Elma ATCA Shelf Manager Board
Technical Specifications

DCA0XXXXX

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1 Introduction

The Shelf Manager Card by Elma Electronics, Inc. is an 18.5 mm wide, 2½U high and 280 mm deep card that incorporates the Pigeon Point IPM Sentry and meets the PICMG 3.0 specifications for System Management.

The Elma ATCA shelves may use 2 slots for redundant Shelf Managers. Each Shelf Manager executes on an IPM Sentry ShMM-500 device installed on a special carrier board

that is plugged into either a backplane shelf management slot or an interface board that allows for the cable routing of signals.

2 Hardware Platform

2.1 SO-DIMM Socket

The carrier board provides a Small Outline Dual Inline Memory Module (SODIMM) socket for the ShMM. The socket implements a 144-pin, high profile SGRAM SODIMM connector, providing a 3.7mm connector height. The connector is an AMP/Tyco part #390111-1.

2.2 IPMB Interface

The carrier board provides for two IPMB's at the backplane connector.

The IPMB signals are buffered on the ShMM using the Linear Technology LTC4300A-1 device, which implements bi-directional buffering and hot swap support for the IPMB signals.

The bus side buffers are powered from the main +3.3V management power. Bus side pull-up resistor is 3.3V through a 5K resistor, connected to the same power rail as the bus side of the IPMB buffers.

2.3 Serial Interfaces

The carrier board provides a RS-232 interface using a front panel micro DB-25M (DTE) connector that includes a full set of the RS-232 signals, including modem control. The carrier board routes the interface signals from the front panel connector to the serial port of the ShMM-500, implemented using the integrated UART3 controller of the Au1550.

The micro DB-25M connector combines the Serial Interface with the Telco Alarm connections. See section 3.2.1 for the connector pinouts.

2.4 Ethernet Interfaces

The carrier board provides 2 Ethernet 10/100 interfaces. The first interface is configurably routed (via jumpers) to either the front panel RJ-45 connector or to the backplane. The second interface is routed through the backplane to the secondary ShMC ports on the first two slots.

2.5 USB Interface

The USB is used for the inter-ShMM-500 redundancy. These signals are routed over differential pairs on the backplane. The Ethernet 1 connection is an alternate to this redundancy.

2.6 Master Only I²C Bus

The carrier board provides a number of I²C devices using the master-only I²C bus of the ShMM-500. The master-only I²C bus is used internally on the ShMM-500 for implementation of the RTC, EEPROM devices and the ADM1060. Additional I²C devices connected to the bus on the carrier board are used for the following functions:

- System hardware monitoring and control
- GPIO extension, for various purposes

- Implementation of off-board I²C buses

2.5.1 I²C Bus Devices

Table 1 lists the I²C slave devices. The ShMM on-board RTC and EEPROM are included for completeness.

I²C Address	Device	Note
0xD0	RTC (DS1339)	On the ShMM
0xA0	EEPROM (AT24Cxx)	On the ShMM
0xA3	ADM1060	On the ShMM
0x58	ADM1026	On the carrier board
0x5A	ADM1031 (fan tach/PWM)	Build-time option on the carrier board
0x5C	ADM1031 (fan tach/PWM)	Build-time option on the carrier board
0x44	PCA9555 (Telco Alarm)	On the carrier board
0x46	PCA9555	On the carrier board
0xA6	SEEPROM (shelf FRU information)	Reserved for shelf FRU SEEPROM on the backplane
0xE0	PCA9545 (off-board I²C)	On the carrier board

Table 1: I²C Devices Address Map

Note: *If two redundant SEEPROM's are used the following connections should be made.*

- *Both SEEPROM's should be wired for the I²C address 0xA6.*
- *The off-board I²C bus 0 of the first management slot is connected to the off-board I²C bus 1 of the second management slot and to the first FRU SEEPROM.*
- *The off-board I²C bus 1 of the first management slot is connected to the off-board I²C bus 0 of the second management slot and to the second FRU SEEPROM.*

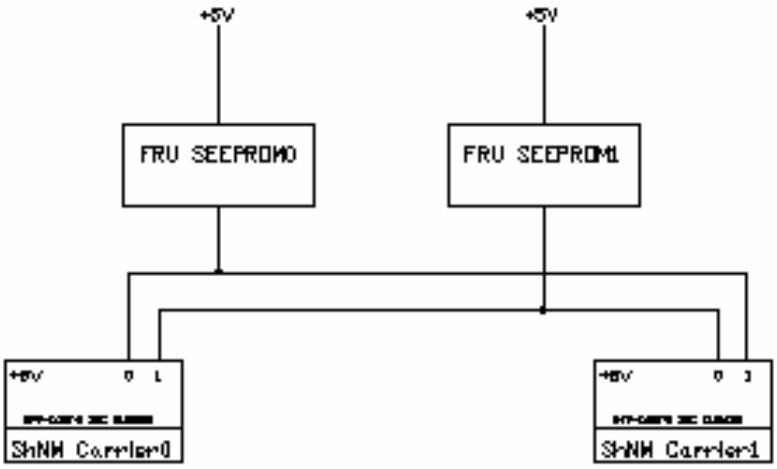

Figure 1: The SEEPROM Connections

2.7 Off Board I²C Buses

The carrier board provides 4 off-board I²C buses that are multiplexed versions of the on-board master-only I²C bus. The off-board I²C buses are available on the backplane connector and dedicated for the following uses:

- o Shelf FRU (buses 0 and 1)

- Power supply monitoring and control (bus 2)
- Thermal sensors (bus 3)

Off-board I²C buses 0 and 1 allow for redundant SEEPROM's for storing the shelf FRU information. Which ever shelf manager is the primary shelf manager will write the shelf FRU information from the SEEPROM connected to it's bus 1 to the SEEPROM connected to it's bus 0. This provides for redundant shelf FRU information that will be identical on both SEEPROM's.

Off-board I²C buses 2 and 3 have a dedicated interrupt request signal. The Interrupt request signals are connected to the interrupt inputs on the I²C multiplexer and may be individually masked. The interrupt request output of the multiplexer is connected to the ShMM-500 INT# input.

The carrier boards provides pull-up resistors for the off-board I²C buses and interrupt request signals for buses 2 and 3. The I²C bus multiplexer/switch signals are 5V tolerant when powered from +3.3V and the device provides voltage conversion, so different buses may transparently operate at different levels. The on-board part of the master-only I²C bus always operates at +3.3V. The pull-up resistors for the off-board I²C buses are connected to +5V.

2.8 Hardware Monitoring and control

2.8.1 Power Entry Module

There are two options on the monitoring of the Power Entry Module (PEM).

1. Using an I²C interface. This will be connected to a PCA9555 with a hardware address of 0x46.

2. Directly monitoring the -48VDC input along with a LM75 thermal sensor.

2.8.2 Power Entry Module Presence Inputs

The shelf manager provides 6 Power Entry Module Presence inputs. The inputs have 10k pull-up resistors to 3.3V. The signals are available on the backplane connector. The inputs are connected to the GPIO pins of the PCA9555 device.

2.8.3 Voltage Sensors

The carrier board provides sensors for the following power supply voltages

- On-board +3.3V (ShMM-500 and carrier bard main power)
- On-board +5V
- On-board backup battery
- Six off board -48VDC inputs.

2.8.4 Temperature Sensors

The carrier board provides one temperature sensor. The sensor is built into the system monitoring chip (ADM1026) and provides readings of the chip temperature with a 1°C resolution (8 bit) and a ±3°C accuracy.

Additional temperature sensors may be implemented with LM75 devices connected to one of the off-board I²C buses. Up to 8 devices may be connected to each of the off-board I²C buses.

2.8.5 Fan Tray Presence Inputs

The shelf manager provides 8 Fan Tray Presence inputs. The inputs have 10k pull-up resistors to 3.3V. The signals are available on the backplane connector and should be routed to the fan tray connectors. A fan tray should connect the respective signal to ground to indicate its presence in the shelf to the Shelf Manager. The inputs are connected to the GPIO pins of the ADM1026 device.

2.8.6 Fan Tray Fail Outputs

The shelf manager provides 8 Fan Tray Fail Outputs. The inputs have 10k pull-up resistors to 3.3V. The signals are available on the backplane connector and should be routed to the fan tray connectors to provide a LED signal indicating a fan failure within the fan tray.

2.8.7 Fan Tachometer inputs

The shelf manager provides for up to 12 fan tachometer inputs. The inputs have 10k pull-up resistors to 3.3V and protection circuitry.

The signals are routed to the fan tachometer inputs of the ADM1026 device and two ADM1031 devices.

The inputs are organized a 3 groups of 4 inputs. The first group is directly connected to the ADM1026 tachometer inputs and is constantly monitored. The second and third groups are connected to the ADM1026 tachometer inputs through two ADM1031's and a software controllable switch to allow for constant monitoring of all 12 tachometer inputs.

2.8.8 PWM Outputs (Fan Speed Control)

The shelf manager provides 4 Pulse Width Modulation (PWM) outputs for fan speed control. The output drivers are Open-Drain with a 24mA sinking current and a maximum allowable voltage of +5.5V. An inactive (high) level on the output should correspond with the maximum fan rotation speed. The outputs are actively driven only when the ShMM-500 on the shelf manager is in an active state.

2.8.9 Air Filter Presence Inputs

The shelf manager provides 4 Air Filter Presence inputs. The inputs have 10k pull-up resistors to 3.3V. The signals are available on the backplane connector and should be routed to the air filters. An air filter tray should connect the respective signal to ground to indicate its presence in the shelf to the Shelf Manager. The inputs are connected to the I/O pins of the PCA9555 device.

2.9 Hardware Address

The hardware address settings of the backplane connector are determined from the ShMM software by two ShMM-500 GPIO pins. There are two management slots on a backplane, but two bits are used to make sure that the board is seated well on a backplane. The shelf manager provide 10K pull-up resistors for the address lines and a backplane should connect HA[0] to ground for the first shelf manager and HA[1] to ground for the second shelf manager.

Table 2 below illustrates this connectivity.

HA[1]	HA[0]	Description
0	0	Error
1	0	First Management Slot (fc)
0	1	Second Management Slot (fe)
1	1	Error, Board is not seated well

Table 2: Hardware Address

2.10 Telco Alarm

The shelf manager provides Telco Alarm functionality that includes the following aspects:

- Micro DB25 Telco Alarm Interface (this connector also provides the RS232 interface)
- Telco Alarm LED's
- Telco Alarm Cutoff push button

All three aspects of the Telco interface are controlled by a single Phillips PCA9555 16-bit I″C port device. The 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, and also for reading and writing GPIO port registers at the appropriate times.

The PCA9555 generates an active low interrupt output when one of the inputs has changed its value. That interrupt output is routed on the shelf manager onto the shared interrupt lint 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.

2.11 Redundancy Control

The ShMM-500 supports redundant operation with an automatic switchover between the two shelf managers. In a configuration where two shelf managers are present, one acts as the active shelf manager and the other acts as a standby shelf manager. Both shelf managers monitor each other, and either shelf manager can trigger a switchover is necessary.

The carrier provides a number of hardware redundancy interfaces on the backplane connector. The redundancy interfaces are implemented using the on-ShMM-500 CPLD device.

The local present output (PRES_L#) is implemented as a medium length pin on the backplane connector. To make the signal active (low) only when all other pins make contact, the board presence signal (PRES#, see 2.11.1) of the hot-swap interface is used. This signal is implemented as a short (last make, first break) pin on the backplane connector, which is grounded on the backplane and has a weak (10K) pull-up on the carrier card.

Figure 2 illustrates the redundancy interface signal connection between the two management slots and the board presence signal implementation.

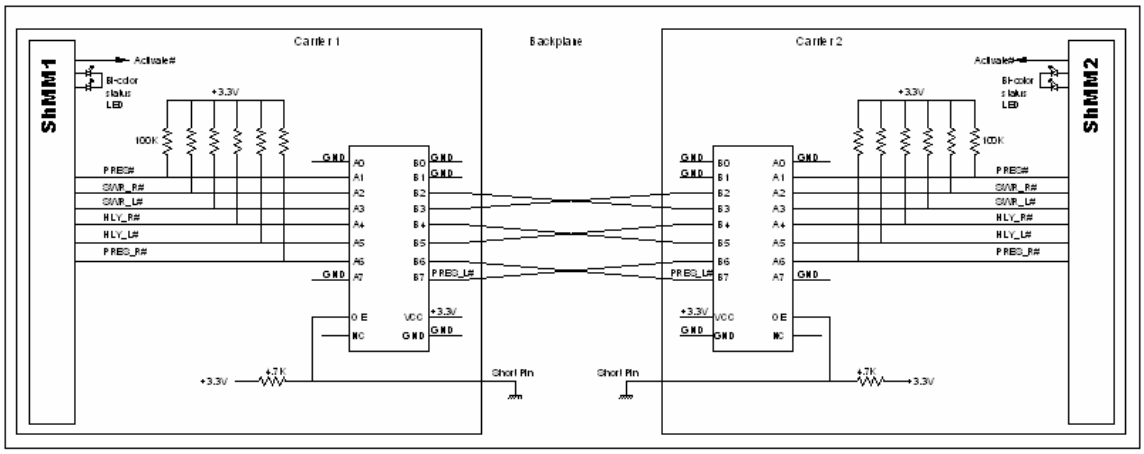

Figure 2: Redundancy interface signal connection

2.11.1 Hardware Redundancy Interface

The hardware redundancy interfaces for the carriers are as follows:

- Cross connected ShMM-500 present input (PRES_R#) and output (PRES_L#)
- Cross connected ShMM-500 healthy input (HLY_R#) and output (HLY_L#)
- Cross connected negotiation input (SWR_R#) and output (SWR_L#)
- Activate output from the ShMM_500 (ACTIVE#) that is used by the carrier to enable interfaces that must be exclusively driven by the active ShMC, specifically, PWM and fan tachometer buffers
- Bi-color LED using SWS_LEDG# (Green) and SWS_LED_R# (red) signals

2.11.2 Shelf Manager Status LED

Shelf Manager status is indicated using Bi-color LED's. The illumination state of the LED is normally controlled by the on-ShMM-500 CPLD. Two bits in the CPLD register are available to software to perform a lamp test of the LED and/or take over the control of the LED.

Table 3 shows the LED states and their meanings when the LED is controlled by the CPLD:

LED State	Condition
Solid Green	Active
Blinking Green	Standby
Red	Failed

Table 3: ShMM-500 Switchover LED States

Note that the blink rate of the Status LED is directly determined by the WDT strobe rate. Each strobe toggles the state of the blinking LED.

2.12 Hot Swap Interface

The ShMM-500 provides a hot swap interface. The interface is composed of three components:

- Handle switch

- Presences signal (PRES#) indicating that the carrier is fully seated into its backplane
- Hot swap LED

2.12.1 Handle Switch and Board Presence Signal

The carrier board provides handle switch and board presence signals to dedicated inputs of the ShMM-500. The handle switch signal is implemented as a switch that is mechanically connected to the board ejector handle and connects the appropriate pin of the ShMM-500 to ground when activated.

The board presence signal is implemented on the backplane connector. The pin is connected to ground on the backplane and the Shelf Manager provides a pull-up resistor for the signal. This signal is also used to generate the local presence signal (PRES_L#) of the redundancy interface.

2.12.2 Hot Swap LED

The carrier board provides a hot swap (Blue) LED. This signal lights when it is safe to remove the carrier board from a live shelf and functions as shown in table 4.

State	Condition
Off	The carrier board is not ready to be removed/disconnected from the shelf
Blue	The carrier board is ready to be removed/disconnected from the shelf
Long Blink	The carrier board is activating
Short Blink	Deactivation has been requested

Table 4: Hot Swap LED States

2.13 Reset

The carrier board provides a reset button on the front panel. Activation of the button results in a full board reset, which is the equivalent of power cycling the board. To avoid unintended resets of the board, a sharp pointed object is required to depress the button.

2.14 Power

The carrier board provides a DC/DC converter with –48VDC redundant input (four inputs) and +5VDC output voltages. The +5VDC is converted to the +3.3VDC main power with an IRU 1030-33 LDO regulator.

2.15 Lithium Backup Battery

The carrier board provides a Lithium “Coin Cell” backup battery. The battery voltage is supplied to the ADM1026 system monitor and to the ShMM-500 connector.

3 Connectors

3.1 Backplane Connector

There are two connectors on the backplane, one for the data signals and one for the power input and monitoring. The connector used for the data signals is a Molex #54145-2409 or equivalent (see figure 3). Table 5 provides the backplane signal/power connector pinout.

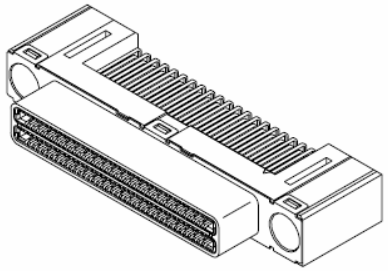

Figure 3: Signal/Power Connector

Pin	Designation	Purpose
1, 2	Gnd	Logic Ground
3	FTFOUT_0	Fan tray fail signal
4	FTFOUT_1	Fan tray fail signal
5	FTFOUT_2	Fan tray fail signal
6	FTFOUT_3	Fan tray fail signal
7	FTFOUT_4	Fan tray fail signal
8	FTFOUT_5	Fan tray fail signal
9	FTFOUT_6	Fan tray fail signal
10	FTFOUT_7	Fan tray fail signal
11,12	Gnd	Logic Ground
13, 14	5VOUT	5V output
15	SDA_B16	Radial IPMB
16	SCL_B16	Radial IPMB
17	SCL_A13	Radial IPMB
18	SDA_A11	Radial IPMB
19	SCL_B11	Radial IPMB
20	SDA_B8	Radial IPMB
21, 22	Gnd	Logic Ground
23	SCL_A8	Radial IPMB
24	SDA_A6	Radial IPMB
25	SCL_B6	Radial IPMB
26	SDA_B3	Radial IPMB
27	SCL_A3	Radial IPMB
28	SDA_A11	Radial IPMB
29	SCL_B2	Radial IPMB
30	SDA_B1	Radial IPMB
31,32	Gnd	Logic Ground
33	SCL_A15	Radial IPMB
34	SDA_B15	Radial IPMB

35	SCL_B15	Radial IPMB
36,37	Gnd	Logic Ground
38	E0RN	Ethernet 0 RX-
39	E0RP	Ethernet 0 RX+
40	RX1N	Ethernet 1 Rx-
41	RX1P	Ethernet 1 Rx+
42, 43	N/C	
44	TACH1	Fan Tach signal
45	TACH0	Fan Tach signal
46, 47	N/C	
48	-48B1_SENSE	-48V B1 Sense
49	-48B1_RTN_SENSE	-48V B1 Sense Rtn
50, 51	N/C	
52	-48A1_SENSE	-48V A1 Sense
53	-48A1_RTN_SENSE	-48V A1 Sense Rtn
54, 55	N/C	
56	PWM0_OUT	Fan PWM signal
57, 58	N/C	
59	-48V_A	-48V A input
60	-48V_A_RTN	-48VA return
61, 62	Gnd	Logic Ground
63	PEM0	PEM present signal
64	PEM1	PEM present signal
65	PEM2	PEM present signal
66	PEM3	PEM present signal
67	PEM4	PEM present signal
68	PEM5	PEM present signal
69	I2C_0_SDA	Off board I2C bus
70	I2C_0_SCL	Off board I2C bus
71, 72	Gnd	Logic Ground
73	I2C_2_SDA	Off board I2C bus
74	I2C_2_SCL	Off board I2C bus
75	SDA_B7	Radial IPMB
76	SCL_B7	Radial IPMB
77	SCL_B12	Radial IPMB
78	SDA_A12	Radial IPMB
79	SCL_B14	Radial IPMB
80	SDA_A14	Radial IPMB
81, 82	Gnd	Logic Ground
83	SCL_A10	Radial IPMB
84	SDA_B10	Radial IPMB
85	SCL_B9	Radial IPMB
86	SDA_A9	Radial IPMB
87	SCL_A5	Radial IPMB

88	SDA_B5	Radial IPMB
89	SCL_B4	Radial IPMB
90	SDA_A4	Radial IPMB
91, 92	Gnd	Logic Ground
93	SCL_A	IPMB A
94	SDA_B	IPMB B
95	SCL_B	IPMB B
96, 97	Gnd	Logic Ground
98	E0TM	Ethernet 0 TX-
99	E0TP	Ethernet 0 Tx+
100-102	N/C	
103	TACH5	Fan Tach signal
104	TACH3	Fan Tach signal
105	TACH4	Fan Tach signal
106	TACH2	Fan Tach signal
107, 108	N/C	
109	-48B2_RTN_SENSE	-48V B2 sense rtn
110-112	N/C	
113	-48A2_RTN_SENSE	-48V A2 sense rtn
114, 115	N/C	
116	PWM1_OUT	Fan PWM signal
117, 118	N/C	
119	-48V_B	-48V B input
120	N/C	
121, 122	Gnd	Logic Ground
123	FTP1	Fan present signal
124	FTP0	Fan present signal
125	FILTER1	Air Filter Present signal
126	FILTER2	Air Filter Present signal
127	FILTER3	Air Filter Present signal
128	SDA_B13	Radial IPMB
129	I2C_1_SDA	Off board I2C bus
130	I2C_1_SCL	Off board I2C bus
131, 132	Gnd	Logic Ground
133	I2C_3_SCL	Off board I2C bus
134	I2C_2_INT	Off board I2C bus
135	SDA_A16	Radial IPMB
136	SCL_A16	Radial IPMB
137	SCL_B13	Radial IPMB
138	SDA_A13	Radial IPMB
139	SCL_A11	Radial IPMB
140	SDA_B11	Radial IPMB
141, 142	Gnd	Logic Ground
143	SCL_B8	Radial IPMB

144	SDA_A8	Radial IPMB
145	SCL_A6	Radial IPMB
146	SDA_B6	Radial IPMB
147	SCL_B3	Radial IPMB
148	SDA_A3	Radial IPMB
149	SCL_A1	Radial IPMB
150	SDA_B2	Radial IPMB
151, 152	Gnd	Logic Ground
153	SCL_B1	Radial IPMB
154	SDA_A15	Radial IPMB
155	HWA2	Hardware Address
156, 157	Gnd	Logic Ground
158	TX1N	Ethernet 1 Tx-
159	TX1P	Ethernet 1 Tx+
160	USBDP	Secondary USB+
161	USBDM	Secondary USB-
162, 163	N/C	
164	TACH6	Fan Tach signal
165	TACH7	Fan Tach signal
166, 167	N/C	
168	-48B2_SENSE	-48V B2 sense
169-171	N/C	
172	-48A2_SENSE	-48V A2 sense
173-175	N/C	
176	PWM2_OUT	Fan PWM signal
177-179	N/C	
180	-48V_B_RTN	-48V B rtn
181	FTP3	Fan present signal
182	FTP2	Fan present signal
183	PRES_L_L	Present signal L
184	PRES_R_L	Present signal R
185	HLY_R_L	Healthy signal R
186	HLY_L_L	Healthy signal L
187	SWR_R_L	Switchover signal R
188	SWR_L_L	Switchover signal L
189	PRES_L	Present signal
190	SDA_B12	Radial IPMB
191	FTP4	Fan present signal
192	FTP5	Fan present signal
193	FILTER0	Air Filter Present signal
194	I2C_3_SDA	Off board I2C bus
195	I2C_3_INT	Off board I2C bus
196	SCL_A2	Radial IPMB
197	SDA_A2	Radial IPMB

198	SCL_A7	Radial IPMB
199	SDA_A7	Radial IPMB
200	SDA_B14	Radial IPMB
201	SCL_A12	Radial IPMB
202	FTP6	Fan present signal
203	FTP7	Fan present signal
204	SDA_A10	Radial IPMB
205	SCL_A14	Radial IPMB
206	SDA_B9	Radial IPMB
207	SCL_B10	Radial IPMB
208	SDA_A5	Radial IPMB
209	SCL_A9	Radial IPMB
210	SDA_B4	Radial IPMB
211	SCL_B5	Radial IPMB
212, 213	Gnd	Logic Ground
214	SDA_A	IPMB A signal
215	SCL_A4	Radial IPMB
216	HWA1	Hardware Address
217, 218	Gnd	Logic Ground
219	USB0P	Primary USB+
220	USB0M	Primary USB-
221-223	N/C	
224	TACH9	Fan Tach signal
225	TACH11	Fan Tach signal
226	TACH8	Fan Tach signal
227	TACH10	Fan Tach signal
228, 229	N/C	
230	-48B3_RTN_SENSE	-48V B3 sense trn
231	-48B3_SENSE	-48B B3 sense
232, 233	N/C	
234	-48A3_RTN_SENSE	-48V A3 sense rtn
235	-48A3_SENSE	-48B A3 sense
236, 237	N/C	
238	PWM3_OUT	Fan PWM signal
239, 240	N/C	

Table 5: Backplane Signal Connector Pinout

Note: *The signals highlighted in blue will be routed to a mezzanine connector for future use.*

Name	Count	Description
Gnd	64	Logic Ground
GA0…7	8	Hardware Address
Reserved	32	Reserved
SCL_A	1	IPMB A Serial Clock
SDA_A	1	IPMB A Serial Data

SCL_B	1	IPMB B Serial Clock
SDA_B	1	IPMB B Serial Data
SCL_3…0	4	Off-board I2C Bus Serial Clock
SDA_3…0	4	Off-board I2C Bus Serial Data
INT_3, INT_2	2	Off-board I2c Bus Interrupt Request
PWM_3…0	4	Pulse Width Modulation outputs (fan speed control)
FTP_7…0	8	Fan Presence inputs
TACH_11…0	12	Fan Tachometer inputs
SCL_A_16…1	16	Radial IPMB A Clock Signals
SDA_A_16…1	16	Radial IPMB A Data Signals
SCL_B_16…1	16	Radial IPMB B Clock Signals
SDA_B_16…1	16	Radial IPMB B Data Signals
FTFOUTPUT_7…0	8	Fan Tray Fail Output Signals
FILTER0…3	4	Air Filter Present signal
USB0P	1	Primary USB+
USB0M	1	Primary USB-
USBDP	1	Secondary USB+ (USB signal from the second Shelf Manager)
USBDM	1	Secondary USB- (USB signal from the second Shelf Manager)
E0TP, E0TM, E0RP, E0RM	4	Ethernet 0 transmit and receive pairs
E1TP, E1TM, E1RP, E1RM	4	Ethernet 1 transmit and receive pairs
PRES#	1	Board seated input (short pin connected to ground on the backplane)
L_PRES#	1	Local Presence
R_PRES#	1	Remote Presence
L_HLY#	1	Local Healthy
R_HLY#	1	Remote Healthy
L_SWR#	1	Local Switchover Request
R_SWR#	1	Remote Switchover Request
PEM_5…0	6	Power Entry Module Present Signals

Table 6: Backplane Signal Connector Pin Definition

3.2 Front Panel Connectors

3.2.1 Serial (RS-232)/Telco Alarm, mini-DB25

Table 7 provides pin definitions for the Serial 0 (RS-232) interface on the front panel of the carrier board.

Pin	Name	Description
1	AMIR+	MinorReset+
2	AMIR-	MinorReset-
3	AMAR+	MajorReset+
4	AMAR-	MajorReset-
5	ACNO	CriticalAlarm - NO
6	ACNC	CriticalAlarm - NC
7	ACCOM	CriticalAlarm - COM
8	AMINO	MinorAlarm - NO

9	CD	Carrier Detect
10	RxD	Receive Data
11	TxD	Transmit Data
12	DTR	Data Terminal Ready
13	SG	Signal Ground
14	AMINC	MinorAlarm - NC
15	AMINCOM	MinorAlarm - COM
16	AMANO	MajorAlarm - NO
17	AMANC	MajorAlarm - NC
18	AMACOM	MajorAlarm - COM
19	APRCO	PwrAlarm - NO
20	APRCOM	PwrAlarm - COM
21	N/C	
22	DSR	Data Set Ready
23	RTS	Request To Send
24	CTS	Clear To Send
25	RI	Ring Indicator

Table 7: Serial (RS-232)/Telco Alarm Connector Pinout

3.2.2 Ethernet 0

This Ethernet connection is routed through a low profile RJ45 connector. Table 8 provides pin definitions for the Ethernet 0 interface on the front panel of the carrier board.

Pin #	Signal
1	TX+
2	TX-
3	RX+
4, 5	Unused pair; terminated on the carrier board
6	RX-

Table 8: Ethernet Connector Pinout

4 Configuration Jumpers and Build-time Options

4.1 Ethernet 0 Routing Jumpers

The carrier board provides two 3x2 jumper blocks for the Ethernet 0 routing either to the front panel connector or to the backplane. Table 10 lists the allowed jumper settings.

JP1	JP2	Description
1-3, 2-4	1-3, 2-4	Ethernet 0 is routed to the front panel connector
3-5, 4-6	3-5, 4-6	Ethernet 0 is routed to the backplane connector

Table 10: Ethernet 0 Routing Jumpers

5 Front Panel

5.1 Front Panel Switches

5.1.1 Reset Switch

The reset push-button is located on the front panel. Mechanical measures to prevent an unintended reset have been implemented. The functional description of the reset button is provided in section 2.12.

5.1.2 Hot Swap Handle Switch

The front panel provides an ejector handle at the bottom. The handle is mechanically integrated with a switch. The switch activates a corresponding signal on the ShMM-500 Hot Swap interface.

5.1.3 Alarm Cut-off Switch

This push-button, which is located in close proximity to the Telco Alarm LED's (see section 5.3.4); implements the Alarm-off switch functionality.

5.2 Front Panel Connectors

Connectors for the following interfaces are located on the front panel:

- RS-232 serial interface/Telco Alarm interface
- RJ45 for Ethernet 0

The pinouts for these connectors are provided in section 3.2.

5.3 Front Panel LED's

5.3.1 Hot Swap LED (Blue LED)

The Hot Swap LED (Blue LED) of the ShMM-500 Hot-Swap Interface is located at the bottom of the front panel. The LED provides a visual indication to service personnel when it is safe to extract the carrier board from a shelf. See section 2.11.2 for a description of the LED states.

5.3.2 Shelf Manager Status Bi-Color LED (standby/active LED)

The Shelf Manager status LED (red/green) of the ShMM-300 Redundancy Interface provides a visual indication to service personnel of the ShMM-300 module status. See section 2.10.2 for a description of the LED status.

5.3.3 FRU Status Bi-Color LED

The carrier board provides a software controllable bi-color (red/green) status LED. The LED is controlled by the ADM1024 GPIO outputs and has no hardware defined meaning. The LED may be used by the ShMM-300 software to report arbitrary status information.

5.3.4 Telco Alarm LED's

Three amber LED's are located on the front panel near the Telco Alarm connector to provide a visual indication of an active alarm condition for the Minor, Major and Critical alarms. When an LED is lit, the respective alarm is active. A blinking LED denotes an

alarm cut-off state, which is initiated by pressing the Alarm Cut-off button (section 5.1.3) when an alarm is active.

5.3.5 Ethernet 0 Link/Active LED's

Two LED's (green and yellow) for the Ethernet 0 interface on the front panel. The LED's indicate the interface Link status and data transmit/receive activity. The indication is available even if the interface itself is routed to the backplane connector.

5.4 Fan Tray LED's

Each fan tray will have a Bi-Color LED indicating whether the fans in the fan tray are functioning properly.

6 Mechanical Specification

The carrier board is a 2.5U board x 280mm by 18.4mm. There is a Molex #54145-2409 connector to route the signals and power to the backplane. See section 3.1 for more information on these connectors.

The front panel has an ejector handle along with a hot swap switch. The switch is activated after all the pins of the backplane connector have a solid match on insertion of the board.

The carrier board implements a discharge strip located along both sides of the bottom edge of the board. The strip is implemented according to the CompactPCI Core Specification PICMG 3.0, R2.0 section 2.2.5 ESD Discharge Strip.

7 Shelf Configurations

1. From 0 to 12 fan tach signals.

2. From 0 to 8 fan tray present signals (ftp's).
   a. Each fan tray can have from 1-12 fans.
   b. The fan tach signals in the fan tray do not need to be in sequential order.

3. From 0 to 4 air filter present signals.

4. From 0 to 4 PWM signals.
   a. Each PWM signal can control from 1-4 fans.
   b. The fans controlled by the PWM do not need to be in sequential order.

5. From 0 to 8 LM75 thermal sensors.

6. From 0 to 4 cooling zones.
   a. Each cooling zone consists of:
      1. From 1-4 PWM signals.
      2. From 1-12 fan tach signals.
      3. From 1-12 thermal sensors.
      4. Thermal sensors on up to 16 ATCA boards.

7. Zero, 1 or 2 SEEPROM's.

8. From two to six -48V inputs.

9. From 1 to 6 Power Entry Module Present Signals

10. From 1 to 8 Fan Tray Fail outputs. These outputs would drive LED's on the fan trays.