NuIPC

cPCI-6770 series

6U CompactPCI Low Power Pentium-III CPU Module with Advanced AGP Display

User's Guide

Recycled Paper

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ADLINK TECHNOLOGY INC.			
Web Site	http://www.adlinktech.com		
Sales & Service	Service@adlinktech.com		
TEL	+886-2-82265877	FAX	+886-2-82265717
Address	9F, No. 166, Jian Yi Road, Chungho City, Taipei, 235 Taiwan		

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Outline of Chapters

This manual describes the operation and use of the cPCI-6770 System CPU Board with Mobile Intel® Pentium® III Processor. The following summarizes the focus of each chapter in this manual.

Chapter 1, **"Introduction,"** introduces the key features of the cPCI-6770. This chapter includes a product definition, a list of product features, product specifications and a functional block diagram with a brief description of each block. This chapter can be used to compare the features of the cPCI-6770 against the needs of a specific application.

Chapter 2, **"Getting Started,"** provides setup information for the cPCI-6770 and compatible expansion boards. This chapter summarizes what you need to know in order to configure your system and should be read before attempting to use the board.

Chapter 3, **"Configuration,"** describes the jumpers and zero Ω shorting resistors on the cPCI-6770. This chapter details factory default settings and provides information about tailoring the board to the needs of specific applications.

Chapter 4, **"Watchdog Timer,"** explains the operation of the cPCI-6770's watchdog timer. A sample code is provided to illustrate how the watchdog's functions are used in an application.

Chapter 5, **"Driver Installation,"** provides step-by-step instructions how to install the software drivers successfully.

Appendix A, **"Specifications,"** contains electrical, environmental, and mechanical specifications for the cPCI-6770. This chapter also provides connector pin definitions.

1

Introduction

This chapter provides an introduction to the cPCI-6770 including a product definition, a list of product features, product specifications and a functional block diagram with a description of each block. The “cPCI-6770 faceplate” illustration shows the on-board I/O accessible from the front of he CPU board.

Unpacking information and initial board configuration instructions are provided in Chapter 2, “Getting Started.” See Chapter 3, “Configuration,” for configuration details and Appendix A, “Specifications,” for detail specification of the cPCI-6770.

1.1 Product Description

The cPCI-6770 CPU Board with Mobile Intel Pentium III Processor is a single board computer designed to work as a modular component in a high-performance CompactPCI system. It utilizes the Mobile Intel Pentium III Processor to provide extremely high PCI performance and the latest in memory and I/O technology combined with low power requirements.

The cPCI-6770 CPU board is an ideal solution for telecommunications, Internet, and industrial control applications with demanding performance and system reliability requirements. The cPCI-6770 occupies a single 6U high Eurocard slot. Though the cPCI-6770 is highly integrated, its capabilities can be extended with optional boards available from ADLINK. Expansion boards are available to add IDE daughter boards such as CompactFlash. For more information about options and accessories, please visit ADLINKS web page at http://www.adlinktech.com.tw

1.2 cPCI-6770 faceplate (2-slot)

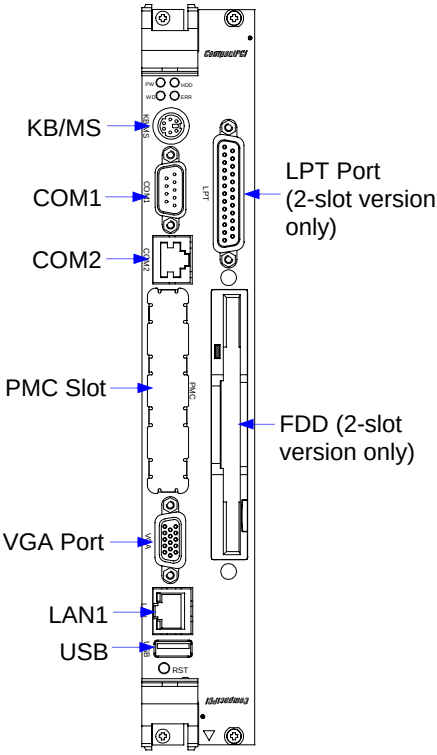


Figure 1. cPCI-6770 faceplate

Note:	Single Slot version is the same without the LPT and floppy disk drive available on the faceplate.

1.3 Features

- PICMG 2.0 Compact PCI Rev. 3.0 compliant
- PICMG 2.1 Rev. 1.0 CompactPCI Hot Swap Specification compliant
- Mobile Intel Pentium III Processor
- Intel 440 BX chipset
- 256 KB of Level 2 cache
- BIOS stored in flash memory
- Standard AT* Systems include:
  - Two enhanced interrupt controllers
  - Three counter/timers
  - Real-time clock/CMOS RAM
  - Two enhanced DMA controllers
  - PS/2 mouse and keyboard
- Dual stage watchdog timer (programmable from 1 - 255 seconds or 1 - 255 minimums)
- ATI's Mobility Radeon M6-M AGP 4x VGA controller, with built-in 8M VRAM
- Single 10/100 Mbps Ethernet interfaces
- Primary IDE channel supports the on-board 2.5-inch hard disk and other optional IDE devices.
- Single on-board PCI Mezzanine Card (PMC) slot, 32-bit @ 33 MHz using 3.3V signaling
- Two 16C550 UARTs compatible ports through a DB9 connector for COM1 (RS-232) and COM2 through a RJ-45 (RS-232/422/485 selectable) connector, both on the faceplate.
- Push Button Reset on the front panel
- DC power monitors
- Support for Windows 98/2000/NT and Linux.

1.4 Functional Blocks and Main Board

The following topics provide an overview of the cPCI-6770's main features as shown in the functional block diagram below and also the main board.

1.4.1 Functional Block Diagram

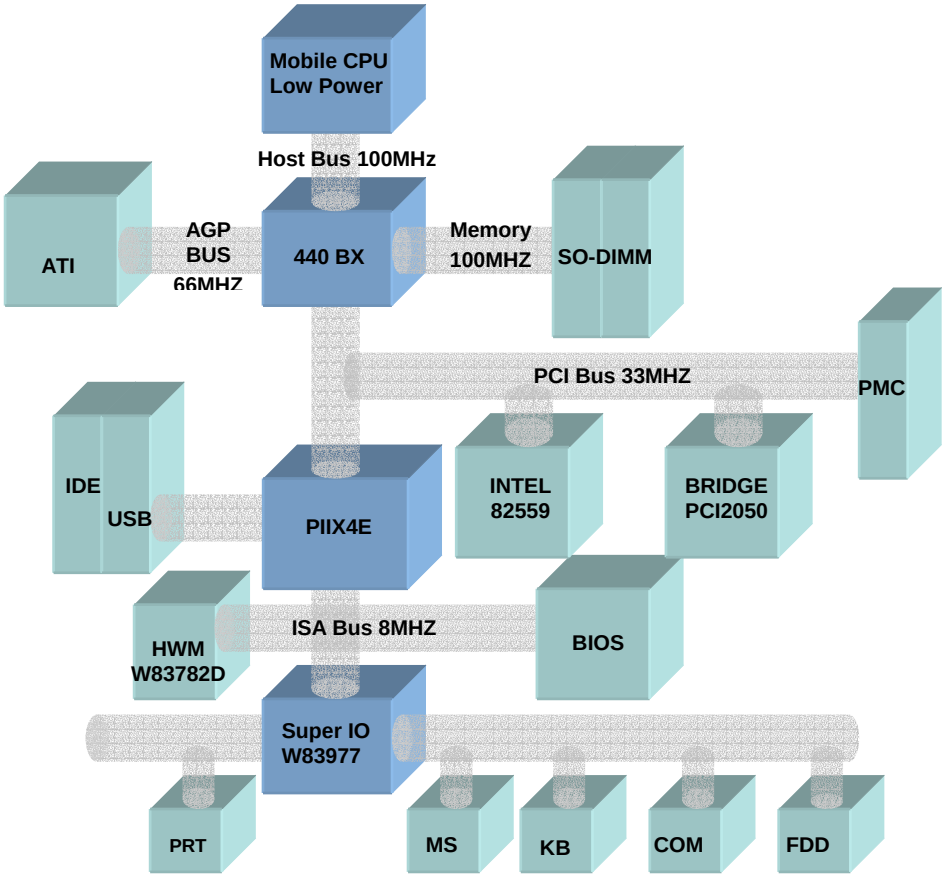


Figure 2. Functional Block Diagram

1.4.2 Main Board Drawing

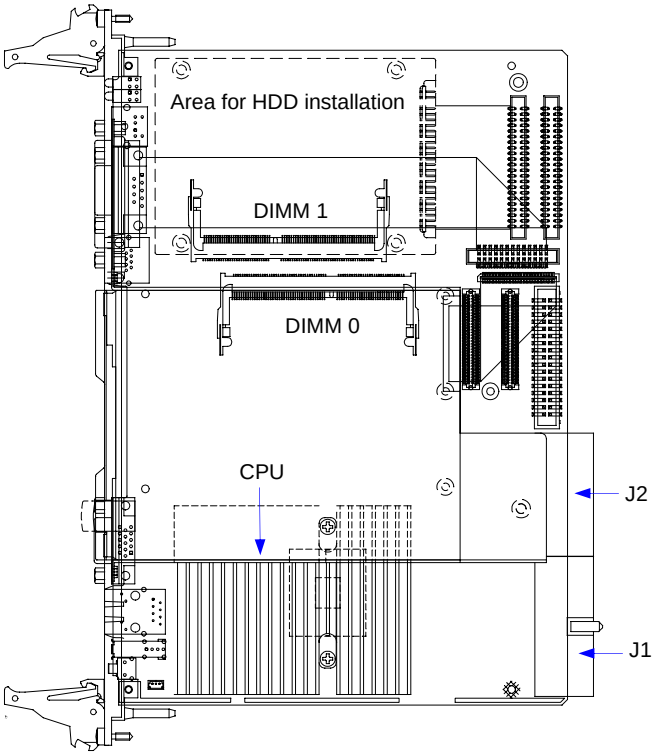


Figure 3. Main Board Drawing

1.4.1 CompactPCI Bus Interface

The cPCI-6770 operates in a 6U CompactPCI system. The CompactPCI standard is electrically identical to the PCI local bus standard but has been enhanced to work in harsh environments and support more peripheral slots. Additionally, when used in a Hot Swap compliant backplane and in accordance with the *CompactPCI Hot Swap Specification, PICMG 2.1, Version 1.0* the cPCI-6770 supports hosting hot swappable peripherals in a powered system. The cPCI-6770 can also function in a standard (non-Hot Swap) CompactPCI system without live insertion and extraction capability.

1.4.2 PCI-to-PCI Bridge (P2P)

The cPCI-6770 features one TI PCI2050 transparent PCI-to-PCI bridge to support the J1/J2 CompactPCI buses. The PCI2050 is compliant with the *PCI Local Bus Specification, Revision 3.0.* Each bridge provides the isolation, arbitration, and clocks for seven PCI peripheral cards without the need for an external bridgeboard.

Special features of the PCI2050 include:

- 33 MHz PCI bus operation
- Support for independent primary and secondary PCI clocks

1.4.3 Mobile Intel Pentium III Processor

The cPCI-6770 uses the Mobile Intel Pentium III Processor. This 0.18-micron product is a highly integrated assembly containing an Intel Pentium III mobile processor and its immediate system-level support. This mobile version of the Pentium III processor runs at a lower voltage than the desktop version.

The 256 KB on-die transfer L2 cache is integrated with the CPU, eliminating the need for separate components and improving performance. The Mobile Intel Pentium III Processor also operates with a 100 MHz Front Side Bus for faster access to memory and data.

1.4.4 PCI Mezzanine Card (PMC) Interface

The cPCI-6770 provides a location for one on-board PMC device with front panel access. The PMC interface is on the PCI Bus with PMC VIO default factory setting tied to 5V by 0-ohm resistors R28 and R29. If R28 and R29 are removed, and R30 and R31 are installed with 0-ohm resistors, the PMC VIO is 3.3V.

1.4.5 Single Ethernet Interfaces

The cPCI-6770 provides one 10/100BaseTx Ethernet channels through the Intel 82559 Fast Ethernet Multifunction PCI Controller. The 82559 consist of both the Media Access Controller (MAC) and the physical layer (PHY) interface combined into a single component solution. A RJ-45 connector is available on the faceplate.

1.4.6 IDE Hard Drive

The cPCI-6770 includes an on-board 2.5-inch Enhanced IDE hard drive. The hard drive is on the cPCI-6770's primary IDE channel and is assigned "device 0" (master) identity. An IDE1 is provided and IDE2 is provided through mini 44-pin connector.

1.4.7 Serial Port

The cPCI-6770 provides support for two16C550 UARTS serial ports. Both of these serial ports are accessible at the faceplate through a DB9 (COM1) and an RJ-45 (COM2) connector.

Both serial ports include a complete set of handshaking and modem control signals, maskable interrupt generation, and data transfer rates up to 115.2K Baud. COM1 serial port is RS-232 compatible with COM2 being RS-232/422/485 selectable

The cPCI-6770 serial controller resides in the Winbond W83977EF Super I/O device.

1.4.7 Interrupts

Two enhanced interrupt controllers provide the cPCI-6770 with a total of 15 interrupt inputs. Interrupt controller features include support for:

- Level-triggered and edge-triggered inputs
- Individual input masking
- Fixed and rotating priorities

Interrupt sources include:

- Counter/Timers
- Serial I/O
- Keyboard
- Printer Port
- Floppy disk
- IDE interface
- Real-Time Clock
- On-board PCI devices

Enhanced capabilities include the ability to configure each interrupt level for active high going edge or active low-level inputs. The cPCI-6770's interrupt controllers reside in the Intel 82371EB (PIIX4E)

1.4.8 DMA

Two enhanced DMA controllers are provided on the cPCI-6770 for use by the onboard peripherals. The cPCI-6770's DMA controllers reside in the Intel 82371EB (PIIX4E) device.

1.4.9 Real-Time Clock

The real-time clock performs timekeeping functions and includes 256 bytes of general purpose, battery-backed, CMOS RAM. Timekeeping features include an alarm function, a maskable periodic interrupt, and a 100-year calendar. The system BIOS uses a portion of this RAM for BIOS setup information. The cPCI-6770's Real-Time Clock resides in the Intel 82371EB (PIIX4E) device.

1.4.10 Power Ramp Circuitry

The cPCI-6770 features a power controller with power ramp circuitry to allow the board's voltages to be ramped in a controlled fashion. The power ramp circuitry eliminates any large voltage or current spikes caused by hot swapping boards. This controlled ramping is a requirement of the *CompactPCI Hot Swap specification, PICMG 2.1, Version 1.0*. The cPCI-6770's power controller unconditionally resets the board when it detects that the 3.3V, 5V, and 12V supplies are below an acceptable operating limit. These limits are defined as 4.75V (5V supply), 3.0V (3.3V supply), and 10.0V (+12V supply).

1.4.11 Watchdog Timer

The watchdog timer optionally monitors system operation and can be programmed for different timeout periods (from 1 seconds to 255 seconds or 1 minute to 255 minutes). It is a two-stage watchdog, meaning that it can be enabled to produce a non-maskable interrupt (NMI) or a "CPU init" before it generates a Reset. Failure to strobe the watchdog timer within the programmed time period may result in an NMI, a reset request, or both. A register bit can be enabled to indicate if the watchdog timer caused the reset event. This watchdog timer register is cleared on power-up, enabling system software to take appropriate action if the watchdog generated the reboot. See Chapter 7, "Watchdog Timer," for more information, including sample code.

1.4.12 IEEE-1284 Parallel Port/Printer Interface

The parallel I/O interface signals are routed to a 26-pin header on the board. This port supports the full IEEE-1284 specifications and provides the basic printer interface.

Firmware will initialize the parallel port as LPT1 with ISA I/O base address of 378h. This default configuration also assigns the parallel port to IRQ7. The printer interface mode (Normal, Extended, EPP, or ECP) is selectable through the BIOS SETUP utility with the Winbond W83977EF Super I/O device managing the cPCI-6770’s parallel port.

1.4.13 Universal Serial Bus (USB)

The Universal Serial Bus (USB) provides a common interface to slower-speed peripherals. Functions such as keyboard, serial ports, printer port, and mouse ports can be consolidated into USB, simplifying the cabling requirements of computers. The cPCI-6770 provides one USB ports on its faceplate and is controlled by the Intel 82371EB (PIIX4E) device.

1.4.14 IDE Controller and Floppy Interface Controller

The cPCI-6770 includes an IDE Controller (in the PIIX4E) and a Floppy Disk Controller (in the W83977EF). The IDE Controller provides support for internal or external IDE drives. Signals are available at the IDE connectors CN3 and CN4 and are routed to a 44-pin header. The FDD Controller provides support for an external FDD drives. Signals are available at the FDD connector CN9 and are routed to a 34-pin header.

1.4.15 Keyboard/Mouse Controller

The cPCI-6770 includes an on-board PC/AT keyboard and mouse controller. The keyboard/mouse signals are available through the PS/2 circular DIN on the front panel. Both the keyboard and mouse can be connected at the same time using ADLINK's Y cable. The cPCI-6770's keyboard/mouse controller resides in the Winbond W83977EF Super I/O device

1.4.16 Software

The cPCI-6770 is compatible with all major PC operating systems. ADLINK provides support, which may include additional drivers for ADLINK peripherals. Software device drivers for the cPCI-6770 may be found in the ADLINK CD.

2

Getting Started

This chapter summarizes the information needed to make the cPCI-6770 operational. This chapter should be read before using the board.

2.1 Unpacking

Check the shipping carton for any damages. If the shipping carton and contents are damaged, notify the dealer for a replacement. Retain the shipping carton and packing material for inspection by the dealer. Obtain authorization before returning any product to ADLINK.

Check the following items are included in the package, if there is any missing items, contact your dealer:

- The cPCI-6770 module (May be equipped with different speed or capacity of CPU, RAM, and HDD.
- Y CABLE FOR PS/2 KBD&MOUSE
- HDD Accessory Pack (If the CPU module is equipped with HDD, this item is not included.)
- This User's Manual
- ADLINK CD

Note: The package of the cPCI-6770A OEM version (non-standard configuration, functionality or package) may vary according to the different configuration requests

CAUTION: This board must be protected from static discharge and physical shock. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the product to handle the board. Wear a wrist strap grounded through one of the system's ESD Ground jacks when servicing system components.

2.2 System Requirements

The following topics briefly describe the basic system requirements and configurable features of the cPCI-6770.

2.2.1 Connectivity

The cPCI-6770 can be installed as a System Master in the System Slot or as a stand-alone computer in a peripheral slot. The cPCI-6770 is designed to operate in a backplane providing CompactPCI form factor interfaces at J1 and J2.

2.2.2 Electrical and Environmental

Power Consumption

The values below are the measured power consumption for the SBC with CPU and RAM only; the CPU is running under 100% loading. The power for other peripheral devices such as keyboard, mouse, add-on cards, HDD, and CD-ROM are not included.

CPU	Voltage	Current	Wattage
PIII-700 with 128MB RAM	+3.3V	5.76A	19.008W
	+5.0V	3.20A	16.000W
	+12.0V	228mA	2.736W
Total Watts=19.008+16.000+2.736=37.744W			

Table 1: Max. Power consumption for PIII-700 with 128MB RAM

CPU	Voltage	Current	Wattage
PIII-850 with 512MB RAM	+3.3V	5.92A	19.536W
	+5.0V	5.80A	29.000W
	+12.0V	228mA	2.736W
Total Watts=19.536+29.000+2.736=51.272W			

Table 2: Max. Power consumption for PIII-850 with 512MB RAM

The cPCI-6770 is supplied with a heatsink allowing the processor to operate between 0º and approximately 55º C ambient with a minimum of 1 meter per second of external airflow. It is the users' responsibility to ensure that the cPCI-6770 is installed in a chassis capable of supplying adequate airflow. The maximum power dissipation of the processor at 850MHz (BGA2 package) is 29W. External airflow **must** be provided at all times. ADLINK has special designed chassis to allow for greater airflow, please contact ADLINK sale representatives for more detail.

CAUTION: The processor "core" temperature must **never** exceed 100°C under any condition of ambient temperature or usage. This may result in permanent damage to the processor.

2.2.5 BIOS Configuration Overview

This topic presents an introduction to the Award PnP BIOS Setup Utility. For more detailed information about the BIOS and other utilities, see the BIOS Manual.

The BIOS has many separately configurable features. These features are selected by running the built-in Setup utility. System configuration settings are saved in a portion of the battery-backed RAM in the real-time clock device and are used by the BIOS to initialize the system at boot up or reset. The configuration is protected by a checksum word for system integrity.

To access the Setup utility, press the "Del" key during the system RAM check at boot time. When Setup runs, an interactive configuration screen displays. Refer to the following “Setup Screen“ illustration below for an example.

Setup parameters are divided into different categories. The available categories are listed in a menu. The parameters within the highlighted (current) category are listed in the bottom portion of the Setup screen. Context sensitive help is displayed in the right portion of the screen for each parameter.

Use the arrow keys to select a category from the menu. To display a submenu, highlight the category and then press the "Enter" key.

BIOS Setup Screen

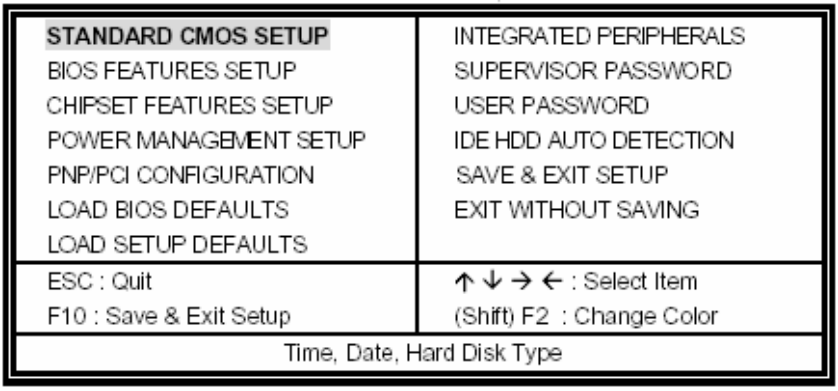


Figure 4. BIOS Setup Screen

2.2.6 Operating System Installation

For more detailed information about your operating system, refer to the documentation provided by the operating system vendor.

1. Install peripheral devices. CompactPCI devices are automatically configured by the BIOS during the boot sequence.
2. Most operating systems require initial installation on a hard drive, from a floppy or CDROM drive. These devices should be configured, installed, and tested with the supplied drivers before attempting to load the new operating system.
3. Read the release notes and installation documentation provided by the operating system vendor. Be sure to read any *README* files or documents provided on the distribution disks, as these typically note documentation discrepancies or compatibility problems.
4. Select the appropriate boot device order in the SETUP boot menu depending on the OS installation media used. For example, if the OS includes a bootable installation floppy, select **Floppy** as the first boot device and reboot the system with the installation floppy installed in the floppy drive. (Note that if the installation requires a non-bootable CD-ROM, it is necessary to boot an OS with the proper CD-ROM drivers in order to access the CD-ROM drive).

5. Proceed with the OS installation as directed, being sure to select appropriate device types if prompted. Refer to the appropriate hardware manuals for specific device types and compatibility modes of ADLINK NuIPC products.
6. When installation is complete, reboot the system and set the boot device order in the SETUP boot menu appropriately.

3

Configuration

The cPCI-6770 has been designed for maximum flexibility and can be configured for specific applications. Most configuration options are selected through the BIOS Setup utility (discussed in the "BIOS Configuration Overview" topic in Chapter 2). Some options cannot be software controlled and are configured with jumpers or removal of certain zero ohm resistors.

3.1 Switch and Jumper Pins

The cPCI-6770 contains a push-button switch on the faceplate and four banks of jumper pins on the component side of the board. The switch and jumpers are listed and briefly described in the "Switch Cross-Reference" table below.

Switch Cross-Reference Table

Switch	Function
SW1	Reset
JP1	COM2 RS-232/422/485 Selectable
JP2	Clear CMOS Content
JP3	COM2 RS-232/422/485 Selectable
JP4	COM2 RS-232/422/485 Selectable

Table 3: Switch Cross-Reference Table

3.1.1 Switch Description

SW1 (Reset)

SW1 is a push-button on the front panel of the cPCI-6770. Pressing SW1 issues a hard reset. Reset is discussed in more detail in Chapter 4.

JP2 (Clear CMOS Content)

JP2	Setting	Function
	Pin 1-2 Short/Closed	Clear CMOS Content
	Pin 2-3 Short/Closed	Normal Operation

Table 4: JP2 (Clear CMOS Content)

If the CMOS contents need to be cleared, short pins 1 and 2 of JP2 and return it to normal operation position after about 2 seconds.

JP1, JP3, and JP4 (COM2 RS-232/422/485 Selectable)

As COM2 is RS-232/422/485 selectable, to operate in the different communication protocols, JP1, JP3, and JP4 must be set according to the table listed below. The numbers in the table indicate the pin number that needs to be shorted together.

Setting	JP1	JP3	JP4
RS-232	1-3 2-4	1-3 2-4	1-2
RS-422	3-5 4-6	3-5 4-6	3-4
RS-485	3-5 4-6	3-5 4-6	5-6

Table 5: JP1, JP3 and JP4 Settings

Zero Ω Shorting Resistors

The cPCI-6770 contains two pairs of zero Ω shorting resistors that allow the user to configure the PMC VIO voltage to either +5V or +3.3V. The PMC interface is on the PCI Bus with PMC VIO default factory setting tied to +5V by 0-ohm resistors R28 and R29. If R28 and R28 are removed, and R30 and R31 are installed with 0-ohm resistors, the PMC VIO is 3.3V. Refer to the table below:

PMC VIO	+3.3V	+5.0V
R28, R29		Mount
R30, R31	Mount	

Table 6: Zero Ω shorting resistor settings

4

Watchdog Timer

This chapter explains the operation of the cPCI-6770's watchdog timer. It provides an overview of watchdog operation and features, as well as a sample code to help you learn how the watchdog timer works.

4.1 Watchdog Timer Overview

The primary function of the watchdog timer is to monitor the cPCI-6770's operation and take corrective action if the software fails to function as programmed. The major features of the watchdog timer are:

- Two-stage
- Enabled and disabled through software control
- Armed and strobed through software control

Watchdog Timer Architecture

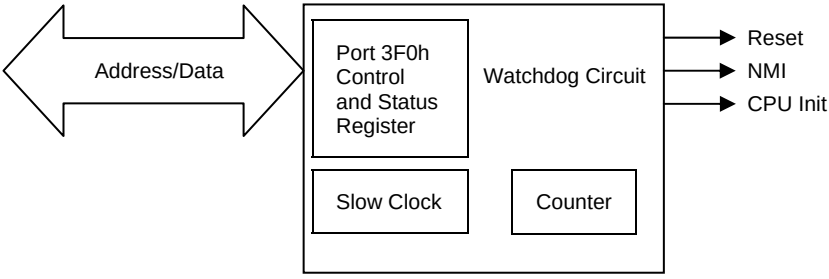


Figure 5. Watchdog Timer Architecture

The cPCI-6770's custom watchdog timer circuit is implemented in a programmable logic device. The watchdog timer contains a "Control and Status Register". The register allows the BIOS or user applications to determine if a watchdog time out was the source of a particular reset.

The watchdog timer drives the First and Second Stages as follows:

1. The watchdog times out (First Stage) after a selected timeout interval.
2. NMI or INIT (software selectable) is driven high.
3. A hard reset occurs (Second Stage).

The timeout period is 1 – 255 seconds or 1 – 255 minutes. The watchdog is normally strobed by reading the Watchdog Register (3F0h). This clears the counter. Writes to this register also clear the counter.

4.2 Using the Watchdog in an Application

The following topic is provided to help you learn how to use the watchdog in an application. The watchdog's Reset function is described. The Watchdog Reset is controlled through the watchdog's "Control and Status Register".

4.2.1 Watchdog Reset

An application using the reset feature enables the watchdog reset, sets the terminal count period, and periodically strobes the watchdog to keep it from resetting the system. If a strobe is missed, the watchdog times out and resets the system hardware.

For a detailed programming sample, please refer to the sample code provide with the CD-ROM located at:

\CHIPDRV\WDT\DOS\CP6770\DOS\6770WDT.CPP

ADLINK provides other examples and various sub functions for programmers to implement with their software. It is stored in the ADLINK CD.

5

Driver Installation

To install the drivers for the cPCI-6770, refer to the installation information in this chapter. Basic information is presented in this section, however, for more detailed installation information for non-Windows Operating Systems, refer to the extensive explanation inside the ADLINK CD. The drivers are located in the following directories of the CD-Rom:

Chipset driver	\CHIPDRV\Chipset\440BX
VGA/AGP relative driver	\CHIPDRV\VGA\ATI
LAN relative driver	\CHIPDRV\LAN\100PDISK
Watchdog relative library	\CHIPDRV\WDT
Hardware Doctor Utility	\Utility\HWDoctor\I2C

As the Bus-mastering IDE drivers are automatically installed by most Windows based operating systems, it will not be described.

Since Windows NT is a non plug-and-play OS, a reminder of some useful tips for installing Windows NT drivers are suggested:

1. Install the LAN driver before installing any service pack.
2. Install the VGA/AGP driver after installing the service pack. Make sure your service pack does support AGP. Service pack 6 or higher is recommend.
3. If Windows NT boots with a warning message, check the Event Viewer to view the source generating the warning message. If strange phenomena's occur and it can't be solved, re-install the Windows NT service pack, then install the drivers in a different sequence.

5.1 VGA Driver Installation

This section describes the VGA driver installation for the onboard VGA controller ***ATI M6-M***. The relative drivers are located in ***X:\CHIPDRV\VGA\ATIM6*** of the ADLINK CD, where X: is the drive letter of the CD-ROM drive. The VGA drivers for Windows 95/98, Windows NT and Windows 2000 are included.

5.1.1 VGA Driver Installation for Windows 98/2000/NT

Windows 98/2000/NT may try to install the standard VGA driver. To ensure compatibility, manually install the most updated driver, which is included in the ADLINK CD. After installing Windows 98/2000/NT, to update to the new driver, follow these procedures.

1. Boot Windows 98/2000/NT, and then run the program ***X:\CHIPDRV\VGA\ATIM6\SETUP.EXE***
2. The VGA driver will automatically be installed to the system.
3. Restart the system.

Note: After installing the VGA/AGP drivers, and you discover the driver does not work. This may be caused by not installing the Windows NT service pack beforehand. Ensure to install Windows NT service pack 6 or higher version to enable AGP capability.

5.2 LAN Driver Installation

This section describes the LAN driver installation procedures for the onboard Ethernet controller ***Intel 82559***. The Intel 82559 is a 32-bit 10/100MBps Ethernet controller for PCI local bus-compliant PCs. It supports the bus mastering architecture, and Auto-negotiation features which makes it possible to combine a common Ethernet cable (RJ-45 connector with twisted-pair cabling) for use with both 10Mbps and 100Mbps connection.

The relative drivers are located in the following ADLINK CD directory: ***X:\CHIPDRV\LAN\100PDISK***, where X: is the letter of the CD-ROM drive.

5.2.1 Software and Driver Support

The 82559 drivers support the following Operating Systems or platforms:

- Windows 98, Windows 95, Windows 2000, Windows NT
- Novell Netware, DOS Setup for Novell NetWare DOS
- UNIX, OS2, Linux

All the above drivers are included in the ADLINK CD. In the following section, driver installation for Windows 98, Windows 2000, and Windows NT are outlined. For driver installation of non-Windows Operating Systems, refer to the readme file inside the CD.

5.2.2 LAN Driver Installation on Windows 2000

Windows 2000 will attempt to install a LAN driver automatically. To guarantee compatibility, manually install the most updated LAN driver, which is stored in the ADLINK's CD. After installing Windows 2000, update to the new driver by following these procedures

1. Boot Windows 2000, Click ***Start***. Select ***Settings*** then double-click the ***Control Panel*** option.
2. Double-click the ***System*** icon, click the ***Hardware*** tab, and then click the ***Device Manager*** button.
3. Double-click the *Network Adapters* entry and selectthe *Intel 8255x-based PCI Ethernet Adapter (10/100)* entry.
4. Click the ***Driver*** tab, then click the ***Update Driver…*** button.
5. An Upgrade *Device Driver Wizard* window will appear, click ***Next>***.
6. Select ***Display a list of ...*** and click ***Next>***. The next window shows a list of hardware models.
7. Insert the CD and click ***Have Disk***.
8. Browse the Intel 82559 driver in the following path location: ***X:\CHIPDRV\LAN\100PDISK***, highlight **oemsetup.inf**, click ***Open***, then click ***OK***.
9. Highlight the model: ***Intel 8255x- based PCI Ethernet Adapter (10/100),*** then click ***NEXT>***. An *Update Driver Warning* window may pop up, click ***Yes*** to continue.
10. A summary window appears, click ***NEXT>***, click the ***Finish*** button, then ***CLOSE*** to finish the installation.

5.2.3 LAN Driver Installation on Windows 98

Windows 98 will attempt to install a LAN driver automatically. To guarantee compatibility, manually install the most updated LAN driver, which is stored in the ADLINK's CD. After installing Windows 98, update to the new driver by following these procedures

1. Boot Windows 98, Click ***Start***. Select ***Settings*** then double-click the ***Control Panel*** option.
2. Double-click on the ***System*** icon, then click on the ***Device Manager*** tab.
3. Double-click on the ***Network Adapters*** entry,select the ***Intel 8255x-based PCI Ethernet Adapter (10/100)*** entry. Then click the ***Properties*** button.
4. Click on the ***Driver*** button, then click the ***Update Driver…*** button.
5. ***Update Device Driver Wizard*** starts, click **NEXT.**
6. Select ***Display a list of ...*** and click ***NEXT***. Insert the CD and click ***Have Disk***.
7. Browse the Intel 82559 driver in the following path location: ***X:\CHIPDRV\LAN\100PDISK***, highlight **net82557.inf**, click ***OK***. The *Update Wizard* displays the message that it has found the driver. Click ***OK*** again to update the driver. Note: Windows 98 may ask for the original Windows 98 CD to install the LAN protocols.
8. Click the ***NEXT*** button, A summary window appears.
9. Click the ***Finish*** button, then restart the computer to active the new driver.

5.2.4 LAN Driver Installation on Windows NT

Before installing the LAN driver on Windows NT, copy the LAN driver files in the CD to a floppy diskette. Insert a new diskette into drive ***A:*** then type the following batch command under a DOS environment to copy the relative NT drivers.

X:\CHIPDRV\LAN\100PDISK\Makedisk\Makedisk NT

Windows NT may ask to install a LAN driver from its own library of drivers. To guarantee compatibility, manually updated the LAN driver, which comes with the ADLINK CD. After installing Windows NT, update to the new driver by following these procedures.

1. In the ***Control Panel***, double-click on the ***Network*** icon, a *Network Configuration* window will appear. Click ***Yes***.
2. On the *Network Setup Wizard*, click ***Next>***, click the ***Select From List…*** button.
3. Insert the LAN driver floppy diskette into drive ***A:*** and click **Have Disk**.
4. In the dialog box of *Insert Disk* window, type in ***A:*** then Click ***OK***.
5. A *Select OEM Options* window pops up, click ***OK***, and then click ***Next>***.
6. Select the necessary Network Protocols, click ***Next>***.
7. Select the necessary Network Services, and click ***Next>***.
8. Continue to click ***Next>*** until Window NT Setup dialog box pops up. Type in ***D:\i386*** (drive D:\ is assumed to be where WinNT resides) in the dialog box, then insert the original Windows NT CD, click ***Continue.***
9. Click ***OK*** when the setup is completed.
10. Reboot the computer.

A

Specifications

A.1 Electrical

This section outlines the electrical specifications of the cPCI-6770

General CompactPCI Features

- PICMG 2.0 CompactPCI Rev. 3.0 Compliant
- PICMG 2.1 R1.0 CompactPCI Hot Swap Specification Compliant

CPU/Cache

- Intel BGA2 Pentium III CPU with 256KB on-die L2 cache @ full core speed & 100MHz FSB, Available CPU speeds are Low Power P-III 700MHz and P-III 850MHz

Chipset

- Intel 440BX AGPset
- Intel 82443BX and 82371EB(PIIX4E)

BIOS

- Award PnP BIOS
- On-board Ethernet, hardware monitoring function enable/disable selectable
- Remote Console: setup console redirection to serial port (terminal mode) with CMOS setup access
- ACPI 1.0, APM 1.2, PC 99 and PC 99A compliant
- Support Intel Preboot Execution Environment (PXE)

Host Memory

- Two 144-pin SODIMM sockets. Max. 512MB PC-100 un-buffered SDRAM
- Optional ECC capability support (available for big quantity OEM project)

IDE Ports

- Bus Master IDE controller supports two 44-pin EIDE interfaces on board for up to four IDE devices
- Support PIO Mode 3/4 or Ultra DMA/33 IDE devices

On Board Super I/O

- Winbond W83977EF
- Supports a high-speed bi-directional SPP/EPP/ECP parallel port with ESD protection to 4KV and downstream device protection to 30V.
- One floppy interface comes with one typical 34-pin connector and one 26-pin connector for flex cable to support slim type floppy.
- Two 16C550 UARTs compatible ports with ESD protection to 2KV, COM1 (RS-232) with DB9 and COM2 with RJ-45 (RS-232/422/485 selectable) connector on front faceplate

USB Interface

- Supports one USB port on front faceplate
- USB Specification Rev. 1.1. Compliant
- Individual over-current protection

Watchdog Timer

- Programmable I/O port 3F0h and 3F1h to configure watchdog timer, programmable timer 1~255 seconds or 1~255 minutes
- A LED indicator on front faceplate for watchdog timer status indication
- Bundled easy-programming library for DOS and Windows 98/NT/2000

Hardware Monitoring

- Winbond W83782D, monitoring CPU temperature, CPU fan, system temperature and DC Voltages

PMC module support

- On-board 32-bit PMC module slot for functionality expansion

On-board VGA Display

- ATI's Mobility Radeon M6-M AGP 4x VGA controller, with built-in 8MB VRAM
- ACPI, VESA DPMS and VESA DDC 2b compliant
- Supports up to 1600x1200 VGA display resolution with 32-bit true color, non-interlaced
- Highly-optimized 128-bit 2D drawing engine, capable of processing multiple pixels/clock
- High performance, power managed 3D acceleration engine
- VGA display on front faceplate
- RAMDAC Latch-up protection

On-board Ethernet

- Intel 82559 high performance Ethernet controller
- IEEE 802.3 10Base-T/100Base-TX compatible
- IEEE 802.3u auto-negotiation support
- IEEE 802.3x 100Base-TX flow control support
- Supports Intel pre-boot execution environment (PXE) for remote boot of WindowsNT/2000
- Driver support DOS, Novell, Windows95/98/ME/NT/2000, Linux, SCO Unix, Sun Solaris, QNX

Flash Disk Support

- Supports CompactFlash type-II socket on front CPU module via optional daughter board

PCI Bus Bridge

- TI PCI2050 transparent PCI to PCI bridge
- Supports up to 7PCI bus mastering devices on CompactPCI bus peripheral slots

Front Panel LEDs and switch

- Power status (green)
- IDE activity indicator (green)
- Ethernet port: 10/100Mbps (amber), activity (Green)
- Watchdog timer status indicator (green)
- Flush tact switch for system reset

A.2 Environment

Storage temperature: -20 to 80ºC

Relative Humidity: 5% to 95% non-condensed

Shock: 15G peak-to-peak, 11ms duration, non-operation

Vibration:

- Non-operation: 1.88Grms, 5-500Hz, each axis
- Operation: 0.5Grms, 5-500Hz, each axis, with 2.5" HDD

A.3 Mechanical

This section describes the board dimensions of the cPCI-6770

Board Dimensions

The cPCI-6770 meets the *CompactPCI Specification, PICMG 2.0, Version 3.0* for all mechanical parameters. In a CompactPCI enclosure with 0.8 inch spacing, the cPCI-occupies one 6U card slot or two slot depending on model.

Mechanical dimensions are shown below.

- Board Length: 160 mm
- Board Width: 233.35 mm
- Board Thickness: 1-slot (4TE/HP, 20.32mm) wide, incl. housing of 2.5" HDD

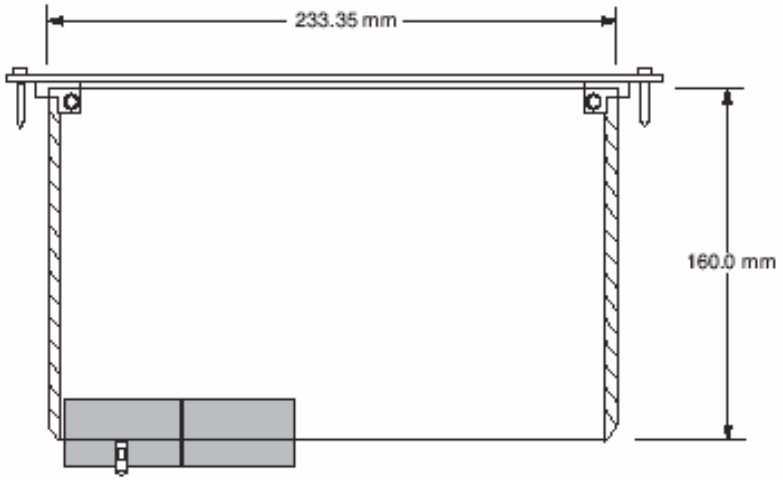
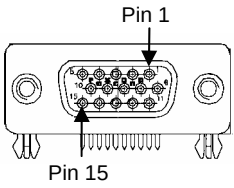


Figure 6. Board Dimensions

A.4 Connectors

A detailed description and pin-out for each connector is given in the following section.

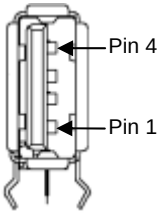
A.4.1 VGA Connector



Signal Name	Pin	Pin	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
N.C.	9	10	GND
N.C.	11	12	DDC DATA
HSYNC	13	14	VSYNC
DDC CLOCK	15		

Table 7: VGA Connector Pin Definition

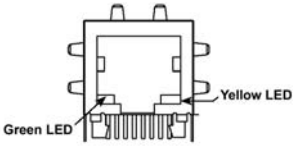
A.4.2 USB Connectors



Pin	Signal Name
1	Vcc
2	USB-
3	USB+
4	GND

Table 8: USB Connectors Pin definiton

A.4.3 Ethernet (RJ-45) Connector



Pin	Signal Name
1	TD+
2	TD-
3	RD+
4	Termination CAP
5	Termination CAP
6	RD-
7	NC
8	GND

Table 9: Ethernet Connector Pin Definition

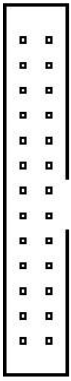
Amber LED 10/100Mbps Status	Description
OFF	10Mbps transfer rate
ON	100Mbps transfer rate

Table 10: Ethernet Amber LED Status

Green LED Link/Activity Status	Description
OFF	No link
ON	Connecting
Blinking	Active/Data transferring

Table 11: Ethernet Green LED Status

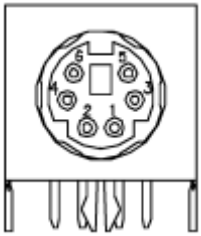
A.4.4 Parallel Port Connector



Signal Name	Pin	Pin	Signal Name
Line printer strobe	1	14	AutoFeed
PD0, parallel data 0	2	15	Error
PD1, parallel data 1	3	16	Initialize
PD2, parallel data 2	4	17	Select
PD3, parallel data 3	5	18	GND
PD4, parallel data 4	6	19	GND
PD5, parallel data 5	7	20	GND
PD6, parallel data 6	8	21	GND
PD7, parallel data 7	9	22	GND
ACK, acknowledge	10	23	GND
Busy	11	24	GND
Paper empty	12	25	GND
Select	13	26	N/C

Table 12: Parallel Connector Pin Definition

A.4.5 PS/2 Keyboard & Mouse Connector

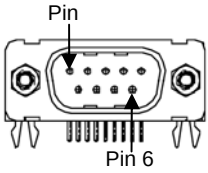


Pin	Signal Name
1	Keyboard data
2	Mouse data
3	GND
4	5V
5	Keyboard clock
6	Mouse Clock

Table 13: PS/2 Keyboard & Mouse Connector

A.4.6 Serial Ports

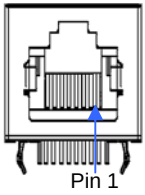
COM1



Pin	Signal Name
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, GND
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator

Table 14: COM1 Pin Definition

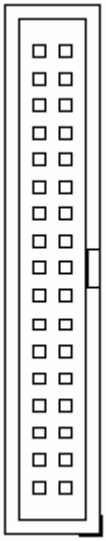
COM2



Pin	Signal Name
1	DCD, Data carrier detect
2	RTS, Request to send
3	DSR, Data set ready
4	TXD, Transmit data
5	RXD, Receive data
6	GND, GND
7	CTS, Clear to send
8	DTR, Data terminal ready

Table 15: COM2 Pin Definition

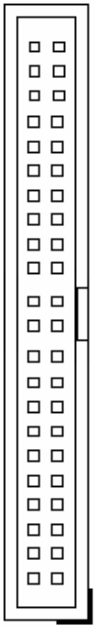
A.4.7 Floppy Connector



Pin	Function	Pin	Function
1	Ground	2	Extended Density
3	Ground	4	No Connect
5	-	6	Data Rate
7	Ground	8	Index
9	Ground	10	Motor A Select
11	Ground	12	Drive B Select
13	Ground	14	Drive A Select
15	Ground	16	Motor B Select
17	Ground	18	Step Direction
19	Ground	20	Step Pulse
21	Ground	22	Write Data
23	Ground	24	Write Gate
25	Ground	26	Track 0
27	Ground	28	Write Protect
29	Ground	30	Read Data
31	Ground	32	Side 1
33	Ground	34	Disk Change

Table 16: Floppy Connector Pin Definition

A.4.8 IDE Connector



Signal	Pin	Pin	Signal
BRSTDRVJ	1	2	GND
DDP7	3	4	DDP8
DDP6	5	6	DDP9
DDP5	7	8	DDP10
DDP4	9	10	DDP11
DDP3	11	12	DDP12
DDP2	13	14	DDP13
DDP1	15	16	DDP14
DDP0	17	18	DDP15
GND	19	20	NC
PDDREQ	21	22	GND
PDIOWJ	23	24	GND
PDIORJ	25	26	GND
PIORDY	27	28	PCSEL
PDDACKJ	29	30	GND
IRQ14	31	32	NC
DAP1	33	34	NC
DAP0	35	36	DAP2
CS1P	37	38	CS3PJ
IDEACTPJ	39	40	GND
+5V	41	42	+5V
GND	43	44	NC

Table 17: IDE Connector Pin Definition

A.4.9 PMC Connectors

Signal	Pin	Pin	Signal
TCK[3]	1	2	-12V
GND	3	4	INTA#
INTB#	5	6	INTC#
BUSMODE1#[1]	7	8	+5V
INTD#	9	10	RESERVED [1]
GND	11	12	+3.3V
CLOCK	13	14	GND
GND	15	16	GNT#
REQ#	17	18	+5V
PMCVIO [4]	19	20	AD[31]
AD[28]	21	22	AD[27]
AD[25]	23	24	GND
GND	25	26	C/BEJ[3]#
AD[22]	27	28	AD[21]
AD[19]	29	30	+5V
PMCVIO [4]	31	32	AD[17]
FRAME#	33	34	GND
GND	35	36	IRDY#
DEVSEL#	37	38	+5V
GND	39	40	LCOK#
RESERVED [1]	41	42	RESERVED [1]
PAR	43	44	GND
PMCVIO [4]	45	46	AD[15]
AD[12]	47	48	AD[11]
AD[9]	49	50	+5V
GND	51	52	C/BEJ[0]#
AD[6]	53	54	AD[5]
AD[4]	55	56	GND
PMCVIO [4]	57	58	AD[3]
AD[2]	59	60	AD[1]
AD[0]	61	62	+5V
GND	63	64	REQ64 #[2]

Table 18: PMC Connector J11 Pin Definition

Signal	Pin	Pin	Signal
+12V	1	2	TRST# (3)
TMS (2)	3	4	RESERVED (1)
TDI (2)	5	6	GND
GND	7	8	RESERVED (1)
RESERVED (1)	9	10	RESERVED (1)
BUSEMODE2# (2)	11	12	+3.3V
PCI RESET	13	14	BUSMODE3# (3)
+3.3V	15	16	BUSMODE4# (3)
PME	17	18	GND
AD[30]	19	20	AD[29]
GND	21	22	AD[26]
AD[24]	23	24	+3.3V
IDSEL (AD[31])	25	26	AD[23]
+3.3V	27	28	AD[20]
AD18	29	30	GND
AD16	31	32	C/BEJ[2]#
GND	33	34	RESERVED (1)
TRDY#	35	36	+3.3V
GND	37	38	STOP#
PERR#	39	40	GND
+3.3V	41	42	SERR#
C/BEJ[1]#	43	44	GND
AD[14]	45	46	AD13
GND	47	48	AD10
AD[8]	49	50	+3.3V
AD[7]	51	52	RESERVED (1)
+3.3V	53	54	RESERVED (1)
RESERVED (1)	55	56	GND
RESERVED (1)	57	58	RESERVED (1)
GND	59	60	RESERVED (1)
ACK64# (2)	61	62	GND
GND	63	64	RESERVED (1)

Table 19: PMC J12 Pin Definition

1. These signals are not connected.
2. These signals are pulled high on board.
3. These signals are pulled low on board.

A.4.10 CompactPCI Connectors

Pin	Z	A	B	C	D	E	F
25	GND	+5V	REQ64# (2)	ENUM# (5)	+3.3V	+5V	GND
24	GND	AD[1]	+5V	VIO (1)	AD[0]	ACK64# (2)	GND
23	GND	+3.3V	AD[4]	AD[3]	+5V	AD[2]	GND
22	GND	AD[7]	GND	+3.3V	AD[6]	AD[5]	GND
21	GND	+3.3V	AD[9]	AD[8]	GND	C/BE[0]#	GND
20	GND	AD[12]	GND	VIO (1)	AD[11]	AD[10]	GND
19	GND	+3.3V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	+3.3V	PAR	C/BE[1]#	GND
17	GND	+3.3V	SMSCL	SMSDA	GND	PERR#	GND
16	GND	DEVSEL#	GND	VIO (1)	STOP#	LOCK#	GND
15	GND	+3.3V	FRAME#	IRDY#	GND	TRDY#	GND
12-14	KEY						
11	GND	AD[18]	AD[17]	AD[16]	GND	C/BE[2]#	GND
10	GND	AD[21]	GND	+3.3V	AD[20]	AD[19]	GND
9	GND	C/BE[3]#	GND	AD[23]	GND	AD[22]	GND
8	GND	AD[26]	GND	VIO (1)	AD[25]	AD[24]	GND
7	GND	AD[30]	AD[29]	AD[28]	GND	AD[27]	GND
6	GND	REQ0#	GND	+3.3V	CLK7	AD[31]	GND
5	GND	RSV (1)	RSV (1)	PCIRST#	GND	GNT0#	GND
4	GND	RSV (1)	HEALTHY(1)	VIO (1)	INTP	SIRQ	GND
3	GND	INTA#	INTB#	INTC#	+5V	INTD#	GND
2	GND	TCK (2)	+5V	TMS (2)	TDO (1)	TDI (2)	GND
1	GND	+5V	-12V	TRST# (2)	+12V	+5V	GND
Pin	**Z**	**A**	**B**	**C**	**D**	**E**	**F**

Table 20: CompactPCI J1 Pin Definition

Pin	Z	A	B	C	D	E	F
22	GND	GA4 (1)	GA3 (1)	GA2 (1)	GA1 (1)	GA0 (1)	GND
21	GND	S1CLK6	GND	RSV (1)	RSV (1)	RSV (1)	GND
20	GND	S1CLK5	GND	RSV (1)	GND	RSV (1)	GND
19	GND	GND	GND	RSV (1)	RSV (1)	RSV (1)	GND
18	GND	RSV (1)	RSV (1)	RSV (1)	GND	RSV (1)	GND
17	GND	RSV (1)	GND	PRST# (1)	S1REQ#6	S1GNT#6	GND
16	GND	RSV (1)	RSV (1)	DEG# (2)	GND	RSV (1)	GND
15	GND	RSV (1)	GND	FAL# (2)	S1REQ#5	S1GNT#5	GND
14	GND	RSV (1)	RSV (1)	RSV (1)	GND	RSV (1)	GND
13	GND	RSV (1)	GND	VIO (1)	RSV (1)	RSV (1)	GND
12	GND	RSV (1)	RSV (1)	RSV (1)	GND	RSV (1)	GND
11	GND	RSV (1)	GND	VIO (1)	RSV (1)	RSV (1)	GND
10	GND	RSV (1)	RSV (1)	RSV (1)	GND	RSV (1)	GND
9	GND	RSV (1)	GND	VIO (1)	RSV (1)	RSV (1)	GND
8	GND	RSV (1)	RSV (1)	RSV (1)	GND	RSV (1)	GND
7	GND	RSV (1)	GND	VIO (1)	RSV (1)	RSV (1)	GND
6	GND	RSV (1)	RSV (1)	RSV (1)	GND	RSV (1)	GND
5	GND	RSV (1)	RSV (1)	VIO (1)	RSV (1)	RSV (1)	GND
4	GND	VIO (1)	RSV (1)	RSV (1)	GND	RSV (1)	GND
3	GND	S1CLK4	GND	S1GNT#3	S1REQ#4	S1GNT#4	GND
2	GND	S1CLK2	S1CLK3	SYSEN#	S1GNT#2	S1REQ#3	GND
1	GND	S1CLK1	GND	S1REQ#1	S1GNT#1	S1REQ#2	GND
Pin	Z	A	B	C	D	E	F

Table 21: CompactPCI J2 Pin Definition

1. These signals are not connected.
2. These signals are pulled high on the board.
3. These signals are pulled low on board.
4. PMC VIO power lines are resistors selectable. The default factory setting is tight to 5V by 0-ohm resistors R28 and R29. When the R28 and R30 are removed, and R30 and R31 are installed with 0-ohm resistors, the PMC VIO is 3.3V.
5. EMUN# are connected to IRQ 3 or IRQ 9 according to the BIOS selection. The default BIOS setting is IRQ9.

A.5 Thermal Consideration

This section of the appendix describes the thermal requirements for reliable operation of a cPCI-6770 using the Pentium III processor. It covers basic thermal requirements and provides specifics about monitoring the board and processor temperature.

A.5.1 Thermal Requirements

The cPCI-6770 is factory-equipped with an integrated heatsink for cooling the processor module. The maximum processor core temperature ***must not exceed 100°C***. The heatsink allows a maximum ambient air temperature of 55°C with a minimum of 1 meter per second of external airflow. The maximum power dissipation of the CPU is 29 W at 850 MHz.

CAUTION: External airflow must be provided at all times during operation to avoid damaging the CPU. ADLINK strongly recommends the use of ADLINK's specially design chassis that allows greater airflow through the system.

A.5.2 Temperature Monitoring

Because reliable long-term operation of the cPCI-6770 depends on maintaining proper temperature, ADLINK strongly recommends verifying the operating temperature of the processor module and processor core in the final system configuration.

The Pentium III processor incorporates an on-die thermal diode that can be used to monitor the processor's die temperature. The cPCI-6770 includes Local Thermal Temperature Sensor to monitor the die temperature of the processor for thermal management purposes. The cPCI-6770's BIOS can read the temperature via the SMB Data Interface.

When checking airflow conditions, let the Processor Core Temperature Test dwell for at least 30 minutes and verify that the Core Temperature does not exceed 55°C. The processor "core" temperature must **never** exceed 100°C under any condition of ambient temperature or usage.

WARNING: Temperatures over 100°C may result in permanent damage to the processor.

A.6 Safety Certificate and Test

This section presents approval and certification information for the cPCI-6770 with Intel Pentium III Processor. The cPCI-6770 is designed to meet the specifications listed in this section

A.6.1 CE Certification

The cPCI-6770 is designed to meet the intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance includes the specifications as listed in the Official Journal of the European Communities:

A.6.2 FCC Regulatory Information

The cPCI-6770 is designed to meet the standards set by the Federal Communications Commission (FCC) regulatory agency

A.6.3 HALT (temperature and vibration stress)

HALT is a test technique using extreme temperatures, fluctuating temperature rates, combinations of temperature and vibration, and other product specific stresses to rapidly expose flaws and weaknesses in a product. Typically performed during the design and validation stage, HALT stresses a product to its destructive limits and helps ensure you are given the most reliable product possible from our design team.

Warranty Policy

Thank you for choosing ADLINK. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully:

1. Before using ADLINK's products please read the user manual and follow the instructions exactly.
2. When sending in damaged products for repair, please attach an RMA application form.
3. All ADLINK products come with a two-year guarantee, repaired free of charge.
    - The warranty period starts from the product's shipment date from ADLINK's factory.
    - Peripherals and third-party products not manufactured by ADLINK will be covered by the original manufacturers' warranty.
    - End users requiring maintenance services should contact their local dealers. Local warranty conditions will depend on local dealers.
4. This warranty will not cover repair costs due to:
    a. Damage caused by not following instructions.
    b. Damage caused by carelessness on the users' part during product transportation.
    c. Damage caused by fire, earthquakes, floods, lightening, pollution, other acts of God, and/or incorrect usage of voltage transformers.
    d. Damage caused by unsuitable storage environments (i.e. high temperatures, high humidity, or volatile chemicals.
    e. Damage caused by leakage of battery fluid.
    f. Damage from improper repair by unauthorized technicians.
    g. Products with altered and/or damaged serial numbers.
    h. Other categories not protected under our guarantees.
5. Customers are responsible for shipping costs to transport damaged products to our company or sales office.
6. To ensure the speed and quality of product repair, please download a RMA application form from our company website: www.adlinktech.com. Damaged products with attached RMA forms receive priority.

For further questions, please contact our FAE staff.

ADLINK: service@adlinktech.com