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ELMA
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Elma Shelf Manager Board
Technical Specifications



DCA030054

Document History:

Rev:	x	8/1/03	Original, 1st draft release.	G. Hanson
Rev:	A	11/10/04	First Release	G. Hanson
Rev:	B	3/29/05	Add Figure 1	G. Hanson

1 Introduction

The Shelf Manager Card by Elma Electronics, Inc. is a 4HP wide, 3U high and 160 mm deep card that incorporates the Pigeon Point IPM Sentry and meets the requirements of both cPCI and ATCA specifications for System Management.

The Elma ATCA and cPCI shelves have 2 slots for redundant Shelf Managers. Each Shelf Manager executes on an IPM Sentry ShMM-300 device installed on a special carrier board

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that is plugged into one of the management slots. The pinout of the management slots for the ATCA and cPCI shelves are identical so the same carrier card may be used for both.

1.1 ATCA and cPCI Shelf Requirements Comparison

The shelf management requirements for ATCA and CompactPCI differ significantly in the following areas:

- Power source
- IPMB electricals (Vcc level and termination)
- Off-board I²C bus electricals

These differences are addressed by automatic detection of a shelf type and adaptation of the board properties. This mechanism is described in more detail in the relevant sections below.

This document defines the carrier board architecture and interfaces, covering both application families.

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.

Additional buffer/level translators are provided on the carrier board to address the different IPMB voltage requirements of cPCI and ATCA shelves. The voltage translation is implemented with Linear Technology LTC4300A-2 or Phillips PCA9512 pin-compatible hot-swappable I²C bus buffers. In a CompactPCI shelf, the bus side of the buffers is powered from IPMB power (+5V), while in a ATCA shelf; the bus side is powered from the main +3.3V management power. Bus side pull-up resistor requirements are different in cPCI and ATCA. The bus-side IPMB pull-up resistors are connected to the signal lines through an IDT QuickSwitch multiplexor device with a 5V rail-to-rail switching range. The multiplexor is controlled by the ATCA shelf detection signal and switches between strong (2.7k) pull-up resistors in an ATCA shelf and weak (47.5k) pull-up resistors in the cPCI shelf. The resistors are connected to the same power rail as the bus side of the IPMB buffers.

The carrier board provides a build time option to enable the pull-up resistors only on the Active management board in a redundant configuration.

2.3 Serial Interfaces

The carrier board provides a RS-232 interface using a front panel mini DB-9M (DTE) connector that includes a full set of the RS-232 signals, including modem control. The

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carrier board routes the interface signals from the front panel connector to the first serial port of the ShMM-300, implemented using the built-in UART/modem port of the C5471.

The ShMM module provides a second serial port, implemented using the built-in UART/IR port of the C5471. Modem control signals are not available for this port. This port is dedicated for software debugging. The signals are available (at CMOS) levels at the AUX ARM Injector connector. The ShMM-300 may include (as a build time option) an RS-232 transceiver for this port. The Transceiver is unconditionally disabled (if installed) by pulling the Ser_En1 ShMM-300 signal high on the carrier board.

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 intended for redundancy state updates between ShMM-300's and is available on the backplane connector to be routed between the two management slots. The routing must cross-connect the receive and transmit differential pairs between two management slots.

For AdvancedTCA shelves, the first Ethernet interface signals available on the backplane connector should be routed to the ShMC channel of the Base Interface, Logical Slots 1 and 2 for the two management slots, respectively. In CompactPCI shelves, the signals may be made available for external connection via an RTM or a connector on the backplane.

2.5 Master Only I²C Bus

The carrier board provides a number of I²C devices using the master-only I²C bus of the ShMM-300. The master-only I²C bus is used internally on the ShMM-300 for implementation of the RTC and EEPROM devices. 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
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
0xA6	SEEPROM (shelf FRU information)	Reserved for shelf FRU SEEPROM on the backplane
0xE0	PCA9544/45 (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.*

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- *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.*
- *In the cPCI shelf both FRU SEEPROM's are powered from the backplane IPMB_PWR power plane (+5V).*
- *In the ATCA shelf, the SEEPROM's are powered from the +5V output from the management slots via O'Ring diodes.*

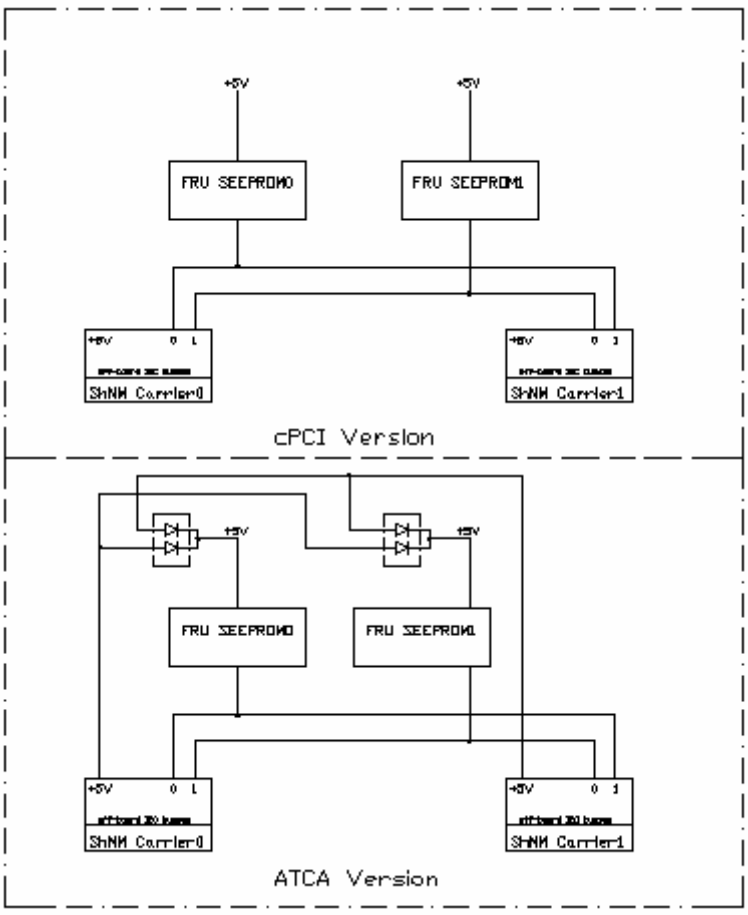


Figure 1: The SEEPROM Connections

2.6 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:

- Shelf FRU (buses 0 and 1)
- Power supply monitoring and control (bus 2)
- Thermal sensors (bus 3)

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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-300 INT# input.

The carrier board 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 in a cPCI shelf and to +3.3V in an ATCA shelf.

2.7 Hardware Monitoring and control

2.7.1 Voltage Sensors

The carrier board provides sensors for the following power supply voltages

- On-board +3.3V (ShMM-300 and carrier bard main power)
- On-board backup battery
- Off-board +3.3V, +5V and ±12V (for CompactPCI)
- Off-board IPMB_PWR (+5V, for CompactPCI)
- Dual –48V power feed through opto-isolated barrier (for ATCA)

2.7.2 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.

2.7.3 Fan Tray Presence Inputs

The shelf manager provides 4 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.

2.7.4 Fan Tachometer inputs

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

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.

2.7.5 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-300 on the shelf manager is in an active state.

2.8 Hardware Address

The hardware address settings of the backplane connector are determined from the ShMM software by two ShMM-300 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

2.9 Telco Alarm

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

- Micro DB15 Telco Alarm 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-300 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-300. Software running on the ShMM-300 is responsible for reacting to an input change when an interrupt is triggered by the PCA9555.

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2.10 Redundancy Control

The ShMM-300 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-300 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.

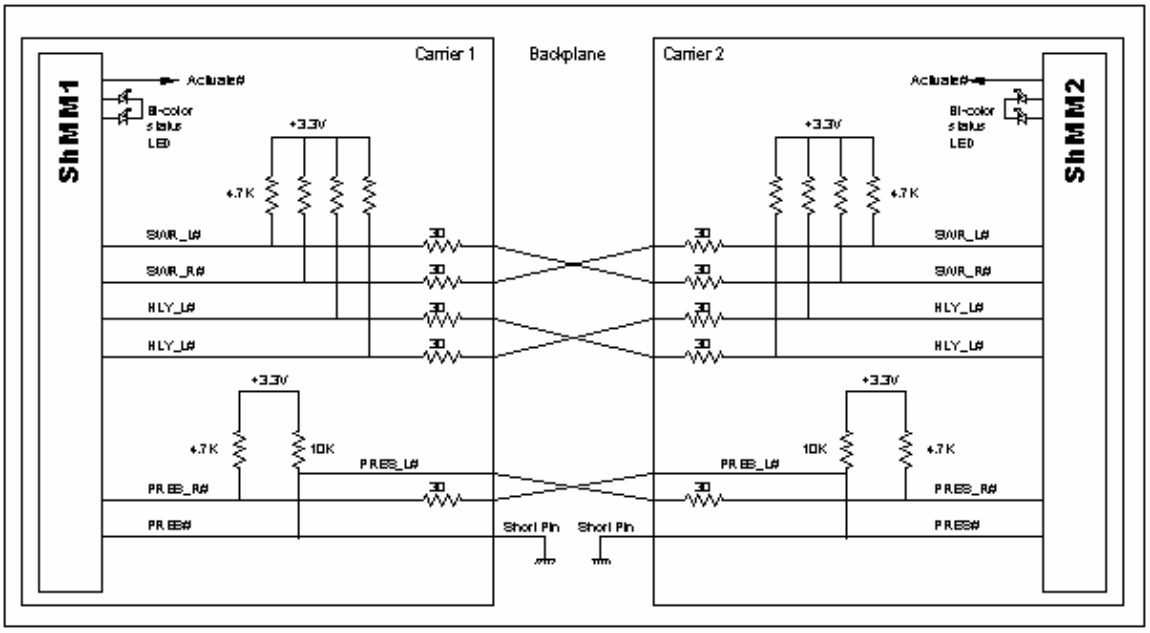


Figure 2: Redundancy interface signal connection

2.10.1 Hardware Redundancy Interface

The hardware redundancy interfaces for the carriers are as follows:

- Cross connected ShMM-300 present input (PRES_R#) and output (PRES_L#)
- Cross connected ShMM-300 healthy input (HLY_R#) and output (HLY_L#)
- Cross connected negotiation input (SWR_R#) and output (SWR_L#)
- Activate output from the ShMM_300 (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

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2.10.2 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-300 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-300 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.

2.11 Hot Swap Interface

The ShMM-300 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

2.11.1 Handle Switch and Board Presence Signal

The carrier board provides handle switch and board presence signals to dedicated inputs of the ShMM-300. 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-300 to ground when activated. The ShMM-300 provides a pull-up resistor and debouncing logic for the signal.

The board presence signal is implemented as a short (last make, first brake) pin on the backplane connector. The pin is connected to ground on the backplane and the ShMM-300 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 (see 2.10).

2.11.2 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

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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

2.12 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.

2.13 Power

The carrier board may be used in AdvancedTCA and CompactPCI shelves. These environments have different power supply configurations:

- ATCA backplanes provide redundant –48VDC power feeds
- CPCI backplanes provide regulated power (with IPMB_PWR at +5VDC) to directly power the on-board circuits from centralized power supplies in the shelf.

To overcome the difference in the power environments, the carrier board implements the following approach. All the on-board circuits are powered by +5VDC inputs from the backplane. This is the only power required or used when the board is plugged into a cPCI backplane. The input voltage is converted to the +3.3VDC main power with an IRU 1030-33 LDO regulator.

The board provides (for ATCA systems) a DC/DC converter with –48VDC redundant input and +5VDC output voltages. The output voltage is routed back to the backplane connector. An ATCA backplane routes the +5VDC power from the carrier board back to the +5VDC inputs of the carrier board that are used for the power input on the cPCI backplane. Figure 3 illustrates this power voltage configuration. The output of the DC/DC connector is used to distinguish between the cPCI and ATCA shelves. This signal is used to change the IPMB and off-board I2C bus electrical properties (reference voltage and pull-up registers) and is available (as a ShMM-300 GPIO) to the software.

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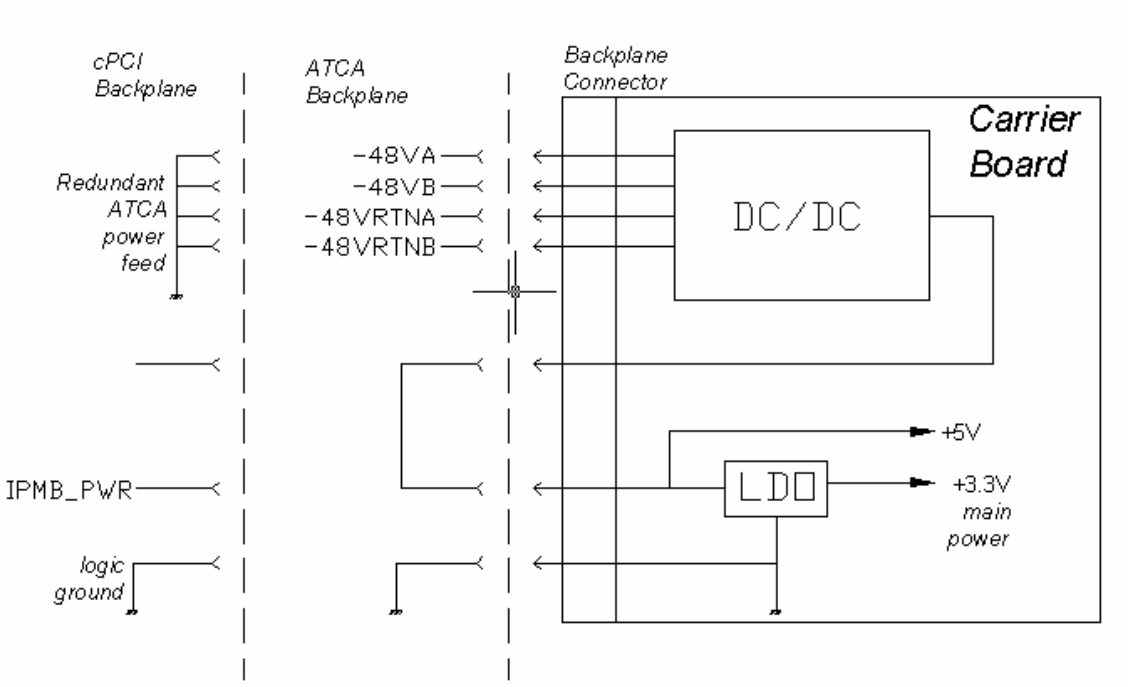


Figure 3: Power Configuration

2.14 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-300 connector.

3 Connectors

3.1 Backplane Connector

Table 5 provides the backplane J1 connector pinout. Table 6 provides pin definitions for the J1 backplane connector.

The connector is an ERNI part number 104512: Type A with split shield, partially loaded.

Two off-board I²C buses (0 and 1), dedicated for the Shelf FRU SEEPROM connection, do not provide interrupt request pins on the backplane connector.

Row Z is Not Populated.

Row F pins 1 through 11 are long ground pins, 15 through 20 are not populated and pins 21 through 25 are long ground pins.

	Z	A	B	C	D	E	F	
25		E0TP	E0RP	Gnd	E1RP	E1TP	Gnd	25
24		E0TM	E0RM	L_PRES#	E1RM	E1TM	Gnd	24
23		Gnd	Gnd	PRES#	Gnd	Gnd	Gnd	23
22		L_HLY#	R_HLY#	R_PRES#	L_SWR#	R_SWR#	Gnd	22
21		Gnd	SDA_3	SCL_3	INT_3	Gnd	Gnd	21

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20								20
19								19
18		-48V A				-48V B		18
17								17
16								16
15		-48V A RTN				-48V B RTN		15
14	KEY AREA							14
13								13
12								12
11		SDA_2	SCL_2	INT_2	Gnd	FTP_2	Gnd	11
10		TACH_0	TACH_1	TACH_2	5VO	FTP_3	Gnd	10
9		PWM_2	TACH_3	TACH_4	5VI	FTP_0	Gnd	9
8		PWM_3	TACH_5	TACH_6	5V0	FTP_1	Gnd	8
7		PWM_0	TACH_7	TACH_10	5VI	+V12	Gnd	7
6		PWM_1	TACH_9	TACH_8	5VO	-12V	Gnd	6
5		TACH_11	SDA_1	SCL_1	5VI	VIO	Gnd	5
4		Gnd	SDA_0	SCL_0	5VO	+3.3V	Gnd	4
3		SDA_B	SCL_B	SDA_A	5VI	+5V	Gnd	3
2		SCL_A	reserved	reserved	reserved	Gnd	Gnd	2
1		reserved	reserved	reserved	HA_1	HA_0	Gnd	1
	Z	**A**	**B**	**C**	**D**	**E**	**F**	

Long Level 3 pins
Medium Level 2 Pins
Short Level 1 Pins
Not Populated

Table 5: Backplane connector J1 Pinout

Name	Count	Description
Gnd	9	Logic Ground
Ha_1, HA_0	2	Hardware Address
Reserved	6	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_3…0	4	Fan Tray Presence inputs
TACH_11…0	12	Fan Tachometer inputs
5VO	4	On-board DC/DC Outputs
5VI	4	Board Main Power (IPMB_PWR for cPCI, connected to 5VO for ATCA)
+5V	1	cPCI backplane +5V monitoring input
+3.3V	1	cPCI backplane +3.3V monitoring input
VIO	1	cPCI backplane V(I/O) monitoring input
+12V	1	cPCI backplane +12V monitoring input

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-12V	1	cPCI backplane -12V monitoring input
-48VA, -48VB	2	ATCA redundant -48V power feed
-48VARTN, -48VBRTN	2	ATCA redundant -48V power return
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

Table 6: Backplane Connector J1 Pin Definition

3.2 Front Panel Connectors

3.2.1 Serial 0 (RS-232, mini-DB9)

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

Pin	Signal	Type	Description
1	CD	In	Carrier Detect
2	RxD	In	Receive Data
3	TxD	Out	Transmit Data
4	DTR	Out	Data Terminal Ready
5	SG		Signal Ground
6	DSR	In	Data Set Ready
7	RTS	Out	Request To Send
8	CTS	In	Clear To Send
9	RI	In	Ring Indicator

Table 7: Serial 0 (RS-232) Connector Pinout

3.2.2 Ethernet 0

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-
7,8	Unused pair; terminated on the carrier board

Table 8: Ethernet Connector Pinout

3.2.3 Telco Alarm

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Table 9 provides pin definitions for the Telco Alarm 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	AMINC	MinorAlarm - NC
10	AMINCOM	MinorAlarm - COM
11	AMANO	MajorAlarm - NO
12	AMANC	MajorAlarm - NC
13	AMACOM	MajorAlarm - COM
14	APRCO	PwrAlarm - NO
15	APRCOM	PwrAlarm - COM
-	Gnd	Not utilized

Table 9: Telco Alarm Connector Pinout

3.3 On-Board Connectors

3.3.1 JTAG Connector (ARM Injector JTAG)

Table 10 provides the JTAG interface pin definitions.

Pin	Signal	Type	Description
1	NC	No Connection	
3	/TRST	In	Test power reset
5	TDI	In	Test Data In signal from the ARM Injector to the ShMM-300 JTAG port
7	TMS	In	Test Mode Select signal from the Injector to the ShMM-300 JTAG port
9	TCK	In	Test Clock signal from the Injector to the ShMM-300 JTAG port
11	TDO	Out	Test Data Out signal from the ShMM-300 JTAG port to the ARM Injector
13 2, 4, 6, 8, 10, 12, 14	NC Gnd	No Connection Power	 Ground

Table 10: JTAG Connector Pinout

3.3.2 AUX ARM Injector Connector

Table 11 provides AUX ARM Injector pin definitions.

Pin	Signal	Type	Description
1	V5	Power	+5V power input supply to the Injector in stand alone mode
3	nMRST	In	Active low Master Reset signal.

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			Connected in parallel with reset push button.
4	Gnd		
5	UMODE	In	User Mode
6	Gnd		
7	NC	No Connection	
8	Gnd		
9	SEL_JTG_DEV	In	JTAG target control. Active low selects C5471. High or no connect selects the CPLD.
10	Gnd		
11	TD	In	Serial data from the Injector to the target serial port (CMOS)
12	NC	No Connection	
13	RD	Out	Serial data to the Injector from the target serial port (CMOS)
14	NC	No Connection	
15	NC	No Connection	
2, 16	Gnd	Power	Ground

Table 11: ARM Injector AUX Connector Pinout

3.3.3 Off-Board I²C Buses

Table 12 provides the off-board I²C buses pin definitions.

Pin	Signal	Description
1	Gnd	Logic Ground
2	SDA_0	Serial Data 0
3	SCL_0	Serial Clock 0
4	INT_0	Interrupt Request 0
5	Gnd	Logic Ground
6	SDA_1	Serial Data 1
7	SCL_1	Serial Clock 1
8	INT_1	Interrupt Request 1
9	Gnd	Logic Ground
10	SDA_2	Serial Data 2
11	SCL_2	Serial Clock 2
12	INT_2	Interrupt Request 2
13	Gnd	Logic Ground
14	SDA_3	Serial Data 3
15	SCL_3	Serial Clock 3
16	INT_3	Interrupt Request 3
17	IPMB_PWR	IPMB power (+3.3V in ATCA and +5V in cPCI)
18	IPMB_PWR	IPMB power (+3.3V in ATCA and +5V in cPCI)
19	VCC3	+5V power
20	VCC5	+5V power

Table 12: Off-Board I²C Buses Connector Pinout

4 Configuration Jumpers and Build-time Options

4.1 Ethernet 0 Routing Jumpers

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

Table 13 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 13: Ethernet 0 Routing Jumpers

4.2 IPMB Pull-Up Resistor Control

The carrier board provides a pull-up resistor for the IPMB bus. The resistors value is automatically adjusted to the cPCI or to the ATCA electrical requirements. As an additional option the board may be configured in such a way that it applies the pull-up resistors to the bus only if the ShMM-300 is in the Active state. Table 14 lists components to be (not) installed to implement this option.

R84	R35	Description
Install	Do not install	Pull-up resistors are always connected
Do not install	Install	Pull-up resistors are controlled by the ACTIVE# signal

Table 14: IPMB Pull-up Resistor Control

4.3 Fan Monitoring and Control

The carrier board provides two configurations of the fan speed monitoring and control circuitry. In the minimal configuration all four PWM outputs are the buffered version of the single ADM1024 PWM output and only four fan tachometers inputs are constantly monitored (the other 8 are monitored as two switch able groups of four inputs). In the maximum configuration all four PWM outputs are independently programmable and all 12 tachometer inputs are constantly monitored. Table 15 lists the components to (not) install to implement these options.

U2, U4, R31, R32, R33, R34	R47, R49, R53, R71	Description
Install	Do not install	Maximum configuration (independent monitoring and control)
Do not install	Install	Minimum configuration (combined monitoring and control)

Table 15: Fan Speed Monitoring and Control

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.

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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-300 Hot Swap interface. Refer to section 2.11 for the description of this 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
- Ethernet 0 interface
- Telco Alarm interface

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-300 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) are integrated into the RJ-45 connector 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.

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6 Mechanical Specification

The carrier board is a standard 3U board (100mm x 160mm). A conventional 2mm HM CompactPCI connector is used as a backplane connector. Mechanical keying of the connector guarantees that the carrier board cannot be inserted into any standard 3U CompactPCI slot. The keying of the backplane connector guarantees that no standard 3U CompactPCI board can be installed into the management slot.

The front panel has an ejector handle with an integrated switch. The switch is guaranteed to be activated after all the pins of the backplane connector has a solid match on insertion of the board and before the shortest pin of the connector breaks on extraction 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 2.0, section 4.1.4 ESD Discharge Strip.

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