AdvancedTCA Shelf, 14-slot

Service Manual

Product Numbers:

11596-100
11596-101
11596-102
11596-103

Doc-No: 63972-171

Revision: R1.1, July 23, 2008

Rev.	Date updated	Change
R1.0	November 24, 2006	Initial Release
R1.1	July 23, 2006	Chapter 3.4 added

Impressum:

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The details in this manual have been carefully compiled and checked - supported by certified Quality Management System to EN ISO 9001/2000

The company cannot accept any liability for errors or misprints. The company reserves the right to amendments of technical specifications due to further development and improvement of products.

Table of Contents

1 Safety

The intended audience of this Service Manual is system integrators and qualified service personnel.
The instructions in this manual primarily describe the installation and maintenance of the 14-Slot ATCA Shelf.
When installing racks, electrical wiring and other equipment, you should follow all local, state, federal, or international codes and regulations.

1.1 Safety Symbols used in this document

	**Hazardous voltage!** *This is the electrical hazard symbol. It indicates that there are dangerous voltages inside the Shelf.*
	**Caution!** *This is the user caution symbol. It indicates a condition where damage of the equipment or injury of the service personnel could occur. To reduce the risk of damage or injury, follow all steps or procedures as instructed.*
	**Danger of electrostatic discharge!** *The Shelf contains static sensitive devices. To prevent static damage you must wear an ESD wrist strap.*

1.2 General Safety Precautions

	**Warning!** *Voltages over 60 VDC can be present in this equipment. As defined in the PICMG 3.0 Specification, this equipment is intended to be accessed, to be installed and maintained by qualified and trained service personnel only.*

- Service personnel must know the necessary electrical safety, wiring and connection practices for installing this equipment in a telecommunication environment.
- Install this equipment only in compliance with local and national electrical codes.
- For additional information about this equipment, see the PICMG 3.0 Specification (*www.picmg.com*) or the User's Manual.

1.3 References and Architecture Specifications

- PICMG® 3.0 AdvancedTCA® Base Specification (*www.picmg.com*)
- PICMG® Engineering Change Notice ECN 3.0-2.0-00
- User's Manual for the 11596-10x ATCA Shelves, Doc-No.: 63972-172

1.4 Product Definition

The Schroff 11596-10x is a 13U / 14 Slot Shelf and designed according to AdvancedTCA standards.

- Product Number 11596-100: Dual Star Backplane, bused IPMB
- Product Number 11596-101: Dual Star Backplane, radial IPMB
- Product Number 11596-102: Full Mesh Backplane, bused IPMB
- Product Number 11596-103: Full Mesh Backplane, radial IPMB

The Schroff 11596-10x is designed to work with two redundant Schroff ShMM-ACB-IV Shelf Managers, at least one Shelf Manager is needed for a working System.

- Product Number 21593-375: Shelf Manager with bused IPMB
- Product Number 21593-376: Shelf Manager with radial IPMB

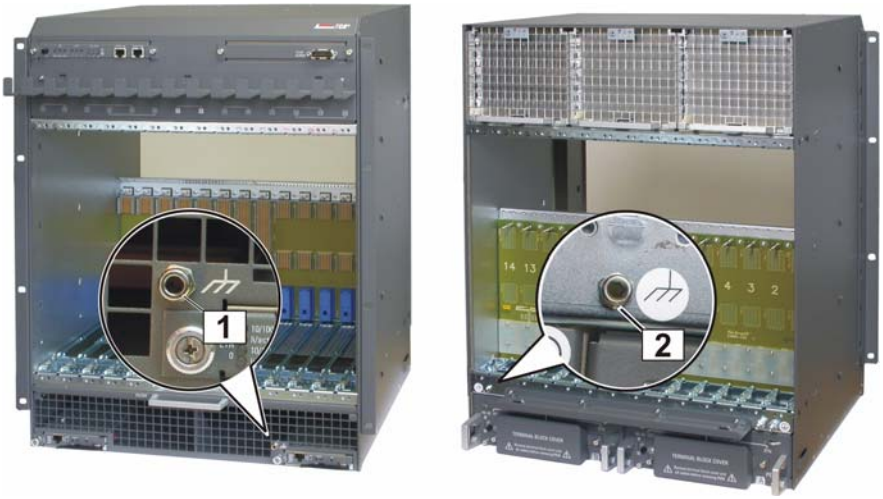
1.5 ESD Wrist Strap Terminals

Danger of electrostatic discharge!

Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!

Two ESD Wrist Strap Terminals are located at the lower front and rear side of the Shelf.

Figure 1: ESD Wrist Strap Terminals



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1 Front ESD Wrist Strap Terminal (4 mm Banana Jack)

2 Rear ESD Wrist Strap Terminal (4 mm Banana Jack)

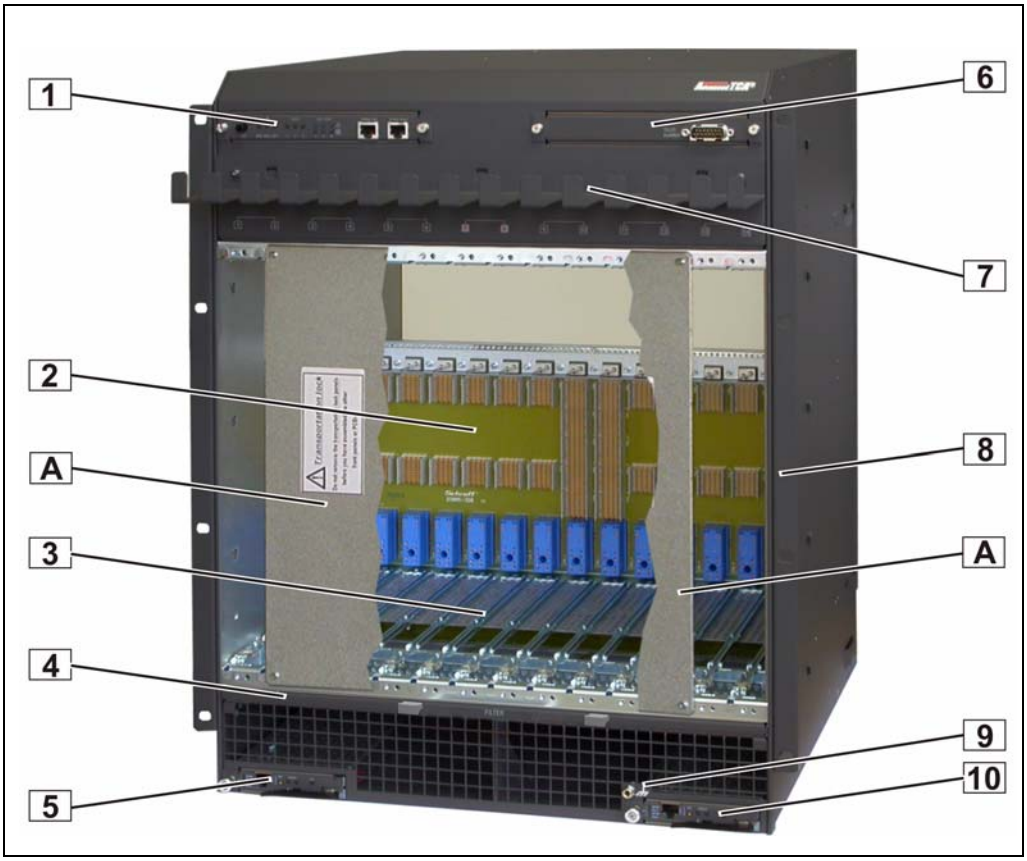
1.6 Terms and Acronyms

Table 1: Terms and Acronyms

Term	Definition
ATCA	Advanced Telecom Computing Architecture
Backplane	Passive circuit board providing the connectors for the front boards. Power distribution, management and auxiliary signal connections are supported
CDM	Chassis Data Module
Chassis	Enclosure containing subrack, Backplane, boards, cooling devices, PEMs, same as Shelf
ECN	Engineering Change Notice
ESD	Electrostatic Discharge
ETSI	European Telecommunications Standards Institute
FRU	Field Replaceable Unit
IPMB	Intelligent Platform Management Bus
IPMC	Intelligent Platform Management Controller
IPMI	Intelligent Platform Management Interface
PCB	Printed Circuit Board
PEM	Power Entry Module
RTC	Real Time Clock
RTM	Rear Transition Module
SAP	Shelf Alarm Panel
Shelf	See Chassis
ShMC	Shelf Management Controller, synonymous with Shelf Manager in this document
ShMM	Shelf Management Mezzanine Module
VRTN	Voltage Return

2 Shelf Overview

Figure 2: Shelf Front View



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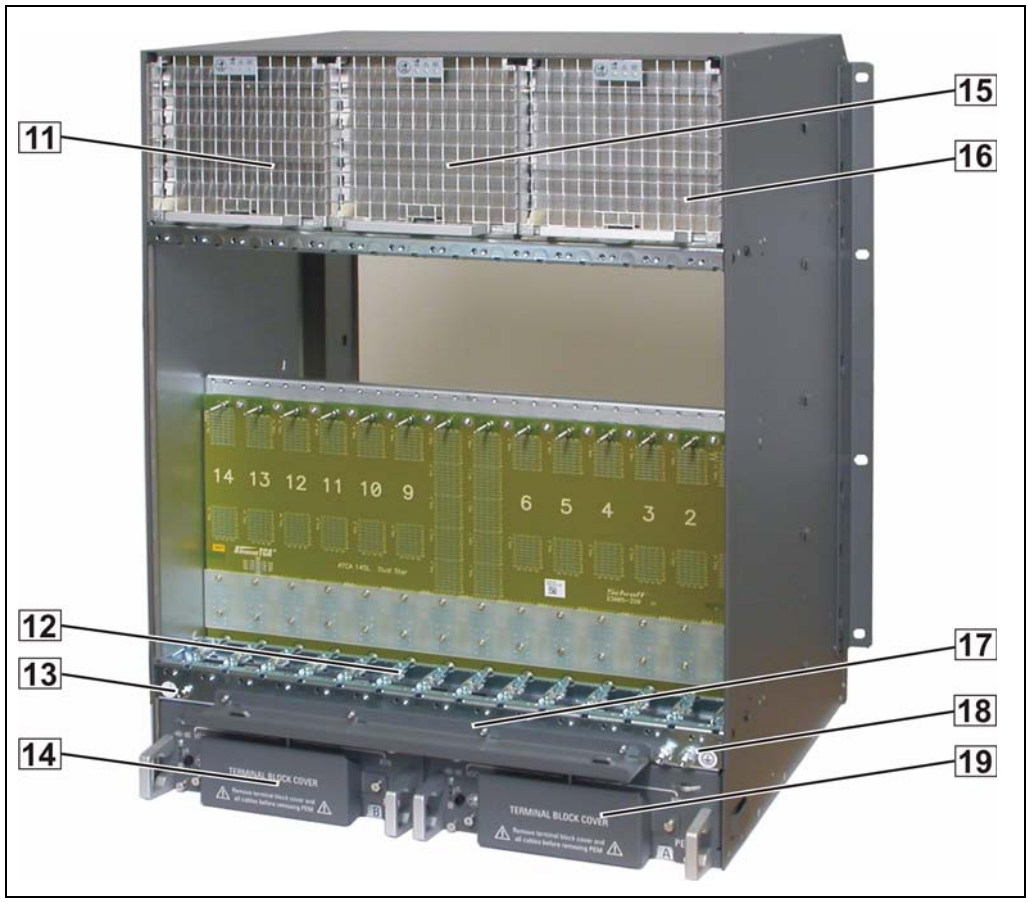
1	Shelf Alarm Display (SAD)	6	Shelf Alarm Panel (SAP)
2	ATCA 14-Slot Backplane	7	Front Cable Tray
3	Front Card Cage	8	Removable Mounting Bracket
4	Air Filter	9	ESD Wrist Strap Terminal
5	Shelf Manger 1 (left)	10	Shelf Manager 2 (right)
A	Transportation Lock		

Figure 3: Shelf Rear View



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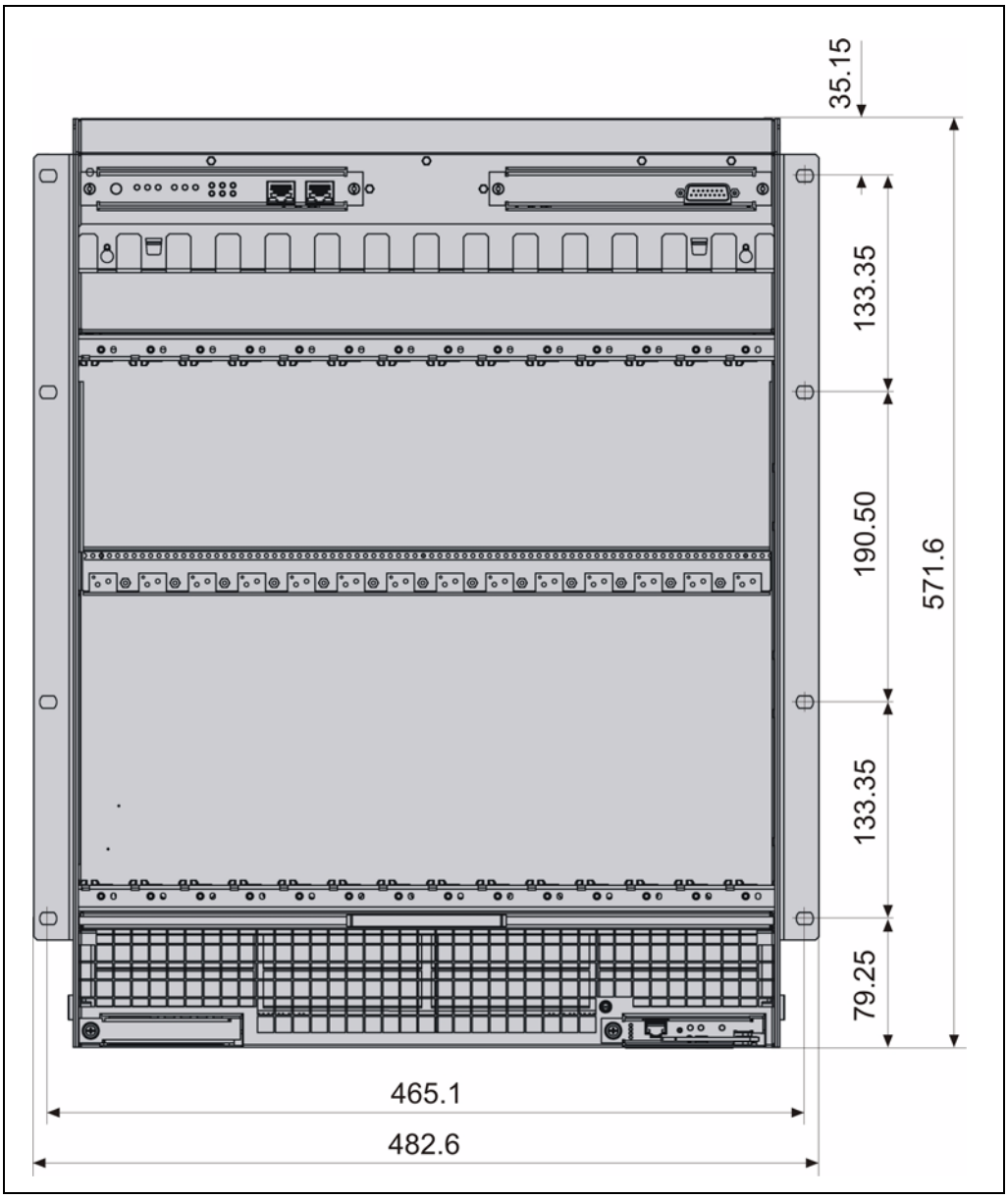
11	Fan Tray #2	16	Fan Tray #0
12	Rear Card Cage	17	Rear Cable Tray
13	ESD Wrist Strap Terminal	18	Shelf Ground Terminal (M6 studs)
14	Power Entry Module B (PEM B)	19	Power Entry Module A (PEM A)
15	Fan Tray #1		

Figure 4: Shelf mechanical dimensions, front view



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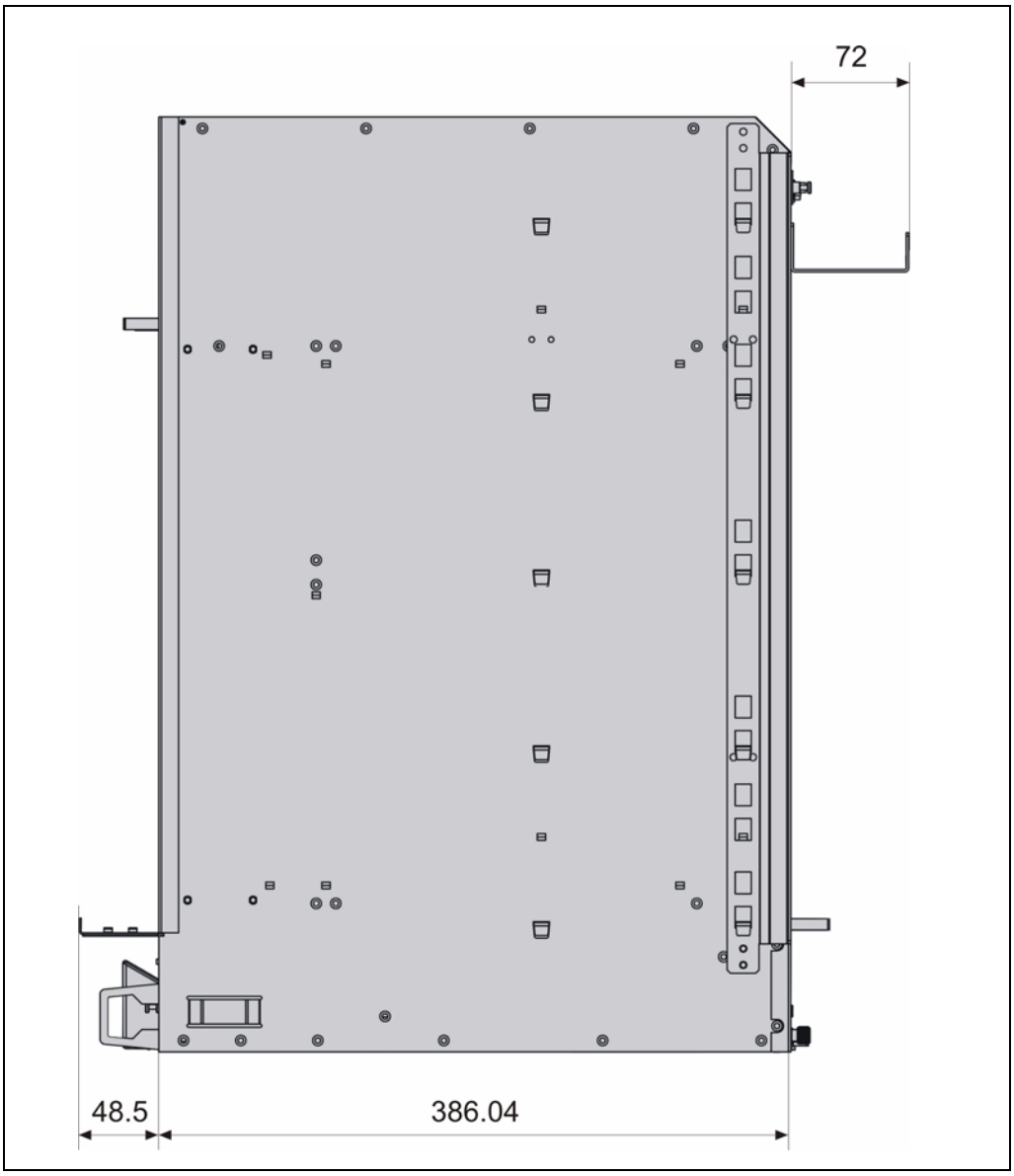
All dimensions are in millimeters (mm).

Figure 5: Shelf mechanical dimensions, side view



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All dimensions are in millimeters (mm).

Table 2: Technical Data

Physical Dimensions	
Height	571.6 mm
Width	482.6 mm
Depth	506.54 mm (with cable trays)
Weight	
Shipping weight completely assembled with packaging	45 Kg
Shelf weight (w/o fan tray and w/o PEMs)	19 Kg
Shelf weight completely assembled	30.6 Kg
Power	
Input voltage nominal	-48/-60 VDC
Input voltage range	-40.5 VDC …. -72 VDC
Input Power	25 A per power feed (total 4 + 4 power feeds)
Overcurrent Protection	30 A Fuses on PEM
Cooling Capacity	
Front Boards	200W / Board
RTM	15W / Board
Environmental	
Ambient temperature normal operating	+5°C…+45°C (41°F to 113°F)
Ambient temperature transient operating	+5°C…+55°C (41°F to 131°F)
Humidity	+5%...+85%, no condensation
EMI	
Conducted Emissions	EN 55022 Class B
Radiated Emissions	EN 55022 Class B
Safety	
Protected Earth Test	EN 60950-1, test current 25 A, resistance <100mOhm
Hipot Test	EN 60950-1, 1000 V

3 Shelf Installation

Install the system in a restricted access area, where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security.

Choose a site with a dry, clean, well-ventilated and air-conditioned area that maintains an ambient temperature of 5°C to 45°C (41°F to 113°F).

3.0.1 Ensuring Overcurrent Protection

The system relies on the protective devices in the building installation for protection against short-circuit, overcurrent, and earth (grounding) fault. Ensure that the protective devices in the building installation are properly rated to protect the system, and that they comply with national and local codes.

3.0.2 Ensuring Proper Airflow

- Install the system in an open rack whenever possible. If installation in an enclosed rack is unavoidable, ensure that the rack has adequate ventilation.
- Maintain ambient airflow to ensure normal operation. If the airflow is blocked or restricted, or if the intake air is too warm, an over temperature condition can occur.
- Ensure that cables from other equipment do not obstruct the airflow through the Shelf.
- Use filler panels to cover all empty chassis slots. The filler panel prevents fan air from escaping out of the front of an open slot.

Caution!

To maintain proper airflow, all open slots must be covered with filler panels. The filler panel should include an airflow baffle that extends to backplane.

3.0.3 Creating a Safe Environment

- Keep tools and chassis components off the floor and away from foot traffic.
- Clear the area of possible hazards, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- Keep the area around the chassis free from dust and foreign conductive material.

3.1 Unpacking

Caution!

When opening the shipping carton, use caution to avoid damaging the Shelf.

Danger of electrostatic discharge!

The Shelf contains static sensitive devices. While unpacking and handling the Shelf you must wear an ESD wrist strap to prevent static damage.

Caution!

Do NOT use the Fan Tray and PEM handles or cable trays as lifting points.

Consider the following when unpacking and storing the Shelf:

- Leave the Shelf packed until it is needed for immediate installation.
- After unpacking the Shelf, save and store the packaging material in case the Shelf must be returned.
- If the packaging is damaged and possible Shelf damage is present, report to the shipper and analyze the damage.

3.2 Rack-Mounting

	**Warning!** *Do NOT move the Shelf by yourself. Due to the height and weight of the Shelf, at least two persons are needed to accomplish this task. We recommend to use a mechanical lift or remove all hot-swappable equipment for weight reduction.*
	**Warning!** *Do NOT stack the Shelf on top of any other equipment. If the Shelf falls, it can cause severe bodily injury and damage the equipment.*
	**Caution!** *Do NOT remove the Transportation Locks (See Fig. 1) before the Shelf is completely fixed in the rack.*
	**Caution!** *Do NOT use the Fan Tray and PEM handles or cable trays as lifting points.*
	**Danger of electrostatic discharge!** *The Shelf contains static sensitive devices. While handling the Shelf you must wear an ESD wrist strap to prevent static damage.*

This ATCA 14-slot Shelf can be installed in 19“ equipment racks. The rack must be accessible from the front and rear for equipment installation.

Mounting brackets and cable trays come with the system. Allow sufficient clearance around the rack for system maintenance.

Mounting Instructions:

- Ensure that the rack is constructed to support the weight and dimensions of the Shelf.
- Install any stabilizers that came with your equipment rack before mounting or servicing the system in the rack.
- Load the rack from the bottom to the top, with the heaviest system at the bottom, avoid uneven mechanical loading of the rack.

	**Caution!** *Never fix the Shelf only with the mounting brackets! Due to the weight of the Shelf you must use two chassis-support brackets or a rack mount tray.*

Figure 6: Chassis-Support Brackets

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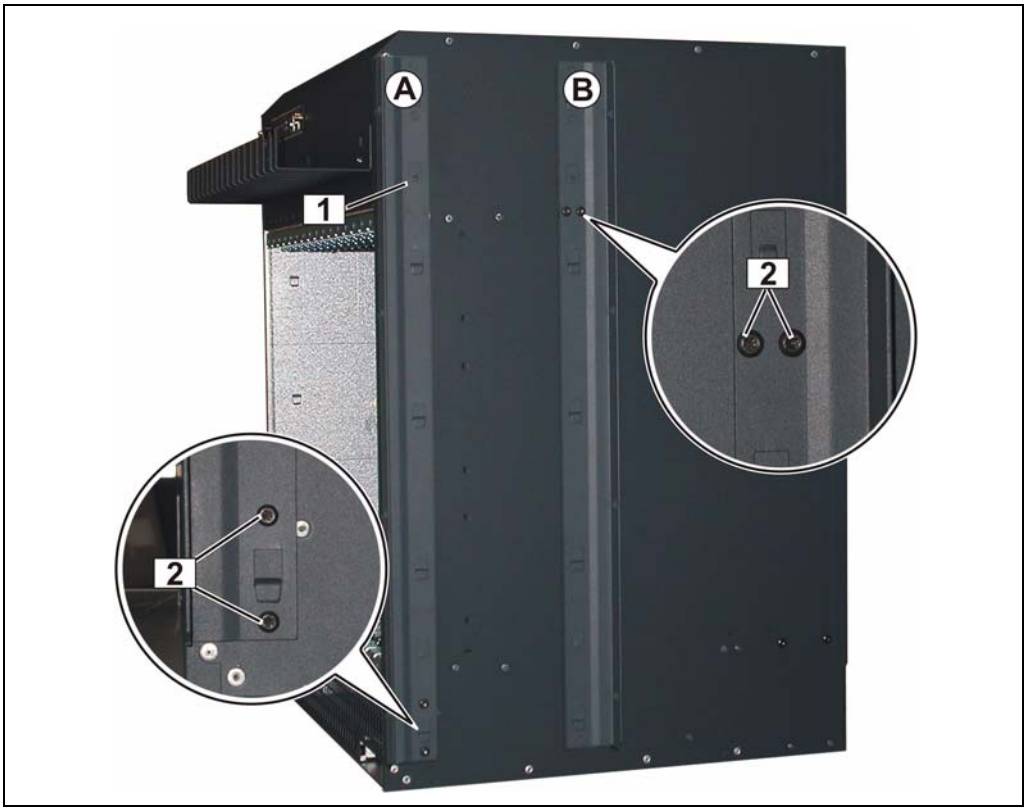
3 Chassis-Support Brackets

3.3 Mounting Bracket Swap

Figure 7: Removable Mounting Brackets



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You can swap the mounting brackets (1) from position (A) to (B).

Mounting brackets swap:

1 Unscrew the locking screws (2).

2 Push the mounting bracket downwards to disengage the locking.

3 Turn the mounting bracket at 180° and move it to the new position.

4 Push the mounting bracket upwards to engage the locking.

5 Tighten the locking screws.

3.4 Additional Rear Fixing Points

The Shelf provides two additional rear fixing points. These points can be used to enhance the shock and vibration stability.

Because the rear fixing points are not standardized, the respective mounting brackets must be manufactured by the customer.

Figure 8: Rear Mounting Brackets

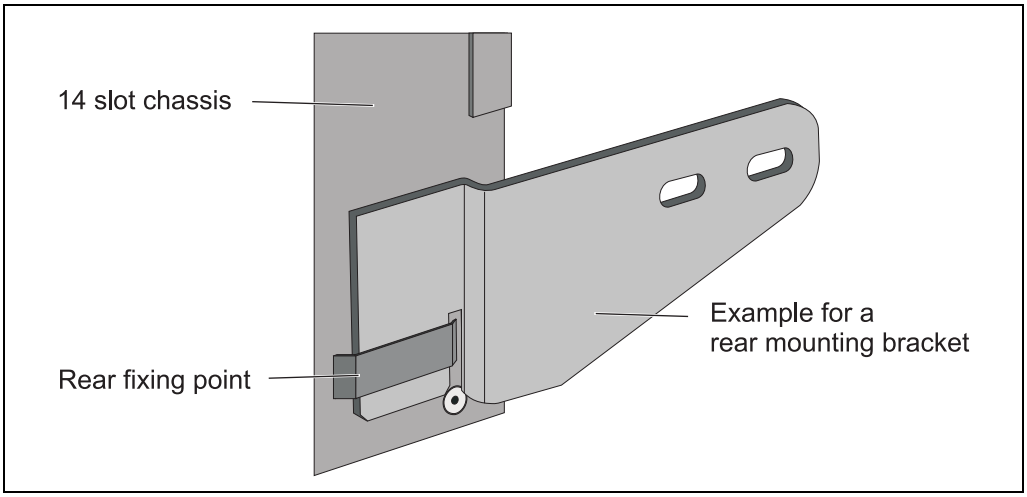

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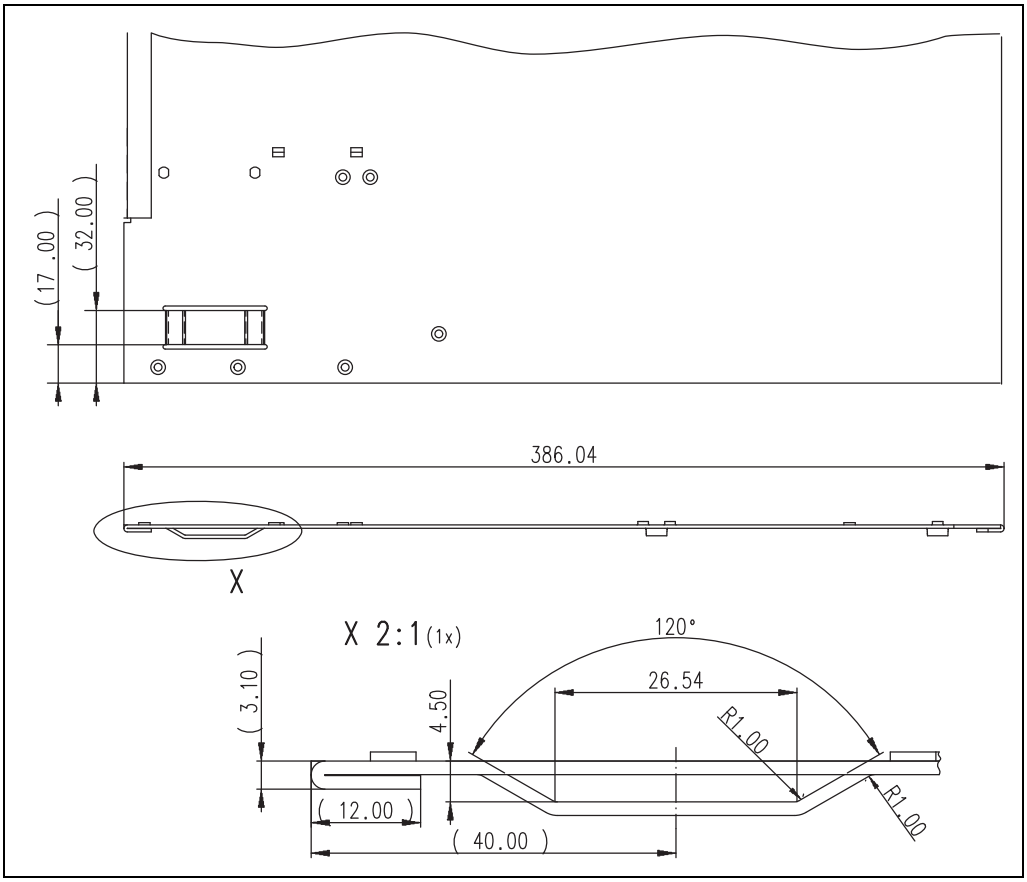
Figure 9: Rear Fixing Points



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3.5 Shelf Ground Connection

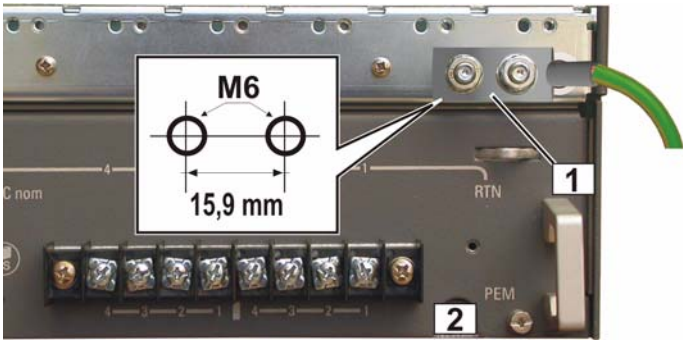
	**Warning!** *This Shelf is intended to be grounded. Ensure that the Shelf Ground terminals are connected to Protective Earth (PE) of the building.*

	**Danger of electrostatic discharge!** *Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!*

The Shelf must be properly grounded via the Shelf Ground Terminal.

The location of the Shelf Ground Terminal is shown in *Figure 10*.

Figure 10: Shelf ground terminal



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1	Shelf Ground Terminal	2	PEM A

Torque for Nuts M6: 5.1 Nm (45 in.-lb.)

3.5.1 Specification for the Shelf Ground connection cable

Required wire size: AWG6

Required terminals: Use only double lug terminals with 45° angle tongue.

Example for terminal:

PANDUIT part no. **LCD6-14AH-L**, or **Thomas&Betts** part no. **54205UF**

See catalogs at www.panduit.com and www.tnb.com.

3.6 Shelf Power Connection

	**Hazardous voltage!** *Before working ensure that the power is removed from the power connection cables. When the system is powered on, do NOT touch the power terminals!*
	**Warning!** *Avoid electric overload. To avoid electrical hazard, do not make connections to terminals outside the specified voltage range for that Shelf.*
	**Warning!** *Ensure that the Shelf is grounded. Ensure that the Shelf Ground terminals are connected to Protective Earth (PE) of the building.*
	**Warning!** *Although there are fuses in the power entry circuit of the Shelf, the power lines have to be protected on rack level with 30 A breakers.*
	**Warning!** *Remove jewelry (rings, watches...) before working on equipment that is connected to power lines!*
	**Danger of electrostatic discharge!** *Static electricity can harm delicate components inside the Shelf. You have to wear ESD wrist straps before exchanging any part or electric component!*

The Shelf can be powered using a regular telecommunication power supply of -48/-60 VDC with a VDC return. The specified voltage range is from -40.5 VDC to -72 VDC.The Shelf supports redundant power supplies but the two supplies should be independently powered.

3.7 Specification for the power connection cables

Required wire size:

Diameter 6 mm² resp. AWG10

max. length 2.5 to 3.0 m

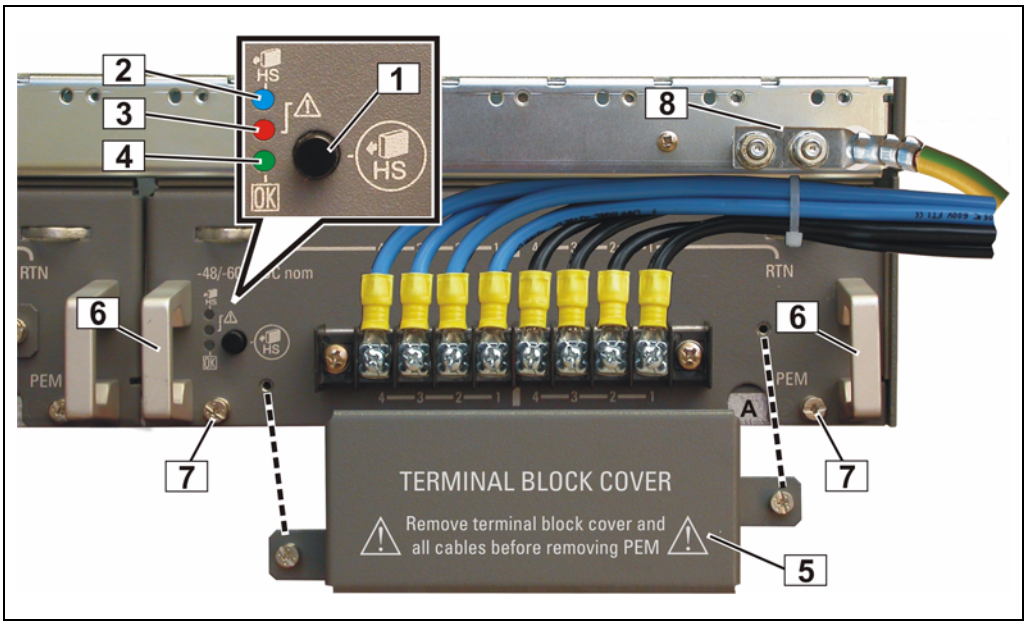
suitable for 30 A at 50° C ambient temperature.

Required terminals:

Use ring terminals for screw M4 or UNC 8-32.

Max. outside diameter is 9.3 mm.

Figure 11: PEM components



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5 Terminal Cover

Table 3: PEM Input Power Terminal

Terminal -48/-60 VDC#	Designation	Terminal RTN#	Designation
1	Power Input Feed 1	1	Return Voltage Feed 1
2	Power Input Feed 2	2	Return Voltage Feed 2
3	Power Input Feed 3	3	Return Voltage Feed 3
4	Power Input Feed 4	4	Return Voltage Feed 4

3.8 Installation the power connection cables

1 Remove the terminal cover (5).

2 Ensure that the power supply is turned off.

3 Connect the power cables to the power terminal as shown in Fig.9
Torque for Bolts 8-32 UNC: 1.4 Nm (12.5 in.-lb.)
Note: Verify the correct polarity of the -48 VDC and the RTN cables!

4 Fix the cables with cable ties.

5 Install the terminal cover (5).

3.9 Initial Operation

Before installing the ATCA boards ensure that there is no transport damage and the system is fully operational.

Apply power to PEM A and PEM B and watch the boot-up process.

Boot-up process:

1 All of the LEDs on the Shelf Alarm Display, the Shelf Manager, the Fan Trays an the PEMs turn on, the fans are spinning with full speed

2 The LEDs on the Shelf Alarm Display with exception of the Fan Tray status LEDs turn off

3 The fans reduce speed up to the initial speed

4 The red LEDs on PEMs, Fan Trays and the Fan Tray status LEDs on Shelf Alarm Display turn off

5 All blue Hot-Swap LEDs blink

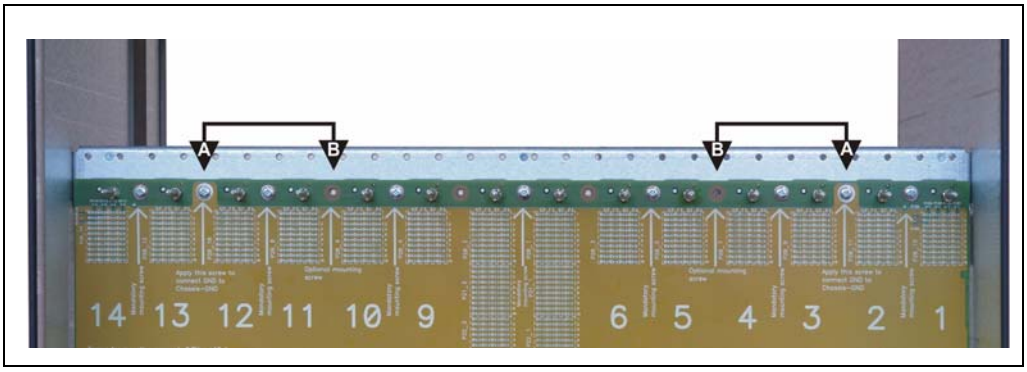
6 All blue Hot-Swap LEDs turn off

7 All Status-OK LEDs are green

The Status LED of the active Shelf Manager is solid green, the Status LED of the backup Shelf Manager is blinking.

3.10 Logic Ground to Shelf Ground connection

Figure 12: Logic Ground/Shelf Ground Connection



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The ATCA Backplane provides a mechanism to connect Logic Ground (GND) and Shelf Ground (Shelf_GND). You can connect/isolate Logic Ground by swapping two screws from position (A) to position (B).

- Screws at position (A): Logic Ground and Shelf Ground connected.
- Screws at position (B): Logic Ground and Shelf Ground isolated.

Torque for the Screws: 0.7 Nm +10%

By default Logic Ground and Shelf Ground is not connected.

4 Maintenace

4.1 Accessing the Shelf Management Software

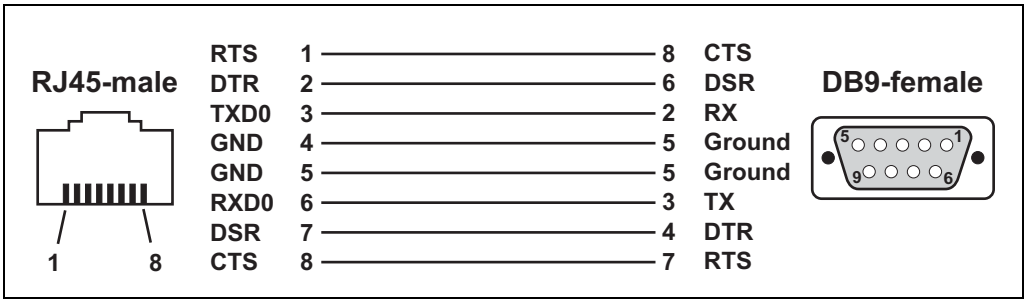
You can access to the Shelf Management software either remotely through ethernet (Tenet, SSH) or by connecting a terminal console directly to the Shelf Manager's serial console interface (RJ45) on the Shelf Alarm Panel (SAP).

Note: *By default the ethernet connector at the Shelf Manager frontpanel is not in service but jumper configurable. See the Shelf's User Manual for details.*

The serial console default configuration is:

- *115200 baud*
- *no parity*
- *8 data bits*
- *1 stop bit*

Figure 13: RJ45 to DB9 Serial Console Cable



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The connectors are shown with the cables pointing away.

Serial Console Cable Order No.: 23204-187

4.1.1 Command Line Interface (CLI)

The Command Line Interface (CLI) connects to and communicates with the IPM-devices of the Shelf, the boards, and the Shelf Manager.
The CLI is an IPMI-based library of commands, service personnel or system administrators can access the CLI through Telnet, SSH, or the Shelf Managers serial port on the SAP.
With the CLI, users can access information about the current system status including sensor values, threshold settings etc.
Users can also access and modify Shelf- and Shelf Manager configurations, perform actions on a FRU a.e. set fan speeds etc.

The default user account is "root" and there is no password.
The default IP address of the primary Shelf Manager is 192.168.0.2

To access all sensor data you have to connect to the active Shelf Manager!

4.1.2 Basic CLI Commands

Service personnel can read system information, FRU information and sensor data with the following basic commands. For a full list of all CLI commands refer to the Firmware User Manual.

- **Change IP address of the primary Shelf Manager:**

  `clia setlanconfig` *`channel`* `ip` *`value`*

Value represents the IP address in dotted decimal notation.

```
clia setlanconfig 1 ip 192.168.0.2
```

- **Display the Shelf Managers firmware version:**

```
clia version
```

Info: To get a complete list of all information just type in "`version`".

- **List all IPM Controllers in a Shelf:**

```
clia ipmc
```

- **List all boards in the Shelf:**

```
clia board
```

- **List all sensors on a board:**

  `clia sensor` *`IPMI-address`*

- **List only sensors which are outside of established thresholds:**

```
clia sensor -t
```

- **Get data (value) from a sensor on a board:**

  `clia sensordata` *`IPMI-address sensor-number`*

- **Display the FRU information in a board:**

  `clia fruinfo` *`IPMI-address FRU-id`*

- **Change the speed for a Fan Tray:**

  `clia setfanlevel` *`IPMI-address Fru-id speed`*

Info: The value for the speed is from 0 to 4.

- **Display the contents of the System Event Log (SEL):**

```
clia sel
```

- **Clear the System Event Log (SEL):**

```
clia sel clear
```

4.2 Telco Alarms

4.2.1 Telco Alarm Interface

The SAP provides a Telco Alarm interface on the DB15-male connector. Three relay outputs are used for remote alarm distribution, reflecting the state of the three Alarm LEDs. The relays are capable of carrying 72 VDC or 1 A with a max. rating of 30 VA.

4.2.2 Telco Alarm LEDs

The Shelf Alarm Panel provides the Telco Alarm LEDs. These LEDs indicate presence of Critical, Major and Minor alarms as follows:

Table 4: Telco Alarm LEDs

State	Description
Off	No alarm active
On	Alarm active
Flashing	Alarm active, but silenced

4.2.3 Alarm Silence Push Button

The Alarm Silence push button on the Shelf Alarm Panel faceplate deactivates the alarm relays. During the time Alarm Silence is activated, the Alarm LEDs flash. By pressing the Alarm Silence push button a second time, the alarm relays are reactivated and the Alarm LEDs are solid.

*The **Alarm Silence** push button only activates the Alarm Silence state, but does not reset the alarms. If the silence interval (default 600 s) is exceeded without resolving the alarms, the alarms will be re-initiated.*

4.2.4 Alarm Reset

Hardware Reset:

Two relay inputs at the DB15 connector are used to reset the Minor and Major alarm state.

The reset inputs accept timed pulse inputs for clearing Minor and Major alarm states. Reset is accomplished by asserting a voltage differential from 3.3 VDC to 72 VDC for between 200 ms and 300 ms. The acceptance voltage range is from 0 to 48 VDC continuous (handles up to 60 VDC at a 50% duty cycle). The current drawn by a reset input does not exceed 12 mA.

There is no hardware reset (reset input) for the Critical Alarm state.

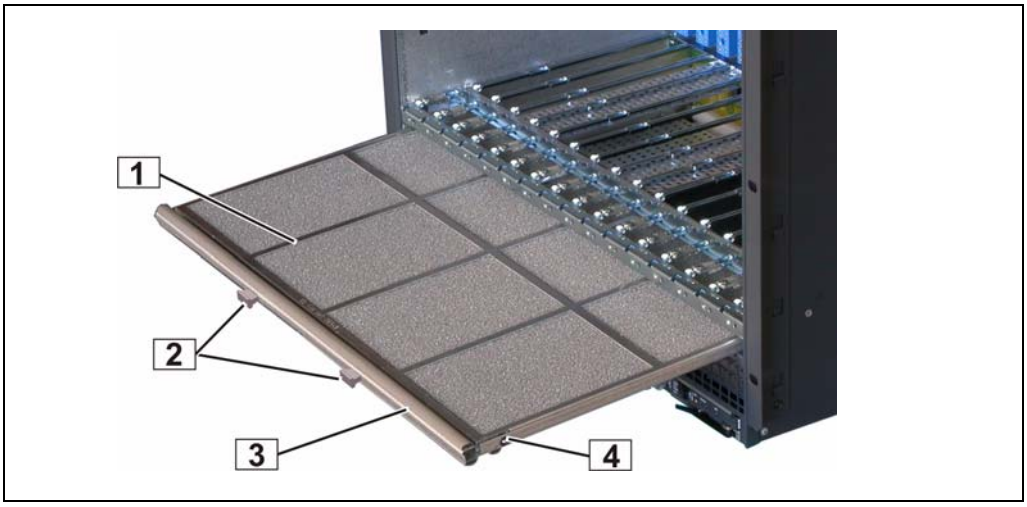
Software Reset:

The RMCP and CLI functions can be used to set and reset the Telco Alarms (incl. Critical Alarm). See the Pigeon Point Shelf Manager External Interface Reference for more information.

4.3 Air Filter Replacement

	**Danger of electrostatic discharge!** *Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!*

Figure 14: Air Filter



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1	Filter Element	3	Filter Tray
2	Handles	4	Spring mounted ball lock

The ATCA Shelf provides a front replaceable air filter. The air filter filters both, the air for the ATCA blades and the air for the Rear Transition Modules (RTM).

The air filter meets the requirements of the Telcordia Technologies Generic Requirements GR-78-CORE specification.

Air Filter Replacement

1 Pull out the filter tray (3) by pulling the handles (2). No additional screw needs to be loosened.

2 Replace the filter element (1).

3 To re-install, push the air filter tray (3) into the guide rails at each side of the Shelf until the spring mounted ball lock (4) engage.

When installing the air filter tray, the filter element must be in top position

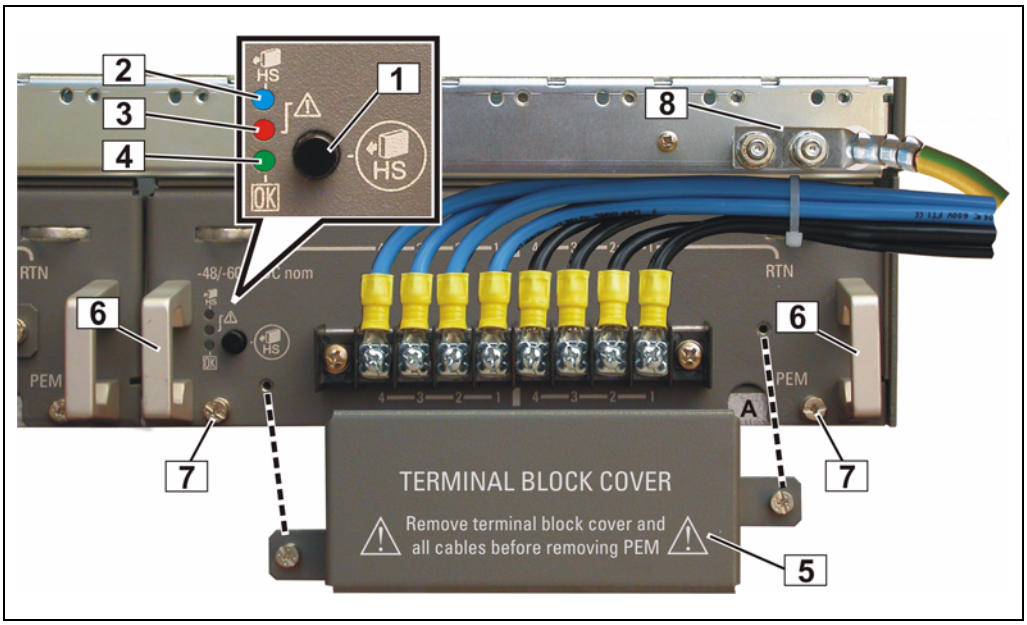
4.4 Power Entry Module (PEM) Replacement

	**Hazardous voltage!** *Before disconnecting the power cables ensure that the power is removed from the power cables. When the system is powered on, do NOT touch the power terminals!*
	**Warning!** *This Shelf is intended to be grounded. Ensure that the Shelf Ground terminals are connected to Protective Earth (PE) of the building.*
	**Warning!** *Although there are fuses in the power entry circuit of the Shelf, the power lines have to be protected on rack level with 30 A breakers.*
	**Warning!** *Remove jewelry (rings, watches...) before working on equipment that is connected to power lines!*
	**Warning!** *Before removing a PEM, make sure that the Power Segments of the other PEM are fully functional.*
	**Danger of electrostatic discharge!** *Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!*
	**Caution!** *To maintain proper airflow, do not leave a PEM slot open.*

Under normal operation, the green OK LED on the PEM is lit, indicating that there is supply voltage on all power feeds and the PEM is fully functional.

When the red Failure LED lights up, there is either a supply voltage missing, a fuse blown or the PEM not working. Before replacing a PEM, check if all power feeds are present at the PEM connector.

Figure 15: PEM components



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1	Hot Swap Push Button	5	Terminal Cover
2	Hot Swap LED	6	Handles
3	PEM Alarm LED	7	PEM Fixing Screws
4	PEM OK LED	8	Shelf Ground Terminal

Remove PEM

1 Ensure that the redundant PEM is fully functional (red Alarm LED is off).

2 Push Hot Swap Push Button (1) until Hot Swap LED (2) starts blinking.

3 Wait until Hot Swap LED (2) is solid blue.

4 Cut off the power supply to the PEM you want to remove.

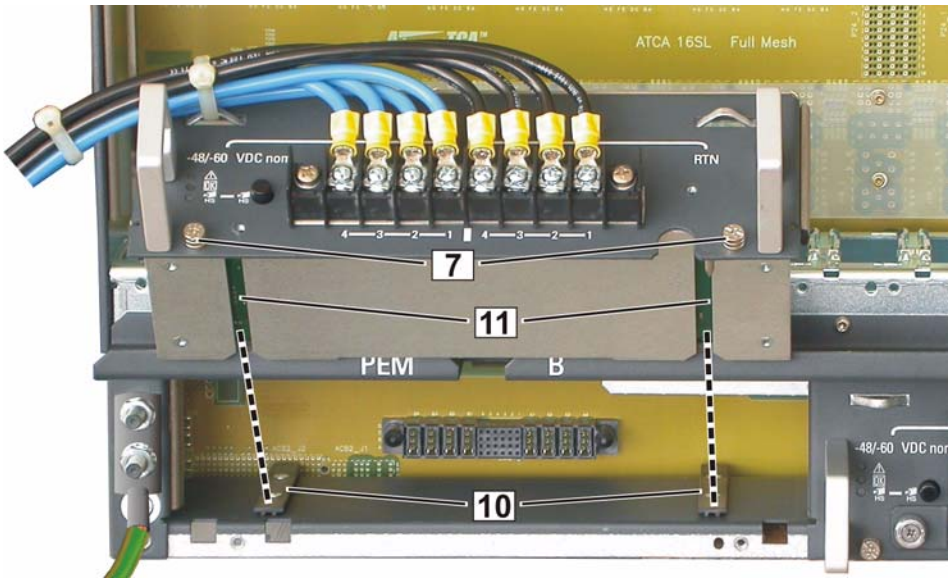
5 Remove Terminal Cover (5).

6 Disconnect the power cables from the power terminal.

7 Unscrew both PEM Fixing Screws (7).

8 Pull out the PEM at both handles (6).

Figure 16:



12706849

7	Fixing Screws	11	Slots
10	Guides		

Install PEM:

1 Insert the PEM into the Shelf. The slots (11) must slide into the guides (10).
Note: The blue Hot Swap LED (2) starts blinking until the PEM is fully functional. Now only the red Alarm LED (3) is illuminated until power is provided to the PEM.

2 Tighten both fixing screws (7).
Torque: 0.67 Nm (6 in.-lb.)

3 Connect the power cables at the power terminal.
Torque: Bolts 8-32 UNC 1.4 Nm (12.5 in.-lb.)
Note: Verify the correct polarity of the -48 VDC and the RTN cables!

4 Mount the terminal cover (5).

5 Power-on the power supply for the PEM.
Note: When all Power Feeds are present, only the green OK LED (4) is illuminated.

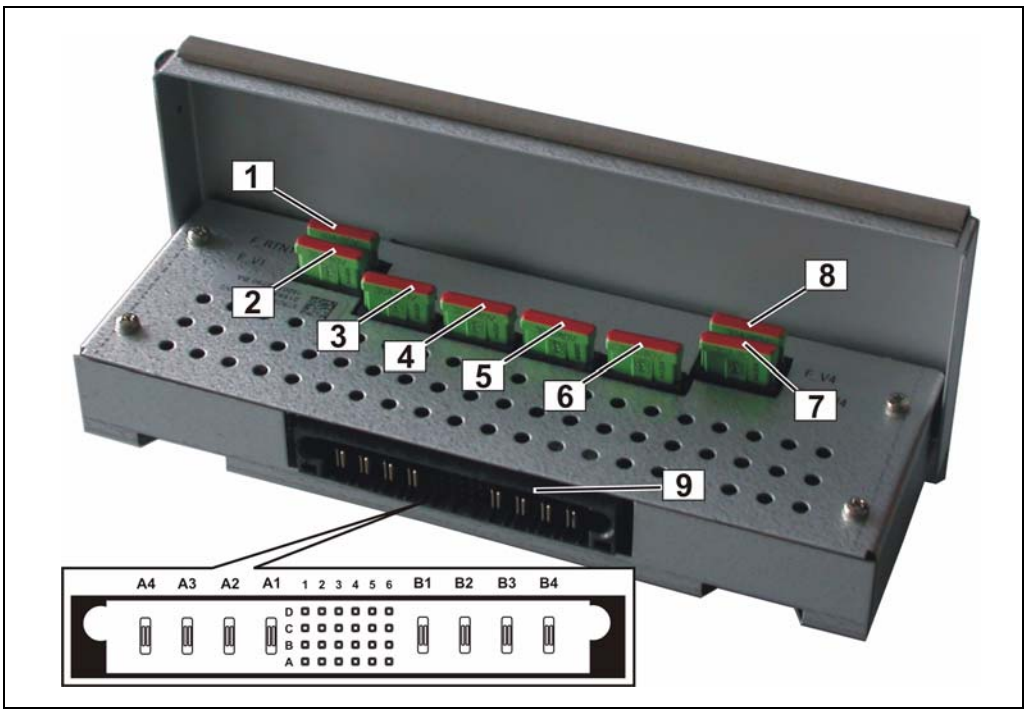
4.4.1 PEM Fuse Replacement

All four Power Feeds are protected by a fuse in the -48 V **and** in the VRTN path.

All fuses have a rating of 30 A/80 V.

To replace a fuse you have to remove the resp. PEM first. See *Chapter 4.4, "Power Entry Module (PEM) Replacement"* for instructions.

Figure 17: PEM Fuses



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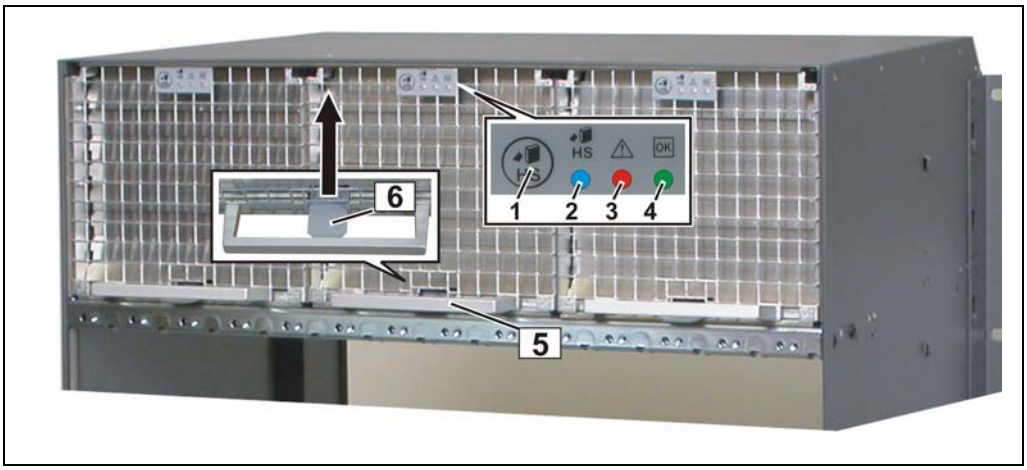
1	30 A Fuse VRTN_1 (F101)	6	30 A Fuse -48V_3 (F302)
2	30 A Fuse -48V_1 (F102)	7	30 A Fuse VRTN_4 (F401)
3	30 A Fuse VRTN_2 (F201)	8	30 A Fuse -48V_4 (F402)
4	30 A Fuse VRTN_3 (F301)	9	PEM Backplane Connector
5	30 A Fuse -48V_2 (F202)		

4.5 Fan Tray Replacement

Danger of electrostatic discharge!

Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!

Figure 18: Fan Tray



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1	Hot Swap Push Button	4	Fan Tray OK LED (green)
2	Hot Swap LED (blue)	5	Handle
3	Fan Tray Alarm LED (red)	6	Retention Lever

Remove:

1 Push Hot Swap Push Button (1) until the Hot Swap LED (2) starts blinking.

2 Wait until the Hot Swap LED (2) is solid blue.
Note: All fans are spinning now with full speed.

3 Lift the retention lever (6).

4 Pull out the Fan Tray.

Install:

1 Insert the Fan Tray completely into the Shelf.
Note: The blue Hot Swap LED (2) starts blinking until the Fan Tray is fully functional. Now only the green OK LED (4) is illuminated.

When the Major Telco Alarm Led on the Shelf Alarm Display is lit after replacing the Fan Tray, you can clear the Alarm by entering the command:

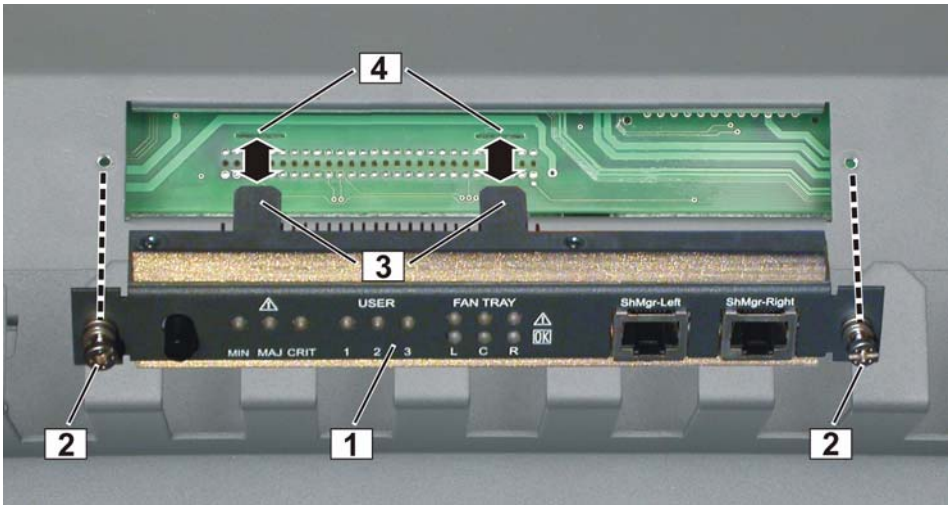
```
<clia alarm clear>
```

through the serial port on the Shelf Alarm Display.

4.6 Shelf Alarm Display (SAD) Replacement

	**Danger of electrostatic discharge!** *Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!*

Figure 19: Shelf Alarm Display (SAD)



12706852

1	Shelf Alarm Display	3	Guides
2	Fixing Screws	4	Slots

Remove:

1 Unscrew both fixing screws (2).

2 Pull out Shelf Alarm Display (1).
Note: Pull at both fixing screws (2).

Install:

1 Insert the guides (3) of the Shelf Alarm Display into the slots (4) of the Horizontal board.

2 Insert the Shelf Alarm Display.

3 Tighten both fixing screws (2).
Torque: 0.67 Nm (6 in.-lb.)

4.7 Shelf Alarm Panel (SAP) Replacement

For instructions see *Chapter 4.6, "Shelf Alarm Display (SAD) Replacement"*.

Figure 20: Shelf Alarm Panel (SAP)

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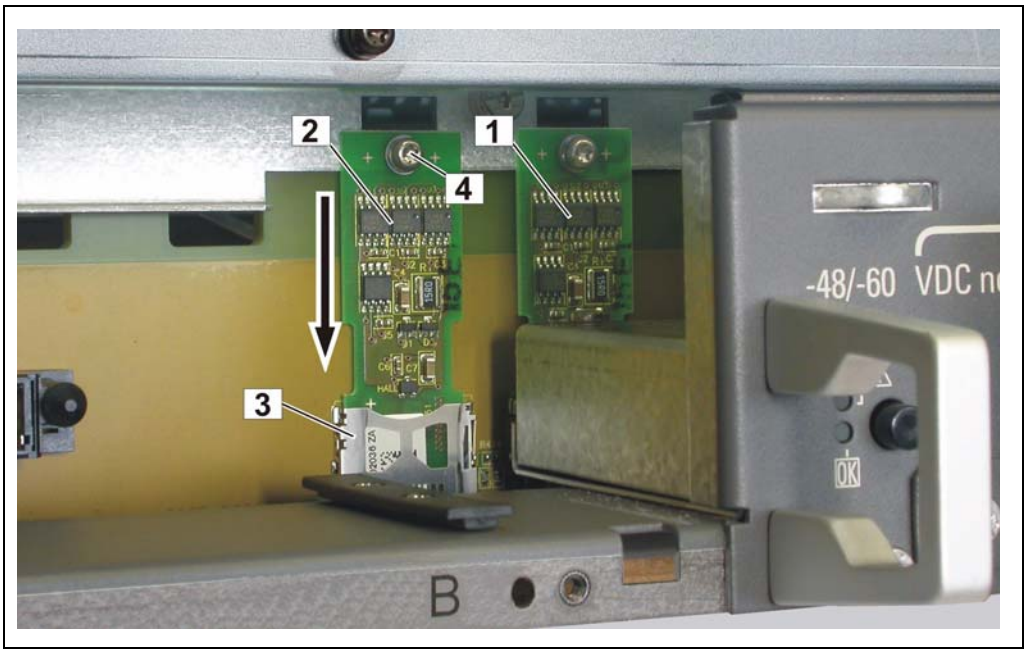
4.8 Chassis Data Module (CDM) Replacement

The Chassis Data Modules (CDMs) are located on the Backplane behind the Power Entry Modules (PEMs). To replace a CDM you have to remove the resp. PEM first.

- CDM 1 is located behind PEM A.
- CDM 2 is located behind PEM B.

	**Warning!** *Before removing a PEM, ensure that the Power Segments of the other PEM are fully functional.*
	**Hazardous voltage!** *Before working ensure that the power is removed from the power connection cables. When the system is powered on, do NOT touch the power terminals!*
	**Warning!** *This Shelf is intended to be grounded. Ensure that the Shelf Ground terminals are connected to Protective Earth (PE) of the building.*
	**Warning!** *Remove jewelry (rings, watches...) before working on equipment that is connected to power lines!*
	**Danger of electrostatic discharge!** *Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!*

Figure 21: Chassis Data Modules (CDMs)



12706915

1	CDM 1	3	Slot
2	CDM 2	4	Fixing Screw

Remove:

1 Remove the resp. PEM.
Note: See instructions in *Chapter 4.4, "Power Entry Module (PEM) Replacement"*.

2 Remove the fixing screw (4).
Note: Use a magnetic screwdriver to prevent the fixing screw from falling into the Shelf!

3 Push the CDM in direction of the arrow to release the locking mechanism in the CDM slot.

4 Remove the CDM.

Install:

1 Insert the CDM in the CDM slot.

2 Push the CDM in direction of the arrow to lock the locking mechanism in the CDM slot.

3 Mount the fixing screw (4).
Note: Use a magnetic screwdriver to prevent the fixing screw from falling into the Shelf!

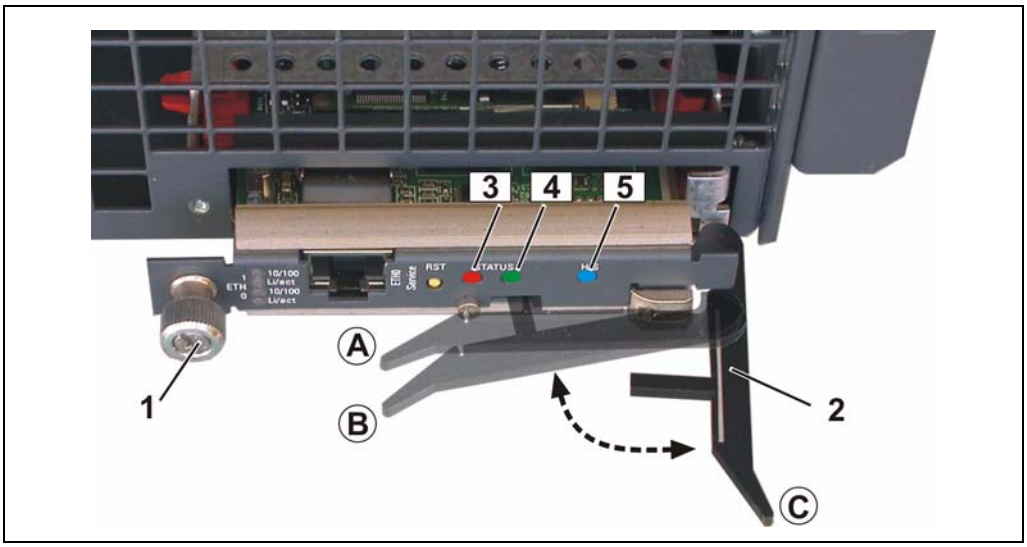
4 Install the PEM.

4.9 Shelf Manager Replacement

Danger of electrostatic discharge!

Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!

Figure 22: Shelf Manager



12706850

1	Fixing Screw	4	Status LED (green)
2	Lever	5	Hot Swap LED (blue)
3	Status LED (red)		

Remove:

1 Unscrew the fixing screw (1).

2 Move the lever (2) to position (B) until the blue Hot Swap LED (5) starts blinking.

3 When the Hot Swap LED is solid blue, move the lever (2) to position (C) and pull out the Shelf Manager.

Install:

1 Insert the Shelf Manager into the guides and push it completely into the Shelf. The lever (2) must be in position (C).

2 Close the lever (2) to position (A) and tighten the fixing screw (1).

3 The Shelf Manager is booting now. After aprox. one Minute the green Status LED (4) indicates that the Shelf Manager is functional.

The Status LED of the active Shelf Manager is solid green, the Status LED of the backup Shelf Manager is blinking.

4.10 ShMM-500 Replacement

	**Danger of electrostatic discharge!** *Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!*

Figure 23: ShMM-500 Replacement

12706992

To replace the ShMM-500 you have to remove the Shelf Manager first.

Remove:

Remove the fixing screw (1). Pull at both locking springs (2).
The ShMM-500 will snap into removable position (A). In this position you can safely pull out the ShMM-500.

Insert:

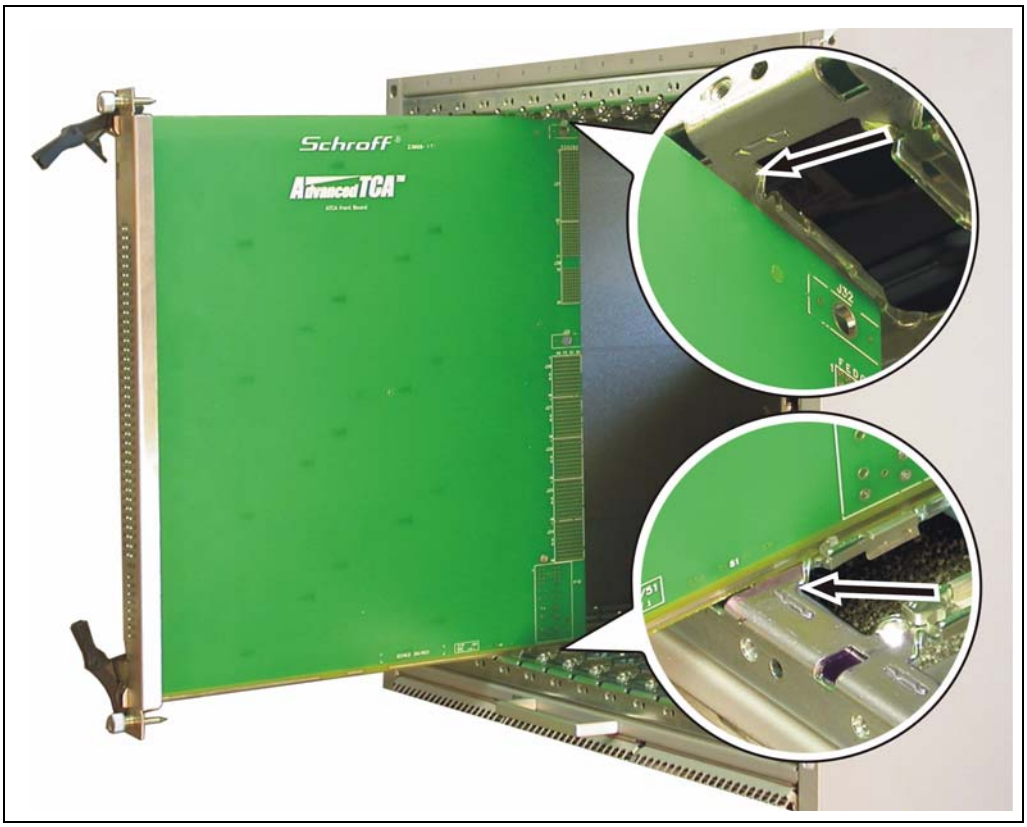
Insert the ShMM-500 with an angle of aprox. 33° in the slot. Press the ShMM-500 downwards until the locking springs (2) engage.
Reinstall the fixing screw (1).

4.11 Insertion of ATCA Boards

Danger of electrostatic discharge!

Static electricity can harm delicate components inside the Shelf. You must wear an ESD wrist strap before exchanging any part or electric component!

Figure 24: Insertion of ATCA Boards



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Caution!

When installing Front boards or RTM boards, ensure that the board slides into the guide rails (Arrows)!

4.12 Part Numbers

Table 5: Part Numbers

Number	Part
11596-100	14-Slot ATCA Shelf, Dual Star Backplane, bused IPMB
11596-101	14-Slot ATCA Shelf, Dual Star Backplane, radial IPMB
11596-102	14-Slot ATCA Shelf, Full Mesh Backplane, bused IPMB
11596-103	14-Slot ATCA Shelf, Full Mesh Backplane, radial IPMB
21593-375	Shelf Manager ShMM-ACB-IV with bused IPMB
21593-376	Shelf Manager ShMM-ACB-IV with radial IPMB
21596-139	Replacement Fan Tray
21596-020	Replacement PEM
21191-207	Fuse 30 A/80 V for PEM (10 pcs)
21596-138	Air Filter Element
21596-012	Filler Panel for empty Shelf Manager slot
21591-079	Filler Panel with airflow baffle for empty front slots
21591-099	Filler Panel with airflow baffle for empty RTM slots
21596-023	Chassis Data Module (CDM)
21596-140	Shelf Alarm Panel (SAP)
21596-026	Shelf Alarm Display (SAD)

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