Schroff Shelf Manager ACB-VI

User‘s Manual

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21990-401

21990-402

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The details in this manual have been carefully compiled and checked.

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Table of Contents

1 Safety

The intended audience of this User's Manual is system integrators and hardware/software engineers. This manual describes the hardware features of the Schroff ACB-VI Shelf Manager. The software features are detailed in the ShMM-700R documentation from Pigeon Point Systems and the Schroff firmware release notes.

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 42 V_{AC} or 60 V_{DC} can be present in ATCA Shelves. 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*).

1.3 References and Architecture Specifications

- Pigeon Point Systems IPM Sentry Shelf-External Interface Reference (www.pigeonpoint.com)
- Pigeon Point Systems Shelf Manager User Guide (www.pigeonpoint.com)
- PICMG® 3.0 AdvancedTCA® Base Specification (www.picmg.org)
- ON Semiconductor ADT7490 Remote Temperature Sensor and Fan Controller
- Philips Semiconductors PCA9543 2-Channel I2C with interrupt logic and reset
- Philips Semiconductors PCA9555 16-bit I2C and SMBus I/O port with interrupt
- National Semiconductor LM75 Digital Temperature Sensor and Thermal Watchdog with Two-Wire Interface

1.4 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 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

1.5 Product Definition

The Schroff Shelf Manager ACB-VI is a 78 mm x 280 mm board that fits into a dedicated Shelf Manager slot in a Schroff ATCA Shelf.

The Shelf Manager has two main responsibilities:

1 Manage/track the FRU population and common infrastructure of a Shelf, especially the power, cooling and interconnect resources and their usage.

2 Enable an external System Manager to join in management/tracking through the System Manager Interface, which is typically implemented over Ethernet.

The Shelf management is based on the Pigeon Point Shelf management solution for AdvancedTCA products.
The Shelf management software runs on the Pigeon Point **Sh**elf **M**anagement **M**ezzanine **700** (**ShMM-700R**), a compact 204-pin SO-DIMM form-factor module, installed on the ACB-VI carrier board.
The ACB-VI carrier board includes several on-board devices that enable different aspects of Shelf management based on the ShMM-700R. These facilities include I²C-based hardware monitoring/control and GPIO expander devices.

The ACB-VI also provides the Fan Controller for up to 9 Fans and individual Ethernet connections to both Base Hubs (ShMC cross connect).

The Shelf Manager communicates inside the Shelf with IPM controllers over the Intelligent Platform Management Bus (IPMB). The Shelf Manager also provides an IPMB interface for the non-intelligent FRUs in a Schroff Shelf. The Shelf Manager communicates with the non-intelligent FRUs over I²C busses and expose the sensors for these FRUs at IPMB address 0x20.

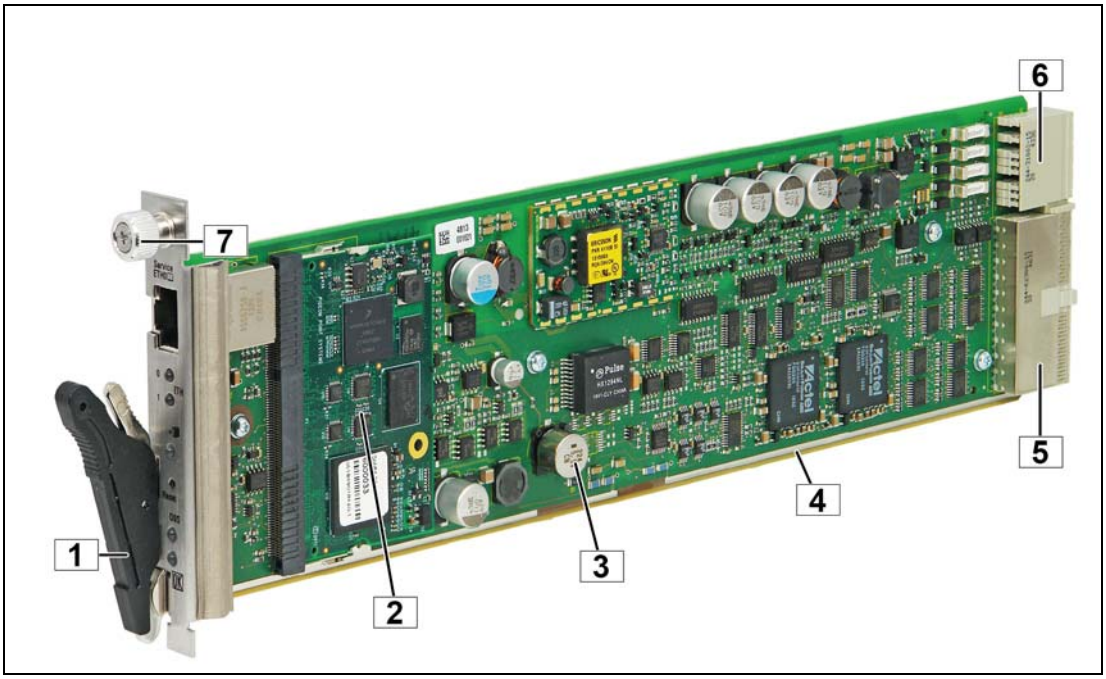
Shelf Manager with bused IPMB: 21990-401 (Product Number)
21990-404 (Catalog Number with packaging)

Shelf Manager with radial IPMB: 21990-402 (Product Number)
21990-405 (Catalog Number with packaging)

The new ACB-VI is plug-compatible with the ACB-V but the Shelf's FRU-data file must be updated.

The ACB-V and ACB-VI shelf manager support converting a live shelf from ACB-V to ACB-VI without losing manageabilty of the shelf. Please see Schroff's firmware release notes for details.

Figure 1: Schroff Shelf Manager ACB-VI



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1	Extraction handle	5	Backplane Connector (X100)
2	ShMM-700R	6	Backplane Connector (X102)
3	RTC backup capacitor	7	Fixing screw
4	ACB-VI Carrier Board		

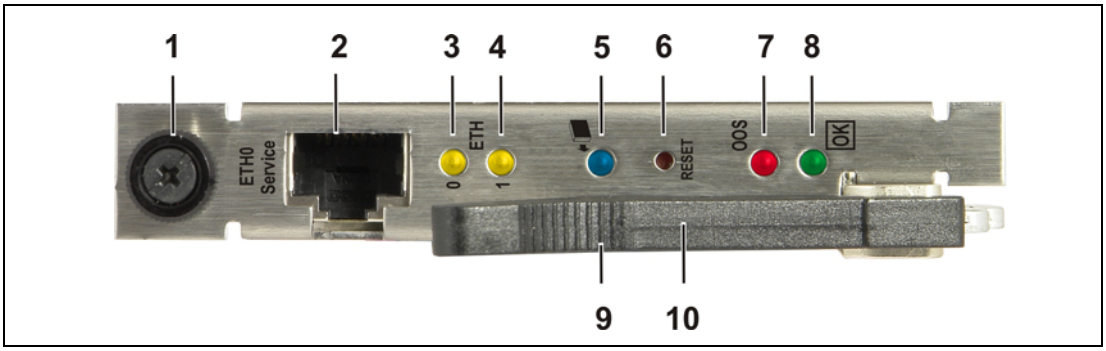
1.6 ACB-V Product Overview

- 78 mm x 280 mm board
- SO-DIMM 204-pin socket with ShMM-700R Shelf Management Mezzanine Card from Pigeon Point Systems
- Dual RS-232 serial ports
- Dual 10/100 Ethernet interfaces
- IPMB-A/B interfaces with bused or radial topology
- Reset push button
- Master-only I^2C bus populated with hardware monitoring/control, GPIO and bus switch devices
- Power supply voltage monitoring
- On-board temperature monitoring
- Detection of hardware address with parity
- Injector/Ejector handle with Hot Swap switch
- Hot swap LED
- Capacitor for the ShMM-700R RTC
- Hardware redundancy interface with dedicated communication paths between dual Shelf Managers for redundant operation
- Interrupt requests for the ShMM-700R generated by on-board and off-board devices
- Status indication for important interfaces, using on-board and off-board LEDs
- Fan Controller for controlling/monitoring up to 9 fans
- Redundant –48 VDC inputs with on-board power regulation

All pictures in this manual may differ from the latest release.

1.7 Front Panel Components

Figure 2: Shelf Manager Front Panel Components



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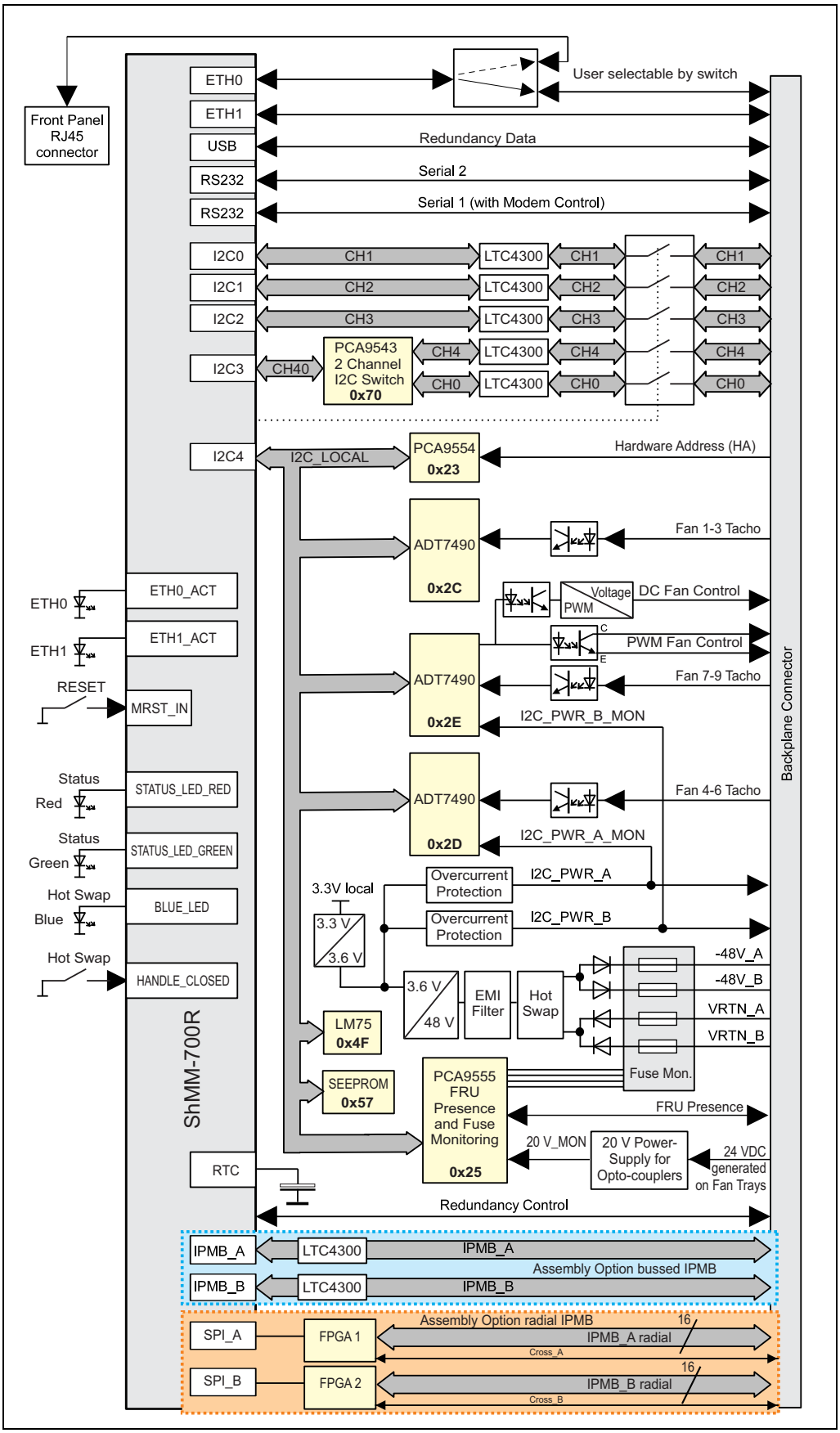
1	Fixing screw	6	RESET push button
2	ETH 0 Ethernet Service Connector (RJ45)	7	Shelf Manager Status LED (red) - Red = Out of Service (OOS)
3	ETH 0 Link/Activity LED (yellow) - On = Link - Off = No Link - Blinking = Activity	8	Shelf Manager Status LED (green) - Solid Green = in Service, active Shelf Manager - Blinking = in Service, Backup Shelf Manager
4	ETH 1 Link/Activity LED (yellow) - On = Link - Off = No Link - Blinking = Activity	9	Hot Swap Switch - Activated by extraction handle
5	Hot Swap LED (blue) - Solid Blue = ready to remove - Blinking = Hot Swap is requested - Off = No Hot Swap possible	10	Extraction handle

2 ACB-VI Block Diagram

Figure 3: ACB-VI Block Diagram



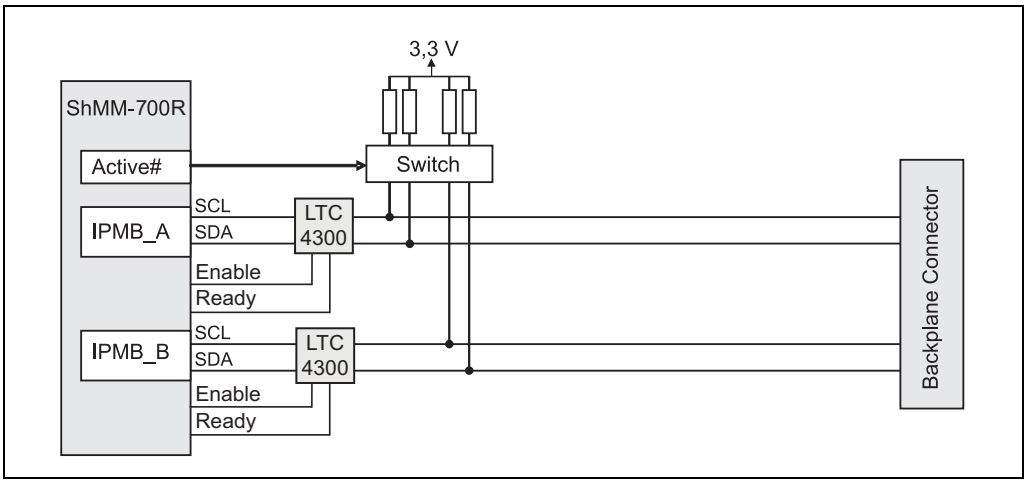
3 IPMB

3.1 Bused IPMB Interface (Product Number: 21990-401)

The ShMM-700R provides two IPMBs. The IPMB-A and IPMB-B from the ShMM-700R are routed to the Backplane connector through I2c buffers. The ATCA Backplane buses the two IPMBs to the ATCA boards.

The Active# signal of the ShMM-700R is used to switch on/off the pull-up resistors of the IPMBs.

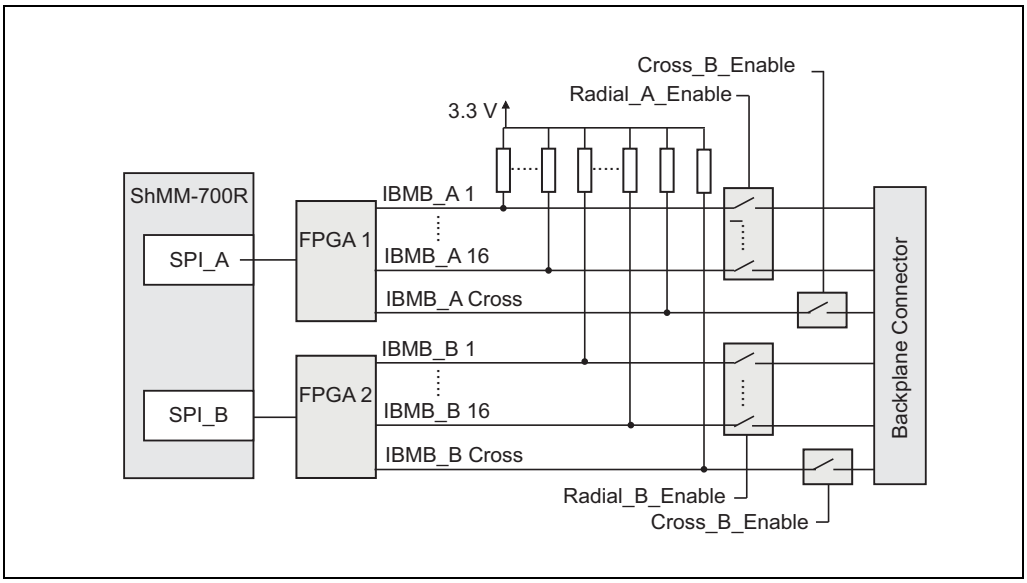
Figure 4: Block diagram bused IPMB



3.2 Radial IPMB Interface (Product Number: 21990-402)

Radial IPMB is implemented by 2 FPGAs connected to the Serial Peripheral Interfaces (SPI) on the ShMM700R.

Figure 5: Block diagram radial IPMB

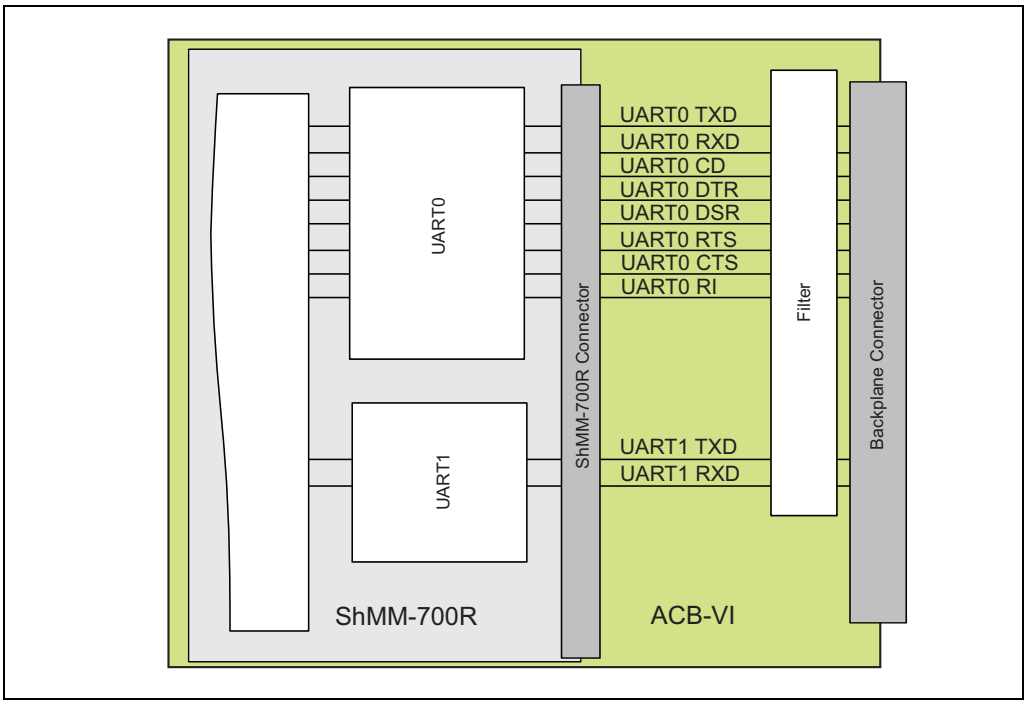


4 RS-232 Interfaces

The ACB-VI provides two RS-232 interfaces. The first serial port is implemented using the UART0, the second serial port is implemented using the UART1 on the ShMM-700R.

The first serial interface provides a full set of RS-232 signals, including modem control. In a Schroff Shelf these signals are routed through the backplane connector to the SAP. The SAP provides two 8-pin RJ45 modular receptacles for the serial interfaces of both Shelf Managers. The second serial interface does not provide modem control signals. These signals are also routed to the backplane connector but not used in the Schroff ATCA Shelves.

Figure 6: RS-232 Serial Ports



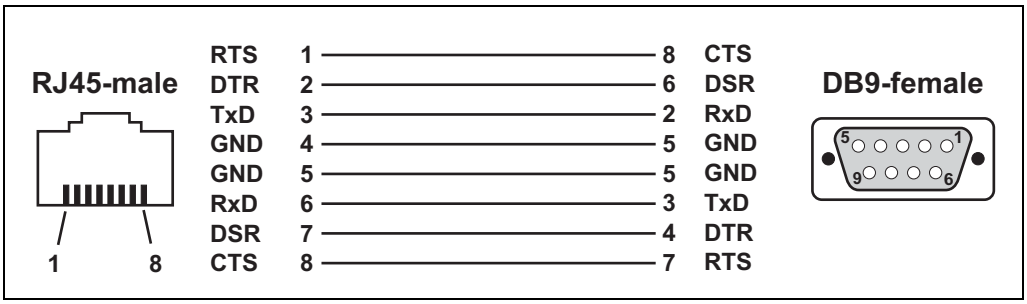
The serial console default configuration is:

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

4.1 Serial Console Cables

To connect to the Shelf Manager via the serial console on the SAP you need a serial console cable wired according to the CISCO convention.

Figure 7: RJ45 to DB9 Serial Console Cable



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The connectors are shown with the cables pointing away.

Depending on the model of the Shelf, the RJ45 connector may have a different pinout of the serial console signals. Refer to the Shelf manual for detailed information.

5 Ethernet Interface

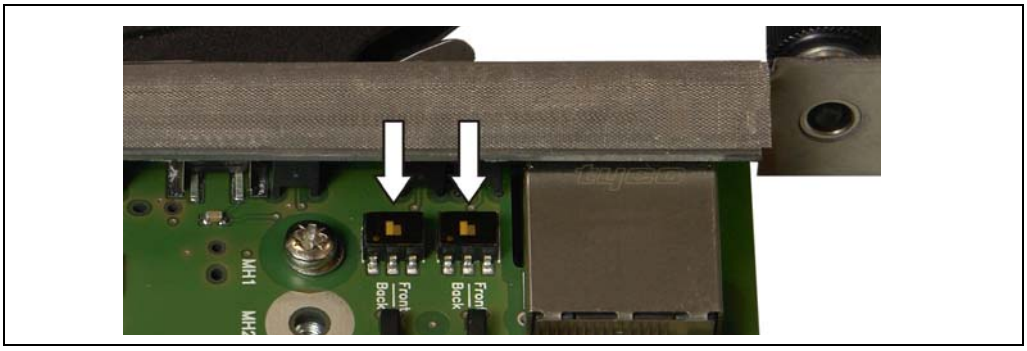
The front panel ETH0 Ethernet connector is intended for service use only or for debugging purposes in laboratory environment. The computer which is connected to this interface must be located nearby the shelf manager with an Ethernet cable that is not longer than 10 m.

The front panel Ethernet connector MUST NOT be connected to a Telecommunication Network Circuit that leaves the building.

The ETH0 interface of the shelf manager can manually be switched between the front panel RJ45 connector (“Front”-position of the rocker-switches) and the backplane connector going to the hub board base interface (“Back”-position of the rocker-switches).

The ATCA specification requires a base channel interface between the shelf manager and the Hub board. The ETH0 rocker-switches MUST be in “Back”-position in normal operation of the shelf manager in an ATCA-shelf.

Figure 8: ETH-Switches shown in default position



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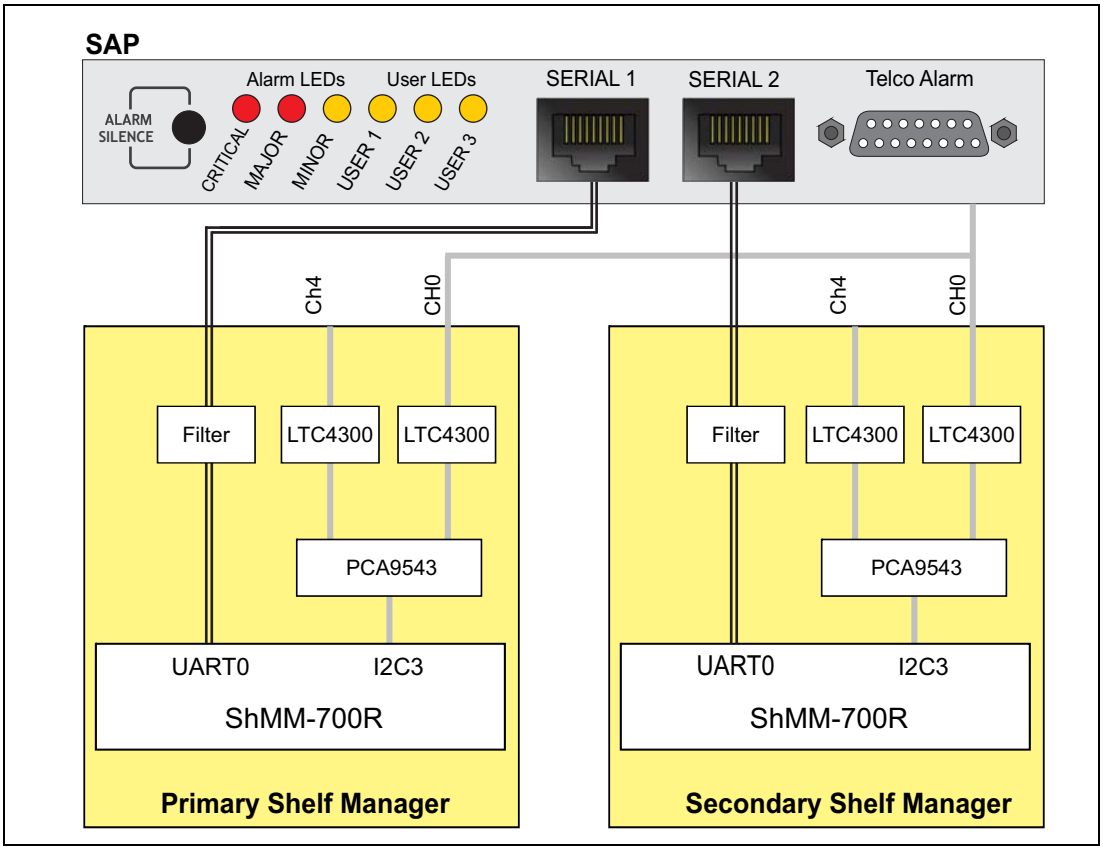
6 Shelf Manager and Shelf Alarm Panel

Some Shelf Manager I/O function have been moved to a separate Board called a Shelf Alarm Panel (SAP). The SAP provides the RJ45 Serial Console connectors, Telco Alarm Interface, user definable LEDs and custom specific I/Os for the Shelf Manager. Only the active Shelf Manager has access to the SAP and can control the Alarms. The advantage of this approach is that the SAP is separated from the Shelf Manager and can be located at a position at the Chassis that is easy to reach and operate by service personnel.

The figure below shows the interconnection between the Shelf Managers and the SAP. Please note that the design of the SAP is Shelf dependent. Please see your Shelf User Manual for the actual SAP-implementation in your Shelf.

Please see chapter „Telco Alarms“ for detailed information concerning the Telco Alarm interface and the user definable LEDs.

Figure 9: Connection between Shelf Manager and SAP



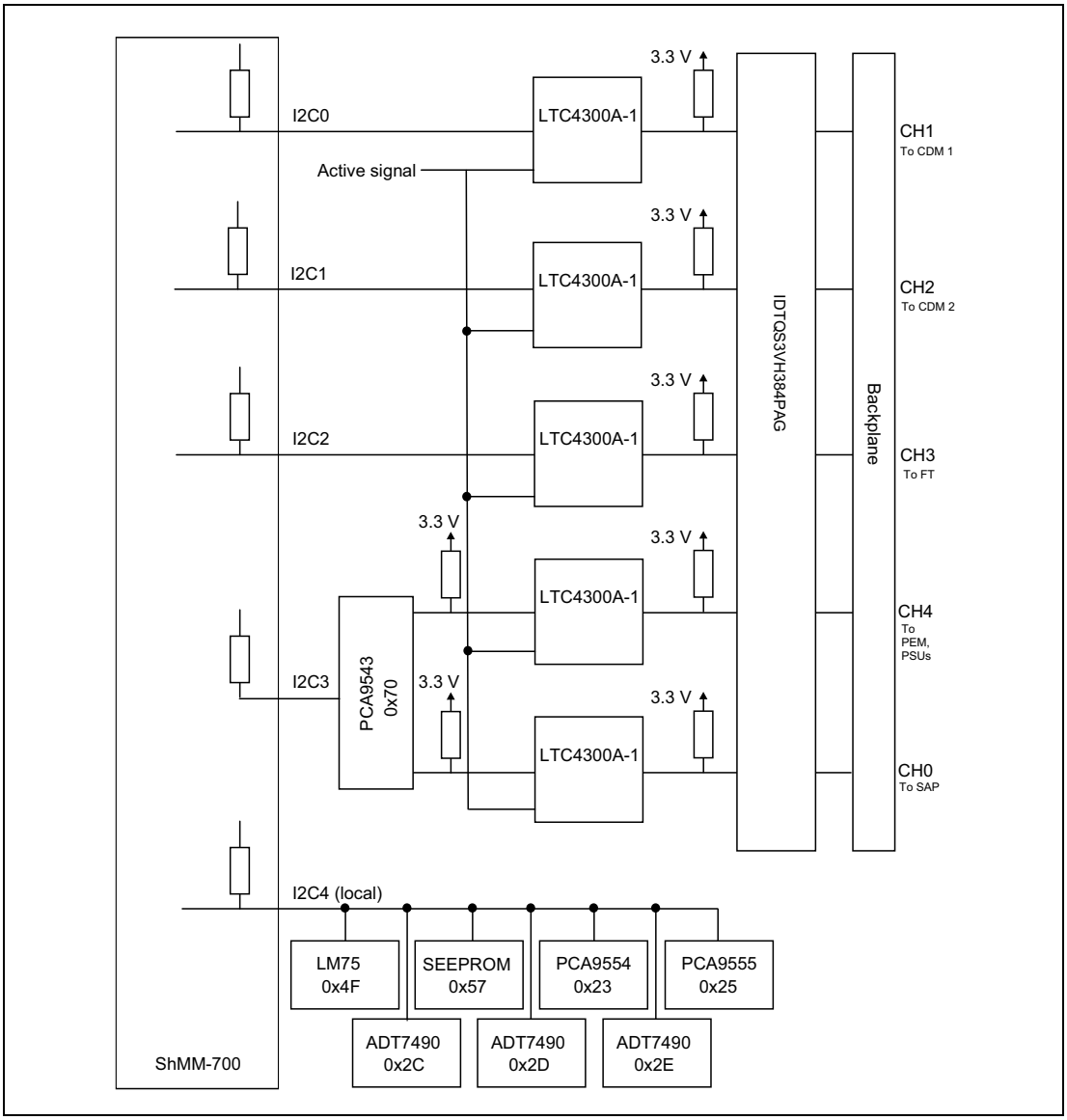
7 Master-Only I²C Bus

The ACB-VI carrier board has a number of onboard I²C devices connected to the local I²C bus. These devices are:

- PCA9554: reads the hardware address at the backplane connector
- PCA9555: monitors the presence signals from the PEMs, SAP, Air Filter, Fan Trays and the presence of the input voltages and fuses.
- ADT7490: monitor voltages, monitor/controls the Fan Trays
- LM75: on-board temperature
- SEEPROM: Shelf Manager FRU information
- PCA9543: This 2-channel switch divides the I²C-bus 3 into 2 channels to:
  - the SAP (Channel 0)
  - the PEMs (Channel 4)

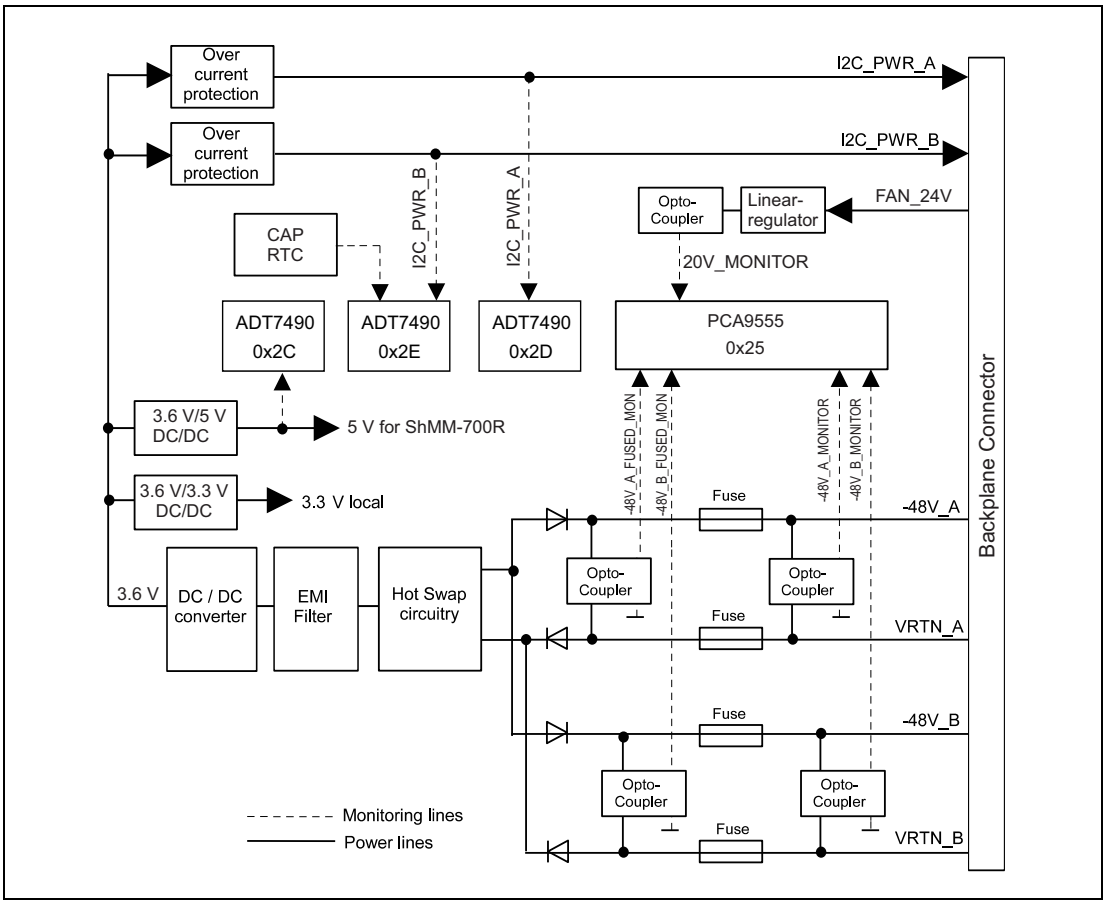
The 'Active' signal of the ShMM-700R is used to enable the LTC4300, so that only the active Shelf Manager has access to the Shelf I²C-bus devices.

Figure 10: Master-Only I2C-bus



8 Power Supply

Figure 11: Power Supply Block Diagram



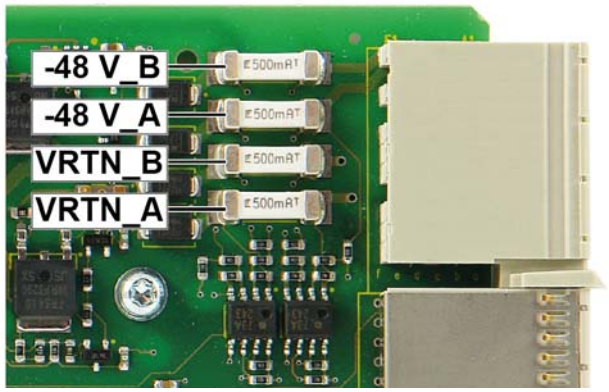
8.0.1 DC-DC Converter

The DC-DC converter on the ACB-VI provides the power for all on-board devices and all off-board I²C devices inside the Shelf.
The 3.6 V local power is routed through two current limiting circuits to create two redundant voltages, **I2C_PWR_A** and **I2C_PWR_B**.
I2C_PWR_A and I2C_PWR_B are routed to the backplane connector and used to power I²C-devices on FRUs like the Fan Tray, PEM or SAP. If one of these voltages is short circuited in a chassis FRU or on the backplane, the short circuit current is limited to 700 - 900 mA so that the Shelf Manager and the FRUs are still fully operational.

8.0.2 Input Fuses

The –48 V input circuits are protected by fuses, one in the supply and in the return path.

Figure 12: Input fuses



The fuses are not user-serviceable.

8.0.3 Voltage and Fuse Monitoring

To detect a missing supply voltage as well as a blown fuse the ADT7490 and PCA9555 provide voltage monitoring and control functions.

Signal	Description	Device	Measurement
3.3V local	3.3 V supply for ACB-VI on-board devices and for the ShMM-700R	ADT7490 0x2C	Analog
5V	5 V supply for the ShMM-700R	ADT7490 0x2C pin 2	Analog
I2C_PWR_A	3.6 V supply redundant path A going to Shelf I²C-devices	ADT7490 0x2D pin 20	Analog
I2C_PWR_B	3.6 V supply redundant path B going to Shelf I²C-devices	ADT7490 0x2E pin 20	Analog
VBAT	Backup-CAP voltage	ADT7490 0x2E pin 21	Analog
-48V_A_MONITOR	Indicates the presence of the –48 V_A / VRTN_A at the backplane connector.	PCA9555 I/O 0.5	Presence/Absence
-48V_A_FUSED_MONITOR	Indicates the presence of the –48 V_A / VRTN_A after the ACB-VI's mains fuse.	PCA9555 I/O 0.3	Presence/Absence
-48V_B_MONITOR	Indicates the presence of the –48 V_B / VRTN_B at the backplane connector.	PCA9555 I/O 0.6	Presence/Absence
-48V_B_FUSED_MONITOR	Indicates the presence of the –48 V_B / VRTN_B after the ACB-VI's mains fuse.	PCA9555 I/O 0.4	Presence/Absence
20V_MONITOR	Indicate the presence of the 20 V auxiliary voltage supply generated on Fan Trays	PCA9555 I/O 0.7	Presence/Absence

9 Fan Control

The Shelf Manager provides fan control functionality through the ADT7490 fan controllers.

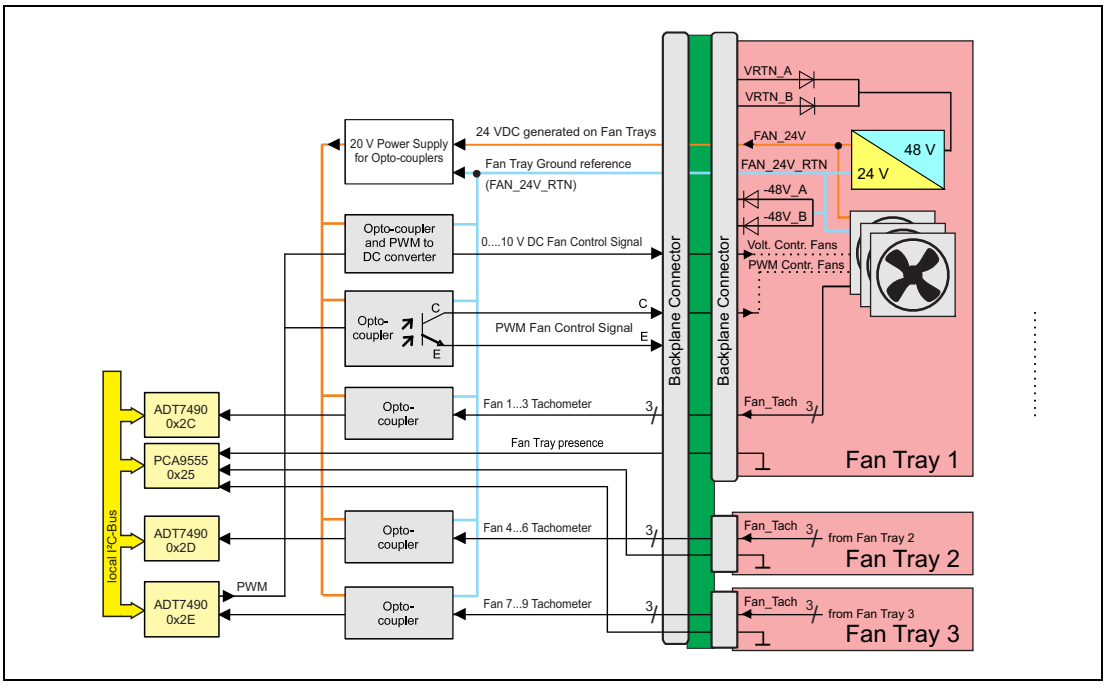
The fan speed is controlled by a PWM signal generated on the ADT7490 0x2E. The PWM output from the ADT7490 is buffered and enabled by the Carrier_Active signal so that only the active Shelf Manager controls the fan speed. The PWM signal is opto-isolated and routed to the backplane connector.
For voltage-regulated Fans the Shelf Manager provides an integrator that converts the PWM signal into a DC-voltage of 0 V to 10 V, referenced to the ground level of the Fan Tray electronics (FAN_24V_RTN), which is also available on the backplane connector.

The tachometer signals from the Fans are routed through the backplane connector to the opto-isolated tachometer inputs of the 3 ADT7490.

Three digital inputs to the PCA9555 (I/O 1.0....I/O 1.2) are used to detect presence of the Fan Trays. The Fan Tray grounds the signal to indicate that it is installed.

The Shelf Manager's fan tachometer inputs and fan control outputs (DC, PWM) are optically isolated from primary voltages of the fans. The primary side of the opto couplers is powered by a 24 V voltage (FAN_24V) which is generated on the Fan Trays and routed together with the Fan Tray ground reference (FAN _24V_RTN) to the Shelf Manager.

Figure 13: Shelf Manager Fan Control Block Diagram



9.1 Schroff Fan Trays

9.1.1 Control characteristics (examples)

Figure 14: Fan Speed Control (PWM) for Shelves 11592-50x

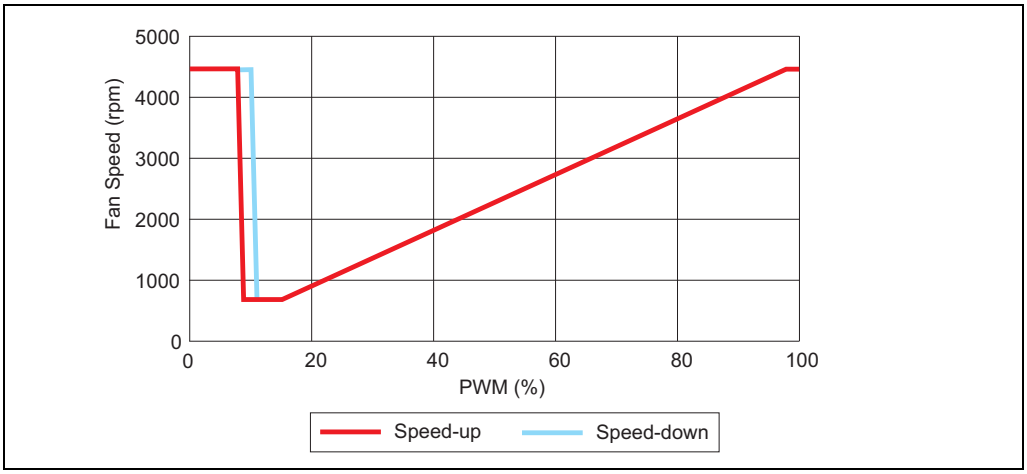


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Figure 15: Fan Speed Control (Control Voltage) for Shelves 11592-40x

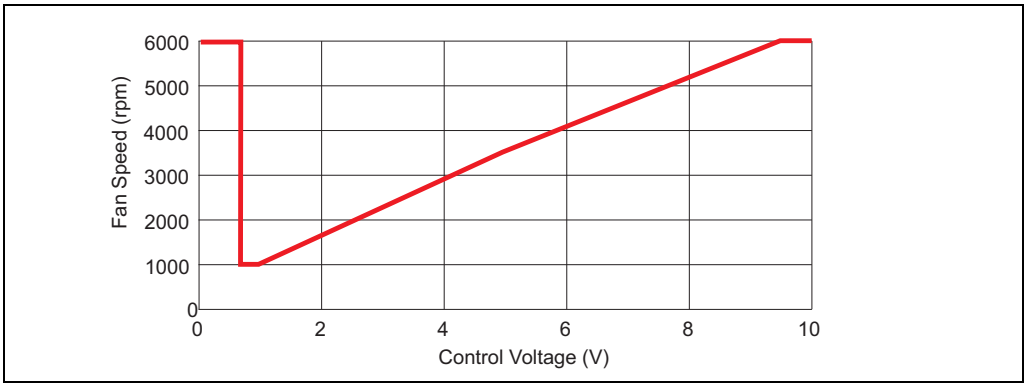

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Figure 16: Fan Tacho Signal Output

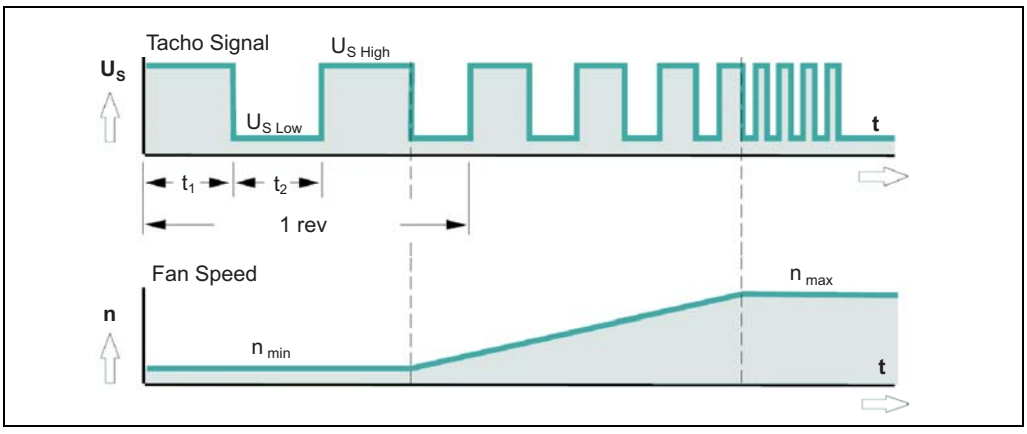

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Table 2: Fan Tacho Data

Description	Comment	Value
Tacho Type	/2 (open collector)	
Tacho operating voltage		up to 30 V
Tacho level low	I_{SINK} = 2 mA	< 0.4 V
Output Frequency		(2 x n) / 60 Hz

10 Hardware Address

The PCA9554 on the ACB-VI reads the hardware address and parity bit from the backplane connector of the dedicated Shelf Manager slot.
Geographic address pins (HA[0], HA7) at the Backplane connector determine bit 0 and bit 7, bit 1 to bit 6 are hardware-coded on the Shelf Manager PCB. The ShMM-700R software determines the hardware address by reading the input port register of the PCA9554 at address 0x23.

Figure 17:

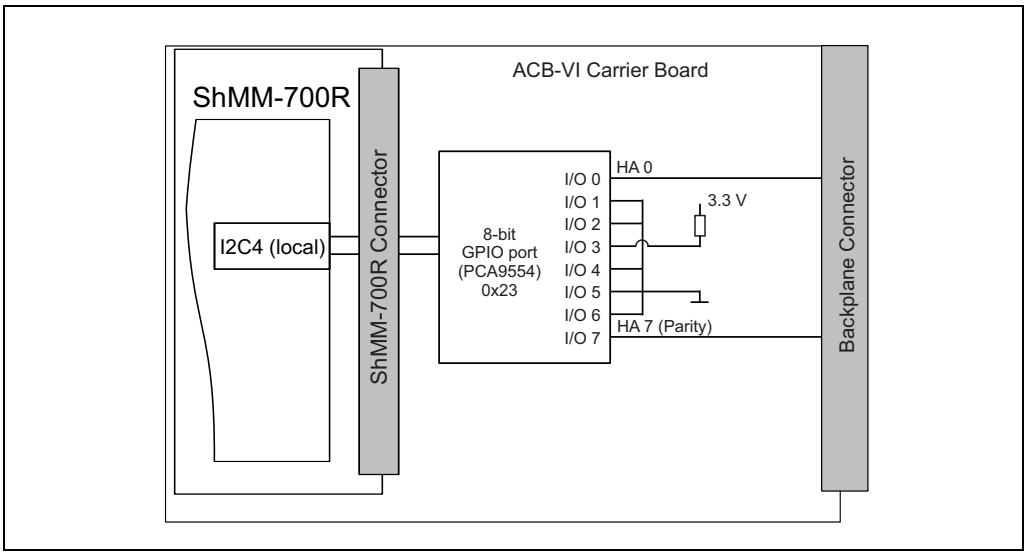

Table 3: Shelf Manager Hardware and IPMB Addresses

	HW-Addr.	IPMB-Addr.	HA[0]	HA7
Shelf Manager 1	0x08	0x10	GND	GND
Shelf Manager 2	0x09	0x12	n.c.	n.c.

11 RESET

11.1 Reset Input / Output

The ACB-VI provides a RESET push button on the front panel. It is connected to the ShMM-700's MRST_IN# signal.

12 Redundancy Control

The Shelf Manager supports redundant operation with automatic switch-over using redundant Shelf Managers. In a configuration where two Shelf Manager are present, one acts as the active Shelf Manager and the other as a standby. The Shelf Managers monitor each other and either can trigger a switchover if necessary.

12.0.1 Hardware Redundancy Interface

The two Shelf Manager communicate over the TCP/IP based Software Redundancy Interface (SRI) which is implemented via a pair of USB links between the ShMM-700Rs. The active instance posts incremental state updates to the backup via this interface. As a result, the backup can quickly step into the active role if necessary.

The Hardware Redundancy Interface (HRI) between the two Shelf Manager instances enables the exchange of hardware level ShMM-700R state information, including the following:

- Presence: each Shelf Manager instance knows whether the other instance is present in the shelf.
- Health: each instance knows whether the other instance considers itself „healthy“.
- Switchover: the backup instance can force a switchover if necessary.

The ACB-VI Hardware Redundancy Interface supports the upgrade from ACB-V to ACB-VI in an ATCA System without interruption. For details see the firmware release notes.

13 Hot Swap Interface

The ACB-VI provides a Hot Swap interface allowing the ACB-VI to be replaced without powering down the Shelf. The interface is composed of three components:

- Hot Swap switch at injector/ejector handle
- Presence signal indicating that the ACB-VI is fully seated in its backplane connector
- Hot Swap LED

13.1 Hot Swap LED

The Shelf Manager provides a a blue Hot Swap LED. The LED indicates when it is safe to "remove" the Shelf Manager from a powered Shelf.

Table 4: Hot Swap LED

LED State	Condition
Off	The Shelf Manager is not ready to be removed from the Shelf
Solid Blue	The Shelf Manager is ready to be removed from the Shelf
Long-blink	The Shelf Manager is activating
Short-blink	Deactivation has been requested

14 Telco Alarms

The Shelf Manager ACB-VI can manage a Telco Alarm Interface with the following components:

- Telco Alarm connector
- Telco Alarm LEDs
- Telco Alarm Cutoff push button

In Schroff Shelves these components are located on a separate board called Shelf Alarm Panel (SAP). All three aspects of Telco interface are controlled by a PCA9555 located on the SAP. The PCA 9555 is connected to the Shelf Manager via an I^2C connection. The Shelf management software running on the ShMM-700R is responsible for:

- configuring the PCA9555 as inputs or outputs, as appropriate for the Telco interface signals.
- reading and writing GPIO port registers at appropriate times.

The PCA9555 generates an active low interrupt output when one of the inputs changes its value. That interrupt output is routed on the ACB-VI onto the shared interrupt line going to the INT# input of the ShMM-700R. Software running on the ShMM-700R is responsible for reacting to an input change when an interrupt is triggered by the PCA9555.

For more information see the Chapter „SAP“ in the Shelf’s User Manual.

15 Sensor Table

Sensor table for the primary shelf manager with IPMB address 0x10.

IPMC	Nr.	LUN	Name	Type-Code		Event/Reading Type-Code		Description
10	0	0	FRU 0 HOT_SWAP	Hot Swap	0xf0	Discrete	0x6f	This sensor returns the hot-swap states for FRU 0.
10	1	0	IPMB LINK	IPMB Link	0xf1	Discrete	0x6f	This sensor returns the IPMB link state.
10	2	0	Local Temp	Temperature	0x01	Threshold	0x01	This sensor measures the local temperature.
10	3	0	3V3_local	Voltage	0x02	Threshold	0x01	This sensor measures the local 3.3 V voltage in volts.
10	4	0	I2C_PWR_A	Voltage	0x02	Threshold	0x01	This sensor measures the 3.3 V power supply A voltage supplied to I2C devices in volts.
10	5	0	I2C_PWR_B	Voltage	0x02	Threshold	0x01	This sensor measures the 3.3 V power supply B voltage supplied to I2C devices in volts.
10	7	0	5V0_local	Voltage	0x02	Threshold	0x01	This sensor measures the 5 V supply voltage for the ShMM700R on the local shelf manager in volts.
10	8	0	1V5_FPGAA	Voltage	0x02	Threshold	0x01	This sensor measures the 1.5 V voltage supplied to FPGAA in volts. (Only with radial IPMB)
10	9	0	1V5_FPGAB	Voltage	0x02	Threshold	0x01	This sensor measures the 1.5 V voltage supplied to FPGAB in volts. (Only with radial IPMB)
10	16	0	-48A Bus voltage	Entity Presence	0x25	Discrete	0x6f	This sensor indicates the presence of the -48 V_A at the shelf manager backplane connector.
10	17	0	-48B Bus voltage	Entity Presence	0x25	Discrete	0x6f	This sensor indicates the presence of the -48 V_B at the shelf manager backplane connector.
10	18	0	-48A ACB voltage	Entity Presence	0x25	Discrete	0x6f	This sensor indicates the presence of the -48 V_A behind the shelf manager's main fuse.
10	19	0	-48B ACB voltage	Entity Presence	0x25	Discrete	0x6f	This sensor indicates the presence of the -48 V_B behind the shelf manager's main fuse.
10	20	0	20V AUX	Entity Presence	0x25	Discrete	0x6f	This sensor indicates the presence of 20 V aux voltage on shelf manager.
10	21	0	-48A ACB Fuse	Entity Presence	0x25	Discrete	0x6f	This sensor indicates the state of -48 V_A input fuse on the shelf manager.
10	22	0	-48B ACB Fuse	Entity Presence	0x25	Discrete	0x6f	This sensor indicates the state of -48 V_B input fuse on the shelf manager.
10	128	0	HWRI State	OEM reserved	0xde	Discrete	0x6f	This sensor indicates the high-level redundancy state of the ShMM.
10	129	0	Reboot Reason	OEM reserved	0xdd	Discrete	0x6f	This sensor indicates the reason for the last reboot.

15.1 Useful commands:

Below is a list of useful commands when using the Pigeon Point Systems command line interface (clia). For more details see the Pigeon Point Systems “User Guide” and the “External Interface reference”.
Please note that the output of the commands may vary, depending on the type of chassis you are using.

Command “version”:

Displays the currently used FW image and the alternative firmware image on the ShMM-700

 # version

```
Current flash bank: 0

Current U-Boot:
Image Name:   63998-53456 ShMM700 U-Boot 9.0.8
Created:      Wed Jul  2 20:05:47 2014
Image Type:   ARM U-Boot Firmware (uncompressed)
Data Size:    524224 Bytes = 511.94 kB = 0.50 MB
Load Address: 00000000
Entry Point:  00000000

Current Kernel:
Image Name:   63998-53456 Linux-2.6.34.8
Created:      Wed Jul  2 20:05:47 2014
Image Type:   ARM Linux Kernel Image (uncompressed)
Data Size:    1494616 Bytes = 1459.59 kB = 1.43 MB
Load Address: 40008000
Entry Point:  40008000

Current RFS:
Image Name:   63998-53456 RFS 3.4.0
Created:      Wed Jul  2 20:05:47 2014
Image Type:   ARM Linux RAMDisk Image (gzip compressed)
Data Size:    2573577 Bytes = 2513.26 kB = 2.45 MB
Load Address: 00000000
Entry Point:  00000000

Current Application:
Image Name:   63998-53456 APP 3.4.0
Created:      Wed Jul  2 20:05:46 2014
Image Type:   ARM Linux Filesystem Image (gzip compressed)
Data Size:    2432907 Bytes = 2375.89 kB = 2.32 MB
Load Address: 00000000
Entry Point:  00000000

Other U-Boot:
Image Name:   63998-53456 ShMM700 U-Boot 9.0.8
Created:      Wed Jul  2 20:05:47 2014
Image Type:   ARM U-Boot Firmware (uncompressed)
Data Size:    524224 Bytes = 511.94 kB = 0.50 MB
Load Address: 00000000
Entry Point:  00000000

Other Kernel:
Image Name:   63998-53456 Linux-2.6.34.8
Created:      Wed Jul  2 20:05:47 2014
Image Type:   ARM Linux Kernel Image (uncompressed)
Data Size:    1494616 Bytes = 1459.59 kB = 1.43 MB
Load Address: 40008000
Entry Point:  40008000

Other RFS:
Image Name:   63998-53456 RFS 3.4.0
Created:      Wed Jul  2 20:05:47 2014
Image Type:   ARM Linux RAMDisk Image (gzip compressed)
Data Size:    2573577 Bytes = 2513.26 kB = 2.45 MB
Load Address: 00000000
Entry Point:  00000000
```

```
Other Application:
Image Name:   63998-53456 APP 3.4.0
Created:      Wed Jul  2 20:05:46 2014
Image Type:   ARM Linux Filesystem Image (gzip compressed)
Data Size:    2432907 Bytes = 2375.89 kB = 2.32 MB
Load Address: 00000000
Entry Point:  00000000

A2F:   SPICOMM protocol v1.7, M3 firmware v1.4, FPGA design v1.0.0.0

Pigeon Point Shelf Manager Command Line Interpreter
Pigeon Point Shelf Manager ver. 3.4.0.1
Pigeon Point and the stylized lighthouse logo are trademarks of Pigeon Point Systems.
Copyright (c) 2002-2014 Pigeon Point Systems
All rights reserved
Build date/time: Jun 27 2014 16:36:10
Carrier: HPDL/ACB
Carrier subtype: 0; subversion: 0
Cooling Management Library: libcooling_acb.so; Version: 3.4.0.1
Carrier Product ID: 21990401
Chassis Product ID: 11596150
```

Command “clia ipmc”:

Displays all IPMC controller in the chassis:

 # clia ipmc

```
Pigeon Point Shelf Manager Command Line Interpreter

10: Entity: (0xf0, 0x60) Maximum FRU device ID: 0x00
    PICMG Version 2.3
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)

12: Entity: (0xf0, 0x60) Maximum FRU device ID: 0x00
    PICMG Version 2.3
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)

20: Entity: (0xf0, 0x1) Maximum FRU device ID: 0x08
    PICMG Version 2.3
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)

9c: Entity: (0xa0, 0x60) Maximum FRU device ID: 0x00
    PICMG Version 2.2
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
```

Command “clia FRU 20”:

List all FRUs which are managed by the shelf manager:

 # clia fru 20

```
Pigeon Point Shelf Manager Command Line Interpreter

20: FRU # 0
    Entity: (0xf0, 0x1)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "PPS BMC"

20: FRU # 1
    Entity: (0xf2, 0x60)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "ShelfFRU1"

20: FRU # 2
    Entity: (0xf2, 0x61)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "ShelfFRU2"

20: FRU # 3
    Entity: (0x1e, 0x60)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "FanTray0"
2
0: FRU # 4
    Entity: (0x1e, 0x61)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "FanTray1"

20: FRU # 5
    Entity: (0x1e, 0x62)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "FanTray2"

20: FRU # 6
    Entity: (0x15, 0x60)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "PEM_A"

20: FRU # 7
    Entity: (0x15, 0x61)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "PEM_B"

20: FRU # 8
    Entity: (0xf3, 0x60)
    Hot Swap State: M4 (Active), Previous: M3 (Activation In Process), Last State Change Cause: Normal State Change (0x0)
    Device ID String: "SAP Board"
```

Command “clia fans”.

Displays the current fan level.

 # clia fans

```
Pigeon Point Shelf Manager Command Line Interpreter

20: FRU # 5
    Current Level: 4
    Minimum Speed Level: 1, Maximum Speed Level: 15    Dynamic minimum fan level: 3

20: FRU # 4
    Current Level: 4
    Minimum Speed Level: 1, Maximum Speed Level: 15    Dynamic minimum fan level: 3

20: FRU # 3
    Current Level: 4
    Minimum Speed Level: 1, Maximum Speed Level: 15    Dynamic minimum fan level: 3
```

Command “clia shmstatus –v”.

Displays the status of the ACB-VI shelf manager.

 # clia shmstatus -v

```
Pigeon Point Shelf Manager Command Line Interpreter

Host: "Active"
Ready For Operation: Yes
Detailed State Flags: "Shelf FRU Found" "Backup Healthy" "Initial Update Sent" "RMCP Up" "Shelf FRU Processed" "Shelfman
Running"
ShM Uptime 0 day(s) 00:05:01; Active Uptime 0 days 00:05:01
```

Command “clia help”.

List all supported clia commands.

16 Shelf Manager Connectors

Table 5: Front Panel 10/100 Ethernet Service Connector

Pin #	Ethernet Signal
1	TX+
2	TX-
3	RX+
4, 5	n.c.
6	RX-
7, 8	n.c.

Figure 18: Backplane Connectors

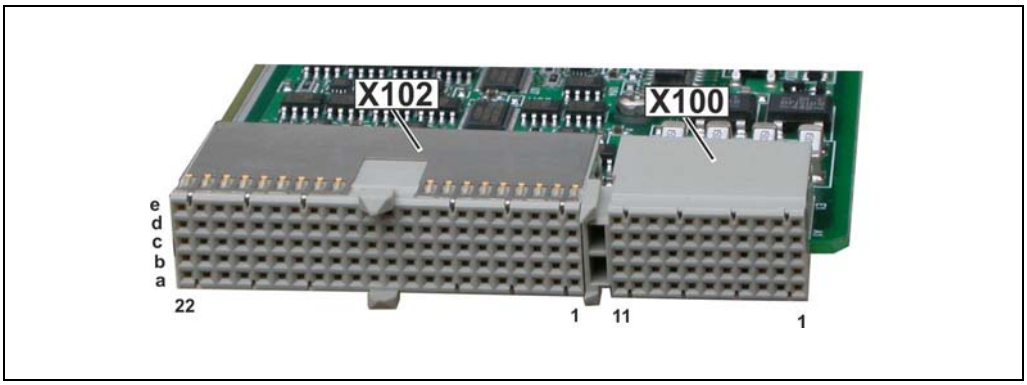

Table 6: Pin Staging (PS)

Pin#	length
A	**8.25 mm**
B	**9.75 mm**
C	**11.25 mm**

The Pin Staging (PS) is the length of the Pins of the connector at the Backplane not at the Shelf manager.

Table 7: Backplane Signal Connector (X100) pin assignment

	a	PS	b	PS	c	PS	d	PS	e	PS
1	-48 V_A	**B**	VRTN_A	**B**	NC	**B**	-48 V_B	**B**	VRTN_B	**B**
2	-		-		-		-		-	
3	SHELF_GND	**B**	SHELF_GND	**B**	SHELF_GND	**B**	SHELF_GND	**B**	SHELF_GND	**B**
4	-		-		-		-		-	
5	FAN_TACH0	**A**	FAN_TACH1	**A**	FAN_TACH2	**A**	FAN_TACH3	**A**	FAN_TACH4	**A**
6	FAN_TACH5	**A**	FAN_TACH6	**A**	FAN_TACH7	**A**	FAN_TACH8	**A**	PWM_C	**A**
7	FAN_SPEED	**A**	NC	**A**	FAN_24V	**A**	FAN_24V_RTN	**A**	PWM_E	**A**
8	-		-		-		-		-	
9	PEM_A_PRES	**A**	SAP_PRES	**A**	SWR_Input#	**A**	HLY_Input#	**A**	SWR_Output#	**A**
10	ETH1_TX+	**A**	ETH1_TX-	**A**	HS_EN	**A**	HLY_Output#	**A**	HA7	**A**
11	AIR_FILT_PR	**A**	PEM_B_PRES	**A**	ETH1_RX+	**A**	ETH1_RX-	**A**	PRES_1#	**A**

Table 8: Backplane Signal Connector (X102) pin assignment (Radial IPMB)

	a	PS	b	PS	c	PS	d	PS	e	PS	f	PS
1	FT0_PRES#	A	UART0_TXD	A	UART1_TXD	A	FT2_PRES#	A	INT#	A	GND	C
2	FT1_PRES#	A	UART0_DTR	A	Pres_GND	A	AUX_PRES#	A	UART0_DSR	A		C
3	UART0_CD	A	UART0_RTS	A	UART1_RXD	A	HA0	A	UART0_CTS	A	GND	C
4	UART0_RXD	A	I2C_SDA_CH1	A	ACTIVE	A	I2C_SDA_CH0	A	GND	A		C
5	I2C_SCL_CH1	A	I2C_SCL_CH0	A	UART0_RI	A	GND	A	I2C_SDA_CH3	A	GND	C
6	ETH0_TX+	A	ETH0_TX-	A	GND	B	USB1_DP	A	USB1_DM	A		C
7	ETH0_RX+	A	ETH0_RX-	A	GND	B	USB0_DP	A	USB0_DM	A	GND	C
8	I2C_SDA_CH4	A	I2C_SCL_CH4	A	I2C_SCL_CH3	A	I2C_SCL_CH2	A	I2C_PWR_B	A		C
9	IPMB_SCL_B15	A	IPMB_SDA_B15	A	IPMB_SCL_A15	A	IPMB_SDA_A15	A	I2C_SDA_CH2	A	GND	C
10	IPMB_SDA_B16	A	IPMB_SCL_B16	A	IPMB_SDA_A16	A	IPMB_SCL_A16	A	I2C_PWR_A	A		
11	IPMB_SDA_A3	A	IPMB_SDA_B3	A	IPMB_SCL_B3	A	IPMB_SDA_B8	A	IPMB_SCL_B8	A	GND	
12	IPMB_SCL_A3	A	IPMB_SDA_A5	A	IPMB_SCL_A5	A	IPMB_SDA_A8	A	IPMB_SCL_A8	A		
13	IPMB_SDA_A1	A	IPMB_SDA_B7	A	IPMB_SCL_A1	A	IPMB_SDA_A10	A	IPMB_SCL_A10	A	GND	
14	IPMB_SCL_B7	A	IPMB_SDA_A7	A	IPMB_SCL_A7	A	IPMB_SDA_A6	A	IPMB_SCL_A6	A		C
15	IPMB_SDA_A9	A	IPMB_SDA_B14	A	IPMB_SCL_B14	A	IPMB_SDA_B10	A	IPMB_SCL_B10	A	GND	C
16	IPMB_SCL_A9	A	IPMB_SDA_A4	A	IPMB_SCL_A4	A	IPMB_SDA_B6	A	IPMB_SCL_B6	A		C
17	CROSS_SDA_B	A	IPMB_SDA_B11	A	IPMB_SCL_B11	A	IPMB_SDA_B4	A	IPMB_SCL_B4	A	GND	C
18	CROSS_SCL_B	A	IPMB_SDA_A11	A	IPMB_SCL_A11	A	IPMB_SDA_A14	A	IPMB_SCL_A14	A		C
19	IPMB_SDA_A13	A	IPMB_SCL_A13	A	IPMB_SCL_B12	A	IPMB_SDA_B12	A	IPMB_SDA_B9	A	GND	C
20	IPMB_SDA_B1	A	IPMB_SCL_B1	A	CROSS_SCL_A	A	CROSS_SDA_A	A	IPMB_SCL_B9	A		C
21	IPMB_SDA_B13	A	IPMB_SDA_B5	A	IPMB_SCL_B5	A	IPMB_SDA_B2	A	IPMB_SCL_B2	A	GND	C
22	IPMB_SCL_B13	A	IPMB_SDA_A12	A	IPMB_SCL_A12	A	IPMB_SDA_A2	A	IPMB_SCL_A2	A		C

Table 9: Backplane Signal Connector (X102) pin assignment (Bused IPMB)

	a	PS	b	PS	c	PS	d	PS	e	PS	f	PS
1	FT0_PRES#	A	UART0_TXD	A	UART1_TXD	A	FT2_PRES#	A	INT#	A	GND	C
2	FT1_PRES#	A	UART0_DTR	A	Pres_GND	A	AUX_PRES#	A	UART0_DSR	A		C
3	UART0_CD	A	UART0_RTS	A	UART1_RXD	A	HA0	A	UART0_CTS	A	GND	C
4	UART0_RXD	A	I2C_SDA_CH1	A	ACTIVE	A	I2C_SDA_CH0	A	GND	A		C
5	I2C_SCL_CH1	A	I2C_SCL_CH0	A	UART0_RI	A	GND	A	I2C_SDA_CH3	A	GND	C
6	ETH0_TX+	A	ETH0_TX-	A	GND	B	USB1_DP	A	USB1_DM	A		C
7	ETH0_RX+	A	ETH0_RX-	A	GND	B	USB0_DP	A	USB0_DM	A	GND	C
8	I2C_SDA_CH4	A	I2C_SCL_CH4	A	I2C_SCL_CH3	A	I2C_SCL_CH2	A	I2C_PWR_B	A		C
9		A		A		A		A	I2C_SDA_CH2	A	GND	C
10		A		A		A		A	I2C_PWR_A	A		
11		A		A		A		A		A	GND	
12		A		A		A		A		A		
13		A		A		A		A		A	GND	
14		A		A		A		A		A		C
15		A	IPMB_SDA_B	A	IPMB_SCL_B	A		A		A	GND	C
16		A		A		A		A		A		C
17		A		A		A		A		A	GND	C
18		A		A		A	IPMB_SDA_A	A	IPMB_SCL_A	A		C
19		A		A		A	I	A		A	GND	C
20		A		A				A		A		C
21		A		A		A		A		A	GND	C
22		A		A		A		A		A		C

Table 10: Backplane connector (X100) and (X102) pin description

-48V_A	-48 VDC supply A
-48V_B	-48 VDC supply B
AIR_FILT_PR	Air filter presence (grounded by air filter presence switch to detect a missing air filter)
AUX_PRES#	Reserved for future use
CROSS_SCL_A	Serial Clock of IPMB-A, cross-connected on Backplane to serial clock of IPMB-B of other Shelf Manager
CROSS_SCL_B	Serial Clock of IPMB-B, cross-connected on Backplane to serial clock of IPMB-A of other Shelf Manager
CROSS_SDA_A	Serial Data of IPMB-A, cross-connected on Backplane to serial data of IPMB-B of other Shelf Manager
CROSS_SDA_B	Serial Data of IPMB-B, cross-connected on Backplane to serial data of IPMB-A of other Shelf Manager
ETH0_RX(+-)	Ethernet interface (ETH0)
ETH0_TX(+-)	Ethernet interface (ETH0)
ETH1_RX(+-)	Ethernet interface (ETH1)
ETH1_TX(+-)	Ethernet interface (ETH1)
FAN_24V	Auxiliary 24 VDC (max. 100 mA) generated on Fan Trays (Voltage supply for opto-couplers on Shelf Manager)
FAN_24V_RTN	Return path (Ground reference) for the auxiliary 24 VDC, generated on Fan Trays, used also as reference ground for the fan control voltage
FT[0...2]_PRES#	Fan Tray present (grounded on Fan Tray when present)
FAN_SPEED	DC for Fan Speed Control (0 V to 10 V, 10 mA)
FAN_TACH[0...8]	Tachometer signals from Fan Trays
GND	logic ground
HA[0]	Hardware address of Shelf Manager - grounded: Shelf Manager IPMI address is 0x10 - open: Shelf Manager IPMI address is 0x12
HA7	Hardware address of Shelf Manager - grounded: Shelf Manager IPMI address is 0x10 - open: Shelf Manager IPMI address is 0x12
HLY_Input#	ACB-VI: Clock signal of the 2 wire Redundancy Interface between two redundant ACB-VI shelf managers. Formerly used on the ACB-V: Health input Shelf Manager (proprietary signal cross-connected on Backplane to HLY_Output of other Shelf Manager)
HLY_Output#	ACB-VI: Data signal of the 2 wire Redundancy Interface between two redundant ACB-VI shelf managers Formerly used on the ACB-V: Health output Shelf Manager (proprietary signal cross-connected on Backplane to HLY_Input of other Shelf Manager)
HS_EN	Tells the Shelf Manager that it is plugged in (Grounded on Backplane)
I2C_SCL_CH0	Master Only-I^2C-bus Channel 0 to SAP
I2C_SCL_CH1	Master-Only I^2C-bus Channel 1
I2C_SCL_CH2	Master-Only I^2C-bus Channel 2
I2C_SCL_CH3	Master-Only I^2C-bus Channel 3
I2C_SCL_CH4	Master-Only I^2C-bus Channel 4
I2C_SDA_CH0	Master Only-I^2C-bus Channel 0 to SAP
I2C_SDA_CH1	Master-Only I^2C-bus Channel 1
I2C_SDA_CH2	Master-Only I^2C-bus Channel 2
I2C_SDA_CH3	Master-Only I^2C-bus Channel 3

I2C_SDA_CH4	Master-Only I^2C-bus Channel 4
I2C_PWR_A	3.6 V (max. 500 mA) generated on Shelf Manager, redundant path A for Shelf I^2C-devices on Fan Trays, PEMs and SAP
I2C_PWR_B	3.6 V (max. 500 mA) generated on Shelf Manager, redundant path B for Shelf I^2C-devices on Fan Trays, PEMs and SAP
INT#	External Interrupt request (Master Only I^2C-bus)
ACTIVE	This ShMM is in active mode
IPMB_SCL_A_[1...16]	Serial Clock, IPMB-A
IPMB_SCL_B_[1...16]	Serial Clock, IPMB-B
IPMB_SDA_A_[1...16]	Serial Data, IPMB-A
IPMB_SDA_B_[1...16]	Serial Data, IPMB-B
NC	not connected
PEM[A, B]_PRES	PEM [A, B] presence signal (grounded on PEM when present)
PRES_1#	ACB-VI: Only used for transition from ACB-V to ACB-VI in a live chassis Formerly used on the ACB-V: Shelf Manager board presence signal (proprietary signal cross-connected on Backplane to PRES_GND of other Shelf Manager)
PRES_GND#	ACB-VI: Only used for transition from ACB-V to ACB-VI in a live chassis Formerly used on the ACB-V: Shelf Manager presence ground (proprietary signal cross-connected on Backplane to PRES_1# of other Shelf Manager)
PWM_C	Opto isolated PWM signal for fan speed control, collector U_{CE0} = max. 70 V, I_{max} = 2 mA
PWM_E	Opto isolated PWM signal for fan speed control, emitter, connected to FAN_24V_RTN on Backplane
SAP_PRES	Presence signal of SAP (Grounded on SAP when present)
SHELF_GND	Shelf Ground
SWR_Input#	ACB-VI: Only used for transition from ACB-V to ACB-VI in a live chassis Formerly used on the ACB-V: Switchover signal from the other Shelf Manager (proprietary signal cross-connected on Backplane to SWR_Output of other Shelf Manager)
SWR_Output#	ACB-VI: Only used for transition from ACB-V to ACB-VI in a live chassis Formerly used on the ACB-V: Switchover signal to the other Shelf Manager (proprietary signal cross-connected on Backplane to SWR_Input of other Shelf Manager)
UART0_CD	Serial Interface 1 Carrier Detect
UART0_CTS	Serial Interface 1 Clear To Send
UART0_DSR	Serial Interface 1 Data Set Ready
UART0_DTR	Serial Interface 1 Data Terminal Ready
UART0_RI	Serial Interface 1 Ring Indication
UART0_RTS	Serial Interface 1 Request To Send
UART0_RXD	Serial Interface 1 Receive Data
UART0_TXD	Serial interface 1 Transmit Data
UART1_RXD	Serial Interface 2 Receive Data (not used in Schroff Shelves)
UART1_TXD	Serial interface 2 Transmit Data (not used in Schroff Shelves)
USB0_DP/DM	USB interface, cross-connected on Backplane toother Shelf Manager
USB1_DP/DM	USB interface, cross-connected on Backplane toother Shelf Manager
VRTN_A	Voltage return supply A
VRTN_B	Voltage return supply B

17 Technical Data

Table 11: Technical Data

Physical Dimensions	
Height	2 U
Width	20 mm with EMC gaskets
Depth (PCB)	280 mm
Depth (with connectors and handle)	310 mm
Weight	
Shipping weight completely assembled without packaging	0.6 kg
Power	
Input voltage	-40 VDC …. -72 VDC
Power dissipation	max. 10 W
Overcurrent Protection	500 mA Fuses on PCB
Environmental	
Ambient temperature	-5°C…+55°C
Humidity	+5%...+85%, non condensing

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