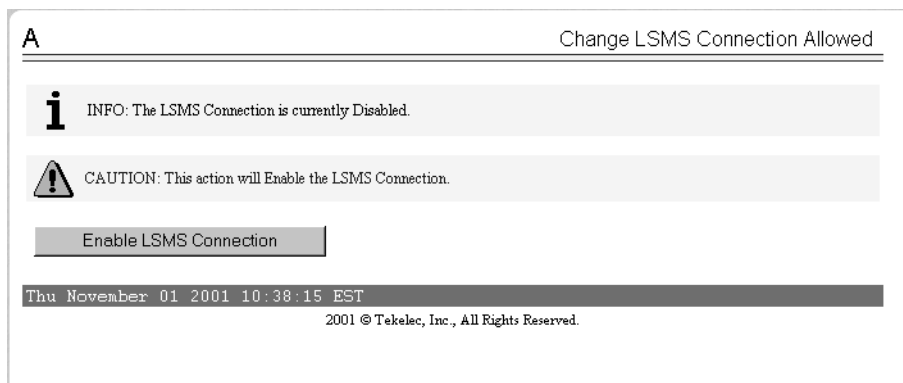
Enter the ELAP provisioning network netmask [255.255.255.0]:

Enter the ELAP provisioning network default router IP Address:

192.168.61.250

- i.** If the default router IP address is incorrect, type the correct address, and press Enter.
- j.** After you have verified or corrected the Provisioning Network configuration information, enter **e** to return to the Configure Network Interfaces Menu.
- k.** Enter **e** again to return to the ELAP Configuration Menu.
- l.** Rerun **syscheck**.
- If the alarm has not been cleared, contact Customer Care Center (see page 1-10) for further assistance. Make the **syscheck** output available to them. Go to step 5.
 - If the alarm has been cleared, the problem is solved, and you can restart the ELAP software and enable the connection to the LSMS as described in the following substeps.
- m.** Restart the ELAP software (see Procedure A-9, “Restarting the ELAP Software,” on page A-12).
- n.** Select **Maintenance>LSMS Connection>Change Allowed**: a window similar to the example shown in Figure 4-3 displays.

Figure 4-3. Enable LSMS Connection Window



- o.** Click the Enable LSMS Connection button. When the connection has been enabled, the workspace displays the information shown in Figure 4-4.

Figure 4-4. LSMS Connection Enabled

p. Go to step 5.

- 4.** Perform the following substeps to reboot the server if the **syscheck** output indicates the following error:

An active route cannot be found for a configured default route, . .

- a.** Log in as **elapconfig** on the MPS console. Enter option **6**, Platform Menu, from the ELAP Configuration Menu.

```

/-----ELAP Configuration Menu-----\
/-----\
| 1 | Display Configuration |
|---|-----|
| 2 | Configure Network Interfaces Menu |
|---|-----|
| 3 | Set Time Zone |
|---|-----|
| 4 | Exchange Secure Shell Keys |
|---|-----|
| 5 | Change Password |
|---|-----|
| 6 | Platform Menu |
|---|-----|
| 7 | Configure NTP Server |
|---|-----|
| e | Exit |
\-----/

Enter Choice: 6

```

- b.** Enter option **3**, Reboot MPS, from the ELAP Platform Menu. At the prompt, enter the identification of the MPS you are logged into (**A** or **B**); in this example, **A** is used.

```

/-----ELAP Platform Menu-----\
/-----\
| 1 | Initiate Upgrade |
|---|-----|
| 2 | Eject CD |
|---|-----|
| 3 | Reboot MPS |
|---|-----|
| 4 | Halt MPS |
|---|-----|
| 5 | MySQL Backup |
|---|-----|

```

```

|----|-----|
|  6 | RTDB Backup |
|----|-----|
|  e | Exit         |
|----|-----|
\-----/

```

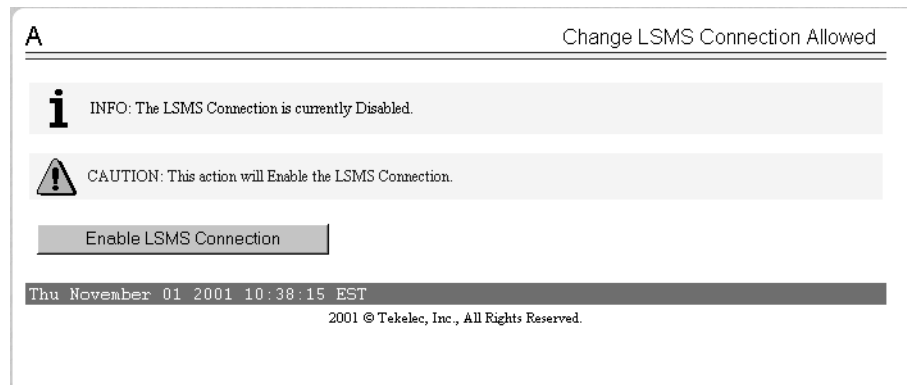
Enter Choice: 3

Reboot MPS A, MPS B or BOTH? [BOTH]: A

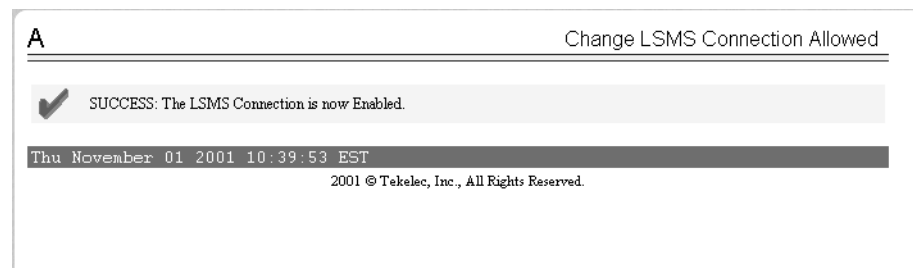
Reboot local MPS...

- c. Wait for the reboot to complete.
- d. Rerun **syscheck**.
 - If the alarm has not been cleared, contact Customer Care Center (see page 1-10) for further assistance. Make the **syscheck** output available to them. Go to step 5.
 - If the alarm has been cleared, the problem is solved, and you can restart the ELAP software and enable the connection to the LSMS as described in the following substeps.
- e. Restart the ELAP software (see Procedure A-9, “Restarting the ELAP Software,” on page A-12).
- f. Select **Maintenance>LSMS Connection>Change Allowed**: a window similar to the example shown in Figure 4-5 displays.

Figure 4-5. Enable LSMS Connection Window



- g. Click the Enable LSMS Connection button. When the connection has been enabled, the workspace displays the information shown in Figure 4-6.

Figure 4-6. LSMS Connection Enabled

h. Go to step 5.

5. You have now completed this procedure.

3000000000004000 - Server Temperature Error

The internal temperature within the server is unacceptably high.

Procedure 4-15. Recovery from Server Temperature Error

1. Ensure that nothing is blocking the fan's intake (see Figure 4-7 on page 4-25). Remove any blockage.

Figure 4-7. Server Fans

2. Verify that the temperature in the room is normal (see Table 4-3). If it is too hot, lower the temperature in the room to an acceptable level.

Table 4-3. Server Environmental Conditions

Ambient Temperature	Operating: 5 degrees C to 40 degrees C Exceptional Operating Limit: 0 degrees C to 50 degrees C Storage: -20 degrees C to 60 degrees C
Relative Humidity	Operating: 5% to 85% non-condensing Storage: 5% to 95% non-condensing
Elevation	Operating: -300m to +300m Storage: -300m to +1200m
Heating, Ventilation, and Air Conditioning	Capacity must compensate for up to 5100 BTUs/hr for each installed frame. Calculate HVAC capacity as follows: Determine the wattage of the installed equipment. Use the formula: watts x 3.143 = BTUs/hr

NOTE: Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. The alarm may take up to five minutes to clear after conditions improve. It may take about ten minutes after the room returns to an acceptable temperature before syscheck shows the alarm cleared.

-
3. Run **syscheck** (see Procedure A-6, "Running System Health Check from the ELAP GUI," on page A-7).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.
-

4. Replace the filter (refer to the *T1100 Applications Server Hardware Manual*).

NOTE: Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. The alarm may take up to five minutes to clear after conditions improve. It may take about ten minutes after the filter is replaced before syscheck shows the alarm cleared.

-
5. Run **syscheck** (see Procedure A-6, "Running System Health Check from the ELAP GUI," on page A-7).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.
-

6. If the problem has not been resolved, contact Customer Care Center for assistance. See page 1-10.
-

3000000000008000 - Server Mainboard Voltage Error

This alarm indicates that one or more of the monitored voltages on the server mainboard have been detected to be out of the normal expected operating range.

Procedure 4-16. Recovery from Server Mainboard Voltage Error

1. Contact Customer Care Center for assistance. See page 1-10..
-

3000000000010000 - Server Power Feed Unavailable

This alarm indicates that one of the power feeds to the server has failed.

If this alarm occurs in conjunction with any Breaker Panel alarm, there might be a problem with the breaker panel. Refer to the Breaker Panel alarm procedures (30000000001000000, 30000000002000000, and 30000000004000000).

Procedure 4-17. Recovery from Server Power Feed Unavailable

1. Verify that all the server power feed cables to the server that is reporting the error are securely connected. (To determine where the cables should connect to the servers, see the Power Connections and Cables page of the ELAP [Interconnect.pdf](#).)
 2. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.
 3. Follow the power feed to its connection on the power source. Ensure that the power source is ON and that the power feed is properly secured.
 4. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.
 5. If the power source is functioning properly and the wires are all secure, have an electrician check the voltage on the power feed.
-

6. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.

7. If the problem has not been resolved, contact Customer Care Center for assistance. See page 1-10.

3000000000020000 - Server Disk Health Test Error

Either the hard drive has failed or failure is imminent.

Procedure 4-18. Recovery from Server Disk Health Test Error

1. Immediately contact the Customer Care Center for assistance to arrange for disk replacement. See page 1-10.
-

3000000000040000 - Server Disk Unavailable Error

The **smartd** service is not able to read the disk status because the disk has other problems that are reported by other alarms. This alarm appears only while a server is booting.

Procedure 4-19. Recovery from Server Disk Unavailable Error

1. Perform the recovery procedures for the other alarms that accompany this alarm.
-

3000000000020000 - Correctable ECC Memory Error

This alarm indicates that chipset has detected a correctable (single-bit) memory error that has been corrected by the ECC (Error-Correcting Code) circuitry in the memory.

Procedure 4-20. Recovery from Correctable ECC Memory Error

1. No recovery necessary. If the condition persists, contact the Customer Care Center (see page 1-10) to request hardware replacement.
-

3000000000400000 - Server Power Supply 1 Error

This alarm indicates that power supply 1 (feed A) has failed.

Procedure 4-21. Recovery from Server Power Supply 1 Error

1. Verify that nothing is obstructing the airflow to the fans of the power supply.
 2. Run **syscheck** in Verbose mode (see “Running the System Health Check” on page A-6). The output will provide details about what is wrong with the power supply.
 3. Contact the Customer Care Center (see page 1-10) and provide them the **syscheck** verbose output. Power supply 1 (feed A) will probably need to be replaced.
-

3000000000800000 - Server Power Supply 2 Error

This alarm indicates that power supply 2 (feed B) has failed.

Procedure 4-22. Recovery from Server Power Supply 2 Error

1. Verify that nothing is obstructing the airflow to the fans of the power supply.
 2. Run **syscheck** in Verbose mode (see “Running the System Health Check” on page A-6). The output will provide details about what is wrong with the power supply.
 3. Contact the Customer Care Center (see page 1-10) and provide them the **syscheck** verbose output. Power supply 2 (feed B) will probably need to be replaced.
-

3000000001000000 - Breaker Panel Feed Error

This alarm indicates that the server is not receiving information from the breaker panel relays.

Procedure 4-23. Recovery from Breaker Panel Feed Error

1. Verify that the same alarm is displayed by both servers (the single breaker panel normally sends alarm information to both servers):
 - If this alarm is displayed by only one server, the problem is most likely to be with the cable or the server itself. Look for other alarms that indicate a problem with the server and perform the recovery procedures for those alarms first.
 - If this alarm is displayed by both servers, go to the next step.

2. Verify that the cables that connect the servers to the breaker panel are not damaged and are securely fastened to both the Alarm Interface ports on the breaker panel and also to the serial ports on both servers. To see locations of these ports, refer to the ELAP [Interconnect.pdf](#)

3. If the problem has not been resolved, contact the Customer Care Center (see page 1-10) to request that the breaker panel be replaced (see “Breaker Panel Replacement Procedure” on page 5-5).

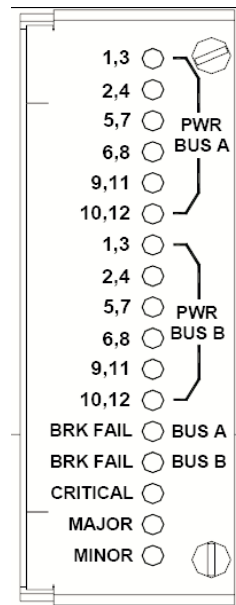
3000000002000000 - Breaker Panel Breaker Error

This alarm indicates that a power fault has been identified by the breaker panel. The LEDs on the center of the breaker panel (see Figure 4-8) identify whether the fault occurred on the input power or the output power, as follows:

- A power fault on input power (power from site source to the breaker panel) is indicated by one of the LEDs in the **PWR BUS A** or **PWR BUS B** group illuminated Red. In general, a fault in the input power means that power has been lost to the input power circuit.

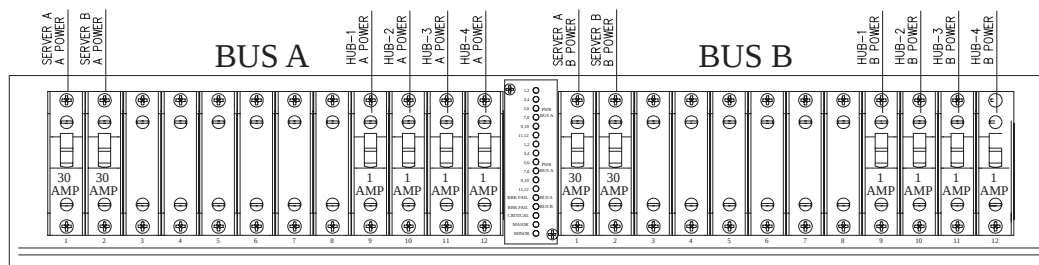
NOTE: LEDs in the PWR BUS A or PWR BUS B group that correspond to unused feeds are not illuminated; LEDs in these groups that are not illuminated do not indicate problems.

- A power fault on output power (power from the breaker panel to other frame equipment) is indicated by either **BRK FAIL BUS A** or **BRK FAIL BUS B** illuminated Red. This type of fault can be caused by a surge or some sort of power degradation or spike that causes one of the circuit breakers to trip.

Figure 4-8. Breaker Panel LEDs

Procedure 4-24. Recovery from Breaker Panel Breaker Error

1. Verify that the same alarm is displayed by both servers (the single breaker panel normally sends alarm information to both servers):
 - If this alarm is displayed by only one server, the problem is most likely to be with the cable or the server itself. Look for other alarms that indicate a problem with the server and perform the recovery procedures for those alarms first.
 - If this alarm is displayed by both servers, go to the next step.
2. Look at the breaker panel assignments in Figure 4-9. For each breaker assignment, verify that the corresponding LED in the **PWR BUS A** group and the **PWR BUS B** group is illuminated Green.

Figure 4-9. Breaker Panel Settings

If one of the LEDs in the **PWR BUS A** group or the **PWR BUS B** group is illuminated Red, a problem has been detected with the corresponding input power feed. Perform the following steps to correct this problem:

- a. Look at the ELAP [Interconnect.pdf](#). Verify that the customer provided source for the affected power feed is operational. If the power source is properly functioning, have an electrician remove the plastic cover from the rear of the breaker panel and verify the power source is indeed connected to the input power feed connector on the rear of the breaker panel. Correct any issues found.
- b. Check the LEDs in the **PWR BUS A** group and the **PWR BUS B** group again.
 - If the LEDs are now illuminated Green, the issue has been resolved. Proceed to step 4 to verify that the alarm has been cleared.
 - If the LEDs are still illuminated Red, continue to the next sub-step.
- c. Have the electrician verify the integrity of the input power feed. The input voltage should measure nominally -48VDC (that is, between -41VDC and -60VDC). If the supplied voltage is not within the acceptable range, the input power source must be repaired or replaced.

NOTE: Be sure the voltmeter is connected properly. The locations of the BAT and RTN connections are in mirror image on either side of the breaker panel.

If the measured voltage is within the acceptable range, the breaker panel may be malfunctioning. The breaker panel must be replaced; (see Procedure 5-1, “Replacing a Breaker Panel,” on page 5-5).

- d. Check the LEDs in the **PWR BUS A** group and the **PWR BUS B** group again after the necessary actions have been taken to correct any issues found.
 - If the LEDs are now illuminated Green, the issue has been resolved and proceed to step 4 to verify that the alarm has been cleared.
 - If the LEDs are still illuminated Red, skip to step 5.

3. Check the BRK FAIL LEDs for BUS A and for BUS B.

If one of the **BRK FAIL** LEDs is illuminated Red, then one or more of the respective Input Breakers has tripped. (A tripped breaker is indicated by the toggle located in the center position.) Perform the following steps to repair this issue:

- a. For all tripped breakers, move the breaker down to the open (**OFF**) position and then back up to the closed (**ON**) position.
 - b. After all the tripped breakers have been reset, check the **BRK FAIL** LEDs again. If one of the **BRK FAIL** LEDs is still illuminated Red, skip to step 5.
-

4. If all of the **BRK FAIL** LEDs and all the LEDs in the **PWR BUS A** group and the **PWR BUS B** group are illuminated Green, there is most likely a problem with the serial connection between the server and the breaker panel. This connection is used by the system health check to monitor the breaker panel for failures. Verify that both ends of the labeled serial cables are properly secured (for locations of serial cables, see the ELAP [Interconnect.pdf](#)). If any issues are discovered with these cable connections, make the necessary corrections and continue to the next step to verify that the alarm has been cleared, otherwise go to step 5.
-

5. Run **syscheck** (see “Running the System Health Check” on page A-6).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.
-

6. If the problem has not been resolved, contact the Customer Care Center (see page 1-10).
-

3000000004000000 - Breaker Panel Monitoring Error

This alarm indicates a failure in the hardware and / or software that monitors the breaker panel. This could mean there is a problem with the file I/O libraries, the serial device drivers, or the serial hardware itself.

NOTE: When this alarm occurs, the system health check is unable to monitor the breaker panel for faults. Thus, if this alarm is detected, it is imperative that the breaker panel be carefully examined for the existence of faults. The LEDs on the breaker panel will be the only indication of the occurrence of either alarm 3000000001000000-Breaker Panel Feed Error or 3000000001000000-Breaker Panel Breaker Error until the Breaker Panel Monitoring Error has been corrected.

Procedure 4-25. Recovery from Breaker Panel Monitoring Error

1. Verify that the same alarm is displayed by both servers (the single breaker panel normally sends alarm information to both servers):
 - If this alarm is displayed by only one server, the problem is most likely to be with the cable or the server itself. Look for other alarms that indicate a problem with the server and perform the recovery procedures for those alarms first.
 - If this alarm is displayed by both servers, go to the next step.

2. Verify that both ends of the labeled serial cables are secured properly (for locations of serial cables, see the ELAP [Interconnect.pdf](#)).

3. Run **syscheck** (see “Running the System Health Check” on page A-6).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue to the next step.

4. Contact the Customer Care Center (see page 1-10).

Major Application Alarms

The major application alarms involve the ELAP software, RTDBs, file system, JRS connection, and logs.

4000000000000001 - Mate ELAP Unavailable

One ELAP has reported that the other ELAP is unreachable.

Procedure 4-26. Recovery from Mate ELAP Unavailable

1. Log in to the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).

2. View the ELAP status on the banner.
 - If the mate ELAP status is DOWN, go to step 4.
 - If the mate ELAP status is ACTIVE or STANDBY, go to step 7.

3. Select the **Select Mate** menu item to change to the mate ELAP.

4. Select **Process Control>Start Software** to start the mate ELAP software.

5. View the ELAP status on the banner.
 - If the mate ELAP status is ACTIVE or STANDBY, the problem is resolved.
 - If the mate ELAP status is still DOWN, continue with the next step.

6. Select the **Select Mate** menu item to change back to the side that reported the alarm.

7. Stop and start the software on the side that is reporting the alarm (see Procedure A-9, “Restarting the ELAP Software,” on page A-12).

8. If the problem persists, run **save logs** to gather system information for further troubleshooting (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9), and contact the Customer Care Center (see page 1-10).

4000000000000002 - RTDB Mate Unavailable

The local ELAP cannot use the direct link to the Standby for RTDB database synchronization.

Procedure 4-27. Recovery from RTDB Mate Unavailable

1. Log in to the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).

2. View the ELAP status on the banner.
 - If the mate ELAP status is DOWN, go to step 4.
 - If the mate ELAP status is ACTIVE or STANDBY, go to step 7.

3. Select the **Select Mate** menu item to change to the mate ELAP.

4. Select **Process Control>Start Software** to start the mate ELAP software.

5. Determine whether the alarm has cleared by verifying whether it is still being displayed in the banner or in the Alarm View window.
 - If the alarm has cleared, the problem is resolved.
 - If the alarm has not yet cleared, continue with the next step.

6. Ensure that you are logged into the side opposite from the side reporting the alarm. If it is necessary to change sides, select the **Select Mate** menu item to change to the side opposite the side that reported the alarm.
7. Stop and start the software on the side that is reporting the alarm (see Procedure A-9, “Restarting the ELAP Software,” on page A-12).
8. Select **RTDB>View RTDB Status** to verify that the RTDB status on both sides is coherent, as shown in Figure 4-9 on page 4-9.

Figure 4-10. Coherent RTDB Status

The screenshot shows a web interface titled "View RTDB Status". It contains two main sections: "Local RTDB Status" and "Mate RTDB Status". Both sections show identical information: DB Status is "Coherent" (in green), Audit Enabled is "Yes", RTDB Level is "1", RTDB Birthday is "08/04/2005 18:52:59 GMT", Counts are "TNs=111567, NPANXXs=5476, LRNs=5014, SPs=5, MRs=38, MRGroups=3", and Reload is "None". Below these sections is a "Refresh Options" section with a text input for "View RTDB Status refresh time (seconds)" set to "0", and two buttons: "Change refresh time" and "Stop refresh". At the bottom, there is a status bar showing "Fri August 05 2005 15:10:10 EDT" and "2003 © Tekelec, Inc., All Rights Reserved."

9. If the problem persists, run **savelogs** to gather system information for further troubleshooting (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9), and contact the Customer Care Center (see page 1-10).

4000000000000004 - Congestion

The ELAP RTDB database record cache used to keep updates currently being provisioned is above 80% capacity.

Procedure 4-28. Recovery from Congestion

1. At the EAGLE 5 ISS input terminal, enter the `rept-stat-mps` command to verify the status.

Refer to the *Commands Manual* to interpret the output.

2. If the problem does not clear within 2 hours with an ELAP Available notice, capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9), and contact the Customer Care Center (see page 1-10).
-

4000000000000020 - RMTP Channels Down

Both IP multicast mechanisms are down.

Procedure 4-29. Recovery from RMTP Channels Down

1. Check the physical connections between the local MPS and the DSM cards on the EAGLE 5 ISS. Make sure the connectors are firmly seated.
-
2. Stop and restart the software on the side that is reporting the alarm (see Procedure A-9, “Restarting the ELAP Software,” on page A-12).
-
3. Capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9) and contact the Customer Care Center (see page 1-10).
-

4000000000000040 - Fatal Software Error

A major software component on the ELAP has failed.

Procedure 4-30. Recovery from Fatal Software Error

1. Perform Procedure A-9, “Restarting the ELAP Software,” on page A-12:
-
2. Capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9) and contact Customer Care Center (see page 1-10).
-

4000000000000080 - RTDB Corrupt

A real-time database is corrupt. The calculated checksum did not match the checksum value stored for one or more records.

Procedure 4-31. Recovery from RTDB Corrupt

1. Capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9) and contact the Customer Care Center (see page 1-10).
-

4000000000000100 - RTDB Inconsistent

The real-time database for one or more DSM cards is inconsistent with the current real-time database on the Active ELAP fixed disks.

Procedure 4-32. Recovery from RTDB Inconsistent

1. Capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9) and contact the Customer Care Center (see page 1-10).
-

4000000000000200 - RTDB Incoherent

This message usually indicates that the RTDB database download is in progress. When the download is complete, the following UIM message will appear:

```
0452 - RTDB reload complete
```

Procedure 4-33. Recovery from RTDB Incoherent

1. If this alarm displays while an RTDB download is in progress, no further action is necessary. If this alarm displays when an RTDB download is not in progress, capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9) and contact the Customer Care Center (see page 1-10).
-

4000000000000400 - JRS to RTDB Connection Down

A major software component on the ELAP has failed.

Procedure 4-34. Recovery from JRS to RTDB Connection Down

1. Perform Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2.
 2. Capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9).
-

4000000000000800 - Transaction Log Full

The transaction log is full.

Procedure 4-35. Recovery from Transaction Log Full

1. Contact the Customer Care Center (see page 1-10).
-

4000000000001000 - RTDB 100% Full

The RTDB on the ELAP is at capacity. The ELAP RTDB is not updating.

You may be able to free up space by deleting unnecessary data in the database. The ELAP must be upgraded in order to add disk capacity.

Procedure 4-36. Recovery from RTDB 100% Full

1. Contact the Customer Care Center for assistance. See page 1-10.
-

4000000000002000 - RTDB Resynchronization in Progress

This message indicates that the RTDB resynchronization is in progress.

Procedure 4-37. Recovery from RTDB DSM Over-Allocation

1. No further action is necessary.
-

4000000000004000 - RTDB Reload Is Required

This message indicates that the RTDB reload is required because the transaction logs did not contain enough information to resynchronize the databases (the transaction logs may be too small).



CAUTION: If both sides are reporting this error, contact the Customer Care Center (see page 1-10).

If only one side is reporting this error, use the following procedure.

Procedure 4-38. Recovery from RTDB Reload Is Required

1. Log in to the User Interface screen of the ELAP (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2)

2. Refer to the *LNP Database Synchronization Manual* for the correct procedures.

3. If the problem persists, contact the Customer Care Center (see “Customer Care Center” on page 1-10).

4000000000040000 - RTDB DSM Over-Allocation

At least one DSM card in the attached EAGLE 5 ISS has insufficient memory to provision the RTDB entry. No more provisioning will be allowed to the RTDB until this issue is resolved.

Procedure 4-39. Recovery from RTDB Over-Allocation

1. Install DSM cards in the attached EAGLE 5 ISS with sufficient memory to accommodate the expected size of the RTDB.

4000000000080000 - RTDB Maximum Depth Reached

RTDB data is stored as inverse tree structures. The trees have a maximum depth allowed. This alarm indicates that the maximum depth has been reached for a tree. If the alarm was initiated during a data update, the update will continually fail until there is manual intervention.

Procedure 4-40. RTDB Maximum Depth Reached

1. Contact the Customer Care Center (see page 1-10).
-

Minor Platform Alarms

Minor platform alarms involve disk space, application processes, RAM, and configuration errors.

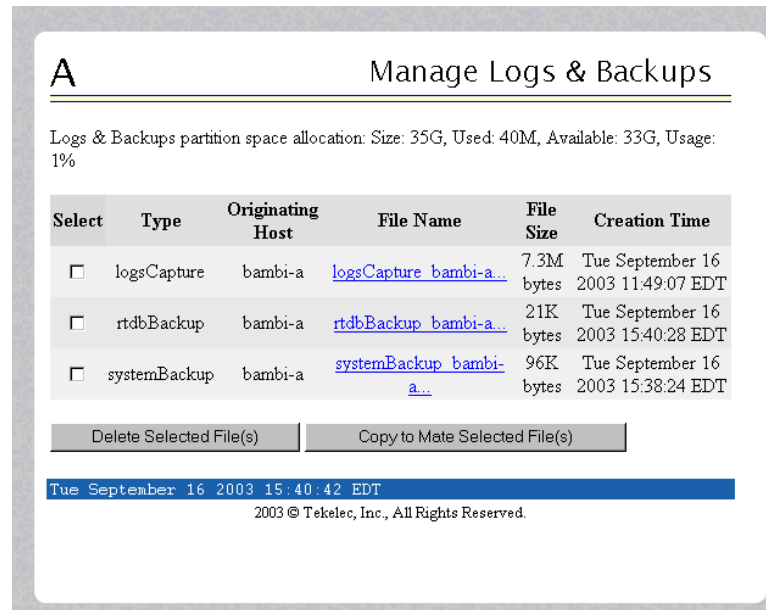
5000000000000001 - Server Disk Space Shortage Warning

This alarm indicates that one of the following conditions has occurred:

- A filesystem has exceeded a warning threshold, which means that more than 80% (but less than 90%) of the available disk storage has been used on the filesystem.
- More than 80% (but less than 90%) of the total number of available files have been allocated on the filesystem.

Procedure 4-41. Recovery from Server Disk Space Shortage Warning

1. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7). Examine the syscheck output to determine if the filesystem `/var/TKLC/elap/free` is the one that is low on space, if so, continue to the next step, otherwise skip to step 3.
2. You may be able to free up space on the free partition by deleting unnecessary files. Do the following:
 - a. Log in to the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
 - b. Select **Debug>Manage Logs & Backups**. A screen similar to Figure 4-11 displays. This screen displays the information about the total amount of space allocated for, and the amount of space currently used by, logs and backups, and it lists logs and backup files that you might choose to delete, freeing up additional disk space.

Figure 4-11. Manage Logs and Backups

- c. Click the checkbox of each file that you want to delete and then click **Delete Selected File(s)**.

3. Call the Customer Care Center for assistance (see page 1-10).

5000000000000002 - Server Application Process Error

This alarm indicates that either the minimum number of instances for a required process are not currently running or too many instances of a required process are running.

Procedure 4-42. Recovery from Server Application Process Error

1. If a Server Platform Process Error (3000000000000020) alarm is also present execute the procedure for “Recovery from Server Platform Process Error” on page 4-8 before proceeding.
2. Log in to the User Interface screen of the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
3. Check the banner information above the menu to verify that you are logged into the problem ELAP indicated in the UAM.

If it is necessary to switch to the other side, select **Select Mate**.

4. Open the Process Control folder, and select the **Stop Software** menu item.

5. Open the Process Control folder, and select the **Start Software** menu item.

6. Capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9) and contact the Customer Care Center (see page 1-10).

7. If the problem has not been resolved, call the Customer Care Center for further guidance (see page 1-10).

5000000000000004 - Server Hardware Configuration Error

This alarm indicates that one or more of the server’s hardware components are not in compliance with Tekelec specifications (refer to the *Tekelec 1100 Application Server Hardware Manual*).

Procedure 4-43. Recovery from Server Hardware Configuration Error

1. Run **syscheck** in verbose mode (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).

2. Call the Customer Care Center for assistance. See page 1-10.

5000000000000020 - Server Swap Space Shortage Warning

This alarm indicates that the swap space available on the server is less than expected. This is usually caused by a process that has allocated a very large amount of memory over time.

NOTE: In order for this alarm to clear, the underlying failure condition must be consistently undetected for a number of polling intervals. Therefore, the alarm may continue to be reported for several minutes after corrective actions are completed.

Procedure 4-44. Recovery from Server Swap Space Shortage Warning

1. Call the Customer Care Center for assistance (see page 1-10).
-

5000000000000040 - Server Default Router Not Defined

This alarm indicates that the default network route is either not configured or the current configuration contains an invalid IP address or hostname.

Procedure 4-45. Recovery from Server Default Router Not Defined



CAUTION: When changing the server's network routing configuration it is important to verify that the modifications will not impact the method of connectivity for the current login session. It is also crucial that this information not be entered incorrectly or set to improper values. Incorrectly modifying the server's routing configuration may result in total loss of remote network access.

1. Perform the following substeps to define the default router:
 - a. Obtain the proper Provisioning Network netmask and the IP address of the appropriate Default Route on the provisioning network. These are maintained by the customer network administrators.
 - b. Log in to the MPS with username elapconfig (see Procedure A-5, "Accessing the ELAP Text-Based User Interface," on page A-6). The server designation at this site is displayed as well as **hostname**, **hostid**, **Platform Version**, **Software Version**, and the date. Ensure that the side displayed is the MPS that is reporting the problem. In this example, it is MPS A. Enter option 2, Configure Network Interfaces Menu, from the ELAP Configuration Menu.

```
MPS Side A:  hostname: mpsa-d1a8f8  hostid: 80d1a8f8
              Platform Version: x.x.x-x.x.x
              Software Version: ELAP x.x.x-x.x.x
              Wed Jul 17 09:51:47 EST 2005
```

```
/-----ELAP Configuration Menu-----\
/-----\
|  1  | Display Configuration           |
|-----|
|  2  | Configure Network Interfaces Menu |
|-----|
|  3  | Set Time Zone                  |
|-----|
|  4  | Exchange Secure Shell Keys      |
|-----|
|  5  | Change Password                 |
|-----|
|  6  | Platform Menu                   |
|-----|
```

```

|----|-----|
| 7 | Configure NTP Server |
|----|-----|
| e | Exit |
|----|-----|
\-----/
Enter Choice: 2

```

- c.** Enter option **1**, Configure Provisioning Network from the Configure Network Interfaces Menu. This displays the submenu for configuring communications networks and other information.

```

/----Configure Network Interfaces Menu-----\
/-----\
| 1 | Configure Provisioning Network |
|----|-----|
| 2 | Configure Sync Network |
|----|-----|
| 3 | Configure DSM Network |
|----|-----|
| 4 | Configure Backup Provisioning Network |
|----|-----|
| 5 | Configure Forwarded Ports |
|----|-----|
| 6 | Configure Static NAT Addresses |
|----|-----|
| e | Exit |
|----|-----|
\-----/

```

Enter choice: 1

- d.** The following warning appears; type **Y** and press Enter:

```
ELAP software is running. Stop it? [N] Y
```

- e.** If the LSMS Connection has not been previously disabled, the following prompt appears; type **Y** and press Enter:

```
The LSMS Connection is currently enabled. Do you want to disable
it? [Y] Y
```

- f.** The following confirmation appears:

```
The LSMS Connection has been disabled.
```

- g.** The ELAP A provisioning network IP address displays:

```
Verifying connectivity with mate ...
Enter the ELAP A provisioning network IP Address [192.168.61.90]:
```

- h.** Press Enter after each address is displayed until the Default Route address displays:

```
Verifying connectivity with mate ...
Enter the ELAP A provisioning network IP Address [192.168.61.90]:
Enter the ELAP B provisioning network IP Address [192.168.61.91]:
Enter the ELAP provisioning network netmask [255.255.255.0]:
Enter the ELAP provisioning network default router IP Address:
192.168.61.250
```

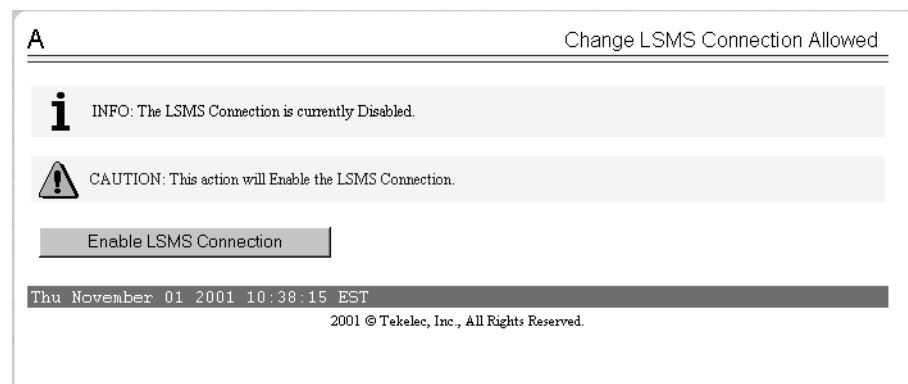
- i.** If the default router IP address is incorrect, correct it, and press Enter.

- j. After you have verified or corrected the Provisioning Network configuration information, enter **e** to return to the Configure Network Interfaces Menu.
 - k. Enter **e** again to return to the ELAP Configuration Menu.

2. Rerun **syscheck**.
 - If the alarm has not been cleared, contact Customer Care Center (see page 1-10) for further assistance. Make the **syscheck** output available to them. Go to step 4.
 - If the alarm has been cleared, the problem is solved, and you can restart the ELAP software and enable the connection to the LSMS as described in the following step.

3. Perform the following substeps to restart the ELAP and enable the LSMS connection.
 - a. Restart the ELAP software (see Procedure A-9, “Restarting the ELAP Software,” on page A-12).
 - b. Select **Maintenance>LSMS Connection>Change Allowed**: a window similar to the example shown in Figure 4-3 displays.

Figure 4-12. Enable LSMS Connection Window



- c. Click the Enable LSMS Connection button. When the connection has been enabled, the workspace displays the information shown in Figure 4-4.

Figure 4-13. LSMS Connection Enabled

d. Go to step 4.

4. You have now completed this procedure.

5000000000000080 - Server Temperature Warning

This alarm indicates that the internal temperature within the server is outside of the normal operating range. A Server Fan Failure may also exist along with the Server Temperature Warning.

Procedure 4-46. Recovery from Server Temperature Warning

1. Ensure that nothing is blocking the fan's intake (see Figure 4-7 on page 4-25). Remove any blockage.

Figure 4-14. Server Fans

2. Verify that the temperature in the room is normal (see Table 4-3 on page 4-26). If it is too hot, lower the temperature in the room to an acceptable level.

Table 4-4. Server Environmental Conditions

Ambient Temperature	Operating: 5 degrees C to 40 degrees C Exceptional Operating Limit: 0 degrees C to 50 degrees C Storage: -20 degrees C to 60 degrees C
Relative Humidity	Operating: 5% to 85% non-condensing Storage: 5% to 95% non-condensing
Elevation	Operating: -300m to +300m Storage: -300m to +1200m
Heating, Ventilation, and Air Conditioning	Capacity must compensate for up to 5100 BTUs/hr for each installed frame. Calculate HVAC capacity as follows: Determine the wattage of the installed equipment. Use the formula: watts x 3.143 = BTUs/hr

NOTE: Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. The alarm may take up to five minutes to clear after conditions improve. It may take about ten minutes after the room returns to an acceptable temperature before syscheck shows the alarm cleared.

3. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).

- If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.
-

4. Replace the filter (refer to the *Tekelec 1100 Application Server Hardware Manual*).

NOTE: Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. The alarm may take up to five minutes to clear after conditions improve. It may take about ten minutes after the filter is replaced before syscheck shows the alarm cleared.

5. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).

- If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.
-

6. If the problem has not been resolved, call the Customer Care Center for assistance. See page 1-10.
-

5000000000000100 - Server Core File Detected

This alarm indicates that an application process has failed and debug information is available.

Procedure 4-47. Recovery from Server Core File Detected

1. Run `savelogs` to gather system information (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9).
 2. Contact the Customer Care Center (see page 1-10). They will examine the files in `/var/TKLC/core` and remove them after all information has been extracted.
-

5000000000000200 - Server NTP Daemon Not Synchronized

This alarm indicates that the NTP daemon (background process) has been unable to locate a server to provide an acceptable time reference for synchronization.

Procedure 4-48. Recovery from Server NTP Daemon Not Synchronized

1. Contact the Customer Care Center (see page 1-10).
-

5000000000000400 - Server CMOS Battery Voltage Low

The presence of this alarm indicates that the CMOS battery voltage has been detected to be below the expected value. This alarm is an early warning indicator of CMOS battery end-of-life failure which will cause problems in the event the server is powered off.

Procedure 4-49. Recovery from Server CMOS Battery Voltage Low

1. Contact the Customer Care Center (see page 1-10).
-

5000000000000800 - Server Disk Self Test Warning

A non-fatal disk issue (such as a sector cannot be read) exists.

Procedure 4-50. Recovery from Server Disk Self Test Warning

1. Contact the Customer Care Center (see page 1-10).
-

5000000000004000 - Server Reboot Watchdog Initiated

This alarm indicates that the server has been rebooted due to a hardware watchdog.

Procedure 4-51. Recovery from Server Reboot Watchdog Initiated

1. Contact the Customer Care Center (see page 1-10).
-

Minor Application Alarms

Minor application alarms involve the ELAP RMTP channels, RTDB capacity, and software errors.

6000000000000001 - RMTP Channel A Down

Channel A of the IP multicast mechanism is not available.

Procedure 4-52. Recovery from RMTP Channel A Down

1. Check the physical connections between the local ELAP(s), and the ELAP(s) and the DSM cards on the EAGLE 5 ISS. Make sure the connectors are firmly seated.

2. Run **syscheck** (see Procedure A-6, "Running System Health Check from the ELAP GUI," on page A-7.)
If you cannot log in, go to step 5.

3. Perform Procedure A-9, "Restarting the ELAP Software," on page A-12.

4. Capture the log files on both ELAPs (see Procedure A-8, "Saving Logs Using the ELAP GUI," on page A-9).

5. Contact the Customer Care Center (see page 1-10).

6000000000000002 - RMTP Channel B Down

Channel B of the IP multicast mechanism is not available.

Procedure 4-53. Recovery from RMTP Channel B Down

1. Check the physical connections between the local ELAP(s), and the ELAP(s) and the DSM cards on the EAGLE 5 ISS. Make sure the connectors are firmly seated.

2. Run **syscheck** (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7.)
If you cannot log in, go to step 5.

3. Perform Procedure A-9, “Restarting the ELAP Software,” on page A-12.

4. Capture the log files on both ELAPs (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9).

5. Contact the Customer Care Center (see page 1-10).

6000000000000004 - Security Log 50 Perc Full

The security log is 50 percent full.

Procedure 4-54. Recovery from Security Log 50 Perc Full

1. No action is necessary. This is an information message.

6000000000000008 - RTDB 80% Full

The RTDB on the ELAP or DSM is approaching capacity (80%).

NOTE: This is an indication to the user to make plans immediately for an ELAP upgrade or upgrade the DSM card to add more memory.

Perform the following procedure.

Procedure 4-55. Recovery from RTDB 80% Full

1. At the EAGLE 5 ISS input terminal, enter the `rept-stat-mps` command.

2. Refer to the output to determine which specific database (for an ELAP or for a DSM card) is approaching its capacity.

3. Run `save logs` on each ELAP (see Procedure A-8, “Saving Logs Using the ELAP GUI,” on page A-9), and contact the Customer Care Center (see page 1-10).

6000000000000010 - Minor Software Error

A minor software error has been detected.

Procedure 4-56. Recovery from Minor Software Error

1. Run `syscheck` (see Procedure A-6, “Running System Health Check from the ELAP GUI,” on page A-7).

2. Contact the Customer Care Center (see page 1-10). Have the system health check data available.

6000000000000040 - RTDB Tree Error

RTDB data is stored as inverse tree structures. The trees have maximum theoretical depths based on the number of records in the tree. This alarm indicates either that the depth is greater than the theoretical maximum or that some other general problem has been found with a tree.

Procedure 4-57. Recovery from RTDB Tree Error

1. Contact the Customer Care Center (see page 1-10).

MPS Field Replaceable Units

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Introduction

Field Replaceable Units (FRUs) are units of hardware that the customer can replace in the field. The following type of FRUs are described in customer documentation:

- Table 5-1 on page 5-2 lists the FRUs that are specific to the MPS. The procedures to replace these FRUs are fully described in the referenced manuals.
- Table 5-2 on page 5-3 lists the FRUs that are both common to all Tekelec 1100 AS implementations and for which replacement is fully described in the referenced manuals.
- Table 5-3 on page 5-4 lists FRUs that are common to all Tekelec 1100 AS implementations, but for which additional recovery actions must be performed by the Customer Care Center (see page 1-10).

General FRU Guidelines

Use the following guidelines when you replace any FRU:

- When unpacking, check the shipping carton for any damage.
- Always use a static strap when handling the components.

- Read the instructions prior to performing the replacement or maintenance.
- Do not use excessive force when installing or removing the component. This can cause damage to a connector. Apply even pressure when installing the component.
- When the procedures instruct you to install a component, you can also remove an existing component for replacement purposes.
- Always test the installed or replaced component to ensure correct operation.

Locating FRU Replacement Procedures

Table 5-1 through Table 5-3 on page 5-4 list the FRU part numbers and where to find replacement procedures.

Table 5-1 shows FRUs whose replacement procedures are fully defined in this manual.

Table 5-1. MPS-Specific FRUs

FRU	Tekelec Part Number	Replace with...	For Replacement Procedure, see:
Breaker Panel	870-1814-01	870-1814-01	Procedure 5-1, "Replacing a Breaker Panel," on page 5-5
Hub	804-1198-01 ¹ or 804-1198-R01	804-1198-R01	Procedure 5-2, "Replacing a Hub," on page 5-6

1. This FRU is functionally equivalent to the one specified by the replacement part number.

Table 5-2 shows the FRUs whose replacement procedures are fully defined in the *Tekelec 1100 Application Server Hardware Manual*.

NOTE: When you need to replace one of the FRUs shown in Table 5-2, all the steps you need to perform are contained in the referenced procedure. No other action is required.

Table 5-2. Tekelec 1100 AS FRUs (No Further Action Required)

FRU	For Replacement Procedure, see:
Fan Filter	<i>Tekelec 1100 Application Server Hardware Manual</i> (this replacement can be performed while the MPS is in service)
Fan Assembly	<i>Tekelec 1100 Application Server Hardware Manual</i> (this replacement can be performed while the MPS is in service)

Table 5-3 shows the FRUs whose replacement procedures are defined in the *Tekelec 1100 Application Server Hardware Manual*, and for which additional action is required.



CAUTION: Replacing one of the FRUs in Table 5-3 usually requires additional action to ensure that system and application data is also properly restored. Although general guidelines are shown here, always contact the Customer Care Center for assistance with a complete replacement procedure.

Table 5-3. Tekelec 1100 AS FRUs (Further Action Required)

FRU	Outline of Replacement Procedure
MPS Server (Tekelec 1100 AS)	1. Contact the Customer Care Center (see page 1-10). Tekelec Technical Services will perform the remaining steps. 2. Shut down the software, as described in Procedure 5-3, "Powering Down the MPS Server," on page 5-8 3. Replace the server, as described in the <i>Tekelec 1100 Application Server Hardware Manual</i>. 4. Ensure that system and application data is properly restored.
Disk Drive	1. Contact the Customer Care Center (see page 1-10). Tekelec Technical Services will perform the remaining steps. 2. Prepare for removing the disk by removing from the mirroring software all references to the failed disk. 3. Replace the disk drive, as described in the <i>Tekelec 1100 Application Server Hardware Manual</i>. 4. Ensure that system and application data is properly restored.
PCI cards or PCI Express cards	1. Contact the Customer Care Center (see page 1-10). Tekelec Technical Services will perform the remaining steps. 2. Shut down MPS server using Procedure 5-3 on page 5-8. 3. Replace PCI card, as described in the <i>Tekelec 1100 Applications Server Hardware Manual</i>. 4. Reboot the MPS using Procedure A-10 on page A-14.
CD / DVD Drive Assembly	1. Contact the Customer Care Center (see page 1-10). Tekelec Technical Services will perform the remaining steps. 2. Shut down MPS server using Procedure 5-3 on page 5-8. 3. Replace CD / DVD Drive Assembly, as described in the <i>Tekelec 1100 Applications Server Hardware Manual</i>. 4. Reboot the MPS using Procedure A-10 on page A-14.
NOTE: Always contact the Customer Care Center when attempting to replace a FRU in this table.	

Fan Replacement Procedure

The Tekelec 1100 AS fan assembly can be replaced while the MPS is in service. For detailed replacement procedures, refer to the *Tekelec 1100 Application Server Hardware Manual*.

Breaker Panel Replacement Procedure

This procedure explains how to remove the breaker panel. For more information about how the breaker panels are configured, see “Breaker Panel” on page 2-6.

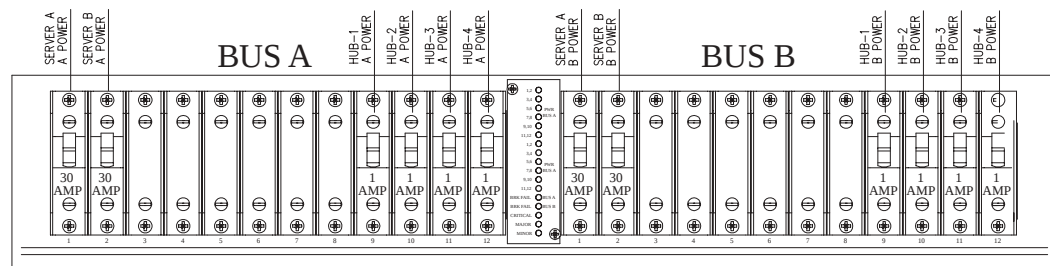


DANGER: Breaker panels contain high current capacities which can be dangerous to personnel and equipment. Before replacing a breaker panel, contact the Customer Care Center (see page 1-10).

Procedure 5-1. Replacing a Breaker Panel

1. Shut down both servers (see Procedure 5-3 on page 5-8).
2. Turn off the breakers for the MPS Server and the hubs at the failed breaker panel. See Figure 5-1 to identify the appropriate breakers.

Figure 5-1. Breaker Panel Settings



3. Turn off the breakers at the main power panel for the “A” and “B” power sources to the failed breaker panel.
4. Verify that power is not present on the leads by checking with a Volt Ohm Meter at the “A” and “B” power input leads on the back of the failed breaker panel.
5. Disconnect the BATT and RTN leads from the power source for “A” and “B” at the breaker panel you want to remove.

Mark or label each cable as you remove it.

Tape or insulate all disconnected power leads.

6. Disconnect from the failed breaker panel all BATT and RTN leads for the hubs and MPS Servers A and B.

7. Disconnect the alarm cable from the failed breaker panel.

8. Disconnect the frame ground from the failed breaker panel.

9. Remove the screws that hold the failed breaker panel in the frame.

10. Remove the failed breaker panel.

11. Place the new breaker panel in the frame.

12. Replace the screws that hold the breaker panel in the frame.

13. Reconnect all cables according to the ELAP [Interconnect.pdf](#).

Hub Replacement Procedure

This procedure explains how to remove a hub. For more information about the hubs, see “Hubs” on page 2-5.

Procedure 5-2. Replacing a Hub

1. Turn off the power switch on the rear of the hub to be replaced and on the rear of the other hub on the same network as the hub to be replaced.



CAUTION: Always turn off the power to both the hub to be replaced and to the other hub on its network. That is, turn the power off to both hubs 1 and 2 (main network) or to both hubs 3 and 4 (backup network)—but not to both pairs of hubs at once.

2. At the breaker panel, turn off the hub breakers (breakers 9 through 12 on the A side and on the B side).

3. Disconnect the BATT and RTN leads from the breaker panel for “A” and “B”.

4. Disconnect the frame ground.

5. Make sure that all RJ45 cables are labeled, and disconnect all the RJ45 cables.

6. Remove the screws that hold the hub in the frame.

7. Remove the hub.

8. Place the new hub in the frame.

9. Replace the screws that hold the hub in the frame.

10. Reconnect all the RJ45 cables according to the ELAP [Interconnect.pdf](#).

11. Reconnect all power connections according to the ELAP [Interconnect.pdf](#).

12. Make sure that the other hub on the same network is also powered up.

MPS Server Power Down Procedure

Use the following procedure to shut down the MPS software and turn off power to the MPS server. Use this procedure before performing the following replacement procedures:

- Replacing a Tekelec 1100 AS main unit (after shutting down the MPS server, refer to the *Tekelec 1100 Application Server Hardware Manual* for the procedure for replacing the server)
- Replacing a disk drive (after shutting down the MPS server, refer to the *Tekelec 1100 Application Server Hardware Manual* for the procedure for replacing the disk drive)



CAUTION: Performing this procedure will cause interruption of service.

NOTE: After the replacement is complete, power up and test the MPS Server.

The following procedure includes details on how to shut down the MPS Server from the ELAP GUI. For more information about the Halt MPS interface menu item, refer to the *ELAP Administration Manual*.

Procedure 5-3. Powering Down the MPS Server



WARNING: DO NOT perform the last step (to turn off the breakers) until step 1 through step 5 are complete.

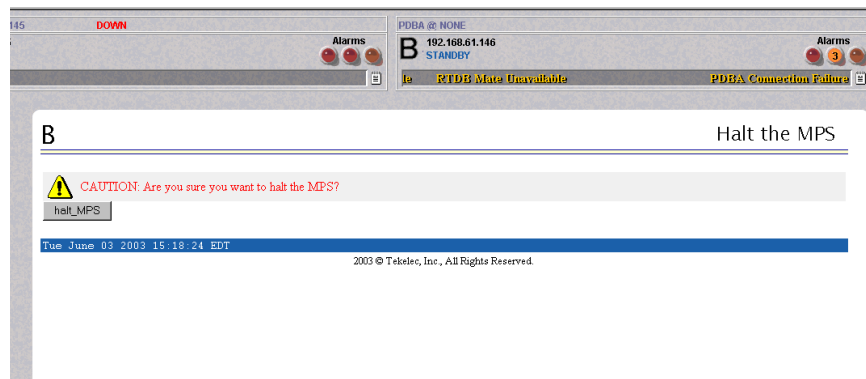
1. Login to the User Interface screen of the ELAP (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
-

2. Check the banner information above the menu to verify that you are logged into the problem ELAP indicated in the UAM.

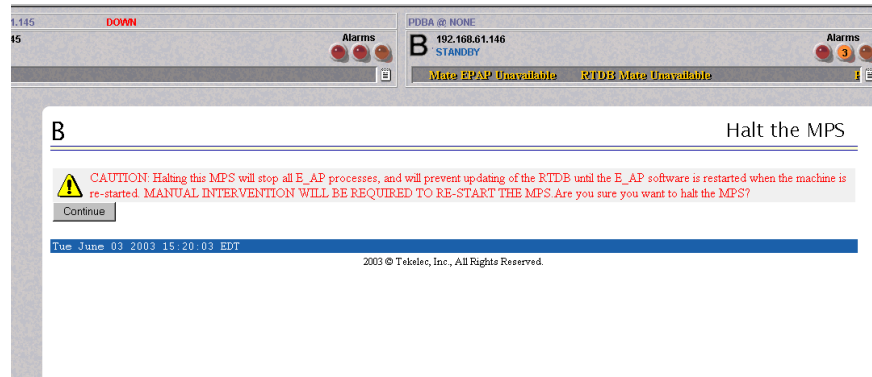
If it is necessary to switch to the proper ELAP associated with the MPS to be powered down, select the **Select Mate** menu item.

3. When you are logged into the MPS to be powered down, select **Platform>Halt the MPS** menu item to stop the MPS. The following window displays:

Figure 5-2. Halting the MPS



-
4. Click the **halt_MPS** button. The following confirmation message appears:

Figure 5-3. Halting the MPS Confirmation

5. Click the **Continue** button.

NOTE: The ELAP software and the MPS Server are now shut down. The MPS Server can be powered down.

WARNING: DO NOT continue with this step to turn off the breakers until step 1 through step 5 are complete.



6. To power down the MPS Server, turn off breakers A1 and B1 on the appropriate breaker panels for the MPS Server that is to be shut down (see Figure 5-1 on page 5-5). For more information about breaker panels, see “Breaker Panel” on page 2-6.

The selected MPS Server is shut down and powered down.

Disk Drive Replacement Procedure



WARNING: Disk drive replacement should be performed only by Tekelec Technical Services. If a disk drive needs to be replaced, contact the Customer Care Center (see page 1-10).

When Tekelec Technical Services replaces a disk drive, they perform the following functions:

1. Once the disk that is failed has been determined, prepare for removing the disk by removing from the mirroring software all references to the failed disk
2. Replace the disk drive hardware, as described in the *Tekelec 1100 Application Server Hardware Manual*.
3. Configure the new disk.

PCI Card or PCI Express Card Replacement Procedure



WARNING: Replacement of PCI cards and PCI Express cards should be performed only by Tekelec Technical Services. If a PCI card or PCI Express card needs to be replaced, contact the Customer Care Center (see page 1-10).

When Tekelec Technical Services replaces a PCI card or PCI Express card, they perform the following functions:

1. Contact the Customer Care Center (see page 1-10). They will perform the remaining steps.
2. Shut down the MPS Server using Procedure 5-3, “Powering Down the MPS Server,” on page 5-8.
3. Replace the PCI card hardware as described in the *Tekelec 1100 Applications Server Hardware Manual*, 910-4221.
4. Reboot the MPS using Procedure A-10 on page A-14.

Tekelec 1100 AS Main Unit Replacement Procedure

Prior to replacing the main unit, the MPS Server must be shut down (see Procedure 5-3, “Powering Down the MPS Server,” on page 5-8).

For a detailed procedure for replacing the main unit, refer to the *Tekelec 1100 Application Server Hardware Manual*. Contact the Customer Care Center (see page 1-10) to perform the steps to configure the new disk.



General Procedures

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Introduction

This chapter contains miscellaneous general procedures that are referred to within this manual.

Accessing the ELAP GUI Interface

ELAP employs a web-based user interface. It uses the typical client-server paradigm. The front end appears on an Internet browser. The back end operates on the MPS platform. The front end is officially supported on Microsoft® Internet Explorer, version 5.0 or later, and on Mozilla® Firefox®, version 1.0.2 or later. When using Firefox, you will encounter the following message when logging into the ELAP GUI:

CAUTION: The User Interface may not function correctly with the browser you are using.

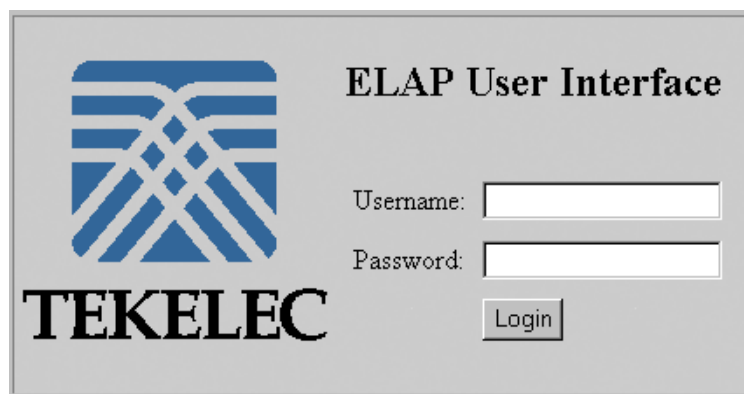
Microsoft Internet Explorer, version 5 and later, has been certified for this application

Use the following procedure to access the main screen of the GUI interface.

Procedure A-1. Accessing the ELAP GUI Interface

1. Using the selected browser (Internet Explorer 5.0 or later or Mozilla Firefox 1.0.2 or later), enter the IP address for your EPAP application. You will see the following login screen.

Figure A-1. ELAP User Interface Screen



If using Firefox, you will encounter the following message when logging into the ELAP GUI:

CAUTION: The User Interface may not function correctly with the browser you are using.

Microsoft Internet Explorer, version 5 and later, has been certified for this application

NOTE: Figure A-1 does not show the release number that appears on the ELAP User Interface Login window because this manual covers multiple ELAP releases.

-
2. Enter the appropriate username and password. Specify a username that has permission to access the menu items indicated in the procedure you need to perform.

Table A-1 shows the default usernames. You can define additional usernames by selecting the User Administration menu item. For more information about assigning usernames, refer to the *ELAP Administration Manual*.

Table A-1. Usernames

ELAP UI Login Name	Access Granted
elapmaint	Maintenance menu and all sub menus
elappdba	Database menu and all sub menus
elapdebug	Debug menu and all sub menus
elapplatform	Platform menu and all sub menus
uiadmin	User Administration menu
elapall	All of the menus in this Table

-
3. Continue with the procedure that referenced this procedure.
-

Connecting to the Server Command Line

You can connect to the ELAP server command line for the following purposes:

- Accessing the ELAP text interface (see “Accessing the ELAP Text Interface” on page A-6)
- Running **syscheck** (see “Running the System Health Check” on page A-6)

You can connect to the ELAP server command line in any of the following ways:

- Use a secure shell (**ssh**) utility to connect to either server’s IP address. This connection will be made through the port that is identified as **eth0** on the ELAP [Interconnect.pdf](#) and is identified as **eth91** by the software. For more information, see “Using ssh to Connect to the Server Command Line” on page A-4.
- Use the **ppp** utility to connect to the modem that is installed in the server’s OOBM (Out-of-Band Management) card and then use **ssh** to connect to the server’s IP address (see “Connecting to a Server’s OOBM Modem” on page A-4).
- Connect a cable, Part Number 830-0058-xx (xx represents the cable length), to serial port 4 on the server B (see “Connecting a Local Access Terminal to Server’s Serial Port” on page A-5)

Using ssh to Connect to the Server Command Line

You can log into either ELAP server from any terminal using a **ssh** (Secure Shell) utility.

NOTE: If your terminal does not already have **ssh** installed, PuTTY is a free **ssh** utility for Windows that you can download from the web.

Use the following procedure to **ssh** to the server command line.

Procedure A-2. Using ssh to Connect to the Server Command Line

1. From a command-line prompt on your terminal, enter the following command to start a secure shell session with an ELAP server:

```
ssh <username>@<server_IP_address>
```

where **<server_IP_address>** is the IP address of the server and **<username>** is either of the following:

- **elapconfig**—for accessing the ELAP text interface, enter the **elapconfig** username and the password provided by your system administrator. For more information about the ELAP text interface, see “Accessing the ELAP Text Interface” on page A-6.
 - **syscheck**—for running the **syscheck** utility, enter **syscheck** as the username and **syscheck** as the password. For more information about running **syscheck** from this interface, see Procedure A-7, “Running **syscheck** Using the **syscheck** Login,” on page A-9.
-

Connecting to a Server’s OOBM Modem

Use the following procedure to connect to the server command line through the modem in the server’s OOBM (Out-of-Band Management) card.

Procedure A-3. Connecting to Server A’s OOBM Modem

1. Use the **ppp** utility to connect the modem located in the OOBM card in server A. (For information about setting up the **ppp** utility, refer to the *ELAP Administration Manual*.
 2. When the prompt appears, perform Procedure A-2, “Using ssh to Connect to the Server Command Line,” on page A-4.
-

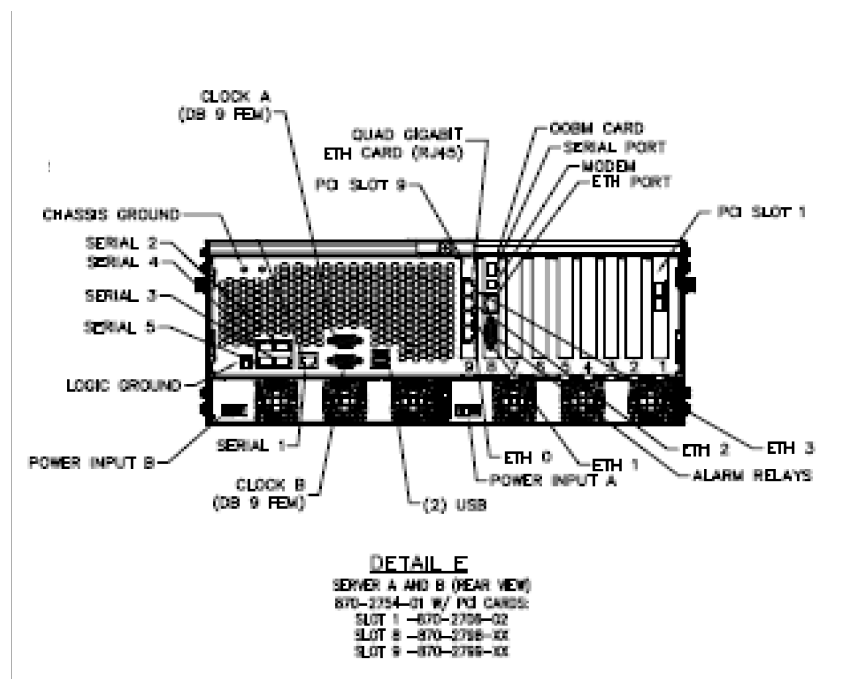
Connecting a Local Access Terminal to Server's Serial Port

Use the following procedure to connect a cable, Part Number 830-0058-xx, to serial port 4 on the server.

Procedure A-4. Connecting a Local Access Terminal

1. Connect the workstation you will use as the Local Access Terminal to Serial port 4 on the server (see Figure A-2).

Figure A-2. Serial Port 4 on MPS Server



2. Set the terminal to match how the serial port is configured by the MPS:
 - 9600 baud
 - Parity 7E1
-

3. When the prompt appears on the Local Access Terminal, enter either of the following usernames and associated passwords:
 - To access the ELAP text interface, enter the `elapconfig` username and the password provided by your system administrator. For more information about the ELAP text interface, see “Accessing the ELAP Text Interface” on page A-6.
 - To run the **syscheck** utility, enter `syscheck` as the username and `syscheck` as the password. For more information about running `syscheck` from this interface, see Procedure A-7, “Running `syscheck` Using the `syscheck` Login,” on page A-9.
-

Accessing the ELAP Text Interface

The ELAP text-based user interface is accessed through the Local Access Terminal. The text-based user interface is used for initial configuration of the ELAP application. Some errors described in this manual result from errors in the initial configuration, and recovery from them requires that you access the text interface.

For information about the initial configuration of the ELAP application, refer to the *ELAP Administration Manual*.

Procedure A-5. Accessing the ELAP Text-Based User Interface

1. Connect the Local Access Terminal to the MPS server you need to access (see Procedure A-4, “Connecting a Local Access Terminal,” on page A-5).
 2. Log in with username `elapconfig` and the password provided by your system administrator.
 3. Continue with the procedure that referenced this procedure.
-

Running the System Health Check

The operator can run **syscheck** to obtain the operational status of the MPS platform with one of the following procedures:

- “Running `syscheck` Through the ELAP GUI” on page A-7
- “Running `syscheck` Using the `syscheck` Login” on page A-9

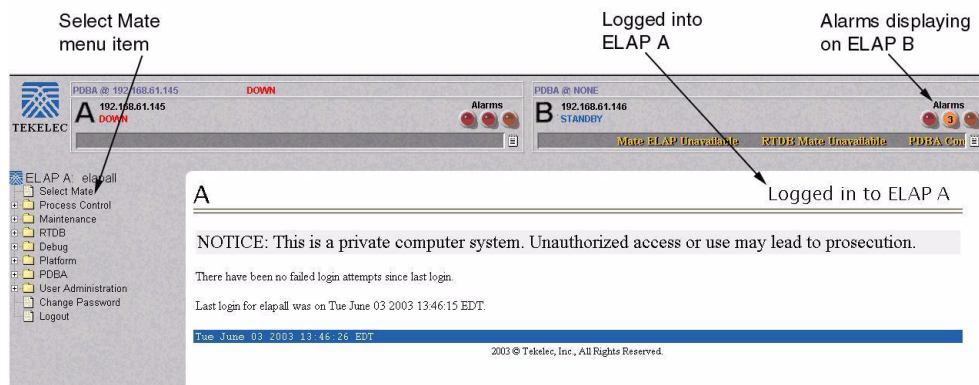
Running syscheck Through the ELAP GUI

Refer to the *ELAP Administration Manual* for more details and information about logins and permissions.

Procedure A-6. Running System Health Check from the ELAP GUI

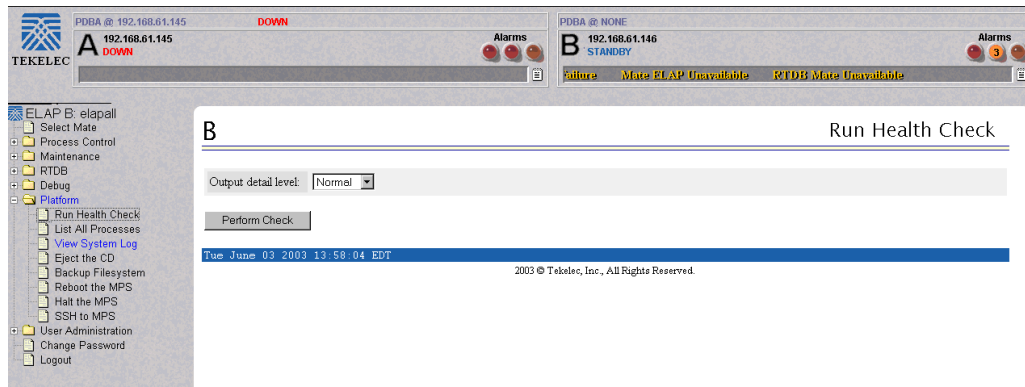
1. Log in to the User Interface screen of the ELAP GUI (see “Accessing the ELAP GUI Interface” on page A-1).
-
2. Check the banner information above the menu to verify that you are logged into the ELAP about which you want system health information. The example in Figure A-3 shows a user is logged into ELAP A, while alarms are showing on ELAP B. To find out more information about conditions on the B server, you need to run **syscheck** on that server.

Figure A-3. Logged In Screen

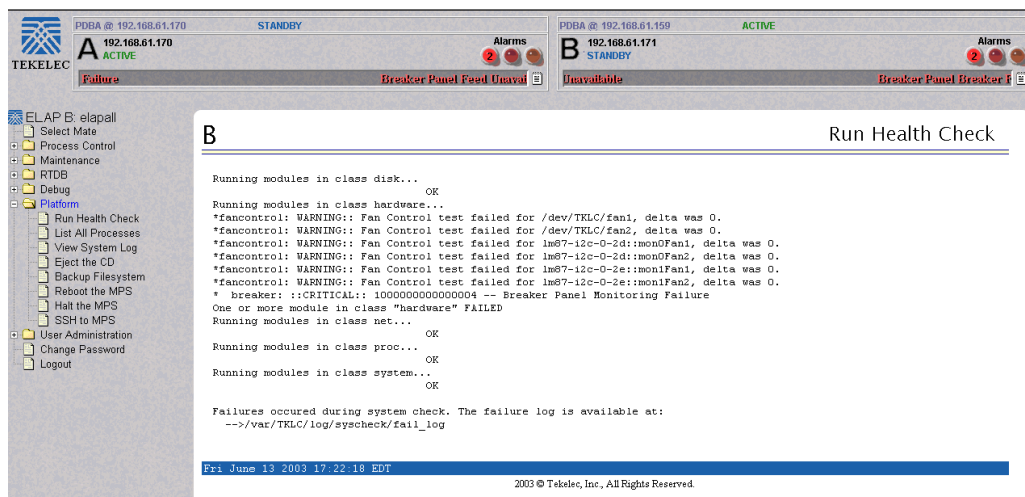


If it is necessary to switch to the other ELAP, click the **Select Mate** menu item.

3. When the GUI shows you are logged into the ELAP about which you want system health information, select **Platform>Run Health Check**.

Figure A-4. Run Health Check

4. On the Run Health Check screen, use the pull-down menu to select Normal or Verbose for the **Output detail level**.
5. Click the **Perform Check** button to run the system health check on the selected MPS.
6. The system health check output data will display on the screen. This example shows Normal output with errors.

Figure A-5. Displaying System Health Check on ELAP GUI

Running syscheck Using the syscheck Login

If the ELAP application has not been installed on the MPS or you are unable to log in to the ELAP user interface, you cannot run **syscheck** through the GUI. Instead, you can run **syscheck** from the **syscheck** login, and report the results to Tekelec Platform Engineering.

Procedure A-7. Running syscheck Using the syscheck Login

1. Connect the Local Access Terminal to the MPS server whose status you want to check (see “Connecting to the Server Command Line” on page A-3).
-

2. Log in as the **syscheck** user.

Login: **syscheck**
Password: **syscheck**

3. The **syscheck** utility runs and its output is displayed to the screen.
-

Savelogs Procedure

During some corrective procedures, it may be necessary to provide Tekelec with information about the MPS for help in clearing an alarm. These log files are used to aid the Customer Care Center when they troubleshoot the MPS.

Saving Logs Using the ELAP GUI

Use the following procedure to save logs using menu selections from the ELAP GUI:

Procedure A-8. Saving Logs Using the ELAP GUI

1. Login to the User Interface screen of the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
-

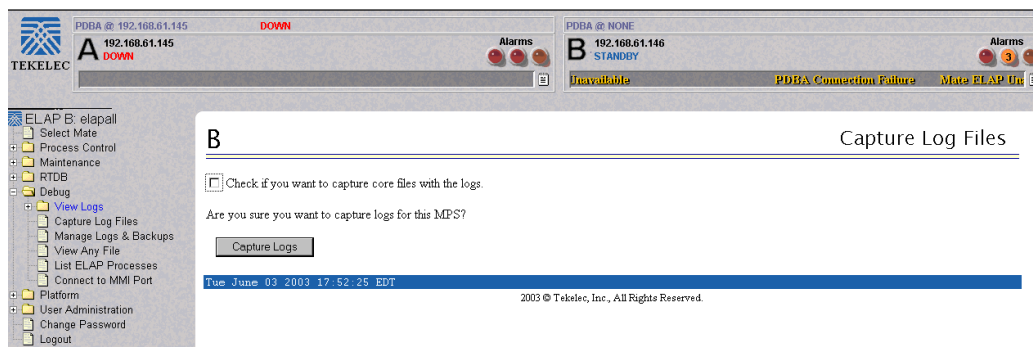
2. Check the banner information above the menu to verify that you are logged into the problem ELAP indicated in the UAM.

If it is necessary to switch to the problem ELAP, click the **Select Mate** menu item.

3. From the menu, select **Debug>Capture Log Files**.
4. Deselect (if necessary) the box labeled Check if you want to capture core files with the Logs, as shown in Figure A-6.

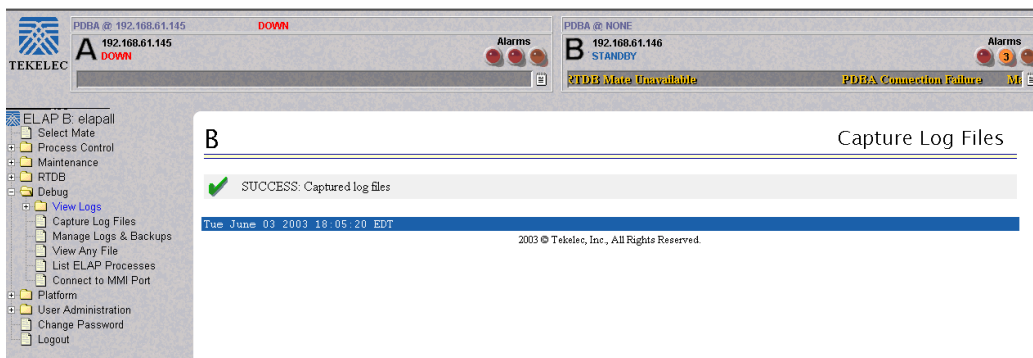
NOTE: Contact the Customer Care Center for assistance before capturing core files with the log files. See page 1-10.

Figure A-6. Capture Logs File Screen



5. Click the **Capture Logs** button to capture the log files.
6. After completion, verify the following response:

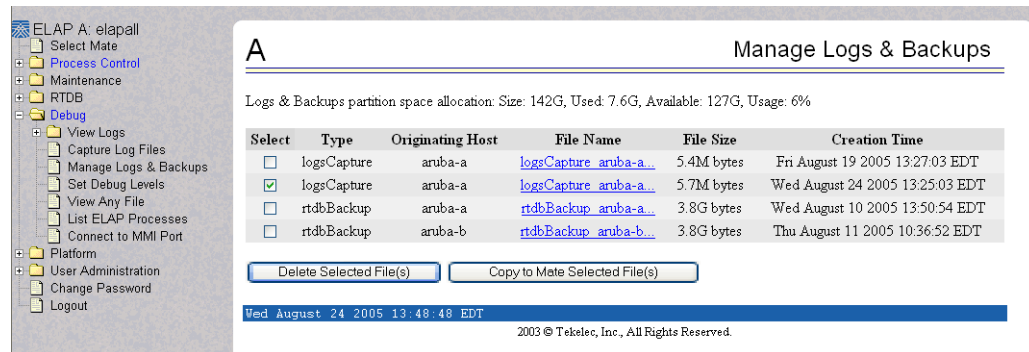
Figure A-7. Capture Logs Success



7. Contact the Customer Care Center to analyze and check the log files.

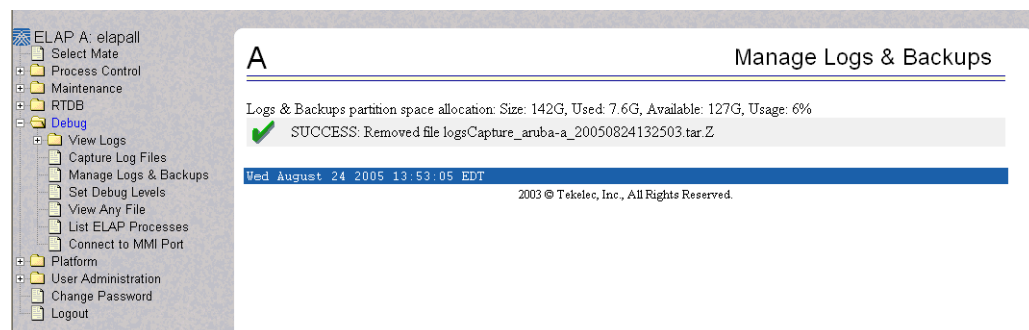
8. When the Customer Care Center has finished analyzing the logs files, delete them from the MPS by selecting **Debug>Manage Logs Files and Backups** to open the **Manage Logs and Backups** Screen.
9. Click the checkboxes for the files you want to delete, as shown in the example in Figure A-8, and then click the **Delete Selected File(s)** button.

Figure A-8. Deleting Captured Log Files



10. When the log files have been deleted, the GUI displays confirmation, as shown in Figure A-9.

Figure A-9. Delete Log Files Success



Restarting the ELAP Software

This procedure is used when referenced by one of the procedures in Chapter 4, “MPS Platform and Application Alarms.”

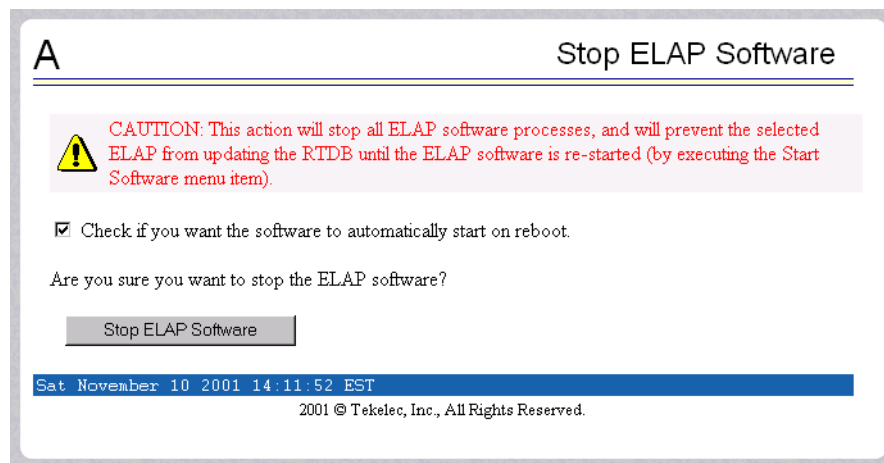


CAUTION: Perform this procedure only when directed to by one of the procedures in Chapter 4, “MPS Platform and Application Alarms.” This is not a standalone procedure.

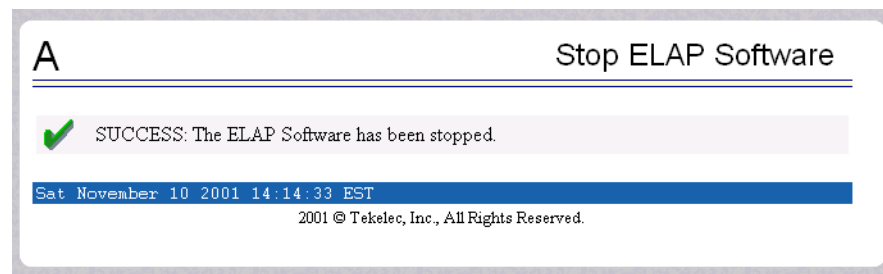
Procedure A-9. Restarting the ELAP Software

1. Log in to the User Interface screen of the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
2. Check the banner information above the menu to verify that you are logged into the problem ELAP indicated in the UAM. If it is necessary to switch to the problem ELAP, select **Select Mate**.
3. From the **elapmaint** screen, select **Process Control>Stop Software**. The following screen appears:

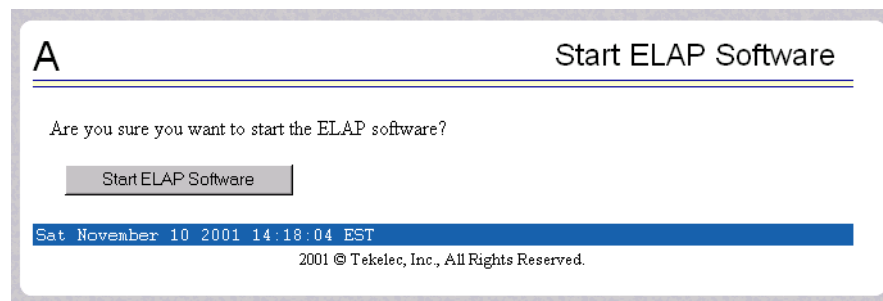
Figure A-10. Stop Software Confirmation



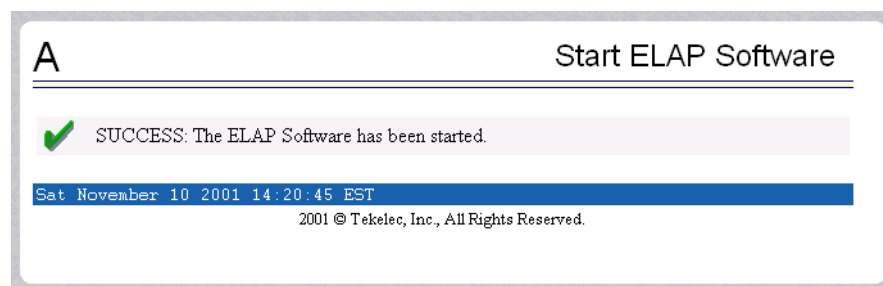
4. On the **Stop ELAP Software** screen, make sure the checkbox is checked as shown in Figure A-1.
5. Click the **Stop ELAP Software** button to stop the software. The following screen appears.

Figure A-11.Stop Software Completion Screen

-
6. Select **Process Control>Start Software.**
 7. From the **Start ELAP Software** screen, make sure the checkboxes are checked as shown in Figure A-9:

Figure A-12.Start ELAP Software

-
8. Click the **Start ELAP Software** button to start the software. The following screen confirms that the software has started:

Figure A-13.Start Software Completion Screen

Rebooting the MPS

This procedure is used when referenced by one of the procedures in Chapter 4, “MPS Platform and Application Alarms.”



CAUTION: Perform this procedure only when directed to by one of the procedures in Chapter 4, “MPS Platform and Application Alarms.” This is not a standalone procedure.

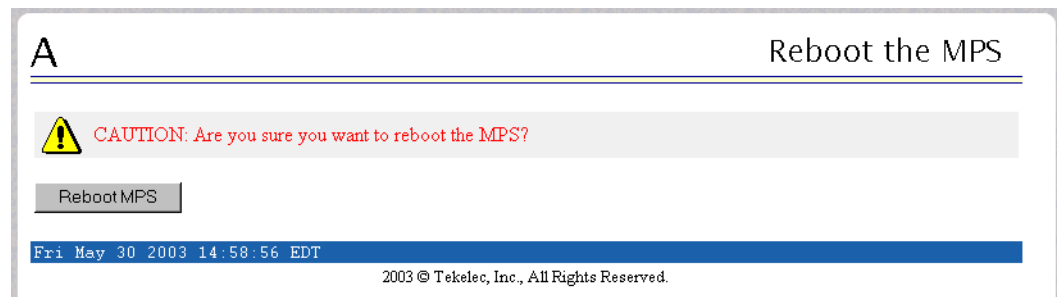
Procedure A-10. MPS Reboot

1. Login to the **User Interface** screen of the ELAP GUI (see Procedure A-1, “Accessing the ELAP GUI Interface,” on page A-2).
2. Check the banner information above the menu to verify that you are logged into the problem ELAP indicated in the UAM.

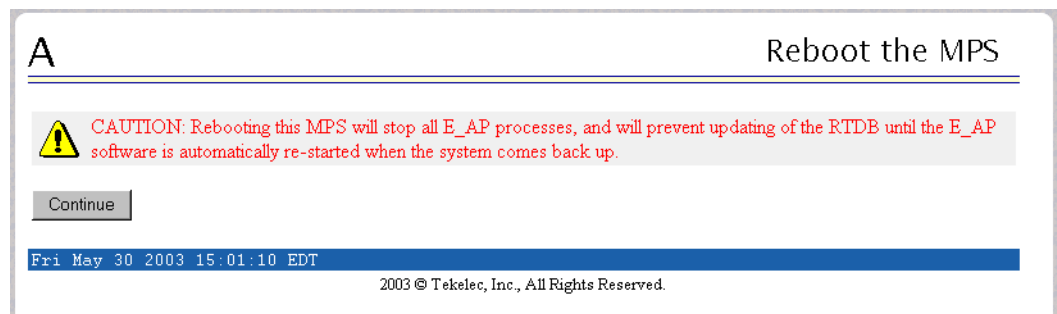
Select **Select Mate** if necessary to switch to the problem ELAP.

3. Select **Platform>Reboot the MPS**. The following screen appears:

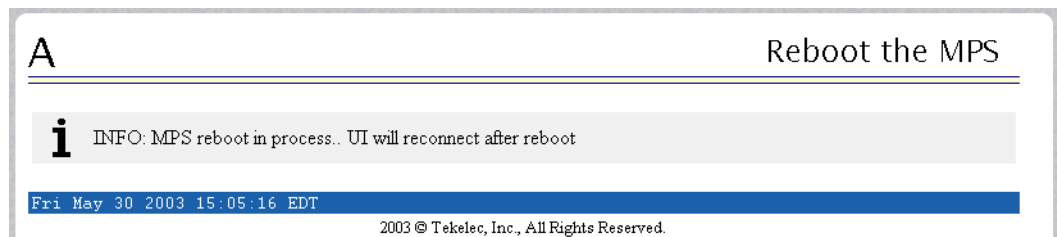
Figure A-14.Request Reboot of the MPS



-
4. Click the **Reboot the MPS** button to restart the MPS. The following screen displays:

Figure A-15.Confirm Requested Reboot the MPS

5. Click the **Continue** button. The following screen displays:

Figure A-16.Reboot Information

This will reboot the ELAP and also start the ELAP software. The connection to the ELAP will be lost.

6. At the EAGLE 5 ISS input terminal, enter the **rept-stat-mps** command to verify the status of the ELAP.

Refer to the *Commands Manual* to interpret the output.

7. If the problem has not been resolved, contact the Customer Care Center for assistance. Have the system health check data available. See page 1-10.

8. Return to the procedure that directed you to perform this procedure.

Glossary

block device	A device file that allows for input and output of data in fixed block sizes rather than character by character.
CD	Compact Disk.
CD-ROM	Compact Disk-Read Only Memory.
CMOS	Complementary Metal Oxide Semiconductor.
CPU	Central Processing Unit, the computing part of a computer.
daemon	A process that runs in the background and performs a specified operation at predefined times or in response to certain events.
DSM	Data Service Module, cards on an EAGLE 5 ISS that store copies of databases.
ELAP	EAGLE LNP Application Processor, an application that accepts and stores data provisioned by an LSMS and ensures that the data is distributed to DSM cards on an EAGLE 5 ISS.
filesystem	A data structure that maps file data onto a block device. When mounted, a filesystem's internal structure (meta-data) is hidden from the user. Access to file data is done through a hierarchical tree.
FRU	Field Replaceable Unit, any unit of hardware that can be replaced in the field by the customer.
FTP	File Transfer Protocol.
Gb	Gigabit.
GB	Gigabyte.
G-Flex	GSM Flexible Numbering feature.
GMT	Greenwich Mean Time.
G-Port	GSM Number Portability feature.
GUI	Graphical User Interface.
HD	Heavy Duty.
INP	INAP-based Number Portability feature.
I/O	Input/Output.

Glossary

IP	Internet Protocol, the network layer protocol in the TCP / IP communications protocol suite. IP contains a network address and allows messages to be routed to a different network or subnet. IP does not ensure delivery of a complete message, and the TCP transport layer is used to provide that guarantee.
IPM	Initial Product Manufacture
ISO	International Standards Organization.
journaling filesystem	A filesystem that contains, in addition to its meta-data, a log (called a journal) of changes to meta-data. Before any meta-data changes, the changes to be attempted is written to this journal. If a non-clean shutdown occurs, upon reboot this journal is played back so that the meta-data changes take place.
kernel	The heart of a UNIX operating system which resides in memory at all times; it allocates resources and controls processes.
LAN	Local Area Network.
LED	Light Emitting Diode.
LSMS	Local Services Management System, an application that accepts and stores data provisioned by an NPAC and ensures that the data is distributed to ELAP applications on one or more EAGLE 5 ISS.
mated MPS systems	Two MPS systems; each MPS system is attached to one of a mated EAGLE 5 ISS pair.
MB	Megabytes.
meta-data	An internal data structure used by a filesystem to organize file data and keep the files readily accessible.
MHz	Megahertz (1,000,000 Hertz).
MPS	Multi-Purpose Server, hardware and software components that interact to create a secure and reliable platform on which some Tekelec applications, such as ELAP, run.
MPS system	Two or more MPSs and associated hardware (such as a modem, CD-ROM, and so on) attached to one EAGLE 5 ISS.
NPAC	Number Portability Administration Center, a business that governs LNP (local number portability) in North America.
NTP	Network Time Protocol, an Internet protocol used to synchronize clocks of computers to Universal Time Coordinated (UTC) as a time reference.
partition	Section of a hard drive set aside for a specific purpose.

PCI	Peripheral Component Interconnect, a peripheral bus commonly used in PCs, Macintoshes and workstations that provides a high-speed data path between the CPU and peripheral devices (such as video, disk, and network).
PPP	Point-to-Point Protocol.
RAM	Random Access Memory.
RMTP	Reliable Multicast Transport Protocol, an Internet protocol that provides sequenced, lossless delivery of a data stream from one sender to a group of receivers.
ROM	Read-only memory.
rpm	Revolutions per minute.
RTDB	Real-Time Database, a database on the MPS or on a DSM that contains application data and is kept synchronized with all other RTDBs.
STP	Signal Transfer Point.
TPD	Tekelec Platform Distribution, a package management system that is used to distribute an operating system.
USB	Universal Serial Bus, a hardware interface for low-speed peripherals such as the keyboard, mouse, joystick, scanner, printer and telephony devices. It also supports MPEG-1 and MPEG-2 digital video. USB version 1.1 has a maximum bandwidth of 12 Mbits/sec (equivalent to 1.5 Mbytes/sec), and up to 127 devices can be attached. Fast devices can use the full bandwidth, while lower-speed ones can transfer data using a 1.5 Mbits/sec subheading.
UTC	Universal Time Coordinated, the international time standard, based on the quantum resonance of the cesium atom, for determining current time.
VDC	Volts Direct Current.
VGA	Videographic array.

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