ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Abaco Systems CR11S3C5KLH6* at our website: ***Click HERE***

Hardware Reference Manual

CR11*, CP11*, CT11* 6U CompactPCI® SBC

Publication No. HRMCR11 Rev. B.0



abaco SYSTEMS

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Document History

Revision	Date	Description
B.0	January 2017	Rebranded to Abaco Systems

Waste Electrical and Electronic Equipment (WEEE) Returns



Abaco Systems is registered with an approved Producer Compliance Scheme (PCS) and, subject to suitable contractual arrangements being in place, will ensure WEEE is processed in accordance with the requirements of the WEEE Directive.

Abaco Systems will evaluate requests to take back products purchased by our customers before August 13, 2005 on a case by case basis. A WEEE management fee may apply.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

About This Manual

Document Information

Abaco Website

You can find information regarding Abaco products on the following website:



LINK

https://www.abaco.com

Abaco Documents

This document is distributed via the Abaco website. You may register for access to manuals via the website.



LINKS

https://www.abaco.com/products/cr11
https://www.abaco.com/products/cp11
https://www.abaco.com/products/ct11

Third-party Documents



NOTE

Technical literature describing components used on the CR11, CP11, and CT11 is available from the manufacturers' websites.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Technical Support Contact Information

You can find technical assistance contact details on the website Embedded Support page.



LINK
https://www.abaco.com/embedded-support

Abaco will log your query in the Technical Support database and allocate it a unique Case number for use in any future correspondence.

Alternatively, you may also contact Abaco's Technical Support via:



LINK
support@abaco.com

Returns

If you need to return a product, there is a Return Materials Authorization (RMA) form available via the website Embedded Support page.



LINK
https://www.abaco.com/embedded-support

Do not return products without first contacting the Abaco Repairs facility.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Welcome

The CR11, CP11, CT11 CompactPCI Single Board Computer is a fully IBM-AT compatible stand-alone PC equipped with numerous functions and add-on features on a minimized board size. This technical manual is designed to provide information regarding the general use and application of the CR11, CP11, CT11 CompactPCI Single Board Computer, as well as detail the hardware design. Software methods and programming information are also provided.

Chapter 1 gives a brief overview of the functions, features and devices of the CR11, CP11 and CT11.
Chapter 2 and 3 illustrate unpacking and installation procedures.
Chapter 4 describes how to get started
Chapter 5 describes all onboard and panel interfaces with pin assignments.
Chapter 6 contains notes on system resources.
Chapter 7 lists details of the function blocks.
Chapter 8 describes electrical and environmental specifications.
Appendix A is about the CTM17 Rear Transmission Module
Appendix B describes the mezzanine card
Appendix C describes the CR9 to CR11 compatibility

A number of expansion and add-on products are available for the CR11, CP11 and CT11. The CTM17 transition module and the PMC module are described in appendices to this manual. Please observe all safety instructions when handling Abaco products as outlined in the unpacking and installation chapters.

The following documents also cover items relevant to the CR11, CP11 and CT11 CompactPCI Single Board Computer. All documents are included as files on the Technical Product Information CD-ROM.

- CR11, CT11, CP11, VR11, VP11 User's Manual for AMIBIOS8 Setup
- CR11, CT11, CP11, VR11, VP11 Board Specific Hardware Programmer's Manual

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- AMIBIOS8 Check Point and Beep Code List
- AMIBIOS8 Error Messages
- Intelligent Platform Management Interface for CT11 User's Manual
- Thermal Report TR-HW-011

Typographic Conventions

This manual uses the following notation conventions:

- *Italics* (sometimes additional in *blue* color) emphasize words in text or documentation or chapter titles or web addresses if underlined.
- Hexadecimal values (base 16) are represented as digits followed by "h", for example: 0Ch.
- Hexadecimal values (base 16) are represented as digits preceded by "H", for example: H0C.
- Hexadecimal values (base 16) are represented as digits preceded by "$", for example: $0C.
- Binary values (base 2) are represented as digits followed by "b", for example 01b
- The use of a "#" (hash) suffix to a signal name indicates an active low signal. The signal is either true when it is at logic zero level (voltage close to 0 V) or the signal initiates actions on a high-to-low transition.
- The use of a "\" (backslash) prefix to a signal name indicates an active low signal The signal is either true when it is at logic zero level (voltage close to 0 V) or the signal initiates actions on a high-to-low transition.
- Text in Courier font indicates a command entry or output from an Abaco embedded PC product using the built-in character set.
- Notes, warning symbols and cautions call attention to essential information.

Product Properties

Certification

The product or products described in this technical manual cannot be operated by themselves They are components for integration into operational systems or add-ons to such systems. The products have been designed to meet relevant regulatory standards like FCC and CE. As mandated by these standards conformance to these standards can only be certified for complete operational systems. This has to be done by the end-user or by the systems integrator in their operational systems. Abaco has tested some products in their own systems. Upon request information is available which products have been tested and about the specific environment under which Abaco has tested these components.

Altitude

Altitude, air pressure and ambient temperature influence the thermal operation of the components described in this manual. They have been developed and tested at about 500 m (1650 ft.) above sea level at a typical ambient temperature of 20 °C (68 °F). Because of only marginal variations within a limited range of altitudes these products operate as specified within altitudes

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

from sea level to 1000 m (3300 ft.). Abaco can assist the user of these components in planning operation outside this altitude range upon request.

Options

This manual describes the basic product plus all options. Your product may not have all options implemented. Please verify with your purchase contract which options are implemented. Descriptions of options which are not implemented obviously do not apply to your product.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER 1 Introduction

Chapter Scope

This chapter describes features, capabilities and compatibility of the CR11, CP11 and CT11 CompactPCI Single Board Computer. All three boards are based on the same PCB design. These three products will be referred to in this manual as the CR11 family. Any further specification in this document referring to CR11 can be applied to CR11, CP11 and CT11 unless otherwise noted.

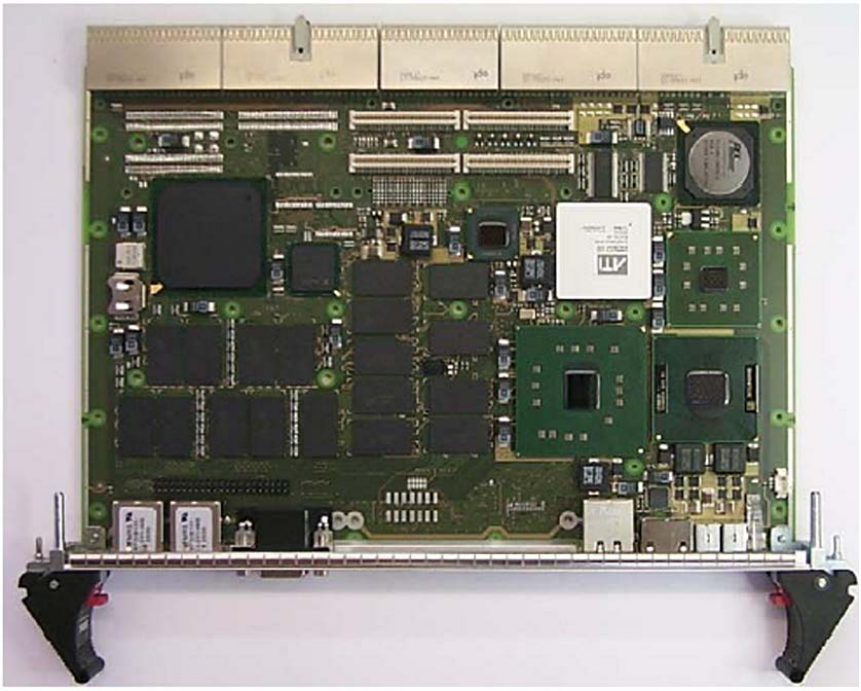


Figure 1: Sample picture of CR11 board

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Board Design

The CR11 is a fully IBM-AT compatible stand-alone PC. It is equipped with many functions a conventional Personal Computer can only offer with several add-on cards. Extension boards can be connected via the CPCI (CompactPCI) interface. The minimized board size and the large number of interfaces and functions allow the CR11 to be used in many applications. See the following block diagram for the board design.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

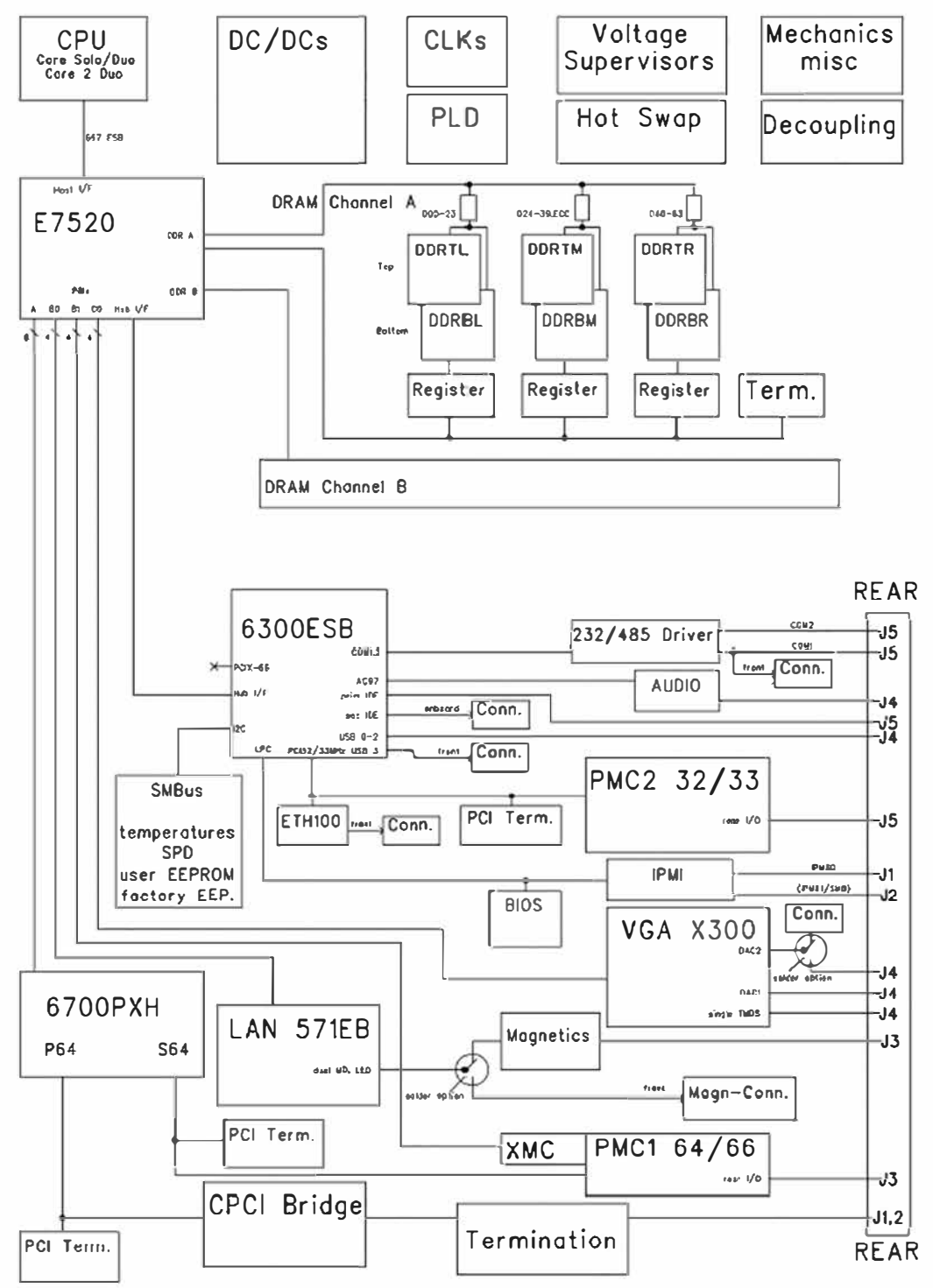


Figure 2: Logical diagram of CR11 board

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Design Features

The CR11 CompactPCI Single Board Computer features:

Microprocessor
Intel® Core™ Duo and Core™ 2 Duo,
Intel® Celeron® M processor

Chipset
Intel® E7520 with 6300ESB and a 6700 PXH PCI bridge

CMOS RAM
114 byte non-volatile RAM
MC146818 compatible RTC with onboard Lithium battery

EEPROM (Serial)
512 Bytes or 64 kBytes for user information

DRAM
512 MB to 4 GB DDR2 400 MHz 128 bit wide with ECC

Flash BIOS
Easy updating, in-system programmable
AMIBIOS
Intel Ethernet BOOT module

Keyboard/Mouse
Via USB port

LCD/VGA
ATI M22 graphics controller with 32 MB DDR2 memory,
dual head display with maximum resolution 1280 x 1024 analog and DVI

USB
Two front and two rear USB 2.0 ports

Watchdog
Watchdog implemented in 6300ESB chipset

High Resolution Timer
User programmable timer, allows 'Real Time Functions' implemented in 6300ESB chipset

Ethernet
Two 10/100/1000BaseT high speed Ethernet channels either front or rear (PICMG 2.16) with Intel 82571EB Ethernet controller
One front 10/100BaseT Intel 82551 fast Ethernet controller

Hard/Flash Disk
Onboard mountable 2.5" IDE hard disk or Flash Drive

Floppy
Via USB port

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

EIDE/ATAPI
Two SATA 150 MB/s channels are implemented on the rear connector. UDMA 100 EIDE/ATAPI interface within 6300ESB with two IDE channels (primary IDE onboard and secondary IDE off-board). Transfer rate with up to 100 MB/s, for two external devices and one onboard 2.5" hard/flash disk.

Serial I/O
Two asynchronous 16550 compatible channels with 16 byte FIFO, Transfer rates up to 115.2 KBaud user selectable RS232/422/485.
COM1 (only RS232) optionally available at front (not with conduction cooling style 8)

Important note:
On the front panel there is an RJ45 type connector for COM1 signals. This limits the front panel connector to RS232 operation (without Ring Indicator). RS422/485 can only be used with rear panel connectors

General Purpose- I/O
8 bit universal in out with +3.3 V signaling and +5 V tolerance.

PMC slots
One 64 Bit 66/133 MHz (+3.3 V IO voltage signaling) and one 32 Bit/33 MHz (+5 V IO voltage signaling) PCI mezzanine connector support standard PMC with front and rear I/O. The I/O signals are available at the rear connectors, The high speed PMC1 will be available as an XMC slot as soon as its specification is finalized.

CPCI System slot
Up to 7 peripheral slots 64 Bit CPCI/33 MHz with PLX PCI6466 bridge (Up to 4 peripheral slots 64 Bit/66 MHz). Standard backplanes can be used. Onboard Pull-up resistors are optimized for the +3.3 V I/O voltage, but +5 V I/O can also be used for 33 MHz.

CPCI I/O Slot
CR11 works as peripheral board 64 Bit or 32 Bit with 66 MHz or 33 MHz and Hot Swap functionality.

IPMI (CT11)
Hitachi controller for support of Intelligent Platform Management Interface.

Temperature Sensors
Measure the temperatures of the CPU-die and one onboard location. The sensors are software readable in 1 °C increments from -55 °C to +125 °C.

Front panel I/O
2x Ethernet, VGA, PMC front I/O, COM1 on RJ45 style connector only for RS232 (without RI), 2x USB, Reset, 2x LED (blue: Hot Swap; bicolor: user definable) depending on the board configuration.

Back panel I/O
DVI, 2x VGA, 2x SATA, IDE (Master/Slave), COM1-2, 2x USB, 2x PMCI/O, speaker, reset, ext. Battery, ICMB, IPMB, 8x GPIO, 2x Ethernet. Transition modules with PC compatible connectors are available.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Approval
Designed to meet standard UL1950, CE class A, FCC-A

H110 Backplanes
The CT11 can be optionally ordered without connector J7004 (=CPCI J4) assembled for backplanes providing H110 functionality. As a consequence some rear I/O will not be available. Please check in Chapter 4 in the Interfaces section for more details.

The list of styles available is shown below.

Table 1: Styles available

CR11	1	2	3	4	6	8
Front panel	X	X	X	X	X	
Extended temperature			X	X	X	X
Parts soldered					X	X
Middle stiffener bar					X	X
Wedge locks						X
Conformal coating		X		X	X	X
Conduction cooling						X
Onboard battery	X	X	X	X		
Onboard speaker	X	X	X	X	X	

CT11 and CP11 can be ordered in commercial or extended temperature version (Styles 1 or 3) only.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER 2 Unpacking and Inspection

Chapter Scope

This chapter covers the suggested inspection and preparation considerations and background information necessary prior to using the CR11. Unpacking, initial inspection, and first-time operation of the CR11 are covered. Following the procedures given in the chapter is recommended, since they will verify proper operation after shipping and before the product is integrated into your system.

Delivery Volume

Please check that the delivered package contains the following items:

Table 2: Delivery volume

Qty.	Item	Purpose
1	CR11 or CP11 or CT11	CompactPCI Single Board Computer
1	CDROM	Technical Product Information with driver software and manuals in Adobe Acrobat (PDF) format

The manual files are also available through the World Wide Web from our Web-Server at:
https://www.abaco.com

Available Accessories

The following table lists accessory options which are available for the CR11:

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3: List of accessory options

Item	Purpose
CTM17	Transition module, 6U x 4HE/HP
VGA2DVI	DVI to standard VGA converter
YLR015RS	RJ45 to 9-pin Sub-D cable

Please contact the sales department or your sales representative for latest information on options and accessories.

Accessories are subject to change without notice.

ESD

Electrostatic Discharge Notice

The discharge of static electricity, known as Electro Static Discharge or ESD, is a major cause of electronic component failure. The CR11 has been packed in a static-safe bag which protects the board from ESD while the board is in the bag. Before removing the CR11 or any other electronic product from its static-safe bag, be prepared to handle it in a static-safe environment.



You should wear a properly-functioning antistatic strap and ensure you are fully grounded. Any surface upon which you place the unprotected CR11 should be static-safe, usually facilitated by the use of antistatic mats. From the time the board is removed from the antistatic bag until it is in the card cage and functioning properly, extreme care should be taken to avoid 'zapping' the board with ESD. You should be aware that you could 'zap' the board without you knowing it; a small discharge, imperceptible to the eye and touch, can often be enough to damage electronic components. Extra caution should be taken in cold and dry weather when static easily builds up.

Only after ensuring that both you and the surrounding area are protected from ESD, carefully remove the board or module from the shipping carton by grasping it by the front panel and the connectors. Place the board, in its antistatic bag, flat down on a suitable surface. You may then remove the board from the anti static bag by tearing the ESD warning labels.

Warning

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Notes:
Drain static electricity before you install or remove any parts. Installing or removing modules without observing this precaution could result in damage to this and/or other modules in your system.

Initial Inspection

After unpacking the CR11, you should inspect it for visible damage that could have occurred during shipping or unpacking. If damage is observed (usually in the form of bent component leads or loose socketed components), contact Abaco Systems for additional instructions. Depending on the severity of the damage, it may need to be returned to the factory for repair. **DO NOT apply power to the board if it has visible damage.** Doing so may cause further, possibly irreparable damage, as well as introduce a fire or shock hazard.

Since the CR11 incorporates a number of socketed components, including the CPU, memory, etc., these should be inspected to make sure they are seated fully in their sockets.

Note
Please observe all safety procedures to avoid damaging system and protect operators and users.

Unpacking

Please adhere to the following:

- Please read this manual carefully before unpacking the module or fitting it into your system. This will certainly save time and avoid trouble.
- Observe all precautions for electrostatic sensitive modules
- If the product contains batteries, please do not place the board on conductive surfaces, antistatic plastic, or sponge, which can cause shocks and lead to battery or board trace damage.
- Please do not exceed the specified operational temperatures. Note that batteries and storage devices might also have temperature restrictions.
- Keep all original packaging material for future storage or warranty shipments of the board.

Although the CR11 is carefully packaged to protect it against the rigors of shipping, it is still possible that shipping damages can occur. Careful inspection of the shipping carton should reveal some information about how the package was handled by the shipping service. If evidence of damage or rough handling is found, you should notify the shipping service and Abaco as soon as possible.

Retain all packing material in case of future need.

Note
Before installing or removing any board, please ensure that the system power and external supplies have bee n turned off.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

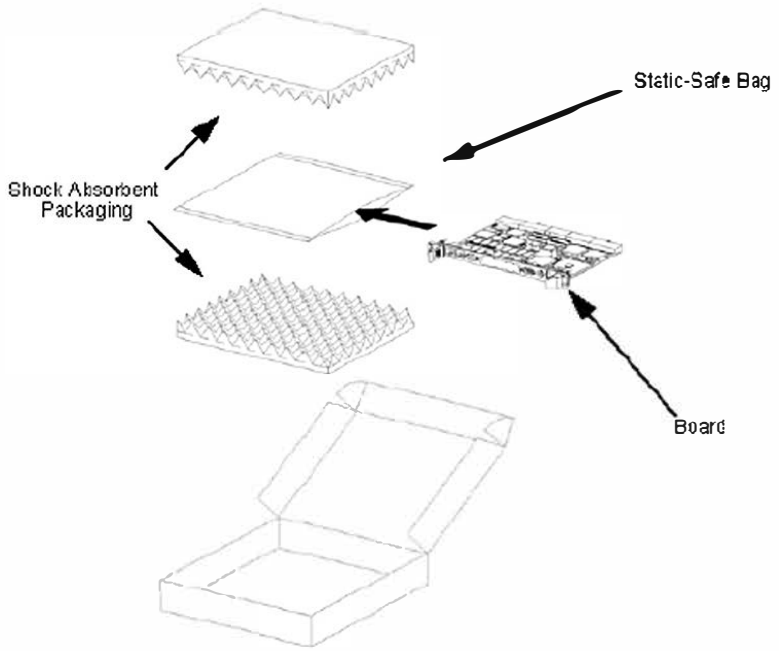


Figure 3: Board packaging

Handling

Proper handling of the CR11 is critical to ensure proper operation and long-term reliability. When unpacking the board, and whenever handling it thereafter, be sure to hold the board by the front panel or the card ejectors as shown in the drawing on the left. Do not hold the board by the circuit card edges, the heat sink, or the connectors.

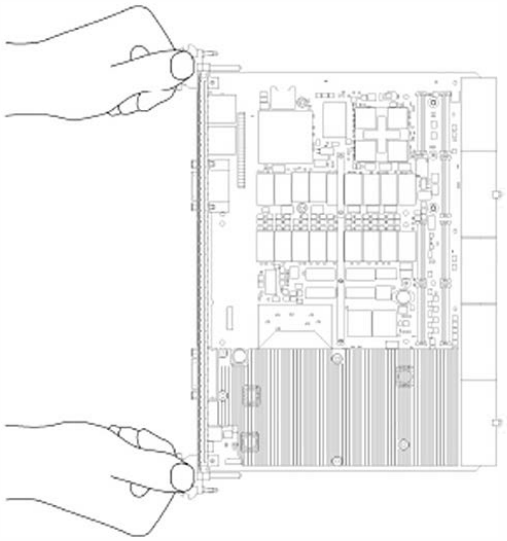


Figure 4: Handling the CR11 board

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER 3 Installation

Chapter Scope

This chapter covers the installation of the CR11 CompactPCI Single Board Computer in a CompactPCI backplane and initial power-on operations.

Installation preparation

Use the following steps to install your Abaco hardware.

- Before installing or removing any board, please ensure that the system power and external supplies have been turned off.
- Check that the jumpers and mezzanines are correctly configured for your application.
- Mount the board/mezzanine/transition module very carefully. See also additional advisories for VMEbus and CompactPCI products below.
- Connect all IO cables.
- Once you are certain that all modules are correctly fitted into the system and all connections have been made properly, restore the power.

General Advisories

Before installing or removing any board, please ensure that the system power and external supplies have been turned off.

Check that jumpers and mezzanines are correctly configured for your application. Mount the board, mezzanine, or transition module very carefully. See also sections on additional advisories below.

Do not restore power until you are sure that all modules are fitted correctly and all connections have been made properly.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Advice on CompactPCI products

Mount the CPU board carefully on the CPCI bus slot. Note that on some boards connectors are used for I/O purposes which must not be inserted into a CPCI bus backplane. A transition module must be used instead.

Because the board is available in several options the description in this chapter is related to the standard configuration. See the following text for standard and optional configurations and their influence on initial operation.

Note:
Make sure that the card ejectors are closed and the Hot Swap LED (blue) is OFF.

Required items

The following items are required to start the CR11 in a standard configuration:

Backplane and Power Supply

You will need a standard CompactPCI backplane wired into a regulated power supply capable of providing stable low noise +5 V, + 3.3 V and +12 V sources. Make sure that the supply is capable of meeting the total power requirements of the CR11. Please refer to 'Specifications' for details.

The CR11 features Full Hot Swap capabilities according to the PCI Hot Plug specification PICMG 2.1. This allows orderly insertion and extraction of the board from the system host (backplane) without having to power down the system. Please note that this feature requires that Hot Swap functions are also available on the backplane. See 'Hot Swap' for details.

Initially, you may plug the CR11 into your 6U system slot of your CPCI system. Optionally, when used as an intelligent peripheral board, the CR11 can also be used in a non-system slot. In case that the CR11 is used in a non-system slot you have to have an additional CPU board in the system slot for providing system clock, arbiter function and more.

Keyboard and Mouse

You should have a USB compatible keyboard for initial system operation. Depending on your application, this keyboard may be a standard full-travel keyboard, or one which utilizes membrane switches for harsh environments. The USB connectors are located on the front panel and are directly compatible with existing compliant keyboards. You can connect a USB mouse, too. You can put mouse and keyboard in whatever front or rear connector you want.

Video Monitor

Any VGA-compatible video monitor can be used initially for display output. The CR11 offers front access to the video. Video can also be accessed via the J5 CPCI connector on the rear I/O side. In order to get access to these pins it is necessary to use a transition module.

Advice on Batteries

There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by Abaco Systems.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Dispose of used batteries according to instructions of Abaco Systems and applicable local regulations.

Installation of a plug-in board

Boards are installed in a CPCI chassis by carefully sliding them into the guide rails, inserting them all the way until the handles can be operated to seat and lock the board in place. Handles typically have a lock (snap lever) to unlock them when extracting a board. Older boards may have screws instead of handles to secure the board in place.

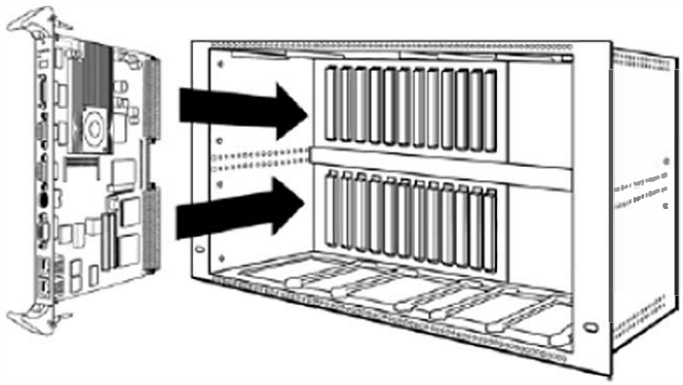


Figure 5: 6U board insertion into system box

Installation of the Rear Transition Module

The CTM17 is a 6U x 80 mm rear I/O module which has to be plugged into the CR11 separated by the backplane. This transition module has a DVI-I connector. If necessary you need an external adaptor to be fully compatible with the VGA standard connector and pin outs. On the transition module you either can connect a DVI panel or a standard VGA Monitor, but not both at the same time.

Plug your video monitor into this connector. Make sure that your selected chassis supports this type of rear I/O transition module.

After making sure that you have installed the CR11 properly into your CPCI backplane, apply power to your video monitor and then the CPCI supply. When the board is completely reset, the processor should begin executing initial BIOS-resident routines.

Note:
Make sure that the card ejectors are closed and the Hot Swap LED (blue) is OFF.

Note:
If the CR11 was ordered without video on board, you can use an external video CompactPCI card or a video PMC module. Consult the technical descriptions of these boards for required voltage and power consumption in the system.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Or use a terminal on COM1. Provide Port Settings – Bits, Data Bits, Parity and Stop Bit.

Initial Power-On Operation

After some seconds, the CR11 system BIOS banner will display on the and the red LED on the front will get non-blinking green.

If you have seen all the messages to this point, you can be confident that the board is running properly and is ready to be installed and setup for your application.

Entering the BIOS SETUP

To enter SETUP during the initial power-on sequence press the DELETE key during the boot up sequence. Check the on-screen messages. This tells you when you can enter the BIOS by pressing the DELETE key. If this message does not appear on your monitor, just press the DELETE key when you hear short beeps indicating the keyboard was initialized. You may also press the DELETE key when the LED goes from blinking orange to blinking green.

Consult the 'AMI BIOS for CR11, CP11, CT11 User's and Programmer's Manual' for further information on how to change settings and configurations.

If the board does not perform as described above, some damage may have occurred in shipping or the board is not installed or setup properly. Contact Abaco Technical Support as described in 'About This Manual' for further instructions.

If the BIOS setup is wrong in the CMOS RAM, then please press the '0/INS' key or the 'INS' key during boot up. This clears the CMOS settings and stops the video output at an early stage. There you can also see the BIOS ID line:

Example/coding of the ID line:

Table 4: BIOS ID line

62 –	0102 –	004199 –	00101111 –	071595 -	E7501 –	VR11 -	Y2KC-0
							year 2000 compliant
							project ID
							chip set
							AMIBIOS core copyright date
							BIOS features
							supplier ID
							major & minor BIOS revisions
							processor, flash ROM size

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER 4 Getting Started

Chapter Scope

This chapter gives some useful tips when using a board from the CR11 family the first time. It might be also useful to read this chapter carefully, when problems came up in using the CR11.

Power Supply

All boards of the CR11 family require up to 70 Watts from the power supply. For exact values please check the actual datasheet, but for rough data a current of up to 7 A to 11 A at the 5 V rail and 10 A to 15 A at the 3.3 V rail must be taken into consideration. The +12 V must only supply a few mA and is not very critical. If there are harddisc or PMC modules attached to the CR11, then their power consumption must also be calculated. Keep in mind, that standard power supplies often require minimum loads on every supply voltage for proper operation. It might be necessary to add a load to the +12 V to ensure correct voltage levels on 3.3 V and 5 V.

If you ever see the board not starting well or doing resets at random states, please check the voltage of the three supply voltages at the backplane. When measuring there, you can use a standard digital multimeter and you have to attach it to the backplane at positions where no high currents are flowing. So better use rear contacts of the bus connectors or unused power connectors to measure, because measuring the voltages at the used power connectors can result in wrong values, which are caused by the high current flowing.

The +12 V are less critical, but 5 V and 3.3 V should reach their nominal value when measuring with a multimeter. If the voltages are less than 5.0 V or 3.3 V, then short voltage drops while the CPU or memory gets into high activities may result in resetting the CR11 board.

Status indicator, Postcode and Beeps

The CR11 family has a triple color LED at the front panel for a quick status indicator usage. The possible colors are red, amber or green and the LED can

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

blink or be on continuously.

The CR11, CP11, CT11 additional have a blue Hot Swap LED as required according to the PICMG specification. This blue LED is also an indication for a reset condition.

While running its BIOS initialization all boards of the CR11 family write postcodes (POST = Power-On Self Test) to port 80h at the PCI bus 0 (at PMC2). These accesses can be monitored with appropriate equipment or a PMC post card. For easier access the postcodes are sent also to the parallel port LPT1 data lines. When measuring their values or adding 8 LEDs with current limiting resistors to GND, you can follow the POST sequence of the BIOS. When the boot process stops at a certain point also the eight voltage levels can be measured with a multimeter.

- Some more debug support is integrated on the CR11 family, which beeps the postcode if the POST stops before the display is initialized. This POST beep support can be removed at a later development stage, if the required space within the onboard programmable logic is no longer available, so don't rely on this. The beeps are long for a '1' and short for a '0'. They start with the highest bit 7 and beep 8 represents the lowest bit 0. If the last postcode was a 16bit value then you will hear 16 beeps starting with the highest bit 15. Always after a nibble (4bits) there is a short break in the beep sequence. After some seconds the beep sequence is repeated for an easier recognition. If the beep code is not repeated, then this beeps are issued within the BIOS execution to show some other failures (i.e. fails in memory detection or if no VGA is detected). For more information please check the AMIBIOS8 Check Point and Beep Code List as well as the AMIBIOS8 Error Messages.

Booting

When switching-on the CR11 following steps are done by hardware:

- On the CR11 family, all voltages at the backplane are observed until they reach a first trip point which is 2.5 V at the 5 V/3.3 V rails and 9.5 V at the +12 V rail. After this the onboard voltages are controlled raised up to the external supplied value
- The continuous red Status LED shows that all circuitry is in reset
- All onboard DC/DC converters are ramped up
- If all onboard supply voltages are at their correct values, the 'power good' status is acknowledged to all onboard devices and the red LED is switched off
- On the CR11 family, the blue Hot Swap LED is switched off when the onboard PCI reset is released. Especially when the battery is removed, this can take a few seconds to start the 32 kHz Oscillator. The PCI reset gets inactive after this period.
- After this the CPU starts reading the first instructions from BIOS. Very soon the red LED is programmed to a red blinking state and the first postcode is issued
- If the CPU does not start correctly, the red LED keeps off until the hardware watchdog will issue a further reset 1.6 seconds later. You can see this at the red LED, which is on again for a short moment (at the CR11 family also the blue LED). This sequence continues until the CPU starts correctly.

For reference the complete BIOS boot sequence is shown with the current

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

BIOS version. This version is a rather early one and hopefully some of the long periods will speed up. The times depend mainly on the memory size and they are measured with 1 GB and quick boot enabled. Some of the postcodes are 16 bit, but only the lower 8bits can be seen at the parallel port data lines. All postcodes are shown in hex.

Table 5: Boot timing

Time after releasing PCI reset	POSTCODE	Status LED	Comment
0.4 s	92	Red blinking	
2 s	94		All memory is initialized
3 s	D5	Amber blinking	All USB devices, hubs are initialized *1
7 s	202A	Green blinking	Video Bios is started *2
13 s	00	Green steady on	Try booting from mass storage

Exact timing may vary a lot in dependence of the number of USB devices/hubs and the DRAM size.
*1 now is the right point to press DEL if you want to go to BIOS SETUP
*2 CRT and/or panel are now initialized and show the startup screen.

Depending on the monitor/display type it may need some additional seconds until you can see something on the screen

Setup

When you want to enter the BIOS Setup, you have to press the keyboard 'DEL' key at the right moment. Especially when using a slow starting monitor it might be too late to wait for the CRT to show the message 'Press DEL to enter Setup'. Better look for the LED and press 'DEL' as soon as the LED changes from amber to green blinking. When you are using add on cards with external BIOS, you can hit the DEL key while their BIOS runs (i.e. SCSI BIOS device scan).

When you miss the right moment to press the DEL key, please use the reset button on the front panel to restart the power up sequence or switch off the power supply for a few seconds and restart it. With the current BIOS pressing the Ctrl-Alt-Del key combination at this boot-moment will result in switching to the next bootable device and try to boot from this. This feature cannot be disabled within Setup.

Hot Swap on CR11

The CR11 family supports full Hot Swap according to CPCI specification 2.1. This includes all hardware functionality to detect other bus cards or devices to be plugged in or removed while the system is running under power. Also the CR11 can be hot plugged to a running system or be removed from it.

The necessary software/driver and operating system handling is not done within the BIOS of the CR11, because all the tasks to recognize new inserted boards,

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

to re-enumerate the PCI memory space while other cards/transfers are still running, cannot be done within BIOS. These tasks have to be fully done from the used operating system. Currently Abaco have no drivers to support these functionalities.

The handling of the blue LED is also done within the necessary drivers. So do not expect the blue LED to go on and off according to the CPCI specification if no driver is loaded.

Unexpected Resets

Whenever the CR11 unexpectedly issues a reset and starts booting again, you may want to know the reset source. For this reason a set of special registers is implemented onboard. Every reset source sets a special bit and can be read during the next boot-up. The register description can be found in the 'Board Specific Hardware Programmer`s Manual`.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER 5 Interfaces

Chapter Scope

This chapter describes the interfaces of the CR11 CompactPCI Single Board Computer located on the board and on the front panel. Each section on a particular interface includes a graphics illustration of the connector and a pin assignment table as well as notes on certain signal line characteristics, if necessary.

For interfaces of the transition module, please refer to the appropriate chapters found in the 'Appendices' to this manual.

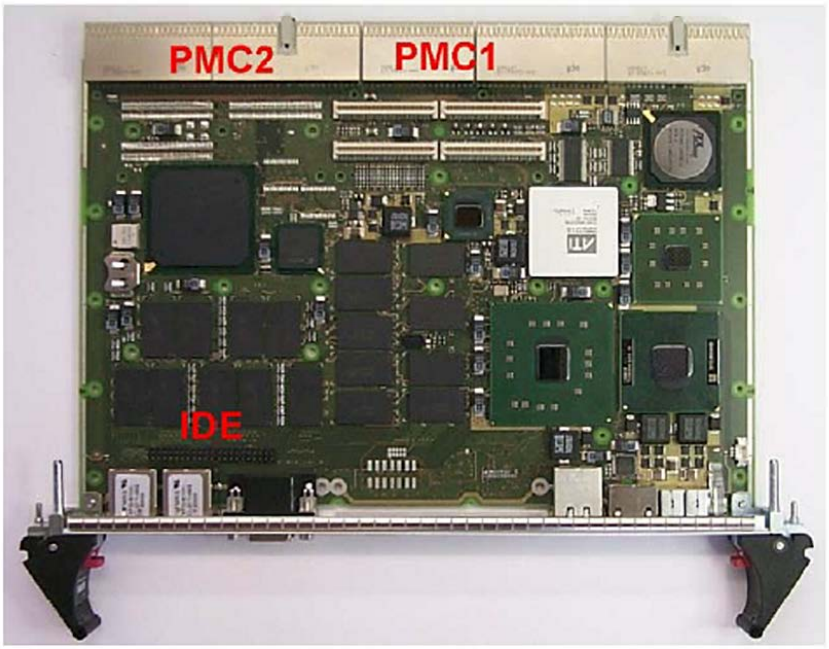


Figure 6: Location of components on board

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Front Panel Interfaces

Refer to the next drawing for the location of interfaces on the front panel of the CR11 and CT11 single slot board (either with front I/O or with dual PMC):

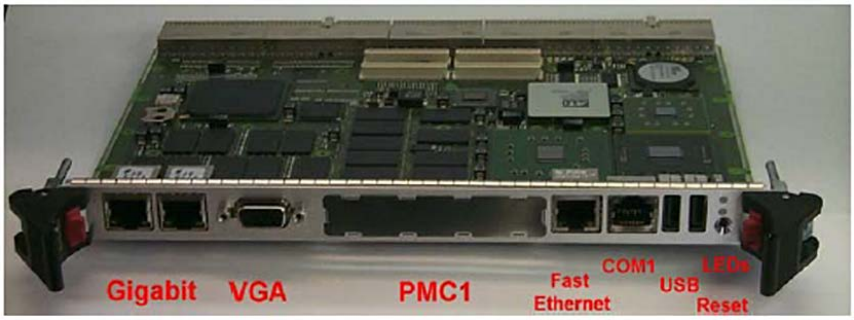


Figure 7: Single slot front panel

This drawing indicates the location of interfaces on the front panel of the CP11 dual slot board:

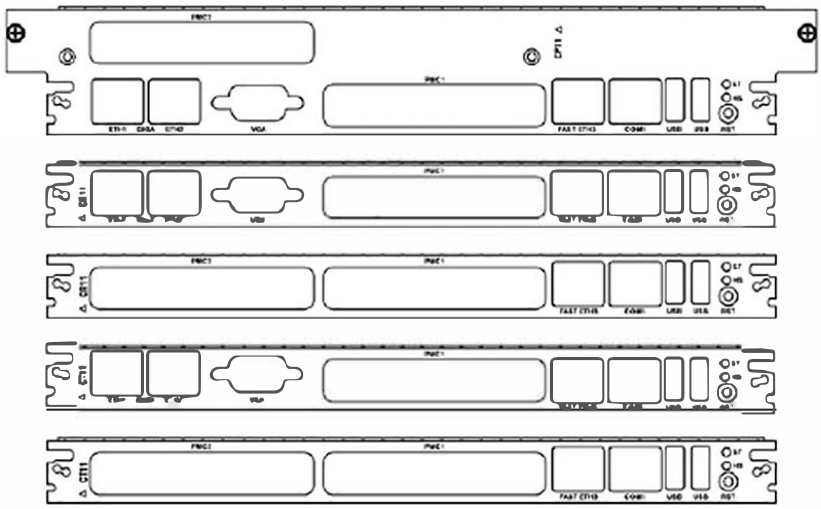


Figure 8: Dual and single slot front panels

CR11 Connectors

This chapter describes connector pin assignments on the CR11. A pin assignment description for available transition module can be found in the corresponding appendix chapters.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CPCI connector reference

The CPCI specification numbers the CPCI connectors from bottom to top J1, J2, J3, J4, and J5. The CPCI connectors on the CR11 are J7001, J7002, J7003, J7004, and J7005 respectively.

Table 6: Signal name groups

Signal groups	Determiner
Hard disk controller signals	PHD…. and \PHD….
SATA interface signals	SATA…
COM1, COM2 signals	C1….., C2…..
VGA signals	V1…, V2…
Universal Serial Bus	USB…
DVI signals	TX…, HOTPLG
LAN signals	LPA…, LPB.., M1…, M2,,,
Audio interface	AU…
SMB (I2C-Bus)	SMB…
IPMI	IPMI…, ICMB…
General purpose I/O	GPIO…
JTAG debugport	TDI, TDO, TMS, TCK
Misc. signals	\SPEAKER
	\RST_BUT
	VBATIN
PMC IO Signals	PMC...
NC:	not connected

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CompactPCI bus Connector J7001 and J7002

This interface is used for connection to a standard CPCI backplane.

Table 7: CPCI connectors J7001 and J7002

J7002	A	B	C	D	E	F
22	GA4	GA3	GA2	GA1	GA0	GND
21	CLK6	GND	NC	NC	NC	GND
20	CLK5	GND	NC	GND	NC	GND
19	GND	GND	SMB_SDA [d]	SMB_SCL [d]	SMB_ALRT# [d]	GND
18	NC	NC	NC	GND	NC	GND
17	NC	GND	\PRST	\REQ6	\GNT6	GND
16	NC	NC	\DEG [c]	GND	NC	GND
15	NC	GND	\FAL [c]	\REQ5	\GNT5	GND
14	AD35	AD34	AD33	GND	AD32	GND
13	AD38	GND	VIO [b]	AD37	AD36	GND
12	AD42	AD41	AD40	GND	AD39	GND
11	AD45	GND	VIO [b]	AD44	AD43	GND
10	AD49	AD48	AD47	GND	AD46	GND
9	AD52	GND	VIO [b]	AD51	AD50	GND
8	AD56	AD55	AD54	GND	AD53	GND
7	AD59	GND	VIO [b]	AD58	AD57	GND
6	AD63	AD62	AD61	GND	AD60	GND
5	C\BE5	\64EN	VIO [b]	C\BE4	PAR64	GND
4	VIO [b]	NC	C\BE7	GND	C\BE6	GND
3	CLK4	GND	\GNT3	\REQ4	\GNT4	GND
2	CLK2	CLK3	\SYSEN	\GNT2	\REQ3	GND
1	CLK1	GND	\REQ1	\GNT1	\REQ2	GND
J7001	**A**	**B**	**C**	**D**	**E**	**F**
25	+5V	\REQ64	ENUM	+3.3V	+5V	GND
24	AD01	+5V	LVIO [a b]	AD00	\ACK64	GND
23	+3.3V	AD04	AD03	L+5V [a]	AD02	GND
22	AD07	GND	L+3.3V [a]	AD06	AD05	GND
21	+3.3V	AD09	AD08	M66EN	C\BE0	GND
20	AD12	GND	VIO [b]	AD11	AD10	GND
19	+3.3V	AD15	AD14	GND	AD13	GND
18	\SERR	GND	+3.3V	PAR	C\BE1	GND
17	+3.3V	IPMB_SCL	IPMB_SDA	GND	\PERR	GND
16	\DEVSEL	GND	VIO [b]	\STOP	\LOCK	GND
15	+3.3V	\FRAME	\IRDY	\BD_SEL	\TRDY	GND
12-14	KEY	KEY	KEY	KEY	KEY	KEY
11	AD18	AD17	AD16	GND	C\BE2	GND
10	AD21	GND	+3.3Vnc	AD20	AD19	GND
9	C\BE3	IDSEL	AD23	GND	AD22	GND
8	AD26	GND	VIO [b]	AD25	AD24	GND
7	AD30	AD29	AD28	GND	AD27	GND
6	\REQ0	\PCI_PRES	L+3.3V [a]	CLK0	AD31	GND
5	NC	NC	\RST	GND	\GNT0	GND
4	IPMI_PWR	\HEALTHY	LVIO [b]	NC	NC	GND
3	\INTA	\INTB	\INTC	L+5V [a]	\INTD	GND
2	NC	+5V	NC	NC	NC	GND
1	+5V	-12V	NC	+12V	+5V	GND

[a] On long backplane pins for early power supply

[b] The VIO signals are not used by the CR11. They are either 5 V or 3.3 V, depending on backplane

[c] These signals are not used on the CR11

[d] These SMBus signals are not supported by the IPMI controller on the CT11

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

I/O Connector J7003, J7004 and J7005

The connector J7004 is not mounted on the CT11, if the H110-Bus is used on the backplane. For easy use a transition module is available from Abaco to connect the I/O-Connectors with standard connectors.

Table 8: I/O connectors J7003, J7004 and J7005

J7003	A	B	C	D	E	F
19	GND	GND	GND	GND	GND	GND
18	LPA_DA+	LPA_DA-	GND	LPA_DC+	LPA_DC-	GND
17	LPA_DB+	LPA_DB-	GND	LPA_DD+	LPA_DD-	GND
16	LPB_DA+	LPB_DA-	GND	LPB_DC+	LPB_DC-	GND
15	LPB_DB+	LPB_DB-	GND	LPB_DD+	LPB_DD-	GND
14	VCC3 [a]	VCC3 [a]	VCC3 [a]	VCC [a]	VCC [a]	GND
13	PMC1IO_05	PMC1IO_04	PMC1IO_03	PMC1IO_02	PMC1IO_01	GND
12	PMC1IO_10	PMC1IO_09	PMC1IO_08	PMC1IO_07	PMC1IO_06	GND
11	PMC1IO_15	PMC1IO_14	PMC1IO_13	PMC1IO_12	PMC1IO_11	GND
10	PMC1IO_20	PMC1IO_19	PMC1IO_18	PMC1IO_17	PMC1IO_16	GND
9	PMC1IO_25	PMC1IO_24	PMC1IO_23	PMC1IO_22	PMC1IO_21	GND
8	PMC1IO_30	PMC1IO_29	PMC1IO_28	PMC1IO_27	PMC1IO_26	GND
7	PMC1IO_35	PMC1IO_34	PMC1IO_33	PMC1IO_32	PMC1IO_31	GND
6	PMC1IO_40	PMC1IO_39	PMC1IO_38	PMC1IO_37	PMC1IO_36	GND
5	PMC1IO_45	PMC1IO_44	PMC1IO_43	PMC1IO_42	PMC1IO_41	GND
4	PMC1IO_50	PMC1IO_49	PMC1IO_48	PMC1IO_47	PMC1IO_46	GND
3	PMC1IO_55	PMC1IO_54	PMC1IO_53	PMC1IO_52	PMC1IO_51	GND
2	PMC1IO_60	PMC1IO_59	PMC1IO_58	PMC1IO_57	PMC1IO_56	GND
1	VCC3 [a]	PMC1IO_64	PMC1IO_63	PMC1IO_62	PMC1IO_61	GND

J7004	A	B	C	D	E	F
25	ICMB+	NC	NC	USB1-	USB0-	GND
24	ICMB-	NC	NC	USB1+	USB0+	GND
23	GND	GND	GND	USBVCC	USBVCC	GND
22	SATA0RX-	SATA0RX+	SATA0TX-	SATA0TX+	V1_RED	GND
21	GND	GND	GND	GND	V1_GREEN	GND
20	SATA1RX-	SATA1RX+	SATA1TX-	SATA1TX+	V1_BLUE	GND
19	GND	GND	GND	GND	V1_HSYNC	GND
18				TDO [a]	V1_VSYNC	GND
17			V2_RED2	TCK [a]	V1_DDCD	GND
16	V2_DDCD	V2_HSYNC	V2_GREEN	TMS [a]	V1_DDCC	GND
15	V2_DDCC	V2_VSYNC	V2_BLUE	TDI [a]	HOTPLG	GND
12-14	KEY	KEY	KEY	KEY	KEY	KEY
11	\VCCOFF	NC	VBATIN	\SPEAKER	GPIO1	GND
10	AUCDINL	AULINEINL	AUGND	\RST_BUT	GPIO0	GND
9	AUCDINR	AULINEINR	AUGND	GPIO2	GPIO3	GND
8	AUCDGND	AUGND	AUGND	GPIO4	GPIO5	GND
7	AUSPDIF	AUHPOUTL	NC	GPIO6	GPIO7	GND
6	NC	AUHPOUTR	NC	GND	GND	GND
5	\M1LINK1000	\M2LINK1000	NC	TX1-	TXC-	GND
4	\M1LINK100	\M2LINK100	NC	TX1+	TXC+	GND
3	\M1LINK	\M2LINK	NC	TX2-	TX0-	GND
2	\M1ACT	\M2ACT	NC	TX2+	TX0+	GND
1	VCC3 [a]	VCC3 [a]	VCC [a]	VCC [a]	-12V	GND

[a]. for internal use only.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

J7005	A	B	C	D	E	F
22	PMC2IO_05	PMC2IO_04	PMC2IO_03	PMC2IO_02	PMC2IO_01	GND
21	PMC2IO_10	PMC2IO_09	PMC2IO_08	PMC2IO_07	PMC2IO_06	GND
20	PMC2IO_15	PMC2IO_14	PMC2IO_13	PMC2IO_12	PMC2IO_11	GND
19	PMC2IO_20	PMC2IO_19	PMC2IO_18	PMC2IO_17	PMC2IO_16	GND
18	PMC2IO_25	PMC2IO_24	PMC2IO_23	PMC2IO_22	PMC2IO_21	GND
17	PMC2IO_30	PMC2IO_29	PMC2IO_28	PMC2IO_27	PMC2IO_26	GND
16	PMC2IO_35	PMC2IO_34	PMC2IO_33	PMC2IO_32	PMC2IO_31	GND
15	PMC2IO_40	PMC2IO_39	PMC2IO_38	PMC2IO_37	PMC2IO_36	GND
14	PMC2IO_45	PMC2IO_44	PMC2IO_43	PMC2IO_42	PMC2IO_41	GND
13	PMC2IO_50	PMC2IO_49	PMC2IO_48	PMC2IO_47	PMC2IO_46	GND
12	PMC2IO_55	PMC2IO_54	PMC2IO_53	PMC2IO_52	PMC2IO_51	GND
11	PMC2IO_60	PMC2IO_59	PMC2IO_58	PMC2IO_57	PMC2IO_56	GND
10	PMC2VIO	PMC2IO_64	PMC2IO_63	PMC2IO_62	PMC2IO_61	GND
9	C1_DCD/TXD-	C1_DSR/TXD+	\PHD_CS0	\PHD_IOR	\PHD_IOW	GND
8	C1_RXD/RTS-	C1_RTS/RTS+	PHD_A0	PHD_D08	PHD_D07	GND
7	C1_TXD/CTS+	C1_CTS/CTS-	PHD_IRQ	PHD_D09	PHD_D06	GND
6	C1_DTR/RXD+	C1_RI/RXD-	PHD_RDY	PHD_D10	PHD_D05	GND
5	C2_DCD/TXD-	C2_DSR/TXD+	\PHD_DAK	PHD_D11	PHD_D04	GND
4	C2_RXD/RTS-	C2_RTS/RTS+	PHD_DRQ	PHD_D12	PHD_D03	GND
3	C2_TXD/CTS+	C2_CTS/CTS-	\PHD_CS1	PHD_D13	PHD_D02	GND
2	C2_DTR/RXD+	\PHD_RST	PHD_A2	PHD_D14	PHD_D01	GND
1	C2_RI/RXD-	\PHD_PDIAG	PHD_A1	PHD_D15	PHD_D00	GND

IDE Connector P1800

The IDE interface (UDMA" only) is designed as a 44-pin 2 mm pitch male onboard connector P1800 to fit directly to a 2.5-inch IDE hard drive or flash disk. P1800 is the secondary IDE interface of the onboard IDE controller.

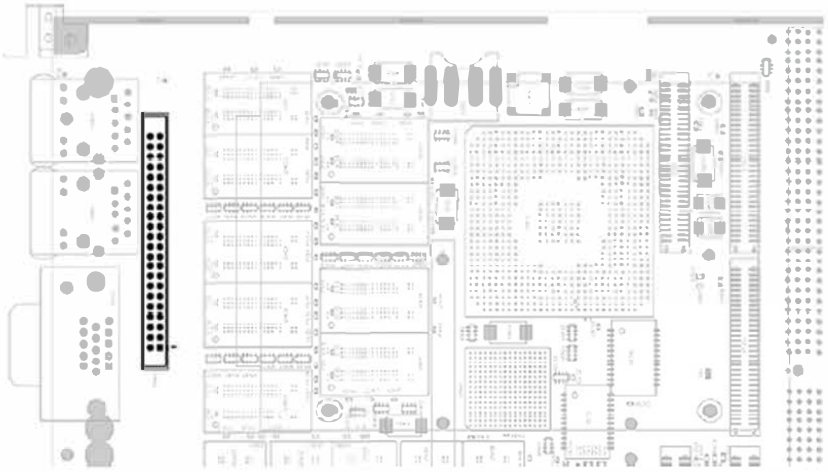


Figure 9: IDE connector location

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 9: IDE connector

Name	P1800	Name
GND	2 1	\HD_RST
HD_D8	4 3	HD_D7
HD_D9	6 5	HD_D6
HD_D10	8 7	HD_D5
HD_D11	10 9	HD_D4
HD_D12	12 11	HD_D3
HD_D13	14 13	HD_D2
HD_D14	16 15	HD_D1
HD_D15	18 17	HD_D0
NC	20 19	GND
GND	22 21	HD_DRQ0
GND	24 23	\HD_IOW
GND	26 25	\HD_IOR
NC	28 27	HD_RDY
GND	30 29	\HD_DAK
NC	32 31	HD_IRQ
ATA detect	34 33	HD_A1
HD_A2	36 35	HD_A0
\HD_CS1	38 37	\HD_CS0
GND	40 39	DASP
+5V	42 41	+5V
NC	44 43	GND

Gigabit Ethernet Interface U5600 and U5650

The Ethernet output front or rear can be selected via order. When ordered with the Gigabit front option, the connectors are located in the front panel.



Figure 10: Gigabit Ethernet connector location

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

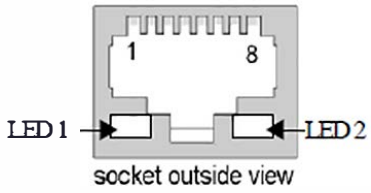


Figure 11: Gigabit Ethernet connector layout

Table 10: Gigabit Ethernet connector pin assignments

Name 10/100base	Name 1000base	U5600, U5650
TxD+	LP_DA+	1
TxD-	LP_DA-	2
RxD+	LP_DB+	3
Not used	LP_DC+	4
Not used	LP_DC-	5
RxD-	LP_DB-	6
Not used	LP_DD+	7
Not used	LP_DD-	8

Two LED's (LED1-green and LED2-yellow) are integrated in each of the RJ45 connector. These LED's indicate the link status and activity of the interfaces.

Table 11: Ethernet LED display definitions

LED1 green	Function
On	Link
Off	No link
LED2 yellow	**Function**
On, blink	Tx/Rx activity
Off	No activity

The pin assignment at the rear I/O is compliant with the PICMG 2.16 (Switched Packet Backplane) specification. The Ethernet interface can also be accessed via the CTM17 transition module (see Appendix A) for connector type and pin assignment.

Fast Ethernet Interface U5102

When ordering the CR11 with the Fast Ethernet front option, the connector is located in the front panel.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

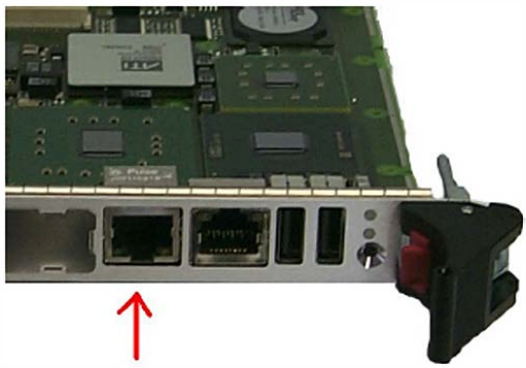


Figure 12: Fast Ethernet connector location

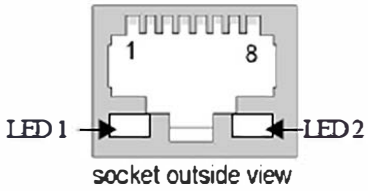


Figure 13: Fast Ethernet connector layout

Table 12: Fast Ethernet connector pin assignments

Name 10/100base	U5102
TxD+	1
TxD-	2
RxD+	3
Not used	4
Not used	5
RxD-	6
Not used	7
Not used	8

Two LED's (LED1-green and LED2-yellow) are integrated in the RJ45 connector. These LED's indicate the link status and activity of the interfaces.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 13: Fast Ethernet LED display definitions

LED1 green	Function
On	Link
Off	No link
LED2 yellow	**Function**
On, blink	Tx/Rx activity
Off	No activity

Serial Port COM1 P2201

The CR11 offers two RS232 serial ports. All COM ports are accessible via the transition module, and additionally COM1 (only RS232) is accessible via the front panel connector. This connector has 8 pins only and does not support the RI (Ring Indicator) signal. For RS422/485 usage this missing signal is the RxD- (negative receive data), therefore this front panel connector does not work with RS422/485. Please use the rear connections for RS422/485.

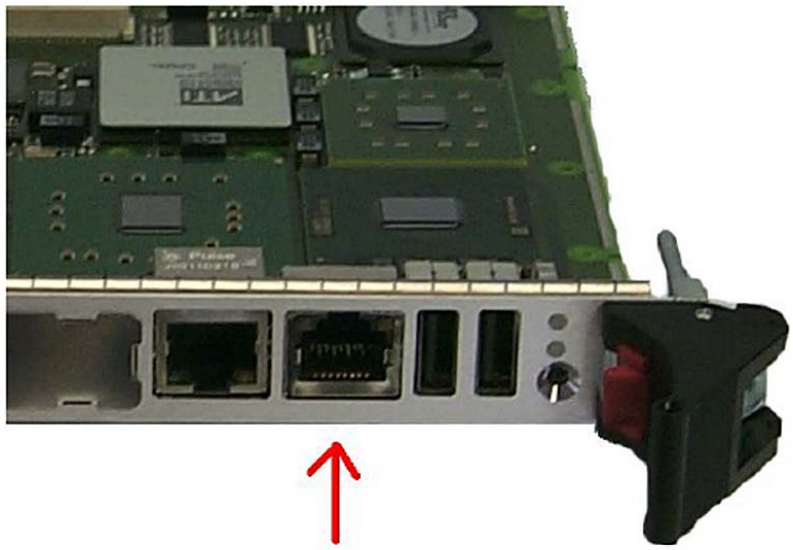


Figure 14: COM1 location

COM1, 2 are software selectable for RS-232 or RS-422/485 operation within BIOS setup. The RS485 output drivers can be enabled or disabled with the DTR signal. An active DTR means the drivers to be enabled. When using the RS422 setting the output drivers are always enabled and the DTR signal is not used.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 14: COM1 pin assignments

Name RS232	Name RS422/485 (only on rear)	P2200 (RJ45 on front panel)
DSR	TXD+	1
DCD	TXD-	2
DTR	RXD+	3
GND	GND	4
RXD	RTS-	5
TXD	CTS+	6
CTS	CTS-	7
RTS	RTS+	8
RI	RXD-	Not available on front

RJ45 cable (optional)

A short cable is optionally available to convert the RJ45 style RS232 (without RI) mechanically/electrically to a Sub-D9 connector (see table below).

The pin assignment for this optional cable (YLR015RS) is shown below.

Table 15: RJ45 converter cable pin assignments

Signal	RJ45	RS232 Male
DSR	1	6
DCD	2	1
DTR	3	4
GND	4	5
RXD	5	2
TXD	6	3
CTS	7	8
RTS	8	7
RI	n. a.	9

VGA Interface P4200

The monitor signals are available at the front panel on a standard 15-pin female D-Sub connector.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

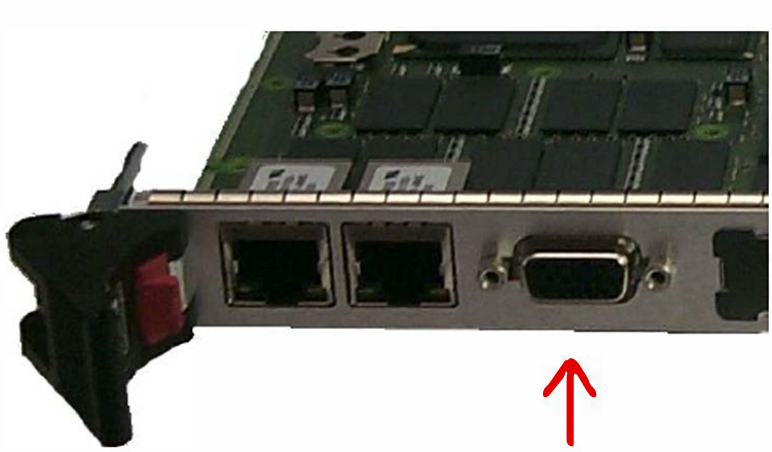


Figure 15: VGA connector location

Table 16: VGA connector pin assignments

Name	P4200
RED	1
GREEN	2
BLUE	3
HSYNC	13
VSYNC	14
DDC-Data	12
DDC-Clock	15
Fused +5V [a]	9
GND	5, 6, 7, 8, 10
NC	4, 11

[a] the Fused +5 V pin is protected with a 2 A fuse. For normal operation don't exceed 100 mA current. The used fuse does automatically recover if the over current is resolved.

USB Interfaces P1680, P1681

Two USB channels are available at the front panel and two USB channels are available on rear IO.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

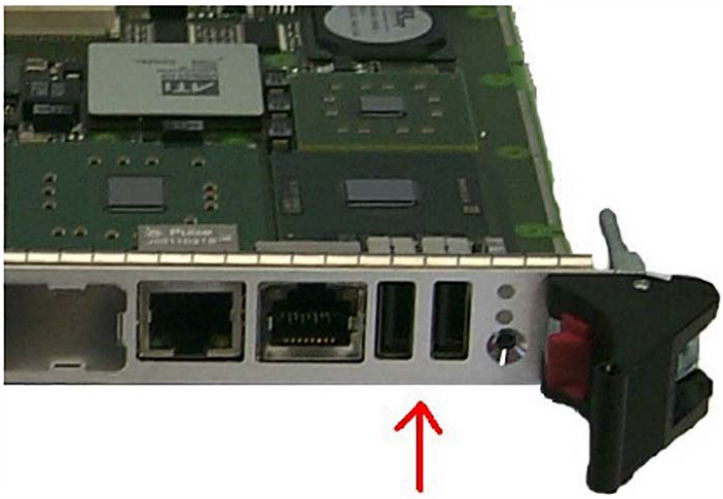


Figure 16: USB connector location

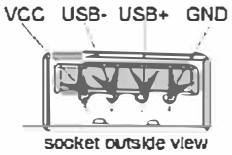


Figure 17: USB connector layout

Table 17: USB connector pin assignments

Name	P1680
USB_VCC[1]	1
USB3-	2
USB3+	3
GND	4
Name	**P1681**
USB_VCC[1]	1
USB2-	2
USB2+	3
GND	4

[a] the Fused +5 V pin is protected with a 2 A fuse. For normal operation don't exceed 500 mA current. The installed fuse does automatically recover if the over current is resolved.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PMC1 Connectors P6201, P6202, and P6203

The following table lists the pin assignments of the onboard PMC1 connector. The PMC1 slot is 64 bit and 66 MHz capable and works with the internal second PCI bus of the 6700PXH PCI Bridge. If an installed PMC card operates at 33 MHz only the PCI bus speed is reduced to 33 MHz. Additional this slot is PCI-X capable with 66/100/133 MHz. The PMC is electrical and mechanical compliant to the specification IEEE 1386 and 1386.1 with enhancements of the Processor PMC Standard VITA 32-2003. The enhancements provide pins for a second device (IDSELB and REQB/GNTB) but don't support a monarch PMC card.

The PCI signaling voltage is connected to 3.3 V. PMC cards with +5 V I/O voltage must never be used on this PMC slot.

Table 18: PMC1 connector pin assignments

P6201	P6202	P6203	Pin	Pin	P6201	P6202	P6203
NC	+12 V	Reserved	01	02	-12 V	NC	GND
GND	NC	GND	03	04	PCIIRQ4#	NC	C/BE7
PCIIRQ5#	NC	C/BE6	05	06	PCIIRQ6#	GND	C/BE5
PRESENT#	GND	C/BE4	07	08	+5 V	Reserved	GND
PCIIRQ7#	Reserved	V(I/O)	09	10	Reserved	Reserved	PAR64
GND	PUP [a]	AD63	11	12	NC	+3.3 V	AD62
PCICLK	PCIRST#	AD61	13	14	GND	PDN [a]	GND
GND	+3.3 V	GND	15	16	GNT0#	PDN [a]	AD60
REQ0#	PME#	AD59	17	18	+5 V	GND	AD58
V(I/O)	AD30	AD57	19	20	AD31	AD29	GND
AD28	GND	V(I/O)	21	22	AD27	AD26	AD56
AD25	AD24	AD55	23	24	GND	+3.3 V	AD54
GND	IDSEL	AD53	25	26	C/BE3#	AD23	GND
AD22	+3.3 V	GND	27	28	AD21	AD20	AD52
AD19	AD18	AD51	29	30	+5 V	GND	AD50
V(I/O)	AD16	AD49	31	32	AD17	C/BE2#	GND
FRAME#	GND	GND	33	34	GND	IDSELB	AD48
GND	TRDY#	AD47	35	36	IRDY#	+3.3 V	AD46
DEVSEL#	GND	AD45	37	38	+5 V	STOP#	GND
PCIXCAP	PERR#	V(I/O)	39	40	LOCK#	GND	AD44
Reserved	+3.3 V	AD43	41	42	RES.	SERR#	AD42
PAR	C/BE1#	AD41	43	44	GND	GND	GND
V(I/O)	AD14	GND	45	46	AD15	AD13	AD40
AD12	M66EN	AD39	47	48	AD11	AD10	AD38
AD9	AD8	AD37	49	50	+5V	+3.3 V	GND
GND	AD7	GND	51	52	C/BE0#	REQB#	AD36
AD6	+3.3 V	AD35	53	54	AD5	GNTB#	AD34
AD4	Reserved	AD33	55	56	GND	GND	GND
V(I/O)	NC	V(I/O)	57	58	AD3	NC	AD32
AD2	GND	Reserved	59	60	AD1	RSTOUT#	Reserved
AD0	ACK64#	Reserved	61	62	+5 V	+3.3 V	GND
GND	GND	GND	63	64	REQ64#	NC	Reserved

[a] Weak 10 kΩ pull-down (PDN) to GND and pull-up (PUP) to VIO.

NC	Not connected
Reserved	Reserved. Do not connect anything
V(I/O)	I/O Voltage, connected with +3.3 V
-12 V	Only available if connected at the CPCI backplane.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PMC2 Connectors P7201, P7202

PMC2 is available on a CR11 and CT11 without the front Ethernet and/or front VGA connector. On a CP11 PMC2 is available in the second slot

The following table lists the pin assignments of the PMC2 connector. The PMC slot is 32 bit and 33 MHz capable and works with the internal primary PCI bus of the I/O Controller Hub. The PMC is electrical and mechanical compliant to the specification IEEE 1386 and 1386.1 with enhancements of the Processor PMC Standard VITA 32-2003. The enhancements provide pins for a second device (IDSELB and REQB/GNTB) but don't support a monarch PMC card. The PCI signaling voltage is fixed to 5 V for this PMC2. Nevertheless PMC cards with +3.3 V or +5 V supply or I/O voltage can be used on this PMC slot.

Table 19: PMC2 connector pin assignments

P7201	P7202	Pin	Pin	P7201	P7202
NC	+12 V	01	02	-12 V	NC
GND	NC	03	04	PCIIRQ6#	NC
PCIIRQ7#	NC	05	06	PCIIRQ4#	GND
PRESENT#	GND	07	08	+5 V	Reserved
PCIIRQ5#	Reserved	09	10	Reserved	Reserved
GND	PUP[a]	11	12	NC	+3.3 V
PCICLK	PCIRST#	13	14	GND	PDN[a]
GND	+3.3 V	15	16	GNT0#	PDN[a]
REQ0#	PME#	17	18	+5 V	GND
V(I/O)	AD30	19	20	AD31	AD29
AD28	GND	21	22	AD27	AD26
AD25	AD24	23	24	GND	+3.3 V
GND	IDSEL	25	26	C/BE3#	AD23
AD22	+3.3 V	27	28	AD21	AD20
AD19	AD18	29	30	+5 V	GND
V(I/O)	AD16	31	32	AD17	C/BE2#
FRAME#	GND	33	34	GND	IDSELB
GND	TRDY#	35	36	IRDY#	+3.3 V
DEVSEL#	GND	37	38	+5 V	STOP#
GND	PERR#	39	40	LOCK#	GND
Reserved	+3.3 V	41	42	RES.	SERR#
PAR	C/BE1#	43	44	GND	GND
V(I/O)	AD14	45	46	AD15	AD13
AD12	GND	47	48	AD11	AD10
AD9	AD8	49	50	+5 V	+3.3 V
GND	AD7	51	52	C/BE0#	REQB#
AD6	+3.3 V	53	54	AD5	GNTB#
AD4	Reserved	55	56	GND	GND
V(I/O)	NC	57	58	AD3	EREADY
AD2	GND	59	60	AD1	RESETOUT#
AD0	PUP[a]	61	62	+5 V	+3.3 V
GND	GND	63	64	PUP[a]	NC

[a] Weak 10 kΩ pull-down (PDN) to GND and pull-up (PUP) to VIO.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NC	Not connected
Reserved	Reserved. Do not connect anything
V(I/O)	I/O Voltage, connected with +5 V
-12 V	Only available if connected at the CPCI backplane.

PMC-I/O Connector P6204 and P7204

Pin 1 of the I/O connector is PMCxIO_01; Pin 2 is PMCxIO_02 and so on. The x denotes PMC1 or PMC2 respectively. All traces are not connected to any signal onboard and no pairs or length adjusted traces are used to route this signals to the backplane connectors. Nevertheless adjacent signals at the PMC connector are routed with an almost equal length

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER 6 Resources

Chapter Scope

This chapter describes system resources, such as memory mapping, register set and default interrupt request assignments.

Memory Map

The table below shows the memory address area used by the CR11.

Table 20: Memory area assignments

Address	Size	Used by
S00000 - S9FFFF	640 kByte	System RAM
SA0000 - SBFFFF	128 kByte	Video RAM (if enabled)
SC0000 - SDFFFF	128 kByte	Used by PCI ROMs: VGA, SCSI, Ethernet
SE0000 - SFFFFF	128 kByte	System BIOS
S100000 - S3FFFFFFF	depends on available DRAM	Extended RAM
S4000000 - SFFFBFFFF	depends on available DRAM	Dynamically used by PCI devices
SFEC00000 - SFFEFFFFF		System devices
SFFF00000 - SFFFFFFFF	1 MByte	System BIOS

Register Set

The following section provides an overview of the registers located in the I/O address area of the CR11.

Note:
The address location of PCI devices such as SCSI or Ethernet are not described in the following tables because the System BIOS automatically configures

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

(PnP, Plug and Play) each PCI device to avoid address conflicts. Many device drivers show the actual address locations after installation and loading.

Standard Register Set

The standard register set is the same as the standard PC/AT systems. The table below provides an overview of the address ranges occupied by these registers.

Table 21: Standard register set

I/O Address Range (Hex)	Function
0x00h – 0x0Fh	DMA Controller 1
0x20h – 0x21h	Interrupt Controller 1
0x40h – 0x43h	Counter / Timer
0x60h	Keyboard Controller
0x61h	NMI Status and Control
0x64h	Keyboard Controller
0x70h – 0x71h	RTC, NMI Mask
0x80h – 0x8Fh	DMA Page register
0xA0h – 0xA1h	Interrupt Controller 2
0xB2h – 0xB3h	Power Management
0xC0h – 0xDEh	DMA Controller 2
0xF0h – 0xF1h	Coprocessor
0x100h – 0x107h	Reserved [b]
0x170h – 0x177h	Secondary IDE
0x1F0h – 0x1F7h	Primary IDE
0x278h – 0x27Fh	LPT
0x2E8h – 0x2Efh	COM port [a]
0x2F8h - 0x2FFh	COM port [a]
0x3E8h – 0x3Efh	COM port [a]
0x3F8h – 0x3FFh	COM1 port [a]

a. Via setup three address ranges can be defined for the parallel interfaces and four address ranges for the serial interfaces.

b. Used for onboard programmable options. They are not intended to be used from normal users. For more explanation please check the 'Board Specific Hardware Programmer's Manual'

Plug and Play Devices

See 'Board Specific Hardware Programmer's Manual'

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Interrupts

The interrupt routing for standard components such as COM1/2 or LPTI is in compliance with standard PC/AT systems. Unused interrupts can be used for add-on cards or other board specific PCI devices such as SCSI and Ethernet.

Table 22: Interrupt assignments

Hardware IRQ	IRQ Source
INTC1	
IRQ00	System Timer
IRQ01	Keyboard [a]
IRQ02	Cascade from INTC2
IRQ03	COM2 / COM1 [b]
IRQ04	COM1 / COM2 [b]
IRQ05	
IRQ06	
IRQ07	
INTC2	
IRQ08	Real Time Clock
IRQ09	Power Management Contr.
IRQ10	PnP/PCI [b]
IRQ11	PnP/PCI [b]
IRQ12	PS/2 Mouse [a]
IRQ13	Numeric Coprocessor
IRQ14	External IDE [d]
IRQ15	Onboard IDE [e]
NMI	Parity Error,
	ECC Error,
	System Error

[a]. This interrupt is available when no Interrupt Service Routine is installed.
[b]. Interrupts are available for Plug and Play PCI devices
[c]. This interrupt is available when PS/2 mouse is not connected.
[d]. This interrupt is available when the primary IDE is disabled in SETUP.
[e]. This interrupt is available when the secondary IDE is disabled in SETUP.

APIC Controller

The CR11 supports also the Interrupt handlings with APIC (Advanced Interrupt Controller). This handling of the APIC interrupt services must be supported by

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

the operating system. The I/O APIC handles interrupts very differently than the 8259. Briefly, these differences are:

- **Method of Interrupt Transmission.** The I/O APIC transmits interrupts through a three wire bus, and interrupts are handled without need for the processor to run an interrupt acknowledge cycle.
- **Interrupt Priority.** The priority of interrupts in the I/O APIC is independent of the interrupt number. For example, interrupt 10 may be given a higher priority than interrupt 3.
- **More Interrupts.** The I/O APIC in the Intel 6300ESB supports a total of 48 interrupts.

For a complete operation descriptions please refer to the 'Intel 6300ESB I/O Controller Hub' datasheet.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER 7 Function Blocks

Chapter Scope

This section gives a brief overview of the software interfaces of onboard devices on the CR11 CompactPCI Single Board Computer.

Processor

The Intel Core Duo and Core 2 Duo families provide high performance with low power and features Enhanced Intel SpeedStep® technology which provides the ability to dynamically adjust the power and performance of the processor based on CPU demand. This results in optimal performance without compromising the power performance of the CR11.

The processor die is thermally protected by two thermal monitor features. When reaching a maximum safe operating temperature the Thermal Control Circuit in the processor activates a throttling feature and reduces the voltage and frequency dynamically. If this feature is active the CR11 will indicate it with short clicks at the speaker. In case of a catastrophic die overheating (above 125 °C) the CR11 switches off the processor core voltage. Recovery from this catastrophic event can be done with a power off-on cycle only.

Memory Controller

The memory controller in the CR11 supports double data rate two synchronous DRAMs (DDR2 SDRAM) with a data bus width of 128 bits + ECC. One, two or four banks are provided by the CR11 with a size of either 512 Mbytes or 1 GByte. This results in a minimum memory size of 512 MByte and a maximum size of 4 GByte. When using memory configuration with 1 GByte and higher the interface uses the full 128 bit bandwidth of both on chip DRAM channels.

DMA Controller

In standard AT compatible PCs, as well as on the CR11, the two DMA controllers integrated on the board are internally cascaded. Both controllers are

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

compatible with the Intel 8237A. The DMA Controller 1 (DMAC1) is used for byte-wide transfers while the DMAC2 is used for word-wide transfers.

Interrupt Controller

The Interrupt controller on a standard PC consists of two 82C59A devices with eight interrupt request lines each. The two controllers are cascaded so that 14 external and two internal interrupt sources are available. The master interrupt controller provides IRQ [7...1], the slave interrupt controller provides IRQ [15...8]. IRQ2 is used to cascade the two controllers, IRQ0 is used as a system timer interrupt and is tied to interval timer 1, counter 0. The remaining 14 interrupt lines are mapped to various onboard devices. Each 82C59A provides several internal registers. The interrupts at the IRQ input lines are handled by two registers, the interrupt request register IRR and the in-service register ISR. For programming details see the 82C59A data sheet. The CR11 supports also the Interrupt handlings with APIC (Advanced Interrupt Controller). This handling of the APIC interrupt services must be supported by the operating system. The I/O APIC handles interrupts very differently than the 8259.

Timer

Standard PCs like the CR11 are equipped with an 8254 compatible timer. This timer contains three counters. Each counter output provides a key system function. Counter 0 is connected to interrupt controller input IRQ0 and provides a system timer interrupt for time-of-day, floppy disk timeout and other system timing functions. Counter 1 generates a refresh request signal and Counter 2 generates the sound for the speaker.

The following table gives an overview over the 8254 functions.

Table 23: Interval timer functions

Interval Timer Functions	
Function	Counter 0 (System Timer)
Gate	Always on
Clock In	1.193 MHz (OSC/12)
Out	IRQ0 (INT1)
Function	Counter 1 (Refresh Request)
Gate	Always on
Clock In	1.193 MHz (OSC/12)
Out	Refresh Request
Function	Counter 2 (Speaker Tone)
Gate	Programmable via Port $061
Clock In	1.193 MHz (OSC/12)
Out	Speaker

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The counter/timers are programmed by I/O accesses. A single control word register controls the operation of all three counters. For more information on programming and a detailed register description see the 8254 data sheet.

Real Time Clock

The RTC is a low-power clock that provides a time-of day clock and a 100-year calendar with alarm features and battery backed operation. The time-of-day function includes 14 control registers. Other features include maskable interrupt sources and 242 bytes of general purpose CMOS RAM used by system BIOS. Valid RAM data and time can be maintained after power down through the use of an external battery source. The RTC is software compatible to the Dallas DS1287, Motorola MC146818 and the Freescale equivalent.

EIDE and SATA Interfaces

The CR11 offers various IDE/ATAPI and SATA interfaces.

There are two SATA channels available which are routed to the backplane. They can transfer up to 150 Mbytes/s.

The signals of the primary parallel EIDE interface are available at the backplane IO connector only. The signals of the secondary EIDE interface are used for connection of a 2.5" HDD or flash disk via connector P1800 on board. The CR11 System BIOS automatically detects connected EIDE/SATA HDDs or flash disks and enters the corresponding drive parameters into the BIOS setup. This feature allows faster and easier handling of varying types of EIDE hard disks. At the primary EIDE interface two hard disks can be connected. In this case one HDD must be configured as master and the other one as slave. Read the hard disk manual to find out where these jumpers are located on your drive. The optional 2.5" onboard disk is connected to an onboard EIDE connector (secondary EIDE interface).

Using EIDE and SCSI devices: The PC allows the simultaneous use of EIDE, SATA and SCSI hard disks. BIOS setup allows reordering drives to boot from either SCSI or EIDE/SATA drives.

Please note:
For correct operation of the parallel EIDE interface, a maximum cable length of 12 inches (30 cm) must not be exceeded. For use with fast transfer rates such as UDMA 66 and higher a high density 80 pole cable must be used. The use of round wired cables is not recommended.
For correct operation of the serial SATA interfaces, a maximum cable length of 100 cm must not be exceeded.

USB Interface

The CR11 has four USB 2.0 channels. They are backward compatible to USB 1.0/1.1. The USB host controller supports legacy Keyboard/Mouse usage with USB–based keyboard and mouse without using additional software drivers.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Serial Interface

The CR11 serial ports are fully compatible with the NS16450 and NS16550. This means that each serial interface provides a 16 byte FIFO and therefore offers a higher performance than earlier used standard serial interfaces. The UARTs have programmable baud rate generators capable of 50 to 115200 baud. There are four address locations defined for serial interfaces on standard PCs. The two serial interfaces are I/O mapped and can occupy four address ranges.

Graphics Controller

The Graphic Controller ATI M22 has the following features:

- Highly integrated Flat Panel and CRT GUI
- Max. pixel clock 300 MHz - 400 MHz
- Dual Independent Display for CRT front and CRT/Flat Panel rear
- CRT resolution up to 2048x1280, DVI up to 1600x1200

Note:
Termination resistors for the RGB lines are on the Transition Module CTM17. If the customer does not use the CTM17 mezzanine module he has to terminate the signal lines properly.

At higher resolutions the cable and connectors have great influence on picture quality. Use very good quality cables and connectors or reduce resolution to get a stable display of good quality. This is especially important for the highest resolution of 2048 x 1280 and 1600 x 1200.

Software Installation

The Technical Product Information CD-ROM supplied with the CR11 includes the most commonly used software drivers and utilities.

PMC Interface

The PCI Mezzanine Card (PMC) Interface is an additional slot for parallel mounted expander or option cards. Please see chapter 'PCI Mezzanine Card (PMC)' on page 97 of this manual for further details. The CR11 PMC Connector interface is described on page 94.

IPMI (CT11)

A Baseboard management controller (BMC) is implemented on the CT11, the interfacing between host processor and the system management network. This controller can also work as a Peripheral management controller (PM). The BMC is mapped into the local CPUs I/O address space, specified in the 'CR11, CT11, CP11, VR11, VP11 Board Specific Hardware Programmer's Manual'. The functionality of the IPMI controller is described in the 'Intelligent Platform Management Interface for CT11 User's Manual'.
For information about the System Management in CompactPCI systems, please refer to the PICMG 2.9 specification 'System Management Specification'. More information about IPMI can be found on the Intel website.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

IPMB

The Intelligent Platform Management Bus (IPMB) is an I2C-based bus that provides a standardized interconnection between different CPCI-boards within a chassis. The standardized connection to the backplane is shown below:

Table 24: IPMB backplane pin assignments

J7001	Name	Description
B17	IPMB_SCL	Serial Clock
C17	IPMB_SDA	Serial Data
A4	IPMB_PWR	Power Supply for all IPMI-devices

Private I^2C

The Private IPMI I^2C bus is equivalent to the onboard SMBus (described in 'Additional devices/SMB'). The IPMI-controller works as a second Master on the I^2C bus to read the SMBus devices.

Software Installation

The Technical Product Information CD-ROM supplied with the CT11 includes the most commonly used software drivers and utilities.

Ethernet Interface

The Ethernet controller 82571EB from Intel used with the CR11 is a high performance dual Gigabit Ethernet 10/100/1000 Mbit PCI controller. Both channels are available on the CR11. Front or rear Ethernet can be selected via order.

For registration and identification of a workstation in a LAN, a unique ID number is required. Each network card is assigned a unique ID number, which resides in an Ethernet address ROM on the CR11. An Ethernet boot option can be enabled in BIOS setup.

Optionally there is a front 10/100 Mbit Fast Ethernet channel based on an Intel 82551 available

Software Installation

The drivers available for the Ethernet controller 82571EB support a large number of operating systems. The table shows operating systems supported by the available software:

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 25: Supported operating systems

Type	System
ODI	DOS, VxWorks
NDIS	DOS, Linux
NDIS	Windows NT 4.0, 98, 2000, XP

The Technical Product Information CD-ROM supplied with the CR11 includes the most commonly used software drivers and utilities.

Additional devices

Hot Swap

The PICMG 2.1 Hot Swap compliant CR11 allows the orderly insertion and extraction under power, without adversely affecting system operation.
According to the PICMG 2.1 Hot Swap specification, the CR11 uses its 2.7 kΩ pull-up resistors for biasing purposes during hot insert. During this phase all CPCI signals are pre-charged to 1.1 V with these 2.7 kOhm resistors.
The Hot Swap process can be described in terms of three processes:

Physical Connection Process - describes the acts of:

- Hot Insertion - by which CR11 is installed in a live system (as a non-system CPU)
- Hot Extraction – which means the CR11 is removed from a live system (as a non-system CPU)
- Hardware Connection Process - Power Up/Down of the CR11 onboard voltages
- Software Connection Process - Connection/disconnection of the software layer(s)

At the end of the Physical Connection Process (the shortest Pin has connection) the Hot Swap controller powers up the onboard voltages in a defined manner. After the handle switches are closed, the CPCI bridge generates an insertion event, which signals a Hot Swap insertion to the system. The system then scans the CPCI-bus for changes.
Please note, that the CPCI backplane must support this function and appropriate software must be installed for Hot Swap to work properly.

SMBus devices

The CR11 uses a serial 2-wire I2C bus to communicate with several onboard devices:

Table 26: SMBus devices

Device	Designators	SMBus address a
Clock synthesizer *	U1000	1101 001Xb
Clock buffer *	U1110	1101 110Xb
SPD Eeprom	U1981	1010 1XXXb
Factory Eeprom	U1981	1010 00XXb

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

User Eeprom 24C512	U1983	1010 010Xb
Temperature Sensor	U1985	0101 011Xb
Optional Temperature sensor LM83	U1982	0011 001Xb
IPMI Controller	U8000	0010 000Xb
Northbridge E7520	U1300	0011 000Xb
Southbridge 6300ESB (slave)	U1600	1000 100Xb
PCIe bridge 6700PXH	U6000	1100 000Xb

Devices marked by * are handled by BIOS. It is strongly recommended not to access these devices by user software.
An X at bit 0 represents the R/#W bit.

SMBus external (IPMB)

The Intelligent Platform Management Bus (IPMB) is available on the J7002 CPCI connector for external use. External access via IPMB to the onboard SMBus devices can only be done via the IPMI controller. For more information please see the IPMB description on page 65 within the IPMI controller section.

Temperature Sensor

A temperature sensor is implemented on the CR11 board. The sensor is located close to the CPU and shows the die-temperature of the CPU and the local onboard temperature. For programming information please see the 'AMI BIOS for CR11, CP11, CT11 User's and Programmer's Manual'.

Serial EEPROM

For storage of user data a serial EEPROM is implemented on the CR11 board. The user EEPROM is a 24C04 (optional a 24C512) type with 512 Bytes. More information about writing and reading the contents can be found in the data sheets from the manufacturer (e.g. Microchip Technology, SGS Thomson, Atmel, Catalyst and many others).

Power Management Event

A Power Management Event can be initiated on CR11 by one of the following events.

Table 27: Power management events

Event	Description
ENUM	Wake CR11 [a] if a non-system board is removed or inserted
REMOVE	Wake CR11 if user wants to remove this CR11
Wake on LAN	Wake CR11 by Ethernet event
Wake on IO	Wake CR11 by IO-device i.e. Modem, KB, MS, etc.

[a]. CR11 in System slot

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

INTP, INTS
The INTP and INTS signals (PICMG2.0) are not supported on the CR11.

ENUM#
ENUM (PICMG 2.0, open-collector) is available on J7001_C25. This signal is be driven by Hot Swap compatible boards after insertion and prior to removal. For CR11 in System Slot, the input ENUM is able to generate an interrupt to force the software to interrogate all boards within the system for resource allocation regarding I/O, memory and interrupt usage.

If the CR11 works in a peripheral slot, the non-transparent bridge generate the output ENUM conform to the specification of a Hot Swap compliant board. For programming information about this PnP device, please see the 'AMI-BIOS for CR11, CP11, CT11 User's and Programmer's Manual'.

Geographic Addressing
If the backplane supports geographic Addressing, the CR11 can detect the unique Address in a CPCI-System with the GA [4...0] Pins (PICMG 2.0) on J7002.

For programming information please see the 'AMI BIOS for CR11, CP11, CT11 User's and Programmer's Manual'. For more information about geographic addressing in appliance to system management, see PICMG 2.9.

GPIO (0...7)
Eight GPIO-Pins are available on J7004. These Pins can be used for I/O functions with output 3.3 V signals as well as 5 V tolerant inputs.
For more information please see the 'Board Specific Hardware Programmer's Manual'.

Watchdog
For security of application software, the CR11 offers a software controlled hardware two stage watchdog with independent count values for each stage. First stage generates an INT or SMI. The second stage issuing a reset signal if its time-out interval expires. The configurable granularity reaches from 1µs to 10min.
For more information please see the Intel 6300ESB I/O Controller Hub datasheet and the 'Board Specific Hardware Programmer's Manual'.

Programmable Timer
An additional programmable Timer is implemented on the CR11. The timer can generate an Interrupt.

For more information please see the 'Board Specific Hardware Programmer's Manual'.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

LEDs

Two LED`s are available at the front panel green/red and blue. The Status LED is a green/amber/red tricolor for BIOS power-up status indication, after boot loading the user software is free to use this LED for its own purpose.

Table 28: BIOS power-up status

Status	LED color
Power-up, still Reset state	Red on (also the blue LED is on)
BIOS early init	Blink red
BIOS start POST	Blink amber
BIOS POST init	Blink green
OS boot	Green on
System halted or reset	Red on
OS initiated Sleep or Shutdown	Amber on

The blue LED is the Hot Swap LED and is working according the Hot Swap specification.

Reset Button

There is a Reset Button onboard. An external Reset button may be connected between the appropriate IO connector at the back side and GND. The PRST# on J7002_C42 (PICMG2.0) is used as Reset input only for the system board and is in this case, compatible to the onboard button.

- If the CR11 works as a System board:
  The push button will issue a hard power-on reset. The reset signal is active for all subsystems of the CR11.
- If the CR11 works as a Peripheral board:
  1) The push button will issue a hard power on reset. The reset signal is active for the CR11 including PMC modules, but will not reset other peripherals or the System board.
  2) The CR11 will signal a Hot Swap Insertion event when reset.

Speaker

An internal speaker is implemented on the CR11 except on a conduction cooled CR11. An external standard PC compatible speaker may be connected between the appropriate IO connector at the backside and +5 V.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHAPTER 8 Specifications

PCB

FR4 Multilayer

Size

Total board size: 6U, 4 HP (CR11 and CT11)
Total size with optional extension board 8HP (CP11)

Dimensions

PCB: 233.35 mm x 178 mm x 20 mm (CR11 and CT11 single slot)
PCB: 233.35 mm x 178 mm x 40 mm (CP11 dual slot)

Weight

Approx. 600 g (with front panel and heat sink), for a HDD add 90 g; the conduction cooled version is about 700g. The exact values depend on model and style

RoHS compliance

The CR11 is RoHS compliant.

Power Consumption

The following two tables are intended to help you calculate the power consumption of a CR11 system. Select power consumption, depending on configuration, in both tables and add them together for total power consumption. Also add any other extra power consumption as described in the footnotes of both tables.

For measurement purposes, the CR11 board is mounted on a CPCI backplane. During measurement, the power consumption of the backplane, keyboard and the hard disk drive are withdrawn from the results. The values measured are

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

typical. The current drawn from +5 V supply the CPU and all external devices. The +3.3 V supply all other components on the CR11.

Table 29: Power consumption CPU dependent

CR11	DOS, one core running full cache access, one core idle, CPU die around +75 °C*	Windows XP, both CPU cores running a thermal design power consumption instruction mix at +100 °C die temperature
	+5 V	+5 V
2.17 GHz (T7400)	4.9 A	7.1 A
2 GHz (T2500)	4.0 A	5.8 A
1.67 GHz (L2400)	2.7 A	3.7 A
1.5 GHz (L7400)**	3.1 A	4.1 A
1.2 GHz (U2500)**	1.4 A	2.0 A
1.07 GHz (Cel423)**	1.2 A	1.4 A

* for every 25 °C more please add around 10 %. The Celeron CPU has one CPU core only.
** estimated values

Table 30: Power consumption DRAM dependent

CR11	DOS prompt or CPU running full cache access, mid range temperature *	BIOS POST during memory initialization*	Windows XP, 3D graphics active, both Gigabit and the Fast-Ethernet channels linked
	+3.3 V	+3.3 V	+3.3 V
512 MB (1 bank, 9 devices)**	8.4 A	11.7 A	9.3 A
1 GB (2 banks, 18 devices)**	8.7 A	12.0 A	9.6 A
2 GB (4 banks, 36 devices)	9.2 A	12.7 A	10.1 A
4 GB (4 banks, 36 devices)	9.2 A	12.7 A	10.1 A

* for every Ethernet channel linked to gigabit please add 0.5 A.. The exact values may vary with different dram vendors by ±20 %
** estimated values

- When using onboard PMC modules don't forget to add their power consumption

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- With an onboard hard disk drive please add following values to the +5 V current:
  - During power up 0.9 A max.
  - In an idle condition 0.13 A typical.
  - During read/write access 0.42 A typical

  Values are taken from the Fujitsu MHT 2060 AT datasheet
- With an onboard compact flash drive please add 0.1 A to the +5 V current
- Connectors P1680, P1681 and P4200 provide fused VCC voltage (+5 V). The total current drawn from this source may not exceed 1.0 A

Onboard Lithium Battery

Not powered by the system

BR1225 (50 mAh), estimated life time depending on temperature and power status. The diagram below shows discharge if board is not powered from the system, i.e. if battery has to supply all current for the clock circuits.

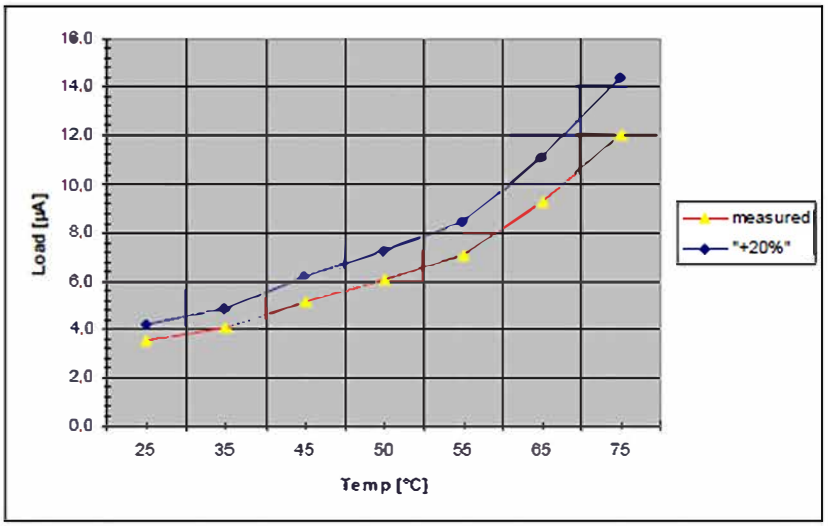


Figure 18: Battery current versus temperature

At temperatures lower than +25 °C use the value at 25 °C. Actually power usage is lower, which means longer operational lifetime for the battery.

All values were taken at 40 % RH (relative humidity).

Using the values of the diagram above (Battery current versus temperature) lifetime of the battery can be derived from the diagram below (Battery current versus time).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

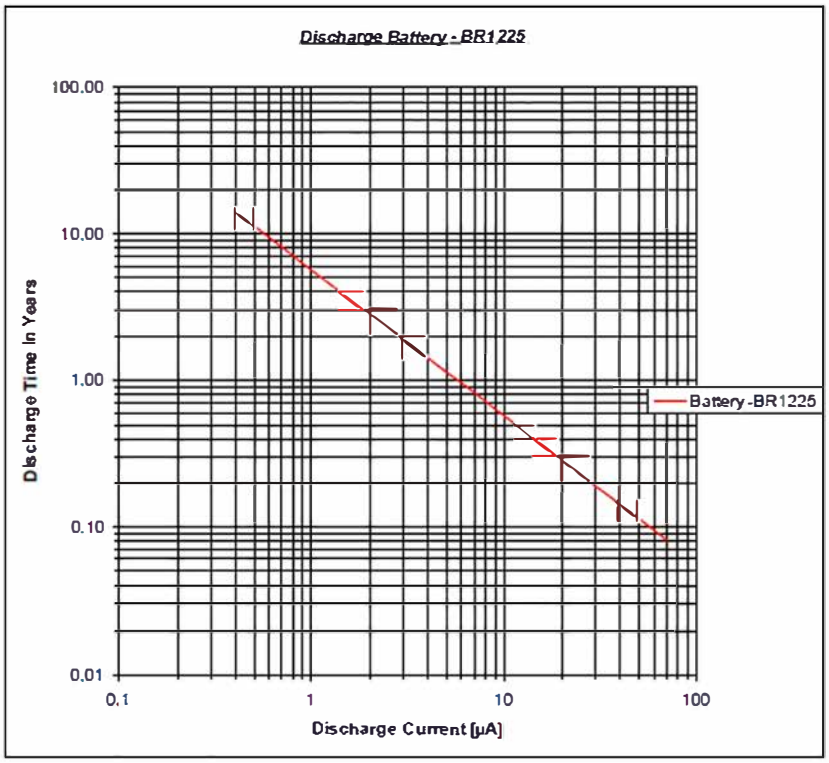


Figure 19: Battery current versus time

Powered by the system

If power to the board is supplied by the system then the battery is not supplying power to the clock circuits. However, self-discharge happens. Typical self-discharge rates are less than 0.3 percent per year with respect to a fully loaded battery at an ambient temperature of 25 °C. Self-discharge rates increase by less than 3 percent per year for temperature values up to 95 °C.

The battery has a user accessible holder on the CR11.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

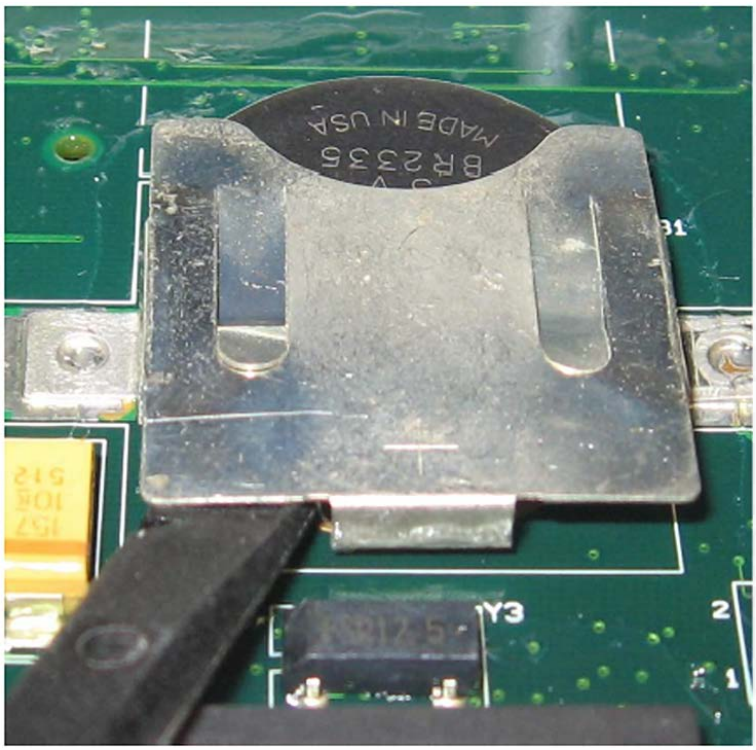


Figure 20: Battery removal

Note:
If exchanged by customer, please use same type for replacement and ensure correct polarization.
For operating without battery please check the following description of the external battery input.

Battery removal and replacement

Locate battery on the computer. Reference the product manual if it is not easily located. On some of the dual slot SBCs, the top board may need to be removed to make it easier to remove the battery. Once the battery is located, take a non-conductive tool and push at the back of the battery holder. Gently apply pressure in order to not break the socket. The battery should slide forward out of the holder. Pressure can be alternated between the two sides to get the battery to slide out of the socket. The battery should slide forward enough that it could be removed from the socket. A new battery can be installed by sliding it into the holder. Make sure to observe correct polarity.

External Battery Input

VBATIN input ranges 2.4 V to 3.3 V, max. Current (@ 3.0 V; 35 °C) 5 µA

Without an onboard battery (Styles 6 or 8) it is recommended to use an external supply connected to this input. This voltage supplies the real time clock. Without battery and without this supply voltage, the real time clock oscillator has to be started at each power up. This time gets longer when operating at lower temperatures and can be up to around 30 seconds (at -40 °C). At normal ambient temperatures this delay is below one second.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The red status LED goes off after the reset sequence and starts its normal blinking within the BIOS POST after the RTC oscillator is up.

When ordering a battery-less CR11 (Styles 6 or 8), the setup information is stored automatically within the BIOS ROM and is updated via standard BIOS Setup function. No external software is needed to create a user defined setup like in earlier products from Abaco. It is still recommended to use an external supply voltage to this battery input to avoid the power on oscillator start time and to keep the date and time information.

Environment Conditions

Ambient temperatures and humidity values for the CR11:

Table 31: Environment conditions

	Styles 1, 2	Styles 3, 4	Styles 6, 8
High Temperature			
- Storage	+85 °C	+85 °C	+105 °C
- Operating	See diagram on next page		See note
Low Temperature			
- Storage	-40 °C	-40 °C	-55 °C
- Operating	0 °C	-40 °C	-40 °C
Temperature Shock			
- Storage	+/-10 °C/min	+/-20 °C/min	+/-20 °C/min
- Operating	+/-5 °C/min	+/-10 °C/min	+/-10 °C/min
Relative Humidity - Storage, Operating	Up to 95 %, non-condensing		

CT11 and CP11 only support commercial and extended temperature styles 1 and 3. For more information on the conduction cooled version (style 8), please check the later available thermal report document of the CR11.

Shock and vibration values for the CR11 designed to meet the values below:

Table 32: Shock & vibration parameters

	Styles 1-4	Style 6	Style 8
Vibration			
- Spectrum	5 to 100 Hz	5 to 2000 Hz	5 to 2000 Hz
- Acceleration	2 g_{rms}	2 g_{rms}	14 g_{rms}
Shock			
- Amplitude	12 g	20 g	40 g / 100 g
- Duration	6 ms	6 ms	11 ms / 6 ms

CT11 and CP11 only support commercial and extended temperature styles 1 and 3.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Maximum height usage

Table 33: Maximum height usage

	Styles 1-6	Style 8
Maximum height		
- Operating	4.5 km	Vacuum
- Storage	12 km	Vacuum

Only the conduction cooled board (Style 8) is capable to be used in a vacuum environment. All other styles contain batteries or do not have the possibility to be cooled without airflow.

For highest operating temperatures (Styles 1-6) please refer to the following diagram:

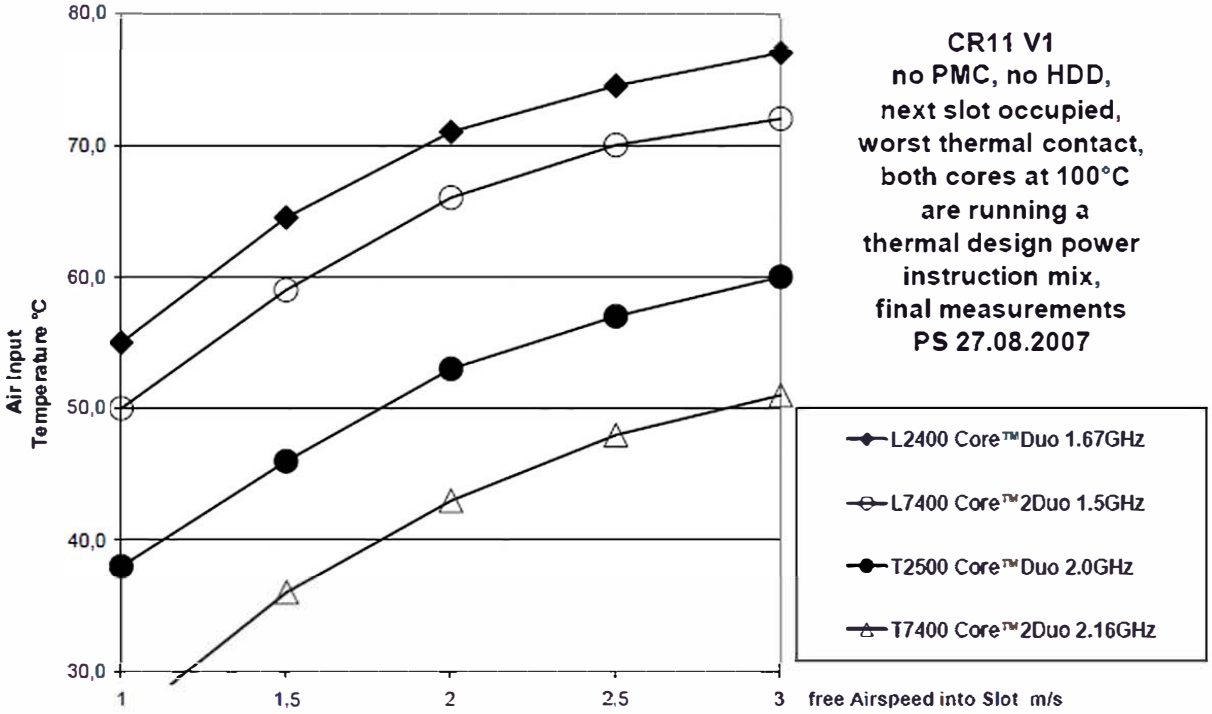


Figure 21: Temperature vs. airspeed

- The above diagram is valid for a usage at heights up to 1000 m above sea level. For higher heights the maximum temperature values have to be reduced in an appropriate way.
- The core temperature of the CPU can be read out via the onboard temperature sensor. The value must be kept below 100 °C for all operating conditions. This value is already included in the airspeed diagram above. If this temperature limit is violated, the Core™ Duo CPUs will start to reduce its internal frequency temporarily. This can be heard by a short click of the speaker which occurs every 0.8 seconds. The Celeron processor will not automatic switch down to lower frequencies but will stop its internal clock in preprogrammed intervals.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- When using an onboard hard disk drive (not with flash disk) the operating temperature is limited to 50 °C
- When using one or two PMC modules, please consider their power consumption and thermal limits in calculating the max. operating temperature

Card edge temperatures for CR11 style 8 and style 9

Table 34: Card edge temperatures for style 8 and style 9

Processor	Card edge temperature style 8	Card edge temperature style 9
Core 2 Duo LV 1.5 GHz	70 °C	85 °C
Core 2 Duo 2.16 GHz	60 °C	75 °C
Core Duo ULV 1.2 GHz	70 °C	85 °C
Core Duo LV 1.67 GHz	70 °C	85 °C
Core Duo 2.0 GHz	65 °C	80 °C

These values do not include temperature variations due to PMC modules.

For more information on the conduction cooled versions (style 8 & 9), please check the thermal report document TR-HW-011 of the CR11.

Electrical Characteristics

The supply voltages are +5 V, 3.3 V and +12 V. The -12 V are required only if needed on the PMC slot. If this voltage appears too late in the startup cycle, the Hot Swap controller will not control the ramp-up of the optional -12 V on startup. In that case the -12 V inrush current to load the decoupling capacitors on the CR11 and on the PMC may be detected as an overcurrent. This may trigger the over current protection circuit and the Hot Swap controller shuts off the complete voltage supply, which is indicated by the blue LED. Make sure that the -12 V power supply is active and up as fast or earlier as the other voltages to prevent the shutdown due to over current situation.
All output voltages of the CR11 boards have an over current protection. The maximum current for each voltage is shown below:

Table 35: Power supply parameters

Name	U	Imax	Description	Fuse
+12VIN	12 V	0.5 A	Supply for Hot Swap controller and PMC-Module	U7700 [a]
-12VIN	-12 V	0.1 A	Supply for PMC-Module	U7700 [a]
USBF_VCC	5 V	2 A	Supply for front panel USB	F1681 [b]
USBR_VCC	5 V	2 A	Supply for rear USB via transition module	F1680 [b]

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

[a]. LTC1643L-1CGN (Linear Technologies)
[b]. TPS2034D (Texas Instruments)

Supply voltage range

The following ranges are defined by the CPCI specification PICMG 2.0 Rev 3.0. The voltages have to be measured at the CR11 board (for example at the CPCI connector pins at the solder side):

Table 36: Supply voltage range

Supply	Voltage and tolerance
+5 V	5.0 V +5 % / -3 %
+3.3 V	3.3 V +5 % / -3 %
+12 V	12.0 V +/- 5 %

Note:
The PCI specification defines +3.3 V with a margin of ±0.3 V for all PCI add on cards. This specification is valid too for PMC modules used on the CR11. Please note that some PMC mezzanine modules may not function when the CR11 supply voltage is close to the lower margin of +3.3 V -3 % (PICMG 2.0).

GPIO 0...7

This general purpose I/O pins can be used as inputs, with following signal levels:

Table 37: GPIO input voltages

	Signal level
low	-0.5 V ... +0.8 V
high	+2.0 V ... +5.5 V

When used as outputs, the following signal levels are supplied:

Table 38: GPIO output voltages

	Signal level at current
low	-0.4 V at 6 mA sinking
high	+2.4 V at 3 mA sourcing

Electrical clearance

The CR11 is designed to meet the parameters as listed below.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Voltage between conductors (DC or AC peaks) of 51 V – 100 V require a spacing of

- **0.6 mm for type B2 conditions**

external conductors, uncoated, sea level to 3050 m.

These rules are in accordance with IPC-2221 requirements.

Isolation

The Isolation of the Ethernet outputs on front is limited to 500 V peak against GND and any other supply voltage.

By itself the onboard digital ground GND and the front panel/chassis frame ground FGND are isolated on the CR11 with a layout distance of more than 0.6 mm in all PCB layers. However, many standard devices (USB-keyboard, USB-mouse, and monitor) except Ethernet will connect FGND and GND directly in the device. Also standard racks (our starter cage too) connect both grounds at the power supply for safety reasons.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Placement Plan Component Side CR11 V1

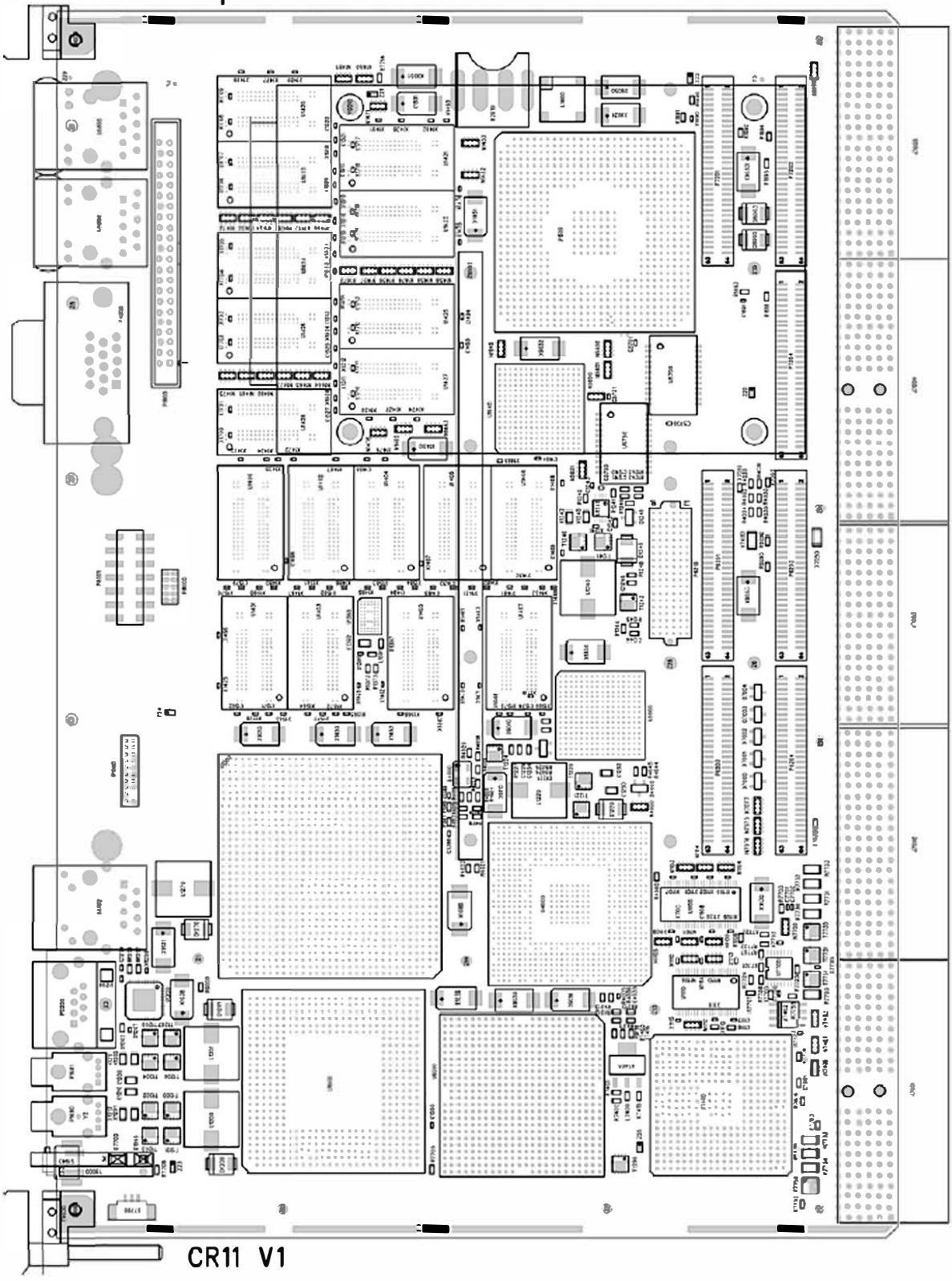


Figure 22: CR11 V1 component side placement plan

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Placement Plan Solder Side CR11 V1

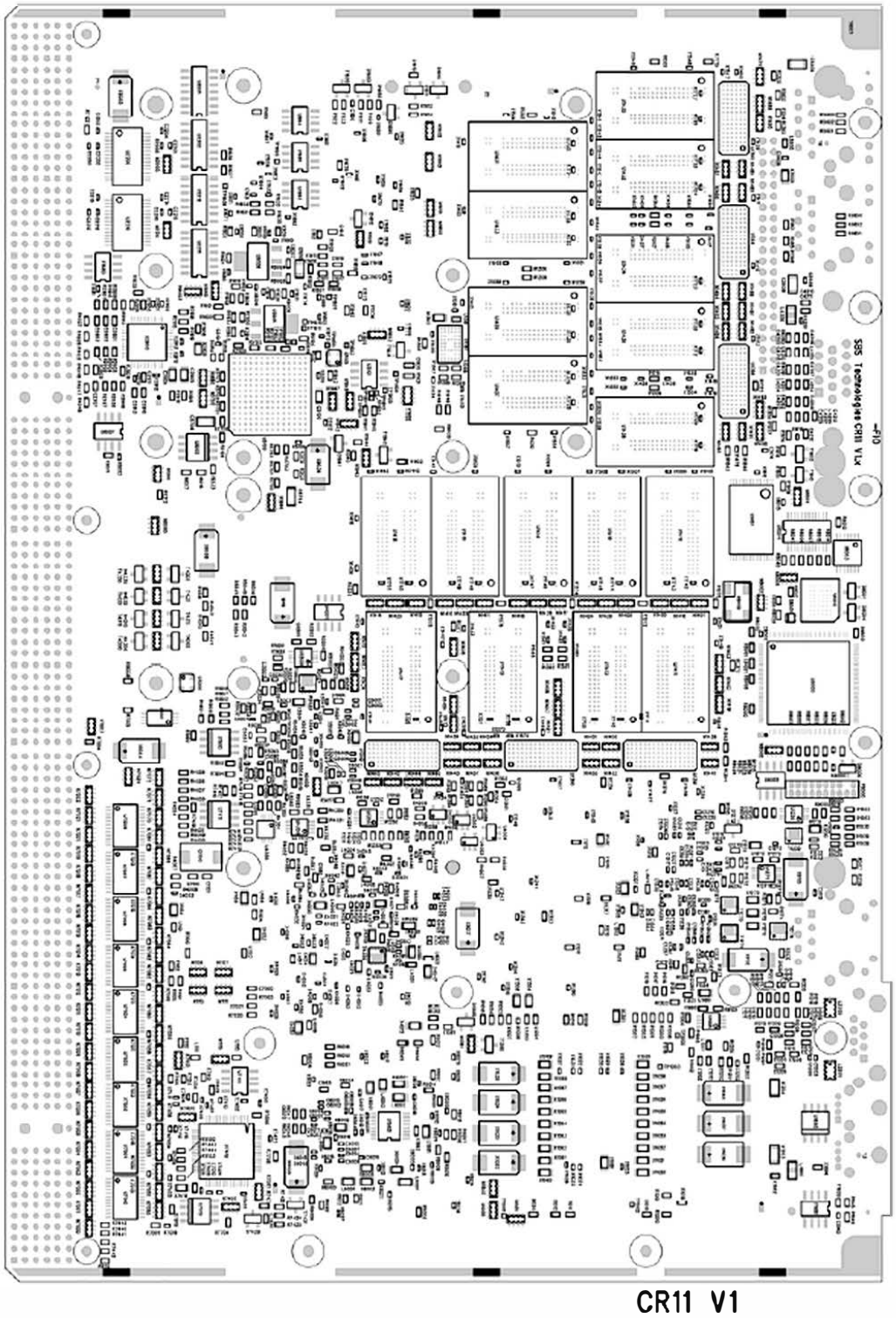


Figure 23: CR11 V1 solder side placement plan

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix A Transition Module CTM17

The CTM17 transition module is used for easy connection of I/O signals to standard connectors.

Please note:
When using the CR11 in a peripheral slot supporting hot swap, care must be taken with EIDE drives. They should not be powered during the extraction-insertion process. The former CTM12 with CT8 or CR9 did support this necessary power switching.

To avoid this problem please use SATA disks instead. They are physically hot swappable.

Please note:
You either can use a DVI display on P4100 or a standard VGA Monitor/Display when using a DVI to VGA adapter. Depending on the front VGA option ordered with the CR11, the front VGA channel is not supported on the CR11 but routed to a header on the CTM17. In these configurations you have two independent display outputs on the CTM17.

Please refer to the drawing for the location of available interfaces.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

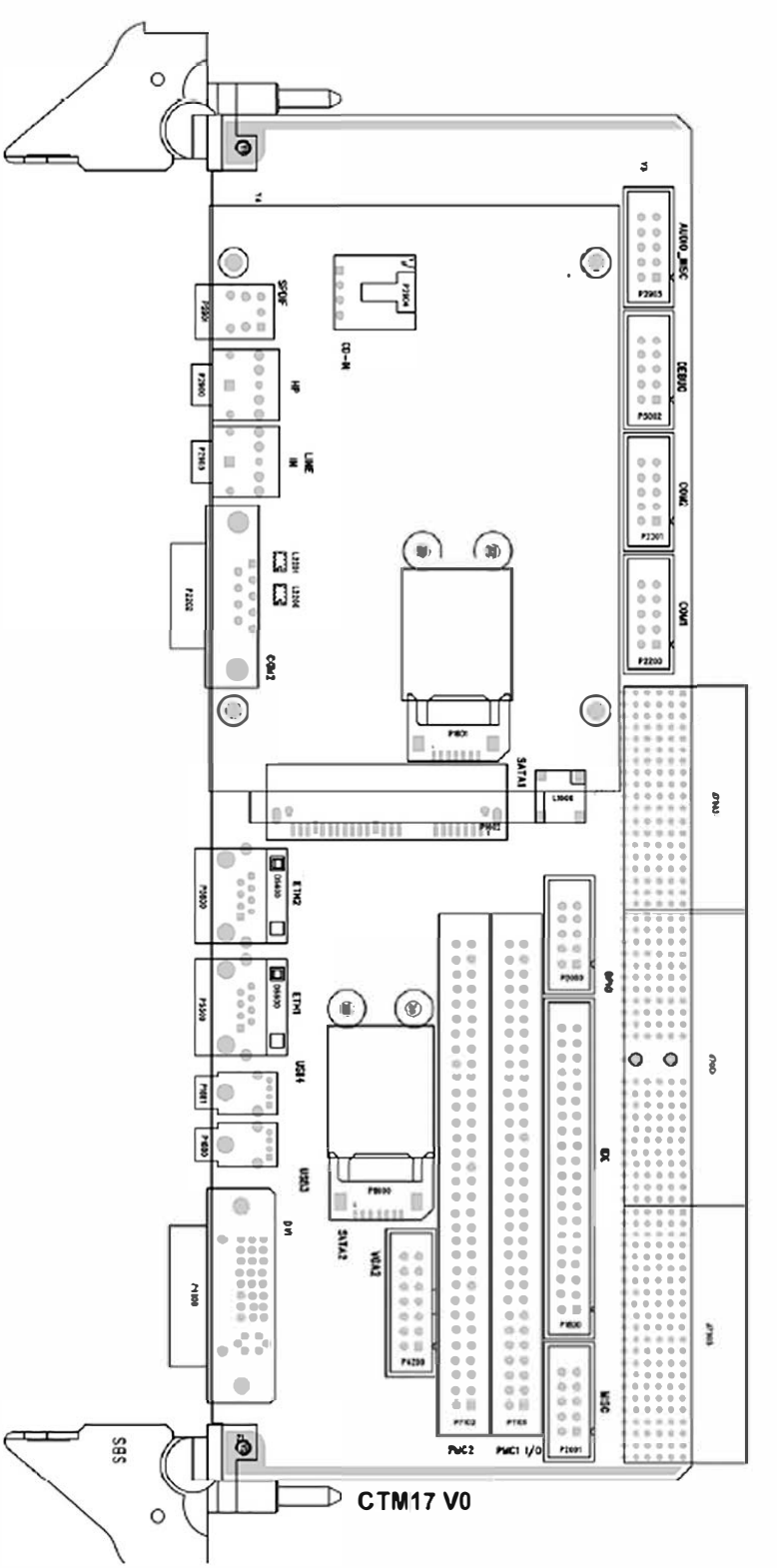


Figure 24: CTM17 component locations

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CTM17 Interfaces

This chapter describes all connector pin assignments on the CTM17 transition module.

IDE Connector P1800

The IDE interface is designed as a 40-pin 2.54 mm pitch male connector to fit directly to one or two external IDE hard drives. The cable length must not exceed 30 cm. It is recommended to use an 80 pole high density cable for UDMA transfer.

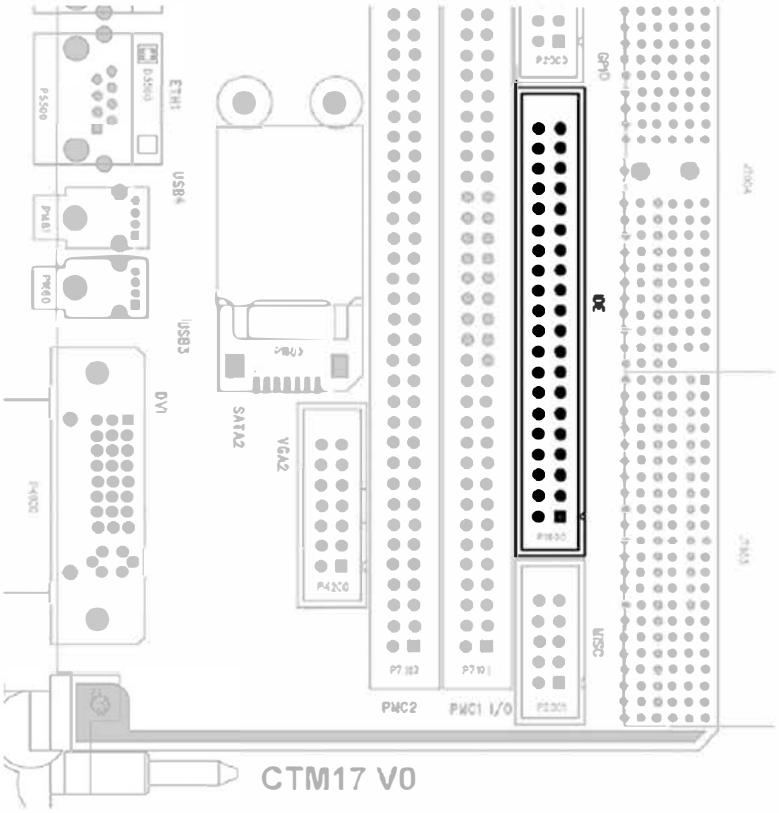


Figure 25: IDE connector location

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 39: CTM 12 IDE connector

Name	P1800		Name
GND	2	1	\RST_DRV
HD_D8	4	3	HD_D7
HD_D9	6	5	HD_D6
HD_D10	8	7	HD_D5
HD_D11	10	9	HD_D4
HD_D12	12	11	HD_D3
HD_D13	14	13	HD_D2
HD_D14	16	15	HD_D1
HD_D15	18	17	HD_D0
NC	20	19	GND
GND	22	21	HD_DRQ0
GND	24	23	\HD_IOW
GND	26	25	\HD_IOR
NC	28	27	HD_RDY
GND	30	29	HD_DAK0
NC	32	31	HD_IRQ
NC	34	33	HD_A1
HD_A2	36	35	HD_A0
\HD_CS3	38	37	\HD_CS1
GND	40	39	NC

SATA Connectors P1600, P1601 and P1602

The SATA interface has two order options. Either you have two connectors for standard SATA cable connection (P1600 and P1601) or you have a direct connector to an onboard SATA HDD (P1602) and one connector for a SATA cable (P1600).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

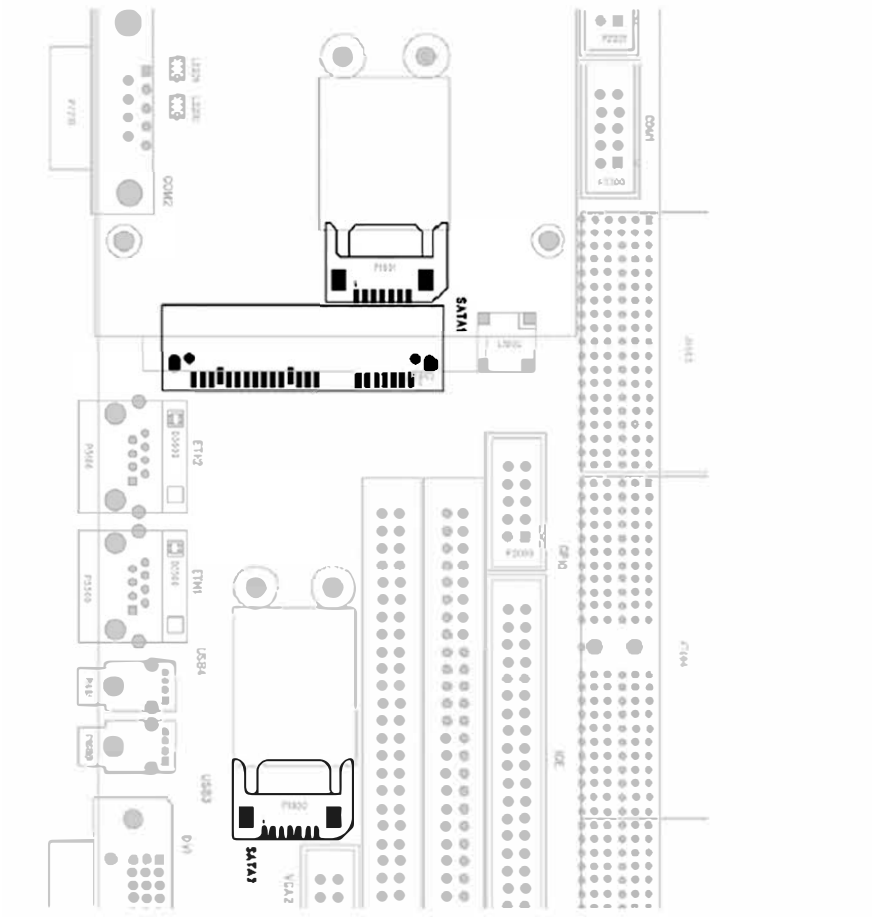


Figure 26: SATA connector locations

Audio Connectors P2903, P2900, P2901, P2904, P2905

The CTM17 provides a header (P2903) for all audio signals. If there is no onboard SATA HDD there are connectors on the front panel for headphone out, line in and digital SPDIF out. The headphone output and the line in are standard 3.5mm jacks. Additional there is also an onboard header (P2904) which can be used for CD or other audio input.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

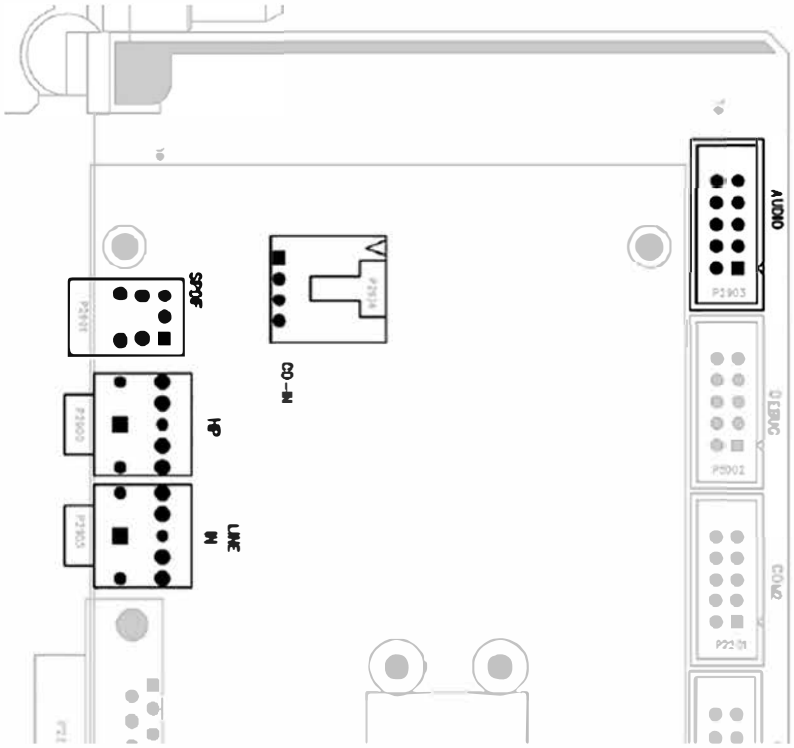


Figure 27: Audio connector locations

Table 40: Audio connector pin assignments

Name	P2903		Name
HP_OUT_L	1	2	HP_OUT_R
AGND	3	4	LINE_IN_L
LINE_IN_R	5	6	AGND
NC	7	8	SPDIF_OUT
GND	9	10	FUSE_VCC [a]

[a] +5 V supplied by the CR11 and fused with max 2 A at CTM17 for normal operation don't exceed 100 mA at this pin.

Ethernet Interface 10/100/1000BaseT P5000 and P5500

The Ethernet interfaces for Rear-IO requires usage of CAT 5 cable for proper operation with 100/1000BaseT.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

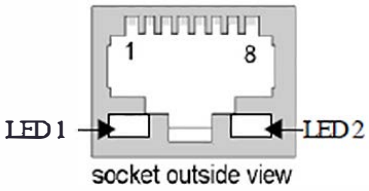


Figure 28: CTM17 Ethernet connector layout

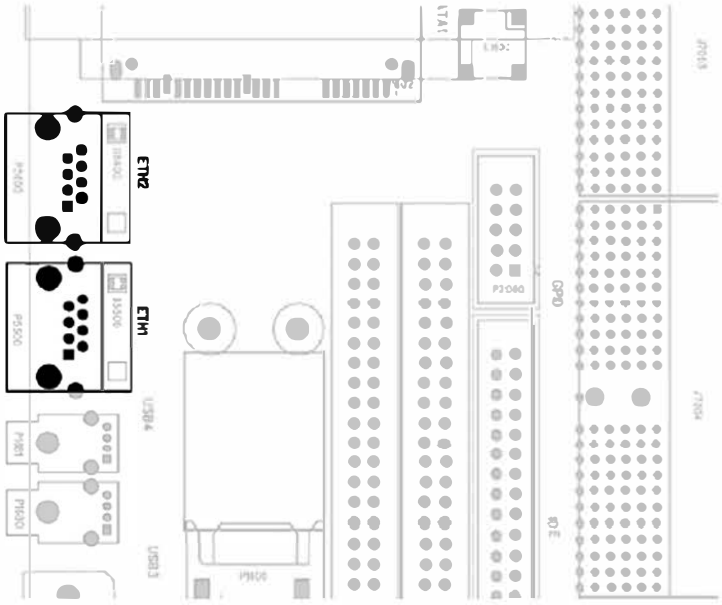


Figure 29: Ethernet connector locations

Table 41: CTM17 Ethernet connector pin assignments

Name 10/100base	Name 1000base	Ethernet1, 2
TxD+	LP_DA+	1
TxD-	LP_DA-	2
RxD+	LP_DB+	3
NC	LP_DC+	4
NC	LP_DC-	5
RxD-	LP_DB-	6
NC	LP_DD+	7
NC	LP_DD-	8

Two LEDs (LED1-green and LED2-yellow) are integrated in the RJ45 connector. These LED's indicate the link status and activity of the interfaces.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 42: Ethernet LED display definitions

LED1 green	Function
On	Link
Off	No link
LED2 yellow	**Function**
On, blink	Tx/Rx activity
Off	No activity

Serial Interfaces COM1 P2200 and COM2 P2201/P2202

The CR11 offers two RS232 serial ports. All COM ports are accessible via the Transition module at 10-pin headers and are software selectable for RS-232 or RS-422/485 operation.

Important note:
COM1 is accessible via an RJ45 type front panel connector (P2200) and via other connectors at the rear. The front panel connector has only 8 pins. It does not support the Ring Indicator (RI) on RS232 and it does not support RS422/485 because it is missing RXD- (negative Receive Data). RS422/485 is available only on rear connections.

The RS485 output drivers can be enabled or disabled with the DTR signal. An active DTR means the drivers to be enabled. When using the RS422 setting the output drivers are always enabled and the DTR signal is not used. COM2 is also available at the rear panel with a 9-pin D-sub connector. When ordering the CTM17 without the onboard SATA HDD option, there is a front panel connector P2202 for COM2 available.

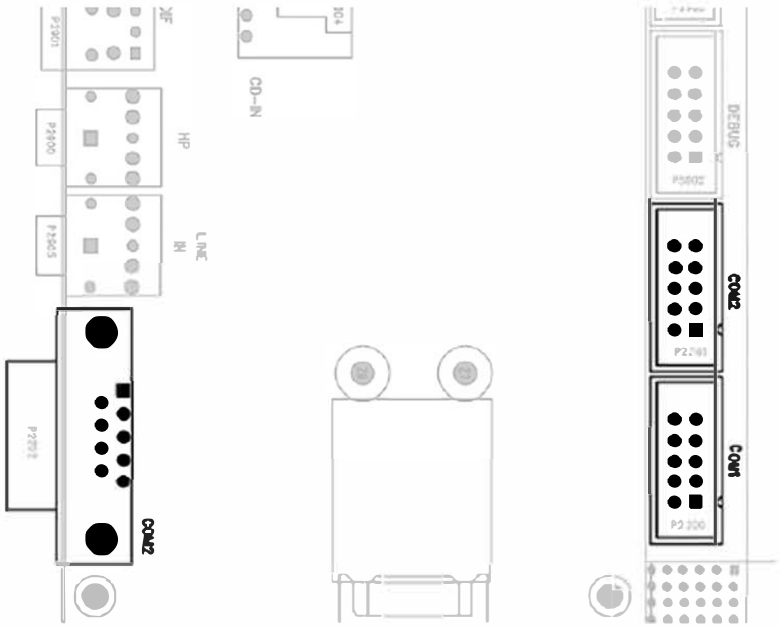


Figure 30: Serial connector locations

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 43: COM1/COM2 connector pin assignments

Name RS232	Name RS422/485	COM2 P2202	P2200, 2201 (CTM17)
DCD	TXD-	1	1
DSR	TXD+	6	2
RXD	RTS-	2	3
RTS	RTS+	7	4
TXD	CTS+	3	5
CTS	CTS-	8	6
DTR	RXD+	4	7
RI	RXD-	9	8
GND	GND	5	9
	FUSE_VCC [a]	-	10

[a] +5 V supplied by the CR11 and fused with max 2 A at CTM17 for normal operation don't exceed 100 mA at this pin.

P2202 is DB9, P2200 & P2201 are pin headers on CTM17

Graphics interfaces

The CTM17 offers an analog/digital DVI interface and if it is not used on the front panel of the CR11, a completely separate VGA interface.

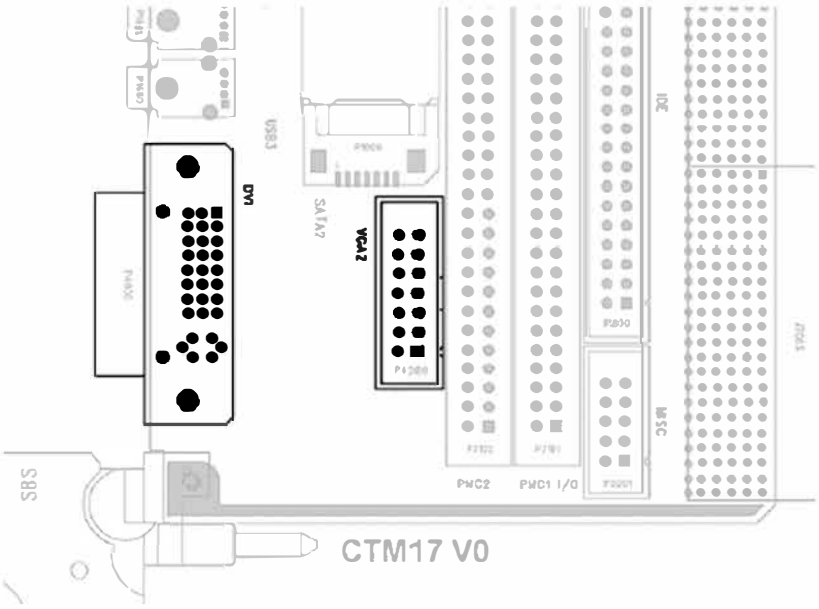


Figure 31: Graphics connector locations

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

DVI-I connector P4000

The CTM17 provides a DVI-I connector to connect DVI capable monitors. Both digital and analog video signals are provided. For the digital signals the Transition Minimized Differential Signaling (TMDS) is used. The maximum resolution with a CR11 is limited to 1280xl024. For use with standard VGA monitors please use a DVI to VGA adaptor.

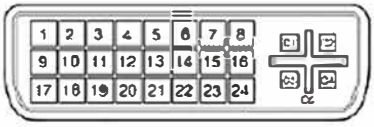


Figure 32: DVI connector layout

Table 44: DVI connector digital pin assignment

Pin	Signal name	Pin	Signal name
1	TX2- (TMDS Data2–)	13	NC
2	TX2+ (TMDS Data2+)	14	FUSE_VCC [a]
3	GND	15	GND
4	NC	16	NC
5	NC	17	TX0- (TMDS Data0–)
6	DDC Clock	18	TX0+ (TMDS Data0+)
7	DDC Data	19	GND
8	VSYNC	20	NC
9	TX1- (TMDS Data1–)	21	NC
10	TX1+ (TMDS Data1+)	22	GND
11	GND	23	TXC+ (TMDS Clock+)
12	NC	24	TXC- (TMDS Clock–)

Table 45: DVI connector analog pin assignments

Pin	Signal name
C1	RED Analog Red Video
C2	GREEN Analog Green Video
C3	BLUE Analog Blue Video
C4	HSYNC Analog Horizontal Sync
C5	GND

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

[a] +5 V supplied by the CR11 and fused with max 2 A at CTM17 for normal operation don't exceed 100 mA at this pin.

VGA2 Interface P4200

The optional second VGA monitor signals are available on P4200 a 14-pin male header. They are available if the front VGA option on the CR11 is not mounted by order (i.e. when ordered with two PMC slots).

Table 46: VGA connector pin assignment

Name	P4200
V2_RED	2
V2_GREEN	4
V2_BLUE	6
V2_HSYNC	8
V2_VSYNC	10
GND	1, 3, 5, 7, 9, 11
DDC-DATA	12
DDC-CLK	13

USB connector P1680, P1681

Four channels are available on a 10-pin male header. USBVCC is supplied and controlled by the CR11 board. It is fused with 2 A, but for normal operation don't exceed 500 mA at this connectors.

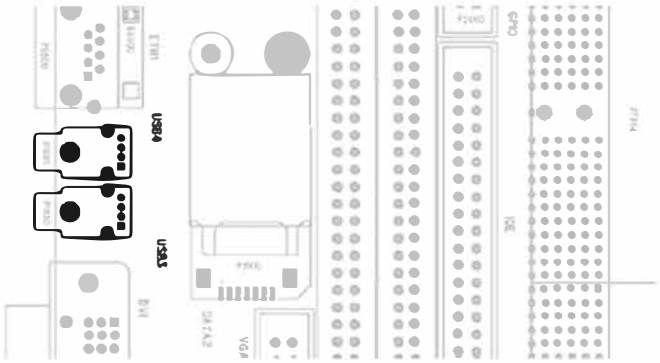
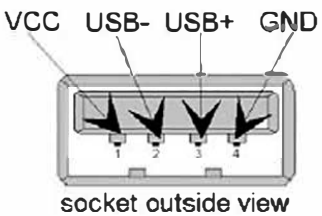


Figure 33: USB connector location



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Figure 34: USB connector pin assignments

Miscellaneous connector P2001

The header P2001 contains miscellaneous signals:

Table 47: Miscellaneous connector pin assignment

Name	P2001		Name
ICMB+	1	2	ICMB-
GND	3	4	GND
VBATIN [b]	5	6	GND
\RST_BUT	7	8	GND
\SPEAKER	9	10	FUSE_VCC [a]

[a] +5 V supplied by the CR11 and fused with max. 2 A at CTM17. For normal operation don't exceed 100 mA at this pin.
[b] VBATIN is used to connect an external battery to CR11. For a description please check the section External Battery Input.

PMC I/O connectors P7101, P7102

The PMC I/O signals of both PMC slots are available at 64-pin male headers (P7101/P7102). The following table lists the pin assignments of the PMC I/O signals at the 64-pin header. The I/O signals from PMC 1 (PMC1IO_xx) are connected to P7101 and the I/O signals from PMC 2 (PMC2IO_xx) are connected to P7102.

Table 48: PMC I/O 64-pin header connector pin assignments

P7101/P7102	Pin		P7101/P7102
PMCxIO_01	1	2	PMCxIO_02
PMCxIO_03	3	4	PMCxIO_04
PMCxIO_05	5	6	PMCxIO_06
...	...	...	...
PMCxIO_63	63	64	PMCxIO_64

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

GPIO connector P2000

The general purpose I/O signals of the CR11 are available at a male header.

Table 49: GPIO connector pin assignment

Name	P2000		Name
GPIO0	1	2	GPIO1
GPIO2	3	4	GPIO3
GPIO4	5	6	GPIO5
GPIO6	7	8	GPIO7
GND	9	10	FUSE_VCC [a]

[a] +5 V supplied by the CR11 and fused with max 2 A at CTM17. For normal operation don't exceed 100 mA at this pin.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Placement Plan

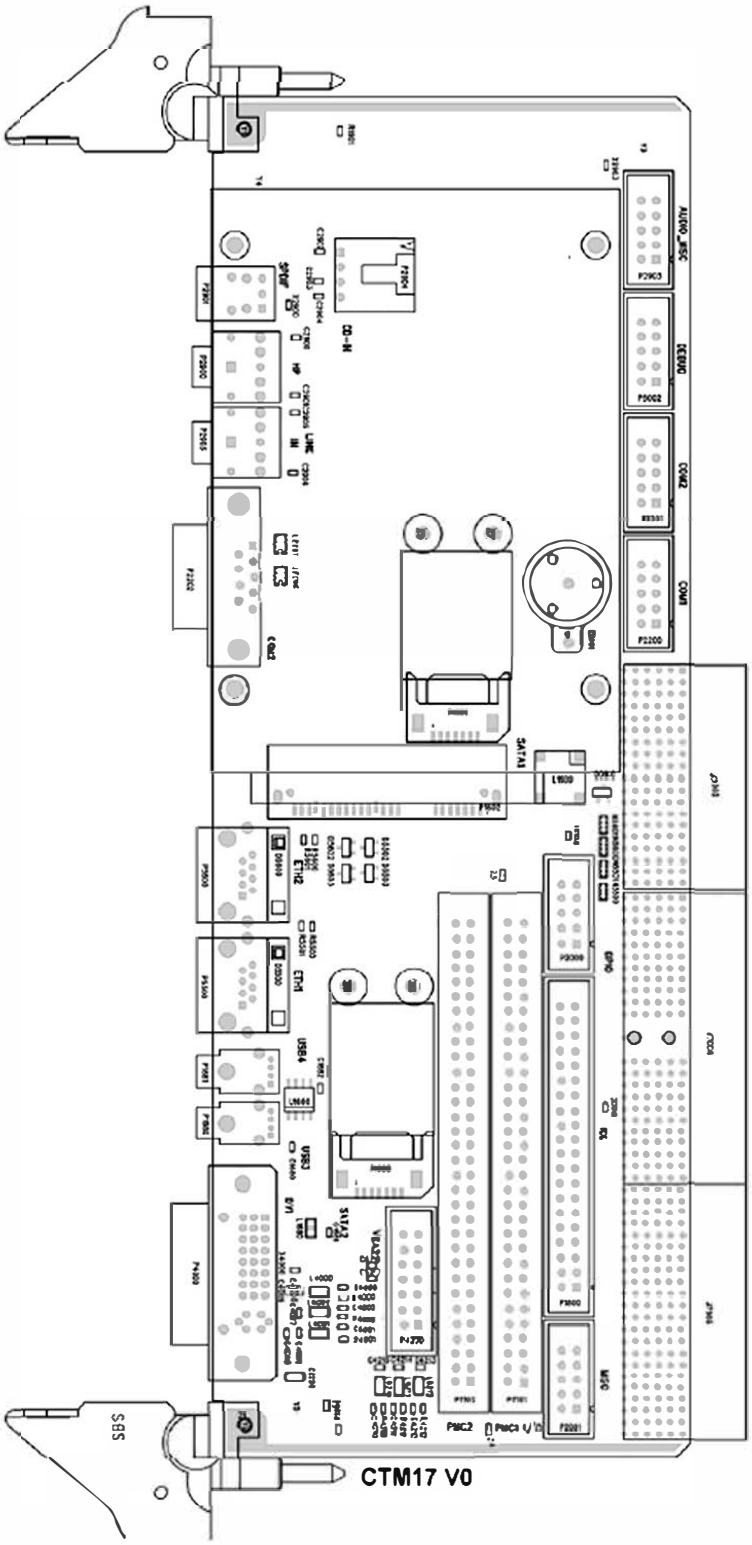


Figure 35: Placement Plan CTM17

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix B PCI Mezzanine Card (PMC)

The PCI Mezzanine Card (PMC) Interface is an additional slot for parallel mounted add on cards. The interface is compliant to the IEEE 1386.1 specification and is based on the electrical and logical layer of the PCI specification. Check for possible height incompatibility in 'Features' and 'Specifications' sections of this manual. PMC Slot1 is 66/100/133 MHz PCI-X capable. PMC Slot 2 is 33 MHz/32 bit only. The user definable I/O Pins are connected to the rear IO connector on the CR11, as defined in the PICMG 2.3 specification.

- A 5 V key is mounted on PMC2, for 5 V compatible PMC cards.
- A 3 V key is mounted on PMC1, for 3 V compatible PMC cards.

Electrical characteristics

Table 50: Electrical characteristics

Parameter	Comment	Value
I3.3V	Max. current on 3.3 V Pins	2.1 A [c]
I5V	Max. current on 5 V Pins	1.2 A [c]
I+12V	Max. current on +12 V Pin	0.1 A
I-12V [a]	Max. current on -12 V Pin	0.1 A
V(I/O) [b]	Voltage for PCI IO	3.3 V or 5 V
P	Max. power consumption total	7.5 W

a) -12 V must be connected to the backplane
b) The appropriate key has to be mounted
c) Total power dissipation on the 3.3 V and 5 V rails is 7.5 W

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

To mount a PMC board to the CR11. follow these steps:

1. Remove CR11 from system housing
2. Remove the front panel cover of the PC slot
3. Take PMC from inside through front panel and push connectors together.
4. Verify correct installation of EMC gasket
5. Fix PMC on host boards with the four screws supplied with the PMC card. The screws must be locked with Loctite 243 when using the CR11 in a mechanical rough environment.

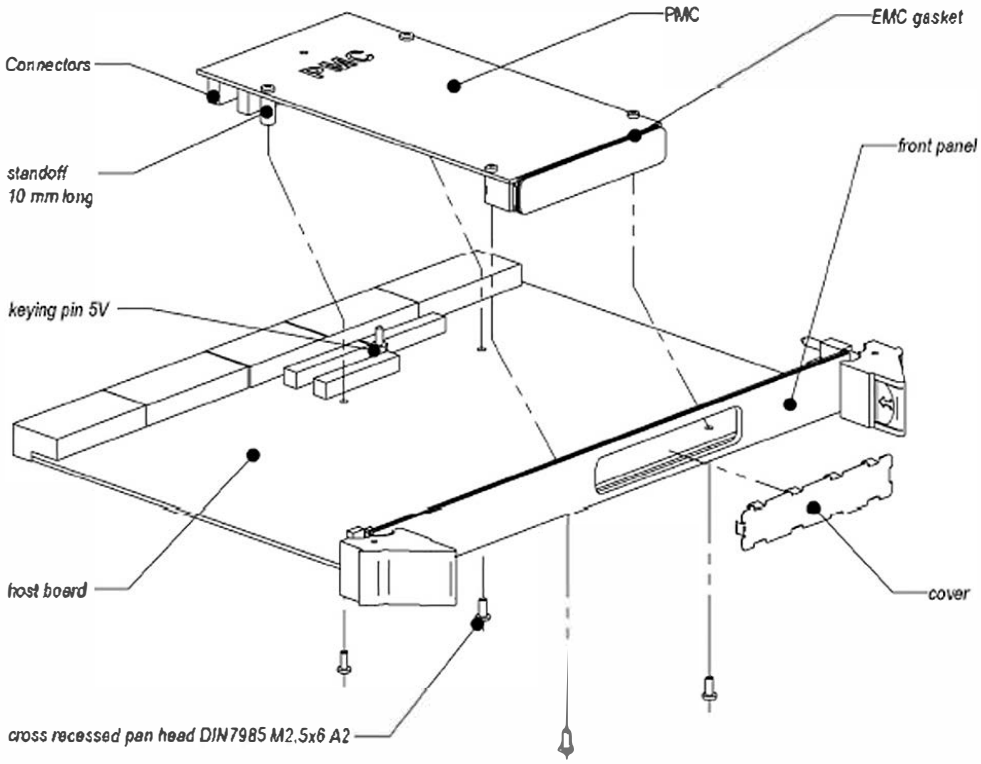


Figure 36: Mount PMC board to CR11

Note:
The PCI specification defines +3.3 V with a margin of ±0.3 V. Some PMC mezzanine modules may not function when the supply voltage is close to the lower margin of 3.3 V -3 % (PICMG 2.0).

Secondary Thermal Interface

On conduction-cooled versions of boards and mezzanines the PMC modules may be equipped with optional Secondary Thermal Interfaces. If the PMCs do not fit into their sockets on the CR11 base board then you can remove them. Use a matching TORX screw driver to remove the Secodary Thermal Interfaces. For mounting use a torque of 0.3 Nm to fix the screws or use minimum force to tighten the screws. Add only a short turn (~1/16th) when the screw starts to get tight.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

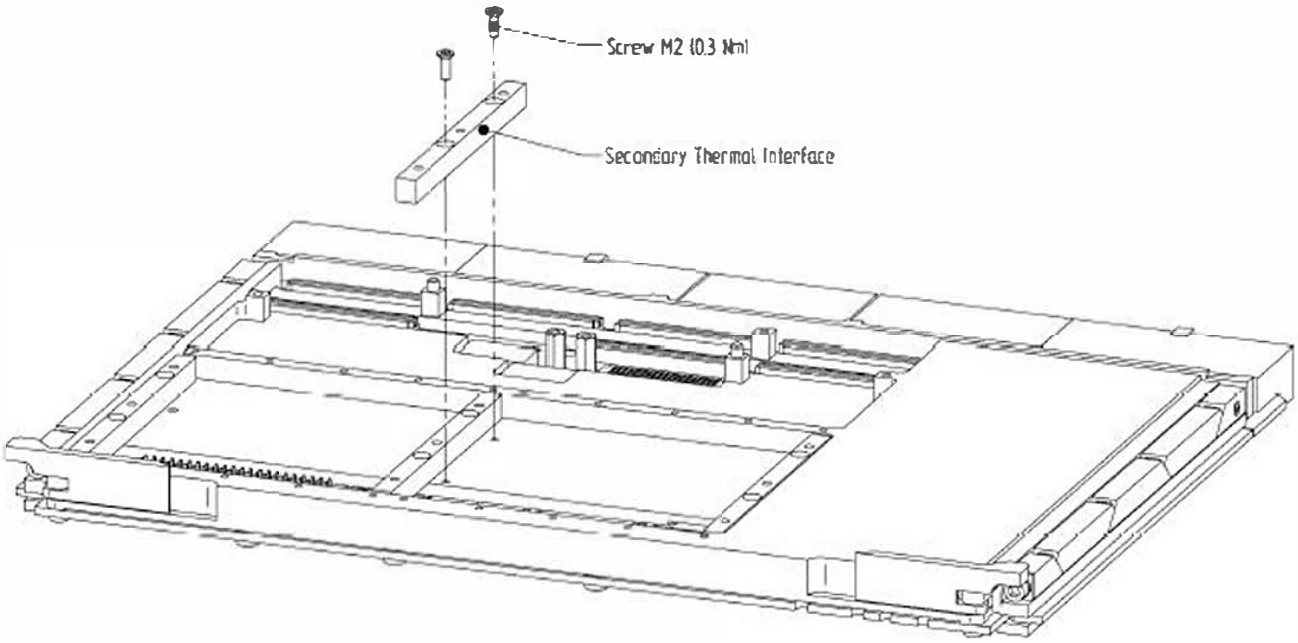


Figure 37: Mounting of Secondary Thermal Interface on PMC module

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix C CR11 and CR9 Compatibility

Chapter Scope

The following sections describes compatibility issues between the CR11 family and its predecessors CR9, CT9, CP9.

Basic compatibility:

Each CR11 is as compatible as possible to the CR9 family. Missing features on the CR11 are the PS/2 keyboard/mouse support, the parallel port, the floppy interface and the limited number of USB channels.

The CR11 offers dual core CPU technology with dual channel DRAM up to 4 GB. It has an XMC/PMC slot, an additional Fast Ethernet port on the front, two SATA channels, two USB connectors at the front panel, onboard audio and a superior graphics solution.

The existing transition module CTM12 can be used for the CR11 if no new functions are required.

Front I/O:

The CR11 offers a second USB port on the front panel instead of the removed PS/2 connectors. The serial port connector is a RJ45 type on the CR11. The CR11 has an optional Fast Ethernet port on its front panel.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Rear I/O

The following table shows the rear I/O connection of the CR11 and CR9 families:

Table 51: Rear I/O pin assignments for CR9 & CR11

CR11					CR9
√	J5	COM1		J5	√
√	J5	COM2		J5	√
√	J5	EIDE		J5	√
√	J5	PMC 2 I/O		J5	√
√	J4	SATA 1	PS/2	J4	√
√	J4	SATA 2	LPT	J4	√
√	J4	VGA 2	Floppy	J4	√
√	J4	USB 2,3		J4	√
	J4		USB 4,5	J4	√
√	J4	VGA 1		J4	√
√	J4	DVI-I		J4	√
√	J4	ICMB		J4	√
√	J4	GPIO		J4	√
√	J4	Speaker		J4	√
√	J4	Reset		J4	√
√	J4	Audio		J4	
√	J3	PMC 1 I/O		J3	√
√	J3	Gigabit Ethernet		J3	√
√	J2	CPCI Bus		J2	√
√	J1	IPMB0		J1	√
√	J1	CPCI Bus		J1	√

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

© 2016 Abaco Systems, Inc.
All rights reserved.

* indicates a trademark of Abaco Systems, Inc. and/or its affiliates. All other trademarks are the property of their respective owners.

Confidential Information - This document contains Confidential/Proprietary Information of Abaco Systems, Inc. and/or its suppliers or vendors. Distribution or reproduction prohibited without permission.

THIS DOCUMENT AND ITS CONTENTS ARE PROVIDED "AS IS", WITH NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF DESIGN, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. ALL OTHER LIABILITY ARISING FROM RELIANCE ON ANY INFORMATION CONTAINED HEREIN IS EXPRESSLY DISCLAIMED.

Abaco Systems Information Centers

Americas:
1-866-652-2226 (866-OK-ABACO)
or 1-256-880-0444 (International)

Europe, Middle East and Africa:
+44 (0)1327 359444

Additional Resources

For more information, please visit the Abaco Systems web site at:

www.abaco.com

Publication No. HRMCR11 Rev. B.0

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP