

*Tekelec EAGLE[®] 5 ISS
with T1000 AS*

MPS Platform Software and Maintenance Manual

910-4995-001 Revision D

November 2007



TEKELEC

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5,732,213; 5,953,404; 6,115,746; 6,167,129; 6,324,183; 6,327,350; 6,456,845; 6,606,379; 6,639,981; 6,647,113; 6,662,017; 6,735,441; 6,745,041; 6,765,990; 6,795,546; 6,819,932; 6,836,477; 6,839,423; 6,885,872; 6,901,262; 6,914,973; 6,940,866; 6,944,184; 6,954,526; 6,954,794; 6,959,076; 6,965,592; 6,967,956; 6,968,048; 6,970,542; 6,987,781; 6,987,849; 6,990,089; 6,990,347; 6,993,038; 7,002,988; 7,020,707; 7,031,340; 7,035,239; 7,035,387; 7,043,000; 7,043,001; 7,043,002; 7,046,667; 7,050,456; 7,050,562; 7,054,422; 7,068,773; 7,072,678; 7,075,331; 7,079,524; 7,088,728; 7,092,505; 7,108,468; 7,110,780; 7,113,581; 7,113,781; 7,117,411; 7,123,710; 7,127,057; 7,133,420; 7,136,477; 7,139,388; 7,145,875; 7,146,181; 7,155,206; 7,155,243; 7,155,505; 7,155,512; 7,181,194; 7,190,702; 7,190,772; 7,190,959; 7,197,036; 7,206,394; 7,215,748; 7,219,264; 7,222,192; 7,227,927; 7,231,024; 7,242,695; 7,254,391

Foreign Patent Numbers:

EP1062792; EP1308054; EP1247378; EP1303994; EP1252788; EP1161819; EP1177660; EP1169829; EP1135905; EP1364520; EP1192758; EP1240772; EP1173969; CA2352246

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Introduction

This manual describes the Multi-Purpose Server (MPS) Release 6.0 and all later releases until this part number is replaced by a part number later than 910-4495-001. 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 1000 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.

Related Publications

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

Documentation 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 for product and service support through highly trained engineers or service personnel. The Tekelec Customer Care Center is available 24 hours a day, 7 days a week at the following locations:

- Tekelec, USA
Phone: +1 888 367 8552 (US and Canada only)
+1 919 460 2150
Email: support@tekelec.com
- Tekelec, Europe
Phone: +44 1784 467804
Email: ecsc@tekelec.com

When a call is received, a Customer Service Report (CSR) is issued to record the request for service. Each CSR includes an individual tracking number.

Once a CSR is issued, Technical Services determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, information regarding the serial number of the system, COMMON Language Location Identifier (CLLI), initial problem symptoms (includes outputs and messages) is recorded. A primary Technical Services engineer is also assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Emergency Response

In the event of a critical service situation, emergency response is offered by Tekelec Technical Services twenty-four hours a day, seven days a week. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

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

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

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

Documentation Packaging, Delivery and Updates

Customer documentation is provided with each system in accordance with the contract agreements. It is updated whenever significant changes that affect system operation or configuration are made. Updates may be issued as an addendum, or a reissue of the affected documentation.

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

Two types of releases are major software releases and maintenance releases. Maintenance releases are issued as addenda with a title page and change bars. On changed pages, the date and document part number are changed; on unchanged pages that accompany the changed pages, the date and document part number are unchanged.

When the software release has a minimum affect on documentation, an addendum is provided. The addendum contains an instruction page, a new title page, a change history page, and replacement chapters with the date of publication, the document part number, and change bars.

If a new release has a major impact on documentation, such as a new feature, the entire documentation set is reissued with a new part number and a new release number.

2

Platform Overview

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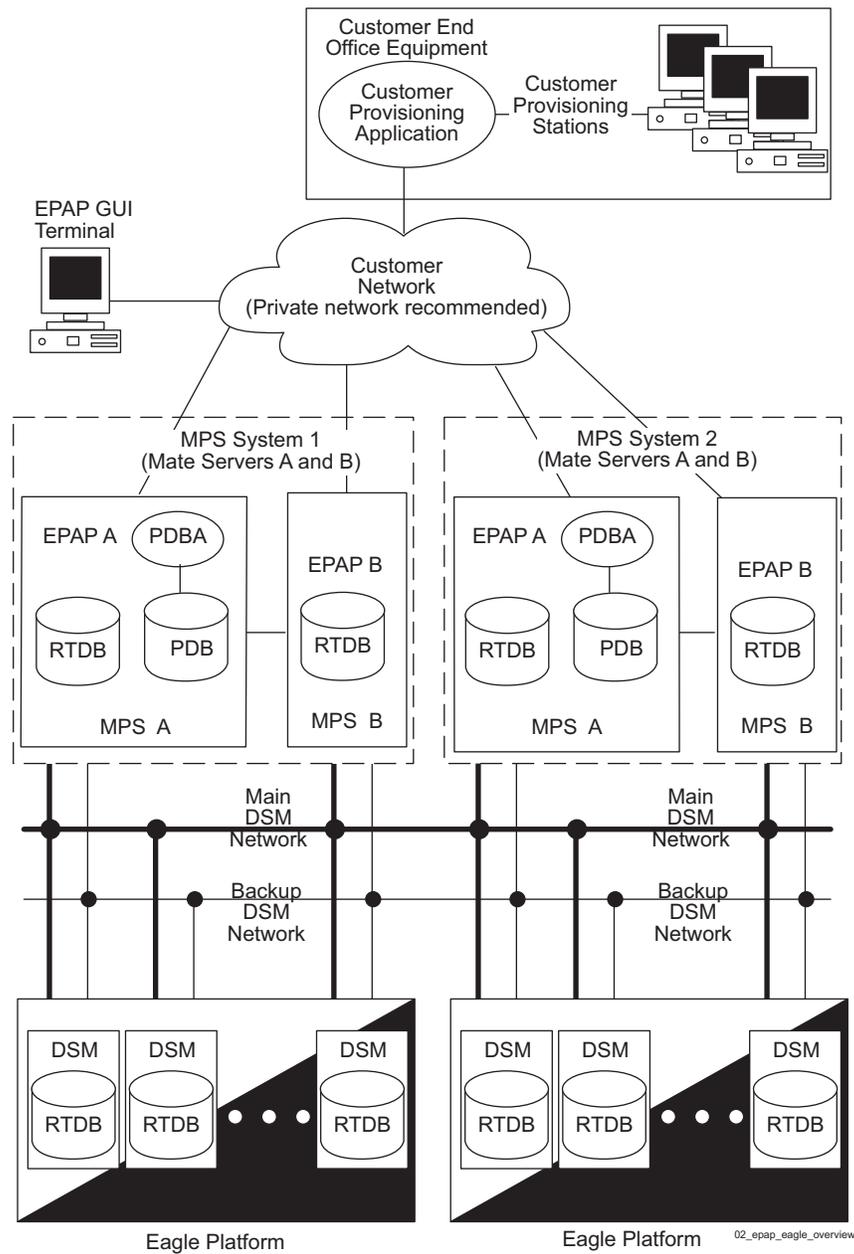
Introduction

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 5 ISS Provisioning Application Processor (EPAP) . The EPAP application includes the INP, G-Flex®, G-Port®, IS-41 to GSM Migration, and Equipment Identity Register (EIR) features. 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.

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

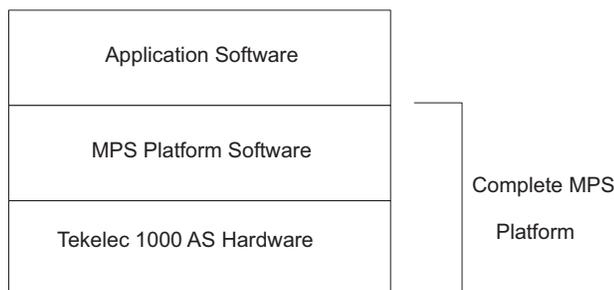
Figure 2-1. MPS/EAGLE 5 ISS Overview



Layered Design

MPS is based on the Tekelec 1000 AS platform and uses a layered design with defined interfaces to enable application and platform changes to be made independently. This design provides an environment in which changes made to platform components need not cause changes in application.

Figure 2-2 on page 2-4 shows the layered design of the MPS and the application it supports. In this manual, the application software is EPAP.

Figure 2-2. Layered Design for MPS and Applications

The MPS platform software is described in “MPS Platform Software Configuration” on page 2-10. For information about the other layers, refer to the following manuals:

- The Tekelec 1000 AS hardware layer is described in the *Tekelec 1000 Application Server Hardware Manual*.
- The application software is described in the *EPAP Administration Manual*.

MPS Terminology

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

Table 2-1. MPS Terminology

Term	Definition
MPS Server	The Tekelec 1000 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.

Table 2-1. MPS Terminology (Continued)

Term	Definition
EPAP A	The EPAP application running on MPS server A (the upper server)
EPAP B	The EPAP application running on MPS server B (the lower server)

Tekelec 1000 AS Terminology

The following table shows the terms used in describing the Tekelec 1000 AS platform.

Table 2-2. Tekelec 1000 AS Platform Terminology

Term	Definition
IPM	Initial Product Manufacture, the process of installing Tekelec 1000 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 1000 AS platform	Combination of Tekelec 1000 AS hardware and Tekelec 1000 AS software platform.
TPD	Tekelec Platform Distribution, common platform Operating System packaged and distributed by Tekelec that is the base installation for all products built on the Tekelec 1000 AS platform.

EAGLE 5 ISS Terminology

The EAGLE 5 ISS supports more than one model of Database Service Module (DSM) card. The cards differ in the size of database and the transactions/second rate that they support. In this manual, the term DSM is used to mean any model of DSM, unless a specific model is mentioned. For more information about the supported DSM models, refer to the *Hardware Manual - EAGLE 5 ISS*.

MPS System Hardware Configuration

Each MPS system requires the hardware shown in Table 2-3.

Table 2-3. MPS Hardware Components

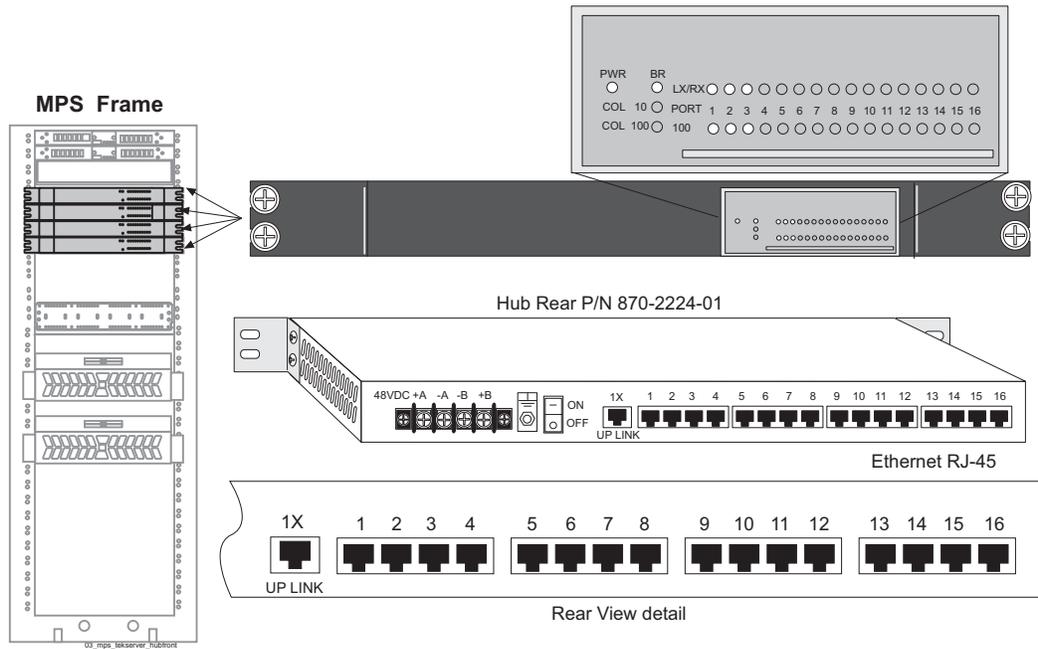
Qty	Hardware Item	For more detail, see:	To replace, see:
2	<p>Tekelec 1000 AS main unit; each unit has the following cards added during manufacturing:</p> <ul style="list-style-type: none"> • Three dual-port gigabit Ethernet Peripheral Component Interconnect (PCI) cards • One Quad-Port serial PCI card • One PCI modem card (for use only by the Customer Care Center) <p>Each Tekelec 1000 AS main unit has 2 gigabytes of Random Access Memory (RAM) installed and available.</p>	<i>Tekelec 1000 Application Server Hardware Manual</i>	<i>Tekelec 1000 Application Server Hardware Manual</i>
4	<p>Ethernet hubs:</p> <ul style="list-style-type: none"> • Two for main DSM network • Two for backup DSM network 	"Hubs" on page 2-6	"Hub Replacement Procedure" on page 5-8
2	Breaker panels	"Breaker Panels" on page 2-7	"Breaker Panel Replacement Procedure" on page 5-6
1	Power distribution panel (also called terminal block or terminal strip)	<i>Tekelec 1000 Application Server Hardware Manual</i>	Contact the Customer Care Center (see page 1-3)

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 2-3 on page 2-7 shows the location of the four hubs in the MPS frame and a magnified view of one of the hubs.

Figure 2-3. MPS Hubs



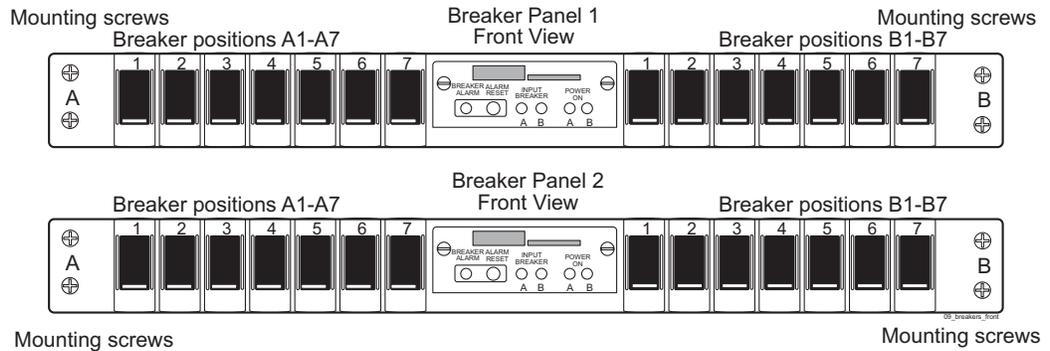
Breaker Panels

Figure 2-4 shows the two breaker panels used to provide redundant power paths:

- An upper breaker panel, called BP-1
- A lower breaker panel, called BP-2

Each breaker panel has two sides: side A and side B. Each side has seven breakers, although only certain breakers on each side are active (closed). The open position of each breaker is marked by "O" and "I" marks the closed position.

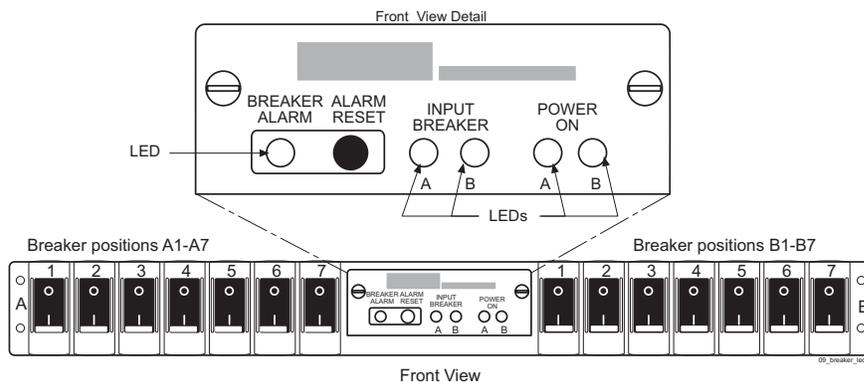
Figure 2-4. Front of Breaker Panel



Breaker Panel LEDs

Figure 2-5 shows a close-up of the power module, also called the “Indicator Panel,” in the center of the front of each breaker panel.

Figure 2-5. Breaker Panel LEDs



The power module contains two pairs of light-emitting diodes (LEDs), each labeled **A** and **B** with respect to the side of the breaker panel that the LED represents:

- The pair of LEDs labeled **INPUT BREAKER** is on (illuminated green) for normal operation. If one of the rear input breakers opens (pops out), its respective LED is off (not illuminated).
- The pair of LEDs labeled **POWER ON** is also on (illuminated green) for normal operation. If power is lost coming to the breaker panel, the affected LED is off (not illuminated.)

NOTE: If one of the **POWER ON** LEDs is off, the respective **INPUT BREAKER** LED will also be off and the **BREAKER ALARM** LED will be illuminated red.

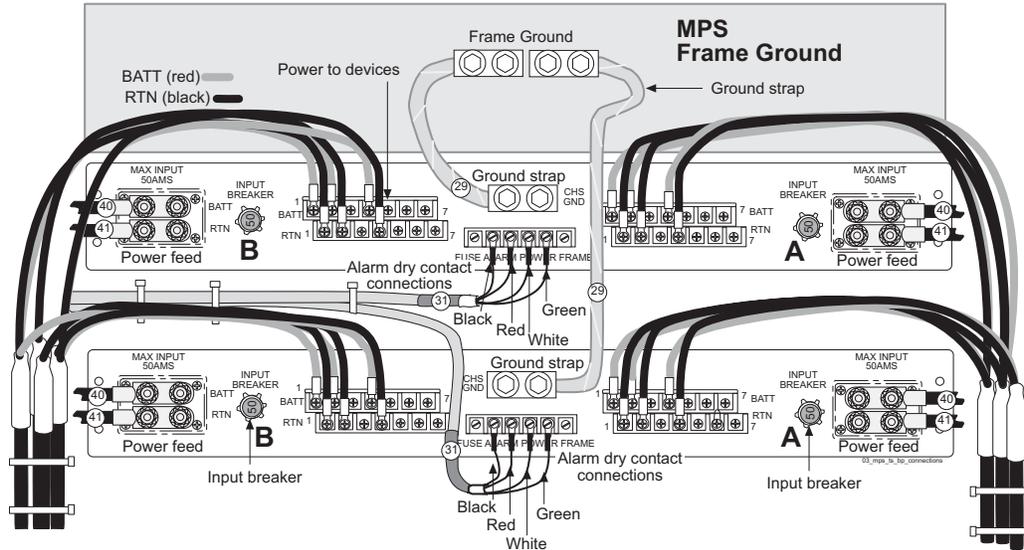
Breaker Panel Power

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.

For more information about the cabling shown in Figure 2-6, refer to the *Signaling Products Integrated Applications Installation Manual*.

Figure 2-6. Rear of Breaker Panel



Mapping Breakers to Devices

Only breakers 1, 2, and 4 on each side of each breaker panel are active (closed). The inactive breakers are not required to be in the closed position. Table 2-4 on page 2-9 shows each active breaker and the device it controls.

Table 2-4. Mapping of Active (Closed) Breakers to Devices

Breaker Panel	Side	Breaker	Device
Upper (BP-1)	A	1	MPS A
		2	Hub 1
		4	Hub 2
	B	1	MPS B
		2	Hub3
		4	Hub4
Lower (BP-2)	A	1	MPS B
		2	Hub 3
		4	Hub 4
	B	1	MPS A
		2	Hub 1
		4	Hub 2

The table shows only end-to-end connectivity from the breaker panel breakers to the MPS. For a more detailed explanation of the wiring, refer to the *Signaling Products Integrated Applications Installation Manual*.

Power Distribution Panel

Power is routed through four terminal blocks, mounted in a power distribution panel (also called a terminal strip) on the rear of the frame.

For more information about the power distribution panel, refer to the MPS section of the *Signaling Products Integrated Applications Installation Manual*.

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:

- “Kernel” on page 2-10
- “Remote Access” on page 2-13
- “Installation and Upgrade” on page 2-14
- “Diagnostics, Monitoring, and Alarming” on page 2-15
- “Disaster Recovery” on page 2-16
- “Security” on page 2-16

Kernel

The MPS platform uses an optimized kernel which supports:

- UNIX domain sockets
- TCP/IP version 4
- Integrated Drive Electronics (IDE)
- Universal Serial Bus (USB) version 1.1
- Point-to-Point Protocol (PPP) for dial-in access
- 10/100BASE-T and 1000BASE-T Ethernet cards

Serial Communication

The MPS provides the serial communication interfaces shown in Figure 2-7 on page 2-11 and described in Table 2-5 on page 2-12:

Figure 2-7. MPS Serial Port Connections

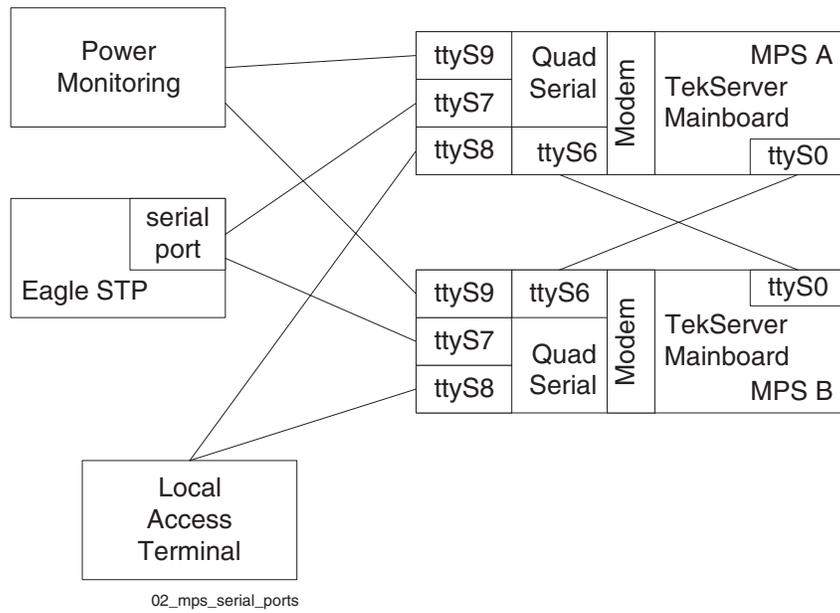
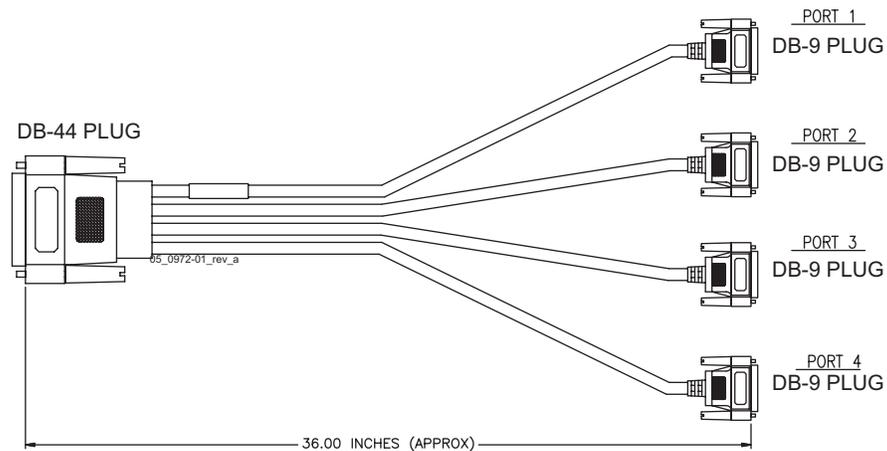


Table 2-5. MPS Serial Port Assignments

Serial Port Name	Location	Access Through:	Serial Port Description
ttyS0	On Tekelec 1000 AS mainboard	Serial RS-232 port on rear of Tekelec 1000 AS chassis	Configured as the console port, cable-crossed to mate: <ul style="list-style-type: none"> • 115200 baud • 8 data bits • 1 stop bit • No parity
ttyS6	Quad-Serial card in PCI slot 8	Port 1 of DB44 to DB9 (X4) cable*	Cable from mate's ttyS0 serial port, configured as: <ul style="list-style-type: none"> • 115200 baud • 8 data bits • 1 stop bit • No parity
ttyS7	Quad-Serial card in PCI slot 8	Port 2 of DB44 to DB9 (X4) cable*	Serial EAGLE 5 ISS connection port, configured by the MPS as: <ul style="list-style-type: none"> • 9600 baud • Parity 7E1 • Logins enabled
ttyS8	Quad-Serial card in PCI slot 8	Port 3 of DB44 to DB9 (X4) cable*	Local access terminal port, configured by the MPS as: <ul style="list-style-type: none"> • 9600 baud • Parity 7E1 • Logins enabled
ttyS9	Quad-Serial card in PCI slot 8	Port 4 of DB44 to DB9 (X4) cable*	Power monitoring port
NOTE: * For port assignments on the DB44 to DB9 (X4) cable, see Figure 2-8 on page 2-13. Port 0 of this cable connects to the Quad-Serial card in PCI slot 8.			

Figure 2-8. DB44 to DB9 (X4) Cable



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 2-6 on page 2-18.
- 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 **rqp**
 - 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, installed in PCI slot 7 on both MPS A and MPS B, provide access for both Microsoft® Windows® and Linux® clients using the Point to Point Protocol (PPP). The modems are for use only by the Customer Care Center.

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 the Customer Care Center. Contact them to schedule an installation or upgrade (see page 1-3).

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 3-11.

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.

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 EPAP 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 three added dual-port gigabit Ethernet PCI cards to support network interfaces (see “MPS System Hardware Configuration” on page 2-5). The MPS software configures the Ethernet interfaces and modifies files to make the network interfaces available to the EPAP application.

Figure 2-9 shows the network connections for an MPS system.

Figure 2-9. MPS Network Connections

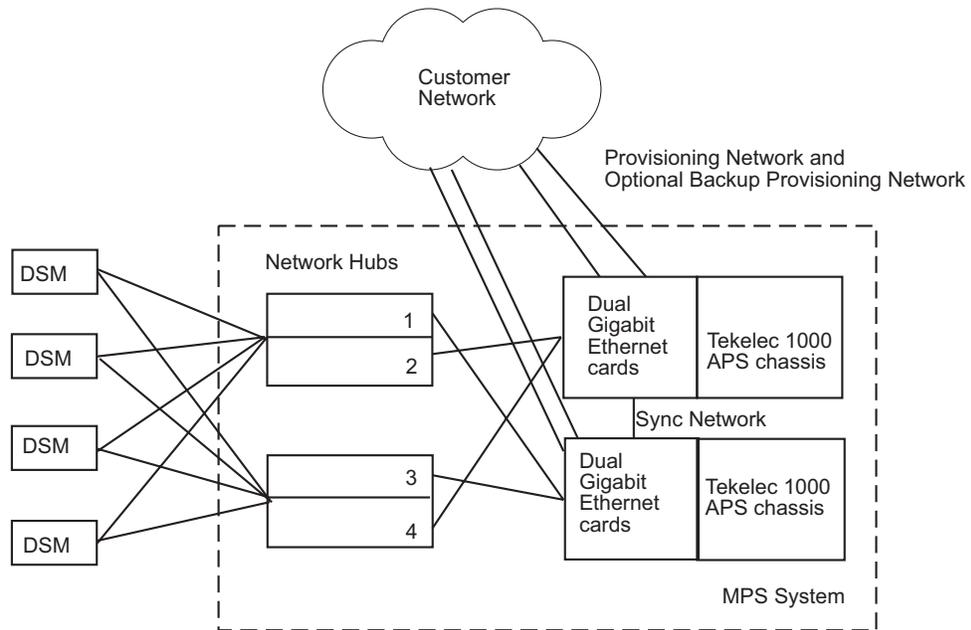


Table 2-6 on page 2-18 describes the network interfaces and how they are used.

Table 2-6. MPS Network Interfaces

Interface Number	Interface Function	Speed and Routing	Network Description
eth0 (lower port on PCI card 4)	Provisioning network	<ul style="list-style-type: none"> • 10/100 BaseT auto-sensing device: <ul style="list-style-type: none"> — 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 is the only required network attached directly to the customer's network (an optional backup provisioning network can be configured on eth4). 	This port is available for remote access and carries: <ul style="list-style-type: none"> • 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 (upper port on PCI card 4)	Main DSM network (A ports only)	<ul style="list-style-type: none"> • 100BaseT 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 (lower port on PCI card 1)	Backup DSM network (B ports only)	<ul style="list-style-type: none"> • 10BaseT: <ul style="list-style-type: none"> — 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 (upper port on PCI card 1)	Sync network	<ul style="list-style-type: none"> • Full-duplex Gigabit Ethernet • Point-to-point network between MPS servers 	This network provides a high-bandwidth dedicated communication channel for MPS data synchronization.

Table 2-6. MPS Network Interfaces (Continued)

Interface Number	Interface Function	Speed and Routing	Network Description
eth4 (lower port on PCI card 6)	Backup provisioning network (optional)	<ul style="list-style-type: none"> • 10/100 BaseT auto-sensing device: <ul style="list-style-type: none"> — 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 is an optional network 	This network can be used as a limited backup network to be available for remote access and to carry all provisioning information from the customer's provisioning system when the main provisioning network is down. NOTE: This network path cannot be used as an alternate path for information that is replicated between PDBs or information flowing from PDBs to RTDBs.
eth5 (upper port on PCI card 6)	NOT USED	N/A	N/A

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.

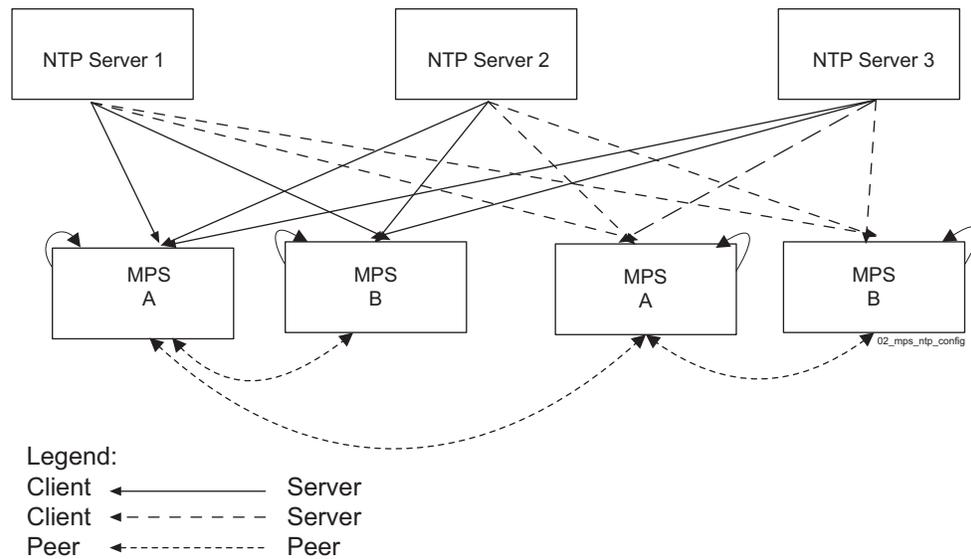
Normally, client workstations do not operate as NTP servers. NTP servers with a relatively small number of clients do not receive their time from a stratum-1 server. At each stratum, it is usually necessary to use redundant NTP servers and diverse network paths in order to protect against broken software, 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 2-10 on page 2-21 shows the NTP configuration used by MPS.

Figure 2-10. MPS NTP Configuration



All MPS servers running the EPAP application have the option to be configured, through the EPAP 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 *EPAP Administration Manual*.

User and Group Administration

The following groups 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.

- tk1cphp (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.

3

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 EPAP 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

Tekelec recommends that the Automatic PDB/RTDB Backup feature be used to backup all data stored in the PDB/RTDB. The Automatic PDB/RTDB Backup feature automates the process of creating backups of the PDB and RTDB databases at the time, frequency, and to the destination configured by the user. The Automatic PDB/RTDB Backup feature replaces all procedures listed under the Daily maintenance procedures. Refer to the EPAP Administration Manual to configure the Automatic PDB/RTDB Backup feature.

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, “Backing Up the PDB,” on page 3-6
 - Procedure 3-3, “Transferring RTDB and PDB Backup Files,” on page 3-8
- Monthly maintenance procedures:
 - Procedure 3-4, “Replacing a Fan Filter,” on page 3-9
 - Procedure 3-5, “Verifying Modem Availability,” on page 3-10

Daily Maintenance

Tekelec recommends that the Automatic PDB/RTDB Backup feature be used to backup all data stored in the PDB/RTDB. The manual backup procedures are included in this section for reference in case there is a need to manually perform this function. 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.

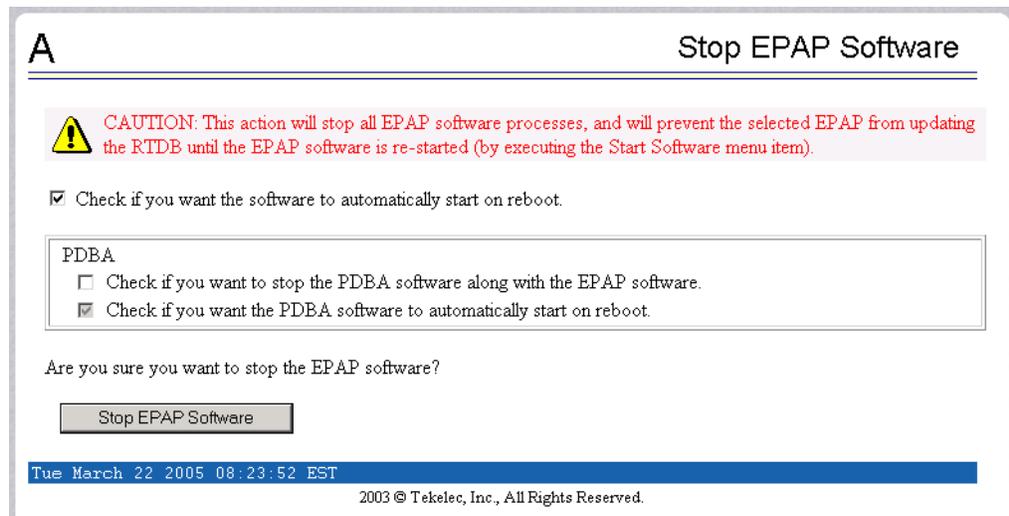
Procedure 3-1. Backing Up the RTDB

1. Log into the EPAP GUI on MPS A as the **epapall** user. For information about how to log in to the EPAP GUI, refer to the *EPAP Administration Manual*.
 2. If you are not logged into EPAP A, select the **Select Mate** option.
-

3. From the EPAP Menu, select **Process Control>Stop Software**.
4. On the Stop EPAP Software screen as shown in Figure 3-1, click **Stop EPAP Software**.

NOTE: DO NOT select the option to stop the PDB along with the EPAP software.

Figure 3-1. Stop EPAP Software

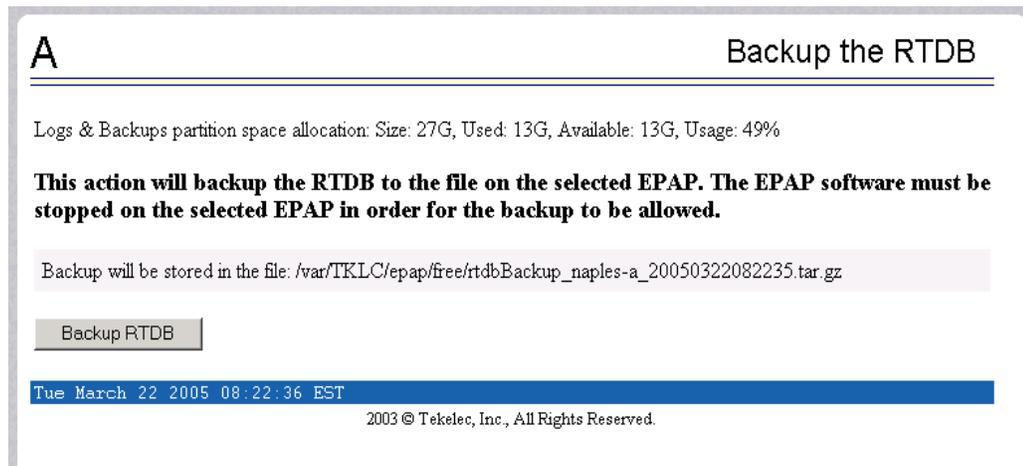


5. When the EPAP software has stopped successfully, the screen shown in Figure 3-2 displays:

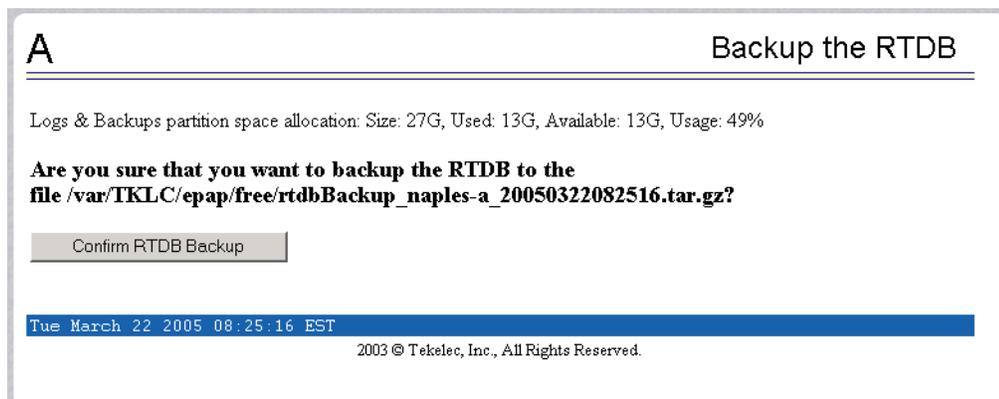
Figure 3-2. EPAP Software Successfully Stopped



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

Figure 3-3. Backup the RTDB

7. Make a note of the file name as shown in this example:
`/var/TKLC/epap/free/rtdbBackup_naples-a20050322082516.tar.gz`
8. Click **Backup RTDB**. The screen in Figure 3-4 displays a request for confirmation:

Figure 3-4. Backup the RTDB Confirmation

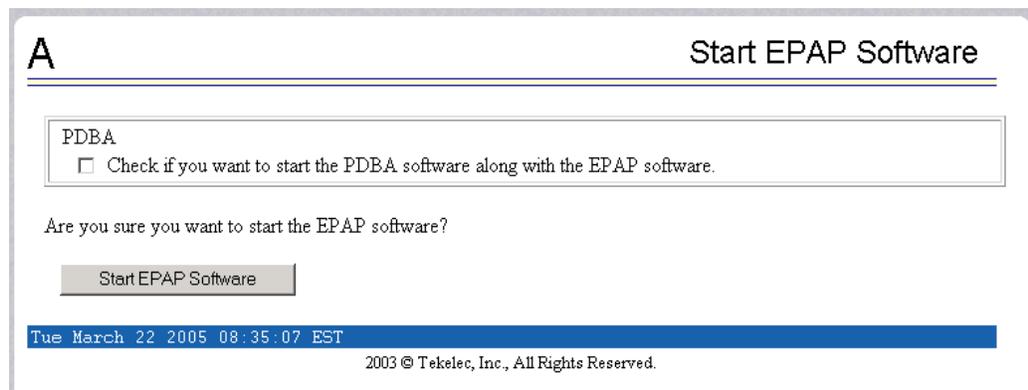
Click **Confirm RTDB Backup**.

9. If the backup starts successfully, the following message will scroll through the GUI banner:
 Backup RTDB in progress.
10. When the backup completes successfully, the screen in Figure 3-5 displays:

Figure 3-5. Backup the RTDB - Success

11. Select **Process Control>Start Software** from the EPAP Menu.

12. On the Start EPAP Software screen as shown in Figure 3-6, click **Start EPAP Software**.

Figure 3-6. Start EPAP Software

13. When the EPAP software has started successfully, the screen in Figure 3-7 displays:

Figure 3-7. Start EPAP Software - Success

-
14. This procedure is now complete. Continue to Procedure 3-2, "Backing Up the PDB," on page 3-6.
-

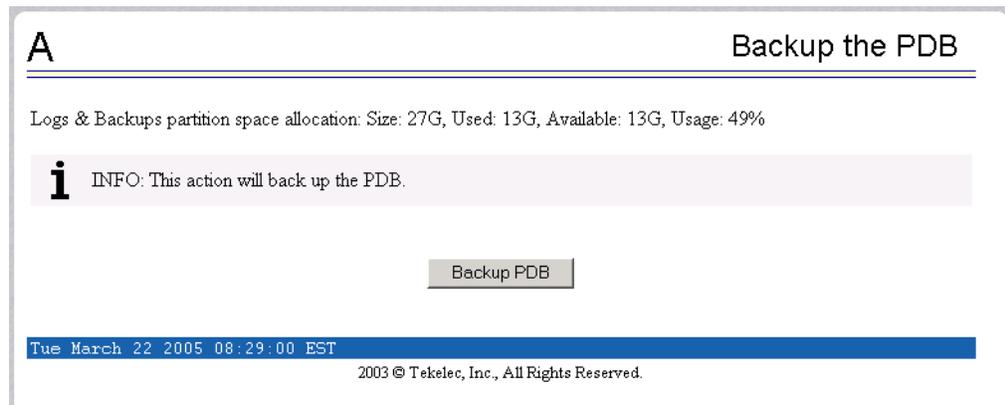
Backing Up the PDB

Perform this procedure once a day. Estimated time of completion is one hour. PDB provisioning can take place while this procedure is being performed.

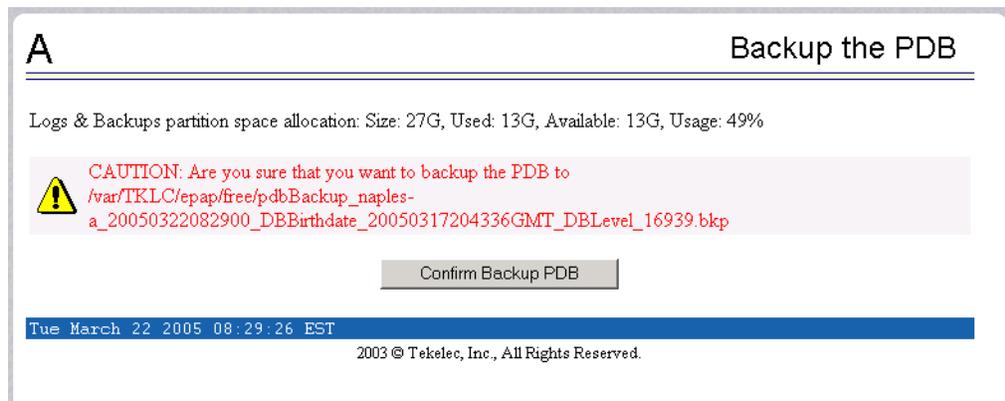
NOTE: Ensure that you perform this procedure on the same server on which you performed Procedure 3-1, "Backing Up the RTDB," on page 3-2. Ensure that you performed Procedure 3-1 first so that the RTDB backup level will be lower than the associated PDB backup level.

Procedure 3-2. Backing Up the PDB

1. Log into the EPAP GUI on MPS A as the **epapall** user. For information about how to log in to the EPAP GUI, refer to the *EPAP Administration Manual*.
 2. If you are not logged into EPAP A, select the **Select Mate** option.
 3. From the EPAP Menu, select **PDBA>Maintenance>Backup>Backup the PDB**.
 4. On the **Backup the PDB** screen as shown in Figure 3-8, click **Backup PDB**:
-

Figure 3-8. Backup the PDB

5. The screen shown in Figure 3-9 displays a button to confirm the desire to backup the PDB and the file name:

Figure 3-9. Backup PDB Confirmation

Make a note of the file name; in this example, the file name is:

```
/var/TKLC/epap/free/pdbBackup_naples-a_20050322082900_DBBirthdate_20050317204336GMT_DBLLevel_16939.bkp
```

Click **Confirm Backup PDB**.

6. While the backup is running, the following message will scroll through the GUI banner:

```
Backup PDB in progress.
```

7. When the backup completes successfully, the following screen shown in Figure 3-10 displays:

Figure 3-10. Backup the PDB - Success

8. This procedure is now complete. Continue to Procedure 3-3, "Transferring RTDB and PDB Backup Files," on page 3-8.

Transferring RTDB and PDB Backup Files

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

Procedure 3-3. Transferring RTDB and PDB Backup Files

1. Log into the EPAP command line interface with user name **epapdev** and the password associated with that name.
2. Use the Secure File Transfer Protocol (**sftp**) to transfer the following files to a remote, safe location:
 - The RTDB backup file, whose name was recorded in step 7 on page 3-4.
 - The PDB backup file, whose name was recorded in step 5 on page 3-7.
3. This procedure is now complete.

Monthly Maintenance

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

Replacing Fan Filters

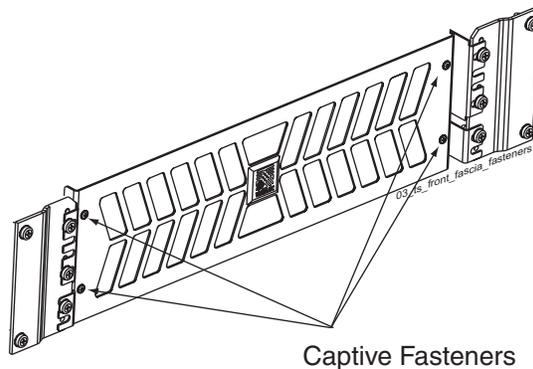
Tekelec recommends replacing filters once a month (or more often, depending on the operating environment). Use the following procedure to replace a filter.

Procedure 3-4. Replacing a Fan Filter

1. Using a Phillips screwdriver, remove the front fascia of the Tekelec 1000 AS chassis by loosening the four spring-loaded captive 1/4 turn screws. See Figure 3-11.

NOTE: Fan filters can be removed from the chassis without turning off the power. A finger-safe perforated panel separates the moving fans from the filters. The Tekelec 1000 AS chassis does not have to be extended from the frame for this procedure.

Figure 3-11. Tekelec 1000 AS Front Fascia Fasteners



-
2. Remove the old filter and discard.
 3. Insert the new filter (P/N 551-0022-01).

NOTE: The filter has an arrow to indicated direction of airflow. The arrow should point toward the rear of the chassis.

NOTE: To orient the fascia when replacing, there is a label "TOP" that can be observed from the back of the fascia.

4. Using a Phillips screwdriver, replace the front fascia by tightening the four spring-loaded captive 1/4 turn screws.
 5. This procedure is complete.
-

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 the Customer Care Center; the support personnel need to be able to dial in to the MPS system.

Procedure 3-5. 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 internal modem card (in PCI slot 7). For information about which servers contain modems, see "MPS System Hardware Configuration" on page 2-5.

2. Log in with username **syscheck** and password **syscheck** (see Procedure A-5, "Running syscheck Using the syscheck Login," on page A-7).
 - 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 1-3).

3. Shut off your terminal emulation software.

Detecting and Reporting Problems

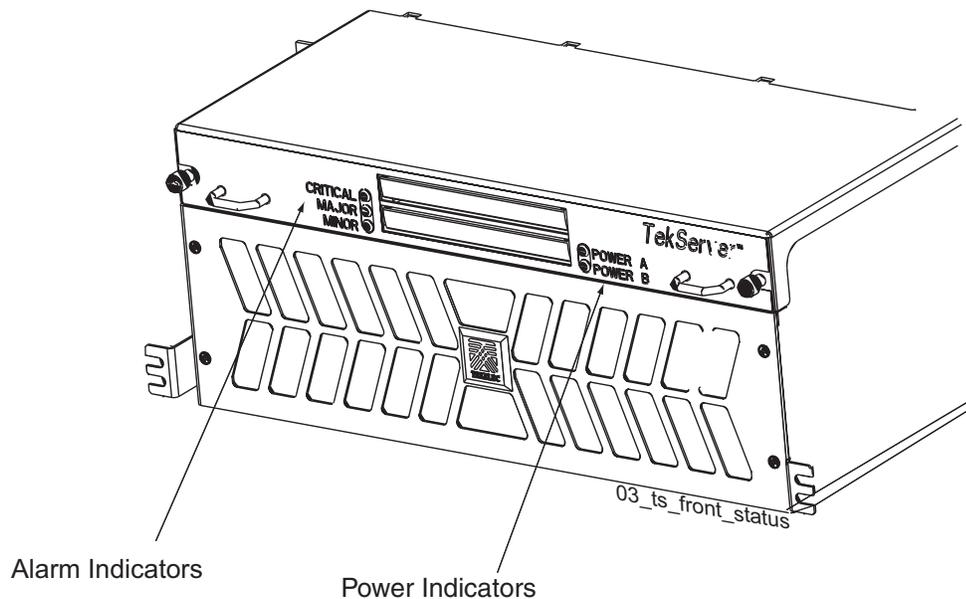
Problems are detected and reported by both of the following:

- 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 3-15.
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 3-11).
 - Sends an alarm message to the MPS application. The MPS application:
 - Displays the alarm on the application GUI (see “Displaying Errors on EPAP GUI” on page 3-13)
 - 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 3-14)
 - Logs the results of the **syscheck** test in a file available for Customer Care Center use. You may be requested to save logs to send to the Customer Care Center; to do so, see “Savelogs Procedure” on page A-8.
- The EPAP 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 3-11).
 - Displays the error on the graphical user interface (GUI) banner (see “Displaying Errors on EPAP GUI” on page 3-13)
 - Forwards the error to the EAGLE 5 ISS, which reports it as a UAM alarm (see “MPS UAMs” on page 3-14).
 - Logs the error in an application log file. You may be requested to save logs to send to the Customer Care Center; to do so, see “Savelogs Procedure” on page A-8.

MPS Alarm LEDs

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

Figure 3-12. MPS Alarm LEDs



The alarms indicate the state of the MPS, as indicated in Table 3-1 on page 3-12.

Table 3-1. MPS 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).

Figure 3-12 on page 3-12 shows the LEDs that correspond to the various categories of platform alarms.

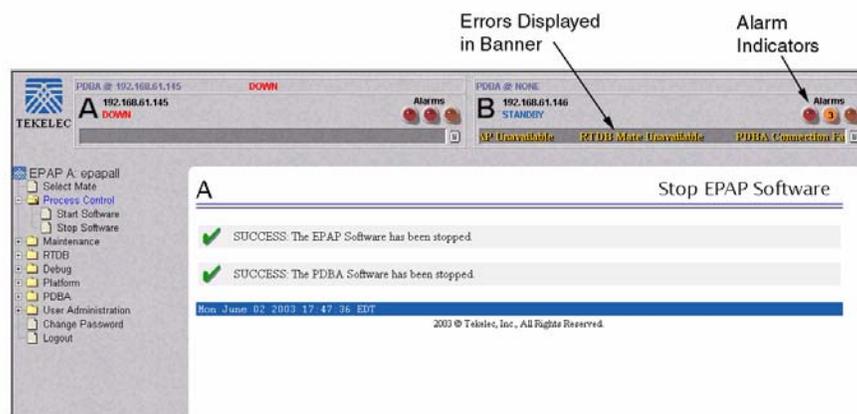
Displaying Errors on EPAP GUI

When the EPAP 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.

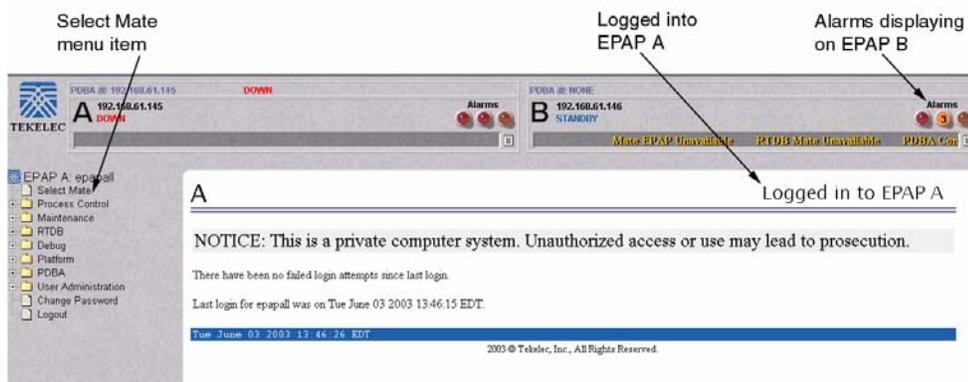
Figure 3-13 shows an example of errors displayed on the EPAP GUI.

Figure 3-13. Errors Displayed on EPAP 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



When an alarm value in the Alarm View popup window represents multiple alarms, as shown in the example in Figure 3-14, this window shows you the text of each of the alarms being reported. Look up the individual alarm text in Table 4-1 on page 4-2. Find the number that is associated with the text, and look up the number in “MPS Alarm Recovery Procedures” on page 4-4.

MPS UAMs

The EAGLE 5 ISS displays only one alarm per EPAP at a time, based on the highest priority. If a single error is detected, the EPAP application sends an error message to the EAGLE 5 ISS terminal to report the active alarm category. If multiple errors are detected, the EPAP 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 that time, a combination alarm code is sent to the Eagle. 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 3-17).

- 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 EPAP GUI Platform Menu (see Procedure A-4, “Running System Health Check from the EPAP GUI,” on page A-5). The user can request either Normal or Verbose output
 - By logging in as a `syscheck` user (see Procedure A-5, “Running syscheck Using the syscheck Login,” on page A-7). 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 2 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. <ul style="list-style-type: none"> • 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, stopped).
Main Power Feeds	Verify that: <ul style="list-style-type: none"> • 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	<p>Verify that all configured power feeds are within specification. Verify that no breakers have been tripped.</p> <p>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.</p> <p>The following error conditions can be detected:</p> <ul style="list-style-type: none"> • Breaker Panel Breaker Error: To recover, verify all breakers and power feeds (see “3000000002000000” on page 4-28). • Breaker Panel Feed Error: To recover, verify that the breaker panel monitoring cable is installed correctly and is not damaged (see “3000000001000000” on page 4-25) .
Voltages	Measure all monitored voltages on the server mainboard and verify that they are all within the normal expected operating range.
Temperature	<p>Measure the following temperatures and verify that they are within a specified range.</p> <ul style="list-style-type: none"> • 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 38%.
fs: Current Inode used in "/" is 38%.
fs: Current file space use in "/boot" is 12%.
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 4%.
fs: Current file space use in "/var/TKLC" is 21%.
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/epap/rt" is 3%.
fs: Current Inode used in "/var/TKLC/epap/rt" is 1%.
fs: Current file space use in "/var/TKLC/epap/db" is 65%.
fs: Current Inode used in "/var/TKLC/epap/db" is 1%.
fs: Current file space use in "/var/TKLC/epap/logs" is 2%.
fs: Current Inode used in "/var/TKLC/epap/logs" is 1%.
fs: Current file space use in "/var/TKLC/epap/free" is 1%.
fs: Current Inode used in "/var/TKLC/epap/free" is 1%.
fs: 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.
meta: 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: FilenameTypeSizeUsedPriority
swap: /dev/md3                partition205624801000
swap: /var/TKLC/swap/swap.1  file209713601
swap: /var/TKLC/swap/swap.2  file209713602
swap: /var/TKLC/swap/swap.3  file209713603
swap: /var/TKLC/swap/swap.4  file209713604
swap: /var/TKLC/swap/swap.5  file209713605
swap: /var/TKLC/swap/swap.6  file209713606
swap: /var/TKLC/swap/swap.7  file209713607
swap: 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/epap/rt".
write: Successfully read from file system "/var/TKLC/epap/db".
write: Successfully read from file system "/var/TKLC/epap/logs".
write: Successfully read from file system "/var/TKLC/epap/free".
write: Return string: "OK"
smart: Finished examining logs for disk: hdc.
smart: Finished examining logs for disk: hda.
smart: SMART status OK.
smart: Return string: "OK"
OK
Running modules in class hardware...
fancontrol: Return string: "OK"
breaker: Module is disabled.
cmosbattery: Return string: "OK"
fan: Server Fan Status OK.
fan: Return string: "OK"
powera: Return string: "OK"
powerb: Return string: "OK"
temp: Return string: "OK"
voltage: Return string: "OK"
```

```

                                OK
Running modules in class net...
defaultroute: Module is disabled.
ping: Module is disabled.
                                OK
Running modules in class proc...
ntp: *mate                LOCAL(0)          14 u  14   64  377   0.229   0.579   0.062
ntp: 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 3 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 maint...
run: Found 1 instance(s) of the maint process.
run: Checking rtdb...
run: Found 1 instance(s) of the rtdb process.
run: Checking topnode...
run: Found 2 instance(s) of the topnode process.
run: Checking prov...
run: Found 1 instance(s) of the prov process.
run: Checking provRMTP...
run: Found 4 instance(s) of the provRMTP process.
run: Checking provRcvr...
run: Found 4 instance(s) of the provRcvr process.
run: Checking pdba...
* run: ::MINOR:: 5000000000000002 -- Server Application Process Error
run: Only 0 instance(s) of pdba running. 1 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 16 instance(s) of the mysqld process.
run: Checking httpd...
run: Found 1 instance(s) of the httpd process.
run: 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: 1999.800 MHz... OK
cpu: CPU 1 is on-line... OK
cpu: CPU 1 speed: 1999.800 MHz... OK
cpu: CPU 2 is on-line... OK
cpu: CPU 2 speed: 1999.800 MHz... OK
cpu: CPU 3 is on-line... OK
cpu: CPU 3 speed: 1999.800 MHz... OK
cpu: Return string: "OK"
mem: Expected memory found
mem: Skipping minimum expected memory check.
mem: 2111262720 bytes (~2013.45703125 Mb) of RAM installed.
mem: Return string: "OK"
                                OK

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

```

NOTE: When errors occur, the syscheck output also includes the alarm number and text that is generated. The example above highlights the alarm 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 3-25

Restoring Databases from Backup Files

This section describes how restore the RTDB or PDB or both from backup files.

Restoring the RTDB from Backup Files

To restore the EPAP’s RTDB from a backup file, contact the Customer Care Center (see page 1-3).

NOTE: Tekelec recommends that the RTDB be backed up daily (see section, “Daily Maintenance” on page 3-2). The RTDB for EPAP Release 5.3 and later **CANNOT** be restored from backups made on an EPAP release earlier than 5.3.

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



CAUTION: Contact the Customer Care Center before performing this procedure.

Procedure 3-6. Restoring the RTDB

1. Log into the EPAP command line interface with user name **epapdev** and the password associated with that name.

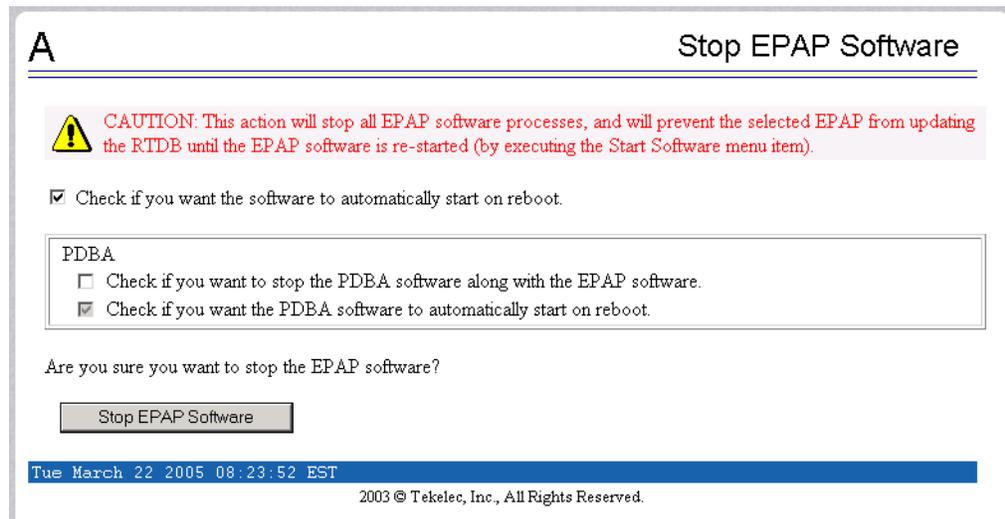
2. Use the Secure File Transfer Protocol (**sftp**) to transfer the RTDB backup file (whose name was recorded in step 7 on page 3-4) to the following location:

```
/var/TKLC/epap/free/
```

3. Log into the EPAP GUI (see Procedure A-1, “Accessing the EPAP GUI Interface,” on page A-2).

4. Select **Process Control>Stop Software** to ensure that no other updates are occurring. The screen in Figure 3-20 displays:

Figure 3-15. Stop EPAP Software



A Stop EPAP Software

 **CAUTION:** This action will stop all EPAP software processes, and will prevent the selected EPAP from updating the RTDB until the EPAP software is re-started (by executing the Start Software menu item).

Check if you want the software to automatically start on reboot.

PDBA

Check if you want to stop the PDBA software along with the EPAP software.

Check if you want the PDBA software to automatically start on reboot.

Are you sure you want to stop the EPAP software?

Tue March 22 2005 08:23:52 EST

2003 © Tekelec, Inc., All Rights Reserved.

5. When you stopped the software on the selected EPAP, the screen in Figure 3-21 displays:

Figure 3-16. Stop EPAP Software - Success



A Stop EPAP Software

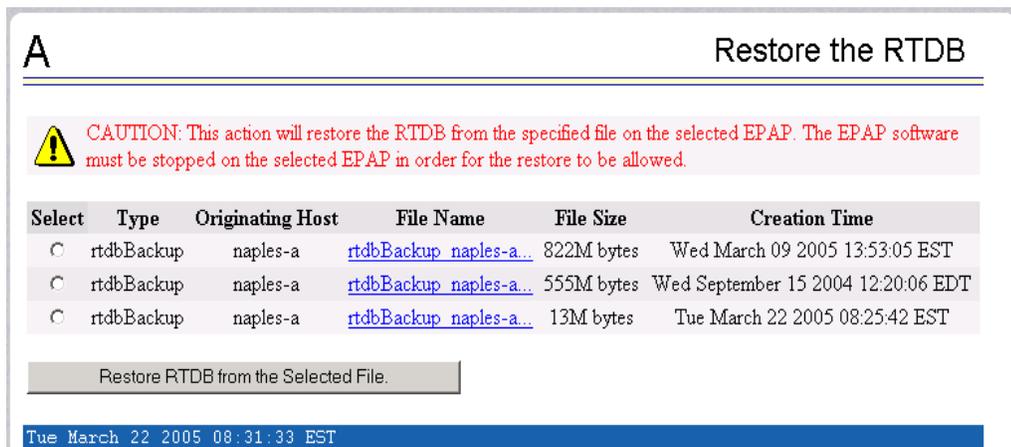
 **SUCCESS:** The EPAP Software has been stopped.

Tue March 22 2005 08:24:34 EST

2003 © Tekelec, Inc., All Rights Reserved.

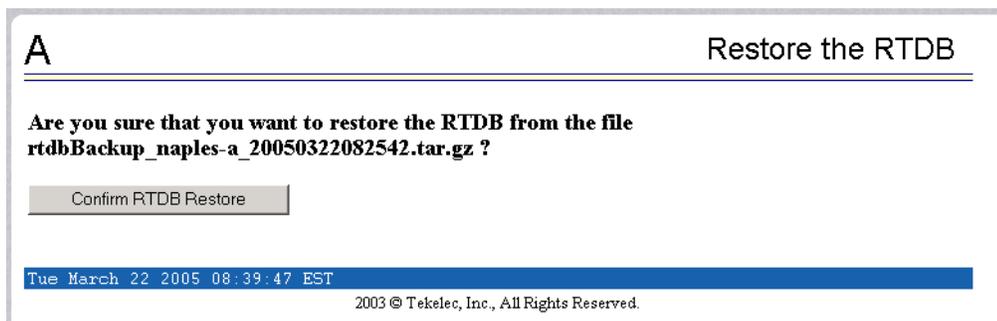
6. Select **RTDB>Maintenance>Restore RTDB**. The screen shown in Figure 3-17 displays:

Figure 3-17. Restoring the RTDB

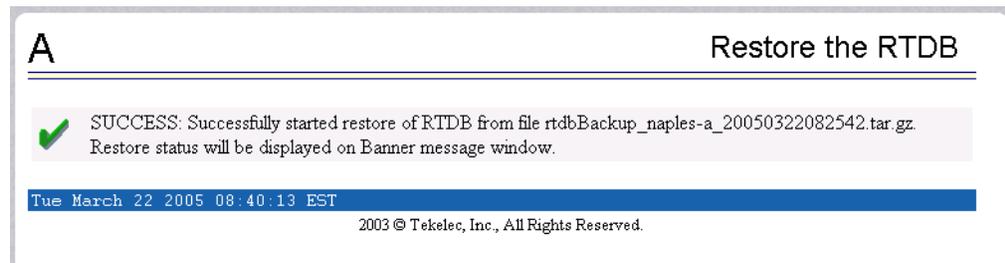


7. On the screen shown in Figure 3-17, select the file that was transferred in step 2. Click **Restore the RTDB from the Selected File**.
8. To confirm restoring a file, click **Confirm RTDB Restore** shown in the screen for RTDB in Figure 3-18:

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.

Restoring the PDB from Backup Files

To restore the EPAP's PDB from a backup file, contact the Customer Care Center (see page 1-3).

NOTE: Tekelec recommends that the PDB be backed up daily (see section, "Daily Maintenance" on page 3-2).

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



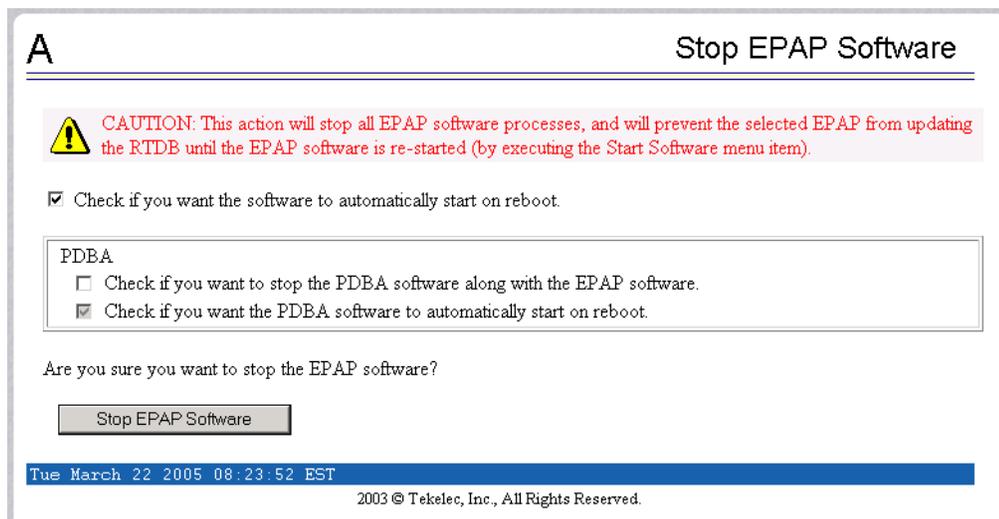
CAUTION: Contact the Customer Care Center before performing this procedure.

Procedure 3-7. Restoring the PDB

1. Log into the EPAP command line interface with user name **epapdev** and the password associated with that name.
2. Use the Secure File Transfer Protocol (**sftp**) to transfer the PDB backup file (whose name was recorded in step 7 on page 3-4) to the following location:

```
/var/TKLC/epap/free/
```
3. Log into the EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).
4. Select **Process Control>Stop Software** to ensure that no other updates are occurring. The screen in Figure 3-20 displays:

Figure 3-20. Stop EPAP Software



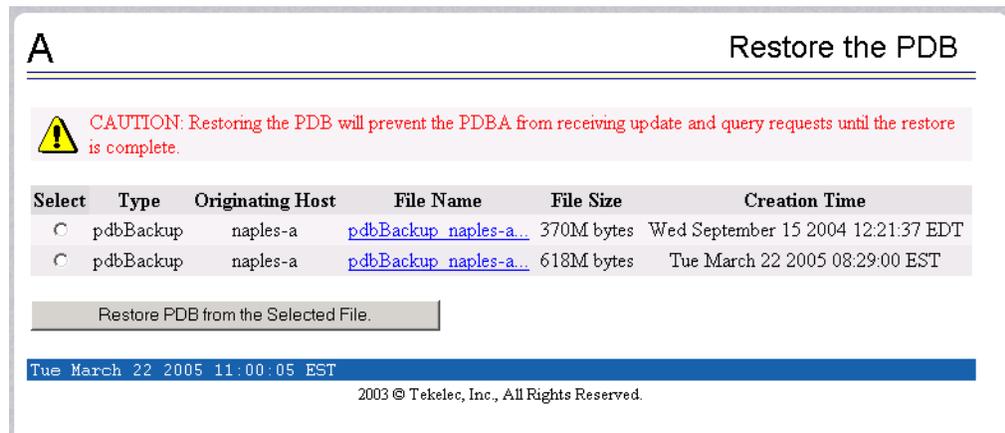
5. When you stopped the software on the selected EPAP, the screen in Figure 3-21 displays:

Figure 3-21. Stop EPAP Software - Success



6. Select **PDBA>Maintenance>Backup>Restore the PDB**. The screen shown in Figure 3-17 displays:

Figure 3-22. Restoring the PDB



7. On the screen shown in Figure 3-22, select the file that was transferred in step 2. Click **Restore the PDB from the Selected File**.
8. Click **Confirm PDB Restore**.
9. When restoring the file is successful, the screen displays a message about 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.

Evaluate the following problems to find the appropriate recovery procedure:

- If you are investigating a problem that is no longer displayed on the EPAP GUI, perform the following procedures:
 1. Procedure 3-8, “Decode MPS Alarm Strings Reference,” on page 3-26
 2. Procedure 3-9, “Determine Alarm Cause; Find Recovery Procedure,” on page 3-28
 3. Recovery procedure to which you are directed by Procedure 3-9, “Determine Alarm Cause; Find Recovery Procedure,” on page 3-28
- If you are investigating a problem that is being reported currently on the EPAP GUI, perform the following procedures:
 1. Procedure 3-9, “Determine Alarm Cause; Find Recovery Procedure,” on page 3-28.
 2. Recovery procedure to which you are directed by Procedure 3-9, “Determine Alarm Cause; Find Recovery Procedure,” on page 3-28

Decoding Alarm Strings

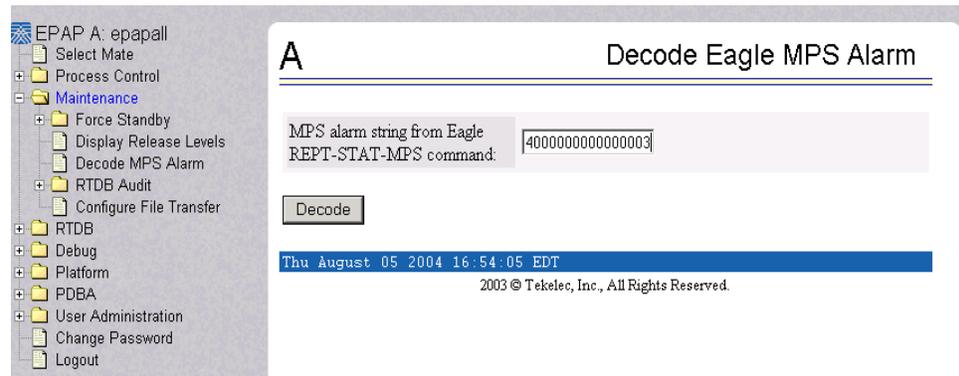
Use the following procedure to decode alarm strings that consist of multiple alarms.

Procedure 3-8. Decode MPS Alarm Strings Reference

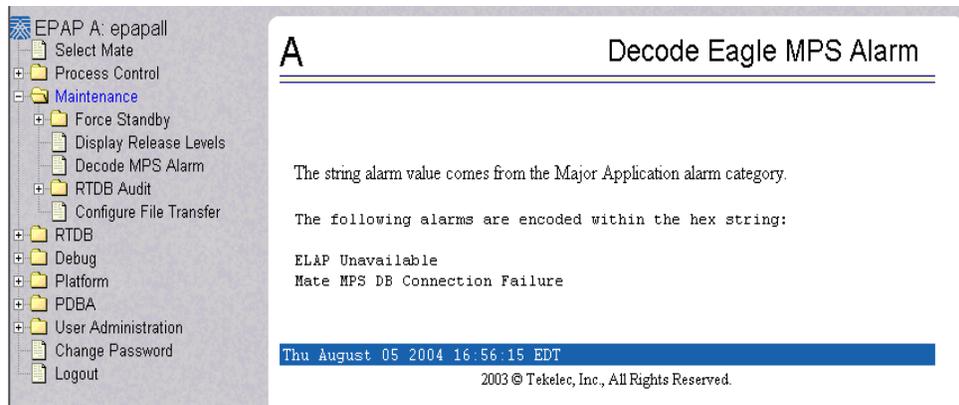
1. Log in to the **User Interface** screen of the EPAP GUI (see Procedure A-1, “Accessing the EPAP GUI Interface,” on page A-2).

2. When you are logged into the EPAP, 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 3-23.

Figure 3-23. 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 3-24 on page 3-27.

Figure 3-24. 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 3-9 on page 3-28.

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 3-9. Determine Alarm Cause; Find Recovery Procedure

1. Record the alarm data string as shown in the banner or the Alarm View on the EPAP GUI or as decoded from Procedure 3-9, "Determine Alarm Cause; Find Recovery Procedure," on page 3-28.

2. Run **syscheck** in verbose mode (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5).

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, call the Customer Care Center (see page 1-3).

4

MPS Platform and Application Alarms

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Critical Application Alarms	4-4
Major Platform Alarms	4-4
Major Application Alarms	4-32
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Minor Application Alarms	4-57

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 3-11.

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,” refer to Procedure 3-8, “Decode MPS Alarm Strings Reference,” on page 3-26.

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 EPAP application. The order within a category is not significant.

Table 4-1. Platform and Application Alarms

Alarm Codes	Error Descriptor	UAMNumber
Critical Platform Errors		
There are no critical EPAP platform alarms		
Critical Application Errors		
There are no critical EPAP application alarms		
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
3000000000010000	Server Power Feed Unavailable	0372
NOTE: The order within a category is not significant.		

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

Alarm Codes	Error Descriptor	UAMNumber
300000000020000	Server Disk Health Test Error	0372
300000000040000	Server Disk Unavailable Error	0372
300000001000000	Breaker Panel Feed Error	0372
300000002000000	Breaker Panel Breaker Error	0372
300000004000000	Breaker Panel Monitoring Error	0372
Major Application Errors		
400000000000001	Mate EPAP Unavailable	0373
400000000000002	RTDB Mate Unavailable	0373
400000000000004	Congestion	0373
400000000000020	RMTP Channels Down	0373
400000000000040	Fatal Software Error	0373
400000000000080	RTDB Corrupt	0373
400000000000100	RTDB Inconsistent	0373
400000000000200	RTDB Incoherent	0373
400000000001000	RTDB 100% Full	0373
400000000002000	RTDB Resynchronization in Progress	0373
400000000004000	RTDB Reload Is Required	0373
400000000008000	Mate PDBA Unreachable	0373
400000000010000	PDBA Connection Failure	0373
400000000020000	PDBA Replication Failure	0373
400000000040000	RTDB DSM Over-Allocation	0375
400000000080000	RTDB Maximum Depth Reached	0375
400000000100000	No PDBA Proxy to Remote PDBA Connection	0375
400000000200000	DSM Provisioning Error	0375
Minor Platform Errors		
500000000000001	Server Disk Space Shortage Warning	0374
500000000000002	Server Application Process Error	0374
500000000000004	Server Hardware Configuration Error	0374
500000000000020	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	UAMNumber
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
6000000000000080	PDB Backup failed	0375
6000000000000100	Automatic PDB Backup failed	0375
6000000000000200	RTDB Backup failed	0375
6000000000000400	Automatic RTDB Backup failed	0375
NOTE: The order within a category is not significant.		

MPS Alarm Recovery Procedures

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

Critical Platform Alarms

There are no critical EPAP alarms

Critical Application Alarms

There are no critical EPAP alarms.

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 4-1. Recovery from Server Fan Failure

1. Refer to the procedure for replacing a fan assembly in the *Tekelec 1000 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-5). 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 to look up the failed fan device in Table 4-2 on page 4-5 and determine which of the server's fan assemblies contains the failed fan. Examining the sample syscheck output above, the fans labeled as **Dev#: 1; mon0, Fan1;** and **mon1, Fan1** are all listed as failed, indicating that fan tray number 1 needs to be replaced.

Table 4-2. Mapping Fan Device Names to Server Fan Tray

Fan Device Name	Fan Tray #
Dev#: 1	1
mon0,Fan1	1
mon1,Fan1	1
Dev#: 2	2

Table 4-2. Mapping Fan Device Names to Server Fan Tray (Continued)

Fan Device Name	Fan Tray #
mon0,Fan2	2
mon1,Fan2	2

- c. Replace the indicated fan tray (using the procedure for replacing a fan assembly in the *Tekelec 1000 Application Server Hardware Manual*) and proceed to step 3.
-
3. Run **syscheck** (see “Running the System Health Check” on page A-5).
 - 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 “Customer Care Center” on page 1-3).
-

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 4-2. Recovery from Server Internal Disk Error

1. Run **syscheck** in Verbose mode (see Procedure A-4, “Running System Health Check from the EPAP GUI,” on page A-5).
-
2. Call Tekelec Customer Care Center and provide the system health check output. See “Customer Care Center” on page 1-3.
-

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 4-3. Recovery from Server Platform Error

1. Run **syscheck** in Verbose mode (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5).
 2. Call Tekelec Customer Care Center and provide the system health check output. See "Customer Care Center" on page 1-3.
-

300000000000010 - Server File System Error

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

Procedure 4-4. Recovery from Server File System Error

1. Call Tekelec Customer Care Center for assistance. See "Customer Care Center" on page 1-3.
-

300000000000020 - 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 4-5. Recovery from Server Platform Process Error

1. Contact Tekelec Customer Care Center for recovery procedures (see "Customer Care Center" on page 1-3).
-

300000000000080 - 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 4-6. Recovery from Server Swap Space Shortage Failure

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

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 the lower port of PCI 4 on the server.

Procedure 4-7. Recovery from Server Provisioning Network Error

1. Verify that the **eth0** cable is securely connected to the lower port of PCI 4 (see Figure 4-1 on page 4-10). Follow the cable to its connection point on the local network and verify this connection is also secure.
 2. Test the **eth0** cable with an Ethernet Line Tester. If the cable does not test positive, replace it.
 3. Have your network administrator verify that the network is functioning properly.
 4. 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 the Customer Care Center for assistance. See page 1-3.
-

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.

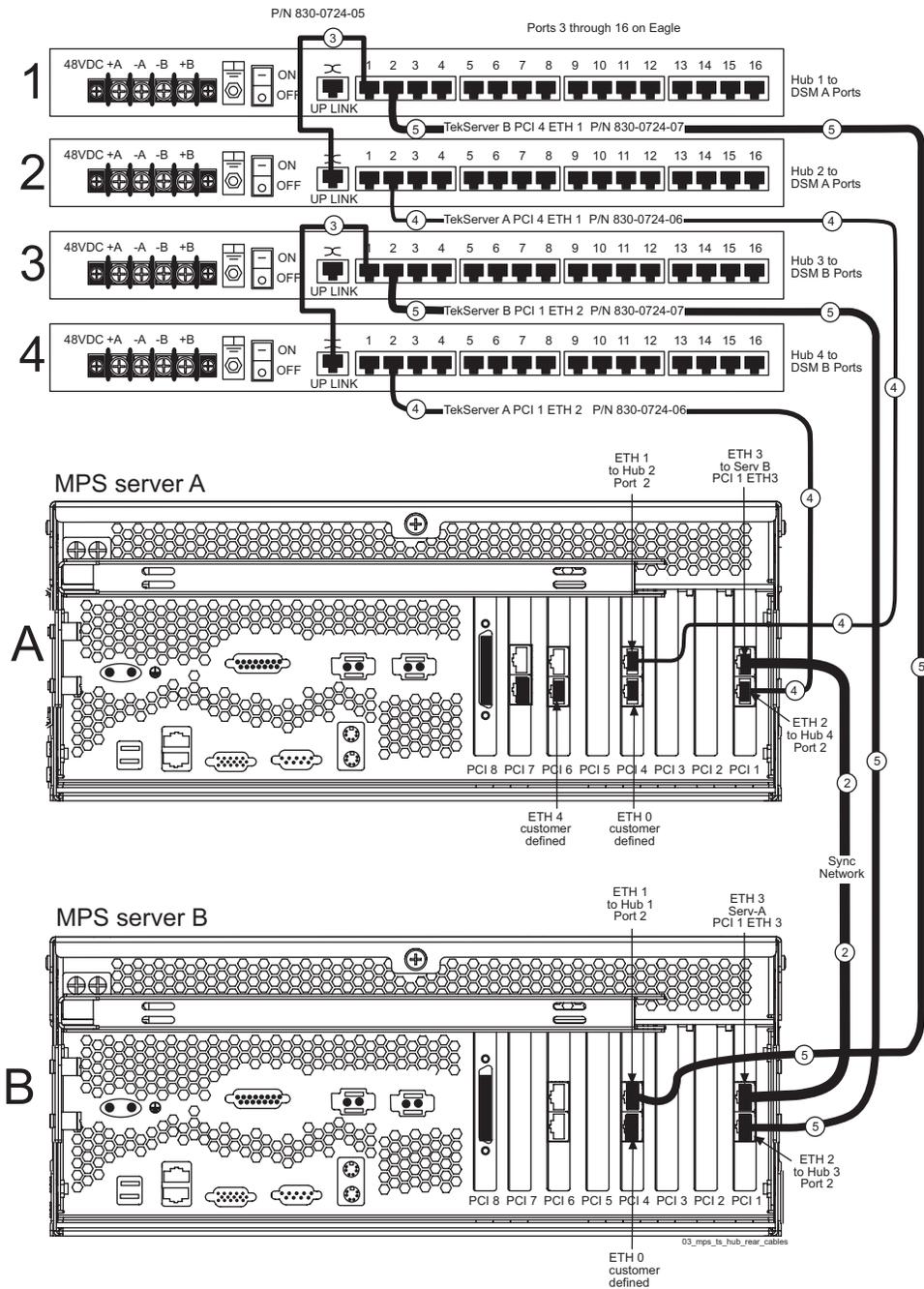
This alarm indicates that there is an error in the Main DSM network, which connects to the DSM A ports. The error may be due to one or more of the following conditions:

- 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

Figure 4-1 on page 4-10 shows the connections between the servers and the hubs of the DSM networks (both main and backup)

- The **eth1** interface is the upper port of PCI 4 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.
- Ports 3 through 16 on hubs 1 and 2 connect to the Main DSM ports (DSM A ports) on the EAGLE 5 ISS. To better display the location of these ports, Figure 4-1 on page 4-10 does not show the connecting cables.

Figure 4-1. Network Connections



NOTE: All numbers shown in Figure 4-1 correspond to cable numbers described in the *Signaling Products Integrated Applications Installation Manual*. In addition, some cables are referred to in Procedure 4-8 on page 4-11.

Procedure 4-8. 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.
 - d. Verify that the **eth1** cable is securely connected to the upper port of PCI 4 on the server that is reporting the error.
 - e. Follow the cable to the hub and verify that the **eth1** cable is securely connected at port 2 on the hub.
 - f. Verify that the cable connecting the hubs (identified as cable 3 in Figure 4-1 on page 4-10) is securely connected at both hubs.

2. Run **syscheck** (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.

3. Verify that the cable going from **eth1** to the hub tests positive with an Ethernet Line Tester and replace any faulty cables.

4. If the problem persists, call the Tekelec Customer Care Center for assistance. See page 1-3.

300000000000400 - Server Eagle Network B Error

NOTE: If all three alarms, 300000000000200-Server Eagle Network A Error, 300000000000400-Server Eagle Network B Error, and 300000000000800-Server Sync Network Error exist, the mate server is probably down.

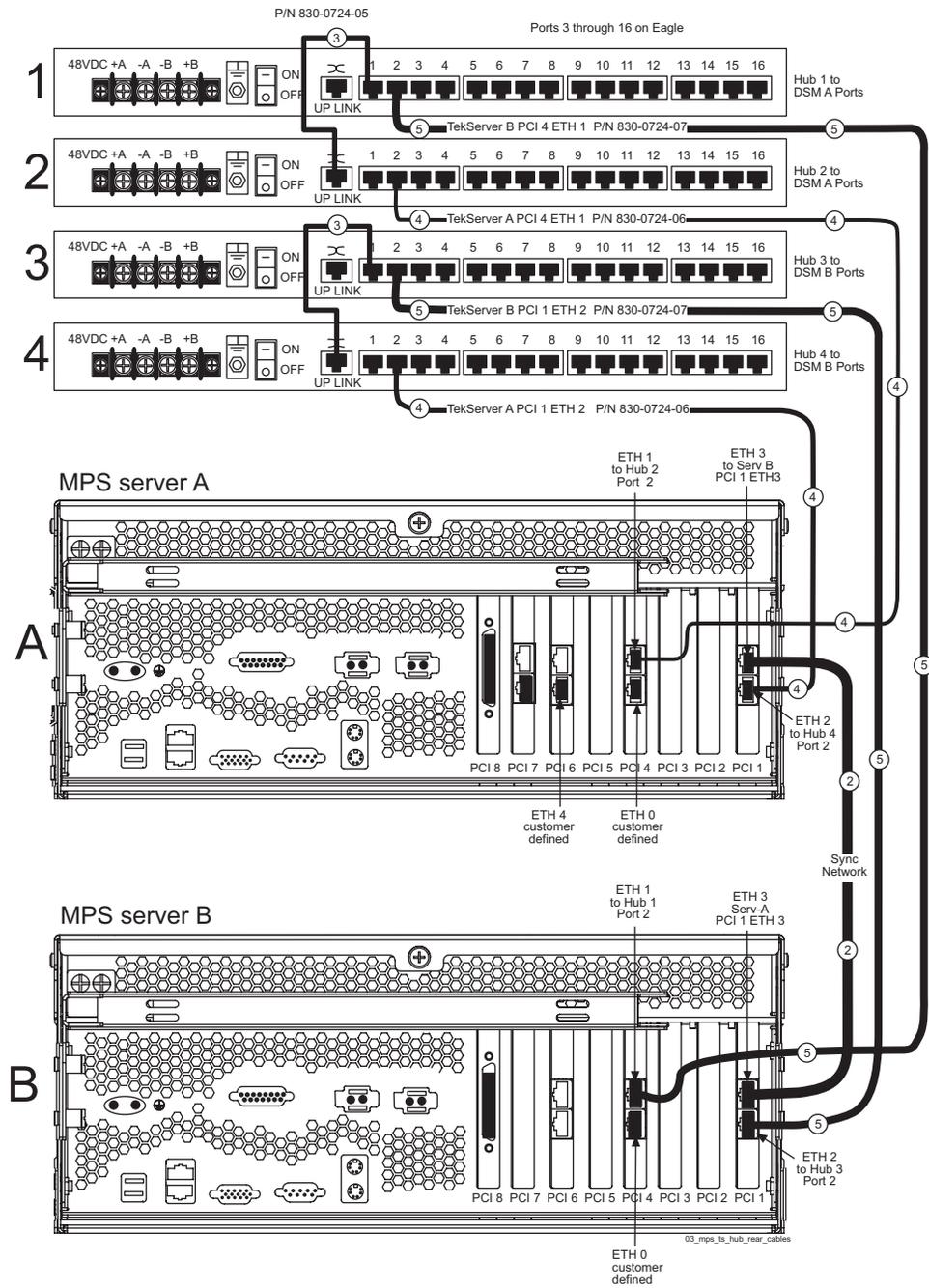
This alarm indicates that there is an error in the Backup DSM network, which connects to the DSM B ports. The error may be due to one or more of the following conditions:

- 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

Figure 4-2 on page 4-13 shows the connections between the MPS servers and the hubs of the DSM networks (both main and backup)

- The **eth2** interface is the lower port of PCI 1 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.
- Ports 3 through 16 on hubs 3 and 4 connect to the Backup DSM ports (DSM B ports) on the EAGLE 5 ISS. To better display the location of these ports, Figure 4-2 does not show the connecting cables.

Figure 4-2. Network Connections



NOTE: All numbers shown in Figure 4-2 correspond to cable numbers described in the *Signaling Products Integrated Applications Installation Manual*. In addition, some cables are referred to in Procedure 4-9 on page 4-14.

Procedure 4-9. 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.
 - d. Verify that the **eth2** cable is securely connected to the lower port of PCI 1 on the server that is reporting the error.
 - e. Follow the cable to the hub and verify that the **eth2** cable is securely connected at port 2 on the hub.
 - f. Verify that the cable connecting the hubs (identified as cable 3 in Figure 4-2 on page 4-13) is securely connected at both hubs.

2. Run **syscheck** (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - If the alarm has been cleared, the problem is resolved.
 - If the alarm has not been cleared, continue with the next step.

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

4. If the problem persists, call the Customer Care Center for assistance. See page 1-3.

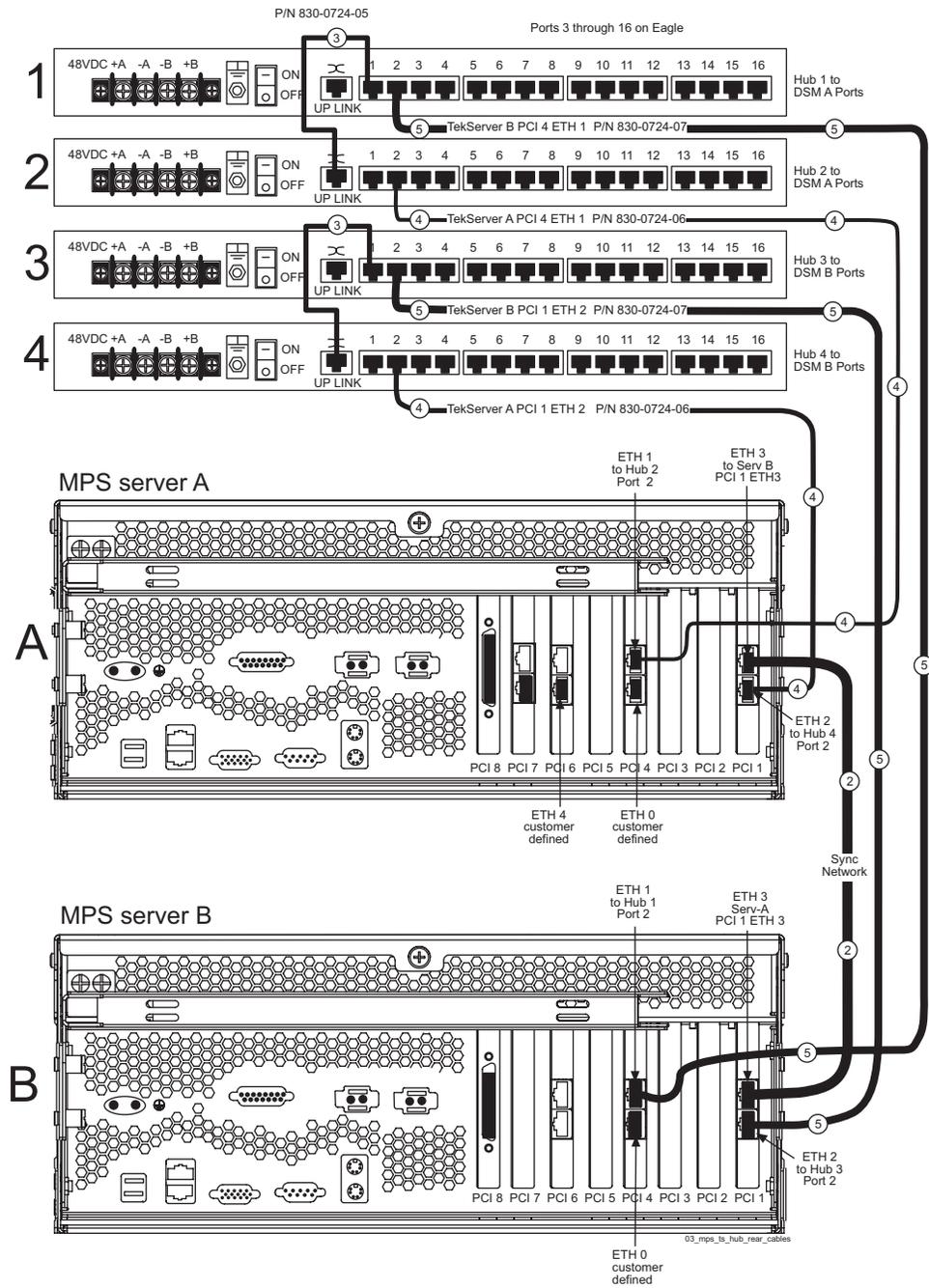
3000000000000800 - Server Sync Network Error

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 1 on the server.

A direct connection is made between the two servers (no hub is used in this connection). A straight-through Ethernet cable (shown as cable 2 in Figure 4-3 on page 4-15) must be used for this connection (all pairs are required).

Figure 4-3. Network Connections



NOTE: All numbers shown in Figure 4-3 on page 4-15 correspond to cable numbers described in the *Signaling Products Integrated Applications Installation Manual*. In addition, some cable numbers are referred to in Procedure 4-10 on page 4-16.

Procedure 4-10. Recovery from Server Sync Network Error

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

2. Verify that the **eth3** cable (cable 2 in) is securely connected to the upper port of PCI 1 on both Server A and Server B.

3. Test the **eth3** cable with an Ethernet Line Tester that is set to test a straight-through cable. If the cable does not test positive, replace it.

4. If the problem persists, call the Customer Care Center for assistance. See page 1-3.

300000000001000 - Server Disk Space Shortage Error

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

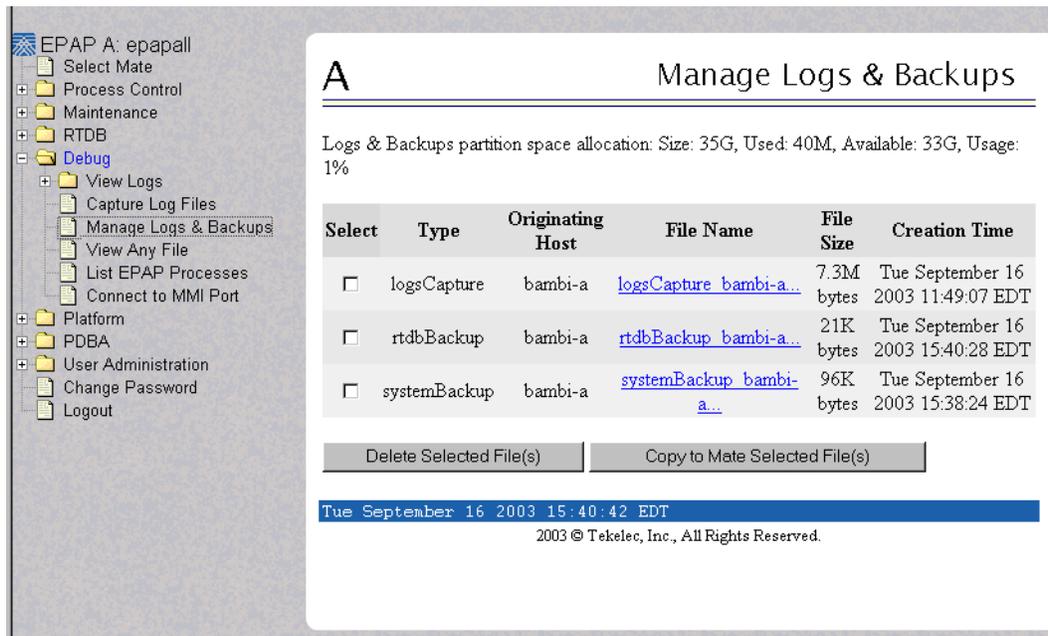
- A filesystem has exceeded a failure threshold, which means that more than 90% of the available disk storage has been used on the filesystem.
- More than 90% of the total number of available files have been allocated on the filesystem.
- A filesystem has a different number of blocks than it had at install.

Procedure 4-11. Recovery from Server Disk Space Shortage Error

1. Run **syscheck** (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5). Examine the syscheck output to determine if the filesystem `/var/TKLC/epap/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 EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).
 - b. Select **Debug>Manage Logs & Backups**. A screen similar to Figure 4-24 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 4-4. 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 1-3).

300000000002000 - 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 4-12. 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.

2. Perform the following substeps when **syscheck** verbose output indicates:
The default router at <IP_address> cannot be pinged
 - a. Verify the network cables are firmly attached to the server and the network switch, router, hub, etc.
 - b. 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.
 - c. Check with the router administrator to verify that the router is configured to reply to pings on that interface.
 - d. Go to step 5.

3. Perform the following substeps when **syscheck** verbose output indicates:
The default route is not on the provisioning network
 - 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 epapconfig (see Procedure A-3, “Accessing the EPAP Text-Based User Interface,” on page A-5). 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 EPAP Configuration Menu.

```
MPS Side A:  hostname: mpsa-d1a8f8  hostid: 80d1a8f8
              Platform Version: x.x.x-x.x.x
              Software Version: EPAP x.x.x-x.x.x
              Wed Jul 17 09:51:47 EST 2002
```

```
/-----EPAP 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 |
|----|-----|
| 8 | PDB Configuration Menu |
|----|-----|
| 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 |
|----|-----|
| 7 | Configure Provisioning VIP Addresses |
|----|-----|
| e | Exit |
\-----/
```

Enter choice: **1**

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

```
EPAP software and PDDBA are running. Stop them? [N] y
```

- e. The EPAP A provisioning network IP address displays:

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

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

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

- g. If the default router IP address is incorrect, type the correct address, and press Enter.
- h. After you have verified or corrected the Provisioning Network configuration information, enter **e** to return to the Configure Network Interfaces Menu.
- i. Enter **e** again to return to the EPAP Configuration Menu.
- j. Go to step 5.

4. Perform the following substeps to reboot the server if the **syscheck** output indicates the following error (otherwise, skip to step 5):

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

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

```

/-----EPAP 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                |
|----|-----|
|  8 | PDB Configuration Menu              |
|----|-----|
|  e | Exit                               |
\-----/

```

Enter Choice: **6**

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

```

/-----EPAP Platform Menu-\
/-----\
| 1 | Initiate Upgrade
|----|-----|
| 2 | Eject CD
|----|-----|
| 3 | Reboot MPS
|----|-----|
| 4 | Halt MPS
|----|-----|
| 5 | File System Backup
|----|-----|
| 6 | MySQL Backup
|----|-----|
| 7 | RTDB Backup
|----|-----|
| 8 | PDB 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. Go to step 5.

5. Rerun `syscheck`.

- If the alarm has been cleared, the problem is solved.
- If the alarm has not been cleared, go to the next step.

- 6.** With the above information collected, contact Customer Care Center for further assistance (see page 1-3).

300000000004000 - Server Temperature Error

The internal temperature within the server is unacceptably high.

Procedure 4-13. Recovery from Server Temperature Error

1. Ensure that nothing is blocking the fan's intake (see Figure 4-5 on page 4-22). Remove any blockage.

Figure 4-5. Server Fans



2. Verify that the temperature in the room is normal (see Table 4-3 on page 4-22). 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-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - 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 by performing Procedure 3-4, "Replacing a Fan Filter," on page 3-9.

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-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - 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 1-3.
-

300000000008000 - 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 4-14. Recovery from Server Mainboard Voltage Error

1. Contact the Customer Care Center (see page 1-3).
-

300000000010000 - Server Power Feed Unavailable

This alarm indicates that one of the power feeds to the server has failed. For more information about power feeds, see "Breaker Panels" on page 2-7.

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 (300000000100000, 300000000200000, and 300000000400000).

Procedure 4-15. Recovery from Server Power Feed Unavailable

1. Locate the server to which the faulty feed supplies power, and make sure that the connections to the power supply units are all connected securely.

2. Run **syscheck** (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - 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 (see Figure 4-7 on page 4-26).

4. Run **syscheck** (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - 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-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - 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, call the Customer Care Center for assistance. See page 1-3.

300000000020000 - Server Disk Health Test Error

Either the hard drive has failed or failure is imminent.

Procedure 4-16. Recovery from Server Disk Health Test Error

1. Immediately call the Customer Care Center for assistance to arrange for disk replacement. See page 1-3.
-

300000000040000 - 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 4-17. Recovery from Server Disk Unavailable Error

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

3000000001000000 - Breaker Panel Feed Error

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

Procedure 4-18. Recovery from Breaker Panel Feed Error

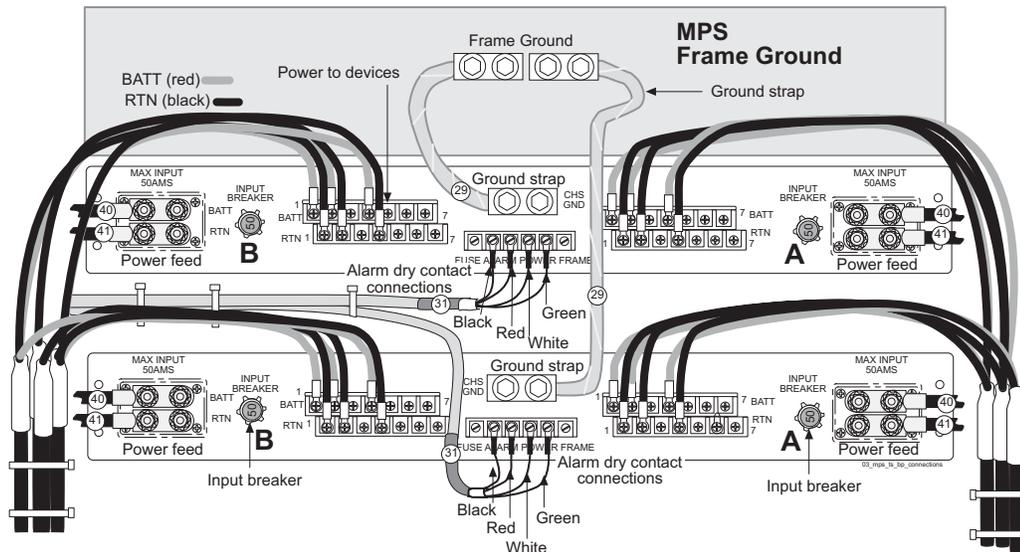
1. Check the **POWER ON** LEDs (see Figure 4-6 on page 4-25).

Figure 4-6. Breaker LEDs



If one of the **POWER ON** LEDs is off, a problem has been detected with the corresponding input power feed, (see Figure 4-7 on page 4-26). Perform the following steps to correct this problem:

Figure 4-7. Breaker Panel Rear View



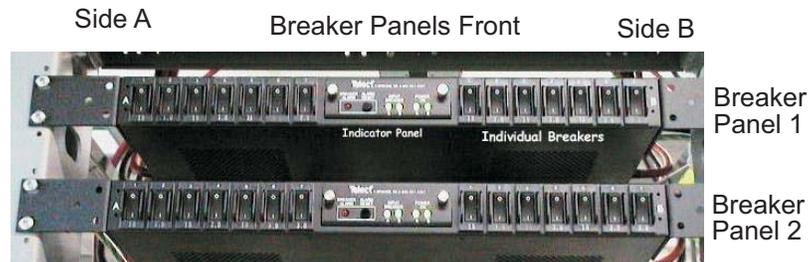
NOTE: All numbers shown in Figure 4-7 correspond to cable numbers described in the *Signaling Products Integrated Applications Installation Manual*.

- a. Verify 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 in fact connected to the input power feed connector on the rear of the breaker panel (see Figures 4-7). Correct any issues found.
- b. Check the POWER ON LED again.
 - If the LED is now illuminated, the issue has been resolved and proceed to step 4 to verify that the alarm has been cleared.
 - If the LED is still not illuminated, continue to the next sub-step.
- c. Have the electrician verify the integrity of the input power feed. The input voltage should measure $-48\text{VDC} \pm 7\text{VDC}$ (that is, between -41VDC and -55VDC). If the supplied voltage is not within the acceptable range, the input power source must be repaired or replaced.

NOTE: If the measured voltage is within the acceptable range, but the POWER ON LED is still not illuminated, the LED could be burned out or the breaker panel may be malfunctioning. In either of these situations, the breaker panel must be replaced, (see Procedure 5-1, "Replacing a Breaker Panel," on page 5-7).

- d. Check the **POWER ON LED** again once the necessary actions have been taken to correct any issues found.
 - If the LED is now illuminated, the issue has been resolved and proceed to step 4 to verify that the alarm has been cleared.
 - If the LED is still not illuminated, skip to step 5.

Figure 4-8. Breakers on Front Panel



2. Check the input breaker LEDs (see) Figure 4-8 on page 4-27

If one of the **INPUT BREAKER LEDs** is off, then the respective Input Breaker, (see Figure 4-6 on page 4-25), has opened (popped out). Perform the following steps to repair this issue:

- a. Turn all breakers for the affected side of the panel to the open (O) position (see Figure 4-8).
- b. Once all breakers have been opened, reset (by pushing in) the Input Breaker on the back of the breaker panel (see Figure 4-7 on page 4-26). If the Input Breaker does not reset, or if it does reset and within a few moments opens (pops out) again, skip to step 5.
- c. Turn the breakers that should be active back to the closed position (I) one at a time (see Figure 4-8 on page 4-27) and check the **INPUT BREAKER LEDs** again. If the LED is still not illuminated, skip to step 5. To determine which breakers should be active, see Table 2-4 on page 2-9.

NOTE: It is possible for this problem to take some time to recur. For this reason, it is important to continue to monitor the server closely for the presence of this alarm after taking corrective actions to repair the problem. If no recurrences are seen for 24 hours, the problem can be considered resolved. If the problem continues to re-occur, contact the Customer Care Center for assistance (see page 1-3).

3. If all of the **INPUT BREAKER LEDs** and the **POWER ON LEDs** are illuminated, 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, (labeled as 31 on Figure 4-7 on page 4-26), are properly secured. 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 skip to step 5.

4. Run **syscheck** (see “Running the System Health Check” on page A-5).
 - 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 problem has not been resolved, contact the Customer Care Center for assistance. See page 1-3.
-

3000000002000000 - Breaker Panel Breaker Error

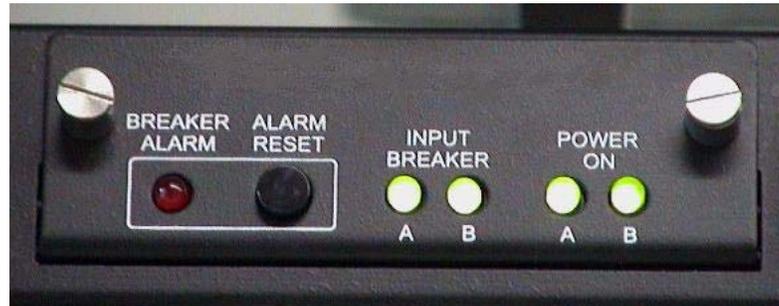
This alarm indicates that one or more of the active breakers on the front of the breaker panel is open. Inactive breakers are labeled **NOT USED** and should always be in the open (O) position. Exactly which of the breakers should be active depends on the specific product installation, (see “Breaker Panels” on page 2-7 for details regarding product breaker panel configuration).

NOTE: It is possible for this problem to take some time to recur. For this reason, it is important to continue to monitor the server closely for the presence of this alarm after taking corrective actions to repair the problem. If no recurrences are seen for 24 hours, the problem can be considered resolved. If the problem continues to re-occur contact the Customer Care Center for assistance (see page 1-3).

Procedure 4-19. Recovery from Breaker Panel Breaker Error

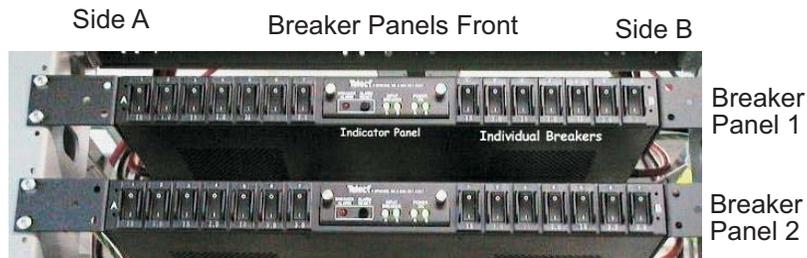
1. Inspect the **BREAKER ALARM LED** (see Figure 4-9). This is a red LED in the center on the front of the breaker panel.
 - If this light is on, one or more of the active breakers is open, skip to step 3.
 - If the red light is not on, there is most likely a problem with the serial connection between the server and the breaker panel. This connection is used by the system health check to monitor the breaker panel for failures. Proceed to the next step to verify this connection.

Figure 4-9. Breaker Panel LEDs



-
2. Verify that both ends of the labeled serial cables, (labeled as 31 on Figure 4-11 on page 4-30), are properly secured. If any issues are discovered with these cable connections, make the necessary corrections and skip to step 6 to verify that the alarm has been cleared, otherwise skip to step 7.
-
3. Carefully examine all breakers on the panel (see Figure 4-10). Unused breakers are labeled **NOT USED** and should always be in the open (O) position. If any of the other breakers are in the open (O) position, flip them back to the closed (I) position.

Figure 4-10. Breaker Positions

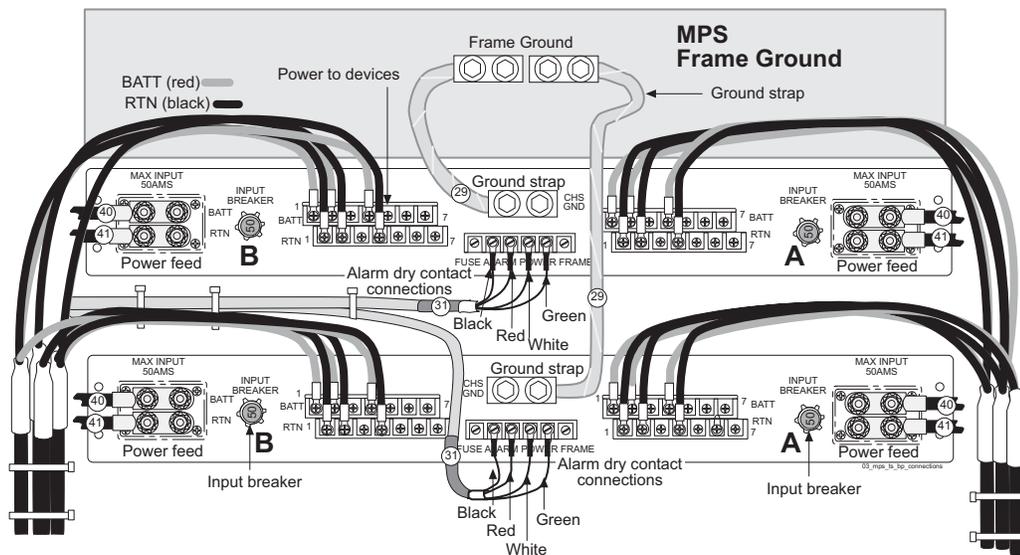


Check the **BREAKER ALARM** LED again (see Figure 4-9 on page 4-29).

- If the red light is no longer illuminated, most likely the problem has been solved. Continue to step 6 to verify that the alarm has been cleared.
 - If the **BREAKER ALARM** LED did not go out, continue to the next step.
-

4. Depress and release the **ALARM RESET** button located in the center on the front of the breaker panel directly next to the **BREAKER ALARM LED**, (see Figure 4-9 on page 4-29). After releasing the reset button, examine the **BREAKER ALARM LED** again.
 - If the **BREAKER ALARM LED** is no longer illuminated red, the problem is most likely corrected. Continue to step 6 to verify the alarm has been cleared.
 - If the **BREAKER ALARM LED** is still red and this is the first attempt at resetting, continue to the next step.
 - If the **BREAKER ALARM LED** is still red and this step is being repeated, skip to step 7.
-
5. Have an electrician verify that all terminal connections for the breakers which should be active (see Figure 4-11 on page 4-30) are tightly secured.

Figure 4-11. Breaker Panel Rear View



NOTE: All numbers shown in Figure 4-11 correspond to cable numbers described in the *Signaling Products Integrated Applications Installation Manual*.

After all connections have been verified and are known to be secure, return to step 4 and repeat.

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

- If the problem has not been resolved, contact the Customer Care Center for assistance. See page 1-3.

30000000400000 - Breaker Panel Monitoring Error

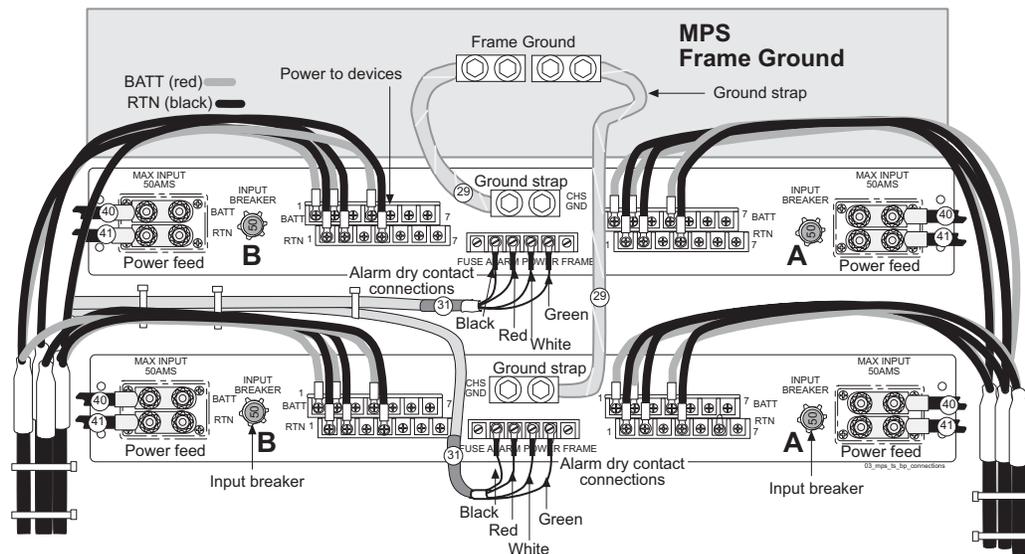
This alarm indicates a failure in the hardware and/or software that monitors the breaker panel. This could mean there is a problem with the file I/O libraries, the serial device drivers, or the serial hardware itself.

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 300000001000000-Breaker Panel Feed Error or 300000002000000-Breaker Panel Breaker Error until the Breaker Panel Monitoring Error has been corrected.

Procedure 4-20. Recovery from Breaker Panel Monitoring Error

- Verify that both ends of the labeled serial cables (labeled as 31 on Figure 4-12) are secured properly.

Figure 4-12. Breaker Panel Rear View



NOTE: All numbers shown in Figure 4-12 correspond to cable numbers described in the *Signaling Products Integrated Applications Installation Manual*.

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

 3. Call the Customer Care Center for assistance. See page 1-3.
-

Major Application Alarms

The major application alarms involve the EPAP software, RTDBs, file system, and logs.

4000000000000001 - Mate EPAP Unavailable

One EPAP has reported that the other EPAP is unreachable.

Procedure 4-21. Recovery from Mate EPAP Unavailable

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

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

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

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

5. View the EPAP status on the banner.
 - If the mate EPAP status is ACTIVE or STANDBY, the problem is resolved.
 - If the mate EPAP 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-7, “Restarting EPAP and PDBA Software,” on page A-10).

8. If the problem persists, run **save logs** to gather system information for further troubleshooting (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8), and contact the Customer Care Center (see page 1-3).
-

4000000000000002 - RTDB Mate Unavailable

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

Procedure 4-22. Recovery from RTDB Mate Unavailable

1. Log in to the EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).

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

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

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

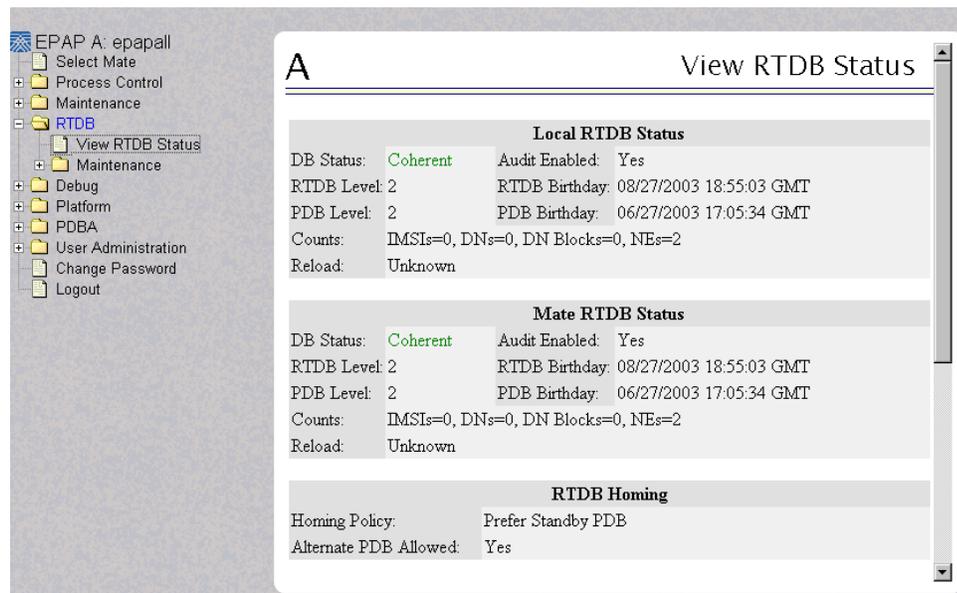
5. Determine whether the alarm has cleared by verifying whether it is still being displayed in the banner or in the Alarm View window.
 - If the alarm has cleared, the problem is resolved.
 - If the alarm has not yet cleared, continue with the next step.

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-8, "Restarting the EPAP Software," on page A-13).

8. Select **RTDB>View RTDB Status** to verify that the RTDB status on both sides is coherent, as shown in Figure 4-7 on page 4-8.

Figure 4-13. Coherent RTDB Status



-
9. If the problem persists, run **saveLogs** to gather system information for further troubleshooting (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8), and contact the Customer Care Center (see page 1-3).
-

4000000000000004 - Congestion

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

Procedure 4-23. 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 EPAP Available notice, capture the log files on both EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8), and contact the Customer Care Center (see page 1-3).
-

400000000000020 - RMTP Channels Down

Both IP multicast mechanisms are down.

Procedure 4-24. 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-8, "Restarting the EPAP Software," on page A-13).

3. Capture the log files on both EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8) and contact the Customer Care Center (see page 1-3).

400000000000040 - Fatal Software Error

A major software component on the EPAP has failed.

Procedure 4-25. Recovery from Fatal Software Error

1. Perform Procedure A-8, "Restarting the EPAP Software," on page A-13:

2. Capture the log files on both EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8) and contact the Customer Care Center (see page 1-3).

400000000000080 - RTDB Corrupt

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

Procedure 4-26. Recovery from RTDB Corrupt

1. Capture the log files on both EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8) and contact the Customer Care Center (see page 1-3).
-

400000000000100 - RTDB Inconsistent

This message indicates one or more of the following conditions:

- The real-time database for one or more DSM cards is inconsistent with the current real-time database on the Active EPAP fixed disks
- RTDBs detect that it is ahead of an ACTIVE PDBA that it just connected to (probably a PDBA switchover has occurred, or a restore from a backup of PDB with a previous db level)
- RTDB timestamp of most recent level does not match the PDBAs record of that timestamp

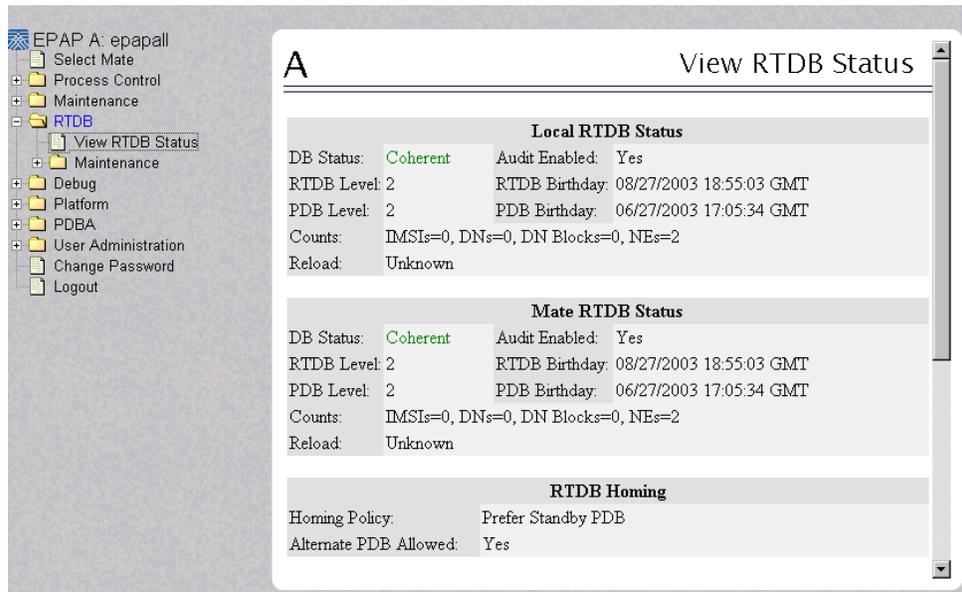
Procedure 4-27. Recovery from RTDB Inconsistent

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

2. Check the banner information above the menu to verify that you are logged into the EPAP A that is reporting the problem.
If it is necessary to switch to EPAP A, click the **Select Mate** menu item.

3. From the menu, select **RTDB>View RTDB Status** to display status information about the RTDBs. Figure 4-14 on page 4-37 shows an example.

Figure 4-14. RTDB Status



4. Verify the PDB information on the RTDB Status view is correct before continuing.
5. Before attempting to copy the RTDB, the EPAP A software must be stopped by doing the following:



CAUTION: If the software is not stopped as directed in substeps a through c, the RTDB will become corrupted.

- a. Select **Process Control>Stop Software** to stop the software. The following warning appears:

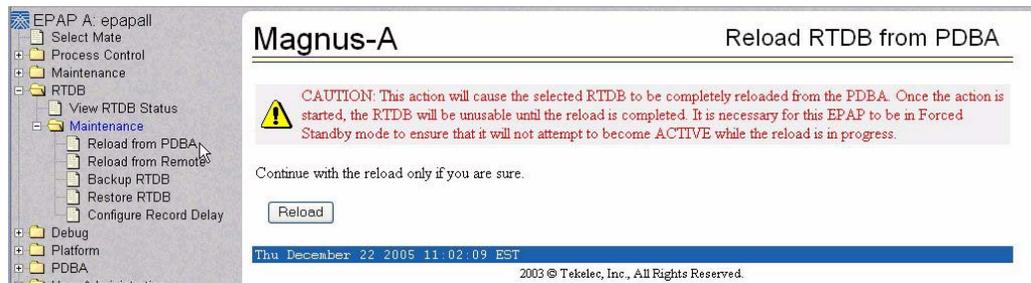
CAUTION: This action will stop all EPAP software processes, and will prevent the selected EPAP from updating the RTDB until the EPAP software is re-started (by executing the Start Software menu item).

- b. On the **Stop EPAP Software** screen, make sure the following item on the screen is checked:

Check if you want the software to automatically start on reboot.

- c. Select the **Stop EPAP Software** button to stop the software.

6. Select **RTDB>Maintenance>Reload RTDB from PDBA**. The screen shown in Figure 4-15 displays.

Figure 4-15. Reload RTDB from PDBA

7. Click the **Reload** button as shown in Figure 4-15.
-
8. When the reload has completed, start the software on EPAP A by doing the following:
 - a. Select **Process Control>Start Software** to start the software again. Make sure the following item on the screen is checked:
Check if you want to start the PDBA software along with the EPAP software.
 - b. Select the **Start EPAP Software** button to start the software.
-
9. If the problem persists, capture the log files on both EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8) and contact the Customer Care Center (see page 1-3).
-

400000000000200 - 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 4-28. 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 EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8) and contact the Customer Care Center (see page 1-3).
-

400000000001000 - RTDB 100% Full

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

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

Procedure 4-29. Recovery from RTDB 100% Full

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

400000000002000 - RTDB Resynchronization in Progress

This message indicates that the RTDB resynchronization is in progress.

Procedure 4-30. Recovery from RTDB DSM Over-Allocation

1. No further action is necessary.
-

400000000004000 - RTDB Reload Is Required

This message indicates that the RTDB reload is required for one of the following reasons:

- The PDB Birthday on the EPAP reporting the error does not match the mate EPAP's PDB Birthday.
- 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 1-3).

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

Procedure 4-31. Recovery from RTDB Reload Is Required

1. Log in to the User Interface screen of the EPAP (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2)
2. Check the banner information above the menu to verify that you are logged into the EPAP that is reporting the problem.

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

3. From the menu, select **RTDB>View RTDB Status** to display status information about the RTDBs. Figure 4-16 on page 4-40 shows an example.

Figure 4-16. RTDB Status

The screenshot shows the EPAP GUI with a menu on the left and a 'View RTDB Status' window on the right. The menu includes options like 'Select Mate', 'Process Control', 'Maintenance', 'RTDB', 'View RTDB Status', 'Debug', 'Platform', 'PDBA', 'User Administration', 'Change Password', and 'Logout'. The 'View RTDB Status' window is titled 'A View RTDB Status' and contains three sections: 'Local RTDB Status', 'Mate RTDB Status', and 'RTDB Homing'. Both Local and Mate RTDBs show a 'Coherent' DB Status and identical birthdates. The 'RTDB Homing' section indicates a 'Prefer Standby PDB' policy and that 'Alternate PDB Allowed' is 'Yes'.

4. If the RTDB birthdays for both the local RTDB and the mate RTDB are the same, you can copy the mate's RTDB to the local RTDB. If the RTDB birthdays are not the same, go to step 11.
5. Before attempting to copy the RTDB, you must stop the software on both sides by doing the following:



CAUTION: If you do not stop the software on both sides, as directed in substeps a through f, the RTDBs will become corrupted.

- a. Select **Process Control>Stop Software** to stop the software. The following warning appears:

CAUTION: This action will stop all EPAP software processes, and will prevent the selected EPAP from updating the RTDB until the EPAP software is re-started (by executing the Start Software menu item).

- b. On the **Stop EPAP Software** screen, make sure the following item on the screen is checked:

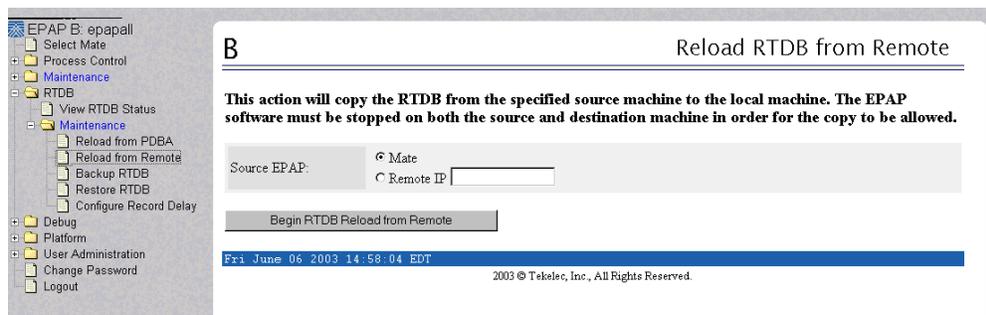
Check if you want the software to automatically start on reboot.

- c. Select the **Stop EPAP Software** button to stop the software.
- d. Select **Select Mate** from the menu.
- e. Repeat substeps a through c on the other side.
- f. Select **Select Mate** from the menu to return to the EPAP that is reporting the problem.

6. Verify that you are logged in to the side that is reporting the problem.

7. Select **RTDB>Maintenance>Reload from Remote**. The screen shown in Figure 4-17 displays.

Figure 4-17. Reload RTDB from Mate EPAP



8. Ensure that the Mate radio button is filled in, as shown in Figure 4-17 on page 4-41 and click the **Begin RTDB Reload from Remote** button.

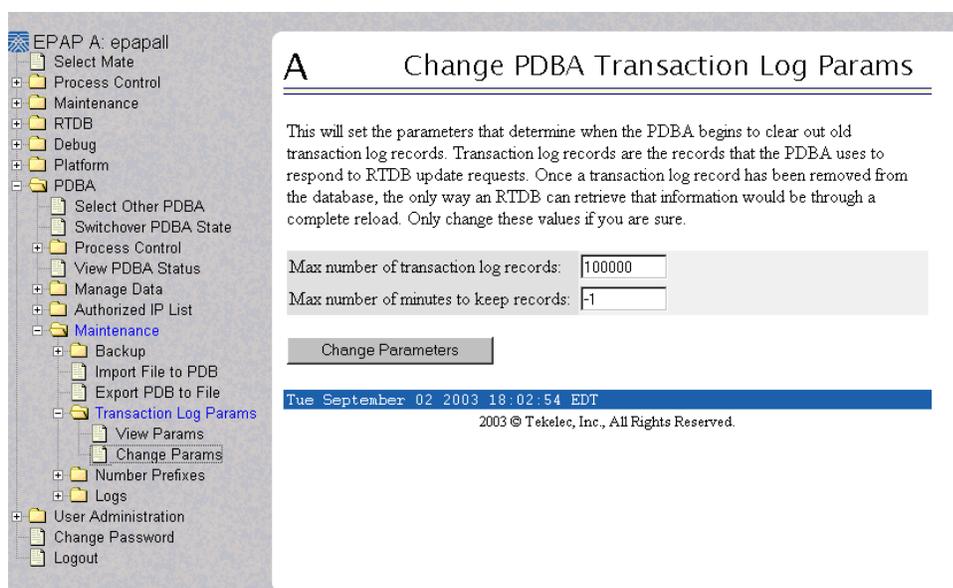
9. When the reload has completed, start the software on both sides by doing the following:
 - a. Select **Process Control>Start Software** to start the software again. Make sure the following item on the screen is checked (this item applies only if performing this procedure on Side A):

Check if you want to start the PDBA software along with the EPAP software.

- b. Select the **Start EPAP Software** button to start the software.
- c. Select **Select Mate** from the menu.
- d. Repeat substeps a and b on the other side.

10. If you wish to increase the size of the transaction logs, select **PDBA>Maintenance>Transaction Log Params>Change Params** as shown in Figure 4-18.

Figure 4-18. Changing Transaction Log Parameters



11. If the problem persists, contact the Customer Care Center (see page 1-3).

400000000008000 - Mate PDBA Unreachable

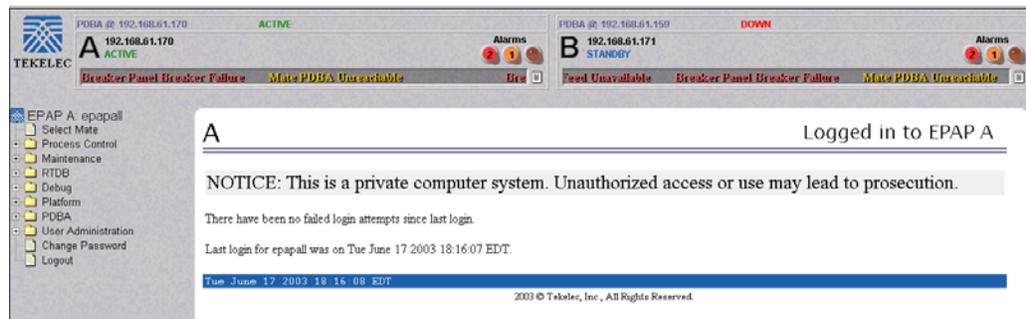
This message indicates that the other PDBA is unreachable.

Procedure 4-32. Recovery from Mate PDBA Unreachable

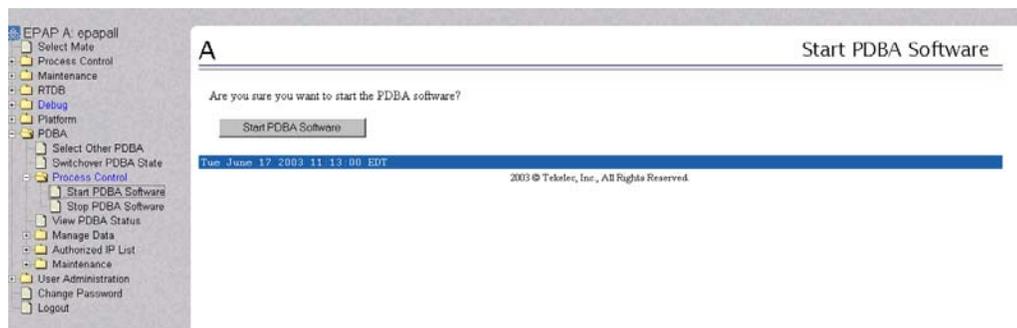
1. Login to the **User Interface** screen of the EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).
-
2. Check the banner information above the menu for the PDBA status.
 - If neither PDBA status is DOWN, go to step 7.
 - If status of one of the PDBAs is DOWN, continue with the next step.

Figure 4-19 on page 4-43 shows an example in which the PDBA on EPAP B is DOWN.

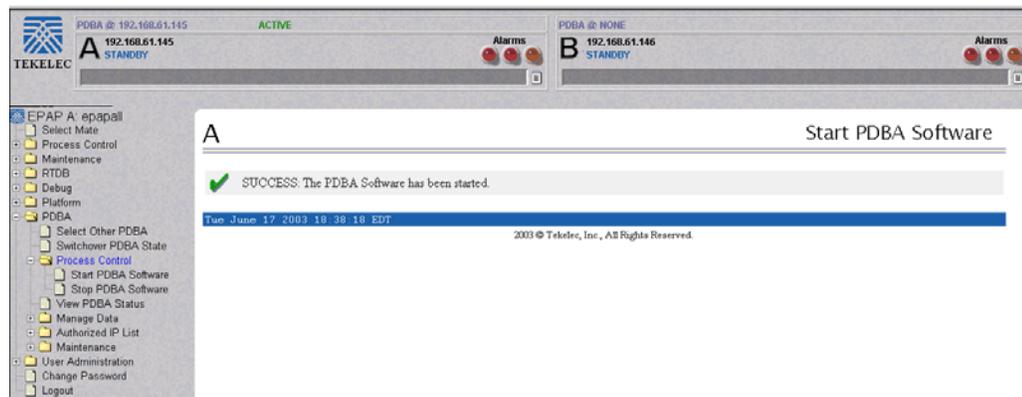
Figure 4-19. PDBA Down



3. Check the banner information above the menu to verify that you are logged into the EPAP whose PDBA is DOWN. If it necessary to switch to the other PDBA, select **PDBA>Select Other PDBA**.
-
4. Attempt to start the PDBA by selecting **PDBA>Process Control>Start PDBA Software**. The window shown in Figure 4-20 displays.

Figure 4-20. Start PDBA

5. Click the **Start PDBA Software** button.
6. When the PDBA software has been started, the window shown in Figure 4-21 on page 4-44 displays, and within moments the banner will show the PDBA status as ACTIVE or STANDBY. If the status does not change to ACTIVE or STANDBY, continue to the next step.

Figure 4-21. PDBA Started

7. Check the status of the provisioning network. If problems exist in the provisioning network, fix them.
8. If the problem persists, run **save logs** (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8), and contact the Customer Care Center.

400000000010000 - PDBA Connection Failure

The local EPAP RTDB process cannot connect to the local PDBA.

Procedure 4-33. Recovery from PDBA Connection Failure

1. Login to the **User Interface** screen of the EPAP (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).

2. Check the banner information above the menu to verify that you are logged into the problem EPAP indicated in the UAM.
Select **Select Mate** if necessary to switch to the problem EPAP.

3. Perform Procedure A-7, "Restarting EPAP and PDBA Software," on page A-10.

4. Select **RTDB>View RTDB Status** and determine the homing policy for the PDBA. In the example shown in Figure 4-22, the Homing Policy shows that the Standby PDB is preferred for homing.

Figure 4-22. Determining the Homing Policy

The screenshot shows the EPAP GUI with a tree view on the left and a 'View RTDB Status' window on the right. The tree view includes folders for Process Control, Maintenance, RTDB, Debug, Platform, PDBA, and User Administration. The 'View RTDB Status' window is titled 'A View RTDB Status' and contains the following information:

Local RTDB Status	
DB Status: Coherent	Audit Enabled: Yes
RTDB Level: 2	RTDB Birthday: 08/27/2003 18:55:03 GMT
PDB Level: 2	PDB Birthday: 06/27/2003 17:05:34 GMT
Counts: IMSIs=0, DNS=0, DN Blocks=0, NEs=2	
Reload: Unknown	

Mate RTDB Status	
DB Status: Coherent	Audit Enabled: Yes
RTDB Level: 2	RTDB Birthday: 08/27/2003 18:55:03 GMT
PDB Level: 2	PDB Birthday: 06/27/2003 17:05:34 GMT
Counts: IMSIs=0, DNS=0, DN Blocks=0, NEs=2	
Reload: Unknown	

RTDB Homing	
Homing Policy:	Prefer Standby PDB
Alternate PDB Allowed:	Yes

5. At the EPAP indicated by the Homing Policy, repeat step 3 and step 4 to restart the PDBA.

6. If the problem persists, run **save1ogs** (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8), and contact the Customer Care Center (see page 1-3).

400000000020000 - PDBA Replication Failure

Provisioning data is no longer being exchanged from the Active PDB to the Standby PDB.

Procedure 4-34. Recovery from PDBA Replication Failure

1. Run **save1ogs** (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8), and contact the Customer Care Center (see page 1-3).

400000000040000 - 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 4-35. 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.

400000000080000 - 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 4-36. RTDB Maximum Depth Reached

1. Contact the Customer Care Center (see page 1-3).
-

400000000100000 - No PDBA Proxy to Remote PDBA Connection

This message indicates that the PDBA Proxy feature is disabled or the software is down.

Procedure 4-37. Recovery from No PDBA Proxy to Remote PDBA Connection

1. Log in to the User Interface screen of EPAP A (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2)
2. Select PDBA>View PDBA Status to verify that the PDBA proxy feature is enabled. The Local Proxy Status items only appear if the PDBA Proxy feature is enabled (See Figure 4-23).

Figure 4-23. View PDBA Status Screen

Magnus-A
View PDBA Status

PDBA@10.253.103.24 Status

Status:	STANDBY	Version:	1.0
Level:	63825	Birthday:	12/15/2005 11:16:22 GMT
DN Prefix:		IMSI Prefix:	
Counts:	IMSI=384740, DN=384740, DN Blocks=0, NE=116, IMEI=0, IMEI Blocks=0		
RTDB Clients:	Address	Level	Time Difference
	10.253.103.24	63825	0
	192.168.2.200 (mate)	63825	0

PDB@10.253.103.24 Status

Status:	Database daemon is running		
Counts:	IMSI=384740, DN=384740, DNBlocks=0, NE=116, IMEI=0, IMEIBlocks=0		
	Resync Objects=63825		
Free space:	12213248 kB		

Local Proxy Status

Local PDBA Level:	63825	Local PDBA ABP:	No
Remote PDBA Level:	NOT CONNECTED	Remote PDBA ABP:	No
ABP Requested:	No	ABP Unrequested:	Yes

Refresh Options

View Pdba Status refresh time (seconds):	<input type="text" value="0"/>	<input type="button" value="Change refresh time"/>	<input type="button" value="Stop refresh"/>
--	--------------------------------	--	---

Tue December 20 2005 14:53:49 EST
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3. Refer to “Restarting EPAP and PDBA Software” on page A-10 to restart the PDBA.
4. If the problem persists, capture the log files on both EPAPs (see Procedure A-6, “Saving Logs Using the EPAP GUI,” on page A-8) and contact the Customer Care Center (see page 1-3).

400000000200000 - DSM Provisioning Error

A coherent DSM is more than 1000 levels behind the EPAP RTDB.

Procedure 4-38. Recovery from DSM Provisioning Error

1. Monitor this situation. If it does not improve, contact the Customer Care Center for guidance (see page 1-3).
-

Minor Platform Alarms

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

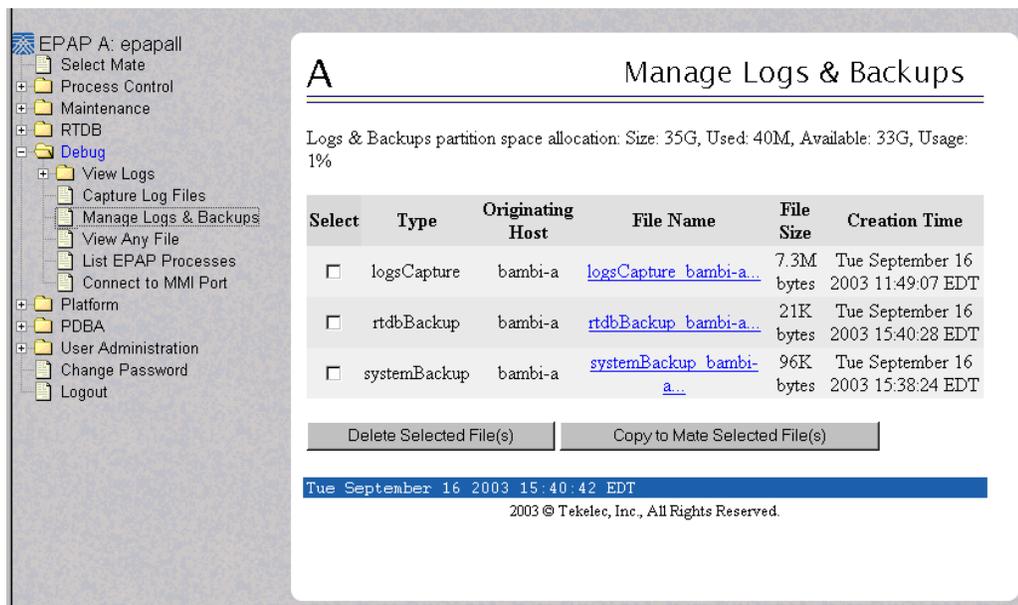
5000000000000001 - Server Disk Space Shortage Warning

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 4-39. Recovery from Server Disk Space Shortage Warning

1. Run **syscheck** (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5). Examine the syscheck output to determine if the filesystem `/var/TKLC/epap/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 EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).
 - b. Select **Debug>Manage Logs & Backups**. A screen similar to Figure 4-24 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 4-24. 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 1-3).

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 4-40. Recovery from Server Application Process Error

1. If a Server Platform Process Error alarm is also present execute the procedure for "Recovery from Server Platform Process Error" on page 4-7 before proceeding.
2. Log in to the User Interface screen of the EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).
3. Check the banner information above the menu to verify that you are logged into the problem EPAP 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 EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8) and contact the Customer Care Center (see page 1-3).
7. If the problem has not been resolved, call the Customer Care Center for further guidance (see page 1-3).

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 1000 Application Server Hardware Manual*).

Procedure 4-41. Recovery from Server Hardware Configuration Error

1. Run **syscheck** in verbose mode (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5).
2. Call the Customer Care Center for assistance. See page 1-3.

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 4-42. Recovery from Server Swap Space Shortage Warning

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

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 4-43. 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 epapconfig (see Procedure A-3, "Accessing the EPAP Text-Based User Interface," on page A-5). 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 EPAP Configuration Menu.

```
MPS Side A:  hostname: mpsa-d1a8f8  hostid: 80d1a8f8
              Platform Version: x.x.x-x.x.x
              Software Version: EPAP x.x.x-x.x.x
              Wed Jul 17 09:51:47 EST 2002
```

```
/-----EPAP 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 |
|----|-----|
| 8 | PDB Configuration Menu |
|----|-----|
| 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 |
|----|-----|
| 7 | Configure Provisioning VIP Addresses |
|----|-----|
| e | Exit |
|----|-----|
\-----/

```

Enter choice: **1**

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

```
EPAP software and PDBA are running. Stop them? [N] y
```

- e. The EPAP A provisioning network IP address displays:

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

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

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

- g. If the default router IP address is incorrect, correct it, and press Enter.
- h. After you have verified or corrected the Provisioning Network configuration information, enter **e** to return to the Configure Network Interfaces Menu.

- i. Enter **e** again to return to the EPAP Configuration Menu.
-
2. Rerun **syscheck**.
 - If the alarm has been cleared, the problem is solved.
 - If the alarm has not been cleared, go to the next step.
-
3. Contact the Customer Care Center for assistance. See page 1-3.
-

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 4-44. Recovery from Server Temperature Warning

1. Ensure that nothing is blocking the fan's intake (see Figure 4-5 on page 4-22). Remove any blockage.

Figure 4-25. Server Fans



-
2. Verify that the temperature in the room is normal (see Table 4-3 on page 4-22). 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
---------------------	--

Table 4-4. Server Environmental Conditions (Continued)

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-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - 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 by performing Procedure 3-4, "Replacing a Fan Filter," on page 3-9.

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-4, "Running System Health Check from the EPAP GUI," on page A-5).
 - 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 1-3.
-

5000000000000100 - Server Core File Detected

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

Procedure 4-45. Recovery from Server Core File Detected

1. Run **save1ogs** to gather system information (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).

2. Contact the Customer Care Center (see page 1-3). 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 4-46. Recovery from Server NTP Daemon Not Synchronized

1. Contact the Customer Care Center (see page 1-3).

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 4-47. Recovery from Server CMOS Battery Voltage Low

1. Contact the Customer Care Center (see page 1-3).

5000000000000800 - Server Disk Self Test Warning

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

Procedure 4-48. Recovery from Server Disk Self Test Warning

1. Contact the Customer Care Center (see page 1-3).
-

500000000004000 - Server Reboot Watchdog Initiated

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

Procedure 4-49. Recovery from Server Reboot Watchdog Initiated

1. Contact the "Customer Care Center" on page 1-3.
-

Minor Application Alarms

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

600000000000001 - RMTP Channel A Down

Channel A of the IP multicast mechanism is not available.

Procedure 4-50. Recovery from RMTP Channel A Down

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

2. Run **syscheck** (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5.)
If you cannot log in, go to step 5.

3. Perform Procedure A-8, "Restarting the EPAP Software," on page A-13.

4. Capture the log files on both EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8).

5. Contact the Customer Care Center (see page 1-3).

6000000000000002 - RMTP Channel B Down

Channel B of the IP multicast mechanism is not available.

Procedure 4-51. Recovery from RMTP Channel B Down

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

2. Run **syscheck** (see Procedure A-4, "Running System Health Check from the EPAP GUI," on page A-5.)
If you cannot log in, go to step 5.

3. Perform Procedure A-8, "Restarting the EPAP Software," on page A-13.

4. Capture the log files on both EPAPs (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8).

5. Contact the Customer Care Center (see page 1-3).

6000000000000008 - RTDB 80% Full

The RTDB on the EPAP or DSM is approaching capacity (80%). Perform the following procedure.

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

Procedure 4-52. 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 EPAP or for a DSM card) is approaching its capacity.

3. Run **savelogs** (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8), and contact the Customer Care Center (see page 1-3).

600000000000020 - Standby PDBA Falling Behind

This is an indication that there is a congestion condition affecting updates to the standby PDBA. The amount of time between an update being committed in the Active PDB and the same update being committed in the Standby PDB has reached an unacceptable level.

Procedure 4-53. Recovery from Standby PDBA Falling Behind

- The EPAP attempts to automatically recover from this situation. This error can result from one of the following conditions:
 - Provisioning activity is very heavy
 - The provisioning network is experiencing errors or latency
 - Server maintenance functions (such as backups, restores, imports, exports, etc) are occurring
- Periodically, verify that the level of the standby PDBA is catching up by selecting **PDBA>View PDBA Status** and comparing the Level of the Standby PDBA (on EPAP A in the example shown in Figure 4-26) to the Level of the Active PDBA (on EPAP B in the example).

Figure 4-26. View PDBA Status

The screenshot displays the TEKELEC management interface. The left sidebar shows a navigation tree with 'PDBA' selected. The main content area is titled 'View PDBA Status' and shows details for three PDBA instances:

PDBA@192.168.61.170 Status			
Status:	STANDBY	Version:	1.0
Level:	1448036	Birthday:	06/10/2003 17:40:17 GMT
DN Prefix:		IMSI Prefix:	
Counts:	IMSI=5324496, DN=10362100, DN Blocks=1, NE=426		
RTDB Clients:	Address	Level	

PDB@192.168.61.170 Status			
Status:	Database daemon is running		
Counts:	IMSI=5324496, DN=10362100, DN Blocks=1, NE=426		

PDBA@192.168.61.159 Status			
Status:	ACTIVE	Version:	1.0
Level:	1448036	Birthday:	06/10/2003 17:40:17 GMT
DN Prefix:		IMSI Prefix:	
Counts:	IMSI=5324496, DN=10362100, DN Blocks=1, NE=426		
RTDB Clients:	Address	Level	
	192.168.2.200 (mate)	1448036	
	192.168.61.170	1448036	
	192.168.61.171	1448036	
	192.168.61.159	1448036	

PDB@192.168.61.159 Status	
Status:	Database daemon is not running

Sat June 14 2003 17:09:42 EDT
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-
3. If the problem persists for more than two hours, run **save1ogs** (see Procedure A-6, "Saving Logs Using the EPAP GUI," on page A-8), and contact the Customer Care Center for assistance. See page 1-3.
-

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 4-54. Recovery from RTDB Tree Error

1. Contact the Customer Care Center (see page 1-3).
-

6000000000000080 - PDB Backup failed

The PDB backup failed because of at least one of the following conditions:

- A manual backup script was not able to create PDB backup successfully
- A PDB backup was already in progress when Automatic PDB backup attempted to start
- A PDB restore was in progress when the Automatic PDB backup attempted to start

To verify the exact failure condition, refer to the error string in the log file.

Procedure 4-55. Recovery from PDB Backup failed

1. This alarm will clear if the Automatic PDB/RTDB backup executes successfully during the next scheduled backup time. This alarm can also be cleared immediately by performing one of the following:
 - Cancelling the Automatic PDB/RTDB backup via the EPAP GUI. Automatic PDB/RTDB Backup will have to be rescheduled if it is cancelled.
 1. Log in to the User Interface screen of the EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).
 2. From the menu, select **Maintenance>Automatic PDB/RTDB Backup** to display the automatic backup screen.

3. From the **Automatic PDB/RTDB Backup** screen, select **None** as the **Backup Type**.
 4. Select the **Schedule Backup** button to complete the cancellation. Automatic PDB/RTDB Backup will have to be rescheduled. Refer to the *EPAP Administration Manual* to reschedule the Automatic PDB/RTDB Backup.
- Perform a manual backup via the EPAP GUI.
Refer to “Backing Up the RTDB” on page 3-2.
-

600000000000100 - Automatic PDB Backup failed

The PDB backup failed because of at least one of the following conditions:

- The mate machine was not reachable.
- The SCP command to transfer of PDB backup file to mate fails
- The transfer of Automatic PDB Backup to Mate fails
- The transfer of Automatic PDB Backup to mate failed due to disk space shortage on mate
- The remote machine was not reachable
- The connection to remote host failed for SFTP of the PDB Backup file
- The SFTP to the remote host failed for Automatic PDB Backup
- The login or password configured for the Remote machine is wrong for the configured user
- The Destination File Path to store the PDB Backup file in Remote machine configured by the user does not exist
- The transfer of the Automatic PDB Backup to the remote failed due to disk space shortage on the remote

To verify the exact failure condition, refer to the error string in the log file.

Procedure 4-56. Recovery from Automatic PDB Backup failed

1. This alarm will clear if the Automatic PDB/RTDB backup executes successfully during the next scheduled backup time.
This alarm can also be cleared immediately by cancelling the Automatic PDB/RTDB backup via the EPAP GUI. Automatic PDB/RTDB Backup will have to be rescheduled if it is cancelled. To cancel the PDB/RTDB Backup, perform the following:
 - a. Log in to the User Interface screen of the EPAP GUI (see Procedure A-1, “Accessing the EPAP GUI Interface,” on page A-2).

- b. From the menu, select **Maintenance>Automatic PDB/RTDB Backup** to display the **Automatic PDB/RTDB Backup** screen.
 - c. From the **Automatic PDB/RTDB Backup** screen, select **None** as the **Backup Type**.
 - d. Select the **Schedule Backup** button to complete the cancellation. Automatic PDB/RTDB Backup will have to be rescheduled. Refer to the *EPAP Administration Manual* to reschedule the Automatic PDB/RTDB Backup.
-

600000000000200 - RTDB Backup failed

The RTDB backup failed because of at least one of the following conditions:

- The manual backup script (backupRtdb.pl) was not able to create RTDB Backup successfully.
- The EPAP software could not be successfully stopped in order for Automatic RTDB Backup to start.
- Another user has already stopped the EPAP Software before the script stops the EPAP Software for Automatic RTDB Backup
- Another user is currently stopping the EPAP Software. The Automatic RTDB Backup script cannot stop the EPAP Software.
- The GUI Server returned an error when trying to get a lock from it for Automatic RTDB Backup.
- Not able to connect to GUI server for Automatic RTDB Backup
- The EPAP software was not running when it was to be stopped for Automatic RTDB Backup
- The mate machine is not reachable.

To verify the exact failure condition, refer to the error string in the log file.

Procedure 4-57. Recovery from RTDB Backup failed

1. This alarm will clear if the Automatic PDB/RTDB backup executes successfully during the next scheduled backup time. This alarm can also be cleared immediately by performing one of the following:
 - Cancelling the Automatic PDB/RTDB backup via the EPAP GUI. Automatic PDB/RTDB Backup will have to be rescheduled if it is cancelled.
 1. Log in to the User Interface screen of the EPAP GUI (see Procedure A-1, “Accessing the EPAP GUI Interface,” on page A-2).
 2. From the menu, select **Maintenance>Automatic PDB/RTDB Backup** to display the **Automatic PDB/RTDB Backup** screen.
 3. From the **Automatic PDB/RTDB Backup** screen, select **None** as the **Backup Type**.
 4. Select the **Schedule Backup** button to complete the cancellation. Automatic PDB/RTDB Backup will have to be rescheduled. Refer to the *EPAP Administration Manual* to reschedule the Automatic PDB/RTDB Backup.
 - Perform a manual backup via the EPAP GUI. Refer to “Backing Up the RTDB” on page 3-2.
-

6000000000000400 - Automatic RTDB Backup failed

The RTDB backup failed because of at least one of the following conditions:

- The mate machine is not reachable.
- Automatic RTDB Backup file transfer to the Mate failed.
- Unable to connect to Remote host *IP Address* for Automatic RTDB Backup.
- Automatic RTDB Backup file transfer to the Remote failed.
- The incorrect login or password configured for Automatic RTDB Backup.
- The destination path does not exist in remote machine *IP Address* for Automatic RTDB Backup.

To verify the exact failure condition, refer to the error string in the log file.

Procedure 4-58. Recovery from Automatic RTDB Backup failed

1. This alarm will clear if the Automatic PDB/RTDB backup executes successfully during the next scheduled backup time. This alarm can also be cleared immediately by cancelling the Automatic

PDB/RTDB backup via the EPAP GUI. Automatic PDB/RTDB Backup will have to be rescheduled if it is cancelled. To cancel the PDB/RTDB Backup, perform the following:

- a. Log in to the User Interface screen of the EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).
 - b. From the menu, select **Maintenance>Automatic PDB/RTDB Backup** to display the **Automatic PDB/RTDB Backup** screen.
 - c. From the **Automatic PDB/RTDB Backup** screen, select **None** as the **Backup Type**.
 - d. Select the **Schedule Backup** button to complete the cancellation. Automatic PDB/RTDB Backup will have to be rescheduled. Refer to the *EPAP Administration Manual* to reschedule the Automatic PDB/RTDB Backup.
-

600000000001000 - SSH tunnel not established

One or more SSH tunnels has been enabled in the past, but the cron job was not able to re-establish the SSH tunnel with all of the Authorized PDBA Client IP addresses.

Procedure 4-59. Recovery from SSH tunnel not established

1. Verify that the Customer Provisioning Application (CPA) machine is up and running.
 - If the CPA machine is not running, restart it and wait for the alarm to clear.
 - If the CPA machine is running, or if the alarm does not clear, contact the Customer Care Center (see page 1-3).
-

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 1000 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 1000 AS implementations, but for which additional recovery actions must be performed by the Customer Care Center.

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. MPS-Specific FRUs

FRU	Vendor Part Number	Tekelec Part Number	Replace with...	For Replacement Procedure, see:
Breaker Panel	Telect T009-5010F1F1A33	804-1423-01* or 804-1423-R01	804-1423-R01	Procedure 5-1, "Replacing a Breaker Panel," on page 5-7
Breaker Panel Alarm Card	Telect 400185	0804-1489-01* or 804-1489-R01	804-1489-R01	For detailed installation and replacement procedures, refer to the <i>Telect ATO Configurable Breaker Panel User Manual</i> , part number 118267, Issue A, Rev 0. Section 6 provides detailed information on "Operation."
Hub	Garrett DS8016R-48VDC	804-1198-01* or 804-1198-R01	804-1198-R01	Procedure 5-2, "Replacing a Hub," on page 5-8

NOTE: *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 1000 Application Server Hardware Manual*. Because replacing fan filters is recommended as regular preventive maintenance, the procedure for doing so is also included in this manual.

NOTE: When you need to replace one of the FRUs shown in Table 5-2 on page 5-3, all the steps you need to perform are contained in the referenced procedure. No other action is required.

Table 5-2. Tekelec 1000 AS FRUs (No Further Action Required)

FRU	Vendor Part Number	Tekelec Part Number	Replace with...	For Replacement Procedure, see:
Fan Filter	N/A	551-0022-01	551-0022-01	Procedure , "Replacing Fan Filters," on page 3-9 (this replacement can be performed while the MPS is in service)
Fan Assembly	N/A	840-1125-02	840-1125-02	<i>Tekelec 1000 Application Server Hardware Manual</i> (this replacement can be performed while the MPS is in service)
CD/DVD Drive Assembly	N/A	870-2746-01* or 870-2746-02	870-2746-02	<i>Tekelec 1000 Application Server Hardware Manual</i> (this replacement can be performed while the MPS is in service)

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

Table 5-3 on page 5-4 shows the FRUs whose replacement procedures are defined in the *Tekelec 1000 Application Server Hardware Manual*.



CAUTION: Replacing one of the FRUs in Table 5-3 on page 5-4 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 1000 AS FRUs (Further Action Required)

FRU	Vendor Part Number	Tekelec Part Number	Replace with...	Outline of Replacement Procedure
MPS Server (Tekelec 1000 AS)	N/A	870-2640-01* or 870-2640-03	870-2640-03	<ol style="list-style-type: none"> 1. Contact the Customer Care Center (see page 1-3). They will perform the remaining steps. 2. Shut down the software, as described in Procedure 5-3, "Powering Down the MPS Server," on page 5-10 3. Replace the server, as described in the <i>Tekelec 1000 Application Server Hardware Manual</i>. 4. Ensure that system and application data is properly restored.
<p>NOTE: Always contact the Customer Care Center when attempting to replace a FRU in this table.</p> <p>* This FRU is functionally equivalent to the one specified by the replacement part number</p>				

Table 5-3. Tekelec 1000 AS FRUs (Further Action Required) (Continued)

FRU	Vendor Part Number	Tekelec Part Number	Replace with...	Outline of Replacement Procedure
Disk Drive	N/A	804-1804-01* or 804-1804-R01	804-1804-R01	<ol style="list-style-type: none"> 1. Contact the Customer Care Center (see page 1-3). They 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 1000 Application Server Hardware Manual</i>. 4. Ensure that system and application data is properly restored.
<p>NOTE: Always contact the Customer Care Center when attempting to replace a FRU in this table.</p> <p>* This FRU is functionally equivalent to the one specified by the replacement part number</p>				

Table 5-3. Tekelec 1000 AS FRUs (Further Action Required) (Continued)

FRU	Vendor Part Number	Tekelec Part Number	Replace with...	Outline of Replacement Procedure
PCI cards	N/A	Varies	Varies	<ol style="list-style-type: none"> 1. Contact the Customer Care Center (see page 1-3). They will perform the remaining steps. 2. Shut down MPS server using Procedure 5-3 on page 5-10. 3. Replace PCI card, as described in the <i>Tekelec 1000 Applications Server Hardware Manual</i>. 4. Reboot the MPS using Procedure A-10 on page A-18.
<p>NOTE: Always contact the Customer Care Center when attempting to replace a FRU in this table.</p> <p>* This FRU is functionally equivalent to the one specified by the replacement part number</p>				

Fan Replacement Procedure

The Tekelec 1000 AS fan assembly can be replaced while the MPS is in service. For detailed replacement procedures, refer to the *Tekelec 1000 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 Panels" on page 2-7.

It is recommended that one panel remain powered while removing the other panel. This will enable the MPS to remain in-service while replacing a panel.



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 1-3).

Procedure 5-1. Replacing a Breaker Panel

1. Turn off the breakers for the MPS Server and the hubs at the failed breaker panel. See Table 5-4 to identify the appropriate breakers.

Table 5-4. Breaker Panel Assignments

Breaker Position	Breaker Value	BP-1 Panel A	BP-1 Panel B	BP-2 Panel A	BP-2 Panel B
1	15.0A	MPS Server A Feeds	MPS Server B Feeds	MPS Server A Feeds	MPS Server B Feeds
2	1.0A	Hub 1 A Feed	Hub 3 B Feed	Hub 3 A Feed	Hub 1 B Feed
3	15.0A	Reserved	Reserved	Reserved	Reserved
4	1.0A	Hub 2A Feed	Hub 4 B Feed	Hub 4 A Feed	Hub 2 B Feed
5	10.0A	Not Used	Not Used	Not Used	Not Used
6	3.0A	Not Used	Not Used	Not Used	Not Used
7	3.0A	Not Used	Not Used	Not Used	Not Used

-
2. Turn off the breakers at the main power panel for the "A" and "B" power sources to the failed breaker panel.
-
3. 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.
-
4. 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.
-
5. Disconnect from the failed breaker panel all BATT and RTN leads for the hubs and MPS Servers A and B.
-
6. Disconnect the alarm cable from the failed breaker panel.
-
7. Disconnect the frame ground from the failed breaker panel.
-

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

9. Remove the failed breaker panel.

10. To install the replacement panel, refer to the *Signaling Products Integrated Applications Installation Manual*.

Hub Replacement Procedure

This procedure explains how to remove a hub. For more information about the hubs, see “Hubs” on page 2-6.

Refer to the “Hub Installation Procedure” in the *Signaling Products Integrated Applications Installation Manual* to install the replacement hub.

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. Turn off the hub breakers at the breaker panel. Table 5-5 and Table 5-6 show the breakers for the hubs.

Table 5-5. Hub Breakers (Main Network)

Hub	Breaker Panel	Breaker
Hub 1 (A leads)	BP-1	A2
Hub 1 (B leads)	BP-2	B2
Hub 2 (A leads)	BP-1	A4
Hub 2 (B leads)	BP-2	B4

Table 5-6. Hub Breakers (Backup Network)

Hub	Breaker Panel	Breaker
Hub 3 (A leads)	BP-2	A2
Hub 3 (B leads)	BP-1	B2
Hub 4 (A leads)	BP-2	A4
Hub 4 (B leads)	BP-1	B4

-
3. Remove the power terminal strip cover.
-
4. Disconnect the BATT and RTN leads from the breaker panel for "A" and "B".
-
5. Disconnect the frame ground.
-
6. Make sure that all RJ45 cables are labeled, and disconnect all the RJ45 cables.
-
7. Remove the screws that hold the hub in the frame.
-
8. Remove the hub.
-
9. To install the replacement hub, use the "Hub Installation Procedure" in the *Signaling Products Integrated Applications Installation Manual*.
-
10. 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 1000 AS main unit (after shutting down the MPS server, refer to the *Tekelec 1000 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 1000 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 EPAP GUI. For more information about the Halt MPS interface menu item, refer to the *EPAP 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.

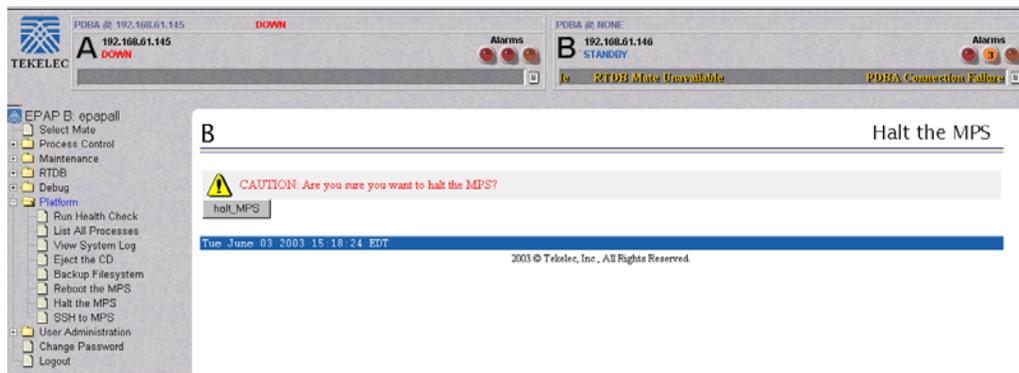
1. Login to the User Interface screen of the EPAP (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).

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

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

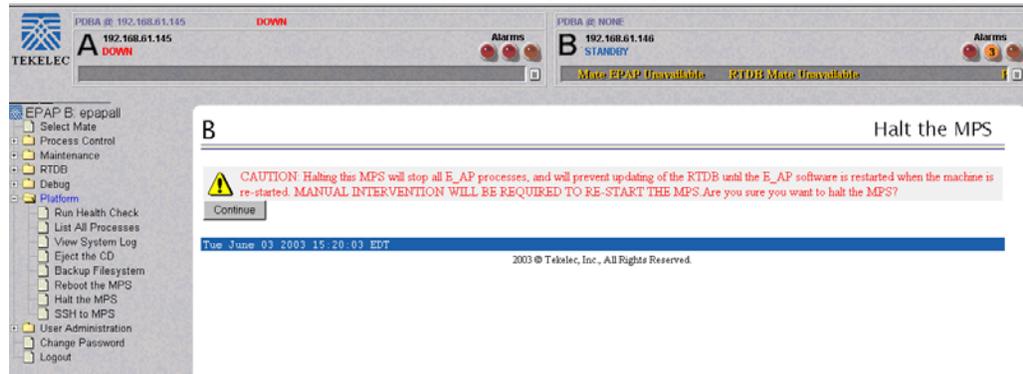
3. When you are logged into the MPS to be powered down, select **Platform>Halt the MPS** menu item to stop the MPS. The following window displays:

Figure 5-1. Halting the MPS



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

Figure 5-2. Halting the MPS Confirmation



5. Click the **Continue** button.

NOTE: The EPAP 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 Table 5-7 and Table 5-8). For more information about breaker panels, see “Breaker Panels” on page 2-7.

Table 5-7. MPS Server A Breaker Locations

MPS Server	Breaker Panel	Breaker
A	BP-1	A1
A	BP-2	B1

Table 5-8. MPS Server B Breaker Locations

MPS Server	Breaker Panel	Breaker
B	BP-1	B1
B	BP-2	A1

The selected MPS Server is shut down and powered down.

Disk Drive Replacement Procedure



WARNING: Disk drive replacement should be performed only by the Customer Care Center. If a disk drive needs to be replaced, contact the Customer Care Center (see page 1-3).

When the Customer Care Center 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. Shut down the MPS Server, using Procedure 5-3, "Powering Down the MPS Server," on page 5-10
3. Replace the disk drive hardware, as described in the *Tekelec 1000 Application Server Hardware Manual*.
4. Reboot the MPS, see Procedure A-10 on page A-18.
5. Configure the new disk.

PCI Card Replacement Procedure



WARNING: PCI card replacement should be performed only by the Customer Care Center. If a PCI card needs to be replaced, contact the Customer Care Center (see page 1-3).

When the Customer Care Center replaces a PCI card, they perform the following functions:

1. Contact the Customer Care Center (see page 1-3). They will perform the remaining steps.
2. Shut down the MPS Server using Procedure 5-3, "Powering Down the MPS Server," on page 5-10.
3. Replace the PCI card hardware as described in the *Tekelec 1000 Application Server Hardware Manual*, 910-4221.
4. Reboot the MPS using Procedure A-10 on page A-18.

Tekelec 1000 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 5-10).

For a detailed procedure for replacing the main unit, refer to the *Tekelec 1000 Application Server Hardware Manual*. Contact the Customer Care Center (see page 1-3) to perform the steps to configure the new disk.



General Procedures

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Accessing the EPAP Text Interface.....	A-4
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Introduction

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

Accessing the EPAP GUI Interface

EPAP 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 EPAP GUI:

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

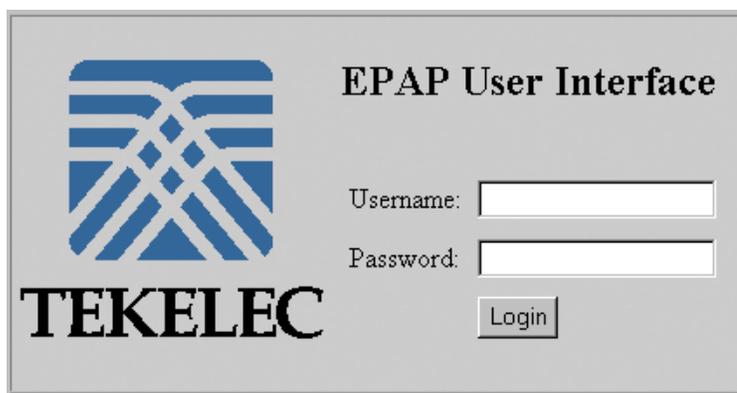
Microsoft Internet Explorer, version 5 and later, has been certified for this application

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

Procedure A-1. Accessing the EPAP 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. EPAP User Interface Screen



If using Firefox, you will encounter the following message when logging into the EPAP 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 EPAP User Interface Login window because this manual covers multiple EPAP 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 *EPAP Administration Manual*.

Table A-1. Usernames

EPAP UI Login Name	Access Granted
epapmaint	Maintenance menu and all sub menus
epappdba	Database menu and all sub menus
epapdebug	Debug menu and all sub menus
epapplatform	Platform menu and all sub menus
uiadmin	User Administration menu
epapall	All of the menus in this Table

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

Connecting the Local Access Terminal

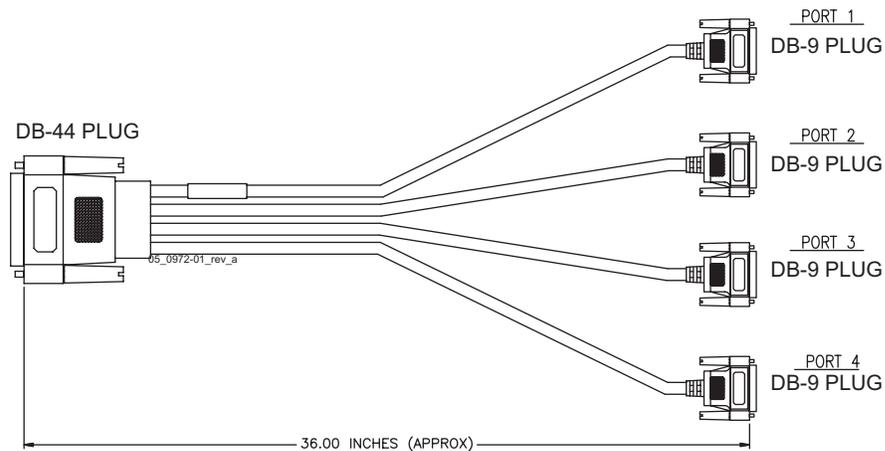
The Local Access Terminal can be used for the following purposes:

- Accessing the EPAP text interface
- Running **syscheck**

Use the following procedure to connect the Local Access Terminal.

Procedure A-2. Connecting the Local Access Terminal

1. Connect the workstation you will use as the Local Access Terminal to Port 3 of the DB44 to DB9 (X4) cable (P/N 830-0972-01), shown in Figure A-2 on page A-4. Port 0 of this cable connects to PCI card 8. (For more information about the location of PCI card 8, refer to the *Tekelec 1000 Application Server Hardware Manual*; for more information about this cable, refer to the *Signaling Products Integrated Applications Installation Manual*.)

Figure A-2. DB44 to DB9 (X4) Cable

-
2. When the prompt appears on the Local Access Terminal, enter either of the following usernames and associated passwords:
 - To access the EPAP text interface, enter the `epapconfig` username and the password provided by your system administrator. For more information about the EPAP text interface, see “Accessing the EPAP Text Interface” on page A-4.
 - 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-5, “Running `syscheck` Using the `syscheck` Login,” on page A-7.
-

Accessing the EPAP Text Interface

The EPAP text-based user interface is accessed through the Local Access Terminal. The text-based user interface is used for initial configuration of the EPAP 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 EPAP application, refer to the *EPAP Administration Manual*.

Procedure A-3. Accessing the EPAP Text-Based User Interface

1. Connect the Local Access Terminal to the MPS server you need to access (see Procedure A-2, "Connecting the Local Access Terminal," on page A-3).

2. Log in with username epapconfig 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 EPAP GUI" on page A-5
- "Running syscheck Using the syscheck Login" on page A-7

Running syscheck Through the EPAP GUI

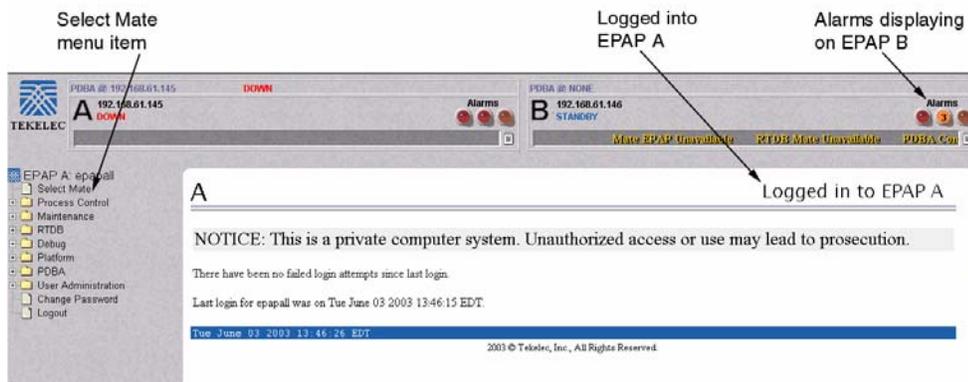
Refer to the *EPAP Administration Manual* for more details and information about logins and permissions.

Procedure A-4. Running System Health Check from the EPAP GUI

1. Log in to the User Interface screen of the EPAP GUI (see "Accessing the EPAP GUI Interface" on page A-1).

2. Check the banner information above the menu to verify that you are logged into the EPAP about which you want system health information. The example in Figure A-3 shows a user is logged into EPAP A, while alarms are showing on EPAP B. To find out more information about conditions on the B server, you need to run **syscheck** on that server.

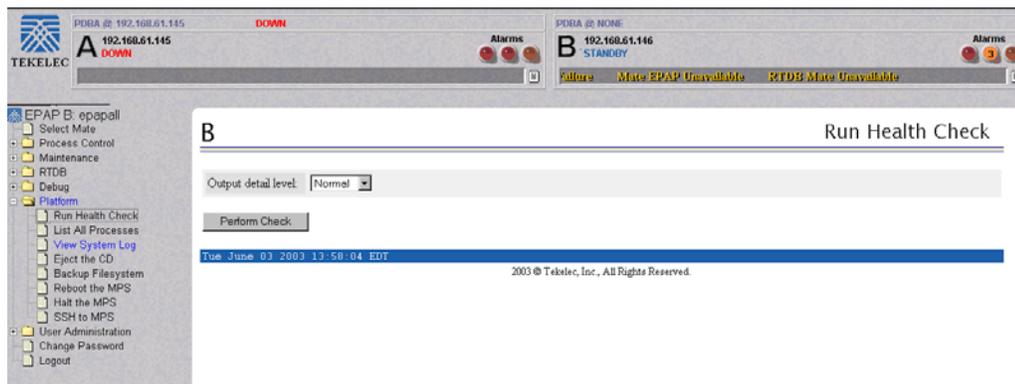
Figure A-3. Logged In Screen



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

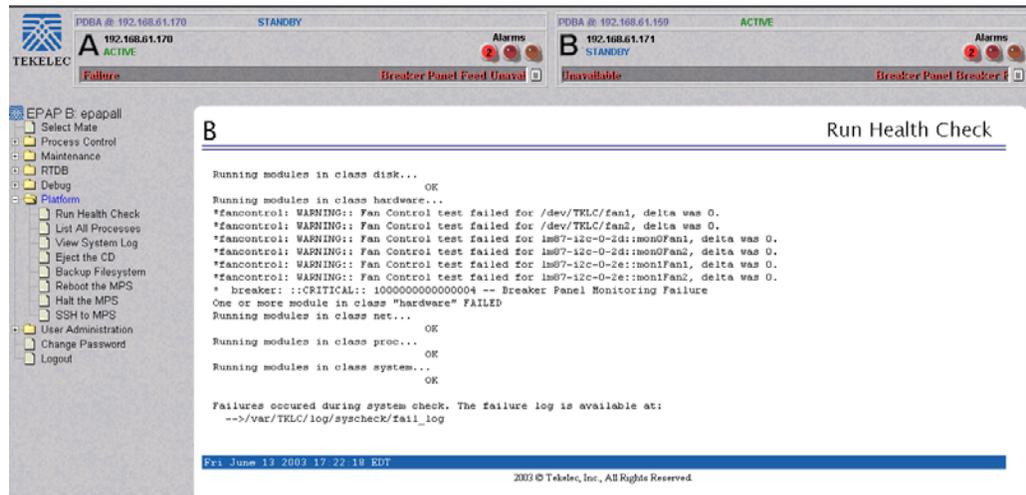
- When the GUI shows you are logged into the EPAP about which you want system health information, select **Platform>Run Health Check**.

Figure A-4. Run Health Check



- On the Run Health Check screen, use the pull-down menu to select Normal or Verbose for the **Output detail level**.
- Click the **Perform Check** button to run the system health check on the selected MPS.
- 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 EPAP GUI



Running syscheck Using the syscheck Login

If the EPAP application has not been installed on the MPS or you are unable to log in to the EPAP 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-5. Running syscheck Using the syscheck Login

1. Connect the Local Access Terminal to the MPS server whose status you want to check (see "Connecting the Local Access Terminal" 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 troubleshooting the MPS.

Saving Logs Using the EPAP GUI

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

Procedure A-6. Saving Logs Using the EPAP GUI

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

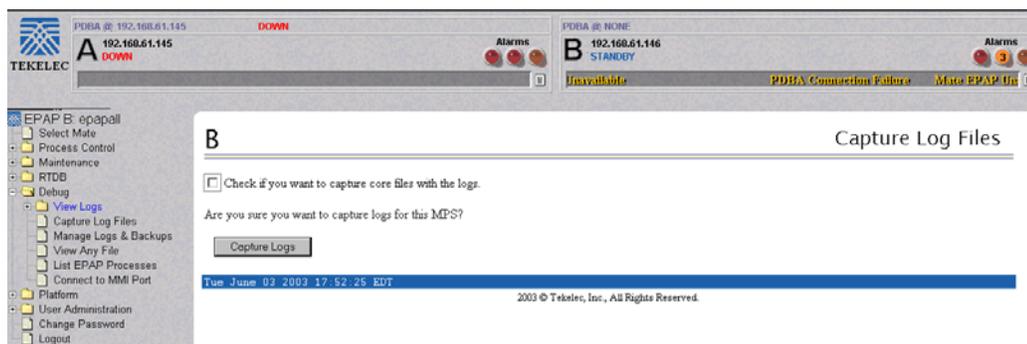
2. Check the banner information above the menu to verify that you are logged into the problem EPAP indicated in the UAM.
If it is necessary to switch to the problem EPAP, click the **Select Mate** menu item.

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 1-3.

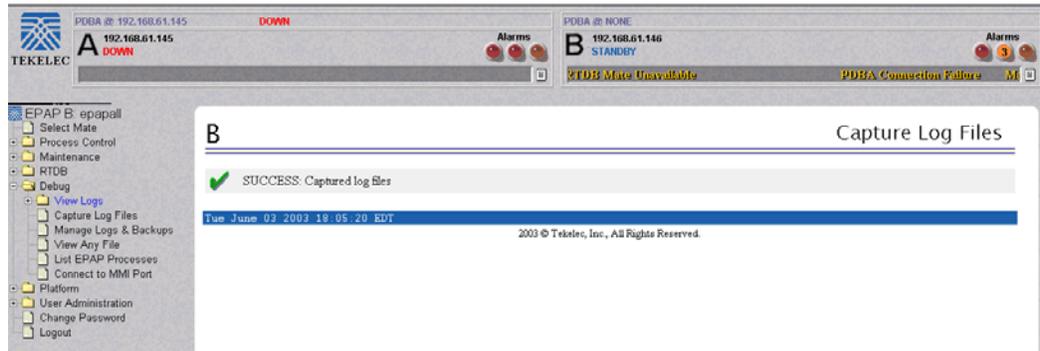
Figure A-6. Capture Logs File Screen



5. Click the **Capture Logs** button to capture the log files.

6. After completion, verify the following response:

Figure A-7. Capture Logs Success

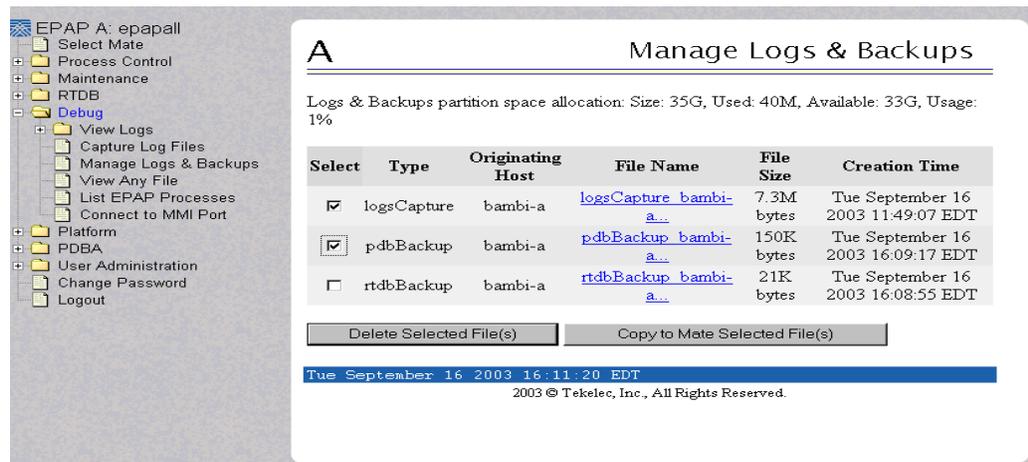


7. Contact the Customer Care Center to analyze and check the log files.

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.

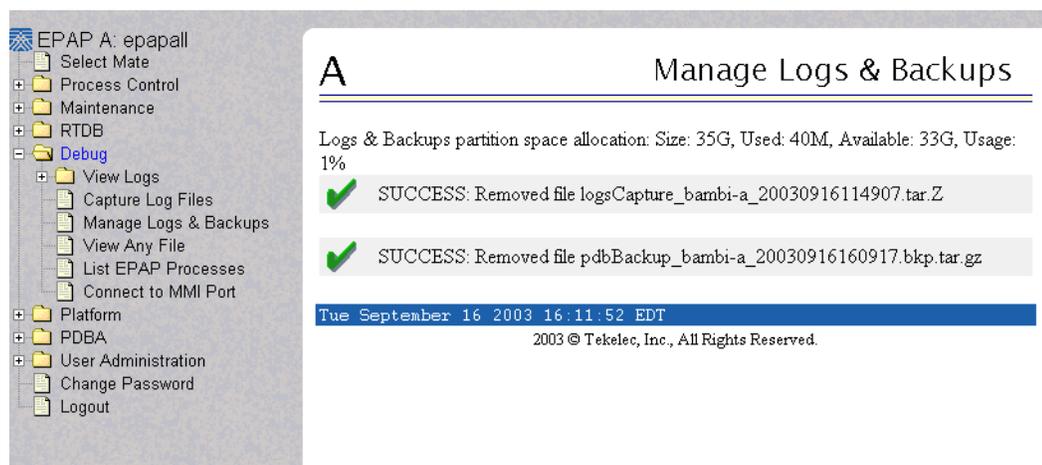
9. Click the checkboxes for the files you want to delete, as shown in the example in Figure A-8, and then click the **Delete Selected File(s)** button.

Figure A-8. Deleting Captured Log Files



-
- 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 EPAP and PDBA

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

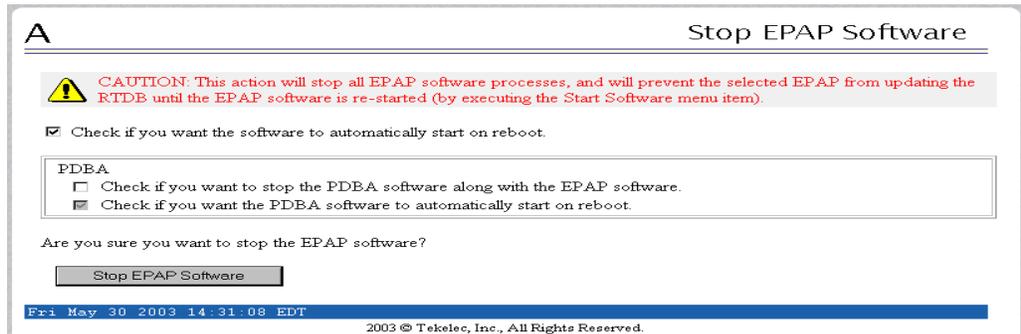


CAUTION: Perform this procedure only when directed to by one of the procedures in Chapter 4, “MPS Platform and Application Alarms.” This is not a standalone procedure.

Procedure A-7. Restarting EPAP and PDBA Software

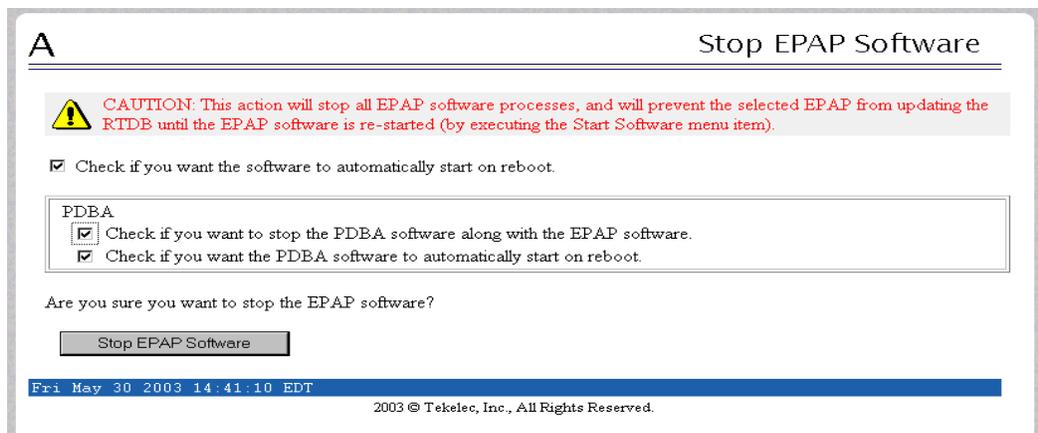
- Log in to the User Interface screen of the EPAP GUI (see Procedure A-1, “Accessing the EPAP GUI Interface,” on page A-2).
- Check the banner information above the menu to verify that you are logged into the problem EPAP indicated in the UAM. If it is necessary to switch to the problem EPAP, select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

Figure A-10. Stop Software Confirmation

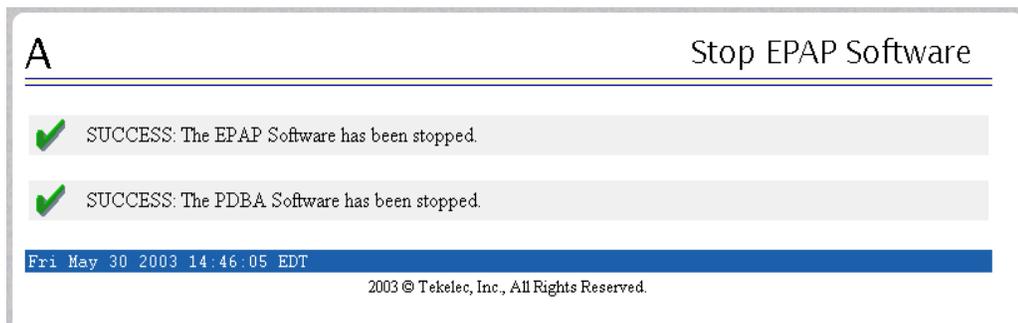


4. On the **Stop EPAP Software** screen, make sure the following checkboxes are all checked, so that the PDBA software is stopped along with the EPAP software and so that both the PDBA and EPAP software are automatically restarted on reboot (see Figure A-11 for an example):
 - **Check if you want the software to automatically start on reboot** (this checkbox causes the EPAP software to automatically reboot)
 - **Check if you want to stop the PDBA software along with the EPAP software**
 - **Check if you want the PDBA software to automatically start on reboot**

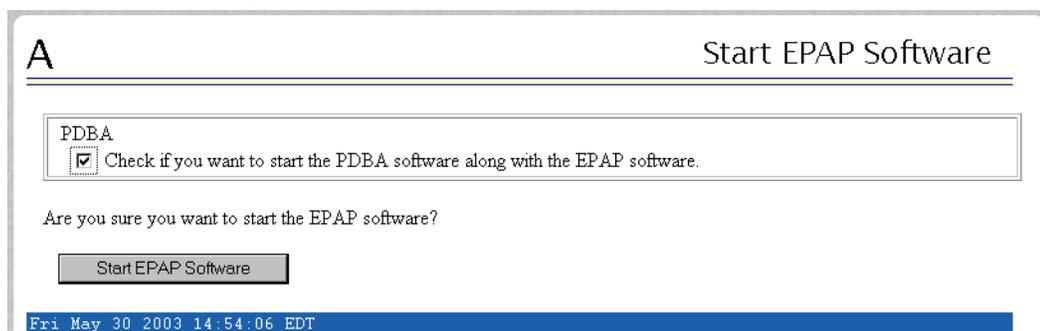
Figure A-11. Stop Software



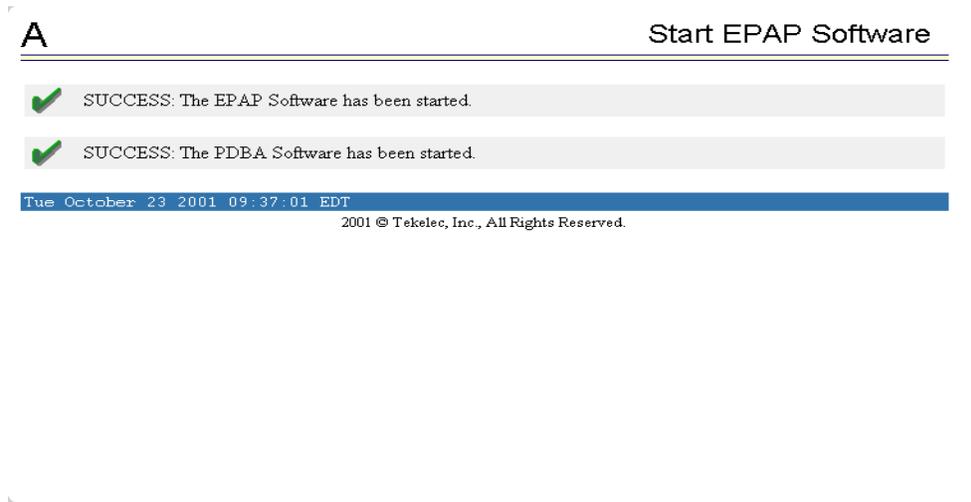
5. Click the **Stop EPAP Software** button to stop the software. The following screen appears (the PDBA item appears only if performing this procedure on Side A).

Figure A-12. Stop Software Completion Screen

6. Select **Process Control>Start Software**.
7. From the **Start EPAP Software** screen, make sure the checkboxes are checked as shown in Figure A-13 (this item applies only if performing this procedure on Side A):

Figure A-13. Start EPAP Software

8. Click the **Start EPAP Software** button to start the software. The following screen confirms that the software has started (the PDBA item appears only if performing this procedure on Side A):

Figure A-14. Start Software Completion Screen

Restarting the EPAP Software

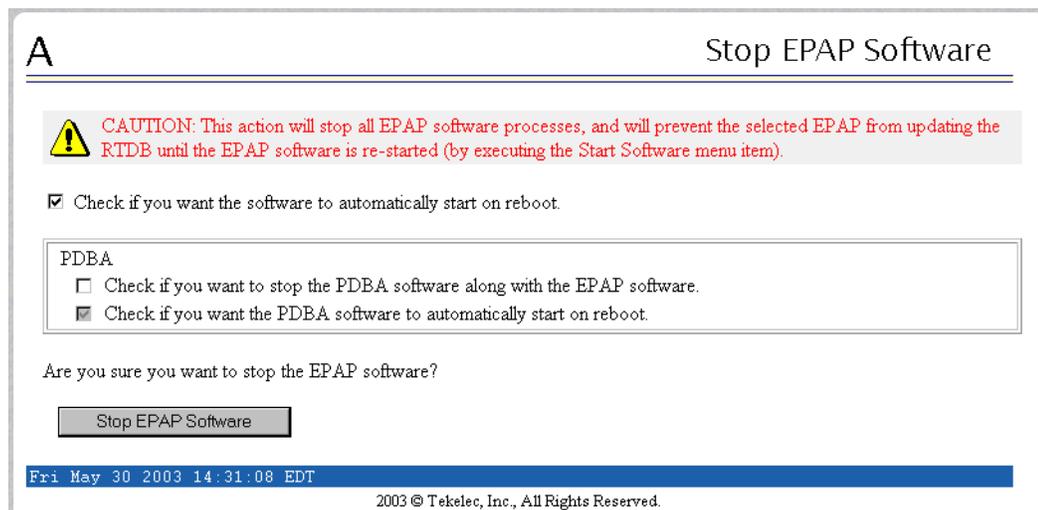
This procedure is used when referenced by one of the procedures in Chapter 4, “MPS Platform and Application Alarms.”



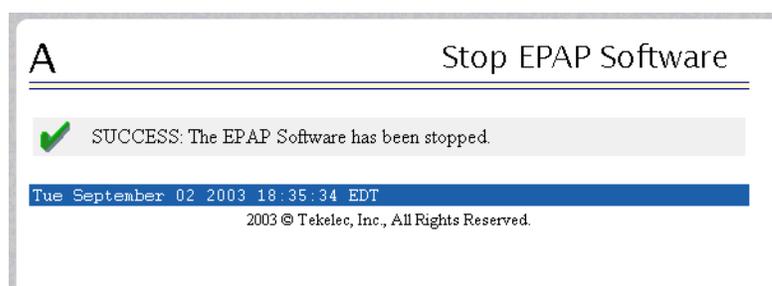
CAUTION: Perform this procedure only when directed to by one of the procedures in Chapter 4, “MPS Platform and Application Alarms.” This is not a standalone procedure.

Procedure A-8. Restarting the EPAP Software

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

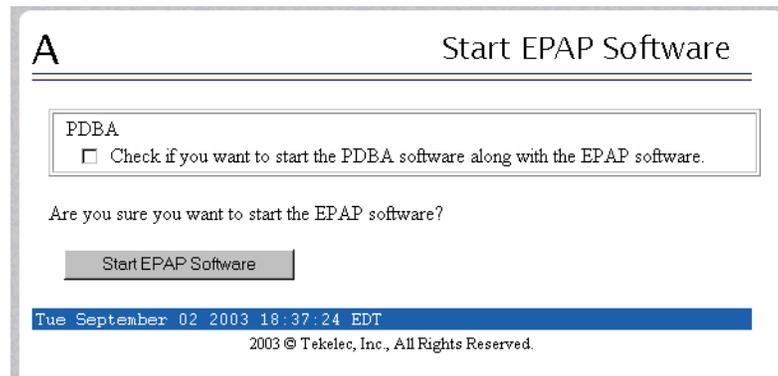
Figure A-15. Stop Software Confirmation

4. On the **Stop EPAP Software** screen, make sure the checkboxes are checked as shown in Figure A-15.
5. Click the **Stop EPAP Software** button to stop the software. The following screen appears.

Figure A-16. Stop Software Completion Screen

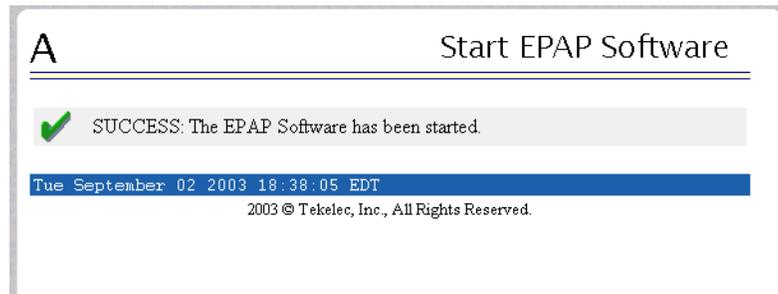
6. Select **Process Control>Start Software**.
7. From the **Start EPAP Software** screen, make sure the checkboxes are checked as shown in Figure A-17:

Figure A-17. Start EPAP Software



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

Figure A-18. Start Software Completion Screen



Restarting the PDBA Software

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

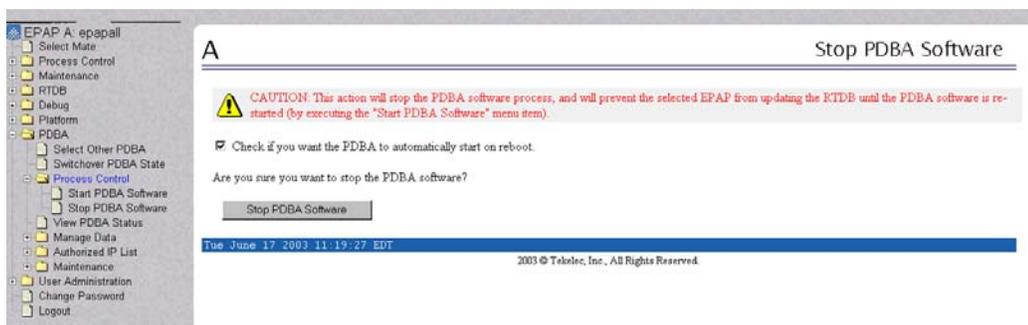


CAUTION: Perform this procedure only when directed to by one of the procedures in Chapter 4, "MPS Platform and Application Alarms." This is not a standalone procedure.

Procedure A-9. Restarting PDBA

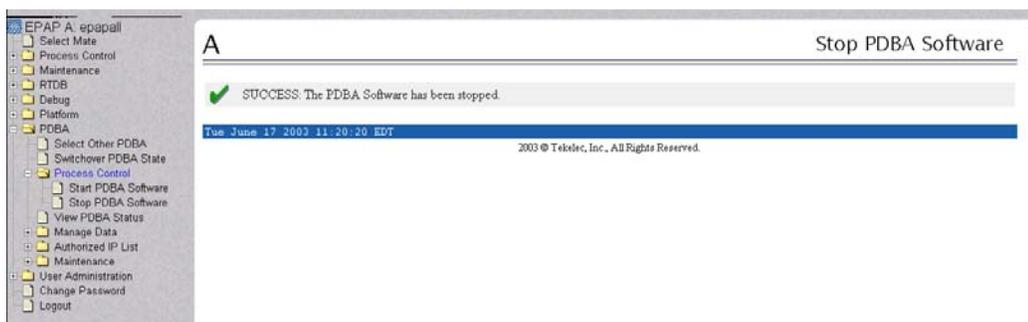
1. Log in to the User Interface screen of the EPAP GUI (see Procedure A-1, "Accessing the EPAP GUI Interface," on page A-2).
2. Check the banner information above the menu to verify that you are logged into the MPS A at the site reporting the problem.
If it is necessary to switch to the other side to be on MPS A, select **Select Mate**. Ensure you are logged into MPS A at the site reporting the problem. If it is necessary to switch to the other site, select **PDBA>Select Other PDBA**.
3. Select **PDBA>Process Control>Stop Software** to stop the PDBA process. The window shown in Figure A-19 displays.

Figure A-19. Stop PDBA



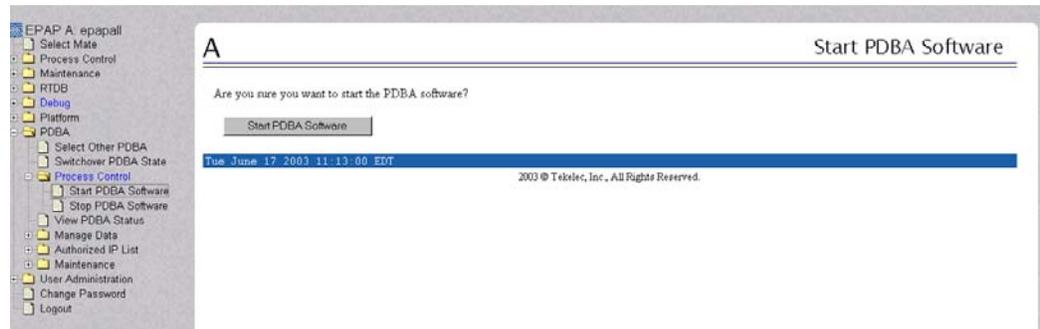
4. Ensure the checkbox is filled in as shown in Figure A-19. Click the **Stop PDBA Software** button. When the software has stopped, a confirmation window display, as shown in Figure A-20.

Figure A-20. PDBA Software Stopped



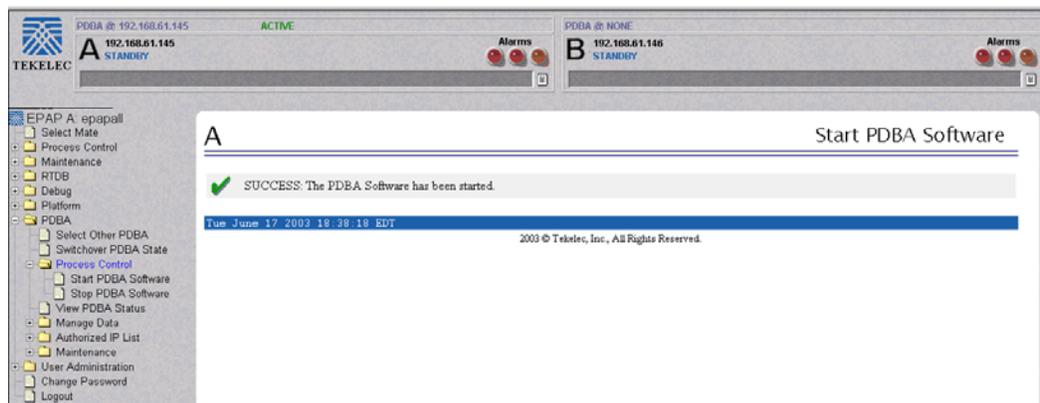
- Restart the PDBA software by selecting **PDBA>Process Control>Start Software**. The window shown in Figure A-21 on page A-17 displays.

Figure A-21. Start PDBA



- Click the **Start PDBA Software** button. When the PDBA software has started, the window shown in Figure A-22 displays.

Figure A-22. PDBA Software Started



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

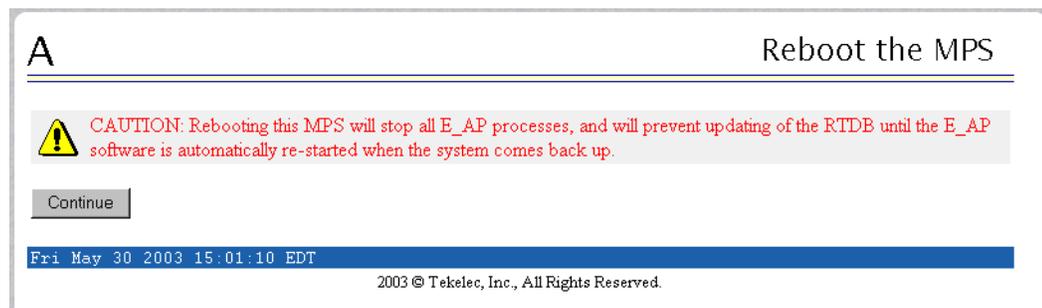
1. Login to the **User Interface** screen of the EPAP GUI (see Procedure A-1, “Accessing the EPAP GUI Interface,” on page A-2).
2. Check the banner information above the menu to verify that you are logged into the problem EPAP indicated in the UAM.
Select **Select Mate** if necessary to switch to the problem EPAP.
3. Select **Platform>Reboot the MPS**. The following screen appears:

Figure A-23. Request Reboot of the MPS



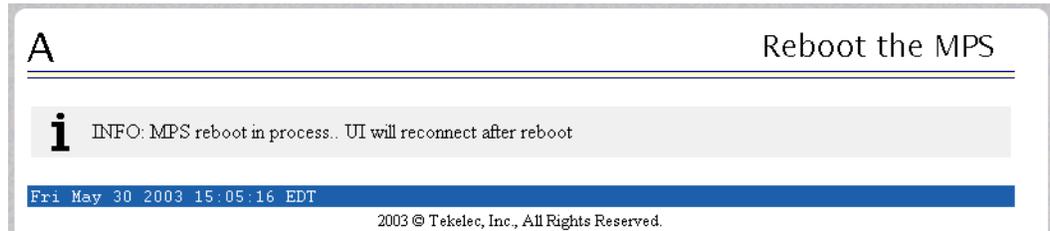
4. Click the **Reboot the MPS** button to restart the MPS. The following screen displays:

Figure A-24. Confirm Requested Reboot the MPS



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

Figure A-25. Reboot Information



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

-
6. At the EAGLE 5 ISS input terminal, enter the **rept-stat-mps** command to verify the status of the EPAP.
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 "Customer Care Center" on page 1-3.
 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.
EPAP	EAGLE Provisioning Application Processor, an application that accepts and stores data provisioned by a customer 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	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.
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 EPAP, 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.
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).
PDBA	Provisioning Database Application, an application that runs on an MPS, receives updates from a customer's provisioning application, and distributes those updates to the EPAP's RTDBs.

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.

Glossary

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