Shelf Manager for FlexChassis ATCA 5U DC and SH140 (12U DC)
User Manual

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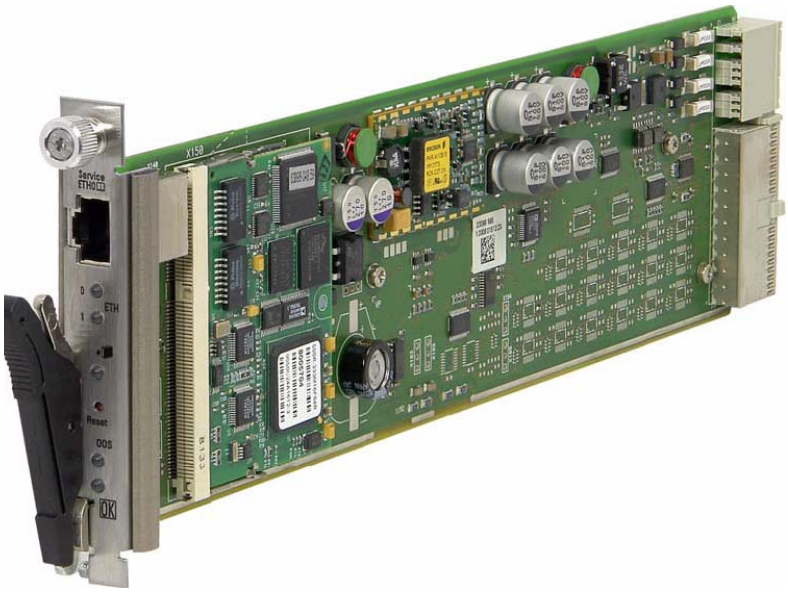

Part Number:
5-02891

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Releases

I.D.	Release	Date
-00	Original Release (p/n 5-02390)	May 2009
-01	HW Change (p/n 5-02891)	December 2009

About this Document

This document provides technical information for the ATCA Shelf Manager Board (ShMC). It is intended for technical staff tasked with installing, setting up and configuring the system, and providing troubleshooting assistance and servicing.

Related Documents

Instructions relating to software installation and documentation for application software development for this platform are available in the Shelf Manager External Interface Reference Manual provided by Pigeon Point Systems - http://www.pigeonpoint.com/.

For Continuous Computing product information and additional resources, please visit the Continuous Computing website at http://www.ccpu.com/.

Downloads (manuals, release notes, software, etc.) are available via the Technical Support Library product links at http://www.ccpu.com/support/downloads/ (for registered customers).

Information about PICMG (PCI Industrial Computer Manufacturers Group) and the ATCA standard may be accessed on the PICMG Web site at www.picmg.com.

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.*

	**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 ATCA Shelves. 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).

2. Introduction

This specific Shelf Manager Board is a 78 mm x 280 mm form factor board that fits into a dedicated Shelf Manager slot in the FlexChassis ATCA-5U DC or -SH140 (12U DC).

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 the overall System Manager to join in that management/tracking through the System Manager Interface, which is typically implemented over Ethernet.

The Shelf management based on the Pigeon Point Shelf management solution for AdvancedTCA products.

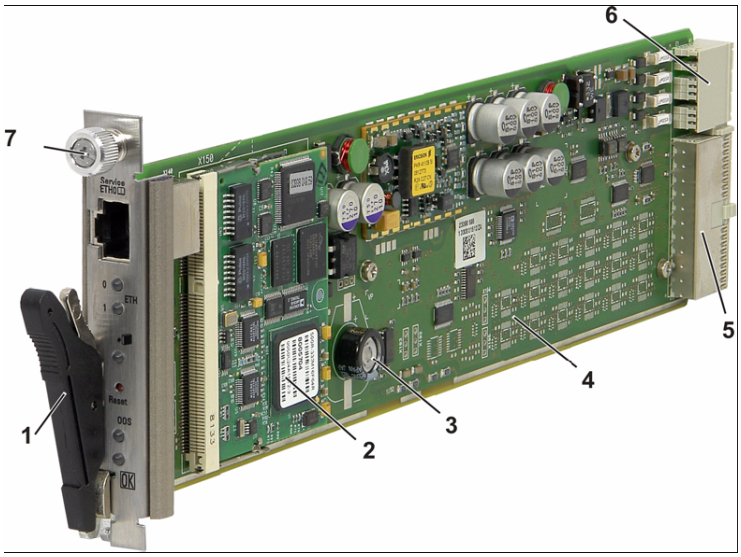
The Shelf management software executes on the Pigeon Point Shelf Management Mezzanine 500 (ShMM-500), a compact SO-DIMM form-factor module, installed on the shelf manager carrier board.

The Shelf Manager carrier board includes several on-board devices that enable different aspects of Shelf management based on the ShMM-500. These facilities include I²C-based hardware monitoring/control and GPIO expander devices.

The Shelf Manager also provides the Fan Controller for up to 9 Fans and individual Ethernet connections to both Base Hubs (ShMC cross connect), according to PICMG Engineering Change Notice ECN 3.0-2.0-001.

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 the FlexChassis ATCA-5U DC or -SH140 (12U DC). The Shelf Manager communicates with the non-intelligent FRUs over I²C busses and exposes the sensors for these FRUs at IPMB address 0x20.

Figure 1: Shelf Management Mezzanine ATCA Carrier Board



1	Extraction handle	5	Backplane Connector (J2)
2	ShMM-500	6	Backplane Connector (J1)
3	RTC Backup Capacitor	7	Fixing Screw
4	Carrier Board (Shelf Manager Board)		

2.1. ATCA Shelf Manager Board Part Number

Module	Part Number
Shelf Manager for FlexChassis ATCA-5U or -SH140 featuring Pigeon Point ShMM500	**5-02891**

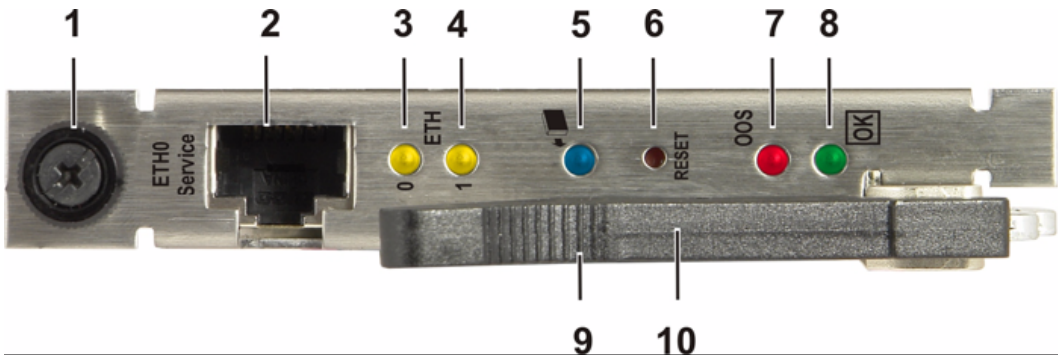
2.2. Shelf Manager Board Components

- 78 mm x 280 mm form-factor board
- SODIMM 144-pin socket with ShMM-500 Shelf Management Mezzanine Card from Pigeon Point Systems
- Dual RS-232 serial ports
- Dual 10/100 Ethernet interfaces
- IPMB-A/B interfaces with bused topology
- Reset push button
- Master-only I²C 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-500 RTC and ADM1026 intrusion detection
- Hardware redundancy interface with dedicated communication paths between dual Shelf Managers for redundant operation
- Interrupt requests for the ShMM-500 generated by on-board and off-board devices
- Status indication for important interfaces, using on-board and off-board LEDs
- Fan Controller for up to 9 fans
- Redundant –48 VDC inputs with on-board power regulation

2.3. Front Panel

The Shelf Manager board's front panel contains the display as shown in figure 2:

Figure 2: Front Panel



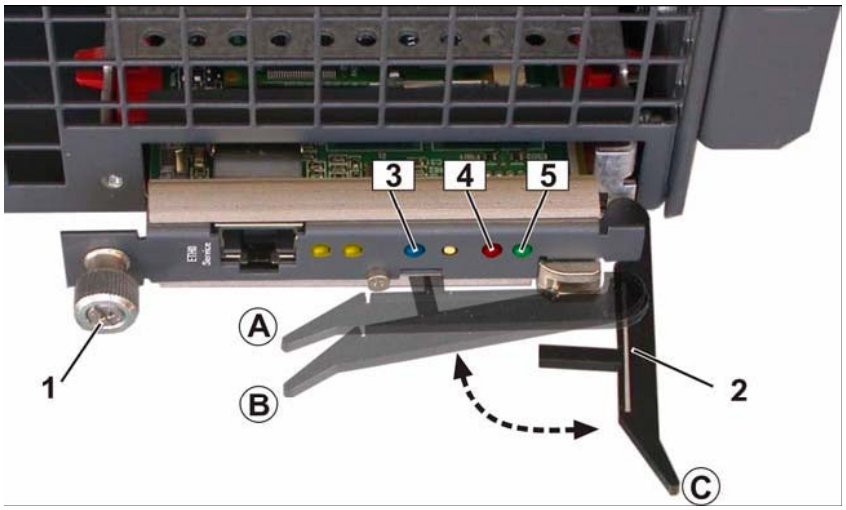
1	Fixing screw	6	RESET push button
2	ETH 0 Ethernet Service Connector (RJ45)	7	Shelf Manager Status LED (red) - Red = Out of Service (OOS)
3	ETH 0 Link/Activity LED (yellow) - On = Link - Off = No Link - Blinking = Activity	8	Shelf Manager Status LED (green) - Solid Green = in Service, active Shelf Manager - 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

3. Shelf Manager Installation

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 3: Shelf Manager Installation



The Shelf the Shelf Manager can be installed in horizontal or vertical position, depending on the Shelf! (Figure shows horizontal position)

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 approximate one Minute the green Status LED (5) 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.

Remove:
1. Unscrew the fixing screw (1).
2. Move the lever (2) to position (B) until the blue Hot Swap LED (3) starts blinking.
3. When the Hot Swap LED is solid blue, move the lever (2) to position (C) and pull out the Shelf Manager.

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

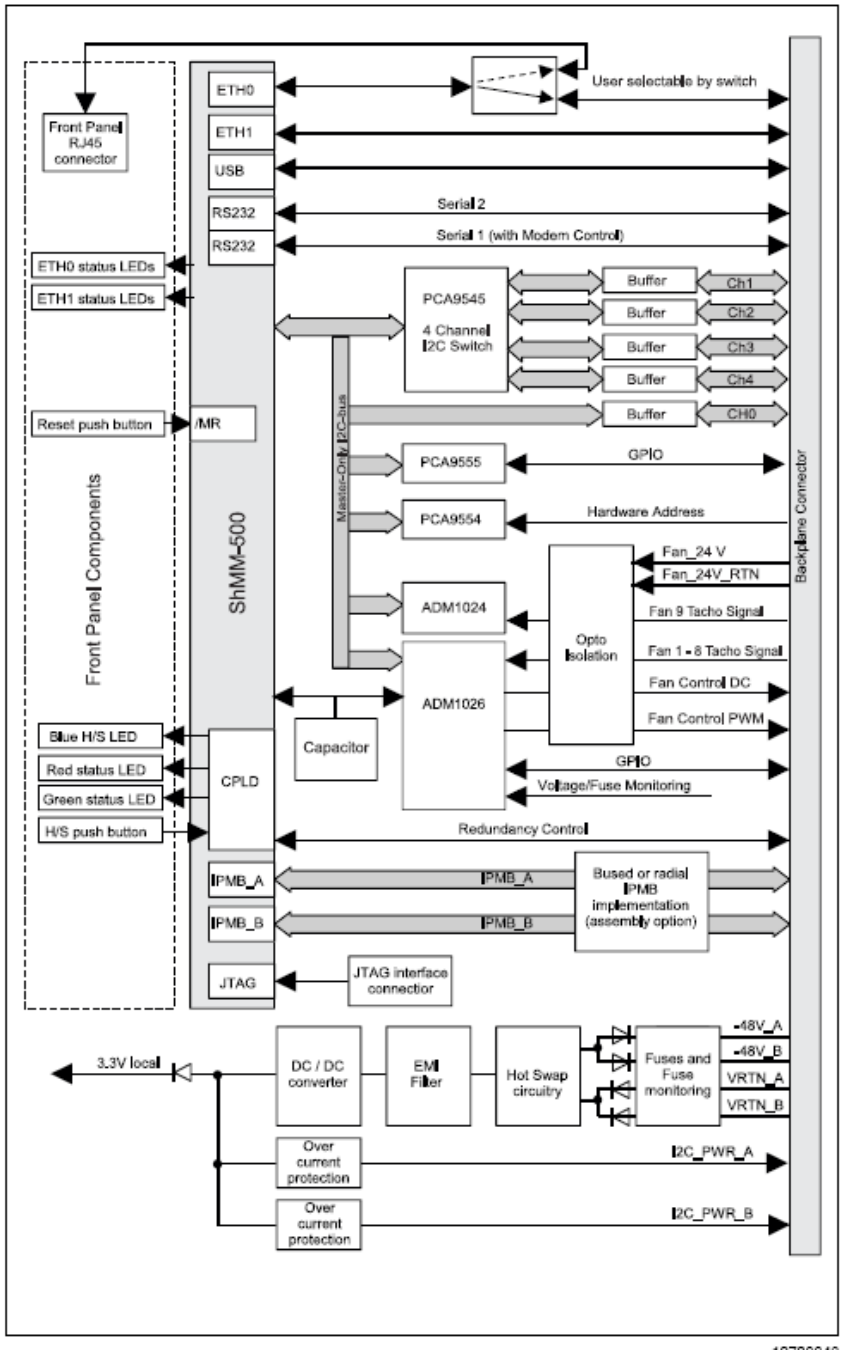
Remove:
Remove the fixing screw (1) and pull at both locking springs (2).
The ShMM-500 will snap into removable position (A). In this position you can safely pull out the ShMM-500.

Insert:
Insert the ShMM-500 with an angle of approximate 33° in the slot. Press the ShMM-500 downwards until the locking springs (2) engage.

Reinstall the fixing screw (1).

4. Shelf Manager Block Diagram

Figure 4: Shelf Manager Block Diagram



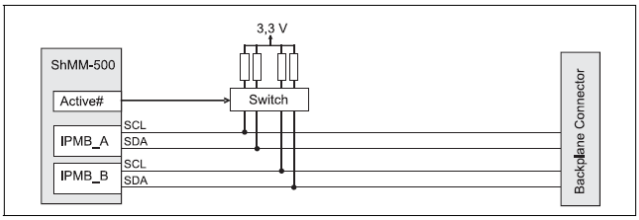
5. IPMB

5.1 Bused IPMB Interface

The ShMM-500 provides two IPMBs. The IPMB-A and IPMB-B from the ShMM-500 are routed directly to the Backplane connector. The ATCA Backplane buses the two IPMBs to the ATCA boards.

The Active# signal of the ShMM-500 is used to switch on/off the pull-up resistors of the IPMBs.

Figure 5: Block diagram bused IPMB



6. RS-232 Interfaces

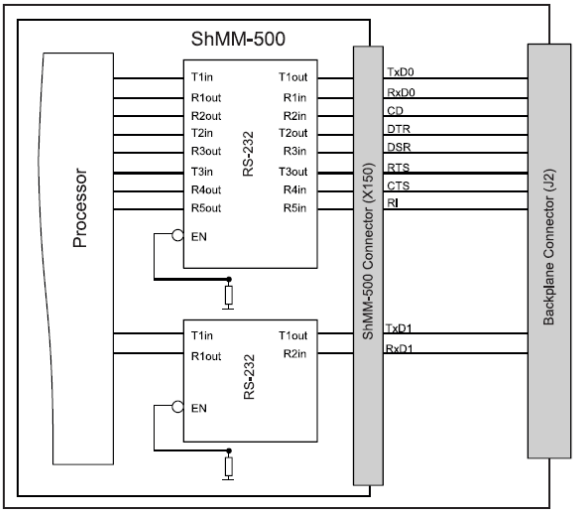
The Shelf Manager provides two RS-232 interfaces. The first serial port is implemented using the built-in UART3 controller, the second serial port is implemented using the built-in UART0 controller of the processor on the ShMM-500.

The on-board RS-232 transceiver on the ShMM-500 is always enabled because the Ser_EN0 signal is pulled down on the ShMM-500.

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 Manager.

The second serial interface does not provide modem control signals. These signals are also routed to the backplane connector but not used in the FlexChassis ATCA-5U DC and –SH140 (12U DC).

Figure 6: RS-232 Serial Ports



The serial console default configuration is:

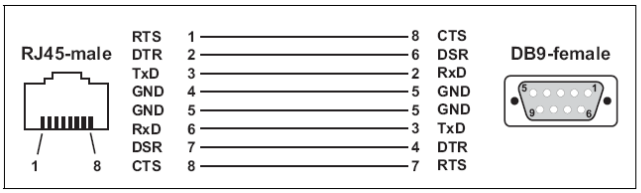
- *115200 baud*
- *no parity*

- *8 data bits*
- *1 stop bit*

6.1 Serial Console Cables

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

Figure 7: RJ45 to DB9 Serial Console Cable



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.

7. Ethernet Interface

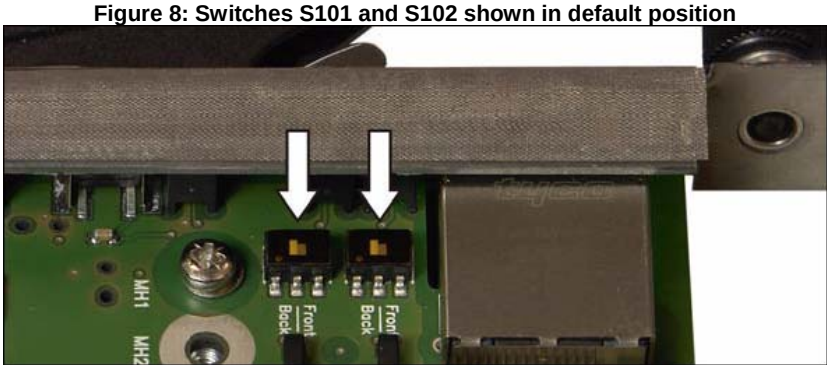
The front panel ETH0 Ethernet connector is intended for service use only or for debugging purposes in laboratory environment. The computer which is connected to this interface must be located nearby the shelf manager with an Ethernet cable that is not longer than 10m. The front panel Ethernet connector 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-switch) and the backplane connector going to the hub board base interface (“Back”-position of the rocker-switch).

The ATCA specification requires a base channel interface between the shelf manager and the Hub board.

The ETH0 rocker-switch MUST be in “Back”- position in normal operation of the shelf manager in an ATCA-shelf.

Figure 8: Switches S101 and S102 shown in default position



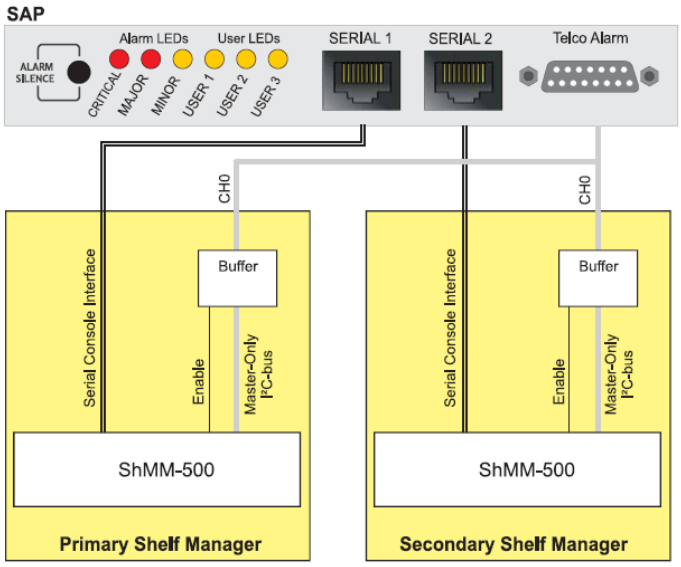
8. Shelf Manager and Shelf Alarm Panel

Some Shelf Manager I/O functionalities have been moved to a separate Board called Shelf Alarm Panel (SAP). The SAP provides the RJ45 Serial Console connectors, the 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 switch 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 Manager and the SAP. Please note that the design of the SAP is Shelf dependent; please see the FlexChassis ATCA-5U DC or SH140 (12U DC) User Manual for the actual SAP-implementation in your Shelf.

Please see Chapter 16, "Telco Alarms" for detailed information concerning the Telco Alarm interface and the user definable LEDs.

Figure 9: Connection between Shelf Manager and SAP



9. Master-Only I²C Bus

The master-only I²C bus is used on the ShMM-500 for the RTC and SEEPROM devices. The Shelf Manager carrier board also has a number of onboard I²C devices connected to the master-only I²C bus. These devices are:

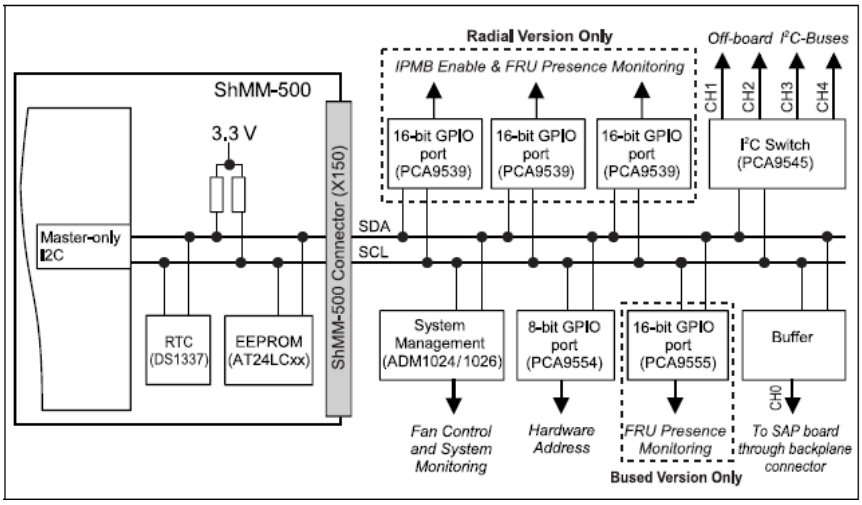
- PCA9554: reads the hardware address at the backplane connector
- PCA9555: monitor the presence signals from the PEMs, SAP, Airfilter and Fan Trays (only bused version)
- ADM1024/1026: monitor all Shelf Manager voltages, monitor/controls the Fan Trays, provides the board temperature
- PCA9545: This 4-channel switch divides the I²C-bus in 4 channels to:
  - the Shelf FRU SEEPROMs (Channel 1 and 2)
  - the Fan Trays and Shelf temperature sensors (Channel 3)
  - the PEMs (Channel 4)

Any individual SCx/SDx channel or combination of channels can be selected by changing the contents of the programmable control register of the PCA9545. Software running on the ShMM-500 is responsible for enabling/disabling individual I²C channels at each particular time, so that no address conflict results on the merged master-only I²C bus.

The master only I²C-bus is also buffered and then routed to the SAP providing Telco Alarm signalizing (Channel 0).

The 'Active' signal of the ShMM-500 is used to enable the I²C switch PCA9545 and the buffer, so that only the active Shelf Manager has access to the Shelf I²Cbus devices.

Figure 10: Master-Only I2C-bus



The following table lists the I²C slave devices. The ShMM-500 on-board RTC and SEEPROM and the Shelf devices are included for completeness.

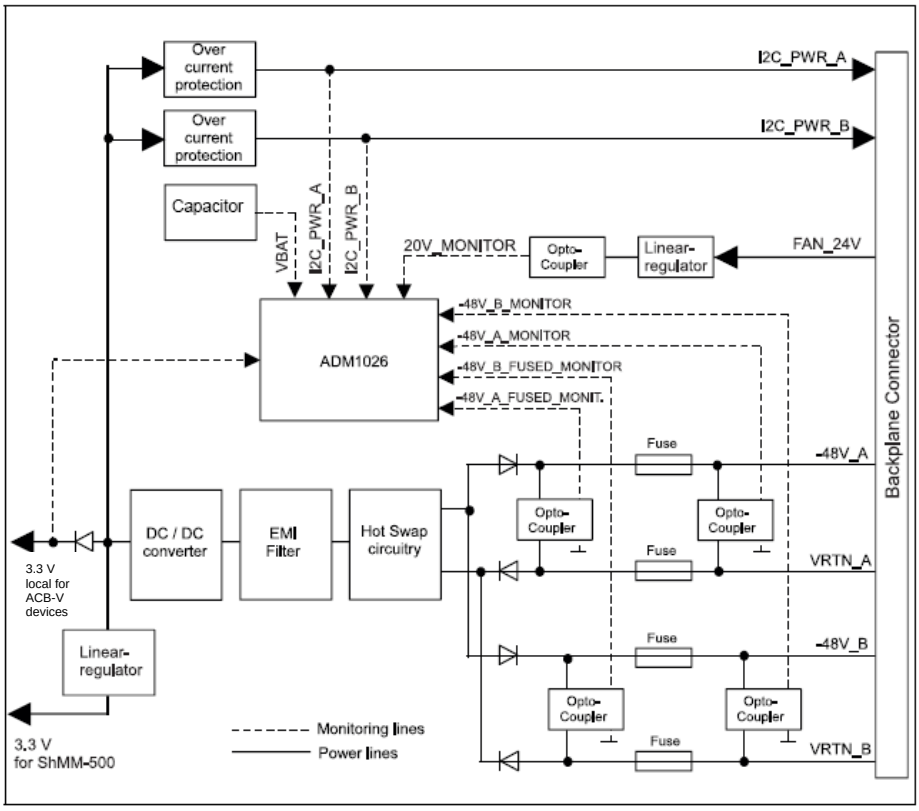
Table 1: I²C-bus addresses of the Shelf

I²C addr.	ShMM	Shelf manager	SAP (CH 0)	CH 1	CH 2	CH 3	CH 4
0x44 / 22			PCA9555 Telco Alarms				
0x46 / 23		PCA9554 HW-Addr					
0x48 / 24						PCA9555 Fan Tray 0 (left)	PCA9555 PEM A
0x4a / 25						PCA9555 Fan Tray 1 (center)	PCA9555 PEM B

0x4c / 26						PCA9555 Fan Tray 2 (right)	
0x4e / 27		PCA9555 GPIO (only bused version)					
0x58 / 2C		ADM1024					
0x5c / 2E		ADM1026					
0x90 / 48						LM75 temp sensor	
0x92 / 49						LM75 temp sensor	
0x94 / 4a						LM75 temp sensor	
0x96 / 4b			LM75 SAP temperature				
0x98 / 4c						LM75 temp sensor	LM75 PEM A
0x9a / 4d						LM75 temp sensor	LM75 PEM B
0x9c / 4e						LM75 temp sensor	
0xa0 / 50	SEEPROM						
0xa4 / 52				SEEPROM CDM 1	SEEPROM CDM 2		
0xa6 / 53			SEEPROM SAP				
0xa8 / 54						SEEPROM Fan Tray 0 (left)	SEEPROM PEM A
0xaa / 55						SEEPROM Fan Tray 1 (center)	SEEPROM PEM B
0xac / 56						SEEPROM Fan Tray 2 (right)	
0xe0 / 70		PCA9545 I²C-bus switch					
0xd0 / 68	RTC DS1337						

10. Power Entry Module

Figure 11: Power Entry Module Block Diagram



10.0.1. DC-DC Converter

The DC-DC converter on the Shelf Manager provides the power (3.3 V) for all on-board devices and all off-board I²C devices inside the Shelf.

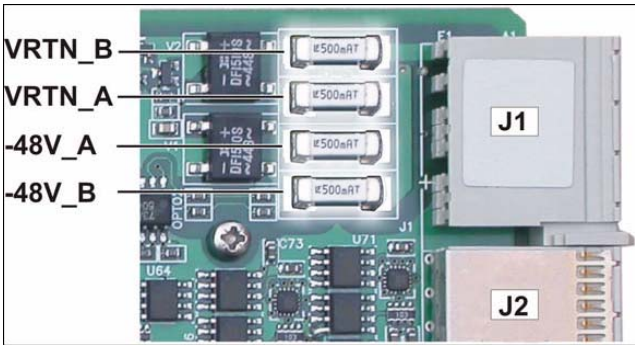
The 3.6 V local power is routed through two current limiting circuits to create two redundant voltages, I2C_PWR_A and I2C_PWR_B.

I2C_PWR_A and I2C_PWR_B are routed to the backplane connector and used to power I²C-devices on FRUs like Fan Tray, PEM or SAP. If one of these voltages is short circuited on 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.

10.0.2. 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.

10.0.3. Voltage and Fuse Monitoring

To detect a missing supply voltage as well as a blown fuse the ADM1026 provides voltage monitoring and control functions. The -48 VDC input voltage before and after the fuses are connected to the ADM1026 chip through opticalisolation devices, all other voltages are connected directly.

Table 2: Voltage and Fuse Monitoring

Signal	Description	Device	Measurement
3.3V local	3.3 V supply for Shelf Manager on-board devices and for the ShMM-500	ADM1026 , pin 22	Analog
I2C_PWR_A	3.6 V supply redundant path A going to Shelf I²C-devices	ADM1026 , pin 32	Analog
I2C_PWR_B	3.6 V supply redundant path B going to Shelf I²C-devices	ADM1026 , pin 30	Analog
-48V_A_MONITOR	Indicates the presence of the –48 V_A / VRTN_A at the backplane connector (J1).	ADM1026 , pin 46	Presence/Absence
-48V_A_FUSED_MONITOR	Indicates the presence of the –48 V_A / VRTN_A after the Shelf Manager's mains fuse.	ADM1026 , pin 44	Presence/Absence
-48V_B_MONITOR	Indicates the presence of the –48 V_B / VRTN_B at the backplane connector (J1).	ADM1026 , pin 45	Presence/Absence
-48V_B_FUSED_MONITOR	Indicates the presence of the –48 V_B / VRTN_B after the Shelf Manager's mains fuse.	ADM1026 , pin43	Presence/Absence
VBAT	Backup-Battery voltage (Backup-Battery is assembly option)	ADM1026 , pin 29	Analog
20V_MONITOR	Indicate the presence of the 20 V auxiliary voltage supply generated on Fan Trays	ADM1026 , pin42	Presence/Absence

11. Fan Control

The Shelf Manager provides fan control functionality through the ADM1024/1026 system management controllers.

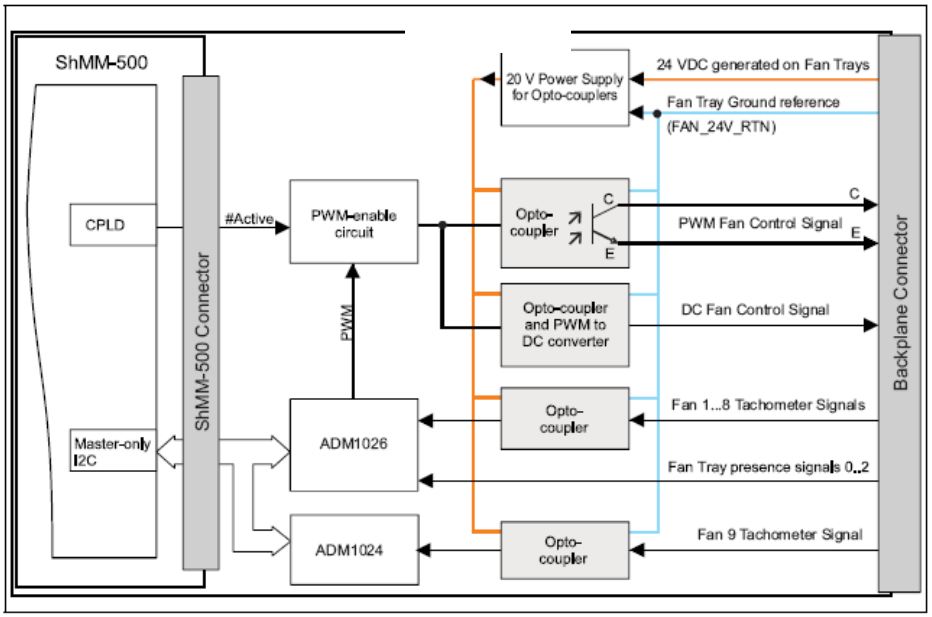
The fan speed is controlled by a 75 Hz PWM signal generated on the ADM1026. The PWM output from the ADM1026 is buffered and enabled by the ShMM-500's ACTIVE# signal so that only the active Shelf Manager controls the fan speed. The PWM signal is opto-isolated and routed to the backplane connector. For voltage-regulated Fans the Shelf Manager provides a converter 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 Fan Trays are routed through the backplane connector opto-isolated to the digital inputs of the ADM1026. Because the ADM1026 has only eight digital inputs with tachometer functionality, the signal of a ninth Fan is routed to the ADM1024.

Three digital inputs to the ADM1026 (FANP0..2/GPIO9..GPIO11) are used to detect the presence of 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



11.1. Fan Trays

11.1.1 Control characteristics (examples)

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

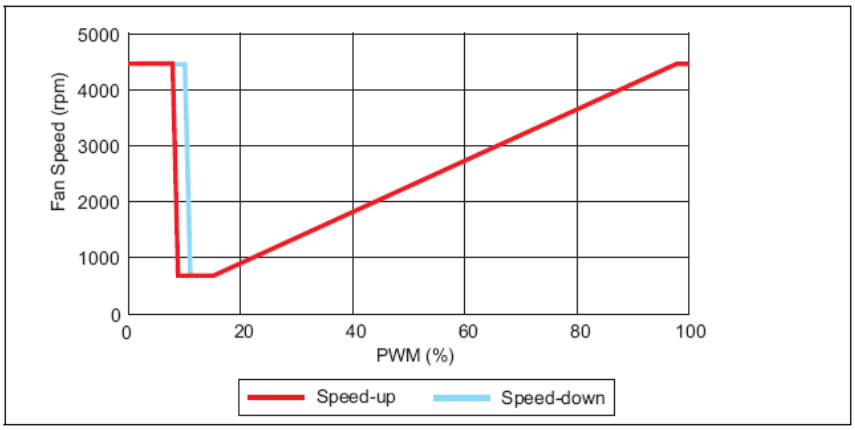


Figure 15: Fan Speed Control (Control Voltage) for Shelves 11592-40x

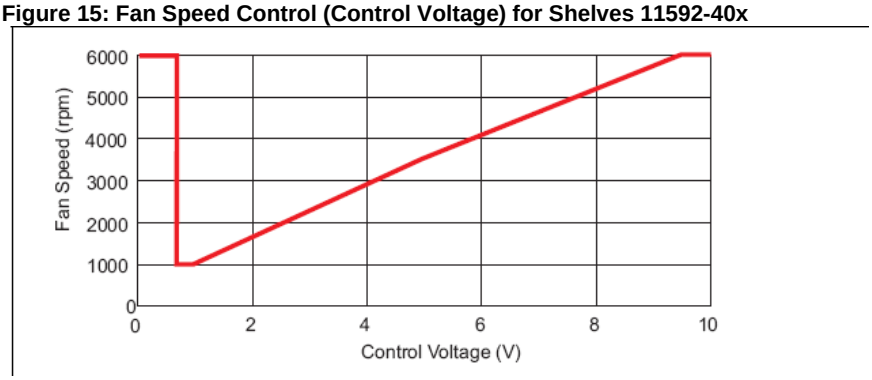


Figure 16: Fan Tacho Signal Output

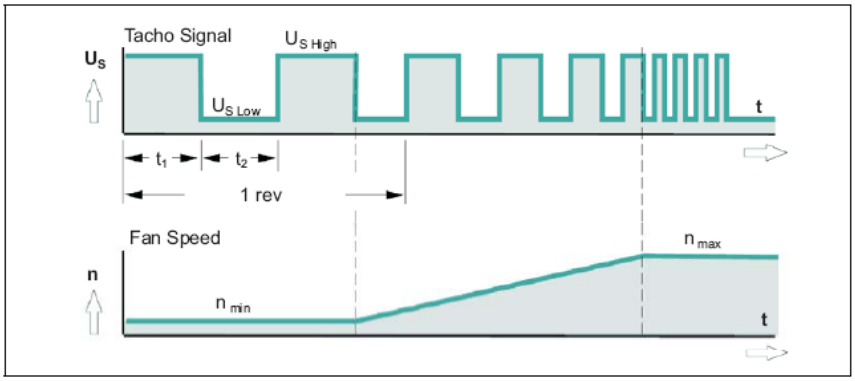
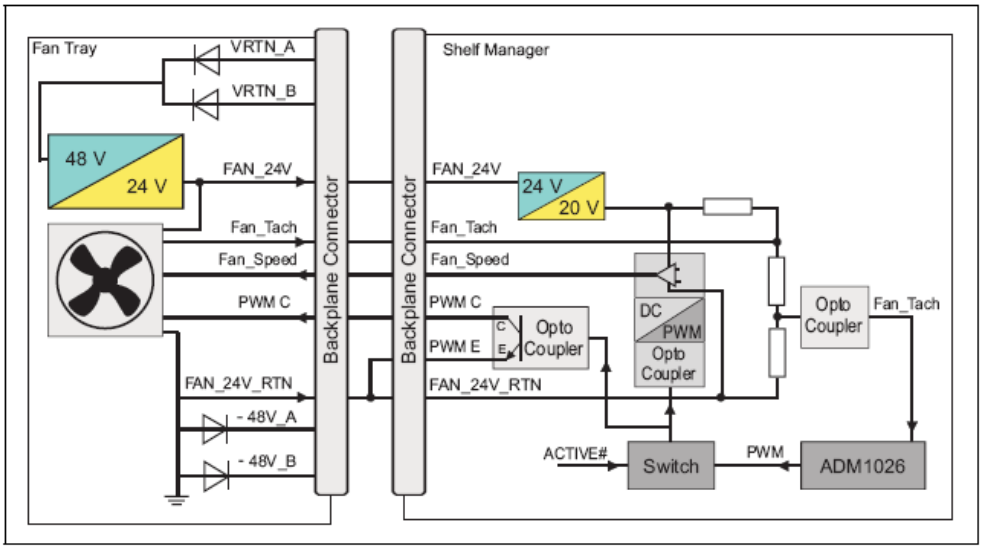


Table 3: Fan Tacho Data

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

11.1.2 Block Diagram Fan Tray - Shelf Manager

Figure 17: Block Diagram Fan Tray - Shelf Manager



12. Hardware Address

The PCA9554 on the SHELF MANAGER 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-500 software determines the hardware address by reading the input port register of the PCA9554 at address 0x46.

Figure 18: Hardware Address

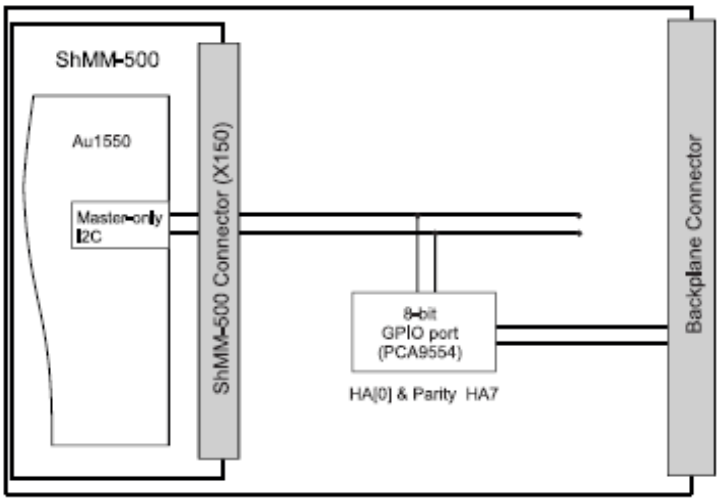


Table 4: Allocation PCA 9554 GPIO Signal Pins to hardware address bits

Switch/Source	Signal	GPIO
J2 pin D3	HA0	0x46-I/O0
Tied to ground	HA1	0x46-I/O1
Tied to ground	HA2	0x46-I/O2
Tied to 3.3V	HA3	0x46-I/O3

Tied to ground	HA4	0x46-I/O4
Tied to ground	HA5	0x46-I/O5
Tied to ground	HA6	0x46-I/O6
J1 pin E10	HA7/P	0x46-I/O7

Table 5: 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.

13. RESET

13.1. Reset Input / Output

The Shelf Manager provides a RESET push button on the front panel. It is connected to the ShMM-500's /MR signal.

The /MR signal is driven low by the CPLD on the ShMM-500 when the watchdog timer has expired. Additionally, the Shelf Manager and ShMM-500 may be reset by the user using the RESET Push Button.

The ShMM-500 activates the /Reset output signal on the following condition:

Condition	Software/Hardware
Under software control	Software
Expiration of the watchdog timer	Hardware
Under-voltage condition or on-board LDO regulator failure	Hardware
Activation of the input /MR signal	Hardware

The /Reset signal clears all logic on the Shelf Manager. The duration of the low pulse on the /Reset output is 200 ms.

14. 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.

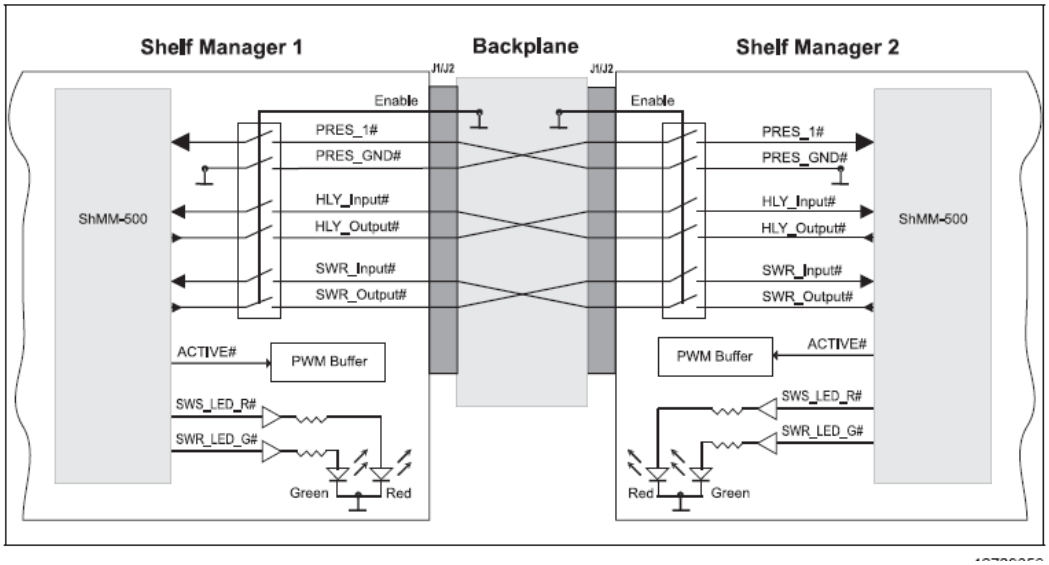
14.0.1. Hardware Redundancy Interface

The Shelf Manager provides a hardware redundancy interface with dedicated communication paths between dual Shelf Managers for redundant operation.

The hardware redundancy interfaces of the Shelf Managers are as follows:

- Cross connected Shelf Manager present input (PRES_1#) and output (PRES_GND#)
- Cross connected Shelf Manager health input (HLY_Input#) and output (HLY_Output#)
- Cross connected negotiation input (SWR_Input#) and output (SWR_Output#)
- Active output from the ShMM-500 (ACTIVE#) that is used by the SHELF MANAGER to enable interfaces that must be exclusively driven by the active Shelf Manager, specifically PWM and fan tachometer buffers Shelf Manager, specifically PWM and fan tachometer buffers
- Two status LEDs using the SWS_LED_G# (Green) and SWS_LED_R# (Red) signals of the ShMM-500
- The PRES_1# signal is grounded on the redundant Shelf Manager. This indicates both Shelf Managers the presence of the other.

Figure 19: Shelf Manager redundancy control



15. Hot Swap Interface

The Shelf Manager provides a Hot Swap interface allowing the SHELF MANAGER to be replaced without powering down the Shelf. The Hot Swap interface is implemented using the on-ShMM-500 CPLD device. The interface is composed of three components:

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

15.1 Hot Swap Switch

The Shelf Manager provides a Hot Swap switch signal using a micro-switch to sense the injector/ejector handle position. The micro-switch provides an input (HS_LATCH) to the ShMM-500 CPLD, which is responsible for taking appropriate hardware actions as well as signaling the condition to the software.

Micro-Switch	HS_LATCH Signal	HSL Bit in the CPLD	Condition
Open	High	0	Handle opened
Closed	Low	1	Handle closed

15.2 Board Presence

Each Shelf Manager grounds the PRES_1# input signal of the other Shelf Manager when installed into the ATCA Backplane. This signal is responsible for taking appropriate hardware action as well as signaling the condition to the software.

15.3 Hot Swap LED

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

Table 6: Hot Swap LED

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

16. Telco Alarms

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

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

In the FlexChassis ATCA-5U DC and –Sh140 (12U DC) 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 I²C connection at address 0x44. The Shelf management software running on the ShMM-500 is responsible for:

- Configuring the PCA9555 as inputs or outputs, as appropriate for the Telco interface signal that a particular pin is attached to.
- 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 Shelf Manager onto the shared interrupt line going to the INT# input of the ShMM-500. Software running on the ShMM-500 is responsible for reacting to an input change when an interrupt is triggered by the PCA9555.

For more information see Chapter 8, "Shelf Manager and Shelf Alarm Panel" and the Chapter “SAP“ in the FlexChassis ATCA-5U DC and –SH140 (12U DC) User Manuals.

17. Shelf Manager Connectors

Table 7: 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 20: Backplane Connectors

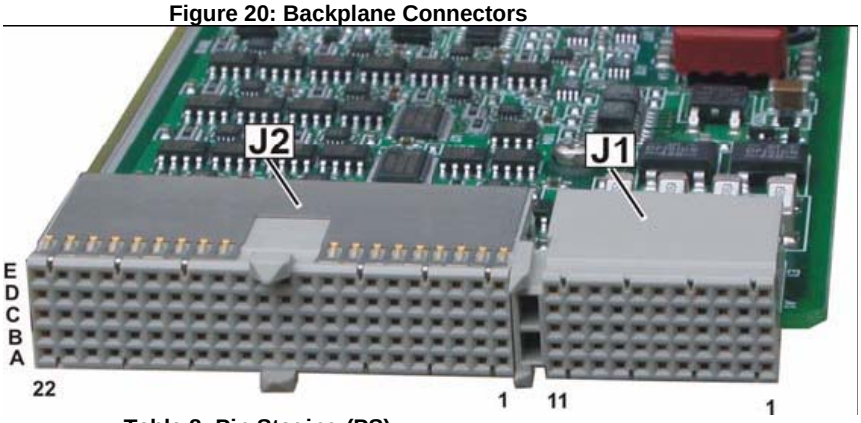


Table 8: Pin Staging (PS)

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 9: Backplane Signal Connector (J1) 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_PRES_A	**A**	SAP_PRES	**A**	SWR_Input#	**A**	HLY_Input#	**A**	SWR_Output#	**A**
10	TX+	**A**	TX-	**A**	HS_EN	**A**	HLY_Output#	**A**	HA7	**A**

11	AIR_FILT_PR	A	PEM_PRES_B	A	RX+	A	RX-	A	PRES_1#	A	

Table 10: Backplane Signal Connector (J2) pin assignment (Bused IPMB)

	a	PS	b	PS	c	PS	d	PS	e	PS	f	PS
1	FAN_PRES0	A	TXD0	A	TXD1	A	FAN_PRES2	A	INT#	A	GND	C
2	FAN_PRES1	A	DTR	A	Pres_GND	A	CI	A	DSR	A		C
3	CD	A	RTS	A	RXD1	A	HA[0]	A	CTS	A	GND	C
4	RXD0	A	SDA_CH1	A	INV_ACTIVE	A	SDA_CH0	A	GND	A		C
5	SCL_CH1	A	SCL_CH0	A	RI	A	GND	A	SDA_CH3	A	GND	C
6	S1_TX+	A	S1_TX-	A	GND	B	S2_TX+	A	S2_TX-	A		C
7	S1_RX+	A	S1_RX-	A	GND	B	S2_RX+	A	S2_RX-	A	GND	C
8	SDA_CH4	A	SCL_CH4	A	SCL_CH3	A	SCL_CH2	A	I2C_PWR_B	A		C
9		A		A		A		A	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	CROSS_SDA_B	A		A		A		A		A	GND	C
18	CROSS_SCL_B	A		A		A	IPMB_SDA_A	A	IPMB_SCL_A	A		C
19		A		A		A	I	A		A	GND	C
20		A		A	CROSS_SCL_A	A	CROSS_SDA_A	A		A		C
21		A		A		A		A		A	GND	C
22		A		A		A		A		A		C

Table 11: Backplane connector (J1) and (J2) 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)
CD	Serial Interface 1 Carrier Detect
CI	Chassis Intrusion signal of ADM1026
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
CTS	Serial Interface 1 Clear To Send
DSR	Serial Interface 1 Data Set Ready
DTR	Serial Interface 1 Data Terminal Ready
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
FAN_PRES[0...2]	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#	Health input Shelf Manager (proprietary signal cross-connected on Backplane to HLY_Output of other Shelf Manager)
HLY_Output#	Health output Shelf Manager (proprietary signal cross-connected on Back-plane to HLY_Input of other Shelf Manager)
HS_EN	Tells the Shelf Manager that it is plugged in (Grounded on Backplane)
I2C_PWR_A	3.6 V (max. 500 mA) generated on Shelf Manager, redundant path A for Shelf I2C-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 I2C-devices on Fan Trays, PEMs and SAP
INT#	External Interrupt request (Master Only I2C-bus)
INV_ACTIVE	This ShMM is in active mode (inverted signal of ShMM)
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_PRES_[A, B]	PEM [A, B] presence signal (grounded on PEM when present)
PRES_1#	Shelf Manager board presence signal (proprietary signal cross-connected on Backplane to PRES_GND of other Shelf Manager)
PRES_GND#	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 UCE0 = max. 70 V, Imax = 2 mA
PWM_E	Opto isolated PWM signal for fan speed control, emitter, connected to FAN_24V_RTN on Backplane
RI	Serial Interface 1 Ring Indication
RTS	Serial Interface 1 Request To Send
RX(+-)	Ethernet interface (ETH1) to Hub-Slot (ShMC cross connect)
RXD0	Serial Interface 1 Receive Data
RXD1	Serial Interface 2 Receive Data (not used in Schroff Shelves)

S1_RX(+-)	Ethernet interface (ETH0)
S1_TX(+-)	Ethernet interface (ETH0)
S2_RX(+-)	USB interface, cross-connected on Backplane to S2_TX(+-) of other Shelf Manager
S2_TX(+-)	USB interface, cross-connected on Backplane to S2_RX(+-) of other Shelf Manager
SAP_PRES	Presence signal of SAP (Grounded on SAP when present)
SCL_CH0	Master Only-I2C-bus Channel 0 to SAP
SCL_CH1	Master-Only I2C-bus Channel 1
SCL_CH2	Master-Only I2C-bus Channel 2
SCL_CH3	Master-Only I2C-bus Channel 3
SCL_CH4	Master-Only I2C-bus Channel 4
SDA_CH0	Master Only-I2C-bus Channel 0 to SAP
SDA_CH1	Master-Only I2C-bus Channel 1
SDA_CH2	Master-Only I2C-bus Channel 2
SDA_CH3	Master-Only I2C-bus Channel 3
SDA_CH4	Master-Only I2C-bus Channel 4
SHELF_GND	Shelf Ground
SWR_Input#	Switchover signal from the other Shelf Manager (proprietary signal cross-connected on Backplane to SWR_Output of other Shelf Manager)
SWR_Output#	Switchover signal to the other Shelf Manager (proprietary signal cross-connected on Backplane to SWR_Input of other Shelf Manager)
TX(+-)	Ethernet interface (ETH1)
TXD0	Serial interface 1 Transmit Data
TXD1	Serial interface 2 Transmit Data (not used in Schroff Shelves)
VRTN_A	Voltage return supply A
VRTN_B	Voltage return supply B

18. Technical Data

Table 12: Technical Data

Physical Dimensions	
Height	2 U (Frontplate 10 mm)
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	-40.5 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%, no condensation

Acronyms and Terms

Acronym	Meaning
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
CMM	Chassis Management Module, same as Shelf Manager
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 Transmission Module
Shelf	See “Chassis”
VRTN	Voltage Return