The Embedded I/O Company

TEWS TECHNOLOGIES

TAMC100

Carrier for 1 Industry Pack®

User Manual

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TAMC100-10R

AMC Carrier for 1 IndustryPack, Mid-size, HD50 SCSI-2 front I/O connector *)

TAMC100-11R

AMC Carrier for 1 IndustryPack, Full-size, HD50 SCSI-2 front I/O connector

*) Please note that the mid-size module has restrictions to its usage because of a component height violation. It is within the responsibility of the user to carefully check if the mid-size module with its component height violation can be used in his system. Otherwise damage of the TAMC100 or its slot to be used in may occur!

Style Conventions

Hexadecimal characters are specified with prefix 0x, i.e. 0x029E (that means hexadecimal value 029E).

For signals on hardware products, an ‚Active Low' is represented by the signal name with # following, i.e. IP_RESET#.

Access terms are described as:

W	Write Only
R	Read Only
R/W	Read/Write
R/C	Read/Clear
R/S	Read/Set

Issue	Description	Date
0.2	Preliminary Issue	February 2008
1.0	Initial Issue	July 2008
1.0.1	New notation for HW Engineering Documentation Releases	April 2009
1.0.2	Added „Handling and Operation Instructions”	July 2009
1.0.3	Only available in RoHS-compliant version	December 2011

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1 Product Description

The TAMC100 is a standard single width / mid-size or full-size AMC.1 compliant carrier for one single-size IndustryPack (IP) module used to build modular, flexible and cost effective I/O solutions for applications in process control, medical systems, telecommunication and traffic control. A HD50 SCSI-2 type connector provides access to all IP I/O lines.

The TAMC100 is a versatile solution to upgrade well known legacy I/O solutions to a high performance form factor.

All IP interrupt request lines are mapped to PCIe INTA; alternatively Message Signaled Interrupts (MSI) can be used. For fast interrupt source detection the TAMC100 provides a special IP interrupt status register.

The IP power lines are fuse protected by self healing fuses and RF filtered. The operating temperature range is -40°C to +85°C.

According to AMC.0, the TAMC100 provides an IPMI compliant Module Management Controller (MMC) with temperature monitoring and hot-swap support.

The TAMC100 is available as mid-size module or as full-size module. Please note that the mid-size module has restrictions to its usage because of a component height violation. It is within the responsibility of the user to carefully check if the mid-size module with its component height violation can be used in his system. Otherwise damage of the TAMC100 or its slot to be used in may occur!

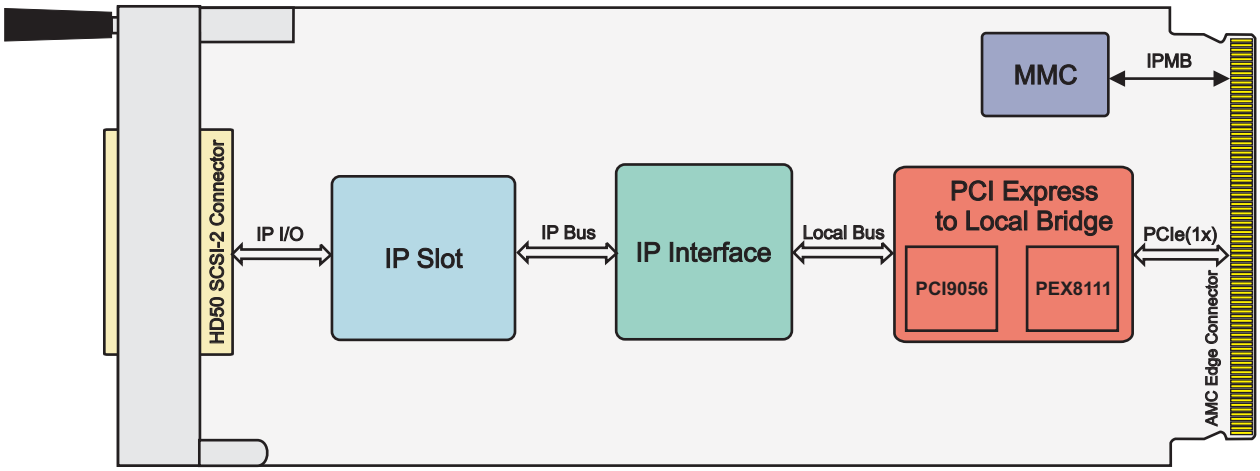

Figure 1-1: Block Diagram

2 Technical Specification

AMC Interface		
Mechanical Interface	Advanced Mezzanine Card (AMC) Interface confirming to PICMG® AMC.0 R2.0 Single, Mid / Full Size Module	
Electrical Interface	PICMG® AMC.1 R1.0 PCIe single lane (x1) port (AMC.1 Type 1 compliant)	
IPMI		
IPMI Version	1.5	
Front Panel LEDs	Blue Hot-Swap LED Red Power Good LED (LED1) Green IP-Activity LED (LED 2)	
On Board Devices		
PCI Express Target Chip	PEX8311 (PLX Technology)	
IP Interface		
IP Interface	According to IndustryPack specification ANSI / VITA 4-1995	
IP Slots	One single-size IP	
IP Access	8 / 16 bit 8 / 32 MHz 8 Mbyte memory space	
Mapping of IP Interrupts	Routing of all IP interrupts to PCIe INTA/MSI, local interrupt status register	
DMA	Not supported	
32-Bit Access	Not supported	
Protection	Self Healing fuses and RF-filtering on all IP power lines	
I/O Interface		
I/O Connector	Front-I/O via HD50 SCSI-2 type connector	
Physical Data		
Power Requirements	tbd. typical @ +12V DC (Payload Power) tbd. typical @ +3.3V DC (Management Power) **Additional power is required by IP modules**	
Temperature Range	Operating Storage	-40°C - +85°C -40°C - +85°C
MTBF	633.000 h MTBF values shown are based on calculation according to MIL-HDBK-217F and MIL-HDBK-217F Notice 2; Environment: G_B 20°C. The MTBF calculation is based on component FIT rates provided by the component suppliers. If FIT rates are not available, MIL-HDBK-217F and MIL-HDBK-217F Notice 2 formulas are used for FIT rate calculation.	
Humidity	5 – 95 % non-condensing	
Weight	100 g	

Table 2-1 : Technical Specification

3 Handling and Operation Instructions

3.1 ESD Protection

The TAMC100 is sensitive to static electricity. Packing, unpacking and all other handling of the TAMC100 has to be done in an ESD/EOS protected Area.

3.2 TAMC100 Mid-size Option Usage Restrictions

Please note that the mid-size module has restrictions to its usage because of a component height violation. It is within the responsibility of the user to carefully check if the mid-size module with its component height violation can be used in his system. Otherwise damage of the TAMC100 or its slot to be used in may occur!

Refer to the chapter "Component Height Violation on TAMC100-10R" for details.

3.3 Voltage Limits on IndustryPacks

The AMC.0 specification limits the voltages on AMC modules. These limits also apply to mounted IndustryPacks.

Refer to the chapter "Voltage Limits on IndustryPack Modules" for details.

4 PEX8311 Target Chip

The PEX8311 internally consists of two devices, a PEX8111 (PCI Express to PCI bridge) and a PCI9056 (PCI to local bus bridge). These are visible as two separate devices with own headers on the PCI/PCIe bus.

In the following chapters both the PEX8111 and the PCI9056 are described as independent devices.

4.1 PEX8111

4.1.1 PCI Express Configuration Space Register Mapping

4.1.1.1 PCI-Compatible Configuration Registers (Type 1)

PCI CFG Register Address	31 24	23 16	15 8	7 0	Read after initialization write access
0x00	PCI Device ID		PCI Vendor ID		10B5 8111
0x04	PCI Status		PCI Command		0010 0000
0x08	PCI Class Code			PCI Device Revision ID	060400 21
0x0C	PCI Built-In Self-Test (Not Supported)	PCI Header Type	Internal PCI Bus Latency Timer	PCI Cache Line Size	00 01 00 00
0x10	PCI Base Address 0				0000000C
0x14	PCI Base Address 1				00000000
0x18	Secondary Latency Timer	Subordinate Bus Number	Secondary Bus Number	Primary Bus Number	00 00 00 00
0x1C	Secondary Status		I/O Limit	I/O Base	0200 00 00
0x20	Memory Limit		Memory Base		0000 0000
0x24	Prefetchable Memory Limit		Prefetchable Memory Base		0000 0000
0x28	Prefetchable Memory Base Upper 32 Bits				00000000
0x2C	Prefetchable Memory Limit Upper 32 Bits				00000000
0x30	I/O Limit Upper 16 Bits		I/O Base Upper 16 Bits		0000 0000
0x34	Reserved			PCI Capabilities Pointer	000000 40
0x38	PCI Base Address for Expansion ROM (Not Supported)				
0x3C	Bridge Control		Internal PCI Interrupt Wire	Internal PCI Interrupt Line	0000 01 00

Table 4-1 : PCI-Compatible Configuration Registers (Type 1)

4.1.1.2 PCI-Compatible Capability Registers

PCI CFG Register Address	31 24	23 16	15 8	7 0	Read after initialization write access
0x40	Power Management Capabilities		Power Management Next Capability Pointer	Power Management Capability ID	CA02 5001
0x44	Power Management Data	Power Management Bridge Support	Power Management Control/Status		00 00 0000
0x48	Device-Specific Control				0000 0000
0x4C	Reserved				0000 0000
0x50	Message Signaled Interrupts Control		Message Signaled Interrupts Next Capability Pointer	Message Signaled Interrupts Capability ID	0080 60 05
0x54	Message Signaled Interrupts Address				0000 0000
0x58	Message Signaled Interrupts Upper Address				0000 0000
0x5C	Reserved		Message Signaled Interrupts Data		0000 0000
0x60	PCI Express Capabilities		PCI Express Next Capability Pointer	PCI Express Capability ID	0071 00 10
0x64	Device Capabilities				0000 0000
0x68	PCI Express Device Status		PCI Express Device Control		0000 2000
0x6C	Link Capabilities				0000 4C11
0x70	Link Status		Link Control		1011 0000
0x74	Slot Capabilities				0000 0C80
0x78	Slot Status		Slot Control		0400 0000
0x7C	Reserved		Root Control		0000 0000
0x80	Root Status				0000 0000
0x84	Main Control Register Index				0000 0000
0x88	Main Control Register Data				0000 0000

Table 4-2 : PCI-Compatible Capability Registers

4.2 PCI9056

4.2.1 PCI Configuration Registers (PCR)

PCI CFG Register Address	Write '0' to all unused (Reserved) bits								PCI writeable	Initial Values (Hex Values)
	31	24	23	16	15	8	7	0		
0x00	Device ID				Vendor ID				N	9056 10B5
0x04	Status				Command				Y	0280 0000
0x08	Class Code						Revision ID		N	068000 BA
0x0C	BIST		Header Type		PCI Latency Timer		Cache Line Size		Y	00 00 00 00
0x10	PCI Base Address 0 for MEM Mapped Config. Registers								Y	FFFFFE00
0x14	Reserved								N	00000000
0x18	PCI Base Address 2 for Local Address Space 0								Y	FFFFF800
0x1C	PCI Base Address 3 for Local Address Space 1								Y	FF000000
0x20	Reserved								N	00000000
0x24	Reserved								N	00000000
0x28	PCI Cardbus Information Structure Pointer								N	00000000
0x2C	Subsystem ID				Subsystem Vendor ID				N	8064 1498
0x30	PCI Base Address for Local Expansion ROM								Y	00000000
0x34	Reserved						New Cap. Ptr.		N	000000 40
0x38	Reserved								N	00000000
0x3C	Max_Lat		Min_Gnt		Wire Interrupt		Interrupt Line		Y	00 00 01 00
0x40	PM Cap.				PM Nxt Cap.		PM Cap. ID		N	0002 48 01
0x44	PM Data		PM CSR EXT		PM CSR				Y	00 00 0000
0x48	Reserved		HS CSR		HS Nxt Cap.		HS Cap. ID		Y	00 00 4C 06
0x4C	VPD Address				VPD Nxt Cap.		VPD Cap. ID		Y	0000 00 03
0x50	VPD Data								Y	00000000

Table 4-3 : PCI Configuration Registers (PCR)

5 Register Addressing

5.1 PCI9056 PCI Base Address Configuration

The local on board addressable regions are accessed from the PCI Express side by using the PCI9056 local spaces.

PCI9056 PCI Base Address (Offset in PCI Configuration Space)	PCI Space Mapping	Size (Byte)	Port Width (Bit)	Endian Mode	Description
2 (0x18)	MEM	2K	16	Little	IP I/O, ID, INT Space and Interface Registers
3 (0x1C)	MEM	16M	16	Little	IP Memory Space

Table 5-1 : PCI Base Address Configuration

5.2 IP I/O, ID, INT Space and Interface Registers

PCI Base Address: PCI9056 PCI Base Address 2 (Offset 0x18 in PCI Configuration Space).

Offset to PCI Base Address 2	Register Name	Size (Byte)
0x000 … 0x07F	IP I/O Space	128
0x080 … 0x0BF	IP ID Space	64
0x0C0 … 0x0FF	IP INT Space	64
0x100 … 0x3FF	Reserved	-
0x400	REVISION ID	2
0x402	IP CONTROL	2
0x404 … 0x408	Reserved	-
0x40A	IP RESET	2
0x40C	IP STATUS	2
0x40E … 0x7FF	Reserved	-

Table 5-2 : IP I/O, ID, INT Space and Interface Register Space

The TAMC100 supports read and write cycles to the IP ID space. A PCIe access to the TAMC100 will be terminated in every case. If the IP supports write access to its ID space, data will be written to the ID-PROM. If the IP does not support write access to its ID space, no ACK# will be generated by the IP to the local control logic, and a local timeout will terminate the IP write cycle after a timeout time of 8µs and the timeout bit is set in the IP Status Register.

The TAMC100 supports read and write cycles to the IP INT space. A read access to the IP INT space initiates an IP interrupt acknowledge cycle. A read access with address A1=0 (e.g. 0x0000_00c0) initiates an interrupt acknowledge cycle for IP INT0#, a read access with address A1=1 (e.g. 0x0000_00C2) initiates an interrupt acknowledge cycle for IP INT1#. The read access returns the interrupt vector. This feature is helpful for IP modules that require an interrupt acknowledge cycle to remove their pending interrupt request. If the IP does not support write access to its INT space, no ACK# will be generated by the IP, and a local timeout will terminate the cycle after a timeout time of 8µs and the timeout bit is set in the IP Status Register.

5.2.1 Revision ID Register (0x400)

The Revision ID Register shows the revision of the on board IP FPGA logic. Initial Value is 0x00.

Changes in the on board FPGA logic will be signed by incrementing the register value.

Bit	Symbol	Description	Access	Reset Value
15	-	Reserved	-	0
14				0
13				0
12				0
11				0
10				0
9				0
8				0
7	REV_ID	FPGA Logic Revision ID	R	-
6				
5				
4				
3				
2				
1				
0				

Table 5-3 : Revision ID Register

5.2.2 IP Control Register (0x402)

The IP Control Registers can be used to control IP interrupts, recover time and clock rate. After power-up or board reset, all bits in the IP Control Register are cleared (‘0’).

Each IP interrupt can be enabled or disabled separately. Interrupt detection can be switched between level and edge sensitive. Edge sensitive interrupts must be cleared by a write to the corresponding bit in the IP Status Register.

If the ERR_INT_EN bit is set to ‘1’, an active IP ERROR# line will generate an interrupt. This interrupt can be cleared by setting the ERR_INT_EN bit to ‘0’.

The status of the IP ERROR# line can be read from the IP Status Register.

If the TIME_INT_EN bit is set to ‘1’ and an IP timeout occurs, the TAMC100 will generate an interrupt. This interrupt can be cleared by writing ‘1’ to the IP timeout status bit in the IP Status Register.

If IP recovery time is enabled for the IP slot, an IP cycle for this slot will not begin until the IP recovery time is expired. The IP recovery time is approx. 1µs.

IP clock rate can be selected between 8 MHz and 32 MHz. After power-up or board reset, the clock rate is set to 8 MHz.

Bit	Symbol	Description	Access	Reset Value
15	-	Reserved	-	0
14				0
13				0
12				0
11				0
10				0
9				0
8				0
7	INT1_EN	0 : IP interrupt 1 disabled 1 : IP interrupt 1 enabled	R/W	0
6	INT0_EN	0 : IP interrupt 0 disabled 1 : IP interrupt 0 enabled	R/W	0
5	INT1_SENSE	0 : IP interrupt 1 level sensitive 1 : IP interrupt 1 edge sensitive	R/W	0
4	INT0_SENSE	0 : IP interrupt 0 level sensitive 1 : IP interrupt 0 edge sensitive	R/W	0
3	ERR_INT_EN	0 : IP error interrupt disabled 1 : IP error interrupt enabled	R/W	0
2	TIME_INT_EN	0 : IP timeout interrupt disabled 1 : IP timeout interrupt enabled	R/W	0
1	RECOVERY	0 : IP recovery time disabled 1 : IP recovery time enabled	R/W	0
0	CLKRATE	0 : IP clock rate 8 MHz 1 : IP clock rate 32 MHz	R/W	0

Table 5-4 : IP Control Register

5.2.3 IP Reset Register (0x40A)

The IP Reset Register can be used to initiate an IP RESET cycle and to detect when the IP RESET cycle has finished.

Writing a '1' to bit 0 of the IP Reset Register initiates a reset cycle and the IP RESET# signal is asserted. After 200 ms, the on board logic automatically negates the IP RESET# signal and completes the IP Reset cycle.

The IP Reset Register can be read to verify the IP reset status.

At power-up or board reset, the IP RESET# signal is asserted.

Bit	Symbol	Description	Access	Reset Value
15	-	Reserved	-	0
14				0
13				0
12				0
11				0
10				0
9				0
8				0
7				0
6				0
5				0
4				0
3				0
2				0
1				0
0	IP_RESET	Read: 0 - IP RESET# signal is de-asserted 1 - IP RESET# signal is asserted Write: 0 - No effect 1 - Assert IP RESET# signal (automatic negation after 200 ms)	R/W	0

Table 5-5 : IP Reset Register

5.2.4 IP Status Register (0x40C)

The IP Status Register can be used to read IP timeout, error and interrupt status.

An IP timeout occurs if the IP module fails to generate the IP ACK# signal within the IP timeout time. The IP timeout time is approx. 8µs. An IP timeout is not reported to the PEX8311 or the PCI master, but in the IP Status Register. If the IP_TIME_EN bit in the IP Control Register is set, an interrupt is generated if a timeout occurs. This interrupt can be cleared by writing '1' to the timeout status bit. If a timeout occurs during an IP read, all ones (0xFF) is returned.

The IP ERROR# signal is used to indicate component failure, unrecoverable self-test failures or serious, hard-wired configuration errors. The status of the IP ERROR# signal can be read in the IP Status Register.

Interrupt status of IP interrupt lines can also be read in the IP Status Register. If edge sensitive interrupt is enabled (see IP Control Register for detail) and an interrupt is active, writing '1' to bit 1:0 clears the corresponding interrupt status.

Bit	Symbol	Description	Access	Reset Value
15	-	Reserved	-	0
14				0
13				0
12	TIME	Read: 0 - IP timeout has not occurred 1 - IP timeout has occurred Write: 0 - No effect 1 - Clear IP timeout status	R/W	0
11	-	Reserved	-	0
10				0
9				0
8	ERR	Read: 0 - IP ERROR# signal de-asserted 1 - IP ERROR# signal asserted Write: 0 - No effect 1 - No effect	R/W	0
7	-	Reserved	-	0
6				0
5				0
4				0
3				0
2				0
1	INT1	Read : 0 - No IP interrupt 1 request 1 - Active IP interrupt 1 request Write : 0 - No effect 1 - Clear edge sensitive IP interrupt 1 status	R/W	0
0	INT0	Read : 0 - No IP interrupt 0 request 1 - Active IP interrupt 0 request Write : 0 - No effect 1 - Clear edge sensitive IP interrupt 0 status	R/W	0

Table 5-6 : IP Status Register

5.3 IP Interrupts

All IP interface interrupt sources (Timeout, Error, IP INT0, IP INT1) are mapped to PCI interrupt INTA#.

For quick interrupt source detection, the IP Status Register can be read to determine the IP interrupt source.

Level sensitive IP interrupts, which are most common for IP modules are cleared by either an interrupt acknowledge cycle to the IP or by accessing an Interrupt Status Register on the IP module.

A read access to the IP INT space initiates an IP interrupt acknowledge cycle. A read access with address A1=0 (e.g. 0x0000_00c0) initiates an interrupt acknowledge cycle for IP INT0#, a read access with address A1=1 (e.g. 0x0000_00C2) initiates an interrupt acknowledge cycle for IP INT1#. The read access returns the interrupt vector. This feature is helpful for IP modules that require an interrupt acknowledge cycle to remove their pending interrupt request.

Timeout interrupts and edge sensitive IP interrupts must be cleared in the IP Status Register.

IP Error interrupts must be cleared in the IP Control Register.

5.4 IP Memory Space

PCI Base Address: PCI9056 PCI Base Address 3 (Offset 0x1C in PCI Configuration Space).

Offset to PCI Base Address 2	Register Name	Size (Byte)
0x00_0000 … 0x7F_FFFF	IP MEM Space (16 bit)	8M
0x80_0000 … 0xBF_FFFF	IP MEM Space (8 bit)	4M
0xC0_0000 … 0xFF_FFFF	Reserved	-

Table 5-7 : IP Memory Space

The PCI9056 local space 3 from address 0x00_0000 to 0x7F_FFFF is used for the IP Memory space (16 bit port).

IPs with Memory space that uses D7:0 only, should be accessed via address 0x80_0000 to 0xBF_FFFF; this allows linear addressing of the IP memory space for IP's with 8 bit port width (D0-D7) only.

Please note that the 8 bit access only works correctly when the PCI9056 local space 3 is set to 8 bit port width before!

This is done by writing "00" to bits [1:0] in the Local Address Space 1 Bus Region Descriptor Register at offset 0xF8 from the PCI Base Address 0. To switch back to 16 bit port, write "01" to these two bits.

6 Configuration Hints

6.1 Big / Little Endian

The serial PCI Express interface is always Little Endian. Little Endian to Big Endian conversion only swaps byte lanes, not individual bits.

- PCI Express Interface (Little Endian)

Byte Mapping	Internal AD DWORD
Byte 0	AD[7..0]
Byte 1	AD[15..8]
Byte 2	AD[23..16]
Byte 3	AD[31..24]

- Both Local Address Space 0 and 1 and the Expansion ROM Space can be programmed to operate in Big or Little Endian Mode.

Big Endian		Little Endian	
32 Bit			
Byte 0	D[31..24]	Byte 0	D[7..0]
Byte 1	D[23..16]	Byte 1	D[15..8]
Byte 2	D[15..8]	Byte 2	D[23..16]
Byte 3	D[7..0]	Byte 3	D[31..24]
16 Bit (upper lane)			
Byte 0	D[31..24]	Byte 0	D[23..16]
Byte 1	D[23..16]	Byte 1	D[31..24]
16 Bit (lower lane)			
Byte 0	D[15..8]	Byte 0	D[7..0]
Byte 1	D[7..0]	Byte 1	D[15..8]
8 Bit (upper lane)			
Byte 0	D[31..24]	Byte 0	D[31..24]
8 Bit (lower lane)			
Byte 0	D[7..0]	Byte 0	D[7..0]

Table 6-1 : Local Bus Little/Big Endian

Default use on the TAMC100:

- Local Address Space 0 16 bit bus in Little Endian Mode
- Local Address Space 1 16 bit bus in Little Endian Mode
- Expansion ROM Space not used

The Endian Mode can be changed in the PCI9056 LCS_BIGEND Big/Little Endian Descriptor register. It can be accessed with PCI Base Address 0 + 0x0C or PCI Base Address 1 + 0x0C

For further information please refer to the PEX8311 / PCI9056 manual.

6.2 Configuration EEPROM

6.2.1 PEX8111 EEPROM

After power-on or PCI reset, the PEX8111 loads initial configuration register data from an on board configuration EEPROM. Only register values differing from default values are stored in the EEPROM.

For further information please refer to the PEX8311 / PEX8111 manual.

Modifications are:

- Address Stepping is disabled (PCI Command Register)
- Slot Clock Configuration is enabled (Link Status/Control Register)
- PCI Express Enable (Device Initialization Register)

6.2.2 PCI9056 EEPROM

After power-on or PCI reset, the PCI9056 loads initial configuration register data from an on board configuration EEPROM.

For further information please refer to the PEX8311 / PCI9056 manual.

The address range 0x00 - 0x3F is factory programmed with configuration information; the PCI9056 reads this memory area at power up for its configuration. This memory area **must not be overwritten**. The address range 0x40 - 0x5F is also factory programmed with configuration information used by the software drivers. This memory area also **must not be overwritten**.

The configuration EEPROM contains the following data:

- Vendor ID
- Vendor Device ID
- Subsystem Vendor ID
- Subsystem Device ID
- The module version and revision

Address	Configuration Register	TAMC100
0x00-0x3F	***PCI9056 Configuration Data - DO NOT MODIFY -***	-
0x40	Vendor ID	0x10B5
0x41	Device ID	0x9056
0x42	Subsystem Vendor ID	0x1498
0x43	Subsystem ID	0x8064
0x44	Module Version	0x0100
0x45	Module Revision	0x0000
0x46	Module Variant	s.b.
0x47	EEPROM Revision	0x0000
0x48-0x7F	Reserved	-

Table 6-2 : PCI9056 Configuration EEPROM Data

Module Variant:	TAMC100-10R	0x800A
	TAMC100-11R	0x800B

6.3 PCI9056 Interrupt enable

To use interrupts, bit 11 (Local Interrupt enable) of the LCS_INTCSR (LCS Interrupt Control/Status, Local MEM BASE0 offset 0x068) must be set to “1”.

For further information please refer to the PEX8311 / PCI9056 manual.

7 Module Management

7.1 Indicators

For a quick visual inspection the TAMC100 offers 3 LEDs in the front panel and one on board LED.

7.1.1 On Board Link-LED

To help diagnose system bring up problems, the Link Up status of the PEX8111 can be visually inspected with an on board LED.

LED	Color	State	Description
Link	Red	Off	Link
		On	No link

Table 7-1 : On Board Link-LED

7.1.2 Front Panel LEDs

LED	Color	State	Description
HS	Blue	Off	No Power or module is powered
		Short Blink	Hot-Swap negotiation (extraction)
		Long Blink	Hot-Swap negotiation (insertion)
		On	Module is ready to be powered or module is ready to be unpowered
FAIL	Red	Off	No fault
		On	Failure or out of service status
ACK	Green	Off	Board is unpowered
		On	Board is powered and OK
		Blink	IP-Access

Table 7-2 : Front Panel LEDs

7.2 Temperature and Voltage Sensors

Sensor Number	Signal Type	Signal Monitored
0	Event	Hot-swap switch
1	Temperature	LM75 #1
2	Temperature	LM75 #2
3	Voltage	+12V (PWR)
4	Voltage	+1.5V
5	Voltage	+12V (IP)
6	Voltage	-12V (IP)

Table 7-3 : Temperature and Voltage Sensors

7.3 Connectivity

The TAMC100 provides a single x1 2.5 Gbps PCI-Express Link on AMC Port 4. The PCI-Express Interface works with SSC and non SSC PCI-Express Reference Clocks.

8 Installation

8.1 AMC Module Insertion & Hot-Swap

8.1.1 Insertion

Handle	Blue LED	Description
Open (Full extracted)	OFF	Insert Module into slot
Open (Full extracted)	ON	Module is ready to attempt activation
Closed (Pushed all way in)	Long Blink	Hot-Swap Negotiation
Closed (Pushed all way in)	OFF	Module is ready & powered

Table 8-1 : AMC Module Insertion

When the blue LED does not go off but returns to the “ON” state, the module FRU information is invalid or the carrier cannot provide the necessary power.

8.1.2 Extraction

Handle	Blue LED	Description
Pulled out 1/2	OFF	Request Hot-Swap
Pulled out 1/2	Short Blink	Hot-Swap Negotiation
Pulled out 1/2	ON	Module is ready to be extracted
Open (Full extracted)	ON	Extract Module from slot

Table 8-2 : AMC Module Extraction

8.2 Installation of IndustryPacks

Before installing an IndustryPack, be sure that the power supply for the TAMC100 is turned off.

The component is an Electrostatic Sensitive Device (ESD). Use an anti-static mat connected to a wristband when handling or installing the components.

Installing IndustryPacks on the TAMC100 is done by simply snapping them into the IP slot. The connectors are keyed, so the IndustryPack can only be installed correctly. After an IP has been installed it can be secured on the carrier board. This is normally necessary only in high vibration or shock environments. Screws and spacers are required to fix a single IP on the TAMC100. They can be ordered from TEWS TECHNOLOGIES (Part number: TIPxxx-HK).

8.3 Component Height Violation on TAMC100-10R

With an assembled standard IndustryPack module with 1.6mm PCB thickness, the mid-size TAMC100-10 violates the component envelope. The picture shows in red the violation of the hatched AMC component envelope.

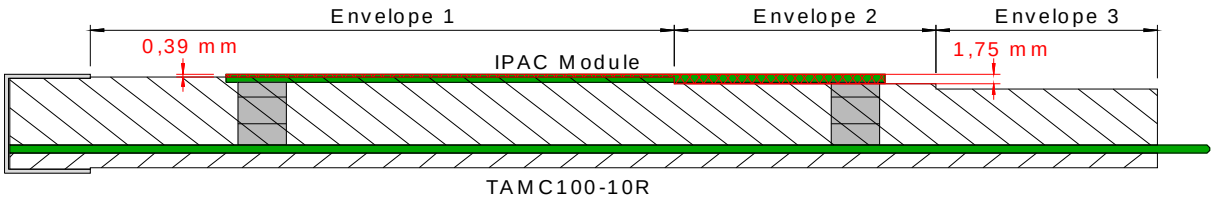

Figure 8-1 : Component Height Violation

The TAMC100-10R is intended for the use in µTCA systems where the adjacent AMC module provides enough spacing (no components on the adjacent AMC modules back side) for the protruding IndustryPack module. This allows improving the density of the µTCA system.

If your IndustryPack module has devices assembled on its back side or if you are not sure if the available spacing is sufficient, it is strongly recommended to use the full-height TAMC100-11R. It is within the responsibility of the user to carefully check if the mid-size module with its component height violation can be used in his system. Otherwise damage of the TAMC100 or its slot to be used in may occur!

8.4 Voltage Limits on IndustryPack Modules

The AMC.0 specification limits the voltages on AMC modules to following thresholds:

	DC voltage	AC voltage
Positive	+27V	+27V peak
Negative	-15V	-15V peak

Table 8-3 : Voltage Limits

When IndustryPack modules with voltages that excess these thresholds are to be used, additional insulation to adjacent modules or carrier boards becomes necessary.

8.5 Fuses and Filters

The IP slot is protected with self-healing fuses. The maximum currents on the IP Module Voltages are:

Voltage	Current Limit
+5V	2A
+12V	120mA
-12V	120mA

Table 8-4 : Fuse currents

For improved performance the TAMC100 provides RF filtering and decoupling capacitors on all IP power lines.

9 Pin Assignment

9.1 Overview

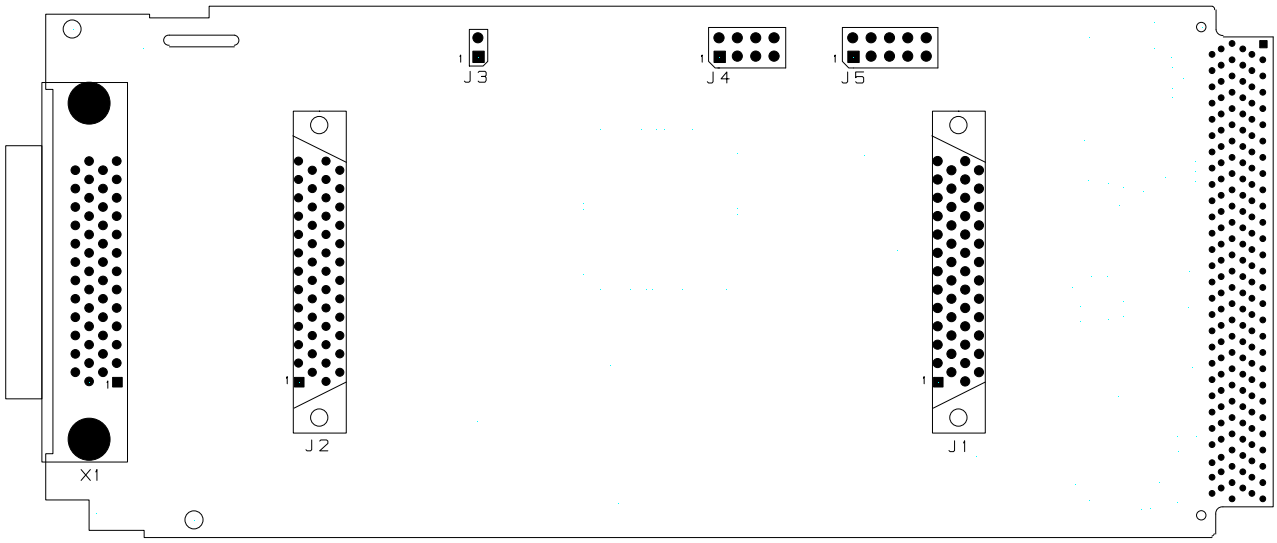

Figure 9-1: Connector Overview

J4 and J5 are for factory use only.

9.2 IP Connector J1

The table below shows the complete IP J1 logic interface pin assignments. Some of these signals are not used on the TAMC100.

Pin #	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
1	GND	2	CLK	26	GND	27	+5V
3	Reset#	4	D0	28	R/W#	29	IDSel#
5	D1	6	D2	30	DMAReq0#	31	MemSel#
7	D3	8	D4	32	DMAReq1#	33	IntSel#
9	D5	10	D6	34	DMAck#	35	IOSel#
11	D7	12	D8	36	Reserved	37	A1
13	D9	14	D10	38	DMAEnd#	39	A2
15	D11	16	D12	40	Error#	41	A3
17	D13	18	D14	42	IntReq0#	43	A4
19	D15	20	BS0#	44	IntReq1#	45	A5
21	BS1#	22	-12V	46	Strobe#	47	A6
23	+12V	24	+5V	48	ACK#	49	Reserved
25	GND			50	GND		

Table 9-1 : IP J1 Logic Interface Pin Assignment

9.3 I/O Connectors J2 and X1

The IP J2 I/O connector routes the IP I/O lines directly to the appropriate pins of the HD50 SCSI-2 type cable connector. The pin assignment of the IP J2 I/O connector is IP specific.

Signal	Pin J2	Pin X1	Signal	Pin J2	Pin X1
IP I/O 0	1	1	IP I/O 25	26	26
IP I/O 1	2	2	IP I/O 26	27	27
IP I/O 2	3	3	IP I/O 27	28	28
IP I/O 3	4	4	IP I/O 28	29	29
IP I/O 4	5	5	IP I/O 29	30	30
IP I/O 5	6	6	IP I/O 30	31	31
IP I/O 6	7	7	IP I/O 31	32	32
IP I/O 7	8	8	IP I/O 32	33	33
IP I/O 8	9	9	IP I/O 33	34	34
IP I/O 9	10	10	IP I/O 34	35	35
IP I/O 10	11	11	IP I/O 35	36	36
IP I/O 11	12	12	IP I/O 36	37	37
IP I/O 12	13	13	IP I/O 37	38	38
IP I/O 13	14	14	IP I/O 38	39	39
IP I/O 14	15	15	IP I/O 39	40	40
IP I/O 15	16	16	IP I/O 40	41	41
IP I/O 16	17	17	IP I/O 41	42	42
IP I/O 17	18	18	IP I/O 42	43	43
IP I/O 18	19	19	IP I/O 43	44	44
IP I/O 19	20	20	IP I/O 44	45	45
IP I/O 20	21	21	IP I/O 45	46	46
IP I/O 21	22	22	IP I/O 46	47	47
IP I/O 22	23	23	IP I/O 47	48	48
IP I/O 23	24	24	IP I/O 48	49	49
IP I/O 24	25	25	IP I/O 49	50	50

Table 9-2 : Pin Assignment I/O Connectors

9.3.1 Front Panel I/O Connector X1

AMP 787395-5 or compatible.

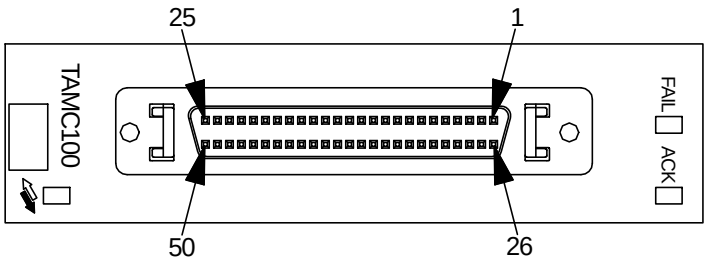

Figure 9-2: Front Panel I/O Connector Numbering

9.4 IP Strobe Signal J3

The IP strobe signal is an uncommitted line of the IP logic interface, which may be used as an optional input to or output from an IP module. It is reserved for a digital strobe or clock signal related to the functionality of the IP.

The strobe signal of the IP slot is accessible on the TAMC100 via a 2-pin jumper field.

Pin	Signal	Description
1	GND	Ground
2	Strobe	External Strobe Signal