

**Oracle® Communications  
Tekelec 1200**

Platform Maintenance

**910-5680-001 Revision F**

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Oracle® Communications Platform Maintenance

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# Chapter 1

## Introduction

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### Topics:

- *Overview.....11*
- *Scope and Audience.....11*
- *Manual Organization.....11*
- *Related Publications.....11*
- *Documentation Availability, Packaging, and Updates.....12*
- *Locate Product Documentation on the Customer Support Site.....12*
- *Hardware Repair and Return.....13*
- *Customer Care Center.....15*
- *Emergency Response.....18*

This chapter contains general information about manual organization, scope, and audience, related documentation, how to locate customer documentation on the Customer Support site, how to get technical assistance, and RMA requirements.

## Overview

The Tekelec 1200 integrated application platform (T1200 platform) is a complete solution consisting of hardware, operating system, and middleware. The T1200 platform has a modular hardware architecture and allows hardware co-mingling to consolidate product configurations of multiple product families to one common cabinet. Tekelec platform software provides alarm management and configuration of each hardware component. Tekelec platform maintenance covers the T1200 components.

## Scope and Audience

This manual provides safety information, site requirements, hardware diagnostics, replacement procedures for field-replaceable units. Where applicable, hardware component configuration is performed through the product application. Instructions can be found in the administrator section of the respective online-help system, which is provided with the product application on the same or a separate DVD.

This manual is intended for maintenance personnel who must maintain the T1200 platform. For a list of system generated alarms and error messages and their procedures, refer to the Platform Alarm Manual.

## Manual Organization

This manual is organized into the following chapters:

- *Introduction* contains general information about manual organization, scope, and audience, related documentation, how to locate customer documentation on the Customer Support site, how to get technical assistance, and RMA requirements.
- *Safety and Pre-Installation Requirements* provides safety information when handling hardware components, electromagnetic compatibility, and typical site requirements.
- provides detailed descriptions of the platform hardware components.
- contains information describing how to unpack and install the application cabinet.

## Related Publications

This document has the following related publications, which can be found either on the same documentation disc, on the application documentation disc, or on the Customer Support site:

- Tekelec 5100 Integrated Application Platform: System Overview
- T5100 Field Replaceable Unit (FRU) Procedures
- PM&C/T5100 ATCA Platform Troubleshooting Guide
- PM&C/T5100 Initial Installation and Configuration User's Guide

- PM&C Administrator's Manual: Help System PDF

## Documentation Availability, Packaging, and Updates

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

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

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

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

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

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

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

## Locate Product Documentation on the Customer Support Site

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

1. Log into the [Tekelec Customer Support](#) site.

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

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.

4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

## Hardware Repair and Return

Any system components being returned for repair or replacement must be processed through the Tekelec Return Material Authorization (RMA) procedures. A hardware repair is defined as an item returned to Tekelec due to a failure, with the returned item being repaired and returned to the customer. It is essential that serial numbers are recorded correctly. RMAs cannot be created without a valid serial number. All repair and quality information is tracked by serial number. [Table 1: Basic RMA Types](#) lists the basic RMA types. [Table 2: RMA Reasons for Return](#) lists the RMA return reasons.

**Table 1: Basic RMA Types**

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

**Table 2: RMA Reasons for Return**

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

Reason for Return	Description
Product Deficiency	Anything wrong with the part that doesn't fall into another category.
Product Recall	Products recalled by divisions for the repair of a defect or replacement of defective products.
Return – No Product Deficiency	Anything returned without the product being defective.

## Repair and Return Shipping Instructions

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

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

### Procedure - RMA

1. Obtain and confirm the following information before contacting the [Customer Care Center](#):

- Your name:
- Company name:
- Call-back number:
- Email address:
- Which product you are calling about?
- Site location:
- CLEI number
- System serial number (NT, CE, LM, DS, etc.):
- Complete software release (e.g., 28.0.1-41.53.0):
- Upgrade forms
  - WI005153
  - WI005154
  - WI005218
  - WI005219
  - WI005220
- Tekelec card type: (e.g., MPL, DSM, etc.):
- Tekelec card part number (870-####-##):

- Associated serial number (102#####):
  - Reason for return or replacement (isolated from system):
  - Full name of person the replacement card is being shipped to:
  - Shipping address:  
**Note:** If possible, include associated alarms (UAMs) and a copy of the associated output (capture file).
2. Contact the [Customer Care Center](#) and request a Return of Material Authorization (RMA).
  3. If the item is a like-for-like advance replacement, the [Customer Care Center](#) arranges for shipment of the replacement item to the customer.
    - a) Wait for the replacement component to arrive.
    - b) Package the defective component in the box of materials you received with your replacement. Use proper static handling procedures.
    - c) Label the outside and inside of the box with your RMA number clearly visible. Place the packing slip from the received replacements on the inside of your box.
    - d) Ship the defective component to the return address listed on the packing slip.
  4. If the item is a repair/return, the [Customer Care Center](#) arranges for shipment of the replacement item to the customer.
    - a) Package the defective component in a suitable package for shipping. Use proper static handling procedures.
    - b) Label the outside and inside of the box with your RMA number clearly visible. Include a packing slip with all the information from [Step 1](#) along with the RMA number.
    - c) Ship the defective component to the following address:  
TEKELEC  
Attn: RMA Department  
5200 Paramount Parkway  
Morrisville, NC 27560  
RMA#: <assigned by Tekelec>
    - d) Wait for the repaired component to arrive.

## Customer Care Center

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

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

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of

the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

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

### Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

Phone:

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

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

TAC Regional Support Office Hours:

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

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

Phone:

+1-919-460-2150

TAC Regional Support Office Hours (except Brazil):

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

- **Argentina**

Phone:

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

- **Brazil**

Phone:

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

TAC Regional Support Office Hours:

8:00 a.m. through 5:48 p.m. (GMT minus 3 hours), Monday through Friday, excluding holidays

- **Chile**

Phone:

1230-020-555-5468

- **Colombia**

Phone:

01-800-912-0537

- **Dominican Republic**

Phone:

1-888-367-8552

- **Mexico**  
Phone:  
001-888-367-8552
- **Peru**  
Phone:  
0800-53-087
- **Puerto Rico**  
Phone:  
1-888-367-8552
- **Venezuela**  
Phone:  
0800-176-6497
- **Europe, Middle East, and Africa**  
Regional Office Hours:  
8:30 a.m. through 5:00 p.m. (GMT), Monday through Friday, excluding holidays
  - **Signaling**  
Phone:  
+44 1784 467 804 (within UK)
  - **Software Solutions**  
Phone:  
+33 3 89 33 54 00
- **Asia**
  - **India**  
Phone:  
+91-124-465-5098 or +1-919-460-2150  
TAC Regional Support Office Hours:  
10:00 a.m. through 7:00 p.m. (GMT plus 5 1/2 hours), Monday through Saturday, excluding holidays
  - **Singapore**  
Phone:  
+65 6796 2288  
TAC Regional Support Office Hours:  
9:00 a.m. through 6:00 p.m. (GMT plus 8 hours), Monday through Friday, excluding holidays

## Emergency Response

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

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

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

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

# Chapter 2

## Safety and Pre-Installation Requirements

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### Topics:

- *Safety Information.....20*
- *Safety and Electromagnetic Compatibility.....23*
- *Generic Site Requirements.....24*

This chapter provides information pertaining to safety, electromagnetic compatibility, and typical site requirements.

## Safety Information

### General

The icons and text shown in [Table 3: Safety Information Icons and Text](#) are used throughout this manual to alert the reader, to assure personnel safety, to minimize service interruptions, and to warn of potential equipment damage.

**Note:** All personnel must be aware of and conform to the safety information provided in each “Safety Information” section of this manual.

**Table 3: Safety Information Icons and Text**

<b>Tip:</b> (This icon and text indicate the possibility of personnel injury and equipment damage.)	
 <b>DANGER</b>	<b>Danger:</b> (This icon and text indicate the possibility of personnel injury.)
<b>Attention:</b> (This icon and text indicate the possibility of equipment damage and personnel injury.)	
 <b>CAUTION</b>	<b>Caution:</b> (This icon and text indicate the possibility of service interruption and personnel injury.)



**Warning:** All personnel associated with the installation of these systems must adhere to all safety precautions and use required protection equipment to avoid the possibility of injury, equipment damage, service degradation, or service interruption.



**Warning:** This procedure may interrupt service. When possible, perform maintenance during low traffic and database provisioning periods, such as the maintenance window

### Frames



**Topple:** Always read and understand instructions thoroughly and completely before working on, moving, raising or lowering the cabinet, any portion of the cabinet, attachments to the cabinet, or equipment.



**Topple:** Never try to unpack any frame from the shipping container without at least two people to steady any movement of the frame and related components. At least two people are required to safely move and position a frame into place.



**Topple:** Never pull out the shelf of a frame that is not anchored properly. Systems with sliding shelves must be securely anchored to the floor and to the overhead cable racks. Extending a shelf without correctly anchoring the frame can cause the frame to topple and endanger personnel and damage equipment.



**Topple:** Frames are required to be attached to over-head ladder-racks before shelves are extended.



**Danger:** Moving a frame requires two people. Injury or damage to internal components due to shock and vibration might occur if not handled properly.



**Warning:** Before drilling holes in any flooring, verify with facilities personnel that the area is free of gas or water pipes, ventilation plenum, and electrical wiring conduits.



**Warning:** Finger-tighten nuts on threaded rods inside the frames above the raised floor before finger tightening the nuts below the raised floor.



**Caution:** Frame ground. Do not “double lug”: The practice of using one bolt through a lug and the ground bar, and through another lug on the other side of the ground bar, held in place by one nut.



**Caution:** After the frame has been shipped or moved, remove all cards prior to applying power. Carefully reset cards to avoid possible faulty connections.

## Power



**Danger:** Strictly observe all grounding requirements to reduce the risk of electric shock.



**Danger:** Do not use or place commercially AC-powered equipment within 7 ft. of –48V equipment. Close proximity can create a shock or current loop that is severely hazardous to personnel and equipment.



**Warning:** The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly **MUST NOT** be metallically connected to interfaces that connect to the Outside Plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described

in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metalically to OSP wiring.



**Warning:** Before testing -48VDC power source:

- Ensure that no power is being provided to the system from the -48VDC power source, such as a power board
- Ensure that no circuit cards are installed in the shelves
- Open all circuit breakers in the PDP
- Recheck wiring and connections for proper polarity



**Warning:** Always install an isolator pad between the frame and ground. Frames are shipped with isolator pads to completely isolate the frames from ground.



**Warning:** Application servers. Verify that all breakers are set to the OFF (O) position. An application server chassis is redundantly powered from both A and B -48VDC buses. Ensure that both the circuit breaker supplying A power to the chassis and the circuit breaker supplying B power to the chassis are turned OFF by measuring the voltage with a VOM on the cable that connects the chassis to its breakers. Both A and B power LEDs on the front panel of the chassis should be OFF.



**Caution:** Redundant systems allow service during normal maintenance. When repairs require a total power disconnect, both input supply sources must be disconnected. This causes service interruption and takes down the systems.



**Caution:** This equipment has a connection between the earthed conductor of the DC supply circuit and the earthing conductor.



**Caution:** Install equipment in restricted access areas in accordance with articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.



**Caution:** Incorporate a readily accessible approved disconnect device in the field wiring.



**Caution:** Use only listed closed-loop connectors for connection to the power supply.

## Electrostatic Discharge



DANGER

**Danger:** Always wear a wrist strap or other electrostatic protection when handling printed circuit cards and other electrostatic-sensitive devices



WARNING

**Warning:** Use an antistatic wrist strap connected to the wrist strap grounding point on the frame when performing these procedures.



WARNING

**Warning:** Do not use tie wraps on or above the top traverse arms on a frame. Always trim tie wrap flush and turn the trimmed tie wrap to the rear of the cable. Contact the Site Supervisor for site-specific customer information.



WARNING

**Warning:** Do not use tie wraps for optical cables.

## Components



WARNING

**Warning:** If components arrive in containers that might have been subjected to extreme temperatures or variations in humidity (such as air transport), allow 6 hours for the components to acclimatize to your site conditions before operating.



WARNING

**Warning:** Metal points on Printed Circuit Boards conduct -48VDC and can cause shorts, shocks, and damage if not handled properly.



CAUTION

**Caution:** New CPCI cards may have a small plastic cover over the screws or the alignment ejector pins. Remove and discard these plastic covers. If inserting the cards takes an excessive amount of force, check for obstructions. Forcing the card into a slot may damage the ejector handle or pin.



CAUTION

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

## Safety and Electromagnetic Compatibility

GR-1089-CORE Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment, Telcordia Technologies. NEBS Level 3.

GR-63-CORE NEBS Requirements: Physical Protection, Telcordia Technologies Generic Requirements, NEBS Level 3.

UL 60950-1 Information Technology Equipment - Safety - Part 1: General Requirements, Agency Listing

IEC 60950-1 Information Technology Equipment - Safety - Part 1: General Requirements

Safety Directive 2006/95/EC EN 60950-1, Information Technology Equipment - Safety - Part 1: General Requirements

CSA C22.2 No. 60950-1 Information Technology Equipment - Safety - Part 1: General Requirements for Canada

EMC Directive 2004/108/EC Compliance with EU Harmonized Standards EN 55022, I.T.E. Radio disturbance characteristics Limits and Methods of Measurement. Compliance with EN 55024, I.T.E. Immunity characteristics Limits and Methods of Measurement

## Generic Site Requirements

The following specifications are standard telephony industry requirements for equipment installation.

### Building Requirements

The building requirements for this system are standard telephony industry requirements for equipment installation.

The building must provide a clear, uncluttered route between the loading/receiving dock and the planned system location. In order to move the equipment to the proper location, recommended hall clearance is at least 4.5 feet (1.4 meters) wide by 8.5 feet (2.6 meters) tall.

Four foot, (1.2 meter) side aisles should be used to allow maneuvering frames into place and provide ample work space around the equipment.

The room selected for system installation should be large enough so the system frames can be at least 2.5 feet (76 cm) from the walls for front and rear access and at least 12 inches (31 cm) for side access.

### Earthquake Resistance

All Tekelec system configurations are designed to assure that the system remains operational during and after an earthquake, even when the system is located on the upper floors of a zone 4 central office.

### Elevation

Operating: 60 m below sea level at ambient temperature of 30° C to +4000 m above sea level at ambient temperature of 40° C.

### Fire Protection

Local fire protection codes must be satisfied in the equipment room where the system is to be located.

## Floor Loading

It is recommended the floor or raised sub-flooring have a distributed load capacity of no less than 100 pounds per square foot (453 kg/m<sup>2</sup>). The floor loading is determined by using the following equation:  
Total equipment weight/floor area = distributed floor capacity.

## HVAC Requirements

To maintain the required temperature range, Heating, Ventilation, and Air Conditioning (HVAC) equipment should have the capacity to compensate for the site engineering recommendations.

The required HVAC capacity to compensate for a miscellaneous frame varies depending on the customer previously installed equipment. To calculate needed HVAC capacity, determine the wattage of the installed equipment and use the following formula: watts x 3.413 = BTUs/hr.

## Lighting

Adequate lighting should be provided in the room where the equipment is to be located. Lighting fixtures must be far enough from the equipment and cables to prevent heat damage and to allow safe access to equipment and cables.

## Relative Humidity

- Operating: 5% to 85% non-condensing (maximum absolute humidity of 0.024 kg of water per kg of dry air)
- Short Term Operating: 5% to 90% non-condensing (maximum absolute humidity of 0.024 kg of water per kg of dry air)

## Space Requirements

This system equipment is housed in 7 foot high (44U), 24 inch wide, floor supported, upright frame with top and side panels as well as door.

The number of frames required for an installation is described in the Initial Sales Order for that site. The number of frames is determined by the space required by the module population of the system.

When planning the installation, be sure to take into account spare module storage, modems, terminals, printers, cross connect panels, and all other items that might require space in a system.

## Temperature Variation

Typical environmental conditions are temperature and humidity controlled. With loss of environmental control, the equipment covered in this manual complies with these conditions:

- Operating: 5° C to 40° C (41° F to 104° F)
- Exceptional Operating Limit: -5° C to 50° C (23° F to 122° F) (no more than 96 hours duration at extremes and at elevations less than 1800m)

- Storage: Tested to meet the storage and transportation requirements in Telcordia GR-63-CORE, ETSI EN 300 019-2-2, T2.3

# Chapter 3

## Hardware Diagnostics and Troubleshooting

---

### Topics:

- *Overview.....28*
- *T1200 Application Server Troubleshooting.....28*
- *Hardware Diagnostic Testing.....32*
- *Referenced Procedures.....33*

This chapter provides hardware diagnostic and troubleshooting procedures for the Tekelec 1200 application server (T1200 AS).

## Overview

This chapter provides hardware diagnostic and troubleshooting procedures for the Tekelec 1200 application server (T1200 AS); additional hardware diagnostic testing, and the referenced troubleshooting procedures (listed in alphabetical order). For references to procedures of field-replaceable units (FRUs), refer to *Field Replaceable Units (FRUs)*.

## T1200 Application Server Troubleshooting

Application server problems can be designated in three different modes: LED failure indication, log file failure indication, or functionality failure. In some cases, the failure of one component may be caused by the failure of another component.

The only customer-serviceable field-replaceable units for the T1200 AS are the power supplies and hard drives. For all other failures, call the *Customer Care Center*.

### About Console Access

Console access in this document refers to the network console access to the server (via the quad serial card port).

### T1200 AS Power Supply Problems

*Figure 1: Power Supply Troubleshooting* provides troubleshooting procedures for the power supplies.

**Note:** Follow this procedure only if there is a redundant power supply available. If there is only one power supply available and it fails, call the *Customer Care Center* immediately.

For referenced FRU procedures, see Chapter 4, Field-Replaceable Units (FRUs). For any other referenced procedures, see *Replacement Procedures* or call the *Customer Care Center*.



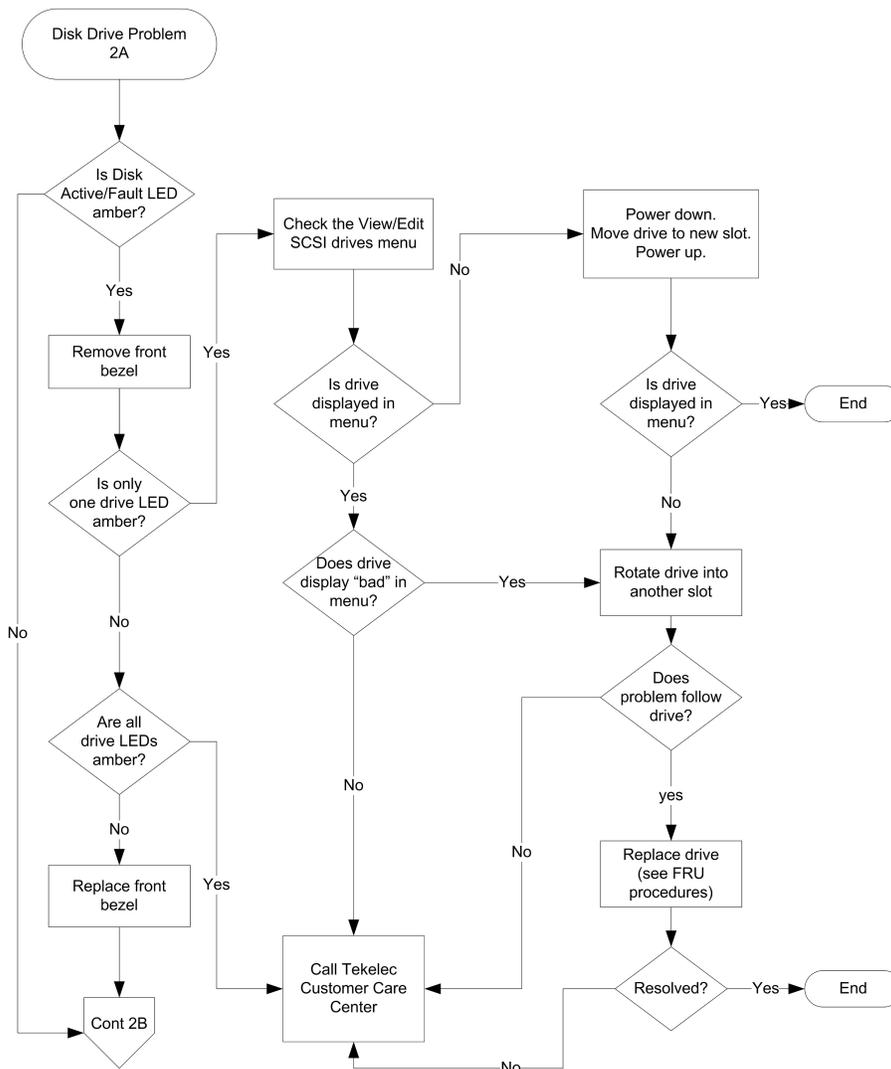


Figure 2: T1200 AS Drive LEDs, Flowchart 1 of 2

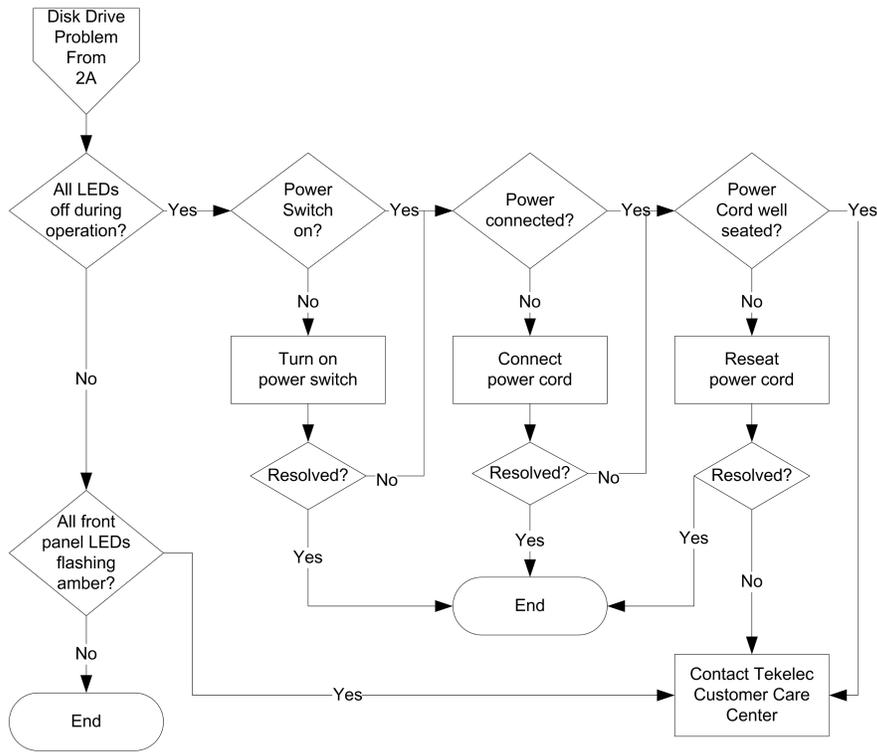


Figure 3: T1200 AS Drive LEDs, Flowchart 2 of 2

### Hard Drives are not Recognized

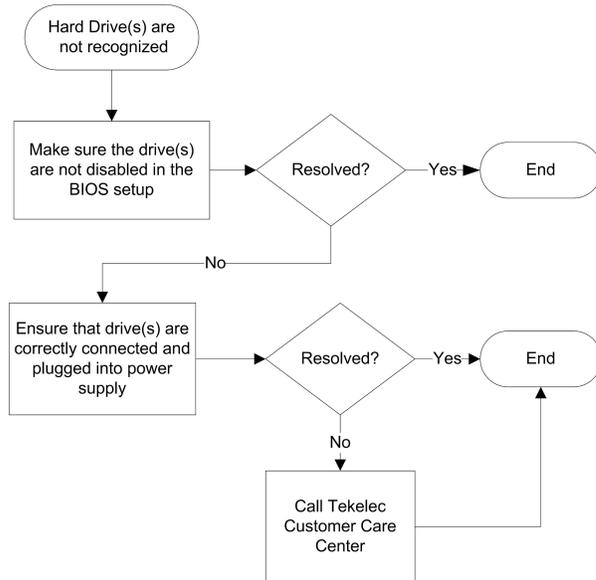


Figure 4: Hard Drives are not Recognized

## Hardware Diagnostic Testing

This section provides a more detailed approach to identifying a hardware problem and locating its source.



**Caution:** Turn off devices before disconnecting cables. Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

### Procedure — Steps Before Diagnosing

1. Turn off the system and all external peripheral devices. Disconnect each of devices from the system, except for the keyboard and the video monitor.
2. Make sure the system power cord is plugged into a properly grounded outlet.
3. Make sure that the video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two thirds of their maximum ranges (see the documentation supplied with the video display monitor).
4. Turn on the system. If the power LED does not light, see [T1200 AS Power Supply Problems](#).

### Verifying Proper Operation of Key System Lights

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity light should turn on briefly. If system LEDs are illuminated, see [LED Descriptions](#) for LED descriptions.

### Confirming Loading of the Operating System

Once the system boots, the operating system prompt appears on the screen. The prompt varies according to the operating system.

### Diagnostics Pass but the Connection Fails

Make sure the network cable is securely attached.

### Problems with Application Software that Ran Correctly Earlier

Problems that occur after the system hardware and software have been running correctly sometimes indicate equipment failure. However, they can also be caused by file corruption or changes to the software configuration. Contact the [Customer Care Center](#) for assistance.

## Referenced Procedures

This section describes the procedures referenced in the troubleshooting flowcharts. The procedures are listed in alphabetical order. For referenced FRU procedures, see [Field Replaceable Units \(FRUs\)](#).

## Checking Temperature in Application Server via Remote Management Module

[Figure 5: Remote Management Module - Monitor Sensors](#) gives a visual and detailed report on individual sensor status. Threshold based sensors within a normal range of operation are displayed in green, and sensors in a critical state are shown in red.

Sensor Type	Sensor Name	Sensor Status	Sensor Reading
Voltage	DD +1.2V Vtt	Ok	1.197 Volts
Voltage	BB +1.5V AUX	Ok	1.490 Volts
Voltage	BB +1.5V	Ok	1.469 Volts
Voltage	BB +1.8V	Ok	1.813 Volts
Voltage	BB +3.3V	Ok	3.320 Volts
Voltage	BB +3.3V STB	Ok	3.337 Volts
Voltage	BB +1.5V ESB	Ok	1.482 Volts
Voltage	DD +5V	Ok	5.096 Volts
Voltage	BB +12V ALX	Ok	12.152 Volts
Voltage	BB 0.9V	Ok	0.902 Volts
Temperature	Baseboard Temp	Ok	31 (+/- 1.500) degrees C
Temperature	Front Panel Temp	Ok	23 (+/- 1.500) degrees C
Fan	SYS FAN 1 TACH	Below lower critical threshold	0 RPM
Fan	SYS FAN 3 TACH	Below lower critical threshold	0 RPM
Temperature	P1 Therm Margin	Ok	-50.000 degrees C
Temperature	P2 Therm Margin	Ok	-58.000 degrees C
Temperature	P1B Therm Margin	Ok	-54.000 degrees C
Temperature	P2B Therm Margin	Ok	-62.000 degrees C
Temperature	P1 Therm Cnt %	Ok	0 (+/- 0.500) unspecified
Temperature	P2 Therm Cnt %	Ok	0 (+/- 0.500) unspecified
Voltage	Proc 1 Vcc	Ok	1.140 Volts
Voltage	Proc 2 Vcc	Ok	1.147 Volts
Power Unit	Power Unit		
Watchdog	BMC Watchdog		
Platform Security Violation Attempt	Scry Violation		
Physical Security	Physical Scry	General Chassis intrusion	
Critical Interrupt	F-P Diag Int		
Event Logging Disabled	System Event Log		

Figure 5: Remote Management Module - Monitor Sensors

## Procedure — Disabling the Periodic Drive Check Time

1. From the Main Menu, choose view and edit Configuration parameters > Drive-side SCSI Parameters > Periodic Drive Check Time.

A list of Periodic Drive Check Time intervals is displayed.

2. Select Disable
3. A confirmation message is displayed

4. Choose Yes to confirm



**Caution:** To prevent any possible data loss, back up user data to another storage device prior to replacing a disk drive

### Procedure — Moving a Drive



**Caution:** When moving or replacing a hard drive, make sure that:

- All I/O is stopped
  - The "Periodic Drive Check Time" setting in the firmware application is set to disabled (this is the default setting). This prevents automatic drive rebuild, which is not recommended for live systems or troubleshooting
1. Check the physical drive parameters using the firmware application.
  2. From the firmware Main Menu, choose view and edit the SCSI drives

### Procedure — Powering off Application Server

Use the Remote Management Module to power off the T1200 AS.

1. To open the console:
  - select Remote Control and click the KVM Console submenu or
  - click the the console icon in the Remote Console Preview window

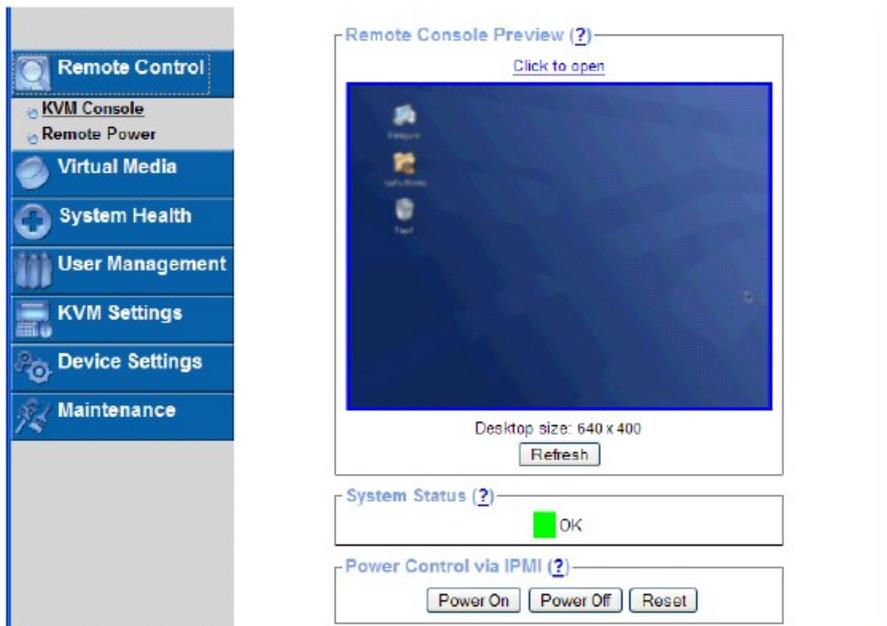


Figure 6: Remote Management Console

2. Open the Power Control window. Either:
  - click the Remote Power submenu or
  - click the Refresh in the Remote Console Preview window
3. Click the Power Off button in the Power Control via IPMI section.

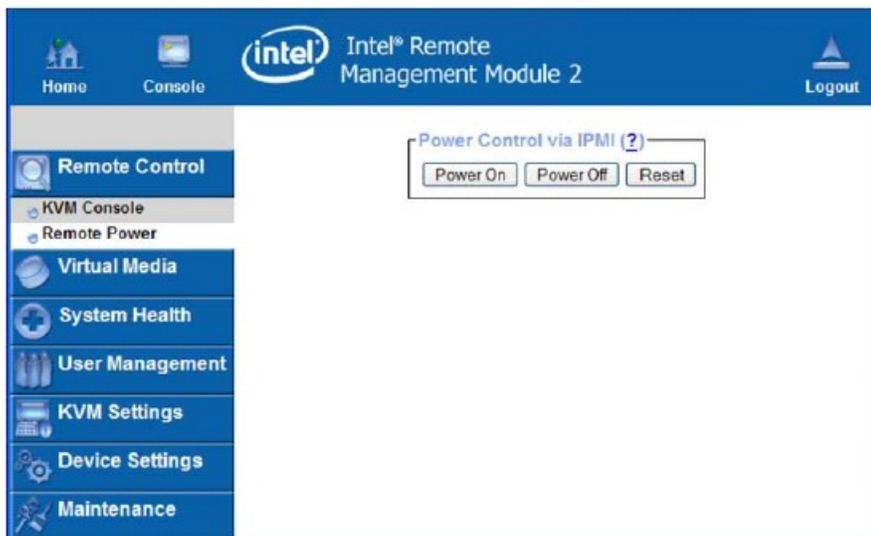


Figure 7: Remote Power Display

### **Reseating/Replacing T1200 AS Power Supply**

To reseat a power supply, remove it and then reinstall it again to possibly resolve loose connection problems. Refer to the instructions on how to replace a power supply in [Field Replaceable Units \(FRUs\)](#).

### **Reseating/Replacing/Moving T1200 AS Hard Drive**

To reseat a hard drive, remove it and then reinstall it again to possibly resolve loose connection problems. Refer to the instructions on how to replace a hard drive in [Field Replaceable Units \(FRUs\)](#).

### **Procedure — Accessing the View/Edit SCSI Drive Menu**

Use this utility to determine if the hard drive is showing on the system.

1. From the Main Menu, choose view and edit Drives.
2. Select the drive to be located.

# Chapter 4

## Field Replaceable Units (FRUs)

---

### Topics:

- [Overview.....38](#)
- [Replacement Procedures.....39](#)

This chapter contains information describing field-replaceable units that can be replaced quickly and easily by non-Tekelec technicians.

## Overview

The field-replaceable units described in this chapter are those that can be replaced quickly and easily by non-Tekelec technicians. For troubleshooting or replacing other components, contact the [Customer Care Center](#).

## Customer-Replaceable and hot-swappable FRUs

The following T1200 platform components are customer-replaceable:

- From the power distribution panel:
  - Breakers
  - Alarm card
- From the T1200 application server:
  - Hard drives (hot-swappable)
  - Power supply (hot-swappable only if redundant power supply is installed)

## Map of FRU Replacement Procedures

[Table 4: FRU Replacement Procedures for T1200 Platform](#) lists the replacement procedures for customer-replaceable T1200 platform FRUs. For any FRUs not listed in this chapter, contact the [Customer Care Center](#).

**Table 4: FRU Replacement Procedures for T1200 Platform**

If you need to...	...perform this procedure
Access the hard drives	<a href="#">Procedure — Removing the Front Bezel</a>
Replace an alarm card	<a href="#">Procedure — Replacing the PDP Alarm Card</a>
Replace a breaker	<a href="#">Procedure — Replacing a Breaker</a>
Replace a hard drive	<a href="#">Procedure — Preparing a Hard Drive for Removal</a>
	<a href="#">Procedure — Removing the Front Bezel</a>
	<a href="#">Procedure — Removing a Hard Drive</a>
	<a href="#">Procedure — Installing a Hard Drive</a>
	<a href="#">Procedure — Replacing the Front Bezel</a>
Replace a power supply	<a href="#">Procedure — Installing the Power Supply Module</a>

## Replacement Procedures

### Procedure — Replacing a Breaker

1. Observe the safety and ESD precautions in [Safety and Pre-Installation Requirements](#).
2. Locate the failed breaker on the applicable bus. Each bus ("Bus A" and "Bus B") has its own breaker fail (BRK FAIL) alarm LED.



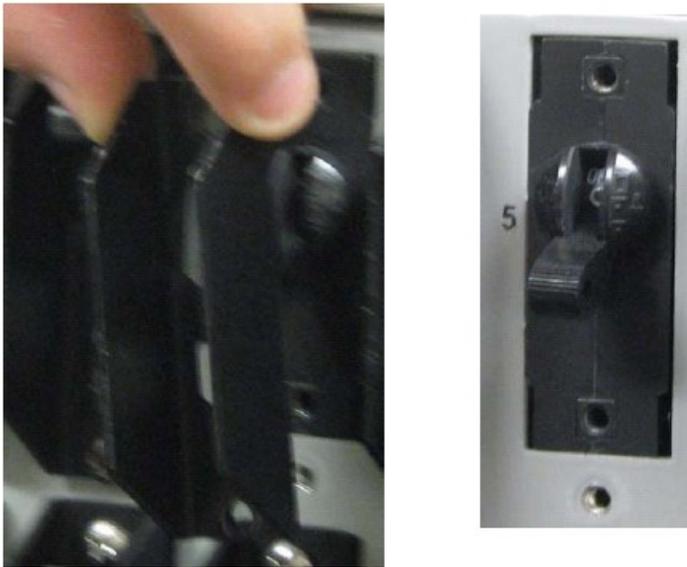
Figure 8: Locate Failed Breaker

3. Unscrew the one screw at the top and the two screws at the bottom of the breaker



Figure 9: Unscrew the Breaker

4. Remove the plastic breaker cover to fully display the breaker lever.



**Figure 10: Removing Plastic Breaker Cover**

5. Hold the lever firmly between thumb and index finger, and pull back hard to remove the breaker from its slot.



**Figure 11: Remove Breaker**

6. Remove the plastic cover from the new breaker and set aside the screws.

7. Insert the new breaker carefully to allow the connector pins to match up with the socket in the PDP chassis.



**Figure 12: Insert New Breaker**

8. Place the plastic cover over the switch.



**Figure 13: Replace the Breaker Cover**

9. Insert the three screws and tighten them.



Figure 14: Replace the Screws

10. Push the breaker to the ON position.



Figure 15: Push Breaker to ON Position

11. Verify that the Breaker Fail LED for this bus returns to green on the alarm card panel.

### Procedure — Replacing the PDP Alarm Card



**Warning:** All power sources must be removed from the PDP before reomoving the alarm card assembly. All alarm contacts will signal an alarm state when all power sources are removed or when the alarm card is removed.

1. Observe the safety and ESD precautions in [Safety and Pre-Installation Requirements](#).
2. Remove all power source from the PDP. The removal of the power source will cause an alarm.
3. Remove the top and bottom screws from the alarm card face plate.



Figure 16: Unscrewing Alarm Card

4. Hold the card at the top and bottom edge and pull it out straight. The removal of the alarm card will cause another alarm.

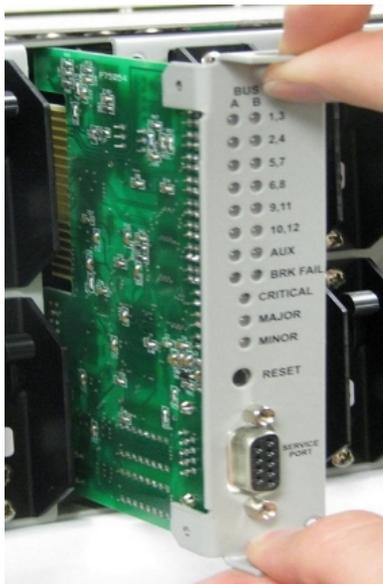
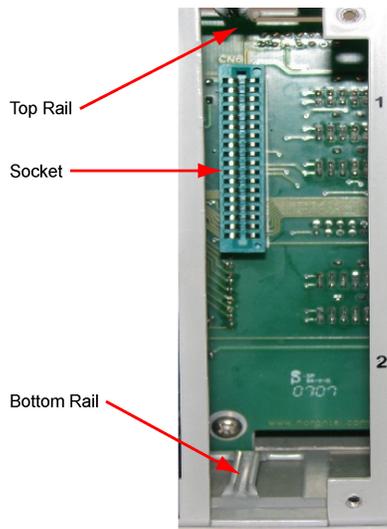


Figure 17: Removing the Alarm Card

5. Go to [Procedure — Configuring the PDP Alarm Card](#) to set the monitoring of the PDP Alarm Card.
6. Locate the top and bottom rail as well as the socket in the open alarm card slot.



**Figure 18: Locating Rails and Socket in Slot**

7. Slide the board of the new alarm card into the top and bottom rails of the open slot.
8. Push the card back carefully to match up the card connector with its socket in the slot.



**Figure 19: Insert Alarm Card Carefully**

9. Replace the screws on the face plate
10. Reconnect all power source to the PDP.

11. Verify that all LEDs on the alarm card are green.

## Procedure — Configuring the PDP Alarm Card

Monitoring of the power input is provided by the alarm card. Three DIP switches on the card allows this monitoring to be turned on or turned off. If the monitoring is not turned off for unconnected inputs, the alarm card detects a loss of input power to these inputs and the corresponding LED for the breakers will be red and an alarm is indicated.

The DIP switches monitor Bus A (S2) and Bus B (S3) individual power inputs. Monitoring of specific alarm cable inputs is provided by switch S4.

This procedure describes how to set the monitoring of the input terminal using a DIP switch on the alarm panel.

1. Observe the safety and ESD precautions in [Safety and Pre-Installation Requirements](#).
2. Remove the alarm card using [Procedure — Replacing the PDP Alarm Card](#).
3. Locate DIP switches S2, S3, and S4. See [Figure 20: Alarm Card Front and Side View](#)

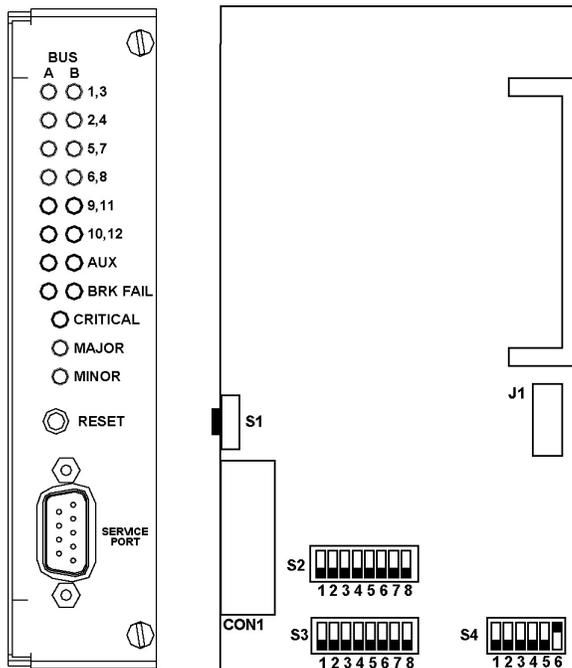


Figure 20: Alarm Card Front and Side View

4. Use [Table 5: Individual Power Supply Input Monitoring \(DIP Switches S2 and S3\)](#) to set DIP switch S2 positions 1 through 8 to monitor power supply inputs for BUS A and DIP switch S3 positions 1 through 8 to monitor power supply inputs for BUS B.

**Note:** Factory settings are S4:6 is OFF, all other positions for S2, S3, and S4 are ON.

Table 5: Individual Power Supply Input Monitoring (DIP Switches S2 and S3)

DIP Switch Position 1 - 8	Group	Breaker and LED Position	Setting	Description
1	A	1 and 3	ON	Input Monitored, LED Enabled.
			OFF	Input Not Monitored, LED Disabled (OFF).
2		2 and 4	ON	Input Monitored, LED Enabled.
			OFF	Input Not Monitored, LED Disabled (OFF).
3	B	5 and 7	ON	Input Monitored, LED Enabled.
			OFF	Input Not Monitored, LED Disabled (OFF).
4		6 and 8	ON	Input Monitored, LED Enabled.
			OFF	Input Not Monitored, LED Disabled (OFF).
5	C	9 and 11	ON	Input Monitored, LED Enabled.
			OFF	Input Not Monitored, LED Disabled (OFF).
6		10 and 12	ON	Input Monitored, LED Enabled.
			OFF	Input Not Monitored, LED Disabled (OFF).
7	-----	AUX	ON	Input Monitored, LED Enabled.
			OFF	Input Not Monitored, LED Disabled (OFF).

DIP Switch Position 1 - 8	Group	Breaker and LED Position	Setting	Description
8	-----	-----	ON	Overrides DIP switch positions 1-6 settings. See S4:1-S4:4 settings.
			OFF	Enable DIP switch settings 1-6.

**Note:** LED for the associated supply input and breaker when enabled shall illuminate either:

- GREEN when -48VDC is connected
- RED when -48VDC is not connected

**Note:** When position 8 is set ON, DIP switch settings 1-6 are ignored with 7 active. For example, if alarm inputs are enabled for PAN and PBN, but disabled for PCN, then the BUS input supply monitoring LEDs are enabled for Group A (inputs 1- 4) and Group B (inputs 5-8), but disabled for Group C (inputs 9-12).

5. Use [Table 6: Alarm Input Monitoring \(DIP Switch S4\)](#) to set DIP switch S4 positions 1 through 4 to specify monitoring of alarm cable inputs on a group (A, B, and/or C) basis.

**Note:** Factory settings are S4:6 is OFF, all other positions for S2, S3, and S4 are ON.

**Table 6: Alarm Input Monitoring (DIP Switch S4)**

DIP Switch Position 1 - 6	Alarm Input	Setting	Description
1	PAN	ON	Alarm Input Enabled and Monitored.
		OFF	Alarm Input Disabled and Not Monitored.
2	PBN	ON	Alarm Input Enabled and Monitored.
		OFF	Alarm Input Disabled and Not Monitored.
3	PCN	ON	Alarm Input Enabled and Monitored.
		OFF	Alarm Input Disabled and Not Monitored.
4	-----	ON	Use S4:1-S4:3 settings for alarm input monitoring.

DIP Switch Position 1 - 6	Alarm Input	Setting	Description
		OFF	All alarm cables inputs provide monitoring.
5	-----	ON	Not Used.
		OFF	Not Used, set to ON.
6	-----	ON	Not Used, set to OFF.
		OFF	Not Used.

6. Re install the alarm card using *Procedure — Replacing the PDP Alarm Card*.
7. Reconnect all power sources to the PDP.

## Replacing T1200 AS Hard Drive

The T1200 application server must be operated with the top cover in place to ensure proper cooling. A non-skid surface or a stop behind the server may be needed to prevent the server from sliding on the work surface.

Up to three hot-swappable hard drives can be installed in the Tekelec 1200 application server. The front bezel must be removed to add or replace a hard drive.



### CAUTION

**Caution:** If installing fewer than three hard drives, the empty bays must be populated with drive trays that have baffles in them to maintain proper system cooling.

**Note:** The Tekelec 1200 application server does not support all SAS hard drives. Use only Tekelec-approved hard drives.

To replace a T1200 AS hard drive, perform these procedures in the following order:

1. *Procedure — Preparing a Hard Drive for Removal*
2. *Procedure — Removing the Front Bezel*
3. *Procedure — Removing a Hard Drive*
4. *Procedure — Installing a Hard Drive*
5. *Procedure — Replacing the Front Bezel*
6. *Procedure — Preparing a Hard Drive After Installation*

## Procedure — Preparing a Hard Drive for Removal

When a disk has been identified for removal, the bad disk must be removed from mirroring.

**Note:** The drive bays are numbered from right (drive 0, sda) to left (drive 2, sdc).

Before removing the bad disk, use the following command for the failed disk:

```
/usr/TKLC/plat/sbin/failDisk [--force] <disk to be replaced>
```

**Note:** The optional `--force` flag may be added if the `failDisk` command exits with the complaint: "No disk detected as failed and `<device>` not specified with force." and it is completely certain the command should be run on the specified disk. The `--force` option may mark a good disk as failed.

For example:

```
# /usr/TKLC/plat/sbin/failDisk /dev/sdb

Removing device /dev/sdb from md group md7...
Removing device /dev/sdb from md group md13...
Removing device /dev/sdb from md group md11...
Removing device /dev/sdb from md group md4...
Removing device /dev/sdb from md group md8...
Removing device /dev/sdb from md group md3...
Removing device /dev/sdb from md group md5...
Removing device /dev/sdb from md group md1...
Removing device /dev/sdb from md group md10...
Removing device /dev/sdb from md group md2...
Removing device /dev/sdb from md group md6...
Removing device /dev/sdb from md group md9...

waiting for md subsystem to fail and remove devices...

md subsystem is finished with '/dev/sdb'

Looking for 3ware SCSI controller...

3ware SCSI controller not found.

Removal of /dev/sdb completed, OK.
```

## Procedure — Removing the Front Bezel

**Note:** Hold the bezel in place while loosening the screws. After both screws are loosened, the bezel from the chassis.

Remove the left and right side mounting screws. ("A" in [Figure 21: Removing the Front Bezel](#))

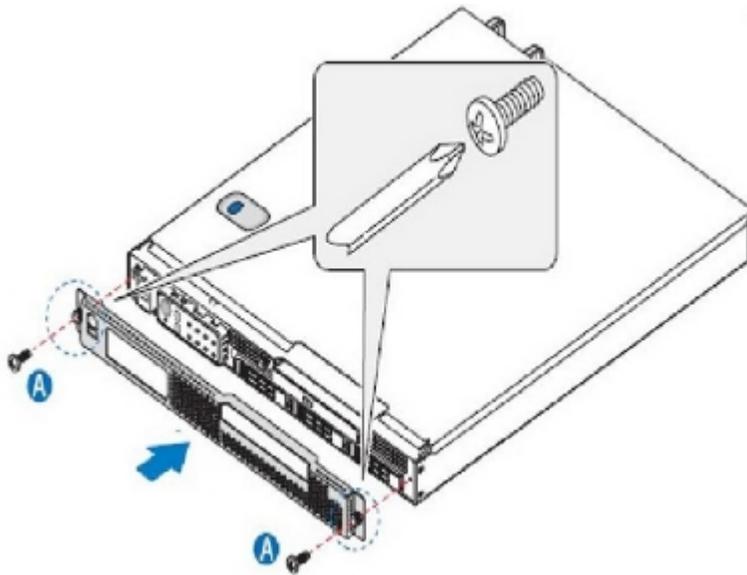


Figure 21: Removing the Front Bezel

### Procedure — Removing a Hard Drive

1. Select the drive bay where the hard drive is to be installed.

**Note:** The drive bays are numbered from right (drive 0, sda) to left (drive 2, sdc).

2. Remove the drive tray by pressing the green button to open the lever.
3. Pull the drive tray assembly out of the chassis. (*Figure 22: Removing a Drive Tray from the Chassis*).

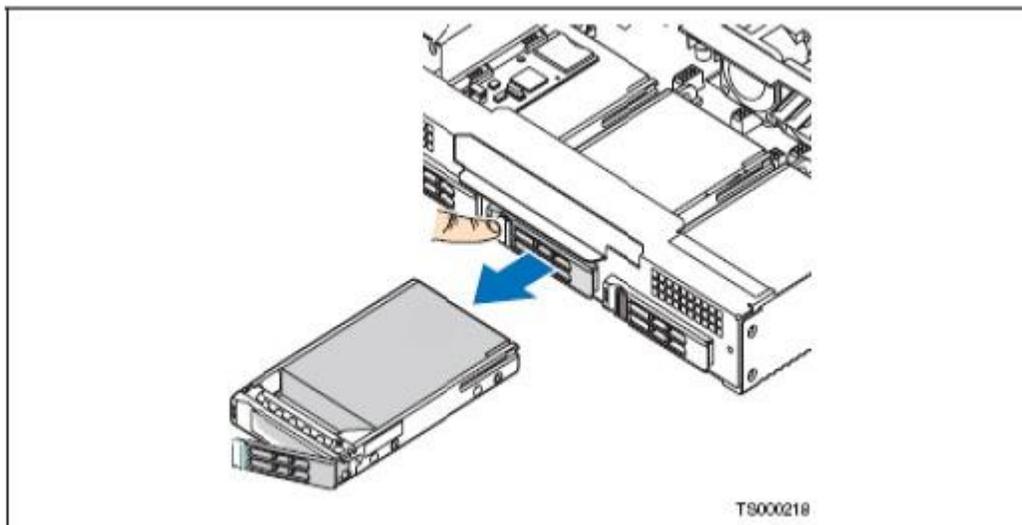


Figure 22: Removing a Drive Tray from the Chassis

4. Remove the hard drive from the drive tray by unfastening the four screws (Inset A in *Figure 23: Removing a Hard Drive from the Drive Tray*) that attach it to the drive tray. .

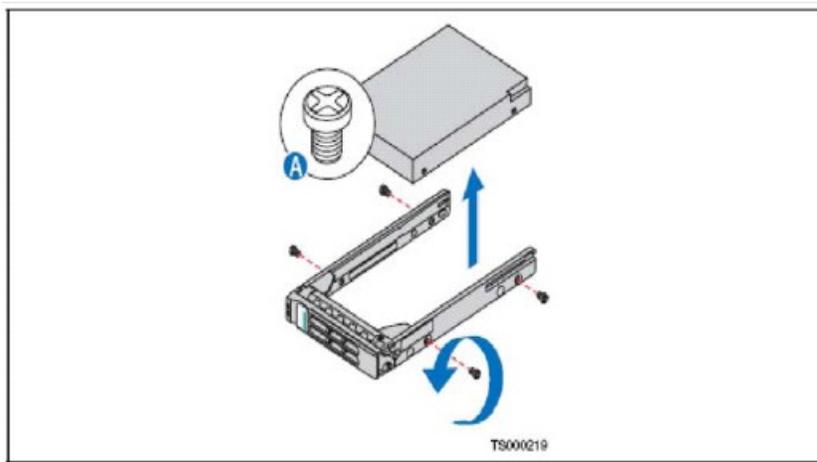


Figure 23: Removing a Hard Drive from the Drive Tray

### Procedure — Installing a Hard Drive

1. Install the new hard drive in the drive tray (“A” in [Figure 24: Attaching a Hard Drive to the Drive Tray](#)) and secure the hard drive with the four screws (Inset “B” in [Figure 24: Attaching a Hard Drive to the Drive Tray](#)), that come with the drive tray.

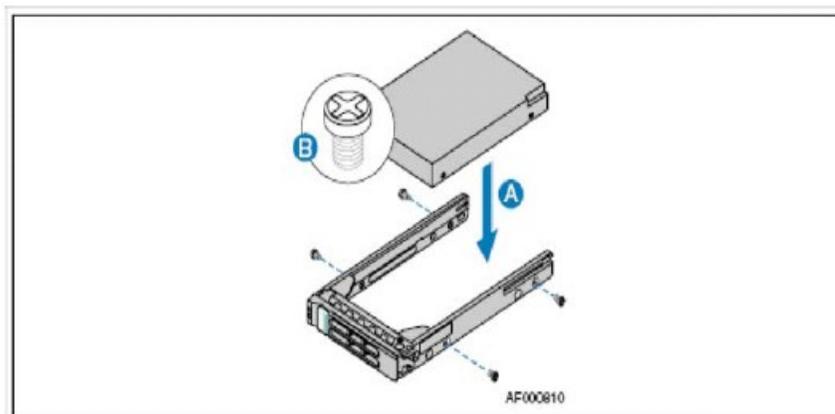


Figure 24: Attaching a Hard Drive to the Drive Tray

2. With the drive tray locking lever fully open, push the drive tray into the drive bay in the chassis until it stops ([Figure 25: Inserting New Drive Assembly into Chassis](#)).
- Note:** The drive bays are numbered from right (drive 0, sda) to left (drive 2, sdc). When fewer than three drives are installed, drive bay 0 must be used first, then drive bay 1.
3. Press the lever until it snaps shut to close the hard drive in the bay (Inset “A” in [Figure 25: Inserting New Drive Assembly into Chassis](#)).

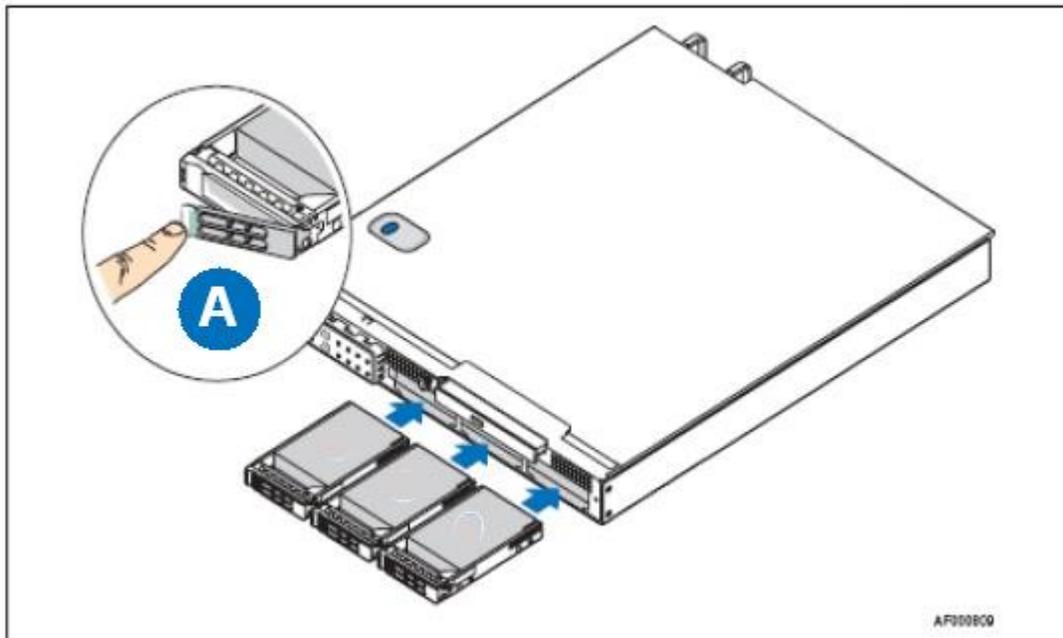


Figure 25: Inserting New Drive Assembly into Chassis

### Procedure — Replacing the Front Bezel

1. Replace the front bezel, insert the screws (“A” in [Figure 26: Replacing the Front Bezel](#)), and tighten them far enough to hold the bezel in place.
2. Finger-tighten both screws.

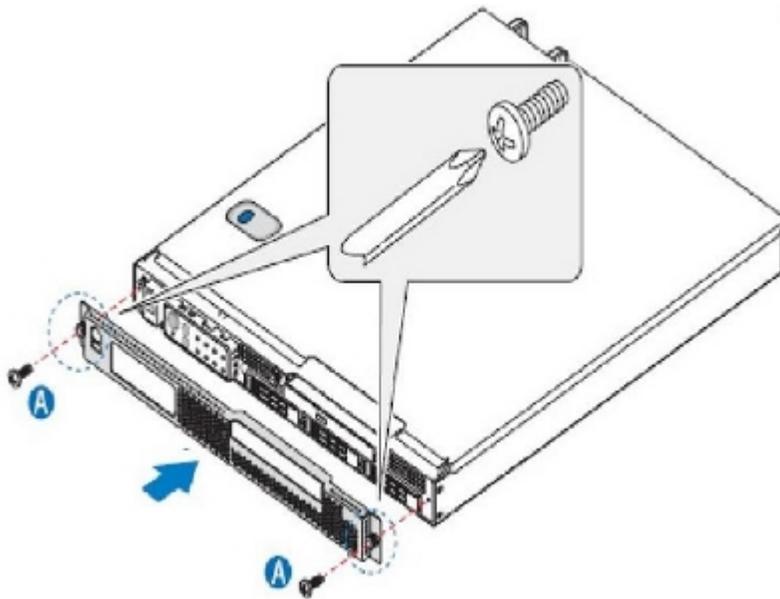


Figure 26: Replacing the Front Bezel

## Procedure — Preparing a Hard Drive After Installation

After installing the hard disk, it must be mirrored.

1. Use the following command to copy a disk configuration:

```
/usr/TKLC/plat/sbin/cpDiskCfg
```

The following is an example of a possible output:

```
# /usr/TKLC/plat/sbin/cpDiskCfg

Looking for 3ware SCSI controller...
3ware SCSI controller not found.
/proc/scsi/scsi shows a device on 0:0:0:0
/proc/scsi/scsi shows a device on 0:0:2:0
/proc/scsi/scsi shows a device on 2:0:0:0
/proc/scsi/scsi shows a device on 3:0:0:0
/proc/scsi/scsi shows a device on 1:0:0:0
/proc/scsi/scsi shows a device on 4:0:0:0
/proc/scsi/scsi shows a device on 0:0:1:0
giving SCSI subsystem some time to discover newly-found disks
Partitioning of disk 'sdb' completed, OK!
```

2. Use the following command to find and add the new drive:

```
/usr/TKLC/plat/sbin/mdRepair
```

The following is an example of a possible output:

```
# /usr/TKLC/plat/sbin/mdRepair

SCSI device 'sdb' is not currently online
probing for 'sdb' on SCSI 0:0:1:0
giving SCSI subsystem some time to discover newly-found disks
Adding device /dev/sdb1 to md group md1...
md resync in progress, sleeping 30 seconds...
md1 is 0.0% percent done...

This script MUST be allowed to run to completion. Do not exit.

Re-installing master boot loader(s)

Adding device /dev/sdb2 to md group md3...
Adding device /dev/sdb6 to md group md11...
Adding device /dev/sdb12 to md group md8...
Adding device /dev/sdb8 to md group md9...
Adding device /dev/sdb11 to md group md5...
Adding device /dev/sdb13 to md group md6...
Adding device /dev/sdb10 to md group md4...
Adding device /dev/sdb3 to md group md2...
Adding device /dev/sdb7 to md group md10...
Adding device /dev/sdb9 to md group md7...
Adding device /dev/sdb5 to md group md13...
md resync in progress, sleeping 30 seconds...
md3 is 3.9% percent done...
This script MUST be allowed to run to completion. Do not exit.
.
.
.
.[lots of similar output for all partitions...]
.
.
```

```
Server md status, OK.
```

3. Use the following command to create the configuration file.

```
/usr/TKLC/plat/sbin/smartCreateConfig
```

This command adds the new drive to the configuration file and also erases any hard drive error log files.

The following is an example of a possible output.

```
[root@teks5030307-S01A ~]# /usr/TKLC/plat/sbin/smartCreateConfig
smartCreateConfig: /dev/sda supports SMART
smartCreateConfig: /dev/sdb supports SMART
smartCreateConfig: /dev/sdc supports SMART
[root@teks5030307-S01A ~]#
```

4. This procedure is complete.

## Replacing T1200 Power Supply Module



**Caution:** The server does not have a redundant power supply unless the optional second power supply module was purchased. If there is no second power supply, before replacing the power supply, take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord from the system or wall outlet. To maintain hot-swap capability, make sure an active power supply module is in each chassis slot before replacing (hot-swapping) a power supply module.

### Procedure — Removing the Power Supply Module

1. Check the status LED to determine which power supply has failed (“A” in [Figure 27: AC and DC Power Supplies](#)). Disconnect the appropriate power cable.
2. Press and hold the green safety lock to the left to disengage the power supply module.
3. Grasp the handle and pull the power supply from the chassis. (“B”)

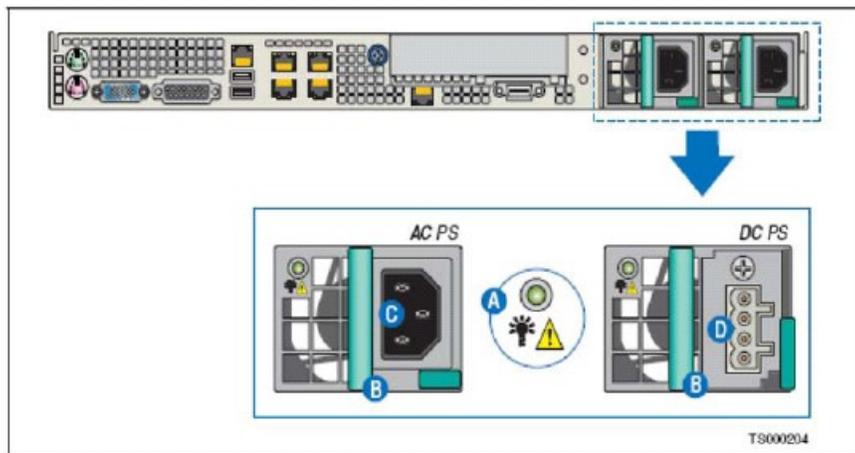


Figure 27: AC and DC Power Supplies

### Procedure — Installing the Power Supply Module

1. Press and hold the green safety lock to the left.
2. Slide the power supply module into the chassis slot until it is seated properly.

# Appendix

# A

## External Hardware Connections

---

**Topics:**

- [T1200 AS External Interface Connections.....57](#)

This appendix provides information regarding the various connections and ports for external hardware.

## T1200 AS External Interface Connections

### Keyboard and Mouse Ports

Two stacked PS/2 ports support both a keyboard and a mouse. Each port can support either a mouse or keyboard. [Table 7: Keyboard and Mouse Port Pin-Out](#) details the pin-out of the PS/2 connector.

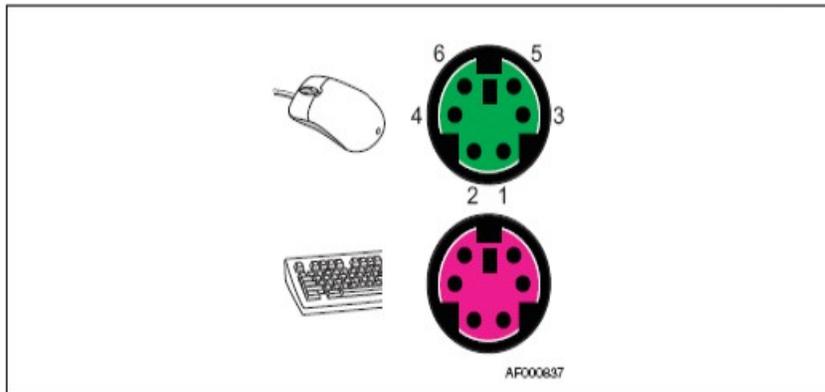


Figure 28: Keyboard and Mouse Connectors and Pinouts

Table 7: Keyboard and Mouse Port Pin-Out

Pin #	Signal
1	KEYDAT (keyboard data)
2	MSEDAT (mouse data)
3	GND (ground)
4	Fused Vcc (+5V)
5	KEYCLK (keyboard clock)
6	MSECLK (mouse clock)

### Video Port

The video port interface is a standard VGA compatible, 15-pin connector. On-board video is supplied by an ATI\* Rage XL video controller with 8 MB of on-board video SGRAM.

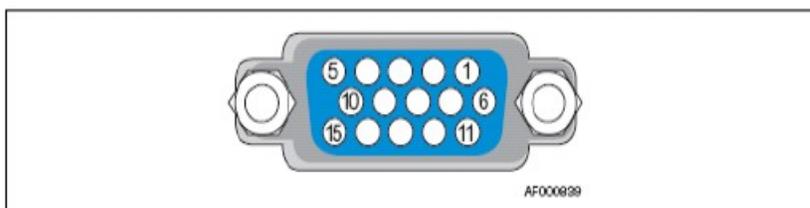


Figure 29: Video Connector

Table 8: Video Connector Pin-Out

Pin #	Signal
1	Red (analog color signal R)
2	Green (analog color signal G)
3	Blue (analog color signal B)
4	No connection
5	GND
6	GND
7	GND
8	GND
9	Fused Vcc (+5V)
10	GND
11	No connection
12	DDCDAT
13	HSYNC (horizontal sync)
14	VSYNC (vertical sync)
15	DDCCLK

## Universal Serial Bus (USB) Interface

The server board provides four USB ports. USB ports 0 and 1 are brought to the rear. USB ports 2 and 3 are routed to the front panel board where USB port 2 is brought to the front of the system and USB port 3 is used internally for interfacing to the optional Intel® Z-U130 Value Solid State Drive. The built-in external USB ports permit direct connection of three USB peripherals without an external hub. If more devices are required, an external hub can be connected to any of the built-in ports.

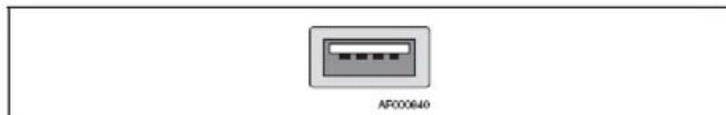


Figure 30: External USB Connector

Table 9: External USB Connector Pin-Out

Pin #	Signal
1	Fused Vcc (+5V w/ over-current monitor of ports 0, 1, 2, and 3)
2	DATAL0 (differential data line paired with DATAH0)
3	DATAH0 (differential data line paired with DATAL0)
4	GND

## Ethernet Connectors

The system provides four RJ45 Ethernet NIC connectors. These NIC connectors are located at the back edge of the Intel® Server Board S5000PHB and are accessible on the rear I/O panel. The Ethernet connectors appear as stacked pairs as illustrated in [Figure 31: Stacked Ethernet Connector Pair](#). The pin-out of each connector is identical and is defined in [Table 10: Ethernet Connector Pin-Out](#).

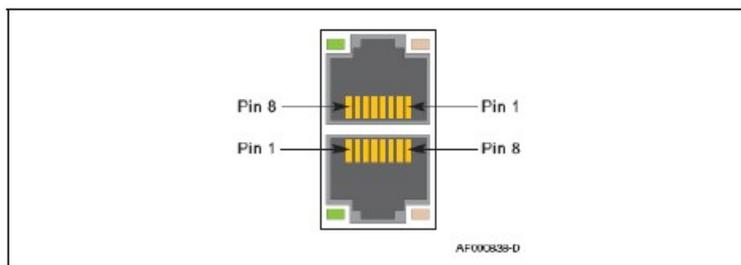


Figure 31: Stacked Ethernet Connector Pair

Table 10: Ethernet Connector Pin-Out

Pin #	Signal Name	Description
1	BI_DA+	Bi-directional pair A, +
2	BI_DA-	Bi-directional pair A, -
3	BI_DB+	Bi-directional pair B, +
4	BI_DC+	Bi-directional pair C, +
5	BI_DC-	Bi-directional pair C, -
6	BI_DB-	Bi-directional pair B, -
7	BI_DD+	Bi-directional pair D, +
8	BI-DD-	Bi-directional pair D, -

For each Ethernet connector there are two status indicator LEDs integrated into the connector assembly, a green LED to the left of the connector and a bi-color LED to the right of the connector. The green LED indicates the connection status for each port. The bi-color LED indicates the connection speed.

## Remote Management Module Connector

The Tekelec 1200 application server supports the installation of an optional Intel® Remote Management Module 2, which provides a 1000 Mbps Ethernet interface through a GCM connector module. The connector outline, pin-out, and LED indications for the GCM connector are the same as for the server's standard Ethernet connectors.

## Telco Alarms Connector

The system provides one Telco DB15 alarms connector on the rear panel. [Figure 32: Telco Alarms Connector](#) shows the Telco alarms connector as viewed from the back of the server and [Table 11: Telco Alarms Connector Pin-Out](#) shows the pin-out for the connector.

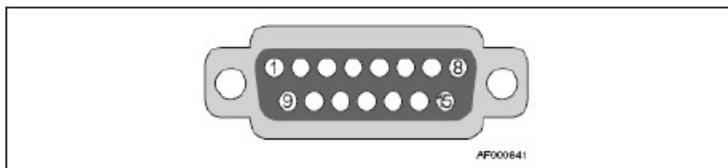


Figure 32: Telco Alarms Connector

Table 11: Telco Alarms Connector Pin-Out

Pin #	Description
1	MinorReset +
2	MinorReset -
3	MajorReset +
4	MajorReset -
5	CriticalAlarm - NO
6	CriticalAlarm - NC
7	CriticalAlarm - COM
8	MinorAlarm - NO
9	MinorAlarm - NC
10	MinorAlarm - COM
11	MajorAlarm - NO
12	MajorAlarm - NC
13	MajorAlarm - COM
14	PwrAlarm - NO

Pin #	Description
15	PwrAlarm - COM

## DC Power Supply Unit Input Connector

The DC input power is delivered to the power supply through a 4-pin connector (Molex\* MTC 55757-0420 or equivalent) as shown in [Figure 33: DC Power Input Connector and Pin Assignments](#).

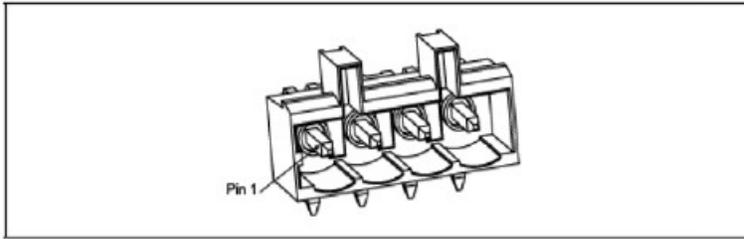


Figure 33: DC Power Input Connector and Pin Assignments

Table 12: DC Power Supply Module Input Pin Assignments

Pin #	Description
1	-48V
2	-48V
3	RTN
4	RTN

The mating connector for customer cable termination is a Molex 54927-0420 or equivalent, as shown in [Figure 34: DC Power Supply Module Power Input Mating Connector](#).

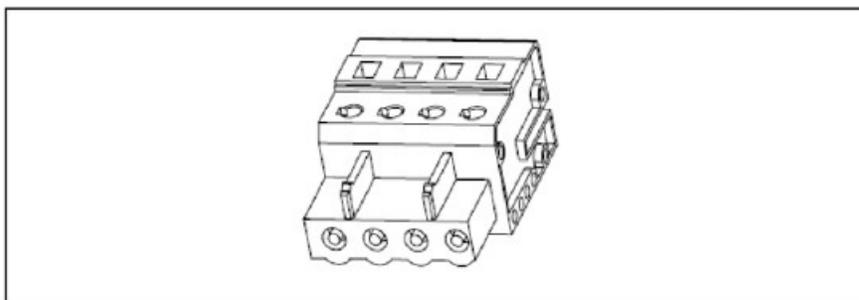


Figure 34: DC Power Supply Module Power Input Mating Connector

## Front Panel Switches and Status Indicators

[Figure 35: T1200 AS Front Panel Board LED Indicators and Switches](#) shows the locations of the front panel switches and LED indicators.

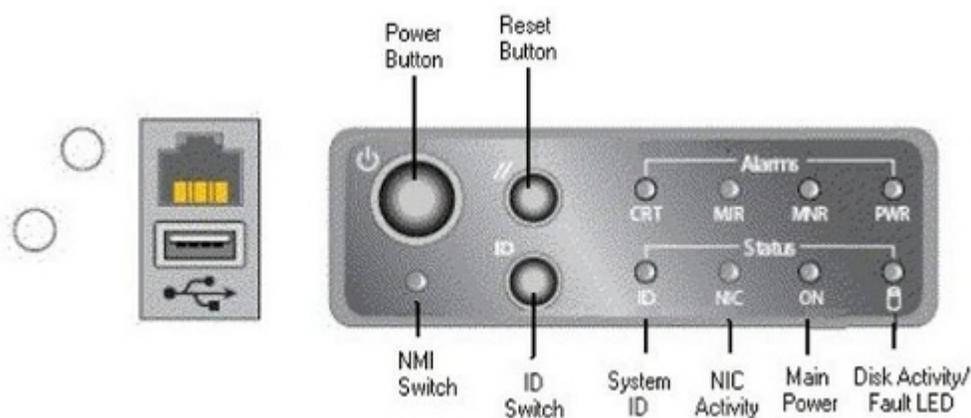


Figure 35: T1200 AS Front Panel Board LED Indicators and Switches

Table 13: Front Panel LED Descriptions (T1200 AS)

Item	Feature	Description
<b>Front Panel Switches</b>		
A	Power switch	Toggles the system power
B	Reset switch	Resets the system
K	ID switch	Toggles the system ID LED
L	NMI switch	Asserts NMI to the server board
<b>Front Panel Status LEDs</b>		
G	Disk Activity / Fault LED (green or amber)	Indicates hard drive activity when green, or a hard drive fault when amber. This is an OR'ed display for all three internal drives.
H	Main Power LED (green)	When continuously lit, this indicates the presence of DC power in the server. The LED goes out when the power switch is turned off (standby mode) or the power source is disrupted.
I	NIC activity LED (green)	Indicates NIC activity
J	System ID LED (white)	This LED can be toggled remotely or by front panel ID switch for identification purposes.

For information on alarm LEDs, refer to [Table 16: Front Panel LED Descriptions \(T1200 AS\)](#).

# Appendix B

## LED Descriptions

---

### Topics:

- [Overview.....64](#)
- [Application Switch LEDs.....64](#)
- [Content Switch LEDs.....65](#)
- [Modem Router LEDs.....67](#)
- [PDP Alarm Panel LEDs.....69](#)
- [T1200 Application Server LEDs.....71](#)

This chapter describes the Alarm LEDs of the T1200 platform components. Alarm LEDs become lit when a fault or error occurs on the platform.

## Overview

This chapter describes the Alarm LEDs of the T1200 platform components. Alarm LEDs become lit when a fault or error occurs on the platform.

## Application Switch LEDs

This section describes the application switch LEDs. For a description of these LEDs, see Figure B-2.

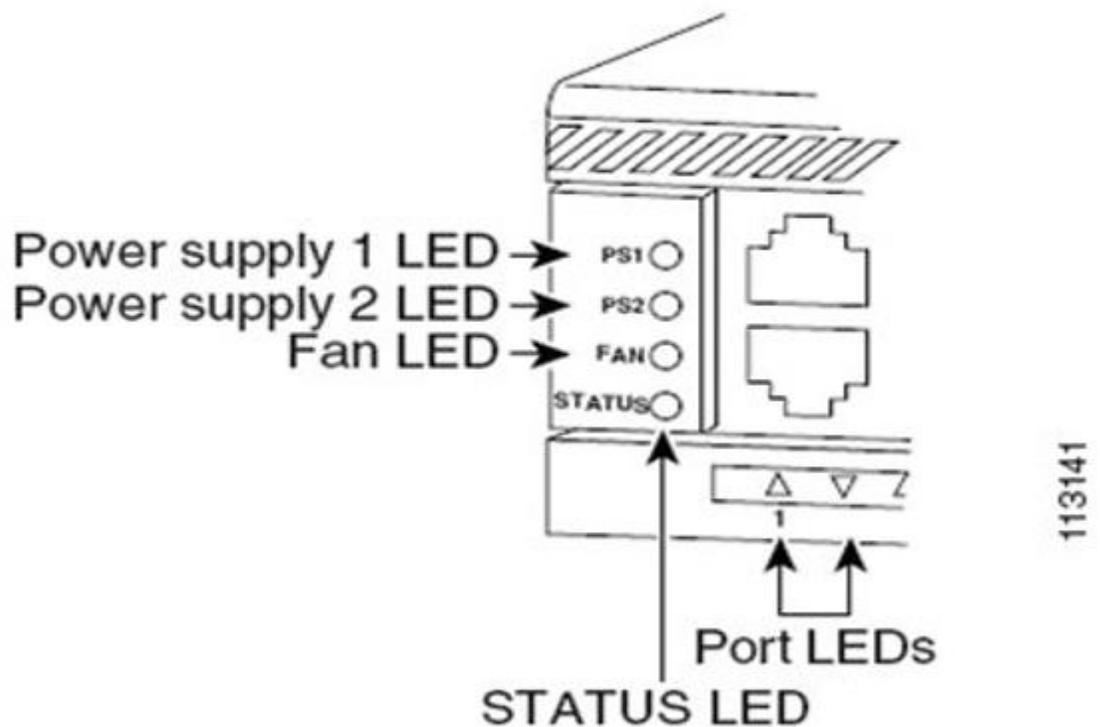


Figure 36: Application Switch - Front Panel LEDs

LED	Color or State	Description
STATUS	Green	At startup, the switch performs a series of diagnostic tests: All tests pass
	Red	A test other than an individual port test fails
	Flashing	System boot or diagnostic tests in progress
	Yellow	System is in rommon mode or a power supply has failed
	Off	Switch is disabled
CON	Green	10/100 BASE-T console port is in link-up state
	Off	10/100 BASE-T console port is in link-down state or not connected  There are no blinking, red, or yellow states for this port
MGT	Green	10/100 BASE-T Management port is in link-up state
	Off	10/100 BASE-T Management port is in link-down state or not connected  There are no blinking, red, or yellow states for this port
Port 1-48	Green	Port is operational
	Yellow	Port is disabled by user
	Flashing yellow	Power-on self-test indicates faulty port
	Off	No signal detected or link configuration failure
FAN	Off	No power to the switch or fans (the tray may not be plugged in especially if one or more of the power supplies status LED is green)
	Green	Fan tray operational
	Red	Fault detected
PS1 and PS2	Off	No power to the PS
	Green	Operational <sup>1</sup>
	Red	Fault detected or the on/off switch is set to off while the power supply is plugged in

Figure 37: Application Switch - Description of Front Panel LEDs

## Content Switch LEDs

This section describes the content switch LEDs. For a description of these LEDs, see [Figure 39: Content Switch - Description of Front Panel LEDs](#).

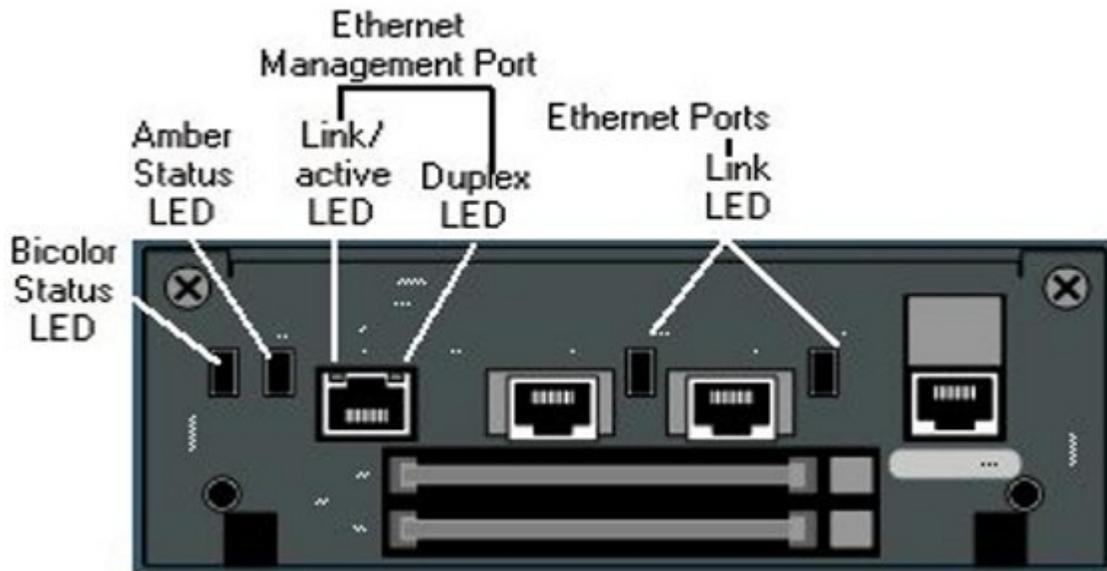


Figure 38: Content Switch - Front Panel LEDs

LED Name	Color	State	Indicates
Status (left)	Green	Solid	The module is ready.
		Variable blink	Disk activity is occurring.
		Slow blink	Another CSS module failed.
	Red	Solid	The module failed the power-up self test during the boot process.
		Slow blink	The module failed.
	No color	Off	The module failed and has no power.
Status (right)	Amber	Fast blink	The module is running power-up self test.
		Slow blink	The module is offline and active.
		Solid	The module is online and not active (passive SCM).
		Off	See the left status LED for indication.
Link/Act for the Ethernet Management Port	Green	Off	There is no link.
		On	The link is established but there is no activity.
		Blinking	The link is established with transmit or receive activity.
Link for each Gigabit Ethernet Port	Green	Off	There is no link.
		On	The link exists and synchronization is achieved.
		Blinking	The link is established with transmit or receive activity.

Figure 39: Content Switch - Description of Front Panel LEDs

## Modem Router LEDs

This section describes the LEDs found on the front and rear of the modem router. [Figure 40: Modem Router - Front Panel LEDs](#) shows the front panel LEDs; and [Figure 41: Modem Router - Rear LEDs](#) shows the LED on the rear. For a description of these LEDs, see [Figure 42: Modem Router - Description of LEDs](#).

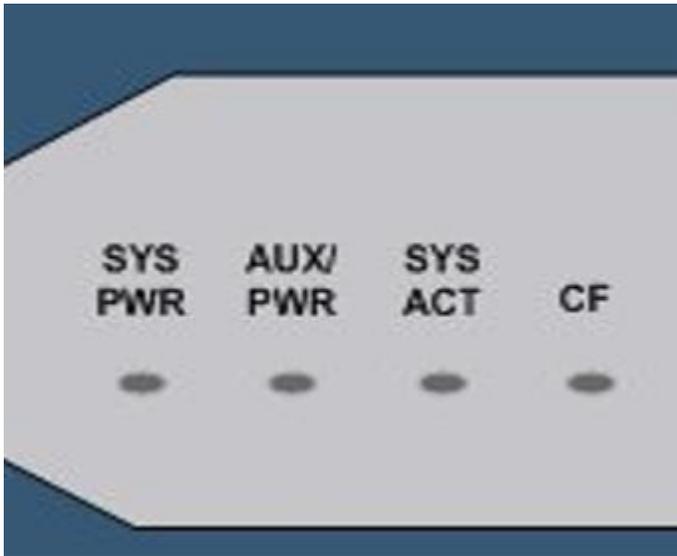


Figure 40: Modem Router - Front Panel LEDs

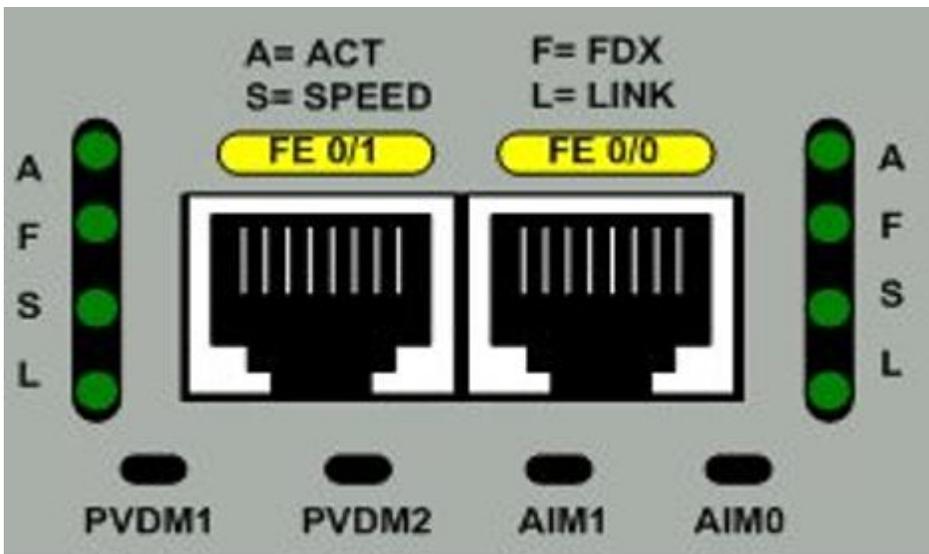


Figure 41: Modem Router - Rear LEDs

LED Location	LED Label	LED Color or State	Meaning
Front of chassis	SYS PWR	Solid green	System is operating normally
		Blinking green	System is booting or is in ROM monitor mode
		Amber	System error
		Off	Power is off or system board is faulty
	AUX/ PWR	Green	IP phone power operating normally (if installed), or Cisco Redundant Power System (RPS) operating normally (if installed)
		Amber	IP phone power fault (if installed), or Cisco Redundant Power System (RPS) fault (if installed)
		Off	IP phone power and Cisco RPS are not installed
	SYS ACT	Blinking green or solid green	Packet transfers are occurring
		Off	No packet transfers are occurring
	CF	Green	Flash memory is being accessed; do not eject the CompactFlash memory card
		Off	Flash memory is not being accessed; okay to eject the CompactFlash memory card
Rear of chassis	A (=ACT)	Blinking green or solid green	Packet activity in FE or GE port
		Off	No packet activity in FE or GE port
	F (=FDX)	Green	FE or GE port is operating in full-duplex mode
		Off	FE or GE port is operating in half-duplex mode
	S (= Speed) <sup>1</sup>	1 blink + pause	FE or GE port operating at 10 Mbps
		2 blinks + pause	FE or GE port operating at 100 Mbps
		3 blinks + pause	GE port operating at 1000 Mbps (Cisco 2821 and Cisco 2851 only)
	L (= Link)	Green	FE or GE link is established
		Off	No FE or GE link is established
	PVDM0	Green	PVDM in slot (0, 1, or 2) is initialized
	PVDM1	Amber	PVDM in slot (0, 1, or 2) is detected but not initialized
	PVDM2 <sup>2</sup>	Off	No PVDM installed in slot (0, 1, or 2)
	AIM0	Green	AIM in slot (0 or 1) is initialized
	AIM1	Amber	AIM in slot (0 or 1) has initialization error
		Off	No AIM installed in slot (0 or 1)

Figure 42: Modem Router - Description of LEDs

## PDP Alarm Panel LEDs

The PDP alarm card provides alarm LEDs to alert service personnel of fault conditions in the PDP. [Figure 43: PDP Alarm Card](#) shows the face plate of an alarm card.



Figure 43: PDP Alarm Card

All front panel LEDs are green (or off) when the panel is fully powered up and operating properly. If there is an active alarm, the associated LED will change color to red, or amber for a minor alarm.

#### Input Power Status LEDs

Input power status LEDs are provided for each of the 14 battery input feeds. The panel can be configured to monitor or ignore each input independently. An input configured to be ignored will have its associated LED unlit. When power is properly applied to a particular input, the associated LED will be green if the panel is configured to monitor that input. If any monitored input does not have an appropriate battery voltage connected to it, the associated LED will change to red.

#### Critical LED

A Critical LED is provided on the panel's faceplate. This LED lights red for a critical alarm and green for a normal condition. The state of the Critical LED is evaluated based on the condition of the monitored critical input(s) from PAN, PBN or PCN. An unlit Critical LED indicates that the current panel configuration is set to ignore critical alarm inputs on PAN, PBN and PCN or the panel is unpowered.

#### **Major LED**

A Major LED is provided on the panel's faceplate. This LED lights red for a major alarm and green for a normal condition. The state of the Major LED is evaluated based on the condition of the monitored major input(s) from PAN, PBN or PCN. An unlit Major LED indicates that the current panel configuration is set to ignore major alarm inputs on PAN, PBN and PCN or the panel is unpowered.

#### **Minor LED**

A Minor LED is provided on the panel's faceplate. This LED lights amber for a minor alarm and green for a normal condition. The state of the Minor LED is evaluated based on the condition of the monitored minor input(s) from PAN, PBN or PCN. An unlit Minor LED indicates that the current panel configuration is set to ignore minor alarm inputs on PAN, PBN and PCN or the panel is unpowered.

#### **Breaker Fail LED**

BRK (Breaker) FAIL LEDs are provided on the panel's faceplate to indicate a tripped breaker condition on the A and B buses respectively. These LEDs light red to indicate a breaker trip on the respective bus. Green LEDs indicate that all breakers on the bus are untripped. Unlit BRK FAIL LEDs will occur if the panel is unpowered. A breaker fail alarm is caused when any of the panel's breakers are electrically tripped (mid-trip style breakers). A breaker which is manually turned off will not cause an alarm.

#### **Alarm Panel Failure**

An alarm panel failure condition is indicated when the Critical, Major and Minor LEDs are simultaneously lit red. The BUS A and B LEDs for input monitoring and BRK FAIL will be unlit and the alarm relays on PAO will signal alarm states during an alarm card failure condition. All power sources must be removed from the PDP before removing the alarm card assembly. All alarm contacts will signal an alarm state when all power sources are removed or when the alarm card is removed.

## **T1200 Application Server LEDs**

This section describes the LEDs found on the front and rear of the application server.

#### **Server Panel LEDs**

*Figure 44: T1200 Application Server LEDs* shows the T1200 application sever LEDs on the front panel

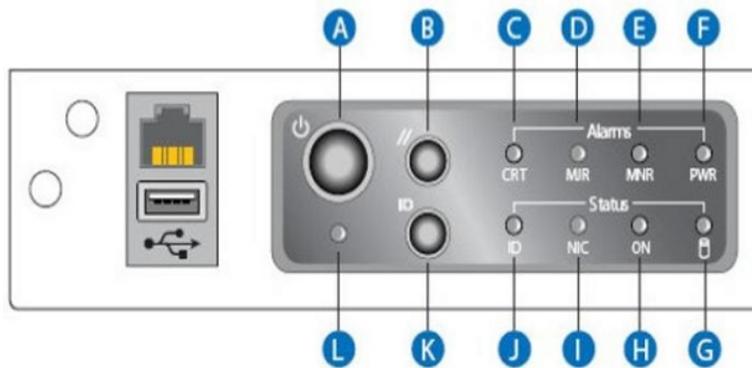


Figure 44: T1200 Application Server LEDs

Table 14: Front Panel LED Descriptions (T1200 AS)

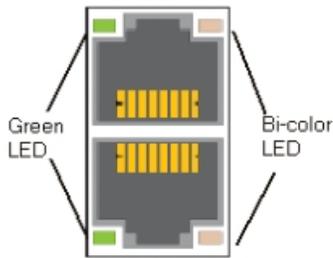
Item	Feature	Description
<b>Front Panel Switches</b>		
A	Power switch	Toggles the system power
B	Reset switch	Resets the system
K	ID switch	Toggles the system ID LED
L	NMI switch	Asserts NMI to the server board
<b>Front Panel Alarms LEDs</b>		
C	Critical (yellow or red <sup>a</sup> )	When continuously lit, this indicates the presence of a Critical System Fault, which is an error or event with a fatal system impact. In this case, the system cannot continue to operate. An example is the loss of a large section of memory, or other corruption that renders the system not operational.
D	Major (yellow or red <sup>a</sup> )	When continuously lit, this indicates the presence of a Major System Fault, which is an error or event which has a discernible system impact. In this case, the system can continue to operate but in a degraded fashion (reduced performance or loss of non-fatal feature reduction). An example is the loss of one or two mirrored disks.

Item	Feature	Description
E	Minor (yellow)	When continuously lit, this indicates the presence of a Minor System Fault, which is an error or event that has little impact to actual system operation. An example is a correctable ECC error.
F	Power (yellow)	When continuously lit, this indicates the presence of a Power System Fault, which is an error or event that has little impact to actual system operation. An example is a correctable ECC error.
<b>Front Panel Status LEDs</b>		
G	Disk Activity / Fault LED (green or amber)	Indicates hard drive activity when green, or a hard drive fault when amber. This is an OR'ed display for all three internal drives.  Remove the front bezel to observe the individual hard drive LEDs and identify a faulty drive.
H	Main Power LED (green)	When continuously lit, this indicates the presence of DC power in the server. The LED goes out when the power switch is turned off (standby mode) or the power source is disrupted.
I	NIC activity LED (green)	Indicates NIC activity
J	NIC activity LED (green)	This LED can be toggled remotely or by front panel ID switch for identification purposes.

<sup>a</sup> Critical and major alarm indicators are bi-color LEDs that can be configured to be yellow or red. Yellow is the default.

#### Ethernet Connector LEDs

For each Ethernet connector, there are two status indicator LEDs integrated into the connector assembly, a green LED to the left of the connector and a bi-color LED to the right of the connector. The same LEDs are used for the RMM port.



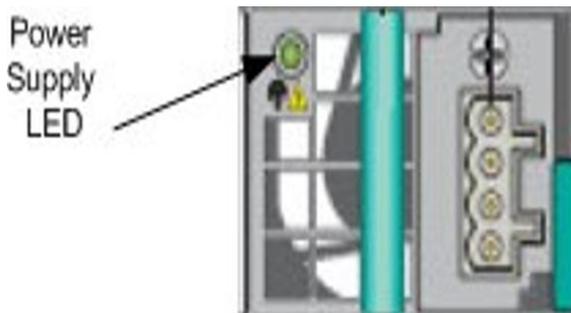
**Figure 45: T1200 AS Ethernet Connectors**

The green LED indicates the connection status for each port. If the port is connected to a network but there is no current activity, the green LED is continuously illuminated. When there is activity on the connected network, the green LED blinks.

The bi-color LED indicates the connection speed. If the green LED indicates a network connection but the bi-color LED is not lit, then the connection speed is 10 Mbps. If the bi-color LED shows a solid green indication, then the connection speed is 100 Mbps. If the bi-color LED is solid amber, then the connection speed is 1 Gbps.

**DC Power Supply LEDs**

The power supply provides a single, external, bi-color LED to indicate its status. [Figure 46: Power Supply LED](#) shows the power supply LEDs on the rear.



**Figure 46: Power Supply LED**

The LED blinks green when DC is applied to the PSU and standby voltages are available. The LED displays solid green when all the power outputs are available. The LED displays solid amber when the PSU has failed or shut down due to over-current or over-temperature.

See [Table 15: DC Power Supply LED Indicators](#) for LED conditions

**Table 15: DC Power Supply LED Indicators**

Power Supply Condition	Bi-color LED Indication
No DC power to all power supplies	OFF
No DC power to this power supply (for 1+1 configuration) OR	Amber

Power Supply Condition	Bi-color LED Indication
Power supply critical event causing a shutdown: Failure, fuse blown (1+1 only), OCP (12V), OVP (12V), fan failed	
Power supply warning events where the power supply continues to operate: High temp, high power/high current, slow fan	1 Hz blinking Amber
DC present/only 5 Vsb on (PS Off)	1 Hz blinking Green
Output ON and OK	Green

### Front View LEDs

#### Front Panel LEDs

Figure 47: T1200 Application Server LEDs shows the T1200 application sever LEDs on the front panel

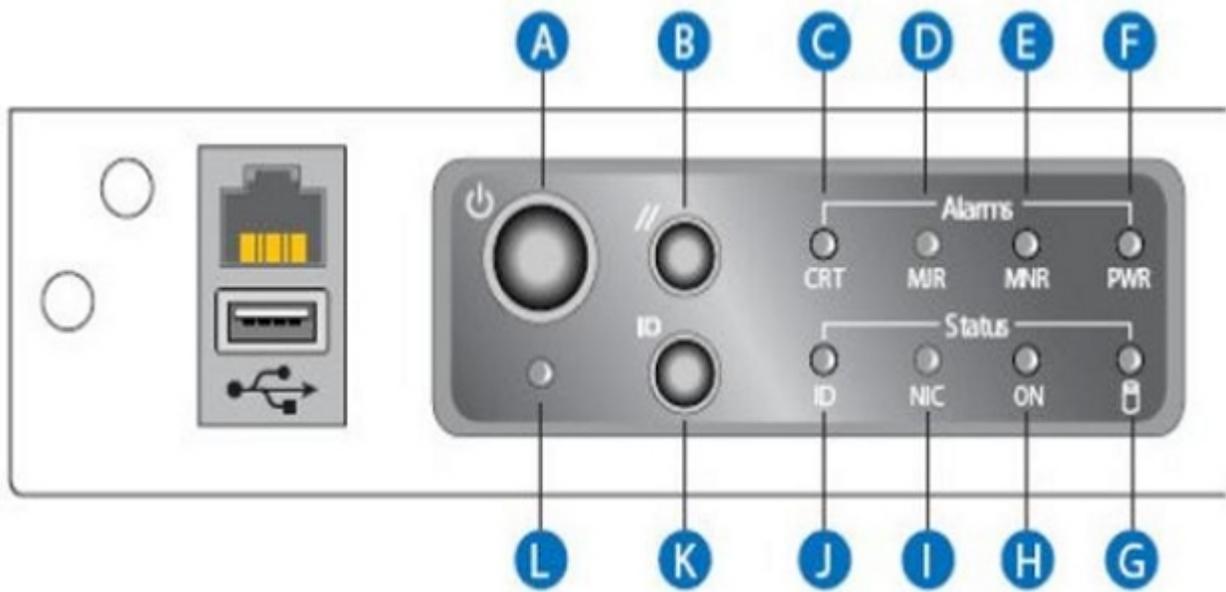


Figure 47: T1200 Application Server LEDs

Table 16: Front Panel LED Descriptions (T1200 AS)

Item	Feature	Description
<b>Front Panel Switches</b>		
A	Power switch	Toggles the system power
B	Reset switch	Resets the system

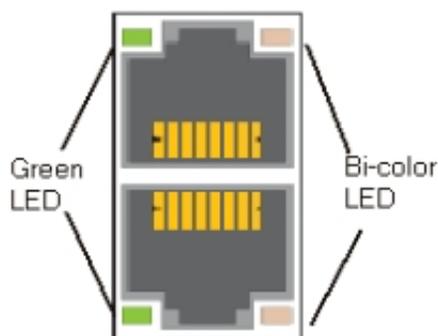
Item	Feature	Description
K	ID switch	Toggles the system ID LED
L	NMI switch	Asserts NMI to the server board
<b>Front Panel Alarm LEDs</b>		
C	Critical (yellow or red <sup>a</sup> )	When continuously lit, this indicates the presence of a Critical System Fault, which is an error or event with a fatal system impact. In this case, the system cannot continue to operate. An example is the loss of a large section of memory, or other corruption that renders the system not operational.
D	Major (yellow or red <sup>a</sup> )	When continuously lit, this indicates the presence of a Major System Fault, which is an error or event which has a discernible system impact. In this case, the system can continue to operate but in a degraded fashion (reduced performance or loss of non-fatal feature reduction). An example is the loss of one or two mirrored disks.
E	Minor (yellow)	When continuously lit, this indicates the presence of a Minor System Fault, which is an error or event that has little impact to actual system operation. An example is a correctable ECC error.
F	Power (yellow)	When continuously lit, this indicates the presence of a Power System Fault, which is an error or event that has little impact to actual system operation. An example is a correctable ECC error.
<b>Front Panel Status LEDs</b>		
G	Disk Activity / Fault LED (green or amber)	Indicates hard drive activity when green, or a hard drive fault when amber. This is an OR'ed display for all three internal drives.

Item	Feature	Description
		Remove the front bezel to observe the individual hard drive LEDs and identify a faulty drive.
H	Main Power LED (green)	When continuously lit, this indicates the presence of DC power in the server. The LED goes out when the power switch is turned off (standby mode) or the power source is disrupted.
I	NIC activity LED (green)	Indicates NIC activity
J	System ID LED (white)	This LED can be toggled remotely or by front panel ID switch for identification purposes.

<sup>a</sup> Critical and major alarm indicators are bi-color LEDs that can be configured to be yellow or red. Yellow is the default

### Ethernet Connector LEDs

For each Ethernet connector, there are two status indicator LEDs integrated into the connector assembly, a green LED to the left of the connector and a bi-color LED to the right of the connector. The same LEDs are used for the RMM port.



**Figure 48: T1200 AS Ethernet Connectors**

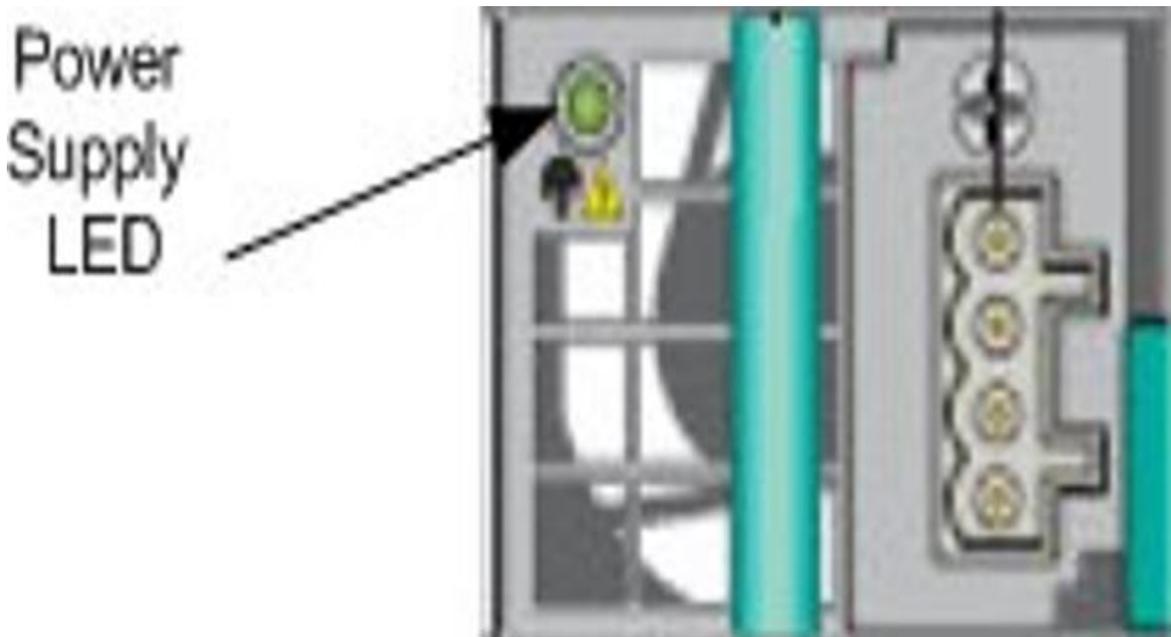
The green LED indicates the connection status for each port. If the port is connected to a network but there is no current activity, the green LED is continuously illuminated. When there is activity on the connected network, the green LED blinks.

The bi-color LED indicates the connection speed. If the green LED indicates a network connection but the bi-color LED is not lit, then the connection speed is 10 Mbps. If the bi-color LED shows a solid green indication, then the connection speed is 100 Mbps. If the bi-color LED is solid amber, then the connection speed is 1 Gbps.

## Rear View LEDs

### DC Power Supply LEDs

The power supply provides a single, external, bi-color LED to indicate its status. [Figure 49: Power Supply LED](#) shows the power supply LEDs on the rear.



**Figure 49: Power Supply LED**

The LED blinks green when DC is applied to the PSU and standby voltages are available. The LED displays solid green when all the power outputs are available. The LED displays solid amber when the PSU has failed or shut down due to over-current or over-temperature.

See [Table 17: DC Power Supply LED Indicators](#) for LED conditions.

**Table 17: DC Power Supply LED Indicators**

Power Supply Condition	Bi-color LED Indication
No DC power to all power supplies	OFF
No DC power to this power supply (for 1+1 configuration) OR Power supply critical event causing a shutdown: Failure, fuse blown (1+1 only), OCP (12V), OVP (12V), fan failed	Amber

<b>Power Supply Condition</b>	<b>Bi-color LED Indication</b>
Power supply warning events where the power supply continues to operate: High temp, high power/high current, slow fan	1 Hz blinking Amber
DC present/only 5 Vsb on (PS Off)	1 Hz blinking Green
Output ON and OK	Green

## A

AC	Alternating Current Application Context Authentication Center Area Code
architecture	Used to conceptually describe the function, interaction, and connectivity of hardware, software, and/or system components within a network.
AS	Application Server  A logical entity serving a specific Routing Key. An example of an Application Server is a virtual switch element handling all call processing for a unique range of PSTN trunks, identified by an SS7 DPC/OPC/CIC_range. Another example is a virtual database element, handling all HLR transactions for a particular SS7 DPC/OPC/SCCP_SSN combination. The AS contains a set of one or more unique Application Server Processes, of which one or more normally is actively processing traffic.  Action Set  Authentication Server  Authentication servers provide public access to certificates, and are integrated with electronic information retrieval systems to this end. Free access to certificates is necessary to support authentication in open systems.

**A**

Application Simulator

Test tool that can simulate applications and/or SMSCs.

**B**

BTU

British Thermal Unit

**D**

DC

Direct Current  
Data Collection

**E**

ESD

Electro-Static Discharge

event

A notification of a state change to a FRU. An event can be an alarm or an informational notification. Events can indicate the assertion or clearing of an alarm. In addition, events can indicate a basic state change that is informational and not related to an alarm condition (for example, card inserted).

An OAM-related occurrence that can be made visible to the user.

In Policy Management, an expected incident that is logged. Events can be used for debugging purposes.

**F**

firmware

Software embedded in a hardware device. Oftentimes, firmware is provided on flash ROMs or as a binary image file that can be uploaded onto existing hardware.

FRU

Field Replaceable Unit

A circuit board or part that can be quickly and easily removed and

**F**

replaced by the user or by a technician without having to send the entire product or system to a repair facility.

**H**

hot-swappable

The ability to remove and replace components of a machine (such as a computer) without turning the machine off. Also known as hot-plugging.

**I**

I/O

Input/Output

IPMI

Intelligent Platform Management Interface

A specification called out by ATCA for providing a low-level interface between blades.

**L**

LED

Light Emitting Diode

An electrical device that glows a particular color when a specified voltage is applied to it.

**N**

NEBS

Network Equipment Building Systems

The most common set of safety, spatial and environmental design guidelines applied to telecommunications equipment in the United States. NEBS was developed by Bell Labs in the 1970s to standardize equipment that would be installed in a central office. This document lists the generic requirements for all new telecommunications equipment

**N**

systems used in central offices and other telephone buildings.

**P**

PDP

Permissive Dialing Period

Power Distribution Panel

Monitors primary and secondary power sources on a continuous basis.

Packet Data Protocol

platform

A platform refers to a framework on which applications may be run.

platform software

Refers to the operating system, firmware, and management software components of a platform. Does not refer to the application software that runs on the platform.

**S**

SAS

Storage Access Services

Serial-attached SCSI

The physical connection used among Controller Enclosures and Disk Enclosures.

**U**

USB

Universal Serial Bus

**V**

VOM

Volt Ohm Meter