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CoreModule™ 410
PC/104 CPU Module
QuickStart Guide

P/N 5001688A Revision A

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REVISION HISTORY

Revision	Reason for Change	Date
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Audience Assumptions

This reference manual is for the person who designs computer related equipment, including but not limited to hardware and software design and implementation of the same. Ampro Computers, Inc. assumes you are qualified in designing and implementing your hardware designs and its related software into your prototype computer equipment.

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Contents

Chapter 1 Setting Up the CoreModule 410 1
Using this Guide 1
Requirements 1
What's in the Box 1
Setup Steps 2
Preparations 2
Setting Up the Workspace 2
Connecting Cables to the CoreModule 410 3
Connecting Peripherals and Boot Devices 7
Applying Power to the CoreModule 410 8
Chapter 2 Installing CoreModule 410 Options 11
DiskOnChip (DOC) Installation 11
Tools Required 11
Installing the DiskOnChip (DOC) 11
Removing the DiskOnChip (DOC) 13
Installing Software, Drivers, and Utilities 14
Appendix A Technical Support 17
Contacting Support 17
Getting Updates 17
Appendix B Connector Part Numbers 19

List of Figures

Figure 1-1. CoreModule 410 Connector Locations 3
Figure 1-2. Module Pin-1 Locations 3
Figure 1-3. Connecting Floppy, IDE, and Parallel Cables 4
Figure 1-4. Connecting Utility, Serial, and Power Cables 5
Figure 1-5. Connecting Battery 5
Figure 2-1. Installing DiskOnChip 12
Figure 2-2. Removing DiskOnChip 13

List of Tables

Table 2-1. BIOS/DOC Select Jumper Matrix 12
Table 2-2. DiskOnChip Boot Address Setting 12
Table A-1. Technical Support Contact Information 17
Table B-1. Connector and Manufacturer's Part Numbers 19

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Chapter 1 Setting Up the CoreModule™ 410

Using this Guide

This guide provides the most efficient way to set up your CoreModule™ 410 CPU Module.

Instructions provided in this guide include:

- Removing the CoreModule 410 CPU Module from the shipping container and inventorying the accessories
- Connecting cables to the CoreModule 410 CPU Module
- Connecting the peripherals, boot devices, and power supply to the CoreModule 410 CPU Module
- Powering up the CoreModule 410 CPU Module

Information not provided in this QuickStart Guide includes:

- CoreModule 410 CPU Module Specifications
- Environmental requirements
- CoreModule 410 CPU Module connector/pin numbers and definitions
- Supplied software use and programming considerations

Requirements

The following peripherals and boot devices are not provided in the QuickStart Kit, but are needed to make full use of the CoreModule 410 CPU Module.

- Peripherals (Customer provided):
  - Keyboard (PS/2 Adapter provided in QuickStart Kit)
  - PS/2 Mouse
  - Serial terminal (or PC with terminal emulation software) for serial console operation, or
  - Optional Video Card and Monitor (not part of QuickStart Kit)

NOTE	Ampro Computers, Inc. has a compatible video card (MiniModule™ VFP II) for the CoreModule 410. Refer to the Ampro web site for more information.

- Power Supply (Customer provided):
  - AT or +5V lab power supply – Typically, an AT power supply is required to provide power to the CoreModule 410 CPU Module and its associated peripherals and boot devices.
- Boot Devices (one or more - Customer provided):
  - Floppy Disk drive
  - CD-ROM
  - IDE hard disk drive
  - DiskOnChip (DOC)
  - Optional cables for RS485 or GPIO connectors, if used (See Figure 1-4)

What's in the Box

Refer to the QuickStart Kit Contents Sheet for a list of the items in the shipping container.

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Setup Steps

It is important to follow the setup steps in this section in the exact order listed here, but skip any steps that do not apply to your situation. References are provided to chapters within this guide or other Ampro documents for more information about installation and use of the CoreModule 410 CPU Module.

Preparations

1) Open shipping box	• Locate the QuickStart Kit Contents Sheet • Unpack the contents of the shipping box
2) Verify Contents	• Verify the contents of the shipping box against the QuickStart Contents Sheet included with your CoreModule 410 CPU Module shipping box. • If anything is missing or damaged, call your sales representative or Tech Support.
3) Support Documentation (CoreModule 410 Documentation and Support Software (Doc & SW) CD-ROM)	*CoreModule 410 QuickStart Guide* This hardcopy document describes how to setup, install, and power up the CoreModule 410 found in the QuickStart Kit and this manual is also provided as a PDF file on the CoreModule 410 Documentation and Support Software (Doc & SW) CD-ROM.
	CoreModule 410 Reference Manual This document describes the CoreModule 410 and provides detailed reference information for your CoreModule 410 and is a PDF file located on the CoreModule 410 Doc & SW CD-ROM.

Setting Up the Workspace

CAUTION	To prevent damage to the electronic components on the CoreModule 410, do not handle the board until you have followed good Electro-Static Precautions. Always touch a grounded, unpainted metal surface before touching the CoreModule 410 or any of the components on the board. Always use an anti-static wrist strap connected to a grounding mat, which has static-dissipating characteristics and attached to earth ground.

4) Select workbench location	• The workbench location should have a static-free mat (or the equivalent) to place the CoreModule 410 and its cables for setup and operation (including the connection of the power supply, peripherals, and support devices).
5) Connect an ESD strap to your body	• Connect an ESD strap between your body (wrist or ankle) and ground or a static-free mat. If you do not have your own ESD strap, an ESD kit is provided in the QuickStart Kit with an anti-static wrist strap.
6) Unpack CoreModule 410	• Remove the CoreModule 410 from its protective plastic case and place it on a flat static-free work surface.

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Connecting Cables to the CoreModule 410

Connect the cables provided with the CoreModule 410 QuickStart Kit to the respective connectors on the CoreModule 410 board. Skip any cable(s) that do not apply to your situation.

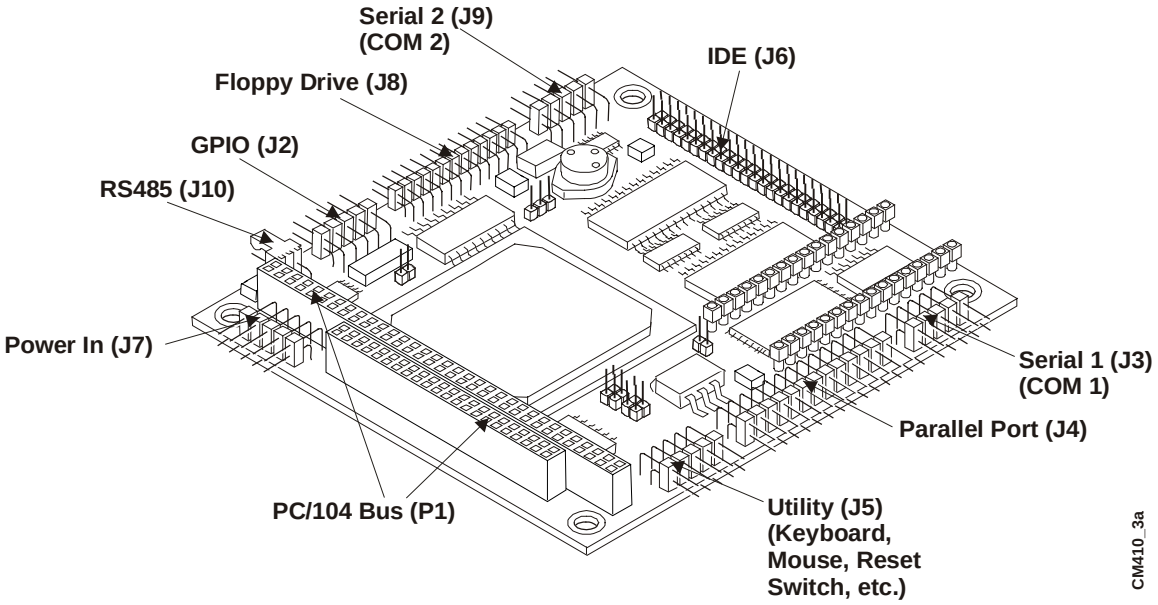


Figure 1-1. CoreModule 410 Connector Locations

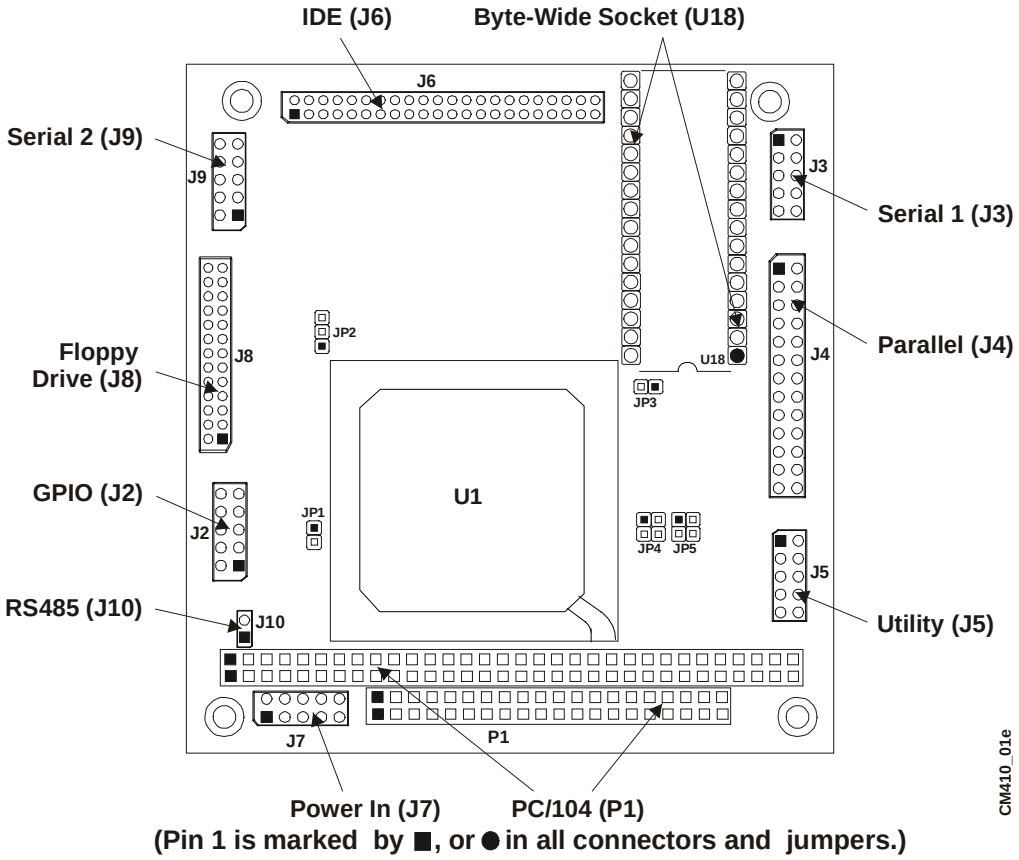
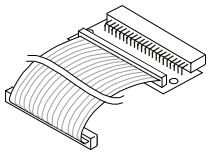
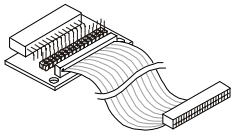
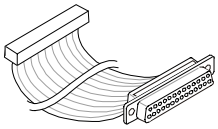


Figure 1-2. Module Pin-1 Locations

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1) Connect Floppy Cable 	The floppy cable and its adapter are connected to the floppy drive connector (J8). See Figures 1-1, 1-2, and 1-3.
2) Connect IDE cable 	The IDE cable and its adapter are connected to the IDE connector (J6). See Figures 1-1, 1-2, and 1-3.
3) Connector Parallel cable 	The parallel cable is connected to the parallel port (J4). See Figures 1-1, 1-2, and 1-3.

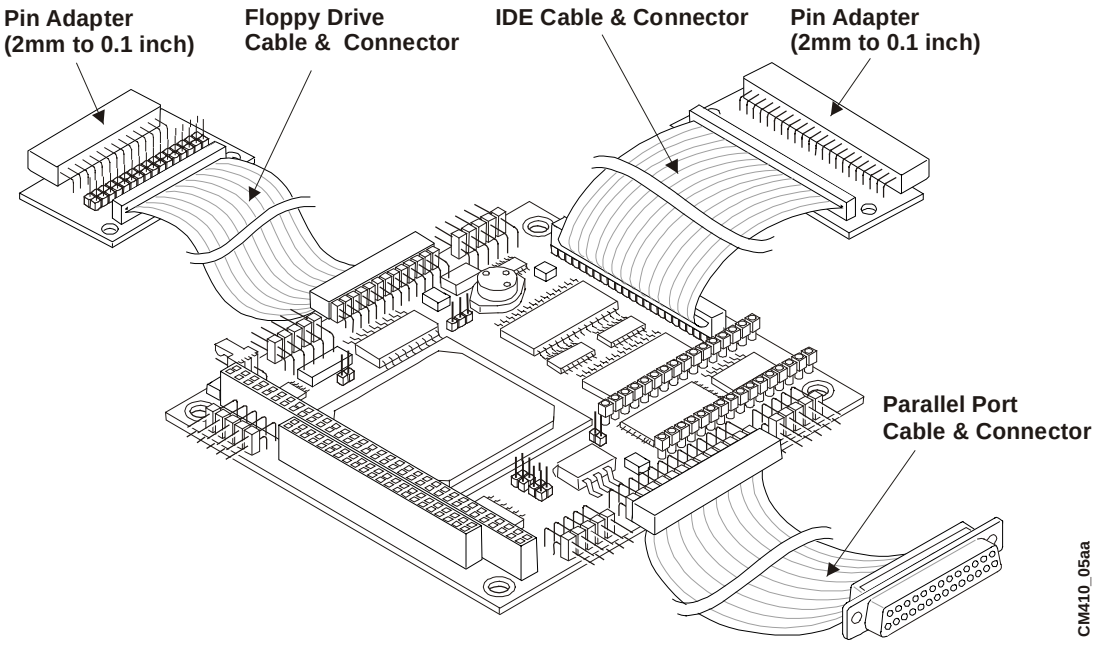
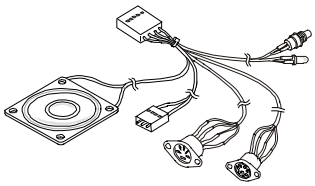


Figure 1-3. Connecting Floppy, IDE, and Parallel Cables

4) Connect Utility cable 	The Utility cable is connected to the Utility connector (J5). See Figures 1-1, 1-2, and 1-4.

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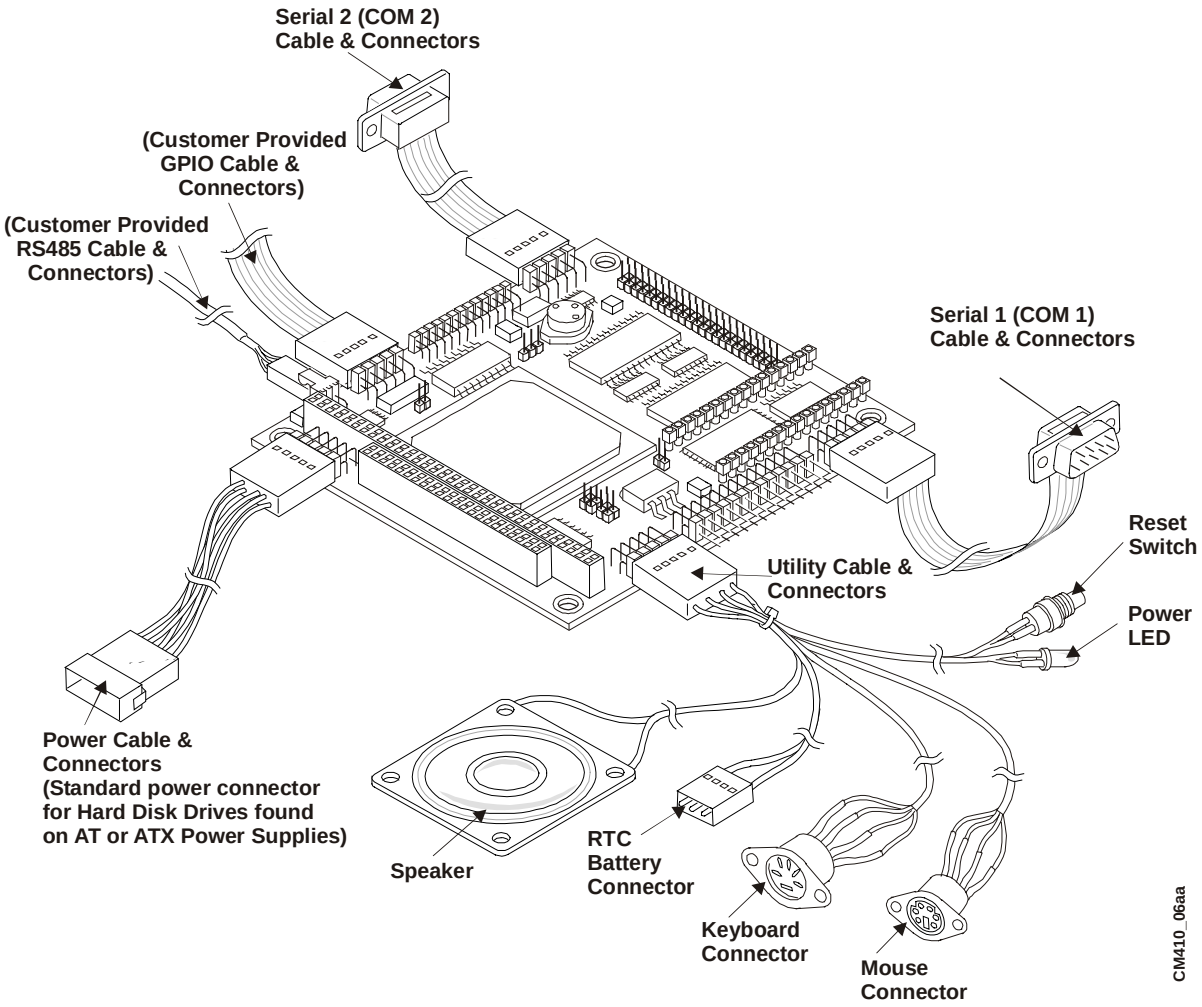


Figure 1-4. Connecting Utility, Serial, and Power Cables

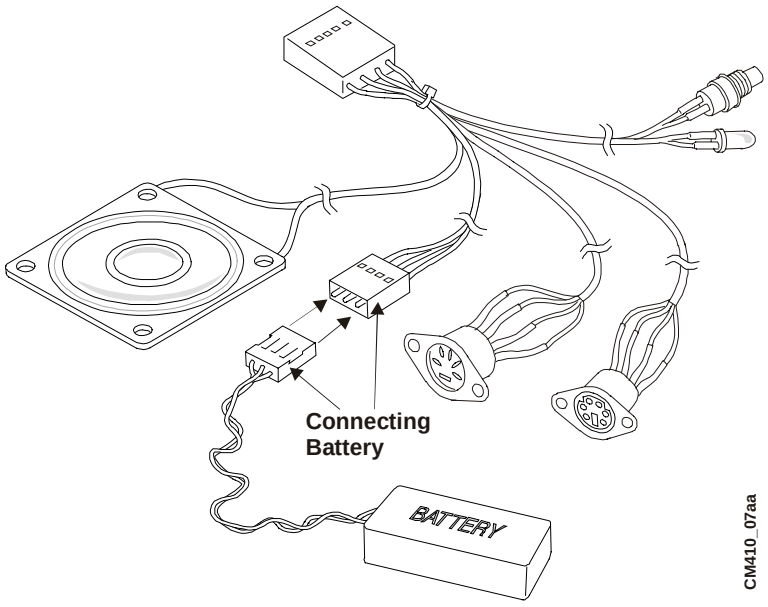
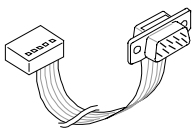


Figure 1-5. Connecting Battery

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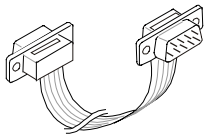
5) Connect Serial cables



The serial cables are connected to the respective Serial ports (J3 and J9). See Figures 1-1, 1-2, and 1-4.

NOTE You must connect at least one serial cable to make use of the serial console option.

6) Connect a standard null modem cable or "Hot Cable" to one of the Serial port connectors.



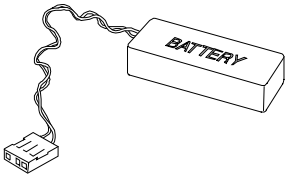
- The standard null modem cable, or "Hot Cable" is connected between a serial port (J3 or J9) on the CoreModule 410 and an ANSI-compatible serial terminal, or the equivalent terminal emulation software running on another PC system. See Figures 1-1, 1-2, and 1-4.

  If you don't have a standard null modem cable, you can convert a serial cable to a "Hot Cable" for the connection. Refer to the *CoreModule 410 Reference Manual* in Chapter 3, *Hot (Serial) Cable* for the pin configuration.
- If you are using an optional video card, connect the video cable to the video card connector (CRT).

NOTE The CM 410 BIOS supports the serial console (or console redirection) feature and the following settings are required for an ANSI-compatible serial terminal, or the equivalent terminal emulation software running on another PC system.

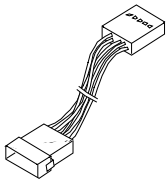
- 9600 baud
- 8 bits
- One stop bit
- No parity
- No hardware handshake

7) Connect RTC Battery



The RTC battery and its cable are connected to the Utility cable connector for the battery to power the RTC. See Figures 1-4 and 1-5.

8) Connect Power cable

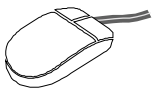
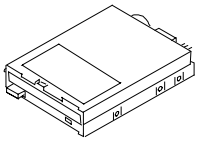
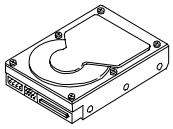
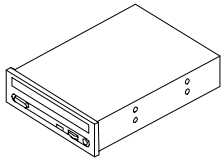
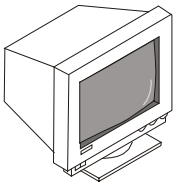
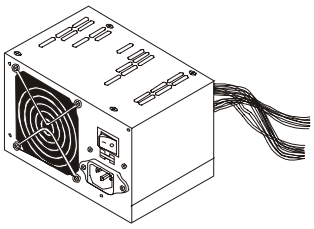


The Power cable is connected to the power connector (J7). See Figures 1-1, 1-2, and 1-4.

NOTE The connector on the free end of the cable is the same type connector found on AT or ATX power supplies cables used to connect to hard disk drives.

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Connecting Peripherals and Boot Devices

1) Connect the device cables to the CoreModule cables 	This includes the keyboard, mouse, floppy drive, IDE devices, serial console (or optional CRT monitor), and power supply. Skip the devices that are not applicable to your situation. • Connect the keyboard to the larger (DIN) connector on the Utility cable. If required, a PS/2-to-AT adapter is provided in QuickStart Kit.
	• Connect the mouse to the PS/2 connector on the Utility cable.
	• If you have not done so already, connect the floppy pin adapter PCB to the 2mm connector from J8 on the CoreModule. • Connect the floppy disk drive cable to the free connection on the floppy adapter PCB.
	• If you have not done so already, connect the IDE pin adapter PCB to one of the 2mm connectors from J6 on the CoreModule. This IDE cable has two 2mm connections for an IDE pin adapter PCB used to connect an IDE hard disk drive and/or CD-ROM. • Connect the IDE hard disk drive to the free connection on the IDE pin adapter PCB.
	• If you have not done so already, connect the second IDE pin adapter PCB to the free 2mm connector on the IDE cable from J6 on the CoreModule. • Connect the CD-ROM drive to the free connection on the IDE pin adapter PCB.
	• Connect the serial console to either Serial port (J3 or J9) cable. • Optional – Connect the CRT monitor cable to the video connector on the video board CRT connector attached to the CoreModule. The optional video board, video cables, and CRT monitor are customer provided. There are no cables provided for this option in the QuickStart Kit.
	• Connect the AT power supply (or +5 voltage power supply) to the free power connector on J7 of the CoreModule. **NOTE** The connector on the free end of the power cable is the same type of connector used on AT or ATX power supply cables to connect to hard disk drives.
2) Connect all support devices to the power supply	• Ensure all of the support devices you have plugged into the connectors from the CoreModule have good power connections to the AT power supply.

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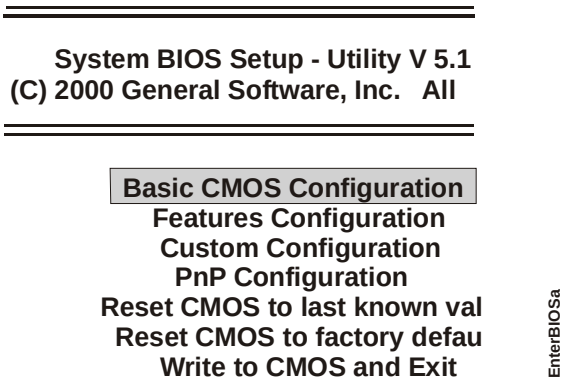
Applying Power to the CoreModule 410

1) Check/Set the Power Supply Input Voltage	• If the power supply uses auto-ranging operation at 50/60Hz, skip this step. • Check the input voltage switch on the power supply located on the rear of the supply just below the power connector. The input voltage switch typically has two positions: 115 or 230 volts – 115 volts is default position.
2) Power up the CoreModule 410.	• Plug the Serial Terminal or CRT monitor's power cord into an AC outlet and turn on the device. • Plug the AT power supply's power cord into the AC outlet. • Turn the AT power supply's power switch to On before continuing.
3) Verify the CoreModule 410 powers-up satisfactorily.	• You should see POST complete successfully before the system starts loading the operating system. If the desired operating system is not loaded on one of the boot devices (floppy drive or CD-ROM) prior to power up, you will see an error message "No Bootable Device Available" after the CoreModule 410 completes the boot process. The boot process will stop, allowing you to select from: R – for Reboot = to reboot the system, or S – for Setup = to enter BIOS Setup • If you do not make a selection, the POST routine stops, until you intervene in the process by acting on one of the following options: ♦ Enter BIOS Setup – press S or skip to Step 4. ♦ Press R to reboot the system. ♦ Load a bootable device with the Operating System included, press R to reboot, and then skip to Step 6. ♦ Turn off the power switch on the power supply. **NOTE** We recommend not using a hard drive, with a preinstalled OS from another PC, to boot the CoreModule 410 and load drivers. This has proven to cause problems or provide unreliable operation. Use a bootable device (floppy or CD-ROM) to load the OS onto the hard drive while attached to the CoreModule 410. Additional drivers can be loaded while still connected to the CoreModule 410. Refer to Step 6.
4) Enter BIOS Setup	• Press the <Del> key during POST, or S to enter BIOS Setup. • Use BIOS Setup during the initial boot to set the desired options (time and date, alter the boot drive for the floppy drive, CD-ROM, or hard disk drive, etc.). • Refer to the next step to alter the boot sequence, while in Setup.
5) If you need to alter the boot sequence to select a bootable device, perform this step.	• Floppy – If you have a bootable floppy for the desired OS, insert the floppy diskette and press the Reset switch to boot from the floppy diskette. • CD-ROM – Some operating systems are supplied on a bootable CD-ROM. You may need to alter the default boot order in BIOS Setup to boot from the CD-ROM. Refer to the following steps.

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To change the Boot Sequence while in BIOS Setup, perform the following steps:

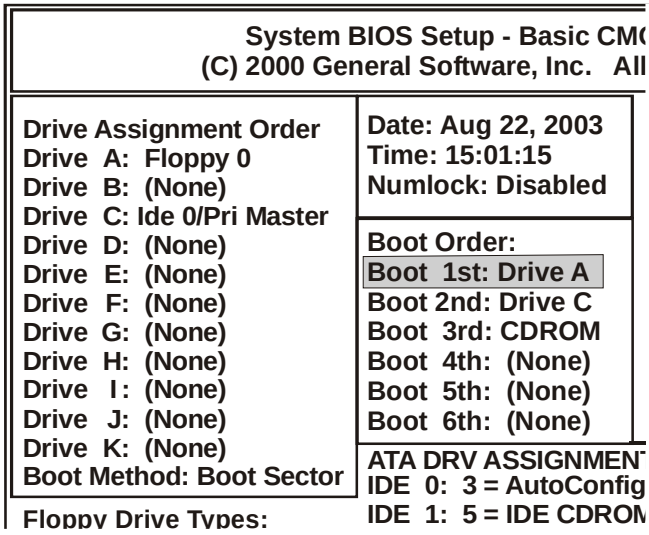
a. Select the Basic CMOS Configuration screen as shown in the figure to the right and press Enter.



b. Select the first drive in the Boot Order box as highlighted to the right.

This example assumes Drive A is a 3 ½" floppy drive, Drive C is an IDE HDD, and the 3rd drive is an IDE CD-ROM.

NOTE The CD-ROM is not listed or selected in the Drive Assignment Order. It must be configured in the ATA DRV ASSIGNMENT and then selected in the Boot Order.



c. Move the CD-ROM up in the Boot Order.

d. Exit and Save changes.

- Use the Arrow keys and PU/PD keys to move the CD-ROM up in the Boot Order.
- If you want to keep the floppy drive and hard drive in the boot order, you will need to make changes to the other Boot Order devices.

  For example, change Boot 3rd to Drive A, to keep it in the boot sequence.
- For more information, refer to the BIOS Chapter in the CoreModule 410 Reference Manual.

6) Install the desired Operating System (OS).

- Locate the desired Operating System (OS) diskette(s) or CD-ROM and follow the manufacturer's instructions for installing the OS and the necessary drivers.

  For Windows Operating Systems, most of the necessary drivers are found on the manufacturer's installation CD-ROM.

  For non-Windows Operating Systems, some or all of the necessary drivers may be found on the manufacturer's diskette(s) or CD-ROM.
- If you require drivers that are not available on the OS manufacturer's diskette(s) or CD-ROM, refer to ***Installing Software, Drivers, and Utilities*** in Chapter 2 and the CoreModule 410 software subdirectory on the CoreModule 410 Doc & SW CD-ROM for instructions.

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NOTE	The CoreModule 410 ships from the factory configured only for serial terminal support. If you need to view the BIOS setup on a CRT with a video card or LCD/TFT flat panel with a specific resolution, you must provide the video card to support these devices. Refer to the Virtual Technician at http://ampro.custhelp.com for possible video cards and the related instruction manual for setting up an Ampro provided video card.

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Chapter 2 Installing CoreModule 410 Options

The procedures in this chapter describe how to install or remove the supported options onto the CoreModule 410 CPU Module. Some of the CoreModule 410 options not described in this chapter are set in the BIOS Setup Utility.

NOTE	Refer to the CoreModule 410 Reference Manual for BIOS options, including the Splash screen.

DiskOnChip (DOC) Installation

The CoreModule 410 CPU Module supports the DiskOnChip™ by M-Systems in the bytewide socket (U18).

Tools Required

Use a complete anti-static service kit (or the equivalent) to remove or install the DiskOnChip onto the CoreModule 410 CPU Module. A complete anti-static service kit should include a static-dissipating work surface, a chassis clip lead, and a wrist or ankle strap.

Installing the DiskOnChip (DOC)

CAUTION	To prevent damage to the CoreModule 410 and the DiskOnChip, ensure the power supply to the CoreModule 410 is turned off and the power cord has been removed from the power source. Most AT power supplies will continue to provide standby current to the CoreModule 410 until the power cord is disconnected.

1. If the CoreModule 410 is already powered up, power down the system and remove the power cord from the power supply.

CAUTION	To prevent damage to the static sensitive components on the CoreModule 410, ensure you follow good Electrostatic Discharge principles. Components on the CoreModule 410 and DiskOnChip are sensitive to static electricity and can be easily damaged by improper handling. Do the following when handling the CoreModule 410 and its related DiskOnChip: Always use an anti-static wrist/ankle strap and a grounding mat. Before you handle the CoreModule 410 or remove the DiskOnChip from the anti-static bag, touch a grounded, unpainted metal surface to discharge any static electricity.

2. Verify the bytewide socket (U18) pins are clear of any material or obstructions that would prevent installation or bend the DiskOnChip pins.

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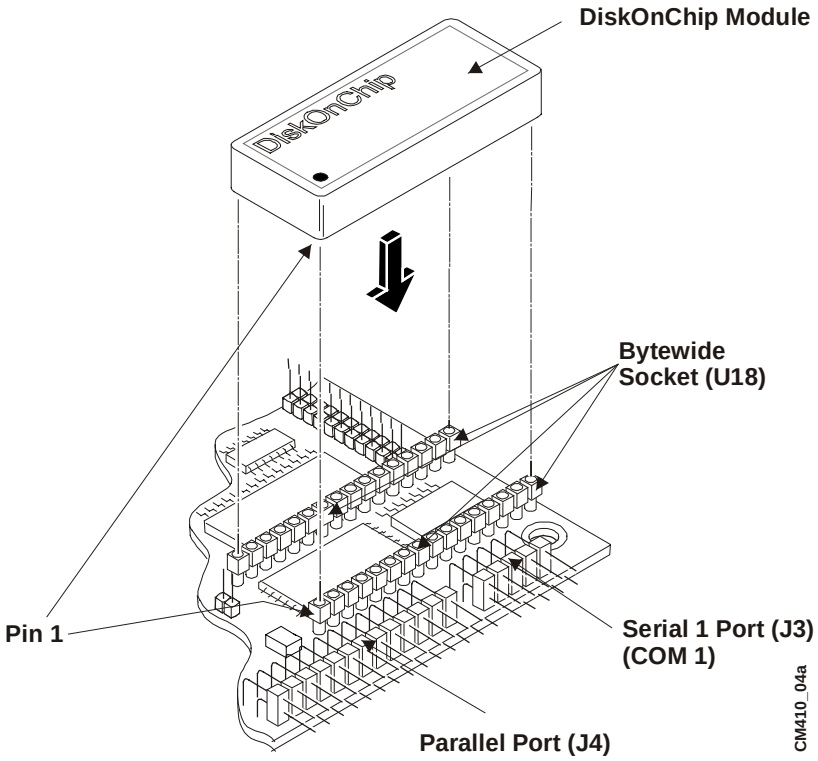


Figure 2-1. Installing DiskOnChip

3. Remove the DiskOnChip from the anti-static package and check it for bent pins, before attempting to insert it into the bytewide socket (U18).
4. Align pin one of the bytewide socket (U18) with pin 1 of the DiskOnChip. See Figure 2-1.
5. Gently insert the DiskOnChip into the bytewide socket (U18) as shown in Figure 2-1 and gently rock it side to side until it is firmly into the bytewide socket (U18).
6. Set jumpers JP3, JP4 and JP5, to boot from the DiskOnChip before you restore power to the CoreModule 410 assembly. See Tables 2-1 and 2-2.

Table 2-1. BIOS/DOC Select Jumper Matrix

Jumper JP4 & JP5	Non-DOC (DiskOnChip)	DOC (DiskOnChip)
Internal BIOS	Normal BIOS operation (JP4 & JP5, Pins 1-3)	Boot from DiskOnChip in bytewide socket (JP4 & JP5, Pins 1-3 & 2-4) **Default** setting JP4 JP5 BIOS/DOC Select Jumper Setting (Shown in Default)
External BIOS	External BIOS – Used for recovery (JP4 & JP5, Pins 1-2)	NA

Table 2-2. DiskOnChip Boot Address Setting

Jumper #	Installed	Removed
JP3 DiskOnChip Address	Access from DC000h-DDFFFh (Pins 1-2) **Default** setting	Access from CC000h-CDFFFh (No jumper)

NOTE	Refer to Figure 1-2 for jumper locations and the CoreModule 410 Reference Manual for more information concerning other jumper settings.

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Removing the DiskOnChip (DOC)

CAUTION	To prevent damage to the CoreModule 410 and the DiskOnChip, ensure the power supply to the CoreModule 410 is turned off and the power cord has been removed from the power source. Most AT power supplies will continue to provide standby current to the CoreModule 410 until the power cord is disconnected.

1. Ensure the CoreModule 410 power supply is turned off and the power cord is removed from the power supply.

CAUTION	To prevent damage to the static sensitive components on the CoreModule 410, ensure you follow good Electrostatic Discharge principles. Components on the CoreModule 410 and DiskOnChip are sensitive to static electricity and can be easily damaged by improper handling. Do the following when handling the CoreModule 410 and its related DiskOnChip: Always use an anti-static wrist/ankle strap and a grounding mat. Before you handle the CoreModule 410 or remove the DiskOnChip from the anti-static package, touch a grounded, unpainted metal surface to discharge any static electricity.

2. Grasp the DiskOnChip and gently rock it side to side while lifting it up out of the bytewide socket.
3. Lift the DiskOnChip away from the bytewide socket and put it on an anti-static surface or anti-static package for safe keeping. See Figure 2-2.

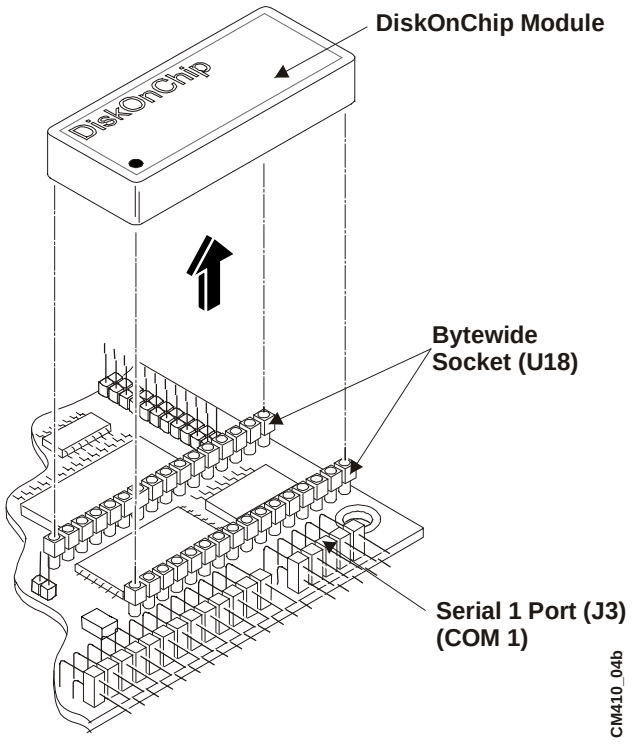


Figure 2-2. Removing DiskOnChip

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Installing Software, Drivers, and Utilities

To install the operating system and respective software drivers, refer to the following procedure.

1. Install the desired Operating System (OS) and related drivers from the manufacturer's diskette(s) or CD-ROM.

   Follow the manufacturer's instructions to install the desired OS and respective drivers.

   - For Windows Operating Systems, some of the necessary drivers may be found on the manufacturer's installation diskette or CD-ROM. If more software drivers are needed, refer to the CoreModule 410 Doc & SW CD-ROM.
   - For other Operating Systems, some or all of the necessary drivers may be found on the manufacturer's installation diskette(s) or CD-ROM. If not, refer to the CoreModule 410 Doc & SW CD-ROM.

2. Run the CoreModule 410 Doc & SW CD-ROM to access the documentation, various utilities, and OS drivers not on the manufacturer's diskette(s) or CD-ROM.

   The CoreModule 410 Doc & SW CD-ROM will operate on any Windows PC, allowing you to view, download, or print the contents of the CD-ROM. This includes the *CoreModule 410 QuickStart Guide, CoreModule 410 Reference Manual*, Release Notes, software drivers and various utilities.

NOTE	You must have an Internet browser to view the main menu and make selections (examples: Microsoft Internet Explorer 4.x, or greater, Netscape Navigator version 4.x, or greater, or the equivalent on a PC). Software download links are provided for Adobe Acrobat Reader version 4.x or greater to view the manuals and documents. An Internet connection is required for the Adobe Acrobat link or access to the Ampro web site.

   The CoreModule 410 Doc & SW CD-ROM should auto-start, but if it does not, go to the root level of the CD-ROM and locate the index.htm by:

   a. Selecting Run from the Start menu in any Windows PC.

   b. Browsing the contents of the CD-ROM until you find the index.htm at the root level.

   c. Select this file and press OK to start the CD-ROM.

      The CD-ROM starts and opens the main menu of the CD-ROM.

3. Select from the directories as shown below:

   - CoreModule 410 Documentation (CoreModule 410 Reference Manual, QuickStart Guide, and Release notes, etc.)
   - CoreModule 410 Software (Supported operating systems, drivers, and Board Support Packages (BSPs))
   - Need Adobe Acrobat? (Link to Adobe Acrobat Reader; need Internet connection)
   - Check for Latest Updates (Hot link to Ampro web site for finding and downloading the latest updates; refer to *Getting Updates* in Appendix A, *Technical Support*; also need Internet connection)

     There are directories and subdirectories under these topics that should provide you with the needed manuals, utilities, and tools not explained earlier.

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4. Install any special OS drivers not found on the manufacturer's diskette(s) or CD-ROM.

   Refer to the directories on the CoreModule 410 Doc & SW CD-ROM for instructions on installing the special drivers for the desired OS.

   If the desired drivers can not be found, contact Ampro through the Virtual Technician on the web site with a request for the driver(s), or use the Link to Ampro's web site on the CoreModule 410 Doc & SW CD-ROM to get the latest updates. Refer also to the Appendix A, Technical Support for more information.

5. Install any utilities or other development tools you may need from the CoreModule 410 Doc & SW CD-ROM.

   Refer to the directories on the CoreModule 410 Doc & SW CD-ROM for instructions on installing and using the utilities or development tools for the desired OS.

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Appendix A Technical Support

Contacting Support

Ampro Computers, Inc. provides a number of methods for contacting Technical Support listed below in Table A-1. Requests for support through the Virtual Technician are given the highest priority, and usually will be addressed within one working day.

- Ampro Virtual Technician – This is a comprehensive support center designed to meet all your technical needs. This service is free and available 24 hours a day through the Ampro web site at http://ampro.custhelp.com. This includes a searchable database of Frequently Asked Questions, which will help you with the common information requested by most customers. This is a good source of information to look at first for your technical solutions. However, you must be registered and then log in to access this service.

  Personal Assistance – You may also request personal assistance by going to the "Ask a Question" area in the Virtual Technician. Requests can be submitted 24 hours a day, 7 days a week. You will receive immediate confirmation that your request has been entered. Once you have submitted your request you can go to the "My Stuff" area and log in to check status, update your request, and access other features.

- Embedded Design Resource Center – This service is also free and available 24 hours a day at the Ampro web site at http://www.ampro.com. However, you must be registered and then log in to access this service.

  The Embedded Design Resource Center was created as a resource for embedded system developers to share Ampro's knowledge, insight, and expertise gained from years of experience. This page contains links to White Papers, Specifications, and additional technical information.

Table A-1. USA Technical Support Contact Information

Method	Contact Information
Virtual Technician	http://ampro.custhelp.com
Web Site	http://www.ampro.com
Standard Mail	Ampro Computers, Incorporated 5215 Hellyer Avenue San Jose, CA 95138-1007, USA

Getting Updates

This feature is provided for you on the CoreModule 410 Doc & SW (Documentation & Software) CD-ROM and is a hot link to Ampro's Web site. You can access the latest updates by clicking on *Check for Latest Updates* in your CD-ROM's main menu. The link on the CD-ROM takes you to the Ampro web site where the search and compare engine on the web site compares your current CD-ROM to the latest files available on the Ampro web site.

Once you have made a selection of desired type of updated material, the search and compare engine generates a list of the current manuals or software updates not on your CD-ROM and displays this list on the screen for you to view. Once the list is displayed you can select the desired updates or new files from the list you want to download to your PC. You can then printout the updates or files, save it to disk, or store it on a new CD-ROM. This list includes documentation and software updates. However, you must be registered before you can log in to the Ampro web site to access this information.

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Appendix B Connector Part Numbers

These connectors are used on the CoreModule 410 and can be used to determine the mating connectors, if you want to make your own cables.

Table B-1. Connector and Manufacturer's Part Numbers

Connector	Pin Number/Pin Spacing/ Orientation	Manufacturer	Manufacturer's PN
J2 – GPIO	10-pin, 0.1", right angle	Samtech	ASP-16939-02M
J3 – Serial 1	10-pin, 0.1", right angle	Molex	10-89-1106
J4 – Parallel	26-pin, 0.1", right angle	T&B Ansley or Spectra-Strip	609-2600M 812-2622-134
J5 – Utility	10-pin, 0.1", right angle	AMP or Molex	102387-1 22-55-3101
J6 – IDE	44-pin, 2mm, straight	Standard IDE connector	
J7 – Power	10-pin, 0.1", right angle	• Housing = AMP or Molex • Contact = AMP or Molex	87456-5 22-55-2101 87523-6 16-02-0103
J8 – Floppy	26-pin, 2mm, right angle	Adam-Tech or Astron	2PH2R26SGA AT-PH2-26-2-1-GF
J9 – Serial 2	10-pin, 0.1", right angle	Molex	10-89-1106
J10 – RS485	2-pin, 0.1", right angle	Molex	22-12-2024

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