aTCA-81514PA

15U 14-Slot AdvancedTCA® Shelf

User's Manual



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Preface

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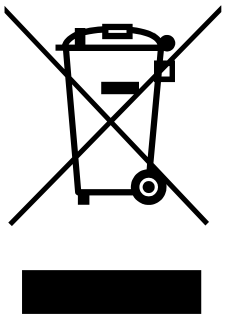
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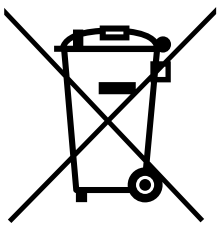
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Battery Labels (for products with battery)









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WARNING: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl)phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.p65warnings.ca.gov.

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1 Safety

The intended audience of this User's Manual is system integrators and hardware/software engineers.

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.*

	**Risk 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 42 V_{AC} or 60 V_{DC} can be present in this equipment. As defined in the PICMG 3.0 Specification, this equipment is intended to be accessed, 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.
- 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.org).

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1.3 References and Architecture Specifications

- Pigeon Point Systems IPM Sentry Shelf-External Interface Reference (*www.pigeonpoint.com*)
- PICMG® 3.0 Revision 3.0 AdvancedTCA® Base Specification (*www.picmg.org*)

1.4 Product Definition

The aTCA-81514PA is a 14-Slot AdvancedTCA® Shelf with 40G backplane connectivity.

- 40G Dual Star backplane, bussed IPM interface, dedicated slots for two Shelf Managers.

1.5 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	Shelf FRU Data Module
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
Shelf	Enclosure containing subrack, backplane, boards, cooling devices, PEMs and Fan Trays
VRTN	Voltage Return
PSU	Power Supply Unit

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1.6 Hardware Platform

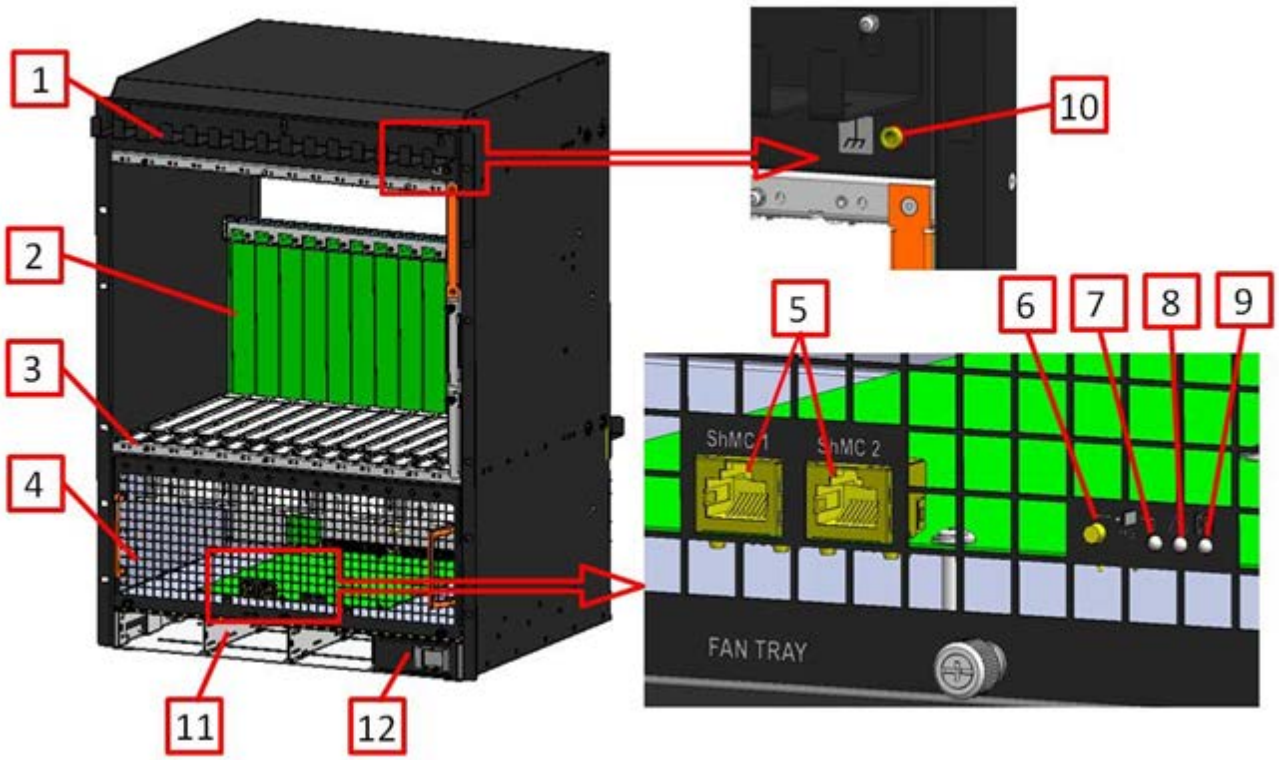
The Shelf is 15 U high and 19“ rack mountable. The chassis is designed for easy access of any Field-Replaceable Units (FRU).

- Powder-coated 15U / 19“ chassis with front card cage for ATCA boards and rear card cage for ATCA RTM boards
- 14 slot 40G ATCA Dual Star Backplane, Dual Star Base Interface, bussed IPM interface, supporting twelve 8U node board slots and two 8U hub slots
- Mounting brackets for 19“ racks and rear fixing point
- ESD Wrist Strap Terminals at the front and the rear
- Two dedicated Shelf Manager bays accepting Shelf Managers
- Front-pluggable, hot-swappable Fan Tray
- Air inlet filter with presence monitoring
- Four IEC320-C20 AC inputs
- 3 kW front-pluggable AC Power Supplies with wide range input in a redundant 3 + 1 configuration.
- Four switches for the AC power supplies

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1.7 Shelf Front and Rear View

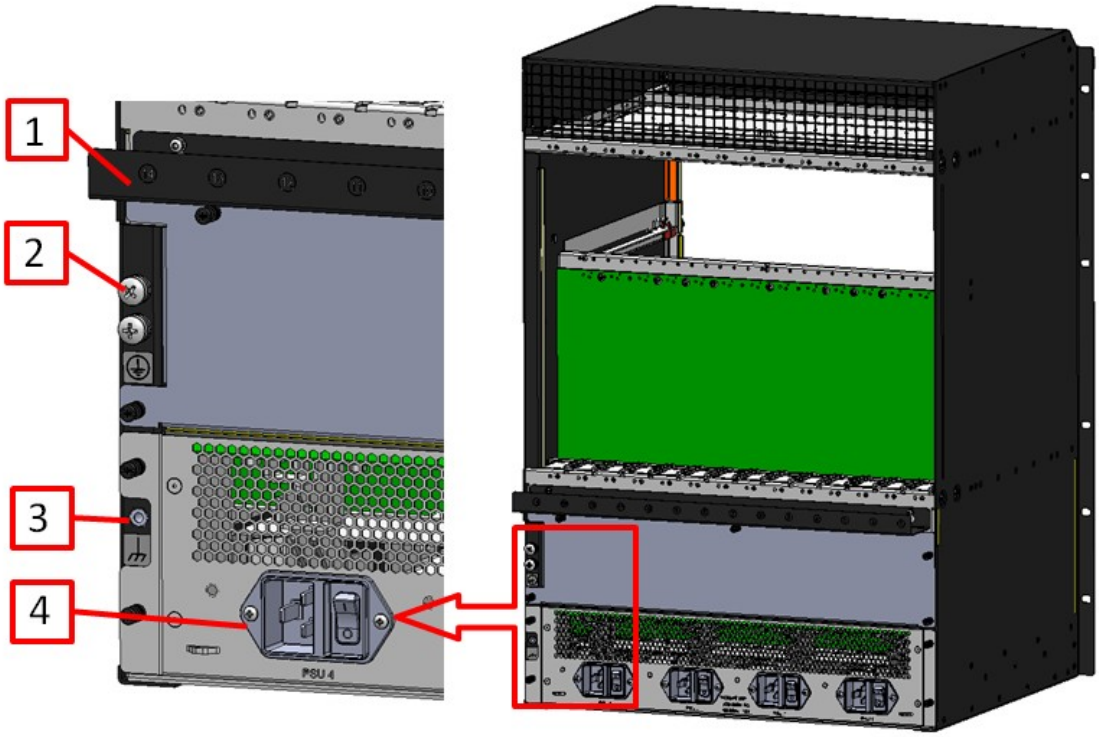
Figure 1: Shelf Front View



1	Cable Tray	7	Hot Swap LED
2	Backplane	8	Fan Tray Fault LED
3	Front Card Cage	9	Fan Tray OK LED
4	Fan Tray	10	ESD Wrist Strap
5	Serial Interfaces for ShMC	11	Slot for PSU
6	Hot Swap Push Button	12	Filler panel

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Figure 2: Shelf Rear View



1	Cable Tray	3	ESD Wrist Strap Terminal
2	Ground Terminal	4	Power Input and Switches

1.8 ESD Wrist Strap Terminals

	**Risk of electrostatic discharge!** *The Shelf contains static sensitive devices. To prevent static damage you must wear an ESD wrist strap.*

One ESD Wrist Strap Terminal is located at the Shelf‘s upper front side, one ESD Wrist Strap Terminal is located at the left rear side of the Shelf.

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2 ATCA Backplane

The 14-slot ATCA monolithic Backplane provides:

- 40 Gb/s connectivity (4 lanes with 10 Gb/s)
- 12 ATCA Node slots
- ATCA Hub slots
- Two dedicated Shelf Manager slots
- PEM Slots
- Fan Tray slot
- SEEPROMs

2.1 Interfaces

2.1.1 Base Interface

Logical slots 1 and 2 are the hub slots for the Dual Star Base Interface.
Base Interface Channel 1 (ShMC) of logical slot 1 and 2 is cross connected to both dedicated Shelf Manager slots on the ATCA Backplane.

2.1.2 Fabric Interface

The Fabric Interface is wired as Dual Star, supporting four ports (8 pairs) per channel. See PICMG® 3.0 AdvancedTCA® Base Specification for details.

2.1.3 Synchronization Clock Interface

Six differential pairs of synchronization clocks are bused between all 14 ATCA slots and terminated at both ends with 80.6 Ohms between each differential pair.

2.1.4 Power Interface

Power distribution within the ATCA Backplane is divided into 4 Power Branches. This topology is used for safety reasons to keep the max. current per branch less than 50 A. Slots connected by update ports, are on separate power branches as well as both hub slots, the Shelf Manager slots and the Fan Trays.

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2.1.5 Update Channel Interface

The Update Channels are wired between two redundant ATCA Backplane slots as 10 differential pairs.

The Update Channel is intended to pass information between two redundant ATCA Boards.

Figure 3: Update Channels

Dual Star

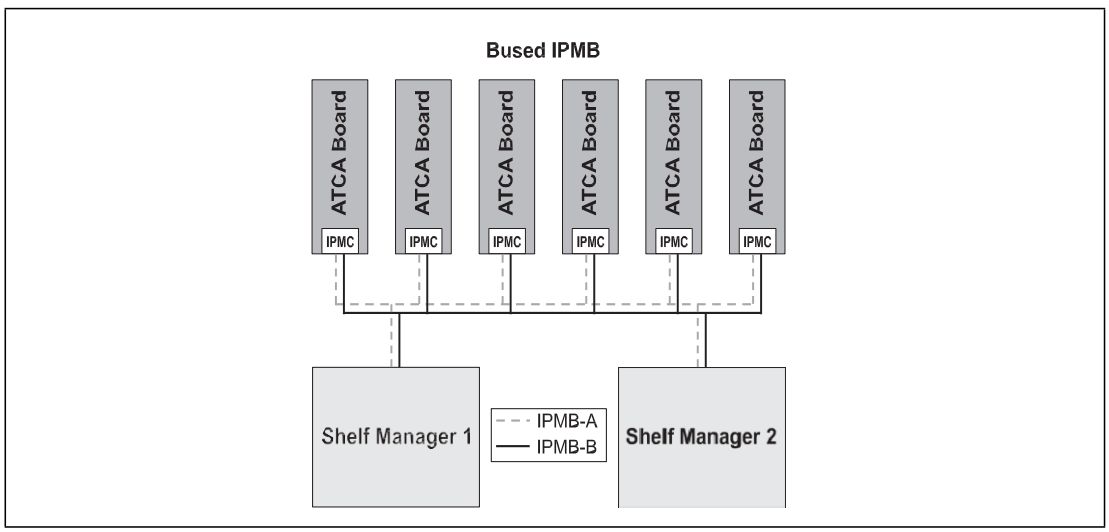
	Node	Node	Node	Node	Node	Node	Hub Star 1	Hub Star 2	Node	Node	Node	Node	Node	Node
Physical Slot	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Logical Slot	13	11	9	7	5	3	1	2	4	6	8	10	12	14
HW-Address (Hex)	4D	4B	49	47	45	43	41	42	44	46	48	4A	4C	4E
IPMB-Address (Hex)	9A	96	92	8E	8A	86	82	84	88	8C	90	94	98	9C
Update Channel														
Power Branch	4	4	3	3	2	2	1	2	1	1	3	3	4	4

2.2 Intelligent Platform Management Bus (IPMB)

The Shelf uses an Intelligent Platform Management Bus (IPMB) for management communications among all ATCA Boards, the Fan Trays and the Shelf Managers. The reliability of the IPMB is improved by the addition of a second IPMB, with the two IPMBs referenced as IPMB-A and IPMB-B.

IPMB-A and IPMB-B are routed to the ATCA slots in a bussed configuration.

Figure 4: IPMB



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2.3 Shelf SEEPROM

The Shelf SEEPROM is a repository of the shelf-specific information, capabilities of the system and other user-configurable options.

The SEEPROM contains as example:

- a list of which slots are connected together
- how the update channels are routed
- how many slots are in the system
- what the maximum power is to each slot
- the serial number of the Shelf
- the backplane topology etc.

The Shelf Managers use this information to provide functions such as electronic keying, controlling the power state of the system, etc.
The Shelf Managers cache the information that is stored in the SEEPROMs so that the SEEPROM is only needed when the Shelf Managers are first inserted or when the Shelf is first turned on.
The redundant SEEPROMs ensure that if one is corrupt or non-functional, the second can provide the necessary information. The Shelf Manager selects what set of information is correct and then synchronizes the two SEEPROMs from the internally cached copy of the SEEPROM information.

2.3.1 Shelf SEEPROM Location

The SEEPROMs are located at the rear side of the backplane.

2.3.2 Shelf SEEPROMs I²C Addresses

The SEEPROMs are managed by the IPM Controller of the fan tray, they have different address and are attached to the fan tray Local I2C channel!

CDM	I²C Channel	I²C Bus Address (7/8 bit)
SEEPROM1	Fan Tray Local Channel	0xa4/52
SEEPROM2	Fan Tray Local Channel	0xa6/53

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2.4 Shelf Manager Cross Connect

The ATCA Backplane provides cross connect traces between the Base Hubs and the Shelf Managers.

Figure 5: Shelf Manager Cross Connect

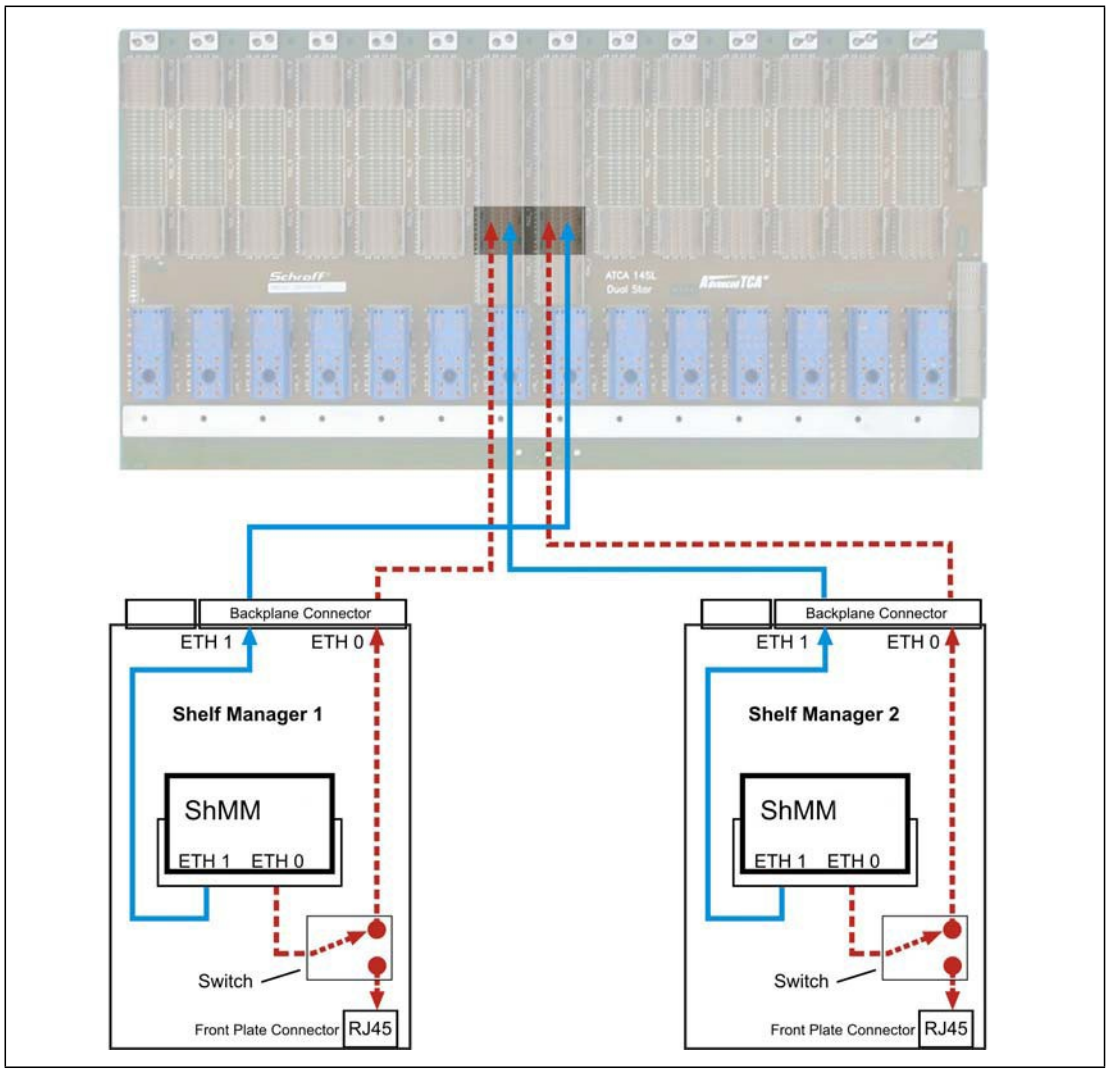


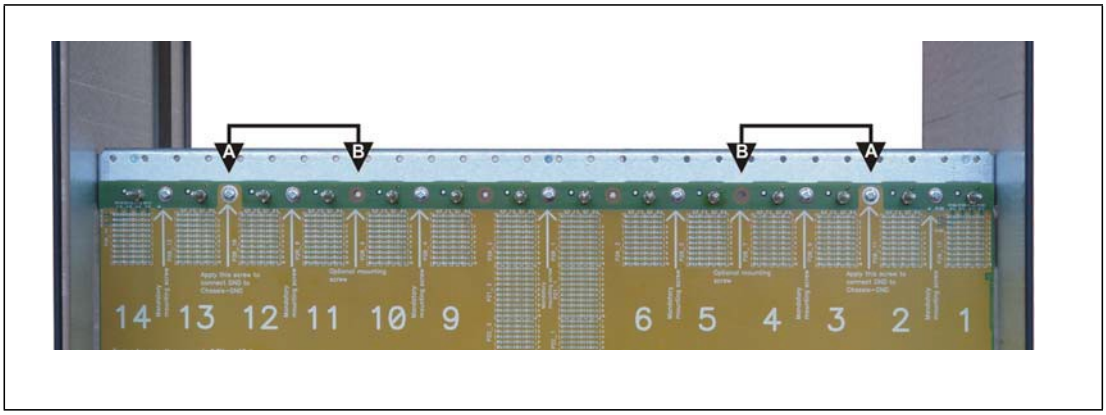
Table 2: Connector (P23) pin assignments for Shelf Manager Cross Connect

Row	Designation	ab		cd		ef		gh	
5	Shelf Manager Port with Shelf Manager Cross Connects	Tx1+	Tx1-	Rx1+	Rx1-	Tx2+	Tx2-	Rx2+	Rx2-
		Shelf Manager Cross Connect 1				Shelf Manager Cross Connect 2			

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2.5 Logic Ground

Figure 6: Logic Ground



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.

By default, Logic Ground and Shelf Ground are isolated.

Torque for the screws: 0.7 Nm +10%

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3 Air Filter

Figure 7: Air Filter



3.1 Introduction

The ATCA Shelf provides a replaceable air filter located on top of the fan tray. The filter element is an open cell polyurethane foam special coating to provide improved fire retardation and fungi resistance.

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

3.2 Air Filter Presence Switch

The air filter presence is detected by a sensor on the backplane. The signal is routed to the IPM controller of the fan tray.

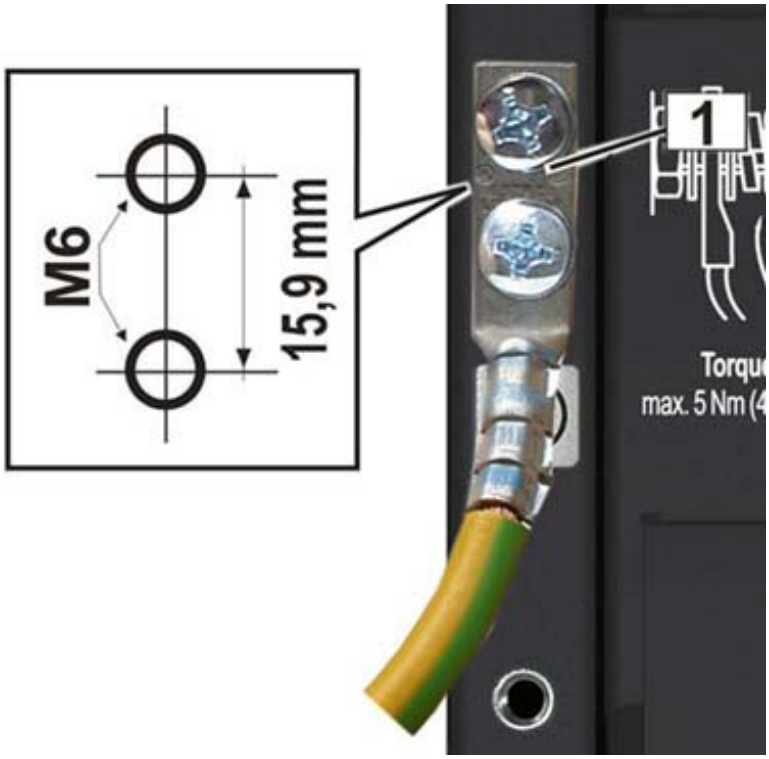
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4 Shelf Ground Connection

	**Hazardous voltage!** *Before powering-up the Shelf, make sure that the Shelf Ground terminals are connected to Protective Earth (PE) of the building.*

The ATCA Shelf provides a Shelf ground terminal at the left rear side. The Shelf ground terminal provides two threads (M6) with a 15.88 mm (5/8“) spacing between thread centers to connect a two hole lug Shelf ground terminal cable.

Figure 8: Shelf Ground Terminal



1 Ground Terminal

4.1 Specification for the Shelf Ground Connection Cable

Required wire size: #3 AWG or #2 AWG, maximum length 3 m.

Required terminals: Use only two hole lug terminals. (For example PANDUIT LCC2-14AHQ or LCD2-14AHQ with 45° angle)

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5 Fan Tray

5.1 Introduction

The Fan Tray is an intelligent FRU controlled by the ShMCs via IPMB.

The interchangeable Fan Tray is equipped with 8 high speed / high air flow fans controlled as a group by the IPM Controller in the Fan Tray.

The Fan Tray is locked into the Shelf with captive screws. A Hot Swap push button is used to provide hot-swap functionality.

The Fan Tray provides:

- A blue Hot Swap LED
- A red Fan Tray Fault LED
- A green Fan Tray OK LED
- A Hot Swap push button

The Fan Tray is controlled via an on-board IPM controller. The Shelf Manager performs management of the Fan Tray through the two independent bussed IPMB connections.

With optional on-blade shelf management, the SEEPROM on the backplane are connected to the internal I²C bus on the Fan Trays. The on-blade Shelf Manager has access to these components via the IPM controller of the Fan Trays.

The speed of each individual fan is monitored. If any of the fan speeds drops below the desired fan speed, a System Event Log (SEL) entry is logged by the Shelf Manager. The Shelf Manager then generates alerts and sets alarm conditions as necessary.

The system is designed to run indefinitely with any single fan failure. When one fan fails, all other fans are set to full speed.



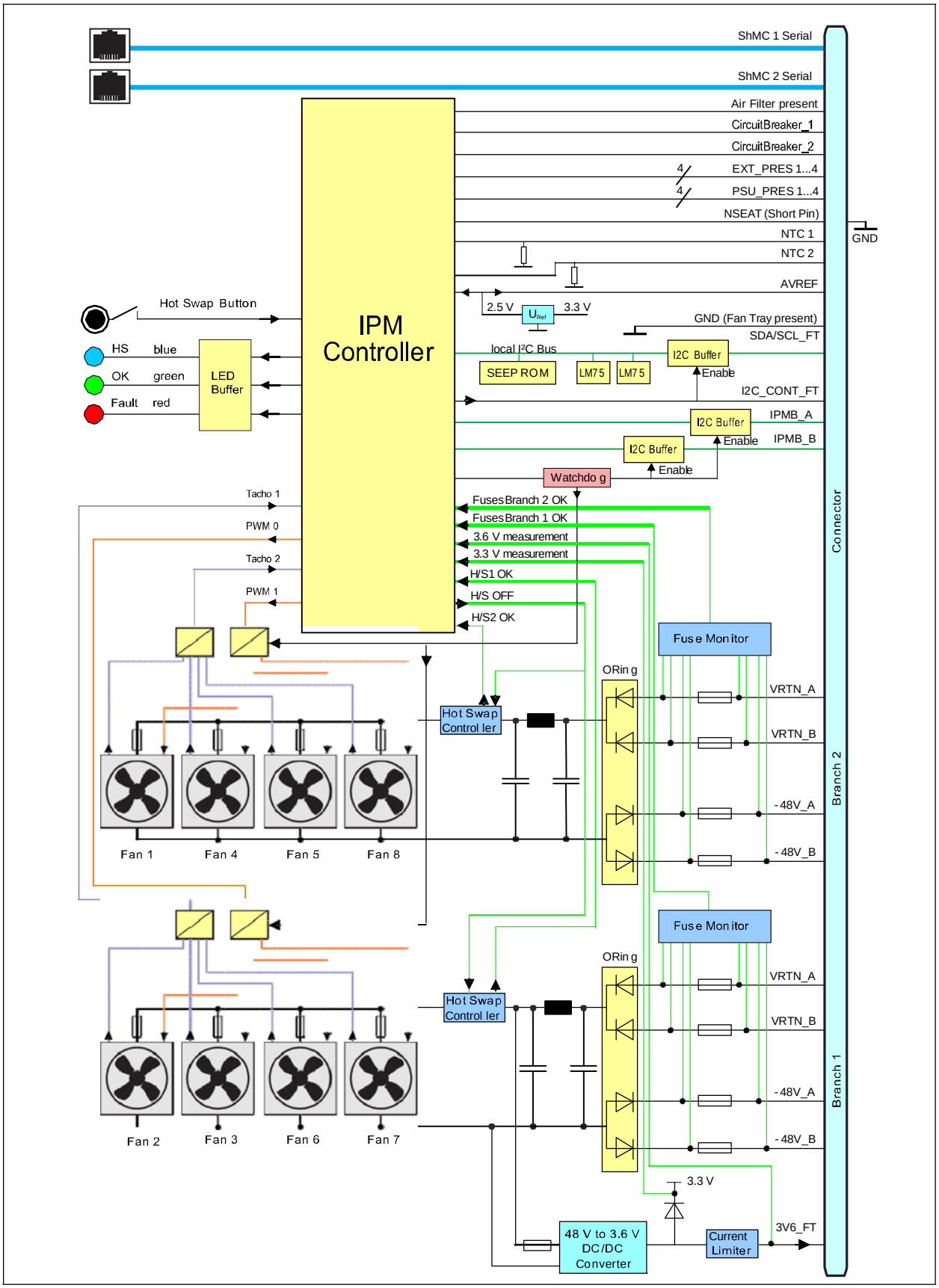
Caution!

The fan tray is not redundant. Depending on the operation temperature and the load state a fan tray swap must be carried out within a maximum of 30 seconds.

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5.2 Fan Tray Block Diagram

Figure 9: Fan Tray Block Diagram



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Figure 10: Fan Tray



5.3 Fan Tray Connectors and Indicators

The front panel includes a green Fan Tray OK LED, a red Fan Tray Fault LED, and a blue Hot Swap LED.

The Hot Swap push button indicates to the Shelf Managers that the Fan Tray is about to be removed. Its use is optional, but it is provided so that service personnel can be trained to look for a blue LED to be illuminated on any active component before removing it from the system. Once the operator pushes the Hot Swap button, the Shelf Manager is informed of the pending extraction. When the Shelf Manager feels it is “safe“ to remove the Fan Tray, the blue Hot Swap LED illuminates solid.

Table 3: LEDs on Fan Tray front panel

Color	Description	Status	Condition
Green	Fan Tray OK LED	Off	No Power to the Fan Tray
		Solid green	Normal Operation
Red	Fan Tray Fault LED	Solid red	Attention Status (error condition)
Blue	Hot Swap LED	Off	No Power to the Fan Tray, or not OK to extract the Fan Tray
		Short blink	Preparing for extraction
		Solid blue	Ready to remove

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5.4 Fan Control

The Fan Tray‘s on-board IPM controller has three operation modes:

Shelf Manager Mode:
The Shelf Manager performs management of the Fan Tray through the two independent bussed IPMB connections.

Board Control Mode:
The fan tray is controlled by the board in any of the 14 board slots using the PICMG extended IPMI commands. If the fan tray does not receive the “Set Fan Level Command” for more than 65 seconds, the fan tray will exit the Board Control Mode.

Autonomous Mode:
When the connection to the Shelf Manager is lost, or the Shelf Manger is absent, and the fan tray is not working in Board Control Mode, the fan controller takes over the fan control after 65 seconds.

Four different control behaviours are user-selectable by a DIP switch located at the fan tray‘s rear side.

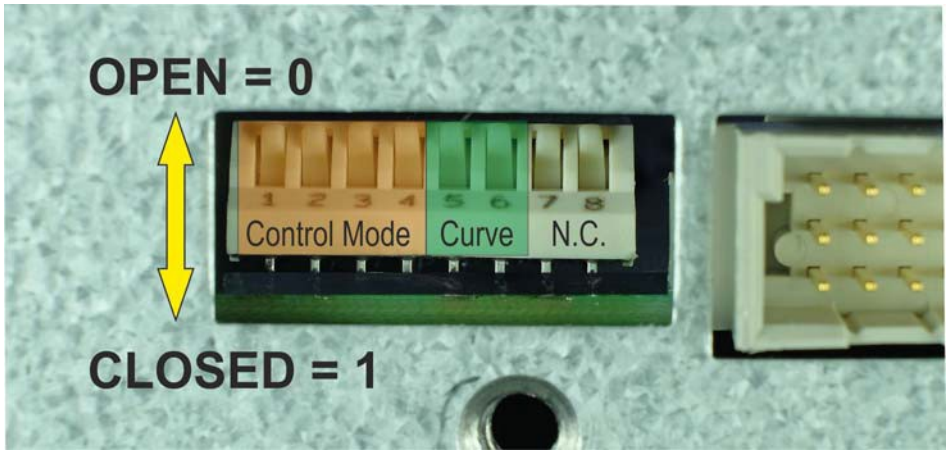
(1) Full speed
Fan level is set to maximum (15)

(2) Outlet temperature based control
The fan level depends on the maximum reading of the two NTC sensors above the card cage and the selected curve.

(3) Intake temperature based control
The fan level depends on the reading of the LM75 temperature on the fan tray PCB and the selected curve.

(4) Fixed speed based control
The fan controller set the fans in a fixed speed.

Figure 11: DIP Switch

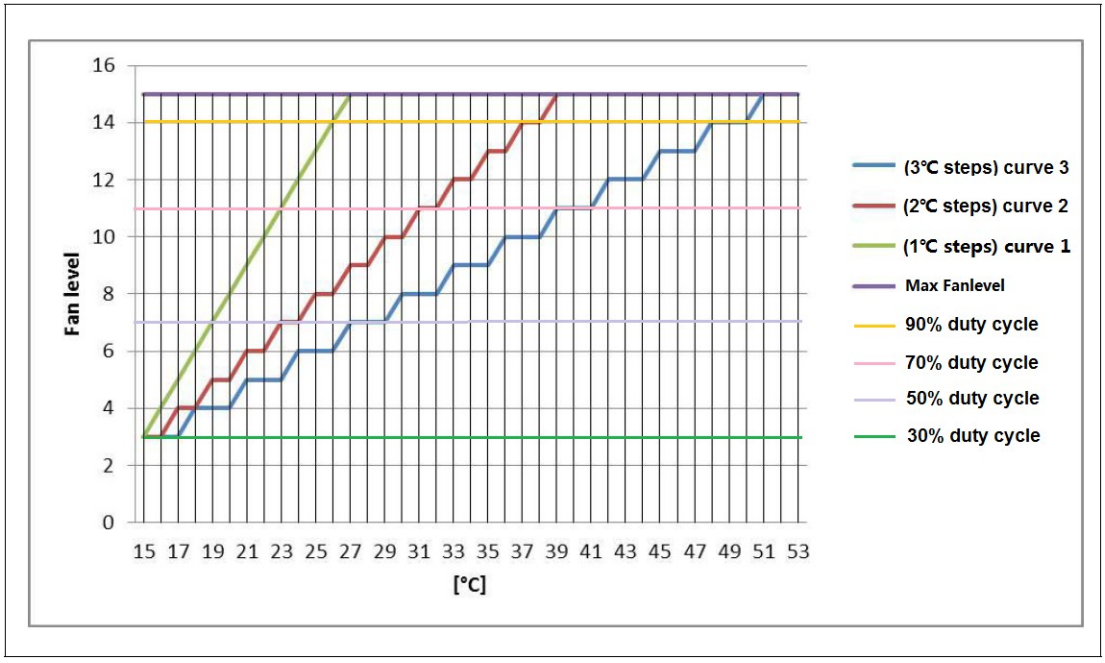


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Table 4: DIP Switch Settings

Switch No						Control Mode
1	2	3	4	5	6	
0	0	0	0	0	0	Full Speed
1	0	0	0	0	0	Full Speed
1	1	1	1	1	1	Full Speed
0	1	0	0	1	0	Outlet Temperature Curve 2
0	1	0	0	0	1	Outlet Temperature Curve 3
0	1	0	0	0	0	Outlet Temperature Curve 1
0	1	0	0	1	1	Outlet Temperature Curve 1
0	0	1	0	1	0	Intake Temperature curve 2
0	0	1	0	0	1	Intake Temperature curve 3
0	0	1	0	0	0	Intake Temperature curve 1
0	0	1	0	1	1	Intake Temperature curve 1
0	0	0	1	1	1	Fixed speed, Level 14, 90% duty cycle
0	0	0	1	1	0	Fixed speed, Level 11, 70% duty cycle
0	0	0	1	0	1	Fixed speed, Level 7, 50% duty cycle
0	0	0	1	0	0	Fixed speed, Level 3, 30% duty cycle

Figure 12: Curves Fan Control



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5.5 Sensor Table

Table 5: Sensor Table

IPMC	No.	LUN	Name	Type	Type-Code	Class	Description
5a	0	0	Hot Swap	Hot Swap	0xf0	Discrete	This sensor returns the Fan Tray hot-swap states.
5a	1	0	ShelfFRU HotSwap	Hot Swap	0xf0	Discrete	This sensor returns the Shelf FRU hot-swap states.
5a	2	0	ShelfFRU 2 HotSwap	Hot Swap	0xf0	Discrete	This sensor returns the Shelf FRU 2 hot-swap states.
5a	3	0	PSU 1 HotSwap	Hot Swap	0xf0	Discrete	This sensor returns the PSU 1 hot-swap states.
5a	4	0	PSU 2 HotSwap	Hot Swap	0xf0	Discrete	This sensor returns the PSU 2 hot-swap states.
5a	5	0	PSU 3 HotWap	Hot Swap	0xf0	Discrete	This sensor returns the PSU 3 hot-swap states.
5a	6	0	Version Change	Version Change	0x2b	Discrete	This sensor indicates a hardware or software change.
5a	7	0	IPMB Physical	IPMB LINK	0xf1	Discrete	This sensor returns the IPMB link state.
5a	8	0	FT +3.3V	Voltage	0x02	Threshold	This sensor measures the local 3.3 V voltage in volts.
5a	9	0	FT +3.6V External	Voltage	0x02	Threshold	This sensor measures the external 3.6 V voltage in volts.
5a	10	0	Temp Out Left	Temperature	0x01	Threshold	This sensor measures the left outlet temperature
5a	11	0	Temp Out Right	Temperature	0x01	Threshold	This sensor measures the right outlet temperature
5a	12	0	Temp FT uC	Temperature	0x01	Threshold	This sensor measures the temperature of the fan tray IPM controller.
5a	13	0	Temp IN	Temperature	0x01	Threshold	This sensor measures the inlet temperature.
5a	14	0	Fan Tach 1	Fan	0x04	Threshold	This sensor indicates the speed of the fan 1 (RPM).
5a	15	0	Fan Tach 2	Fan	0x04	Threshold	This sensor indicates the speed of the fan 2 (RPM).
5a	16	0	Fan Tach 3	Fan	0x04	Threshold	This sensor indicates the speed of the fan 3 (RPM).
5a	17	0	Fan Tach 4	Fan	0x04	Threshold	This sensor indicates the speed of the fan 4 (RPM).
5a	18	0	Fan Tach 5	Fan	0x04	Threshold	This sensor indicates the speed of the fan 5 (RPM).
5a	19	0	Fan Tach 6	Fan	0x04	Threshold	This sensor indicates the speed of the fan 6 (RPM).
5a	20	0	Fan Tach 7	Fan	0x04	Threshold	This sensor indicates the speed of the fan 7 (RPM).
5a	21	0	Fan Tach 8	Fan	0x04	Threshold	This sensor indicates the speed of the fan 8 (RPM).
5a	22	0	Air Filter	OEM reserved	0xc0	Discrete	This sensor checks the presence of the air filter.
5a	23	0	FT -48V B2	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the –48 V_B branch 2 at the fan tray connector.
5a	24	0	FT -48V B2 Fused	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the –48 V_B branch 2 after fan tray's main fuse.
5a	25	0	FT -48V A2	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the –48 V_A branch 2 at the fan tray connector.
5a	26	0	FT -48V A2 Fused	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the –48 V_A branch 2 after fan tray's main fuse.
5a	27	0	FT -48V B1	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the –48 V_B branch 1 at the fan tray connector.

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IPMC	No.	LUN	Name	Type	Type-Code	Class	Description
5a	28	0	FT -48V B1 Fused	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the –48 V_B branch 1 after fan tray's main fuse.
5a	29	0	FT -48V A1	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the –48 V_A branch 1 at the fan tray connector.
5a	30	0	FT -48V A1 Fused	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the –48 V_A branch 1 after fan tray's main fuse.
5a	31	0	PSU1 presence	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the PSU 1
5a	32	0	PSU1 Fault	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the fault state of the PSU 1
5a	33	0	PSU1 Temp Err	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the temperature error state of the PSU 1
5a	34	0	PSU1 Fan Err	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the fan error state of the PSU 1
5a	35	0	PSU1 Inlet Temp	Temperature	0x01	Threshold	This sensor measures the inlet temperature of the PSU 1
5a	36	0	PSU1 Voltage Out	Voltage	0x02	Threshold	This sensor measures the output voltage of the PSU 1
5a	37	0	PSU1 Current Out	Current	0x03	Threshold	This sensor measures the output current of the PSU 1
5a	38	0	PSU1 Power Out	Other Units-based Sensor	0x0b	Threshold	This sensor measures the output power of the PSU 1
5a	39	0	PSU1 Voltage In	Voltage	0x02	Threshold	This sensor measures the input voltage of the PSU 1
5a	40	0	PSU1 Current In	Current	0x03	Threshold	This sensor measures the input voltage of the PSU 1
5a	41	0	PSU1 Power In	Other Units-based Sensor	0x0b	Threshold	This sensor measures the input current of the PSU 1
5a	42	0	PSU2 presence	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the PSU 2
5a	43	0	PSU1 Fault	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the fault state of the PSU 2
5a	44	0	PSU2 Temp Err	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the temperature error state of the PSU 2
5a	45	0	PSU2 Fan Err	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the fan error state of the PSU 2
5a	46	0	PSU2 Inlet Temp	Temperature	0x01	Threshold	This sensor measures the inlet temperature of the PSU 2
5a	47	0	PSU2 Voltage Out	Voltage	0x02	Threshold	This sensor measures the output voltage of the PSU 2
5a	48	0	PSU2 Current Out	Current	0x03	Threshold	This sensor measures the output current of the PSU 2
5a	49	0	PSU2 Power Out	Other Units-based Sensor	0x0b	Threshold	This sensor measures the output power of the PSU 2
5a	50	0	PSU2 Voltage In	Voltage	0x02	Threshold	This sensor measures the input voltage of the PSU 2
5a	51	0	PSU2 Current In	Current	0x03	Threshold	This sensor measures the input voltage of the PSU 2
5a	52	0	PSU2 Power In	Other Units-based Sensor	0x0b	Threshold	This sensor measures the input current of the PSU 2
5a	53	0	PSU3 presence	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the PSU 3
5a	54	0	PSU3 Fault	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the fault state of the PSU 3
5a	55	0	PSU3 Temp Err	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the temperature error state of the PSU 3
5a	56	0	PSU3 Fan Err	OEM reserved	0xc0	Discrete	This sensor indicates the presence of the fan error state of the PSU 3

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IPMC	No.	LUN	Name	Type	Type-Code	Class	Description
5a	57	0	PSU3 Inlet Temp	Temperature	0x01	Threshold	This sensor measures the inlet temperature of the PSU 3
5a	58	0	PSU3 Voltage Out	Voltage	0x02	Threshold	This sensor measures the output voltage of the PSU 3
5a	59	0	PSU3 Current Out	Current	0x03	Threshold	This sensor measures the output current of the PSU 3
5a	60	0	PSU3 Power Out	Other Units-based Sensor	0x0b	Threshold	This sensor measures the output power of the PSU 3
5a	61	0	PSU3 Voltage In	Voltage	0x02	Threshold	This sensor measures the input voltage of the PSU 3
5a	62	0	PSU3 Current In	Current	0x03	Threshold	This sensor measures the input voltage of the PSU 3
5a	63	0	PSU3 Power In	Other Units-based Sensor	0x0b	Threshold	This sensor measures the input current of the PSU 3

5.6 RS-232 Serial Console Interfaces

The Fan Tray provides two RS-232 serial console connectors for Shelf Manager 1 and 2. The connectors are 8-pin RJ45 modular receptacles.

A full set of RS-232 signals, including modem control is provided.

Table 6: RS-232 Serial Console Interface Pin assignment

RJ45 Pin	RS-232 Signal	Type	Description
1	RTS	Out	Request To Send
2	DTR	Out	Data Terminal Ready
3	TxD	Out	Transmit Data
4	GND	---	Logic Ground
5	GND	---	Logic Ground
6	RxD	In	Receive Data
7	DSR	In	Data Set Ready
8	CTS	In	Clear To Send

The serial console default configuration is:

115200 baud

no parity

8 data

bits 1

stop bit

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6 Power

	**Hazardous voltage!** *Before working ensure that the power is removed from the power connection cables.*

	**Warning!** *The Power lines must be protected on site level with 16A breakers or 16A fuses.*

The Power Supplies are not included with the Shelf.
The Shelf accepts Huawei R4850xx series power supplies.

The Shelf can be powered with 230 VAC line voltage or 240HVDC input depending on PSU type.

6.1 Introduction

3 pluggable AC power supplies are located at the bottom side of the Shelf. The power supplies are lugged-in from the front side and are hot-swappable. To provide a redundancy, they are arranged in a 2+1 configuration. It can also support a redundant 3 + 1 configuration by removing the filler panel in front of the shelf.

The output voltage of the PSUs is 53.5 VDC. Because the nominal supply voltage for ATCA systems acc. to the PICMG specification is 48VDC, all signal names in this Manual with exception of this chapter are related to 48 VDC.

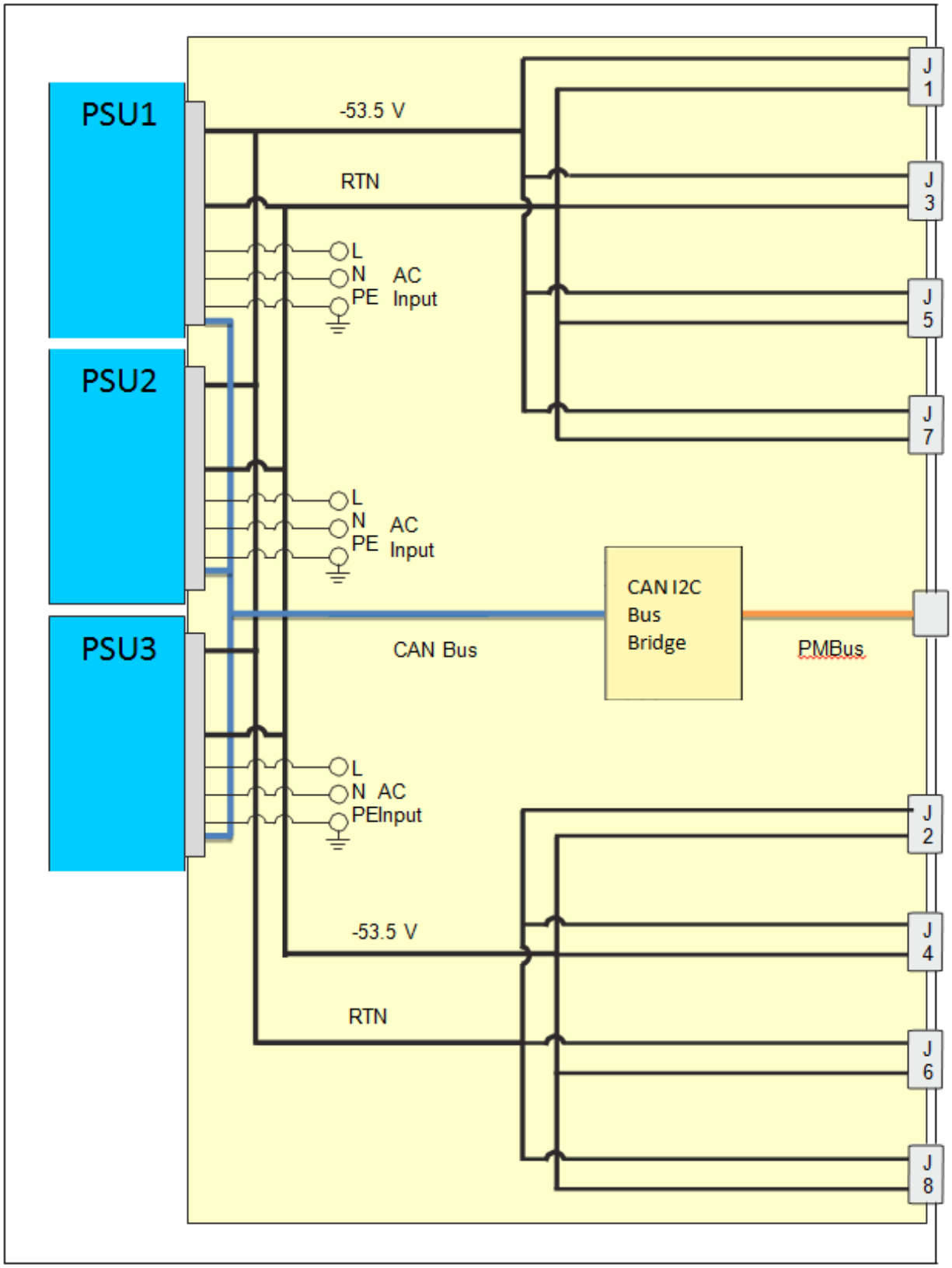
The PSUs are plugged into a Power Distribution Board (PDB) where the power is divided in four output branches towards the backplane.

The R4850xx series PSU only support communication on the CAN bus, but not support communication on the I2C bus, on the Power Distribution Board, there is one functional modular to implement the CAN bus to I2C bus bride, so that the R4850xx series PSU can be managed through the I2C bus.

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6.2 Power Distribution

Figure 12: Power Distribution



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6.3 AC Power Supply Units (PSUs)

The AC PSUs with front-to-back airflow are hot pluggable from the front side. The Shelf Manager can monitor the PSUs through the IPMC of the fan tray. The fan tray access the PSUs through an I2C bus to CAN bus bride on the Power Distribution Board, since the PSUs only support CAN bus communication.

Table 7: Basic Specifications for the PSUs

230 V Operation	
Input Voltage nominal	230 VAC
Input Voltage Range max.	176 VAC - 290 VAC
Input Frequency Range	45 Hz - 66 Hz
Output Voltage	53.5 VDC
Output Current	<17 A
Output Power	3000 W
115 V Operation	
Input Voltage nominal	115 VAC
Input Voltage Range max.	85 VAC - 175 VAC
Input Frequency Range	45 Hz - 66 Hz
Output Voltage	53.5 VDC
Output Current	<17 A
Output Power	1250 W

See Huawei R4850xx Series PSU Data Sheet for detailed information.

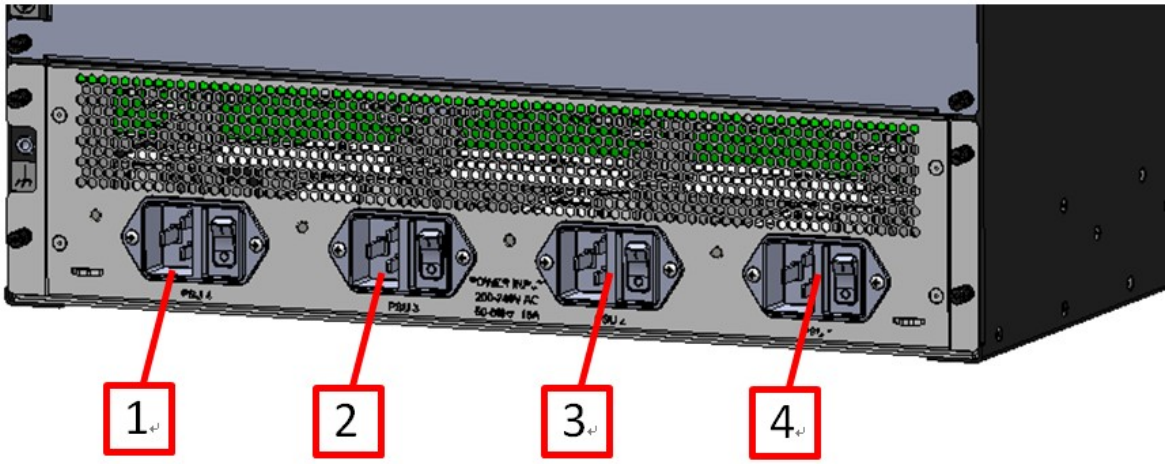
Figure 13: Power Supplies Unit



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6.4 Power Components

Figure 14: Power Input



1	AC Input PSU 4
2	AC Input PSU 3
3	AC Input PSU 2
4	AC Input PSU 1

AC power input is provided by 4 IEC 320-C20 connectors at the rear side of the Shelf.

The Power Distribution Board (PDB) is located behind the AC PSUs. It provides 4 connectors for the PSUs and a connector for the PMbus interface to the CAN to I2C bridge function modular.

6.5 PMBus Interface

The Huawei R4850xx series PSU only support communication on the CAN bus, there is a function modular to implement the bridge from CAN bus to I2C bus on the Power Distribution Board. The PMBus is routed from the CAN to I2C bus bridge to the local I2C bus of the fan tray, so that the PSUs can be managed by the IPM controller of the fan tray.

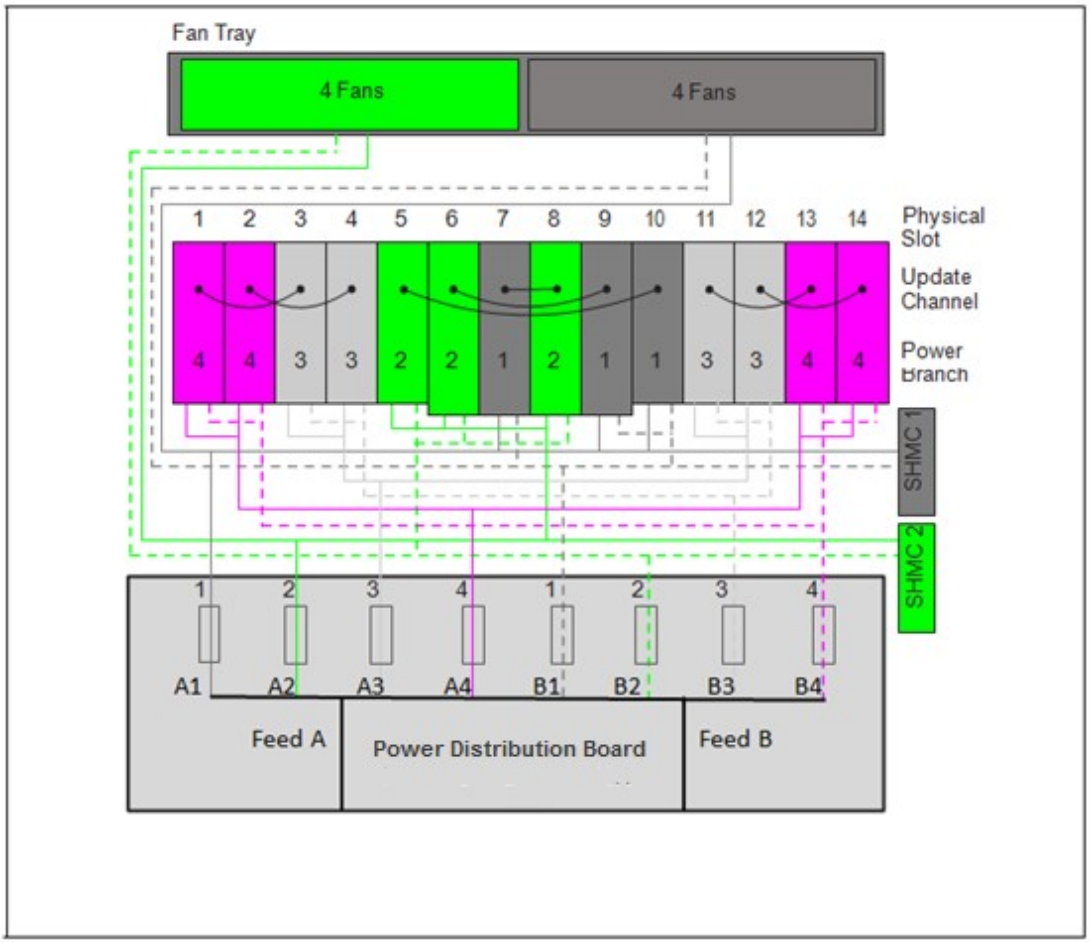
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6.6 Power Branches

Power branches within the Shelf originate from the PEM and powers all the blades, the Shelf Managers and the Fan Trays. The power is divided in four output branches towards the backplane.

If the joint power capability of all ATCA boards assigned to a branch is greater than the calculated branch power, the Shelf Manager will not power-on all boards. (The last plugged-in or the last in the power-up sequence.)

Figure 15: Power Branches



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7 Shelf Management

The aTCA-81514PA is designed to work with two redundant Shelf Managers in dedicated Shelf Manager slots.

Upon request a version with on-blade shelf management is available. With on-blade shelf management, the SEEPROMs on the backplane are connected to the internal I²C bus on the Fan Trays. The on-blade Shelf Manager has access to these components via the IPM controller of the Fan Trays.

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8 Technical Data

Table 8: Technical Data

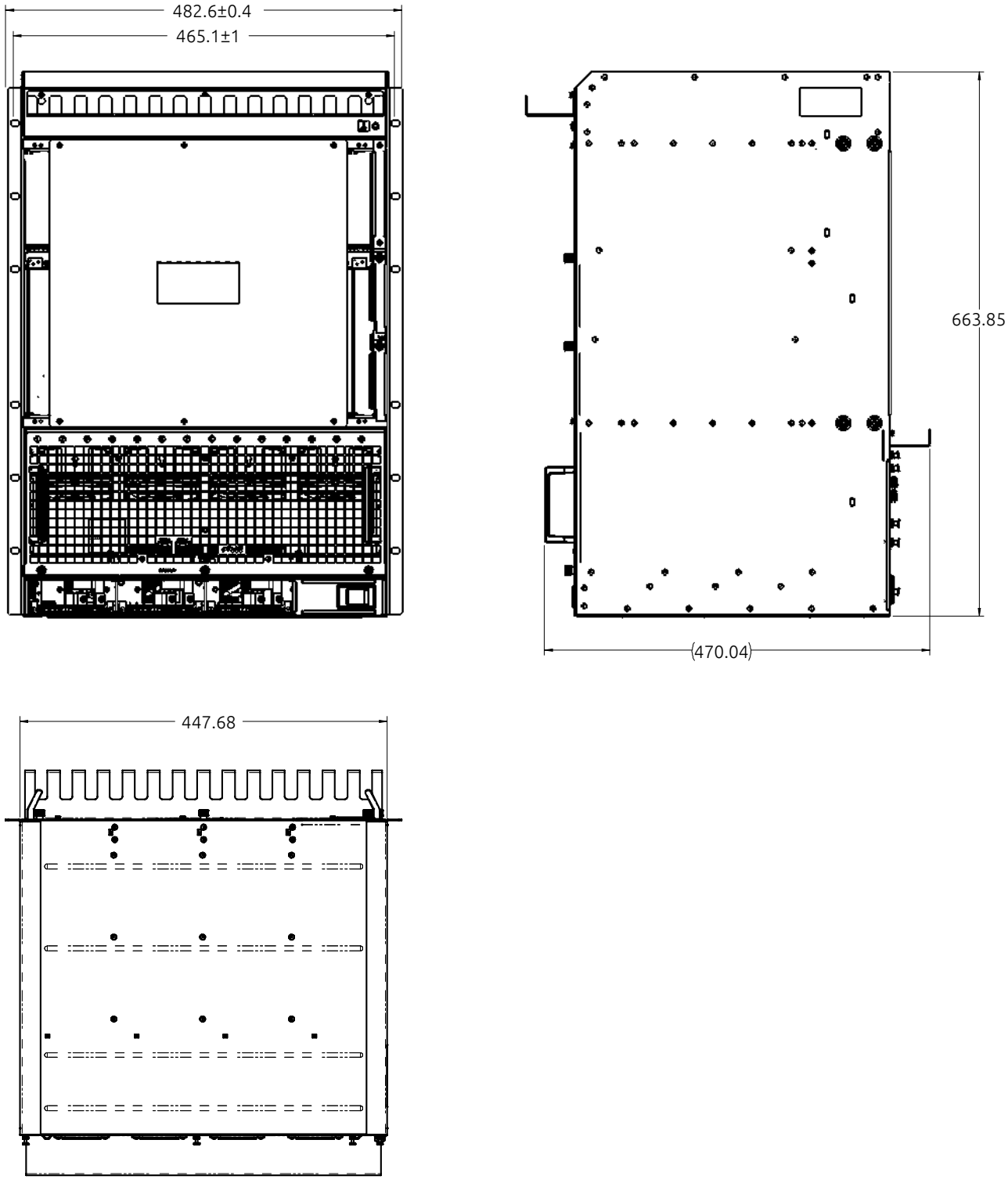
Physical Dimensions	
Height	15U
Width	482.6 mm
Depth (with handles)	470 mm
Weight	
Net Weight	30 kg
Gross Weight (including packaging)	65 kg
Power AC	
Input voltage nom.	115V AC / 230V AC
Input frequency	50/60 Hz
Input voltage range	85….175V AC / 176….290V AC
Input power protection	< 17 A
Cooling Capacity	
Front Boards	300 W / Board
RTM	35 W / Board
Environmental	
Ambient temperature (long term)	+5°C…+40°C (41°F to 104°F)
Ambient temperature (short term)	-5°C…+55°C (23°F to 131°F)
Humidity	+5%...+85%, no condensation
EMI	
Conducted Emissions	EN 55022 Class A
Radiated Emissions	EN 55022 Class A
Safety	
Protected Earth Test	EN50514, test current 25 A, resistance <100 mOhm

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8.1 Dimensions

All dimensions below are in mm.

Figure 16: Dimensions



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