PATX3070 ATX Motherboard

Installation and Use

PATX3070A/IH1

February 2001

Printed in the United States of America.

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual could result in personal injury or damage to the equipment.

The safety precautions listed below represent warnings of certain dangers of which Motorola is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ground the Instrument.

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. If the equipment is supplied with a three-conductor AC power cable, the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green/yellow) reliably connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards and local electrical regulatory codes.

Do Not Operate in an Explosive Atmosphere.

Do not operate the equipment in any explosive atmosphere such as in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment could result in an explosion and cause injury or damage.

Keep Away From Live Circuits Inside the Equipment.

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified service personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Service personnel should not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, such personnel should always disconnect power and discharge circuits before touching components.

Use Caution When Exposing or Handling a CRT.

Breakage of a Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, do not handle the CRT and avoid rough handling or jarring of the equipment. Handling of a CRT should be done only by qualified service personnel using approved safety mask and gloves.

Do Not Substitute Parts or Modify Equipment.

Do not install substitute parts or perform any unauthorized modification of the equipment. Contact your local Motorola representative for service and repair to ensure that all safety features are maintained.

Observe Warnings in Manual.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions which you deem necessary for the operation of the equipment in your operating environment.

⚠ **Warning**

To prevent serious injury or death from dangerous voltages, use extreme caution when handling, testing, and adjusting this equipment and its components.

Flammability

All Motorola PWBs (printed wiring boards) are manufactured with a flammability rating of 94V-0 by UL-recognized manufacturers.

EMI Caution

⚠ **Caution**

This equipment generates, uses and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used with adequate EMI protection.

Lithium Battery Caution

This product contains a lithium battery to power the clock and calendar circuitry.

⚠ **Caution**

Danger of explosion if battery is replaced incorrectly. Replace battery only with the same or equivalent type recommended by the equipment manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

⚠ **Attention**

Il y a danger d’explosion s’il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d’un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

⚠ **Vorsicht**

Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch denselben oder einen vom Hersteller empfohlenen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

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> EN55022 “Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment”; this product tested to Equipment Class B
>
> EN50082-1:1997 “Electromagnetic Compatibility—Generic Immunity Standard, Part 1. Residential, Commercial and Light Industry”

System products also fulfill EN60950 (product safety) which is essentially the requirement for the Low Voltage Directive (73/23/EEC).

Board products are tested in a representative system to show compliance with the above mentioned requirements. A proper installation in a CE-marked system will maintain the required EMC/safety performance.

In accordance with European Community directives, a “Declaration of Conformity” has been made and is on file within the European Union. The “Declaration of Conformity” is available on request. Please contact your sales representative.

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About This Manual

This manual provides information on hardware preparation and installation for the PATX3070 Intel PGA370 ATX Motherboard (hereinafter referred to as the PATX3070). In addition, it also provides a brief description of the BIOS power-on self-test (POST) and lists the features and specifications applicable to the motherboard.

For programming information or for additional details on BIOS routines, refer to the *PATX3070 BIOS and Programmer's Reference Guide*, listed in Appendix A, *Related Documentation*.

The information in this manual applies to model numbers listed in the following table.

Model Number	**Description**
PATX3070-104	Single Ethernet Interface and five PCI slots
PATX3070-105	Dual Ethernet Interfaces and two PCI slots
PATX3070-108	Dual Ethernet Interfaces, SCSI, and five PCI slots

Overview of Contents

Chapter 1, *Hardware Preparation and Installation*, provides information on hardware preparation and installation for the PATX3070.

Chapter 2, *BIOS Self-Test and Setup*, provides a brief description of the BIOS power-on self-test (POST) and lists the features and specifications applicable to the motherboard.

Chapter 3, *Features and Specifications*, describes features and specifications of the PATX3070.

Chapter 4, *Connector Pin Assignments*, summarizes the pin assignments for I/O and power cable interconnect signals on the PATX3070 motherboard.

Appendix A, *Related Documentation*, lists all documentation related to the PATX3070.

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In all your correspondence, please list your name, position, and company. Be sure to include the title and part number of the manual and tell how you used it. Then tell us your feelings about its strengths and weaknesses and any recommendations for improvements.

Conventions Used in This Manual

The following typographical conventions are used in this document:

bold

is used for user input that you type just as it appears; it is also used for commands, options and arguments to commands, and names of programs, directories and files.

italic

is used for names of variables to which you assign values. Italic is also used for comments in screen displays and examples, and to introduce new terms.

`courier`

is used for system output (for example, screen displays, reports), examples, and system prompts.

<**Enter**>, <**Return**> or <**CR**>

<**CR**> represents the carriage return or Enter key.

CTRL

represents the Control key. Execute control characters by pressing the Ctrl key and the letter simultaneously, for example, **Ctrl-d**.

Hardware Preparation and Installation

1

Introduction

The PATX3070 is an Intel Architecture ATX form factor computer motherboard targeted to run Windows NT®, QNX®, VxWorks®, Linux®, and LynxOS®, in an embedded environment. The PATX3070 is based on the Intel Pentium® III or Celeron™ processor for the PGA370 socket.

Features of the full-function PATX3070 include the following:

- ❑ Intel 440BX chipset with support for 66/100 MHz processor-side bus
- ❑ four 3.3V DIMM slots (with support for up to 1GB SDRAM)
- ❑ 10BaseT/100 BaseTX Ethernet Interfaces (single or dual population options)
- ❑ two Ultra ATA/33 EIDE interface connectors, supporting up to four hard drives
- ❑ CompactFlash™ Type II socket
- ❑ dual-channel Wide Ultra SCSI interface with optional RAID support
- ❑ two RS-232 serial ports, parallel, floppy, PS/2 keyboard/mouse support and IrDA header
- ❑ watchdog, interval timers, hardware monitor
- ❑ one 2x AGP slot, two 32-bit/33 MHz PCI slots, five 32-bit/33 MHz PCI slots if configured with additional PCI-to-PCI bridge (one shared if PCI-to-PCI bridge option used), and two ISA expansion slots (one shared if PCI-to-PCI bridge option used).

Note Please see the table in the *About This Manual* on page -xiii section for a list of model numbers.

The block diagram in Figure 1-1 on page 1-3 shows the architecture of the PATX3070 motherboard. Chapter 3, *Features and Specifications*, contains complete features and specifications for the board.

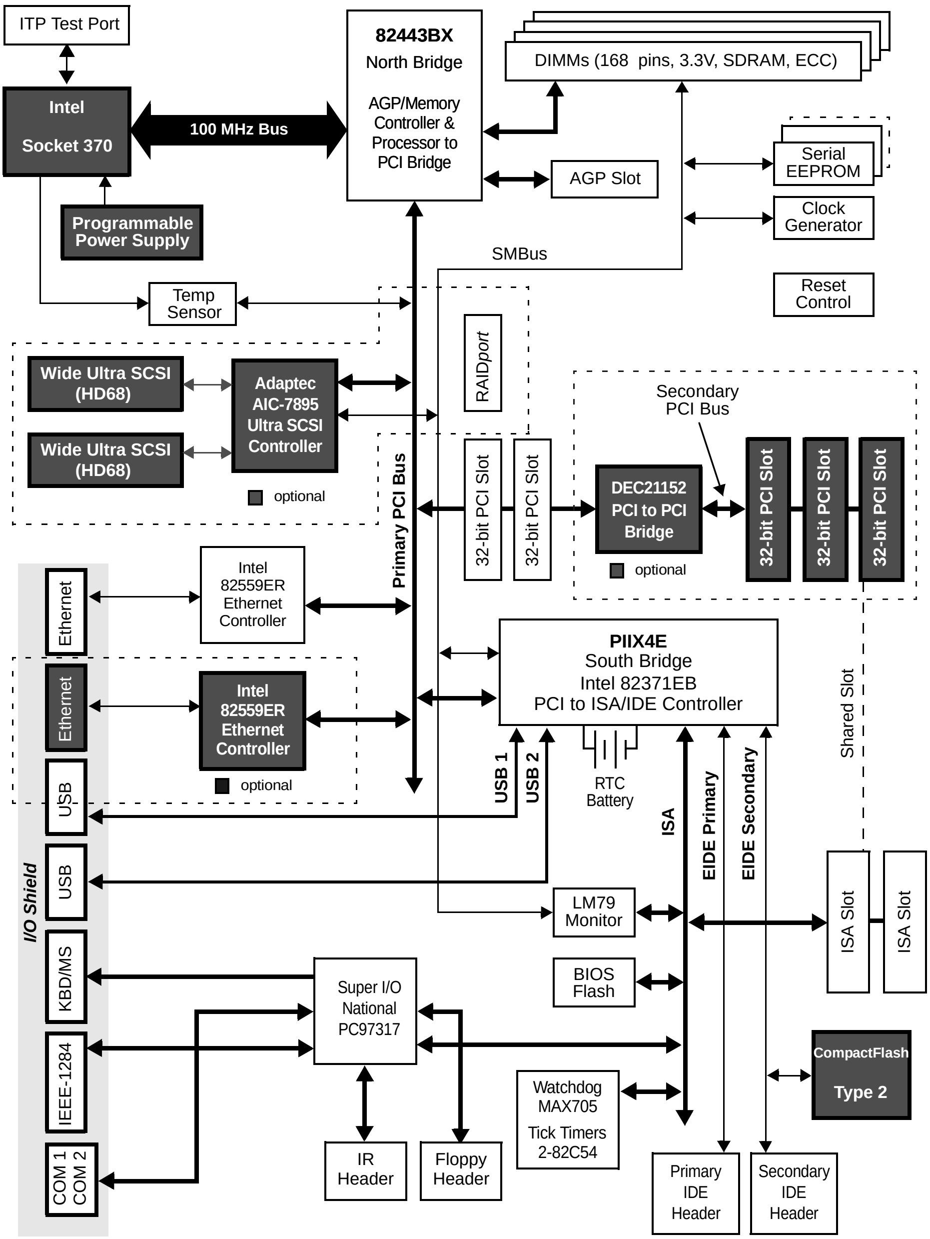


Figure 1-1. PATX3070 Motherboard Block Diagram

Overview

The following table lists the things you will need to do before you can use this board and tells where to find the information you need to perform each step. Be sure to read this entire chapter, including all cautions and warnings, before you begin.

Table 1-1. Startup Overview

What you need to do...	Refer to...
Unpack the hardware.	*Unpacking Instructions on page 1-5*
Configure the hardware by setting jumpers on the motherboard.	*PATX3070 Motherboard Preparation on page 1-6*
If necessary, install an I/O shield on the motherboard.	*I/O Shield on page 1-14*
Install the motherboard in the chassis.	*Motherboard on page 1-15*
Ensure that DIMM memory module(s) are properly installed on the motherboard.	*DIMM Memory on page 1-18*
If applicable, install an AGP Graphics card on the motherboard.	*AGP Graphics Slot on page 1-19*
If applicable, install any PCI expansion cards on the motherboard.	*PCI Expansion Cards on page 1-20*
If applicable, install any ISA expansion cards on the motherboard.	*ISA Module(s) on page 1-21*
If applicable, install a SanDisk® IDE CompactFlash module on the motherboard.	*SanDisk IDE CompactFlash on page 1-22*
Connect a display terminal and any other equipment you will be using.	*Connection to Peripherals on page 1-25*
	For more information on optional devices and equipment, refer to the documentation provided with the equipment.
Power up the system.	*Chapter 2, BIOS Self-Test and Setup*

Table 1-1. Startup Overview (Continued)

What you need to do...	Refer to...
Note that the BIOS initializes the PATX3070 motherboard.	*Chapter 2, BIOS Self-Test and Setup*
	You may also wish to consult the *PATX3070 BIOS and Programmer's Reference Guide*, listed in Appendix A, *Related Documentation*.
Initialize the system clock.	*Chapter 2, BIOS Self-Test and Setup*
Program the board as needed for your applications.	*PATX3070 BIOS and Programmer's Reference Guide*, listed in Appendix A, *Related Documentation*.

Unpacking Instructions

Note If the shipping carton is damaged upon receipt, request that the carrier's agent be present during the unpacking and inspection of the equipment.

Unpack the equipment from the shipping carton. Refer to the packing list and verify that all items are present. Save the packing material for storing and reshipping of equipment.

Caution

Avoid touching areas of integrated circuitry; static discharge can damage circuits.

Hardware Configuration

To produce the desired configuration and ensure that the PATX3070 motherboard operates properly, you may need to carry out certain hardware modifications before installing the motherboard.

Some PATX3070 motherboard functions, such as the timers, are controlled by setting bits in registers. These and other registers are described in the *PATX3070 BIOS and Programmer's Reference Guide* or in vendor documentation as listed in Appendix A, *Related Documentation*.

Many options, however, are controlled through manual installation or removal of header jumpers or interface modules on the motherboard.

PATX3070 Motherboard Preparation

Figure 1-2 on page 1-8 illustrates the placement of the jumper headers, connectors, and various other components on the PATX3070 motherboard. Manually configurable jumper headers on the motherboard are listed in the following table. Default settings are enclosed in brackets. For the connector pin assignments on the PATX3070, refer to the Chapter 4, *Connector Pin Assignments*.

Table 1-2. PATX3070 Jumper and Switch Settings

Jumper	Function	Settings	
J7	*Backup Battery Selection (J7 and BT1)*	[1-2] No jumper	On-board battery selected External battery selected (cable installed)
J9	*CompactFlash Configuration (J9)*	1-2 [No jumper]	CompactFlash is master device CompactFlash is slave device
J27	*CMOS-to-EEPROM Backup (J27)*	1-2 [2-3]	CMOS contents not copied to EEPROM CMOS backup copy stored in EEPROM
J33	*USB Port 1 Routing (J33)*	[1-3, 2-4, 9-10] 3-5, 4-6, 7-8	Rear panel connector J2 selected Board connector header J26 selected
J34	*CMOS Battery Backup Control (PIIX RTC CMOS CLR J34)*	1-2 [2-3]	Battery backup disabled, CMOS cleared Battery backup enabled
J43	*Watchdog Timer Enable (J43)*	1-2 [No jumper]	Watchdog timer enabled at power-up Watchdog timer disabled

Note Items in brackets are factory default settings.

The PATX3070 motherboard is tested and shipped with the configurations described in the following sections. The PATX3070's required and factory-installed BIOS performs its power-up self-test (POST) with those factory settings.

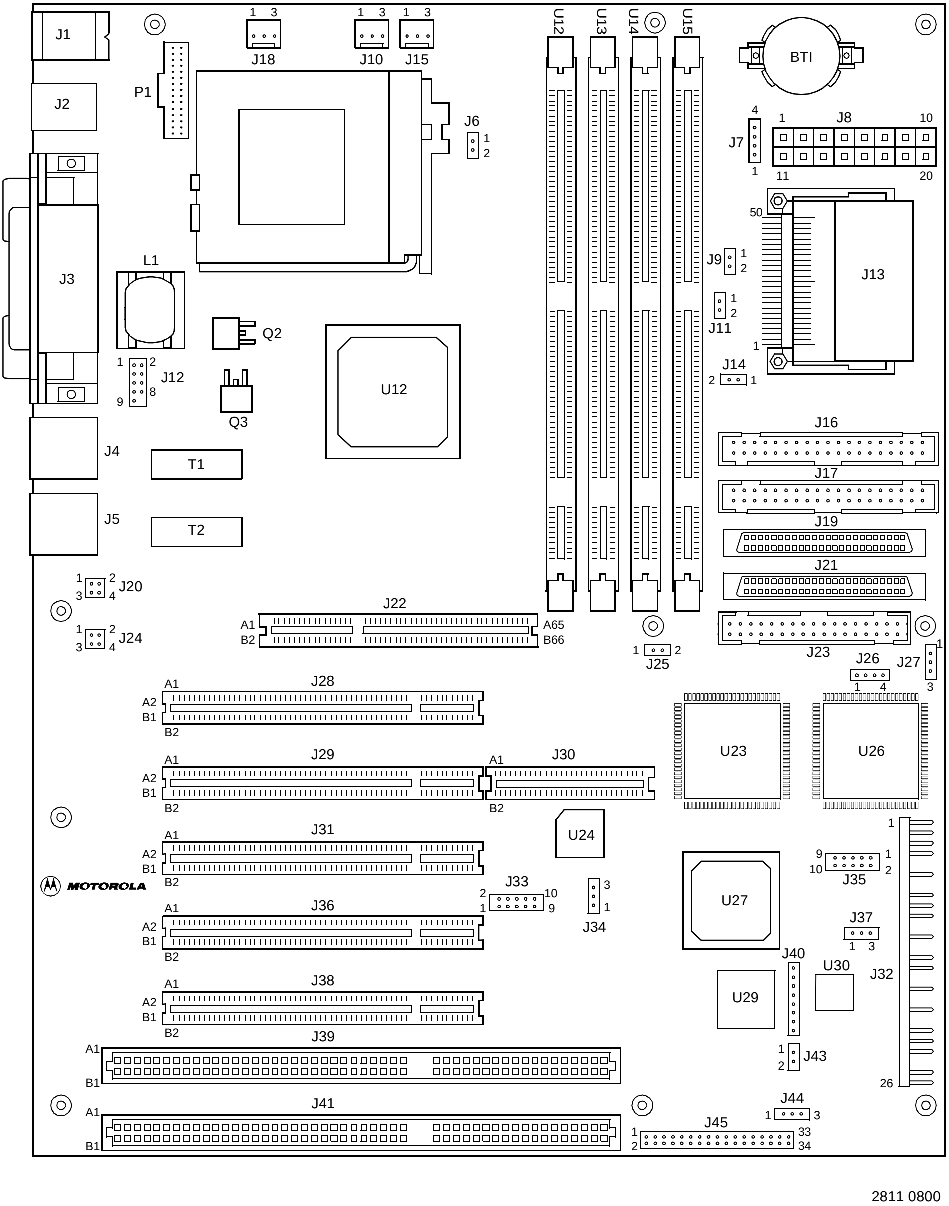


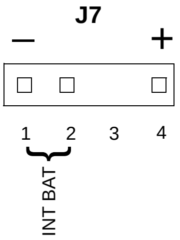
Figure 1-2. PATX3070 Motherboard Layout

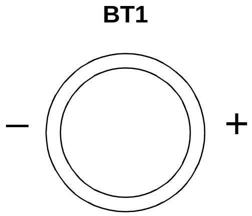
Backup Battery Selection (J7 and BT1)

J7 is the battery backup configuration point. BT1 is the socket for the on-board battery.

To use the on-board battery for backup, verify that a battery (Panasonic CR2032) is installed securely in socket BT1. With a jumper installed at J7 (pins 1-2 together), the on-board battery is enabled (this is the factory default).

To use an external battery for backup, remove the jumper from pins 1-2 and instead connect the external battery cable to J7. Pin 1 connects to the negative side of the external battery, pin 4 to the positive side.





CompactFlash Configuration (J9)

The SanDisk CompactFlash cards, which can be used on the PATX3070, contain an intelligent controller for management of the Flash media. The CompactFlash implementation mimics the file structure of a hard disk drive. These characteristics make it possible for the PATX3070 to treat the CompactFlash card as a bootable device.

With a jumper installed across J9 pins 1-2, the CompactFlash device is in ‘‘master’’ mode. This configuration enables the PATX3070 to boot from the CompactFlash card.

With the jumper removed from J9 (the factory configuration), the CompactFlash device is in ‘‘slave’’ mode.

CompactFlash in Master mode

CompactFlash in Slave mode
(factory configuration)

CMOS-to-EEPROM Backup (J27)

You have the option to store, in EEPROM, a backup copy of the current BIOS configuration (contained in CMOS RAM on the Intel 82371EB PIIX4E PCI/ISA bridge device). J27 controls the CMOS-to-EEPROM backup configuration. If the CMOS-to-EEPROM backup is enabled, the BIOS configuration is copied to EEPROM each time the power-on self-test (POST) executes.

The factory configuration has a jumper between J27 pins 2-3, so that a fresh copy of the CMOS RAM contents is stored in EEPROM each time you power up the system. If you move the jumper to J27 pins 1-2, the CMOS-to-EEPROM backup is disabled.

CMOS backup enabled
(factory configuration)

CMOS backup disabled

If the BIOS configuration data becomes corrupted while you are operating the board with the CMOS-to-EEPROM backup enabled, you may need to momentarily disable the backup, clear CMOS, and reconfigure the BIOS. This is done as follows:

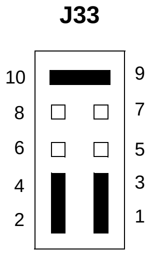
1. Turn off the power to the board.

2. Move the jumper on J27 from pins 2-3 to pins 1-2, disabling the CMOS-to-EEPROM backup.
3. Clear the CMOS by moving the jumper on J34 (CMOS battery backup control) momentarily from pins 2-3 to pins 1-2. After a lapse of several seconds, return the jumper to pins 2-3.
4. Turn on the power to the board, start the Setup utility, and reconfigure the BIOS as needed (refer to Chapter 2, *BIOS Self-Test and Setup*).
5. Power down the board once more. Return the jumper on J27 to pins 2-3, re-enabling the CMOS-to-EEPROM backup.
6. Power up the board once more. The board will reinitialize using the BIOS configuration data you have entered, and a copy of the data will be placed in EEPROM.

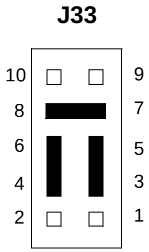
USB Port 1 Routing (J33)

The PATX3070 is equipped with two USB (Universal Serial Bus) ports. The primary port, Port 0, is routed to a USB panel connector. The secondary USB, Port 1, may be directed either to a panel connector or to a connector header on the board.

J33 is the 2ND USB routing header. The setting of J33 determines whether I/O signals on USB port 1 are directed to a panel connector or to a connector header on the board. The default factory configuration has jumpers between pins 1-3, 2-4, and 9-10, directing the signals to the upper panel connector of J2. To route the signals to connector header J26, place the jumpers between pins 3-5, 4-6, and 7-8.



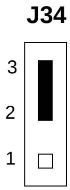
To Connector
(factory configuration)



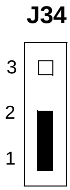
To Header

CMOS Battery Backup Control (PIIX RTC CMOS CLR J34)

J34 controls battery backup power to the CMOS RAM on the PATX3070 motherboard. The factory configuration has a jumper between J34 pins 2-3, enabling battery power to the CMOS RAM. If you move the jumper to J34 pins 1-2, when the board is powered down, the CMOS memory is cleared and BIOS default settings take over. Refer also to *CMOS-to-EEPROM Backup (J27)*.



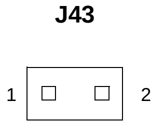
Battery backup enabled
(factory configuration)
NORMAL



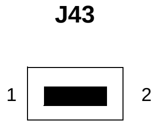
Clear CMOS

Watchdog Timer Enable (J43)

J43 is the watchdog timer enable header. Putting a jumper on J43 pins 1-2 enables the watchdog timer upon power-up. J43 is empty in the factory configuration, leaving the watchdog timer function disabled at power-up.



No connection - Watchdog timer disabled
(factory configuration)



Watchdog timer enabled

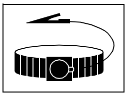
Hardware Installation

The following sections describe the placement of CPU and DIMM Memroy modules, as well as PCI Expansion Cards, ISA Module(s), and other user-supplied plug-ins, on the motherboard.

Installation Preliminaries

This section applies to all hardware installations you may perform on PATX3070 motherboards.

Use ESD



Wrist Strap

Motorola strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading a system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to electrostatic discharge (ESD). After removing the component from its protective wrapper or from the system, place the component flat on a grounded, static-free surface (and, in the case of a board, component side up). Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an active electrical ground. Note that a system chassis may not be grounded if it is unplugged.

Warning

To prevent serious injury or death from dangerous voltages, before connecting peripherals, disconnect the power cord from the power source. Only qualified, experienced electronics personnel should access the interior of a system.

PATX3070 Motherboard Installation

With headers properly configured, you are ready to mount (if necessary) the I/O shield and install the PATX3070 motherboard in a chassis or system enclosure. You can then plug the memory modules, CompactFlash module, and the various application-specific daughter boards into the motherboard and cable up the peripherals. Proceed as described in the following sections to accomplish these tasks.

I/O Shield

The I/O shield for the PATX3070 must be in place before you install the board in a chassis. In most cases, the I/O shield is a factory-installed item. If you need to install the shield yourself, however, refer to Figure 1-3 on page 1-15 and follow the procedure below:

1. Carefully remove the PATX3070 from its packaging and lay it flat, with the connectors facing you.

Caution

Avoid touching areas of integrated circuitry; static discharge can damage these circuits.

2. Position the I/O shield on the motherboard I/O connectors, with icons facing outward.
3. Install jackposts at the printer port and the serial ports (the connectors are identifiable by the icons on the face plate).
4. Hand-tighten the jackposts to clamp the I/O shield in position.

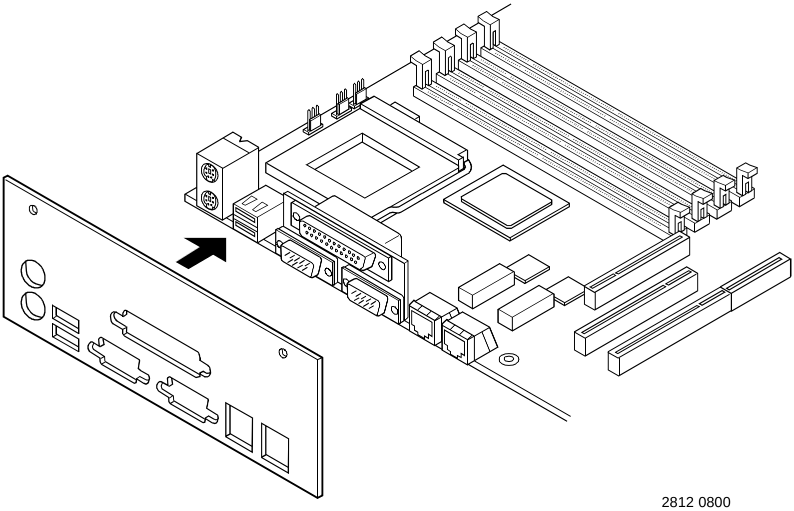


Figure 1-3. Installing the I/O Shield on the Motherboard

Motherboard

To install a PATX3070 motherboard in your chassis, refer to Figure 1-4 on page 1-17 and follow the procedure below. (The chassis shown is a Motorola unit. With other chassis, the procedure may differ slightly.)

1. Attach an ESD strap to your wrist. Attach the other end of the ESD strap to an electrical ground (refer to *Installation Preliminaries* on page 1-13). The ESD strap must be secured to your wrist and to ground throughout the procedure.
2. Ensure that the AC or DC power is switched off and remove the AC cord or DC power lines from the system.

Caution

Inserting or removing modules with power applied may result in damage to module components.

Warning

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

3. Remove the chassis cover. If necessary, loosen or temporarily remove chassis components (fans, etc.) as needed for access to the interior of the chassis.
4. Install metal standoffs on the floor of the chassis in alignment with the PATX3070 motherboard mounting holes. Use as many standoffs as feasible.

Caution

Avoid touching areas of integrated circuitry; static discharge can damage these circuits.

5. Set the PATX3070 motherboard on the chassis standoffs and start the screw(s) provided into the standoffs, without tightening them completely. (The chassis shown is a Motorola unit. With other chassis, the procedure may differ slightly.)
6. Thread two screws through the back wall of the chassis into the upper corners of the I/O shield.
7. With all screws in place, tighten them snugly.

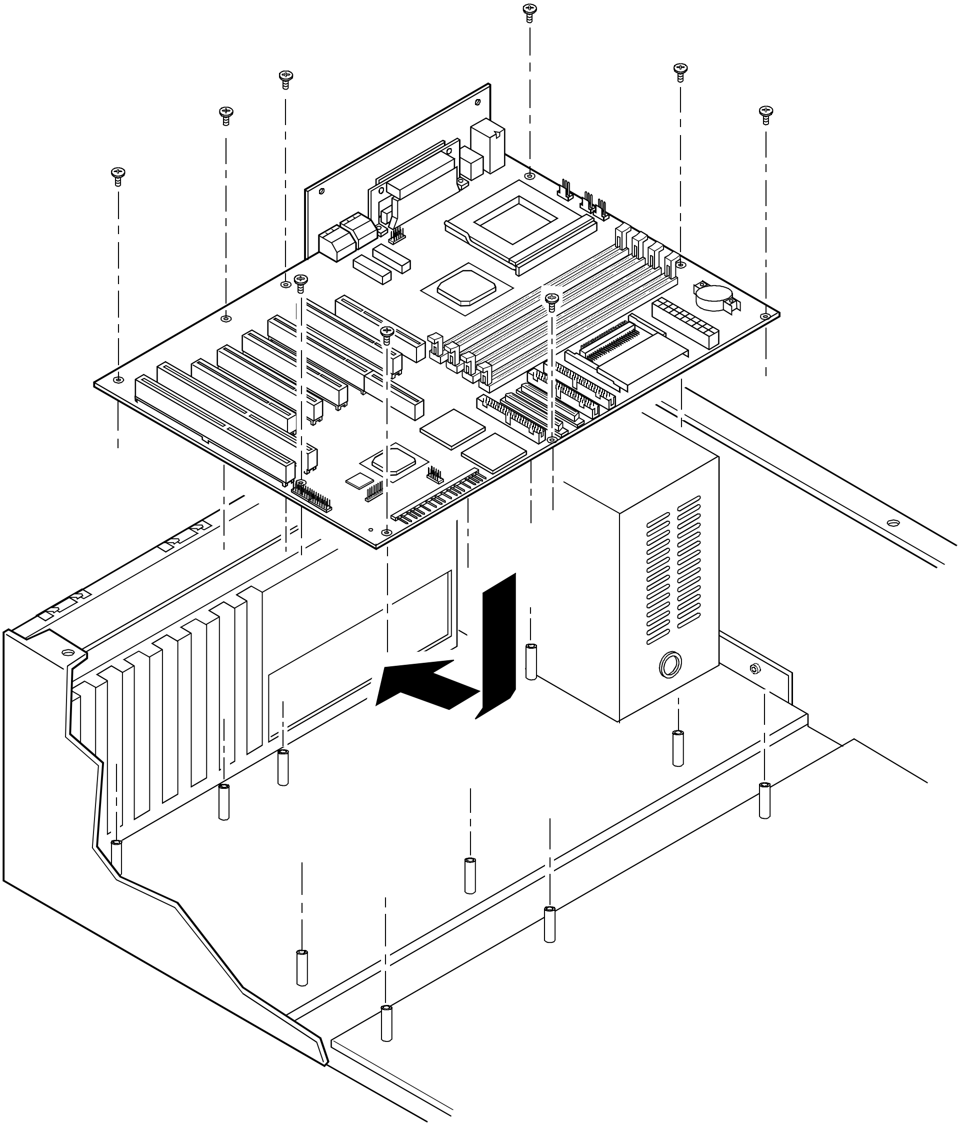


Figure 1-4. Installing the PATX3070 Motherboard in a Chassis

DIMM Memory

See Figure 1-5 below. You can install from one to four SDRAM DIMMs in any order, but you may find it more convenient to start with the inner DIMM slot and finish with the outer one. In other words, install DIMMs first in U15, then U14, then U13, then U12 (DIMM MODULE Slots 3 through 0).

Note For information on other DIMMs that may be suitable for use with this product, refer to Intel's Web site, listed in Appendix A, *Related Documentation*.

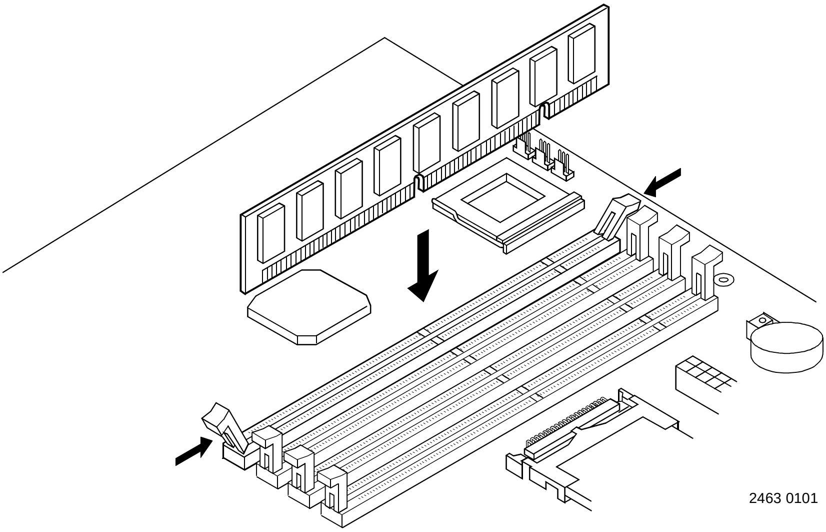


Figure 1-5. Installing Memory DIMM(s)

AGP Graphics Slot

See Figure 1-6 below. Install an AGP (Accelerated Graphics Port) graphics card in the AGP Slot J22.

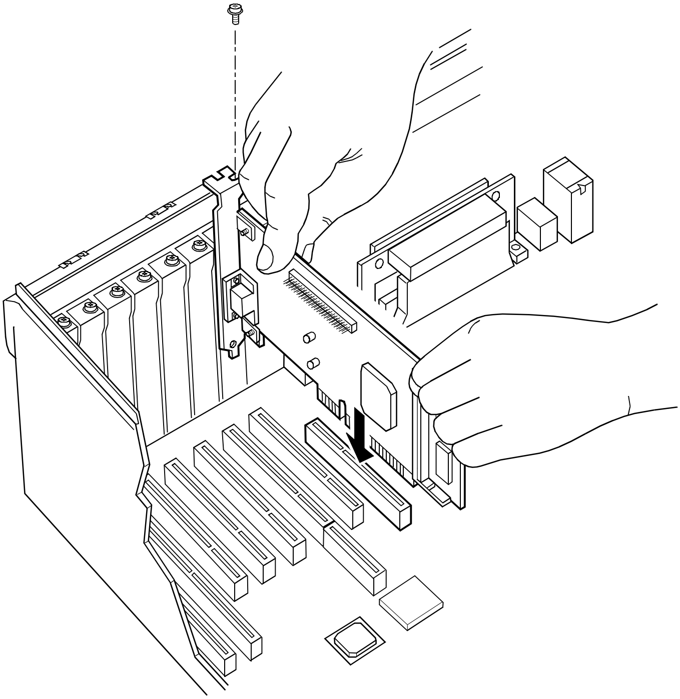


Figure 1-6. Installing an AGP Graphics Card

PCI Expansion Cards

See Figure 1-7 below. You can install one, two, three, four, or five PCI expansion cards in any order, but you may find it more convenient to start with the inner PCI slot and finish with the outer one. In other words, install PCI module(s) first in J28, then J29, then J31, then J36, then J38 (SLOT 1, SLOT 2, SLOT 3, SLOT 4, SLOT 5).

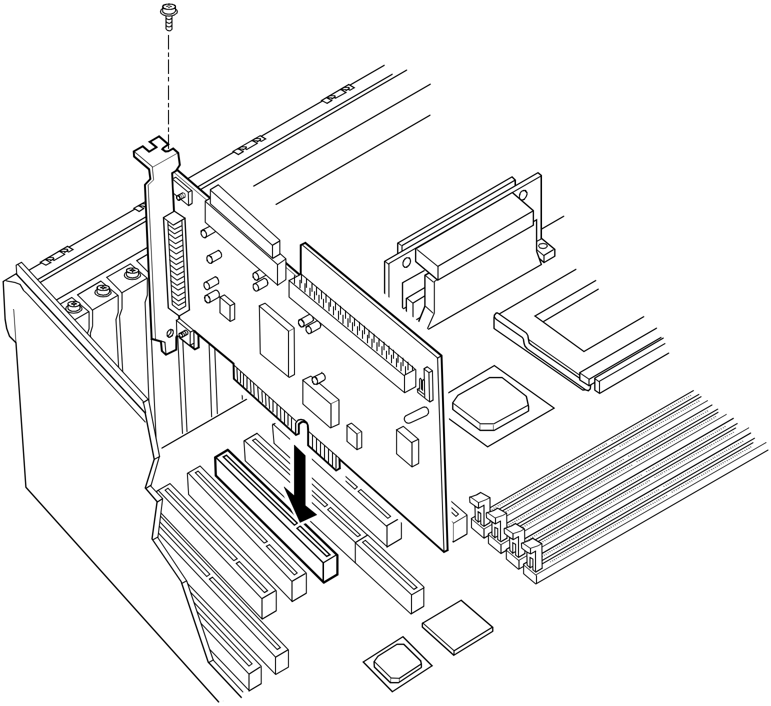


Figure 1-7. Installing PCI Module(s)

Notes Boards that occupy PCI Slot 5 and the adjacent ISA Slot (J39) share I/O space in the back panel. If the ISA slot is occupied, PCI Slot 5 must remain vacant, and vice versa.

The two PCI slots closest to the processor are the primary PCI Slots (J28 and J29) and provide a greater degree of performance. However, if an expansion card fails to operate in any of the primary PCI slots, install the card in the secondary PCI slots.

ISA Module(s)

See Figure 1-8 below. You can install either one or two ISA modules in either order, but you may find it more convenient to start with the inner ISA slot and finish with the outer one. In other words, install the first ISA module in Slot J39, the second in Slot J41.

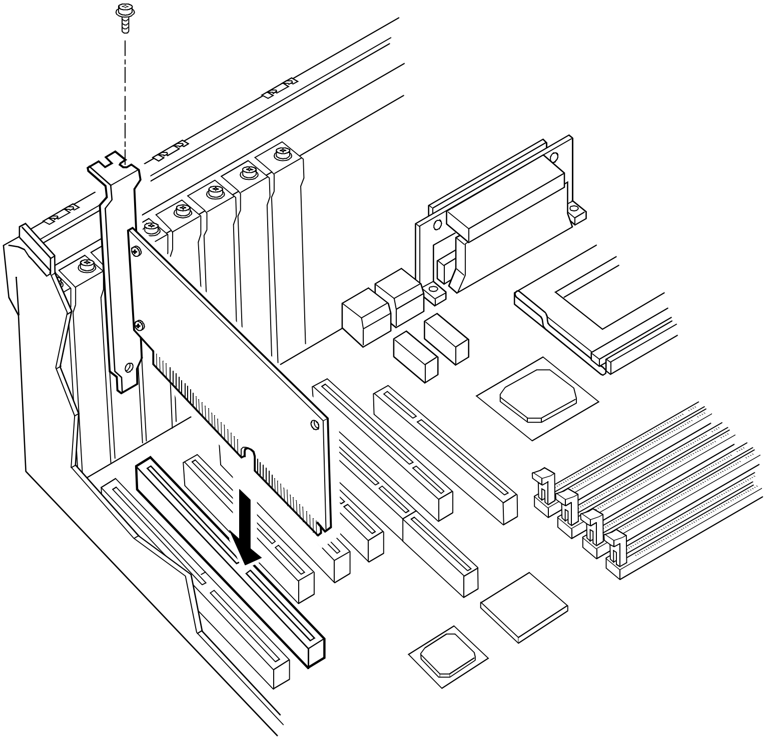


Figure 1-8. Installing ISA Module(s)

Note Boards that occupy ISA Slot J39 and the adjacent PCI Slot 5 (J38) share I/O space in the back panel. If the ISA slot is occupied, PCI Slot 5 must remain vacant, and vice versa.

SanDisk IDE CompactFlash

The SanDisk CompactFlash cards, which can be used on the PATX3070, contain an intelligent controller for management of the Flash media. The CompactFlash implementation mimics the file structure of a hard disk drive. With a CompactFlash card installed, you can store and manipulate files on the card as you would on a hard disk or floppy disk. For details on installing this component, refer to the *SanDisk IDE FlashDrive Installation Guide* at **http://www.sandisk.com/cons/prod_lit.htm**.

The general installation procedure is as follows (see Figure 1-9 below):

1. Start the CompactFlash card into the card guides on the CompactFlash connector, J13.
2. Press the card gently into the connector until it seats.

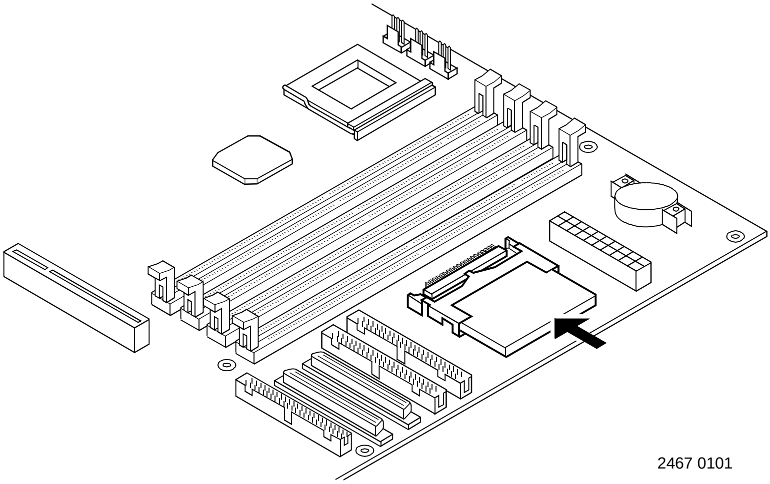


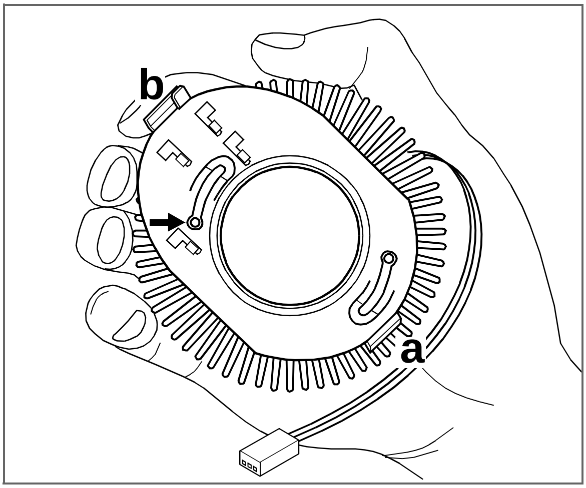
Figure 1-9. Installing a SanDisk IDE CompactFlash Card

Notes Be sure that the CompactFlash master/slave setting (jumper header J9) is compatible with the secondary IDE devices installed.

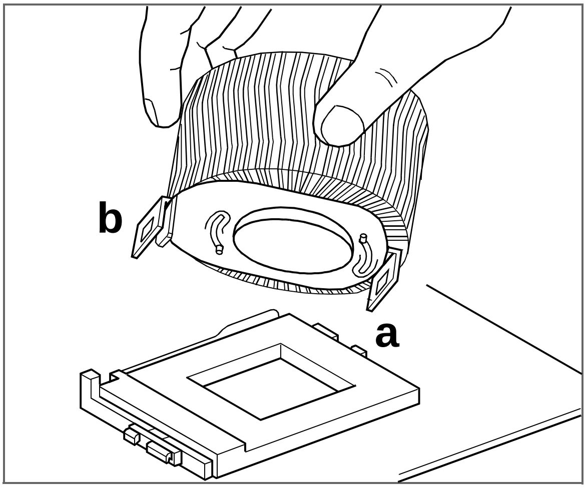
If the CompactFlash card is the only device installed on the secondary bus, set it to master mode. If an additional IDE device is present on the bus, the CompactFlash card can be in either master or slave mode, with the other IDE device being set the opposite way. (If an ATAPI device is present on the bus, however, the CompactFlash card must be in master mode and the ATAPI device in slave mode.)

CPU Cooler

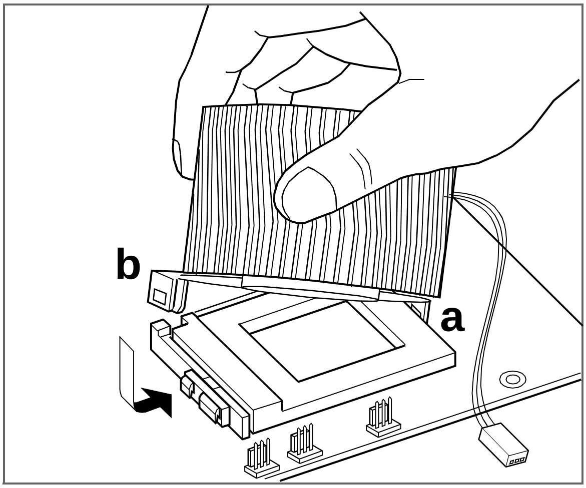
A CPU cooler is installed on the Intel PGA 370 socket to keep your microprocessor cool. A CPU cooler includes a heat sink as well as a fan and is more efficient than a heat sink alone. See the following procedure and illustrations for installation instructions.



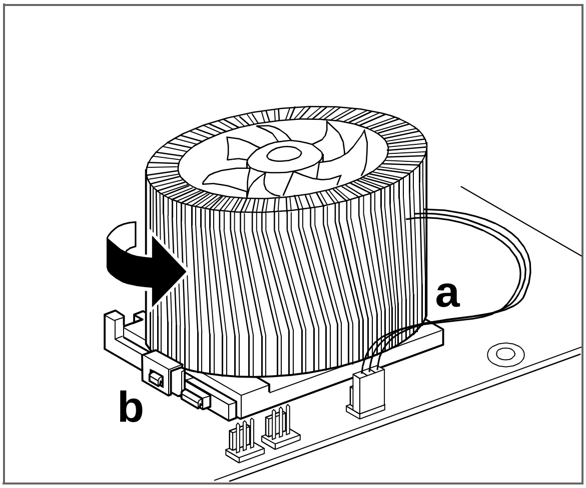
1. Hold the air cooler with the shorter end metal spring clip (point "a") toward your wrist.
2. Set the guide pin all the way to the left.



3. Clasp the spring clip over the tab (point **a**) at the narrow end of the socket (opposite CAM side of socket).



4. Clasp the spring clip over the tab (point **b**) at the CAM end of the socket.



5. Twist the air cooler counter-clockwise about 1/2 inch, making sure the spring clip features are securely seated over the socket tabs. Verify the heat sink is firmly locked in place.

6. Plug the 3-pin connector into the 3-pin header (J18) on the motherboard.

The air cooler is ready to work.

Connection to Peripherals

With the I/O shield in place, the PATX3070 motherboard installed in a chassis, and modules installed on the PATX3070, you are ready to connect peripherals and apply power to the board.

Figure 1-2 on page 1-8 shows the locations of the various cable connectors. They are also listed in Table 1-3 on page 1-26 with the rest of the connectors.

For the pin assignments of the connectors listed, refer to Chapter 4, *Connector Pin Assignments*.

Note In the following table, an asterisk (*) denotes a connector which may not be found on reduced-function versions of the PATX3070 motherboard. The others are used on all versions.

Table 1-3. PATX3070 Board Connectors

Connector	Function
I/O Panel Connectors	
J2 (bottom)	USB0 (Universal Serial Bus 0) panel connector
J2 (top)	USB1 (Universal Serial Bus 1) panel connector
J1 (bottom)	KB (keyboard) panel connector
J1 (top)	MSE (mouse) panel connector
J3 (left)	COM1 panel connector
J3 (right)	COM2 panel connector
J4	*Ethernet 1 panel connector
J5	*Ethernet 2 panel connector
J3 (top)	Parallel printer panel connector
Board Surface Connectors	
J7	External battery cable header
J8	Power-in board connector
J9	CompactFlash master/slave select
J10	Power supply fan cable header
J12	COM2 auxiliary board connector
J13	*CompactFlash board connector
J14	Reset cable header
J15	Chassis fan cable header
J16	Secondary (IDE) board connector
J17	Primary (IDE) board connector
J18	CPU fan cable header
J19	*SCSI (channel B) board connector

Table 1-3. PATX3070 Board Connectors (Continued)

Connector	Function
J20	*Ethernet 1 LED cable header
J21	*SCSI (channel A) board connector
J22	AGP board connector
J23	Floppy board connector
J24	*Ethernet 2 LED cable header
J26	USB1 (Universal Serial Bus 1) header
J28	PCI Slot 1 board connector
J29	PCI Slot 2 board connector
J30	*RAID*port* board connector
J31	*PCI Slot 3 board connector
J32	LED/power switch/keylock/speaker cable header
J33	USB1 routing
J34	CMOS clear
J35	Infrared interface cable header
J36	*PCI Slot 4 board connector
J37	Chassis intrusion detection cable header
J38	*PCI Slot 5 board connector
J39	ISA Slot 1 board connector
J41	ISA Slot 2 board connector
J43	Watchdog timer enable
U4	CPU connector
U12-U15	DIMM module sockets

Completing the Installation

Verify that hardware is installed and the power/peripheral cables connected as appropriate for your system configuration.

Replace the chassis or system cover, reconnect the system to the AC or DC power source, and turn the equipment power on.

Processor Removal and Replacement

Microprocessors in Motorola board products are factory-installed and tested to ensure proper operation under board-specific BIOS software within specified power and cooling requirements. Field replacement of the processor is not recommended. A processor of a different type or with a different stepping mask may not be supported by the BIOS. Also, faster processors may alter cooling and power requirements beyond specifications.

Motorola is continually improving its products to use the latest processor speeds and technologies as they become available. If your application requires a different processor, consult your local Motorola representative.

Replacing Lithium Batteries

Follow these safety rules for proper battery operation and to reduce equipment and personal injury hazards when handling lithium batteries. Use the battery for its intended application only.

Note **Do not** recharge, open, puncture or crush, incinerate, expose to high temperatures or dispose of in your general trash collection.

To replace the lithium battery, observe the following guidelines and follow the steps below.

Note When replacing the battery, power must be applied to the board to prevent data loss.

Warning

To prevent serious injury or death from dangerous voltages, use extreme caution when handling, testing, and adjusting this equipment and its components.

Warning

Lithium batteries incorporate flammable materials such as lithium and organic solvents. If lithium batteries are short-circuited or exposed to high temperature or pressure, they may burst open and ignite, possibly resulting in injury and/or fire. When dealing with lithium batteries, carefully follow the precautions listed below in order to prevent accidents.

- Do not short-circuit.
- Do not disassemble, deform, or apply excessive pressure.
- Do not heat or incinerate.
- Do not apply solder directly.
- Do not use different models, or new and old batteries together.
- Do not charge.
- Always check proper polarity.

Caution

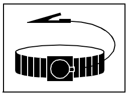
Danger of explosion if battery is replaced incorrectly.

Replace battery only with the same or equivalent type recommended by the equipment manufacturer. Dispose of used batteries according to local regulations and manufacturer's instructions.

Caution

Avoid touching areas of integrated circuitry; static discharge can damage circuits.

Use ESD



Wrist Strap

Attach an ESD strap to your wrist. Attach the other end of the ESD strap to an electrical ground. (Note that the system chassis may not be grounded if it is unplugged.) The ESD strap must be secured to your wrist and to ground throughout the procedure.

1. To remove the battery from the module, carefully pull the battery from the socket.
2. Before installing a new battery, ensure that the battery pins are clean.
3. Note the battery polarity and press the new battery into the socket.

Note When the battery is in the socket, no soldering is required.

4. Recycle or dispose of the old battery according to local regulations and manufacturer’s instructions.

BIOS Self-Test and Setup

2

Introduction

The BIOS on the PATX3070 motherboard is a customized version of an industry-standard BIOS for IBM PC AT-compatible personal computers. It supports Intel x86 and compatible processors, including those of the Pentium family. The BIOS provides important low-level support for the board’s central processing, memory, and I/O subsystems.

Description

The BIOS is immediately activated when you first turn on the computer. The BIOS reads system configuration information from CMOS RAM and begins the process of checking out the system and configuring it through the power-on self-test (POST).

When these preliminaries are finished, the BIOS seeks an operating system on one of the data storage devices (hard drive, floppy drive, etc.). The BIOS then launches the operating system and surrenders control of system operations to it.

Configuration Information

The system configuration information which the BIOS reads from CMOS RAM during power-up has been stored there by means of the Setup utility. The Setup utility uses a number of menus for making changes and for turning special features on or off. Should you wish to change any of the configuration information, you can start the Setup utility during POST by pressing <**F2**> at any time while the following message is displayed at the bottom of the screen:

```
PRESS <F2> TO ENTER SETUP
```

If the message disappears before you respond and you still wish to enter Setup, you can restart the system for another attempt by any of the following means:

- Cycling power
- Pressing the **RESET** button on the system case
- Simultaneously pressing the <**Ctrl**>, <**Alt**>, and <**Delete**> keys

The Setup Interface

The Setup utility uses a menu-driven interface. As shown in the following illustration, each Setup screen has a menu bar, a legend bar, and a field-specific help window. For each field with predefined values, an options window is available as well.

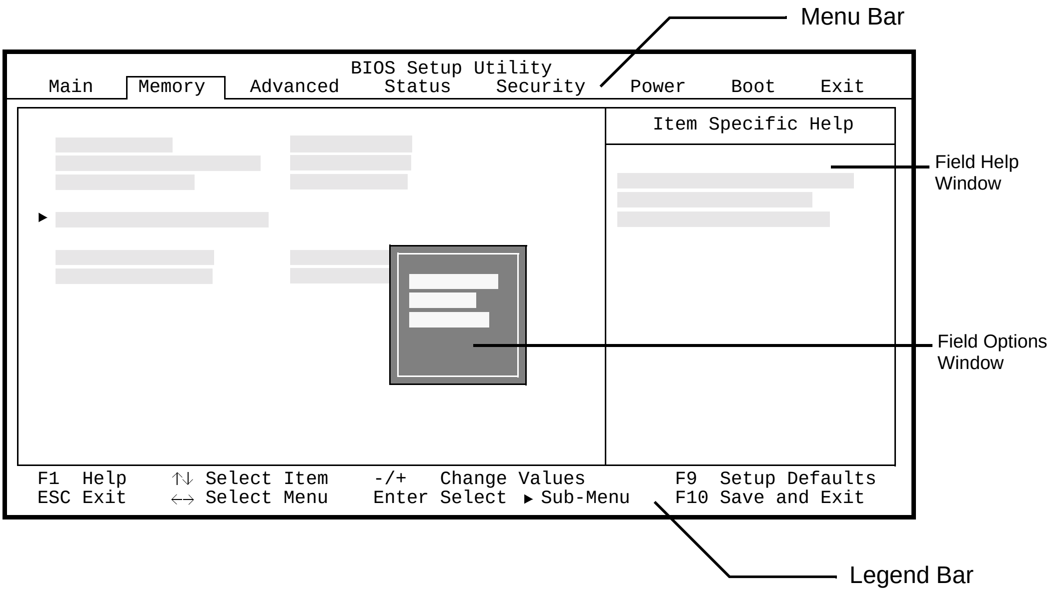


Figure 2-1. The Basic Setup Screen

Menu Bar

The menu bar at the top of the window enables you to select from the principal Setup functions. Use the left/right arrow keys to select among the principal functions; use the up/down arrow keys and the <**Return**> key to accept and enter the associated sub-menus.

The Setup menus are summarized below. For further details on using the Setup utility, consult the *PATX3070 BIOS and Programmer’s Reference Guide*, listed in Appendix A, *Related Documentation*.

Table 2-1. BIOS Setup Menus

Menu	Function
Main	Set time and other basic elements of system configuration.
Memory	View and configure system memory.
Advanced	Set up drives or configure I/O and advanced chipset features.
Status	View fan, temperature, and power status.
Security	Set passwords and access options.
Power	Configure power management options.
Boot	Specify boot options.
Exit	Exit the Setup Utility with or without saving changes.

Legend Bar

The legend bar lists keys and commands that are helpful in navigating the Setup utility and configuring its functions. Refer to *Navigation in Setup* below for details.

Field Help Window

For most fields and submenus, item-specific help is displayed in a field help window on the right side of each screen. The help window contains a brief description of the field or sub-menu, and/or directions for using it.

Field Options Window

Pressing the <**Return**> key after you select a given field or submenu displays the options available for that field.

Navigation in Setup

To select a menu, use the left/right arrow keys.

To select a submenu or field within a menu, use the up and down arrow keys.

To change the value of a field, use the plus and minus keys to cycle through the field's values, or press **<Enter>** to display an options window with all values for that field. With the options window displayed, use the up/down arrows to select a new value. Press **<Enter>** again to set the selected value, or press **<Esc>** to close the options widow and retain the previous setting.

To display a submenu, use the arrow keys to move the cursor to the submenu you want (a pointer ▸ marks all submenus). Then press **<Enter>**.

To exit a submenu and return to the menu above it, press **<Esc>**. Pressing **<Esc>** in a principal menu (such as Main or Security, for example) takes you directly to the Exit menu.

Note Pressing **<Esc>** in a menu or submenu does not cancel any changes you have made in that menu.

The following table lists all keys available for navigation in the Setup utility.

Table 2-2. Keys for Navigation in Setup

Key	Function
<**F1**> or <**Alt-H**>	Open General Help Window.
<**Esc**>	Exit a menu or window.
→ ← arrow keys	Select a different menu.
↑ ↓ arrow keys	Move cursor up and down.
<**Tab**> or <**Shift-Tab**>	Move cursor within a field.

Table 2-2. Keys for Navigation in Setup (Continued)

Key	Function
<**Home**> or <**End**>	Move cursor to top or bottom of window.
<**PgUp**> or <**PgDn**>	Move cursor to next or previous page (in Help).
<**F5**> or <–>	Select the previous value for a field.
<**F6**> or <+> or <**Space**>	Select the next value for a field.
<**F9**>	Load the default configuration values for all menus.
<**F10**>	Save all changes and exit.
<**Enter**>	Execute command, select submenu (▸), or display options window.

Getting Help

Pressing <**F1**> or <**Alt-H**> on any menu brings up the General Help window that describes the legend keys and their alternates.

The scroll bar on the right of any window indicates that there is more than one page of information in the window. Use <**PgUp**> and <**PgDn**> to display all the pages. Pressing <**Home**> and <**End**> displays the first and last page. Pressing <**Enter**> displays each page and then exits the window.

Press <**Esc**> to exit the current window.

In Case of Difficulty

Caution

It is strongly recommended that you only alter settings that you thoroughly understand. Even seemingly small changes may cause the system to become unstable.

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the BIOS supports an override that, after five failed boot attempts, boots using the BIOS defaults. You should then enter Setup, make any needed adjustments, and save the changes.

As indicated in Table 2-2 on page 2-4, pressing <**F1**> or <**Alt-H**> brings up a Help window with information pertaining to specific menus.

In addition, the hardware override described under *CMOS Battery Backup Control (PIIX RTC CMOS CLR J34)* on page 1-12 enables you to restore the BIOS default settings without resorting to repeated boot attempts. Once the defaults are restored, you can restart the Setup utility and make necessary adjustments.

For further details on the Setup menus and the BIOS in general, refer to the *PATX3070 BIOS and Programmer's Reference Guide*, listed in *Appendix A, Related Documentation*.

BIOS Messages and Beep Codes

During POST, the BIOS may display status/error messages. For details on those status/error messages, refer to the *PATX3070 BIOS and Programmer's Reference Guide*, listed in *Appendix A, Related Documentation*.

Features and Specifications 3

Features

The PATX3070 is an ATX form factor motherboard. It supports Microsoft Windows NT and various other Intel x86-based real-time operating systems in an embedded environment.

The board's Architecture incorporates an Intel 440BX chipset which fully supports both Pentium III and Celeron processors. It is available in both reduced-function and full-function configurations, the latter being the more integrated version of the board.

The following table lists the features of the PATX3070 motherboard.

Table 3-1. PATX3070 Motherboard Features Summary

Feature	Description
Processor	– Single Intel PGA370 Pentium III or Celeron processor with auto selection of bus frequency and core voltages – 66/100 MHz front side bus (FSB) frequency
L2 Cache	– 256KB on-die Advanced Transfer Cache (ATC) –128KB ATC for the Celeron Processor
DRAM	– Four 168-pin DIMM sockets, 3.3V, I^2C serial presence detect (SPD) – SDRAM (PC100) at 100 MHz – Unbuffered or registered DIMMs – ECC or non-ECC (no parity)
Intel 440BX AGPset	– 82443BX (memory controller, processor-to-PCI bridge, AGP controller) – 82371EB PIIX4E (PCI-to-ISA bridge, USB support, Ultra DMA/33 EIDE support, system interrupt controller)

Table 3-1. PATX3070 Motherboard Features Summary (Continued)

Peripheral Support	– One IEEE-1284 parallel port – One PS/2 floppy port – One PS/2 keyboard port and one PS/2 mouse port – Two EIDE Ultra DMA/33 hard drive ports – IrDA (infrared) port – Two USB ports – Up to two 10BaseT/100BaseTX Ethernet interfaces (Intel 82559ER) – Dual-channel Wide Ultra SCSI (AIC-7895) with RAID*port* connector (population option) – CompactFlash Type II socket
RTC & CMOS RAM	– DS1287 and MC146818 compatibility via 82371EB PIIX4E device – 242 bytes of battery-backed RAM available for BIOS – EEPROM backup for CMOS RAM
Form Factor	– Standard ATX (9.6 inches by 12 inches)
Interrupt Controllers	– Intel 82371EB PIIX4E (82C59 compatible)
PCI Interface	– 5V 32-bit interface at up to 33 MHz – 5 PCI expansion slots, 3 of which are optional and are expanded across the PCI-to-PCI bridge (DEC21152)
ISA Interface	– 82371EB PCI-to-ISA/IDE Xcelerator (PIIX4E) – Two ISA expansion slots (one shared if extended PCI option used)
Graphics	AGP slot 2x/1x
BIOS	Support for 4/8MB BIOS Flash on ISA bus
Miscellaneous	– Two-level watchdog timer – Two 82C54 timers – Fan and temperature monitoring (LM79) – Voltage and chassis intrusion monitoring (LM79) – Wake-on-LAN capability

Environmental Monitoring and System Management

The National LM79 hardware monitor device on the PATX3070 motherboard operates in tandem with the Intel 82559ER Ethernet controller, the MAX1617 CPU temperature sensor, and the PIIX4E PCI-to-ISA/IDE bridge and interrupt controller to provide a number of useful system management features. These features are summarized below. For details on their implementation, refer to the device data sheets and to the *PATX3070 BIOS and Programmer's Reference Guide*, listed in Appendix A, *Related Documentation*.

LM79 Hardware Monitor

The LM79 device monitors system voltages, temperatures, and fan speeds. Its readings can be sampled by system management software at any time. It has programmable limit registers which can be configured to generate SMIs (system management interrupts) as appropriate for your application. SMI signals from the LM79 are routed to the PIIX4E's EXTSMI input.

The PATX3070 also includes circuitry for the detection of chassis intrusion events. When implemented with appropriate sensory devices in an enclosure, the intrusion detection circuitry is active continually (even while the system is shut down, as long as backup battery or standby power is present). Interrupts generated through chassis intrusion are also fed to the LM79.

CPU Temperature Monitor

The PATX3070 includes a Maxim MAX1617 device to directly monitor the temperature of the processor. An over-temperature condition produces an alarm signal. The MAX1617 allows system management software to read processor temperatures, set temperature sample rates, specify alarm threshold values, and clear the alarm output after processing the interrupt. Alarm signals from the MAX1617 are routed to the LM79 and to the PIIX4E (refer to the device data sheets and to the *PATX3070 BIOS and Programmer's Reference Guide* for programming details).

AC Fail Circuit

The PATX3070 incorporates an AC fail circuit that allows the hardware to detect the operating state of the board at the time of a power failure. When power is restored, the board will remain off if it was off when the power failed, or, if it was on when power failed, it will automatically boot.

Note Some power supplies may defeat this circuit, causing the board to remain off when power is restored even if the board was running at the time of failure.

Specifications

The following table lists the specifications for the PATX3070 motherboard.

Table 3-2. PATX3070 Motherboard Specifications

Characteristics		Specifications
Power Requirements (exclusive of attached daughter boards and/or peripherals)		
One PGA370 socket; supports either a 300+ MHz Celeron processor or a 600+ MHz Pentium III processor.		+5VDC (±5%), 5A typical, 15.8A maximum +3.3VDC (±5%), 4A typical, 12.7A maximum +12VDC (±5%), 0.3A typical, 0.5A maximum –12VDC (±5%), 0.05A typical, 0.1A maximum –5VDC (±5%), 0A typical, 0A maximum
Environmental Parameters		
Temperature	Operating	0° C to 45° C at point of entry of forced air cooling
	Non-operating	–40° C to 85° C
Altitude	Operating	–500 to 5,000 meters (–1640 to 16,405 feet)
	Non-operating	–500 to 15,000 meters (–1640 to 49,215 feet)
Relative humidity	Operating	5% to 95% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Physical Dimensions		

Table 3-2. PATX3070 Motherboard Specifications (Continued)

Characteristics		Specifications
Motherboard	Height	2.5 inches (64 mm) with CPUs only
		3.2 inches (81 mm) with CPUs and expansion modules
	Length/Width	Standard ATX form factor: 9.6 inches wide by 12 inches long (244 mm x 305 mm)
Motherboard I/O Connectors		
Ethernet interface		One or two Intel 82559ER controllers. One or two RJ-45 connectors. 10/100 Mbps interface speed.
Serial port interface (asynchronous)		9-pin D-sub, panel I/O
Parallel port interface		25-pin D-sub, panel I/O
Mouse interface		6-pin mini DIN, panel I/O
Keyboard interface		6-pin mini DIN, panel I/O
USB		Dual independent USB channels for 1.5Mbps and 12Mbps transfer rates allow for easy, hot plugging of USB peripherals
Super I/O device		National PC97317 controller. Two asynchronous serial ports, one parallel port, PS/2 floppy port, PS/2 keyboard/mouse interfaces, and an infrared header.
SCSI interface		Adaptec AIC-7895 (dual-channel Wide Ultra) controller. Transfer rate of up to 40MBps per channel. PCI bus master. HD-68 connector for each channel.

Cooling Requirements

The PATX3070 motherboard is designed and tested to operate reliably in open ambient air with a temperature range from 0° to 45° C (32° to 113° F) with the fan heat sink providing the cooling for the CPU.

A power supply fan and a chassis fan may be required to properly cool any expansion modules (AGP cards, PCI cards, and ISA cards). The PATX3070 provides headers (J10, J15) to power these fans if necessary.

While the exact amount of airflow required for cooling depends on the ambient air temperature, enclosure venting, and the type, number, and location of expansion modules and other heat sources, an average airflow of 40 CFM (cubic feet/minute) should provide adequate cooling for most applications.

Connector Pin Assignments

4

PATX3070 Cable Connectors

This section summarizes the pin assignments for I/O and power cable interconnect signals on the PATX3070 motherboard. For device socket pin assignments, refer to *PATX3070 Socket Connectors* on page 4-14.

Table 4-1. Keyboard/Mouse Panel Connector (J1)

1	KBDAT_FB∗	Keyboard Interface (Bottom)
2		
3	CH_GND	
4	KB5V_FB	
5	KBCLK_FB∗	
6		
7	MSDAT_FB∗	Mouse Interface (Top)
8		
9	CH_GND	
10	KB5V_FB	
11	MSCLK_FB∗	
12		

Table 4-2. Dual USB Panel Connector (J2)

L1	USBV0	USB Port 0 (Bottom)
L2	USBP0–	
L3	USBP0+	
L4	USBG0	

Table 4-2. Dual USB Panel Connector (J2) (Continued)

U1	USBV0	USB Port 1 (Top)
U2	USBP1–	
U3	USBP1+	
U4	USBG1	

Table 4-3. COM2 Auxiliary Board Connector (J3)

1	SP_DCD1	SP_DSR1	2
3	SP_RXD1	SP_RTS1	4
5	SP_TXD1	SP_CTS1	6
7	SP_DTR1	SP_RI1	8
9	GND	Key	10

Table 4-4. Parallel Printer Panel Connector (J3, top)

1	STB*	AFD*	14
2	PD0	ERR*	15
3	PD1	INIT*	16
4	PD2	SLIN*	17
5	PD3	GND	18
6	PD4	GND	19
7	PD5	GND	20
8	PD6	GND	21
9	PD7	GND	22
10	ACK*	GND	23
11	BUSY	GND	24
12	PE	GND	25
13	SLCT		

Table 4-5. Ethernet 1 Panel Connector (J4)

1	TX1+
2	TX1–
3	RX1+
4	TC2RR1
5	TC2RR1
6	RX1–
7	TC2RR
8	TC2RR

Table 4-6. Ethernet 2 Panel Connector (J5)

1	TX2+
2	TX2–
3	RX2+
4	TC2RR2
5	TC2RR2
6	RX2–
7	TC2RR
8	TC2RR

Table 4-7. External Battery Cable Header (J7)

1	GND
2	BAT_G
3	Key
4	VBAT

Table 4-8. POWER IN Connector (J8)

1	+3.3V	+3.3V	11
2	+3.3V	–12V	12
3	GND	GND	13
4	+5V	PS_ON∗	14
5	GND	GND	15
6	+5V	GND	16
7	GND	GND	17
8	POWER_GOOD	–5V	18
9	+5VSTB	+5V	19
10	+12V	+5V	20

Table 4-9. Dual Serial Port Panel Connector (J9)

P1	SP_DCD0	COM1 Serial Port (Bottom)
P2	SP_RXD0	
P3	SP_TXD0	
P4	SP_DTR0	
P5	GND	
P6	SP_DSR0	
P7	SP_RTS0	
P8	SP_CTS0	
P9	SP_RI0	
Q1	SP_DCD1	COM2 Serial Port (Top)
Q2	SP_RXD1	
Q3	SP_TXD1	
Q4	SP_DTR1	
Q5	GND	
Q6	SP_DSR1	
Q7	SP_RTS1	
Q8	SP_CTS1	
Q9	SP_RI1	

Table 4-10. Power Supply Fan Cable Header (J10)

1	GND
2	+12.0V
3	FANTACH2

Table 4-11. Reset Cable Header (J14)

1	RSTBTN∗
2	GND

Table 4-12. Chassis Fan Cable Header (J15)

1	GND
2	+12.0V
3	FANTACH1

Table 4-13. Secondary IDE Connector (J16)

1	IDERSTS∗	GND	2
3	DDS7R	DDS8R	4
5	DDS6R	DDS9R	6
7	DDS5R	DDS10R	8
9	DDS4R	DDS11R	10
11	DDS3R	DDS12R	12
13	DDS2R	DDS13R	14
15	DDS1R	DDS14R	16
17	DDS0R	DDS15R	18
19	GND	Key	20
21	IDEDRQ1R	GND	22
23	IDEIOW1∗R	GND	24
25	IDEIOR1∗R	GND	26
27	IDEIORDY1R	IDESELB	28
29	IDEDACK1∗R	GND	30
31	IDEIRQ1R		32

Table 4-13. Secondary IDE Connector (J16) (Continued)

33	SDA1R	SPDIAG∗	34
35	SDA0R	SDA2R	36
37	IDECS11∗R	IDECS13∗R	38
39	HDACTB*	GND	40

Table 4-14. Primary IDE Connector (J17)

1	IDERSTP∗R	GND	2
3	PDD7R	PDD8R	4
5	PDD6R	PDD9R	6
7	PDD5R	PDD10R	8
9	PDD4R	PDD11R	10
11	PDD3R	PDD12R	12
13	PDD2R	PDD13R	14
15	PDD1R	PDD14R	16
17	PDD0R	PDD15R	18
19	GND	Key	20
21	IDEDRQ0R	GND	22
23	IDEIOW0∗R	GND	24
25	IDEIOR0∗R	GND	26
27	IDEIORDY0R	IDESELA	28
29	IDEDACK0∗R	GND	30
31	IDEIRQ0R		32
33	PDA1R		34
35	PDA0R	PDA2R	36
37	IDECS01∗R	IDECS03∗R	38
39	HDACTA∗	GND	40

Table 4-15. CPU Fan Cable Header (J18)

1	GND
2	+12.0V
3	FANTACH3

Table 4-16. Ethernet LED Cable Header (J20, J24))

1	100Mbit LED (+) 10Mbit LED (–)	100Mbit LED (–) 10Mbit LED (+)	2
3	Activity LED (–)	Activity LED (+)	4

Table 4-17. SCSI Channel A/B Connectors (J19, J21)

1	GND	GND	2
3	GND	GND	4
5	GND	GND	6
7	GND	GND	8
9	GND	GND	10
11	GND	GND	12
13	GND	GND	14
15	GND	GND	16
17	+5.0V TERMPWR	+5.0V TERMPWR	18
19	No Connection	GND	20
21	GND	GND	22
23	GND	GND	24
25	GND	GND	26
27	GND	GND	28
29	GND	GND	30

Table 4-17. SCSI Channel A/B Connectors (J19, J21) (Continued)

31	GND	GND	32
33	GND	GND	34
35	SCDB∗(12)	SCDB∗(13)	36
37	SCDB∗(14)	SCDB∗(15)	38
39	SCDPH∗	SCDB∗(0)	40
41	SCDB∗(1)	SCDB∗(2)	42
43	SCDB∗(3)	SCDB∗(4)	44
45	SCDB∗(5)	SCDB∗(6)	46
47	SCDB∗(7)	SCDPL∗	48
49	GND	GND	50
51	+5.0V TERMPWR	+5.0V TERMPWR	52
53	No Connection	GND	54
55	SATN∗	GND	56
57	SBSY∗	SACK∗	58
59	SRST∗	SMSG∗	60
61	SSEL∗	SCD∗	62
63	SREQ∗	SIO∗	64
65	SCDB∗(8)	SCDB∗(9)	66
67	SCDB∗(10)	SCDB∗(11)	68

Table 4-18. Floppy Disk Drive Connector Header (J23)

1	GND	FLPREDWC∗	2
3	GND		4
5	KEY	FLPDRATE0	6
7	GND	FLPINDEX∗	8
9	GND	FLPMOTEA∗	10
11	GND	FLPDRVSB∗	12
13	GND	FLPDRVSA∗	14
15	GND	FLPMOTEB∗	16

Table 4-18. Floppy Disk Drive Connector Header (J23) (Continued)

17	GND	FLPDIR*	18
19	GND	FLPSTEP*	20
21	GND	FLPWDATA*	22
23	GND	FLPWGATE*	24
25	GND	FLPTRK0*	26
27	GND	FLPWPT*	28
29	GND	FLPRDATA*	30
31	GND	FLPSIDE1*	32
33	GND	FLPDSKCHG*	34

Table 4-19. USB 1 Cable Header (J26)

1	USBV1–I
2	USBP1–I
3	USBV1+I
4	USBG1I

Table 4-20. RAID*port* Connector Header (J30)

	Row A	**Row B**	
1	No Connection	No Connection	1
2	No Connection	No Connection	2
3	No Connection	GND	3
4	No Connection		4
5	EXTARBACK*	EXTARBREQ*	5
6	No Connection	No Connection	6
7	No Connection	No Connection	7
8	No Connection	No Connection	8
9	IDDAT	SCSILED*	9
10	No Connection	No Connection	10

Table 4-20. RAID*port* Connector Header (J30) (Continued)

11	No Connection	No Connection	11
12	SCSI_RST*	No Connection	12
13	US_ROMCS*	RAID40MHZ	13
14	US_RAMCS*	GND	14
15	GND	US_MRW	15
16	US_MDP	US_MD(0)	16
17	US_MD(1)	US_MD(2)	17
18	US_RAMPS*	US_MD(4)	18
19	US_MD(3)	GND	19
20	US_MD(5)	US_MD(6)	20
21	US_MA(13)	US_MA(14)	21
22	US_MD(7)	US_MA(12)	22
23	US_MA(11)	US_MA(10)	23
24	US_MA(9)	US_MA(8)	24
25	US_MA(7)	ARO_PRSNT*	25
26	GND	US_MA(6)	26
27	US_MA(5)	US_MA(4)	27
28	US_MA(3)	GND	28
29	US_SEECS	US_MA(2)	29
30	US_MA(1)	US_MA(0)	30

Table 4-21. LED/Power Switch/Keylock/Speaker Header (J32)

1	GND
2	SUSPLED
3	PLED
4	No Connection
5	
6	No Connection
7	

Table 4-21. LED/Power Switch/Keylock/Speaker Header (J32) (Continued)

8	PWRON∗R
9	GND
10	No Connection
11	
12	HDLED
13	
14	HARDDRV
15	HDLED
16	
17	GND
18	
19	PLED
20	
21	KBLOCK∗
22	GND
23	No Connection
24	SPK_P
25	No Connection
26	SPK_N

Table 4-22. Infrared Interface Cable Header (J35)

1	+5V	IRSL1	2
3	IRSL0	GND	4
5	IRRXD	IRSL2	6
7	GND	ID3	8
9	IRTXD	GND	10

Table 4-23. Chassis Intrusion Detection Cable Header (J37)

1	
2	CHASINTV
3	CHAS_INT

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Table 4-24. CompactFlash Connector (J13)

1	GND	DDS3R	2
3	DDS4R	DDS5R	4
5	DDS6R	DDS7R	6
7	IDECS1∗R	GND	8
9	GND	GND	10
11	GND	GND	12
13	+5.0V	GND	14
15	GND	GND	16
17	GND	SDA2R	18
19	SDA1R	SDA0R	20
21	DDS0R	DDS1R	22
23	DDS2R	CF_IOCS16∗	24
25	CD2∗	CD1∗	26
27	DDS11R	DDS12R	28
29	DDS13R	DDS14R	30
31	DDS15R	IDECS3∗R	32
33	CF_VS1∗	IDEIOR1∗R	34
35	IDEIOW1∗R	CF_WE∗	36
37	IDEIRQ1R	+5.0V	38
39	CF_CSEL∗	CF_VS2∗	40
41	IDERSTS∗R	IDEIORDY1R	42
43	CF_INPACK∗	CF_REG∗	44
45	DASP∗	SPDIAG∗	46
47	DDS8R	DDS9R	48
49	DDS10R	GND	50

Table 4-25. AGP Connector (J22)

	Row A				Row B		
1	+12V	Reserved	2	1	AGPOC*	+5V	2
3	Reserved	USBAGP–	4	3	+5V	USBAGP+	4
5	GROUND	PIRQ3*A	6	5	GROUND	PIRQ3*B	6
7	PCIRST*	GGNT*	8	7	GCLKO	GREQ*	8
9	+3.3V	GST1	10	9	+3.3V	GST0	10
11	Reserved	GPIPE*	12	11	GST2	GRBF*	12
13	GROUND	Reserved	14	13	GROUND	Reserved	14
15	GSBA1	+3.3V	16	15	GSBA0	+3.3V	16
17	GSBA3	Reserved	18	17	GSBA2	GSB_STB	18
19	GROUND	GSBA5	20	19	GROUND	GSBA4	20
21	GSBA7		22	21	GSBA6		22
23			24	23			24
25		GAD30	26	25		GAD31	26
27	GAD28	+3.3V	28	27	GAD29	+3.3V	28
29	GAD26	GAD24	30	29	GAD27	GAD25	30
31	GROUND	Reserved	32	31	GROUND	GAD_STB1	32
33	GCBE3*	+3.3V	34	33	GAD23	+3.3V	34
35	GAD22	GAD20	36	35	GAD21	GAD19	36
37	GROUND	GAD18	38	37	GROUND	GAD17	38
39	GAD16	+3.3V	40	39	GCBE*2	+3.3V	40
41	GFRAME*	Reserved	42	41	GIRDY*	Reserved	42
43	GROUND	Reserved	44	43	GROUND	Reserved	44
45	+3.3V	GTRDY*	46	45	+3.3V	GDEVSEL*	46
47	GSTOP*	AGP_PME*	48	47	+3.3V	GPERR*	48
49	GROUND	GPAR	50	49	GROUND	GSERR*	50
51	GAD15	+3.3V	52	51	GCBE1#	+3.3V	52
53	GAD13	GAD11	54	53	GAD14	GAD12	54

Table 4-25. AGP Connector (J22) (Continued)

55	GROUND	GAD09	56	55	GROUND	GAD10	56
57	GCBE0#	+3.3V	58	57	GAD08	+3.3V	58
59	Reserved	GAD06	60	59	GAD_STB0	GAD07	60
61	GROUND	GAD04	62	61	GROUND	GAD05	62
63	GAD02	+3.3V	64	63	GAD03	+3.3V	64
65	GAD00	Reserved	66	65	GAD01	Reserved	66

Table 4-26. PCI Connectors (J28/29/31/36/38)

	Row A				Row B		
1	PCI_TRST∗	+12V	2	1	–12V	PCI_TCK	2
3	PCI_TMS	PCI_TDI	4	3	GROUND	RESERVED	4
5	+5V	INTA*	6	5	+5V	+5V	6
7	INTC*	+5V	8	7	INTB*	INTD*	8
9	RESERVED	+5V	10	9	PCI0	RESERVED	10
11	RESERVED	GROUND	12	11	PCI1	GROUND	12
13	GROUND	RESERVED	14	13	GROUND	RESERVED	14
15	PCIRESET*	+5V	16	15	GROUND	PCLK	16
17	PGNT*	GROUND	18	17	GROUND	PREQ*	18
19	PME*	AD30	20	19	+5V	AD31	20
21	+3.3V	AD28	22	21	AD29	GROUND	22
23	AD26	GROUND	24	23	AD27	AD25	24
25	AD24	IDSEL	26	25	+3.3V	CBE∗3	26
27	+3.3V	AD22	28	27	AD23	GROUND	28
29	AD20	GROUND	30	29	AD21	AD19	30
31	AD18	AD16	32	31	+3.3V	AD17	32
33	+3.3V	FRAME∗	34	33	CBE∗2	GROUND	34
35	GROUND	TRDY#	36	35	IRDY#	+3.3V	36
37	GROUND	STOP∗	38	37	DEVSEL∗	GROUND	38
39	+3.3V	SDONE	40	39	PLOCK∗	PERR∗	40

Table 4-26. PCI Connectors (J28/29/31/36/38) (Continued)

41	SBO*	GROUND	42	41	+3.3V	SERR#	42
43	PAR	AD15	44	43	+3.3V	CBE*1	44
45	+3.3V	AD13	46	45	AD14	GROUND	46
47	AD11	GROUND	48	47	AD12	AD10	48
49	AD09		50	49	GROUND		50
51		CBE0#	52	51		AD08	52
53	+3.3V	AD06	54	53	AD07	+3.3V	54
55	AD04	GROUND	56	55	AD05	AD03	56
57	AD02	AD00	58	57	GROUND	AD01	58
59	+5V	REQ64S0*	60	59	+5V	ACK64S0*	60
61	+5V	+5V	62	61	+5V	+5V	62

Table 4-27. ISA Connectors (J39/41)

	Row A	Row B	Row C	Row D	
1	IOCHK*	GROUND	SBHE*	MEMCS16*	1
2	SD7	RSTIS	LA23	IOCS16*	2
3	SD6	+5V	LA22	IRQ10	3
4	SD5	IRQ9	LA21	IRQ11	4
5	SD4	–5V	LA20	IRQ12	5
6	SD3	DRQ2	LA19	IRQ15	6
7	SD2	–12V	LA18	IRQ14	7
8	SD1	ZWS*	LA17	DACK0*	8
9	SD0	+12V	MEMR*	DRQ0	9
10	IOCHRDY	GROUND	MEMW*	DACK5*	10
11	AEN	SMEMW*	SD8	DRQ5	11
12	SA19	SMEMR*	SD9	DACK6*	12
13	SA18	IOW*	SD10	DRQ6	13
14	SA17	IOR*	SD11	DACK7*	14
15	SA16	DACK3*	SD12	DRQ7	15

Table 4-27. ISA Connectors (J39/41) (Continued)

16	SA15	DRQ3	SD13	+5V	16
17	SA14	DACK1∗	SD14	MASTER∗	17
18	SA13	DRQ1	SD15	GROUND	18
19	SA12	REFRESH∗			
20	SA11	SYSCLK			
21	SA10	IRQ7			
22	SA9	IRQ6			
23	SA8	IRQ5			
24	SA7	IRQ4			
25	SA6	IRQ3			
26	SA5	DACK2∗			
27	SA4	TC			
28	SA3	BALE			
29	SA2	5V			
30	SA1	OSC			
31	SA0	GROUND			

Table 4-28. DIMM Module Sockets (U12-U15)

Pin/Signal							
1	Vss	22	CB1	43	Vss	64	Vss
2	DQ0	23	Vss	44	DU12	65	DQ21
3	DQ1	24	No Connection	45	CS2∗	66	DQ22
4	DQ2	25	No Connection	46	DQM2	67	DQ23
5	DQ3	26	Vcc	47	DQM3	68	Vss
6	Vcc	27	WE∗	48	No Connection	69	DQ24
7	DQ4	28	DQM0	49	Vcc	70	DQ25
8	DQ5	29	DQM1	50	No Connection	71	DQ26
9	DQ6	30	CS0∗	51	No Connection	72	DQ27
10	DQ7	31	DU11	52	CB2	73	Vcc

Table 4-28. DIMM Module Sockets (U12-U15) (Continued)

11	DQ8	32	Vss	53	CB3	74	DQ28
12	Vss	33	A0	54	Vss	75	DQ29
13	DQ9	34	A2	55	DQ16	76	DQ30
14	DQ10	35	A4	56	DQ17	77	DQ31
15	DQ11	36	A6	57	DQ18	78	Vss
16	DQ12	37	A8	58	DQ19	79	CLK2
17	DQ13	38	A10	59	Vcc	80	No Connection
18	Vcc	39	A12	60	DQ20	81	WP
19	DQ14	40	Vcc	61	No Connection	82	SDA
20	DQ15	41	Vcc	62	No Connection	83	SCL
21	CB0	42	CLK0	63	CKE1	84	Vcc
85	Vss	106	CB5	127	Vss	148	Vss
86	DQ32	107	Vss	128	CKE0	149	DQ53
87	DQ33	108	No Connection	129	CS3*	150	DQ54
88	DQ34	109	No Connection	130	DQM6	151	DQ55
89	DQ35	110	Vcc	131	DQM7	152	Vss
90	Vcc	111	CAS*	132	VSS	153	DQ56
91	DQ36	112	DQM4	133	Vcc	154	DQ57
92	DQ37	113	DQM5	134	No Connection	155	DQ58
93	DQ38	114	CS1*	135	No Connection	156	DQ59
94	DQ39	115	RAS*	136	CB6	157	Vcc
95	DQ40	116	Vss	137	CB7	158	DQ60
96	Vss	117	A1	138	Vss	159	DQ61
97	DQ41	118	A3	139	DQ48	160	DQ62
98	DQ42	119	A5	140	DQ49	161	DQ63
99	DQ43	120	A7	141	DQ50	162	Vss
100	DQ44	121	A9	142	DQ51	163	CLK3
101	DQ45	122	A11	143	Vcc	164	No Connection

Table 4-28. DIMM Module Sockets (U12-U15) (Continued)

102	Vcc	123	A13	144	DQ52	165	SA0
103	DQ46	124	Vcc	145	No Connection	166	SA1
104	DQ47	125	CLK1	146	No Connection	167	SA2
105	CB4	126	DU1	147	DOREGE	168	Vcc

Related Documentation

A

Motorola Computer Group Documents

The Motorola publications listed below are referenced in this manual. You can obtain paper or electronic copies of Motorola Computer Group publications by:

- ❑ Contacting your local Motorola sales office
- ❑ Visiting Motorola Computer Group's World Wide Web literature site, http://www.motorola.com/computer/literature

Table 4-1. Motorola Computer Group Documents

Document Title	Motorola Publication Number
PATX3070 BIOS and Programmer's Reference Guide	P3070BOSA/RM

To obtain the most up-to-date product information in PDF or HTML format, visit http://www.motorola.com/computer/literature.

Manufacturers' Documents

For additional information, refer to the following table for manufacturers' data sheets or user's manuals. As an additional help, a source for the listed document is provided. Please note that, while these sources have been verified, the information is subject to change without notice.

Please note that in many cases, the information is preliminary and the revision levels of the documents are subject to change without notice.

Table A-2. Manufacturers' Documents

Document Title and Source	**Publication Number**
Pentium III Processor for the PGA370 socket at 500 MHz to 1.0B GHz—Data Sheet; Intel Corporation; http://developer.intel.com/design/pentiumiii/datashts/245264.htm	24526406.pdf
Celeron Processor Data Sheet; Intel Corporation http://developer.intel.com/design/celeron/datashts/243658.htm	24365816.pdf
Intel 440BX AGPset: 82443BX Host Bridge/Controller — Data Sheet Intel Corporation; http://developer.intel.com/design/chipsets/datashts/290633.htm	29063301.pdf
Intel 82371AB PCI-to-ISA/IDE Xcelerator (PIIX4) — Specification and Update Intel Corporation; http://developer.intel.com/design/chipsets/datashts/290562.htm	29056201.pdf
Intel 82559ER Fast Ethernet PCI Bus Controller with Integrated PHY — External Design Specification; Intel Corporation; http://developer.intel.com/design/network/datashts/738259.htm	73825902.pdf
82C54 CMOS Programmable Interval Timer Data Sheet Intersil Corporation; http://www.intersil.com/search	FN2970.pdf
AIC-7895 PCI Bus Master Single-Chip SCSI Host Adapter — Data Book Adaptec, Inc.; http://www.adaptec.com/pdfs/aic7895.pdf	aic7895.pdf
DEC 21152 PCI-to-PCI Bridge — Data Sheet; Intel Corporation; http://developer.intel.com/design/bridge/datashts	27822701.pdf
LM79 Microprocessor System Hardware Monitor; National Semiconductor Corporation; http://www.national.com/pf/LM/LM79.html	LM79.html
MAX1617 Remote/Local Temperature Sensor with SMBus Serial Interface; Maxim Corporation; http://pdfserv.maxim-ic.com/arpdf/1855.pdf	1855.pdf
MAX705 Supervisory Circuit — Data Sheet Maxim Corporation; http://pdfserv.maxim-ic.com/arpdf/1151.pdf	1151.pdf

Table A-2. Manufacturers’ Documents (Continued)

Document Title and Source	**Publication Number**
PC87307VUL ISA Super I/O™ Device — Data Manual (documentation applies to **PC97317** as well); National Semiconductor Corporation; http://www.national.com/pf/PC/PC87307.html	PC87307.html
PCA8550 4-Bit 1-of-2 I^{2}C Multiplexer; Philips Semiconductor; http://www.semiconductors.com/acrobat/datasheets/PCA8550_3.pdf	PCA8550_2.pdf
SanDisk CompactFlash cartridge; SanDisk Corporation; http://www.sandisk.com/cons/prod_lit.htm	CompactFlash Product Data
Smart 5 Boot Block Flash Memory Family 2, 4, 8 Mbit — Specification Intel Corporation; http://developer.intel.com/design/flcomp/PRODBREF/297810.htm	297810.htm

Related Specifications

For additional information, refer to the following table for related specifications. As an additional help, a source for the listed document is provided. Please note that, while these sources have been verified, the information is subject to change without notice.

Table A-3. Related Specifications

Document Title and Source	**Publication Number**
ATX Specification Version 2.03; Intel Corporation http://www.teleport.com/~ffsupprt/spec/atx/atx2_03p1/pdf	atx2_03p1.pdf
Bidirectional Parallel Port Interface Specification Institute of Electrical and Electronics Engineers, Inc. http://standards.ieee.org/catalog/	IEEE Standard 1284
Peripheral Component Interconnect (PCI) Local Bus Specification, Revision 2.0 PCI Special Interest Group; http://www.pcisig.com/	PCI Local Bus Specification
Information Technology - Local and Metropolitan Networks - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Global Engineering Documents; http://global.ihs.com/index.cfm (for publications) *(This document can also be obtained through the national standards body of member countries.)*	ISO/IEC 8802-3
Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange; Electronic Industries Alliance; http://global.ihs.com/index.cfm (for publications)	TIA/EIA-232 Standard

Table A-3. Related Specifications (Continued)

Document Title and Source	**Publication Number**
Open HCI; Open Host Controller Interface Spec for USB Compaq Corporation, Microsoft Corporation, National Semiconductor http://www3.compaq.com/support http://www.national.com/ http://www.microsoft.com/	Open HCI Release 1.0 12/15/95
Accelerated Graphics Port Interface Specification, Revision 1.0 Intel Corporation http://www.intel.com/technology/agp/agp_index.htm	agp10.pdf
Universal Host Controller Interface (UHCI) Design Guide Intel Corporation; http://www.intel.com/design/litcentr/	297650-002
Universal Serial Bus (USB) Intel Corporation; http://www.intel.com/design/litcentr/	297773-001

URLs

The following URLs (uniform resource locators) may provide helpful sources of additional information about this product, related services, and development tools. Please note that, while these URLs have been verified, they are subject to change without notice.

- ❏ Motorola Computer Group, http://www.motorola.com/computer
- ❏ Motorola Computer Group OEM Services, http://www.motorola.com/computer/support

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