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AT5+

Pentium PC Processor

P/N 103626C

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Chapter 1 – Introduction

Product Overview

The AT5+is based on a Pentium PC Processor. This highly integrated, eight-layer board supports up to 64 Mbytes of fast page mode interleave DRAM, 256K external cache in a COAST site, and provides an integrated floppy disk drive controller that supports up to two floppy disk drives. It also offers a high-performance, cost-effective integrated drive electronics (IDE) hard disk interface, two serial ports, one parallel port, and a Super VGA controller with flat panel support.

Features of the AT5+ CPU Board

- CPU
  - Pentium Processor
  - Field upgradeable
  - COAST cache modules supported (up to 256K)
  - Two standard 72-pin SIMM sites support up to 64 Mbytes of DRAM
  - Real-time clock with on-board battery backup
  - Keyboard port
  - 8.33 MHZ ATbus speed

- On-Board PCI Video Controller
  - PCI bus super VGA graphics controller
  - VGA analog output
  - Flat panel driver circuitry
  - Supports 8-bit monochrome, 16-bit passive colors (STN) and active color (TFT)
  - Maximum resolution - 1024 x 768 with 256 colors

- I/O Controller
  - PCI to ISA bus interface
  - PCI enhanced IDE hard disk controller (supports two drives)
  - Floppy disk (supports two drives)

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- Two 16550-compatible RS-232 serial ports
- One Centronics-compatible parallel port

CPU

Features of the Pentium are highlighted below:

- Full 64-bit internal architecture
  - 8, 16, and 64-bit data types
  - Eight general purpose 32-bit registers
- Object code compatible with 8086, 80186, 80286, 80386, and 80486 processors
- Runs MS-DOS, OS/2, UNIX, Windows NT, and Windows 95
- High-performance 64-bit data bus with 66 MHz clock
- Internal-bus speeds from 100 MHz to 233 MHz
- Integrated Memory Management Unit (MMU)
  - Virtual memory support
  - Optional on-chip paging
  - Four levels of hardware-enforced protection
- Virtual 8086 mode allows executing 8086 Software in a protected and paged system
  - Large uniform address space
  - 16 Mbyte physical
  - 64 Terabyte virtual
  - 4 Gigabyte maximum segment size
- On-chip debugging support including breakpoint registers
- On-chip 8 Kbyte instruction
- On-chip 8 Kbyte write back data cache
- Super scalar architecture
  - Two pipeline integer units
  - Capable under one clock cycle per instruction
  - Pipelined floating - point unit

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AT Chipset

The Triton 82430 FX chipset—located at sites U14, U37, U33, and U34—provides the following features:

- Pentium control logic and clocks support CPU speeds up to 66 MHZ with zero (or one) wait states
- PCI bus speeds up to 33 MHz (½ CPU external/speed)
- 146818-compatible real-time clock with 114 bytes of CMOS RAM
- Two 8237-compatible DMA controllers
- Two 8259-compatible interrupt controllers
- 8254-compatible programmable interval timer
- 82284-compatible clock generation and READY interface
- 82288-compatible bus controller
- DRAM controller that supports DRAM SIMM modules (1 Mbyte x 32, 2 Mbyte x 32, 4 Mbyte x 32 and 8 Mbyte x 32)
- EDO supported
- Built-in PCI IDE controller
- DRAM refresh controller
- Four EMS page register (LIM EMS 4.0 and 3.2 compatible)
- Interface logic for an 8042 keyboard controller
- Interface logic for secondary cache
- Fast CPU Reset logic

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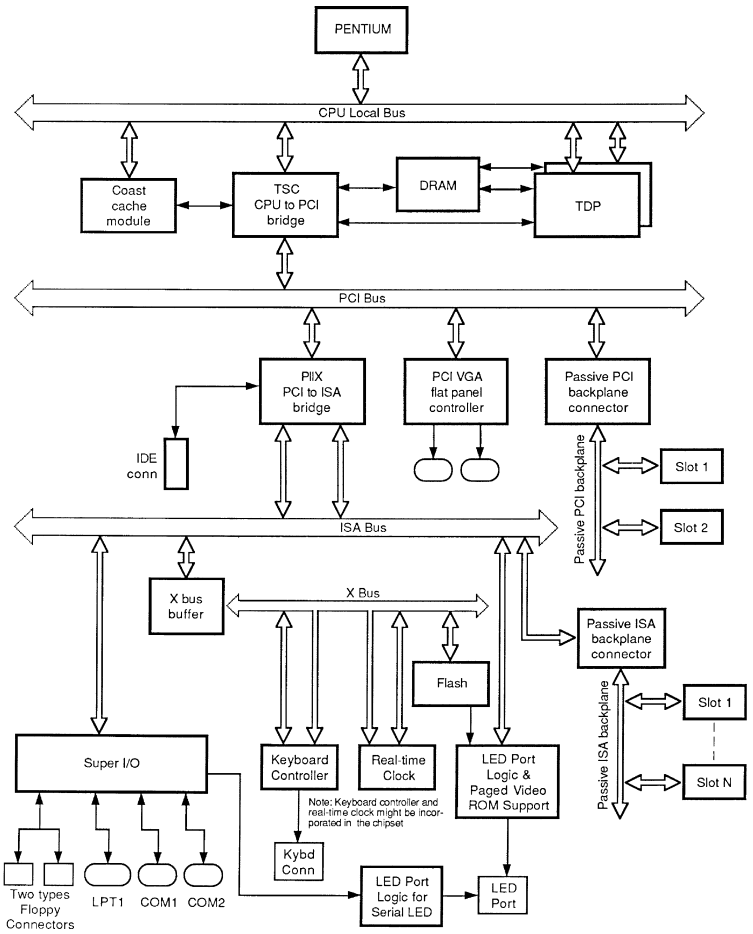


Figure 1-1. AT5+ Pentium PC Processor Block Diagram

VGA Controller

The on-board PCI SVGA controller (Chips and Technologies, Model #65548) supports all IBM VGA, EGA, CGA, and MDA modes to the register level. The VGA adapter contains 1 Mbyte DRAM and supports Super VGA up to 1024 x 768 by 256 colors. The VGA BIOS defaults to shadowed mode, which increases video performance.

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The VGA controller supports IBM modes 0-13h. In addition to these standard IBM modes, the following Super VGA resolutions are supported:

- 132 x 25 text
- 132 x 50 text
- 800 x 600 x 16 colors
- 800 x 600 x 16 colors
- 1024 x 768 x 256 colors
- 640 x 400 x 256 colors
- 640 x 480 x 64K colors
- 640 x 480 x 16M colors
- 640 x 480 x 256 colors
- 800 x 600 x 256 colors
- 800 x 600 x 32K colors

A jumper is provided to disable the SVGA controller (refer to Chapter 2). This allows other video adapters to be used.

Multifunction I/O Controller

The I/O controller provides the system's serial, parallel and floppy ports.

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Chapter 2 – Board Configuration

Board Layout

This chapter provides the information necessary to configure the AT5+. The following figure illustrates the layout of the board.

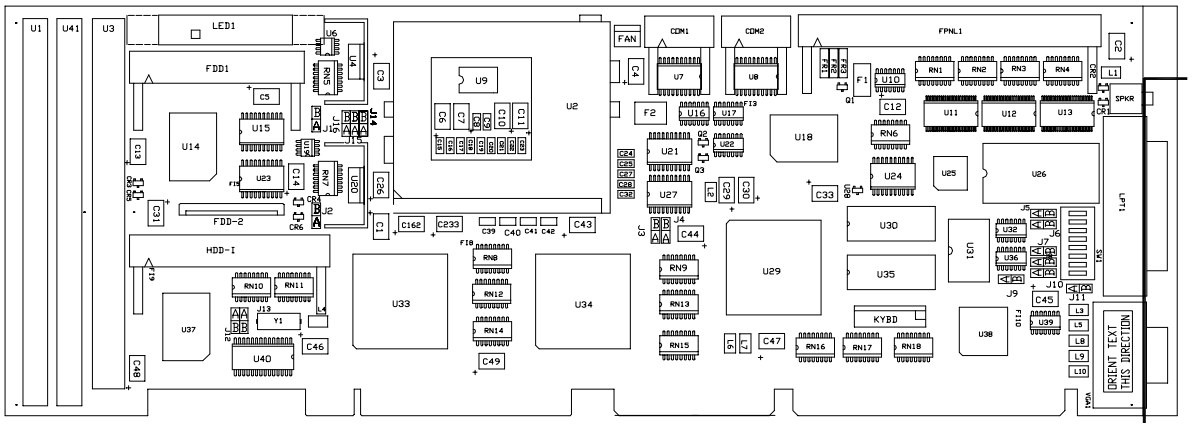


Figure 2- 1. AT5+ Board Layout

The following shows where the jumpers, connectors, and switches are located on the AT5+.

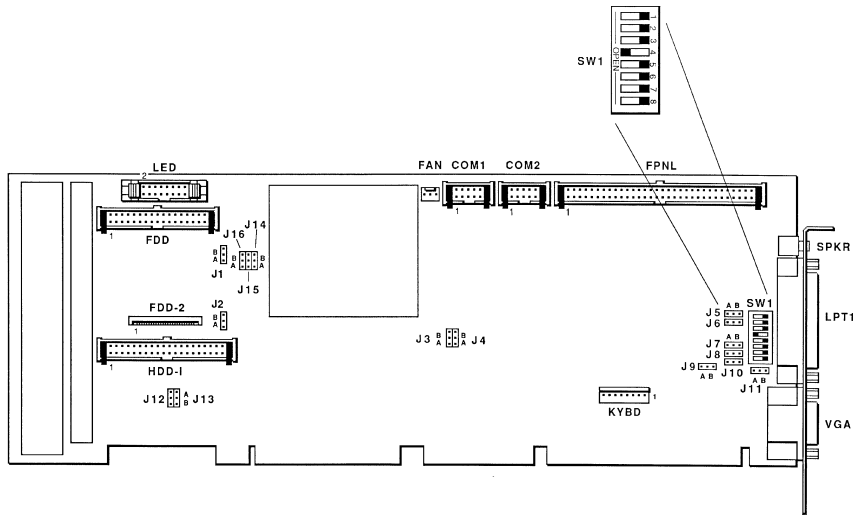


Figure 2- 2. AT5+ Jumpers, Connectors, and Switches

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Jumpers

The table below lists AT5+ jumpers, their default positions, and their functions (refer to Figure 2-2).

AT5+ Jumpers

Jumper	Position	Function
J1	B A	Pentium CPU Pentium MMX CPU
J2, J3, J4	CPU speed J2 J3 J4 100/233 MHz A A A 133 MHz A A B 166 MHz B A B 200 MHz B A A	 Core bus speed/external bus speed 7/2 or 3/2 - sets internal bus speed Core bus speed/external bus speed 2x - sets internal bus speed Core bus speed/external bus speed 5/2 - sets internal bus speed Core bus speed/external bus speed 3x - sets internal bus speed
J5	A✓ B	M is the display enable signal LP is the display enable signal
J6	A✓ B	VGA enabled VGA disabled
J7	A✓ B	Intel Flash installed AMD Flash installed
J8	A✓ B	Boot Flash enabled AT boot enabled
J9	A✓ B	Parallel port set for IRQ7 (LPT 1) Parallel port set for IRQ5 (LPT 2)
J10	A✓ B	ISP disable ISP enable
J11	A✓ B	Orb ground not connected to logic ground Orb ground connected to logic ground
J12, J13	J12 J13 A B✓ B A A A	 66 MHz frequency - external CPU bus frequency 60 MHz frequency - external CPU bus frequency 50 MHz frequency - external CPU bus frequency
J14, J15, J16	J14 J15 J16 A A A B B B	 Pentium CPU Pentium MMX CPU

✓indicates the default settings

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Disabling Functional Blocks

The SVGA controller can be disabled by moving jumper J6 to the B position. The IDE and floppy drives and the parallel and COM ports can be disabled through the BIOS Setup Menus (refer to Chapter 3).

Battery-backed RAM and Real-time Clock

The AT5+ uses a self-contained, battery-backed real-time clock. The real-time clock is specified for 10 years of operation in the absence of power at 70°C. Switch SW1-1 is used to clear CMOS memory.

Switch Settings

The following table lists the available switch options and their default settings for the AT5+.

Switch Settings

Switch	Position	Function
SW1-1	Open Closed✓	Clear CMOS memory CMOS memory okay
SW1-2	Open Closed✓	Unused Unused
SW1-3	Open Closed✓	Monochrome display Color display
SW1-4	Open✓ Closed	Keyboard unlocked Keyboard locked
SW1-5	Open Closed✓	reserved
SW1-6*	Open Closed✓	FPSEL2=1 FPSEL2=0
SW1-7*	Open Closed✓	FPSEL1=1 FPSEL1=0
SW1-8*	Open Closed✓	FPSEL0=1 FPSEL0=0

✓indicates the default settings
Closed means signal is low
*See Flat Panel Table on the following page

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The following table lists the flat panels supported by the AT5+ and their associated switch settings, and switch settings reserved for future flat panel types.

Flat Panels Supported

SW1-6 (FPSEL 2)	SW1-7 (FPSEL 1)	SW1-8 (FPSEL 0)	Flat Panel Type
Closed	Closed	Closed	CRT
Closed	Closed	Open	Monochrome
Closed	Open	Closed	Color STN (passive)
Closed	Open	Open	Color TFT (active)
Open	Closed	Closed	Reserved
Open	Closed	Open	Reserved
Open	Open	Closed	Reserved
Open	Open	Open	Reserved

CPU Configurations

The AT5+ is field upgradable up to a 233 MHZ Pentium with MMX. Please contact Xycom Application Engineering (at 1-800-289-9266) for assistance when changing the AT5+ CPU.

Memory Map

AT5+ Memory Map

Pentium Address Range (HEX)	Size	Device
FFFE0000-FFFFFFFF	128K	System BIOS
end of DRAM-FFFDFFFF	xxxK	I/O Memory
00100000-end of DRAM	xxxK	DRAM
000F0000-000FFFFF	64K	System BIOS
000E0000-000EFFFF	64K	System BIOS
000C8000-000DFFFF	96K	AT bus I/O (Note 4)
000C0000-000C7FFF	32K	VGA BIOS
000A0000-000BFFFF	128K	VGA DRAM Memory
00000000-0009FFF	640K	DRAM

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I/O Map

The AT5+ I/O map contains all IBM PC/AT architecture I/O ports, with some additions. The AT5+ is shipped with serial ports 1 and 2 and parallel port 1 enabled at the address specified. Standard PC/AT I/O addresses are shown on the following page. Status/LED port bits, and CMOS RAM addresses are listed in the tables that follow.

I/O Address Map

Hex Range	Device
000-01F	DMA Controller 1, 8237A-5 equivalent
020-021	Interrupt Controller 1, 8259 equivalent
022-023	Available
025-02F	Interrupt Controller 1, 8259 equivalent
040-05F	Timer, 8254-2 equivalent
060-06F	8742 equivalent (keyboard)
070-07F	Real-time clock, bit 7 NMI mask
080-091	DMA page register
93-9F	DMA page register
0A0-0BF	Interrupt controller 2,8259 equivalent
0C0-0DF	DMA controller 2,8237A-5 equivalent
0F0	N/A
0F1	N/A
0F2-OFF	N/A
100	Available
102	C&T Global enable register
103-1EF	Available
1F0-1F7	IDE controller (AT drive)
231	Xycom LED Port
233	Xycom Flash control register
234	Temperature sensor
278-27F	Parallel Port 2
280-2F7	Available
2F8-2FF	Serial Port 2
300-36F	Available
370-377	Alternate floppy disk controller
378-37F	Parallel Port 1
380-3BF	Available
3C0-3CF	VGA/EGA2
3D0-3EF	Available
3F0-3F7	Primary floppy disk controller
3F8-3FF	Serial Port 1
CF8	PCI configuration address register
CF9	Reset Control Register
CFC	PCI configuration data register

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Xycom enclosures feature six status LEDs. Three are wired to hardware (power, disk, and COM). The remaining three—Maintenance, Fault, and RADAR—are programmable and can be accessed through Xycom's LED/Status register, located at address 231h.

LED/Status Port (address 231h)

Bit	Read/Write	Description
0	R/W	1 = Maintenance LED is off 0✓ = Maintenance LED is on
1	R	0✓ = Not used
2	R/W	1 = Fault LED is off 0✓ = Fault LED is on
3	R/W	1 = RADAR LED is on 0✓ = RADAR LED is off
4	R	0 = Not used
5	R	0 = Reserved (Xycom internal use only)
6	R	0 = Reserved (Xycom internal use only)
7	R	1 = CMOS OK 0 = Clear CMOS memory

✓ indicates state after a cold boot (not after <Ctrl><Alt><Del>).

Bits 0, 2, and 3 are reserved for use with the RADAR card; Bits 1 and 4 are not used; and bit 7 reflects the status of the CMOS memory.

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CMOS RAM Address Map

Address	Description
00-0D	Real-time clock information
0E	Diagnostic status byte
0F	Shutdown status byte
10	Diskette drive type byte - drives A and B
11	Reserved
12	Fixed disk type byte
13	Reserved
14	Equipment byte
15	Low base memory byte
16	High base memory byte
17	Low expansion memory byte
18	High expansion memory byte
19	Disk C extended byte
1A	Disk D extended byte
1B-2D	Reserved
2E-2F	2-byte CMOS checksum
30	Low expansion memory byte
31	High expansion memory byte
32	Date century byte
33	Information flags (set during power on)
34-3F	Reserved
40-5F	Reserved
60-6F	Reserved for Xycom CMOS
70-7F	Reserved

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System Interrupts

The following table describes the interrupts used on the AT5+.

AT5+ System Interrupts

Interrupt	Function
IRQ1	Keyboard controller
IRQ2	Cascade controller
IRQ3	Secondary COM port (COM2)*
IRQ4	Primary COM port (COM1)*
IRQ5	Parallel port (LPT2)*
IRQ6	Floppy drive
IRQ7	Parallel port (LPT1)
IRQ8	Real-time clock
IRQ9	VGA controller
IRQ10	Primary COM port (COM3)*
IRQ11	Secondary COM port (COM4)*
IRQ14	IDE hard drive interface

*Interrupt selection depends on jumper configuration.
**Interrupt selection can be configured in BIOS setup.

Shadow RAM

Shadowing is the process of loading the BIOS from EPROM into DRAM after power-up. Both the System and VGA BIOS can be shadowed into DRAM to increase system performance. The AT5+ is shipped with the System BIOS and Video BIOS shadowed.

Connectors

The connectors for the AT5+ are described in this section. Pinouts for each of the connectors are listed in Appendix A.

Floppy Drive Connector (FDD and FDD-2)

Floppy drive connector FDD is a 34-pin header; FDD-2 is a 26-pin flat flexible connector (FFC). They are the interface and control connections for up to two floppy drives.

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IDE Hard Drive Connectors (HDD-I)

IDE hard drive connector HDD-I is a 40-pin header. It is the control connector for any hard drive(s) interfaced with the AT5+. The board can control up to two hard drives.

COM1 Serial Port Connector (COM1)

COM1 is a 10-pin dual row header. A 10-pin ribbon socket to 9-pin IDC style adapter is required. For more information, refer to the system manual.

COM2 Serial Port Connector (COM2)

COM2 is a 10-pin dual row header. A 10-pin ribbon socket to 9-pin IDC style adapter is required. For more information, refer to the system manual.

VGA Connector (VGA)

The VGA connector is a 15-pin subminiature D style located on the bottom right of the board.

Port Connector (LPT1)

The Parallel port connector, LPT1, is a 25-pin female D subminiature connector.

Keyboard (KYBD)

The keyboard signals are located on an 8-pin ramp lock connector.

Speaker Jack (SPKR)

The speaker jack is a 2.5 mm phone jack protruding through the ORB drive cap.

Flat Panel (FPNL)

The flat panel connector is a 64-pin dual row header.

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Chapter 3 – BIOS Setup Menus

BIOS Overview

The AT5+ board's customized BIOS has been designed to surpass the functionality provided for normal PC/ATs. This custom BIOS allows you to access the value-added features present on the AT5+ module without interfacing the hardware directly.

General instructions for navigating through the screens are described below:

- ←↑↓→ moves the cursor up, down, left, and right. Pressing [Enter] validates the selection.
- [Esc] exits the menu. You are prompted to save any changes.
- [F5] selects the previous or smaller value.
- [F6] selects the next or higher value.
- [F9] automatically configures the system with the default values. These default values are defined by the system configuration and the values set in the Setup Menu.

> **Note**
>
> Disk drives must be configured via the IDE adapter menu.

- [F10] loads previous values.

BIOS Main Setup Menu

To start the BIOS Setup utility:

1. Press [F2] to enter SETUP
2. Press [F2] to display the Main Menu, which is depicted below:

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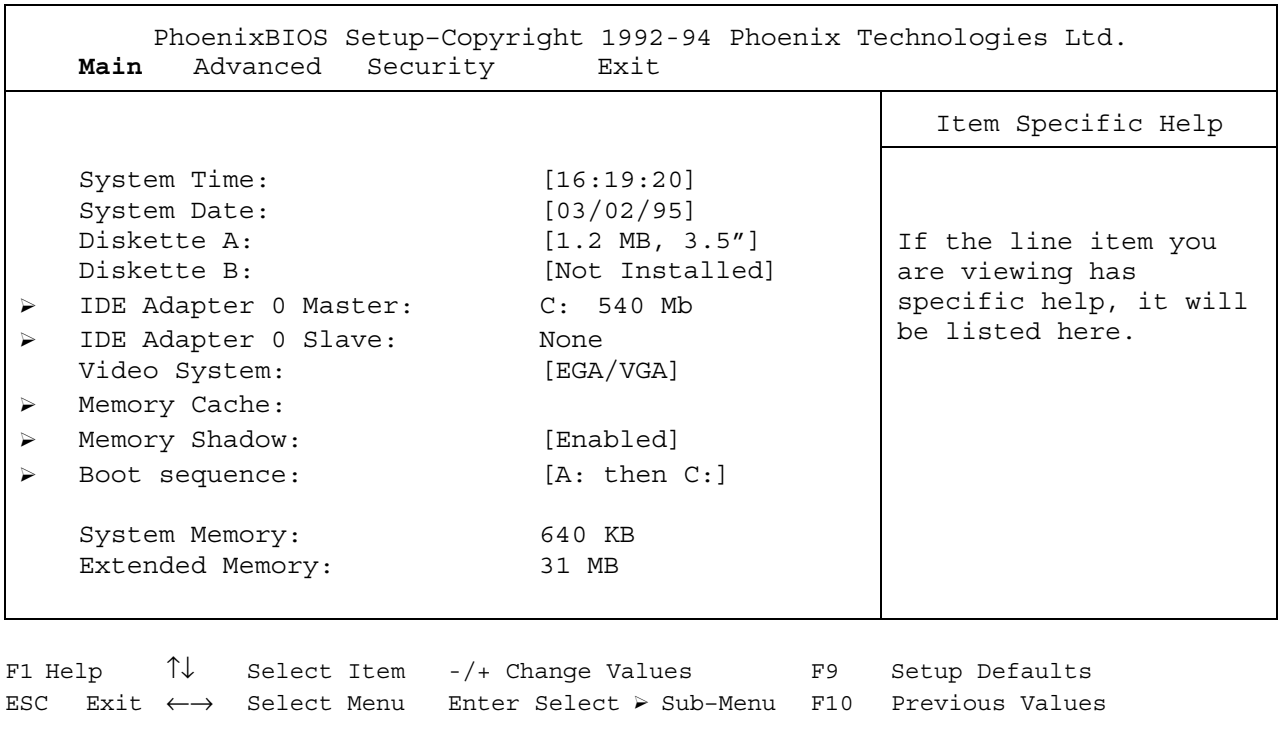


Figure 3- 1. Main Setup Menu

System Time (HH/MM/SS)

Sets the real-time clock for the month, day, and year.

The hour is calculated according to a 24-hour military clock, i.e., 00:00:00 through 23:59:59. The left and right arrow keys and the [Enter] key may be used to move from one field to the next. The numeric keys, 0-9, are used to change the field values. It is not necessary to enter the seconds or type zeros in front of numbers.

System Date (MM:DD:YYYY)

Sets the real-time clock for the month, day, and year. The left and right arrow keys and the enter key may be used to move from one field to the next. The numeric keys, 0-9, are used to change the field values. It is not necessary to type zeros in front of numbers.

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Diskette A or B

Select the floppy-disk drive installed in your system.

IDE Adapter 0 Master and Slave Sub-Menu

The IDE Adapter 0 Master and Slave sub-menus are used to configure the IDE hard drive information. If only one drive is attached to the IDE adapter, then only the parameters in the Master sub-menu needs to be entered. If two drives are connected, both Master and Slave sub-menu parameters will need to be entered. The Master and Slave sub-menus contain the same information.

```
IDE Adapter 0 Master (C: 540 Mb)

                                                    Item Specific Help

Autotype Fixed Disk:     [Press Enter]
Type:                    [User]  540 Mb
Cylinders:               [ 1048]                    If the line item you are
Heads:                   [   16]                    viewing has specific
Sectors/Track:           [   63]                    help, it will be listed
Write Precomp:           [None]                     here.

Multi-Sector Transfers:  [16 Sectors]
LBA Mode Control:        [Enabled]
32 Bit I/O:              [Disabled]
Transfer Mode:           [Fast PIO 3]

F1    Help     ↑↓    Select Item   -/+   Change Values       F9    Setup Defaults
ESC   Exit     ←→    Select Menu   Enter Select ➢ Sub-Menu   F10   Previous Values
```

Figure 3- 2. IDE Adapter Sub-Menu

Autotype Fixed Disk

Pressing <Enter> at this field attempts to read the hard disk parameters from the drive itself, and sets “Type” field to “User” and allows editing of other fields. You should not attempt to manually set the disk drive parameters unless instructed to do so by Xycom Application Engineering.

Type

Options include 1 to 39, User or Auto. One to 39 fills in all remaining fields with values for predefined disk type. User prompts you to fill in remaining fields. Auto autotypes at each boot, displays settings in setup menus, and does not allow edit of remaining fields.

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Cylinders

Number of cylinders on the hard drive. This information will be automatically entered when using the Autotype Fixed Disk option above.

Heads

Number of read/write heads on the hard drive. This information will be automatically entered when using the Autotype Fixed Disk option above.

Sectors/Track

Number of sectors per track on the hard drive. This information will be automatically entered when using the Autotype Fixed Disk option above.

Write Precomp

This value is not used or required by IDE hard drives.

Multi-Sector Transfers

Options are Auto, 2, 4, 8, or 16 sectors. Auto sets the number of sectors per block at the highest number supported by the drive.

LBA Mode Control

Enables Logical Block Access. Default is disabled and should work with most hard drives.

32-Bit I/O

Enables 32-bit communication between CPU and IDE interface.

Transfer Mode

Selects the method for transferring the data between the hard disk and system memory.

Memory Cache Sub-Menu

Enabling cache increases CPU performance by holding data most recently accessed in a special high-speed static RAM area called cache. The AT5+ provides two levels of cache memory; level one is 16K internal to the Pentium processor, and level two or external cache is the cache on a stick site (COAST) which can accommodate 256K of high-speed cache memory.

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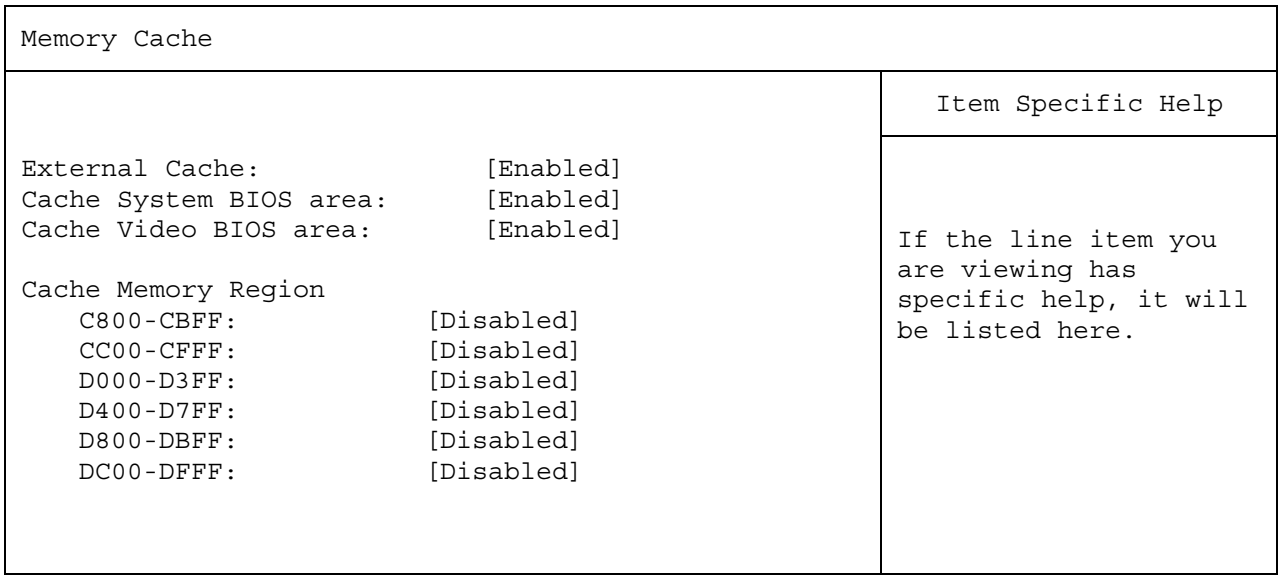


Figure 3- 3. Memory Cache Sub-Menu

External Cache

Controls the state of external (COAST) cache memory. The default is enabled. The system BIOS automatically disables external cache if not installed.

Cache System BIOS Area

If enabled, this option allows the System BIOS Memory area to be cached. Enabling also increases system performance.

Cache Video BIOS Area

If enabled, this option allows the Video BIOS memory area to be cached. Enabling also increases system performance.

Cache Memory Region

By selecting enable, the corresponding memory will be cached. Memory in this area is usually extended BIOS or AT bus memory. Enabling cache may increase system performance, depending on how the extended BIOS is accessed.

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Memory Shadow Sub-Menu

This field displays the amount of shadow memory in use. The contents of this field are controlled by BIOS shadow selection. Shadow memory is used to copy the system and/or Video BIOS into RAM to improve performance. The AT5+ allocates Shadow RAM in Kbytes, and this number will be displayed on the menu. This field, which is not editable, is for reference only.

The AT5+ is shipped with the System BIOS and Video BIOS shadowed.

```
Memory Shadow

                                                    Item Specific Help

System Shadow:      Enabled
Video Shadow:       [Enabled]                       If the line item you
                                                    are viewing has
                                                    specific help, it will
                                                    be listed here.

F1    Help    ↑↓    Select Item      -/+   Change Values       F9    Setup Defaults
ESC   Exit    ←→    Select Menu      Enter Select ➢ Sub-Menu   F10   Previous Values
```

Figure 3- 4. Memory Shadow Sub-Menu

Boot Sequence Sub-Menu

This menu allows the boot sequence to be configured.

```
Boot Sequence

                                                    Item Specific Help

Previous Boot          [Disabled]
Boot sequence:         [A: then C:]                 If the line item you
Setup prompt:          [Disabled]                   are viewing has
POST Errors:           [Enabled]                    specific help, it will
Floppy check:          [Enabled]                    be listed here.
Summary screen:        [Enabled]

F1    Help    ↑↓    Select Item    -/+   Change Values       F9    Setup Defaults
ESC   Exit    ←→    Select Menu    Enter Select ➢ Sub-Menu   F10   Previous Values
```

Figure 3- 5. Boot Options Sub-Menu

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Previous Boot

This option is disabled. If this option is enabled, the System BIOS can detect if a boot sequence was not completed properly. This condition may be caused by a power failure, or reset during boot-up, or invalid CMOS configuration. If the BIOS detects this condition, the following message will be displayed, "Previous boot incomplete - default configuration used." The system will be rebooted using the default configuration.

If this option is disabled, the system BIOS will not detect incomplete boot and you will not be notified.

Boot Sequence

The BIOS attempts to load the operating system from the disk drives in the sequence selected here.

Setup Prompt

This option is disabled. If enabled, the system will display "Press <F2> for Setup" during boot up.

POST Errors

If enabled, the system will halt if it encounters a boot error and display "Press <F1> to resume, <F2> for Setup".

Floppy Check

If enabled, the system seeks diskette drives during boot up. Disabling speeds boot time.

Summary Screen

If enabled, displays system summary screen during boot up.

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Advanced Menu

This menu allows you to change the peripheral control, advanced chipset control, and the disk access mode.

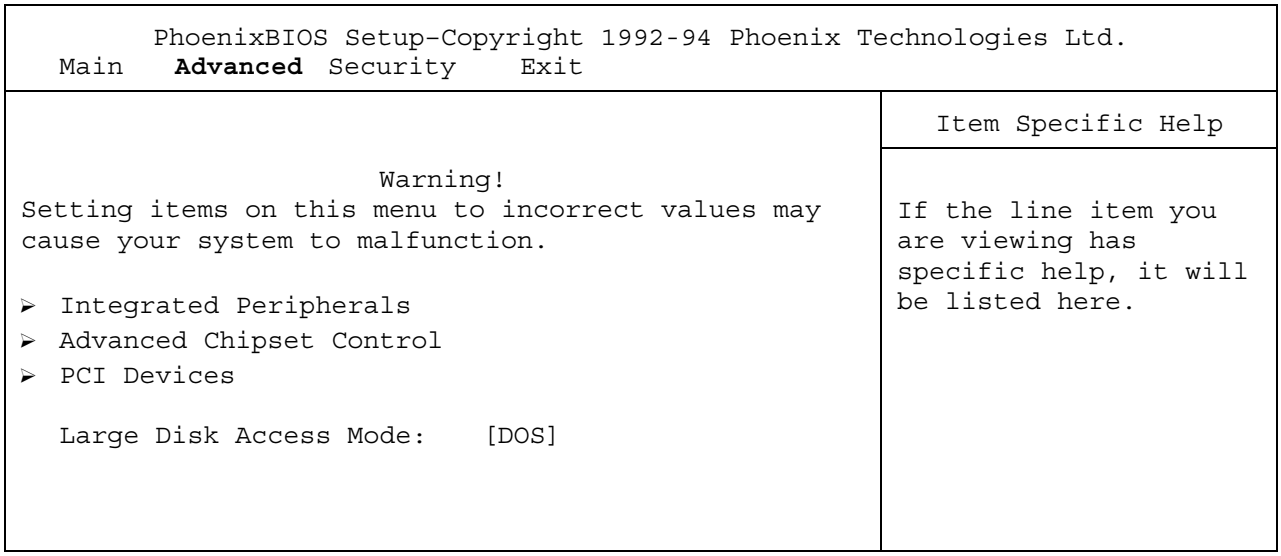


Figure 3- 6. Advanced Setup Menu

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Integrated Peripherals Sub-Menu

The Integrated Peripherals sub-menu is used to configure the COM ports, parallel ports, and enable/disable the diskette and enhanced IDE controllers.

```
Integrated Peripherals

                                                    Item Specific Help

COM port:                [3F8, IRQ 4]
COM port:                [2F8, IRQ 3]               If the line item you
LPT port:                [378, IRQ 7]               are viewing has
LPT Mode:                [Bi-directional]           specific help, it will
Diskette controller:     [Enabled]                  be listed here.
Local Bus IDE Adapter:   [Enabled]

F1   Help    ↑↓   Select Item   -/+   Change Values        F9   Setup Defaults
ESC  Exit    ←→   Select Menu   Enter Select ➢ Sub-Menu    F10  Previous Values
```

Figure 3- 7. Integrated Peripherals Sub-Menu

COM Port

This option allows the COM Port address and IRQ levels to be modified or disabled.

LPT Port

This port can be enabled or disabled.

LPT Mode

LPT port can be configured for bi-directional or output only.

Diskette Controller

This option is used to enable or disable the on-board floppy disk controller.

Local Bus IDE Adapter

Enables or disables the local bus IDE adapter.

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Advanced Chipset Control Sub-Menu

This menu can be used to change the values in the chipset registers and optimize your system's performance.

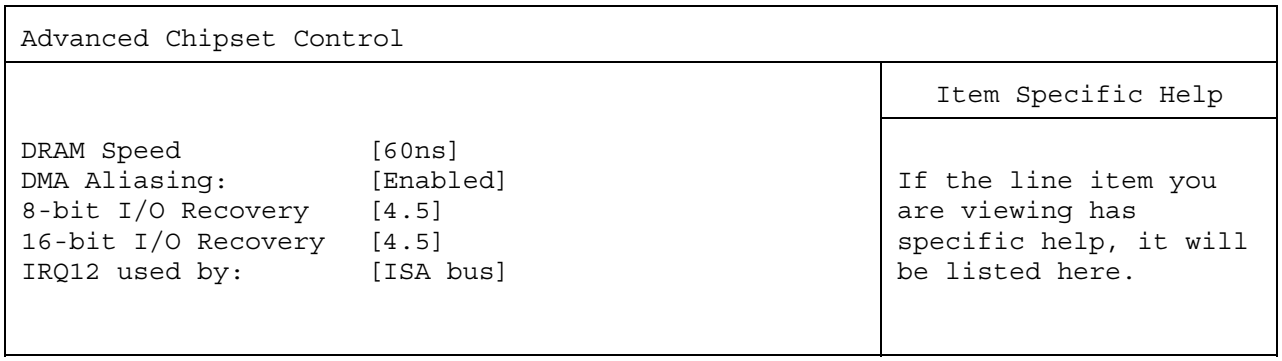


Figure 3- 8. Advanced Chipset Control Sub-Menu

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PCI Devices Sub-Menu

PCI devices are peripheral devices designed for operation with a PCI bus. Use this menu to configure the PCI bus and connected devices.

```
PCI Devices
                                                    Item Specific Help

PCI Device, Slot #1:
   Enable Master:              [Enabled]            If the line item you are
   Default Latency Timer:      [Yes]                viewing has specific
   Latency Timer:              [0040]               help, it will be listed
                                                    here.
PCI Device, Slot #2:
   Enable Master:              [Enabled]
   Default Latency Timer:      [Yes]
   Latency Timer:              [0040]

PCI Device, Slot #3:
   Enable Master:              [Enabled]
   Default Latency Timer:      [Yes]
   Latency Timer:              [0040]

PCI Device, Slot #4:
   Enable Master:              [Enabled]
   Default Latency Timer:      [Yes]
   Latency Timer:              [0040]
   PCI IRQ lines 1 thru 4:     [Auto Select]

F1    Help    ↑↓    Select Item    -/+   Change Values          F9    Setup Defaults
ESC   Exit    ←→    Select Menu    Enter Select ➢ Sub-Menu      F10   Previous Values
```

Figure 3- 9. PCI Devices Sub-Menu

Note

The options in this menu should be left in their default configurations.

Enable Master

Enables selected device as a PCI bus master.

Default Latency Timer

Should be Yes. Controls PCI bus master time-out.

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Latency Timer

Displays the current value of latency timer.

Security Menu

This menu prompts you for the new system password and requires you to verify the password by entering it again.

The password can be used to stop access to the setup menus or prevent unauthorized booting of the unit. The supervisor password can also be used to change the user password.

```
        PhoenixBIOS Setup-Copyright 1992-94 Phoenix Technologies Ltd.
  Main   Advanced  Security    Exit
                                                        Item Specific Help

Supervisor Password is     Disabled
User Password is           Disabled
Set Supervisor Password    [Press Enter]
Set User Password          Press Enter

Password on boot:          [Disabled]

Diskette access:           [Supervisor]
Fixed disk boot sector:    [Normal]
System backup reminder:    [Disabled]
Virus check reminder:      [Disabled]

                                                        If the line item you
                                                        are viewing has
                                                        specific help, it will
                                                        be listed here.

F1   Help   ↑↓   Select Item    -/+  Change Values       F9   Setup Defaults
ESC  Exit   ←→   Select Menu    Enter Select ➢ Sub-Menu  F10  Previous Values
```

Figure 3- 10. Security Menu

Supervisor Password

This option gives full access to SETUP menus. You may use up to seven alphanumeric characters. Disabled by setting to [CR] or nothing.

Set User Password

This option gives restricted access to SETUP menus. Requires prior setting of Supervisor password. You may use up to seven alphanumeric characters.

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Password on Boot

If the supervisor password is set and this option is disabled, BIOS assumes the user is booting.

Diskette Access

Supervisor may restrict use of floppy drives to the supervisor. Requires setting the Supervisor password.

Fixed Disk Boot Sector

Write protected to help prevent viruses.

System Backup Reminder/Virus Check Reminder

Displays a message during boot up asking (Y/N) if you have backed-up the system or scanned it for any viruses.

Message returns on each boot until you respond with “Y”.

Displays the message daily on the first boot of the day; weekly on the first boot after Sunday; and monthly on the first boot of the month.

Exit Menu

This menu prompts you to exit setup.

```
        PhoenixBIOS Setup-Copyright 1992-94 Phoenix Technologies Ltd.
    Main   Advanced   Security      Power      Exit

                                                        Item Specific Help

Save Values & Exit
Exit Without Saving Changes                             If the line item you
Get Default Values                                      are viewing has
Load Previous Values                                    specific help, it will
Save Current Values                                     be listed here.

F1   Help   ↑↓   Select Item    -/+  Change Values       F9   Setup Defaults
ESC  Exit   ←→   Select Menu    Enter Select ➢ Sub-Menu  F10  Previous Values
```

Figure 3- 11. Exit Menu

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Save Values and Exit

After making your selections on the Setup menus, always select either "Save values & Exit" or "Save Current Values." Both procedures store the selections displayed in the menus in battery-backed CMOS RAM.

After you save your selections, the program displays this message:

```
Values have been saved.
[Continue]
```

If you attempt to exit without saving, the program asks if you want to save before exiting.

The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. If those values cause the system boot to fail, reboot and press [F2] to enter Setup. In Setup, you can get the Default Values (as described below) or try to change the selections that caused the boot to fail.

Exit Without Saving Changes

Use this option to exit Setup without storing any new selections you may have made in CMOS. The selections previously in effect remain in effect.

Get Default Values

To display the default values for all the Setup menus, select "Get Default Values" from the Main Menu. The program displays this message:

```
Default values have been loaded.
[Continue]
```

If during boot up, the BIOS program detects a problem in the integrity of values stored in CMOS, it displays these messages:

```
System CMOS checksum bad - run SETUP
Press <F1> to resume, <F2> to Setup
```

This means the CMOS values have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS.

Press `[F1]` to resume the boot (this causes the system to be configured using the default values) or `[F2]` to run Setup with the ROM default values already loaded into the menus. You can make other changes before saving the values to CMOS.

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Load Previous Values

If, during a Setup Session, you change your mind about changes you have made and have not yet saved the values to CMOS, you can restore the values you previously saved to CMOS.

Selecting Load Previous Values on the Exit menu updates all the selections and displays this message:

```
Previous values have been loaded.
[Continue]
```

Save Current Values

This option saves all the selections without exiting Setup. You can return to the other menus if you want to review and change your selections.

BIOS Compatibility

This BIOS is IBM PC/AT compatible with additional CMOS RAM and BIOS data areas used.

Battery-Backed RTC SRAM Usage

This BIOS uses the standard PC/AT battery-backed RTC SRAM. In addition, the following locations are used as indicated:

Address	Bit(s)	Description
62h	0-3	Reserved (set to 000b). Backlight blanking timeout: 0000b:none 0001b:5 minutes ...
6E		1111b:75 minutes
6FH	0-7	Xycom Configuration Checksum

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Appendix A – Pinouts

This appendix describes the pinouts for the AT5+ connectors defined in Chapter 2.

Floppy Drive Connector (FDD and FDD-2)

Floppy drive connector FDD is a 34-pin header; FDD-2 is a 26-pin flat flexible connector (FFC). They are the interface and control connections for up to two floppy drives.

Floppy Drive Connector (FDD)

Pin	Signal	Pin	Signal
1	GND	18	FDIRC*
2	FRWC*	19	GND
3	GND	20	FSTEP*
4	N/C	21	GND
5	KEY	22	FWD*
6	N/C	23	GND
7	GND	24	FWE*
8	IDX*	25	GND
9	GND	26	FTK0*
10	MO1*	27	GND
11	GND	28	FWP*
12	FDS2*	29	GND
13	GND	30	FRDD*
14	FDS1*	31	GND
15	GND	32	FHS*
16	MO2*	33	GND
17	GND	34	DCHG*

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Floppy Drive Connector (FDD-2)

Pin	Signal	Pin	Signal
1	+5V	14	FSTEP*
2	IDX*	15	GND
3	+5V	16	FWD*
4	FDS1*	17	GND
5	+5V	18	FWE*
6	DCHG*	19	GND
7	N/C	20	FTKO*
8	N/C	21	GND
9	N/C	22	FWP*
10	MO1*	23	GND
11	N/C	24	FRDD*
12	FDIRC*	25	GND
13	GND	26	FHS*

IDE Hard Drive Connectors (HDD-I)

IDE hard drive connector HDD-I is a 40-pin header. The board can control up to two hard drives.

IDE Hard Drive Connector (HDD-I)

Pin	Signal	Pin	Signal
1	RESET*	21	N/C
2	GND	22	GND
3	IDED7	23	IOW*
4	SD8	24	GND
5	SD6	25	IOR*
6	SD9	26	GND
7	SD5	27	N/C
8	SD10	28	ALE
9	SD4	29	N/C
10	SD11	30	GND
11	SD3	31	IRQ14
12	SD12	32	IOCS16*
13	SD2	33	SA1
14	SD13	34	N/C
15	SD1	35	SA0
16	SD14	36	SA2
17	SD0	37	HCS0*
18	SD15	38	HCS1*
19	GND	39	HDACTIVE*
20	N/C	40	GND

COM1 Serial Port Connector

COM1 is a 10-pin dual row header. A 10-pin ribbon socket to 9-pin IDC style adapter is required.

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COM1 Serial Port Connector

Pin	Signal	Pin	Signal
1	DCD1	6	CTS1
2	DSR1	7	DTR1
3	RXD1	8	RI1
4	RTS1	9	GND
5	TXD1	10	NO CONNECT

COM2 Serial Port Connector

COM2 is a 10-pin dual row header. A 10-pin ribbon socket to 9-pin IDC style adapter is required.

COM2 Serial Port Connector

Pin	Signal	Pin	Signal
1	DCD2	6	CTS2
2	DSR2	7	DTR2
3	RXD2	8	RI2
4	RTS2	9	GND
5	TXD2	10	NO CONNECT

VGA Connector

The VGA connector is a 15-pin subminiature located on the bottom right of the board.

VGA Connector

Pin	Signal	Pin	Signal
1	RED	9	KEY
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	N/C
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	N/C
8	GND		

Parallel Port Connector (LPT1)

The Parallel port connector, LPT1, is a 25-pin female D subminiature connector.

Parallel Port Connector

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Pin	Signal	Pin	Signal
1	STROBE	14	AUTOFEED
2	PD0	15	PERROR
3	PD1	16	INIT
4	PD2	17	SELIN
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	PACK	23	GND
11	PBUSY	24	GND
12	PE	25	GND
13	SELECT		

Keyboard (KYBD)

The keyboard signals are located on an 8-pin ramp lock connector.

Keyboard Connector

Pin	Signal
1	SPEAKER
2	+5V
3	KBINHIBIT*
4	DATA
5	CLK
6	+12V
7	GND
8	NC

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Speaker Jack (SPKR)

The speaker jack is a subminiature phone jack protruding through the ORB.

Speaker Jack Connector

Pin	Signal
Tip	Sources Current
Sleeve	GND

Pentium Fan/Heat Sink (FAN)

The Pentium fan/heat sink is required to properly cool the Pentium chip. The AT5+ will not run properly without the fan/heat sink installed.

Pentium Fan/Heat Sink (FAN)

Pin	Signal
1	GND
2	Fused +5V
3	Fused +12V

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Flat Panel Connector (FPNL)

The flat panel connector is a 64-pin dual row header.

Flat Panel Connector

Pin	Signal	Pin	Signal
1	GND	33	GND
2	MAINT LED	34	FP11
3	FAULT LED	35	GND
4	SERIAL LED	36	BLANK
5	DRIVE LED	37	GND
6	RADAR LED	38	SHFCLK
7	GND	39	GND
8	KB CLOCK	40	LP
9	GND	41	GND
10	RESET*	42	FLM
11	GND	43	GND
12	ENAVDD*	44	ACDCLK
13	GND	45	GND
14	ENAVEE*	46	FP17
15	GND	47	FP18
16	FP0	48	FP19
17	FP1	49	FP20
18	FP2	50	GND
19	FP3	51	FP21
20	GND	52	FP22
21	FP4	53	FP23
22	FP5	54	FP24
23	FP6	55	GND
24	FP7	56	N/C
25	GND	57	N/C
26	FP8	58	N/C
27	GND	59	N/C
28	FP9	60	N/C
29	GND	61	N/C
30	FP10	62	N/C
31	GND	63	N/C
32	FP11	64	GND

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Appendix B – Installation of Additional DRAM

DRAM

The AT5+ has two single 72-pin in-line memory modules (SIMMs) sites in which to add memory. Due to the 66 MHz CPU speed, the access time of DRAM interface is very important. To run at 0 wait states, you must have a 60 ns access time for three chip DRAM SIMMs.

The AT5+ can accommodate 8, 16, 32, or 64 Mbytes of DRAM. SIMM sizes of 1Mx32, 2Mx32, 4Mx32, or 8Mx32 DRAM may be used. The table below lists the combinations needed for the five memory configurations. (The "U" number location is silk screened on the back of the board.)

DRAM SIMM Module Combinations

Memory	SIMM Site U1	SIMM Site U2
8 Mbytes	1Mx32	1Mx32
16 Mbytes	2Mx32	2Mx32
32 Mbytes	4MX32	4Mx32
64 Mbytes	8Mx32	8Mx32

For other memory configurations, contact the Xycom Customer Service Department.

Recommended manufacturers for DRAM, along with the respective part numbers, are listed below:

DRAM Manufacturers/Part Numbers

Mfg.	1Mx32		2Mx32		4Mx32	
	Non-EDO	EDO	Non-EDO	EDO	Non-EDO	EDO
Micron	MT8D132M-6	MT8D132M-6x	MT6D232M-6	MT16D232M-6x	MT8D432M-6	MT8D432M-6x
Xycom	104273		104258		10430	

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Dram Installation

The following figure shows DRAM installation.

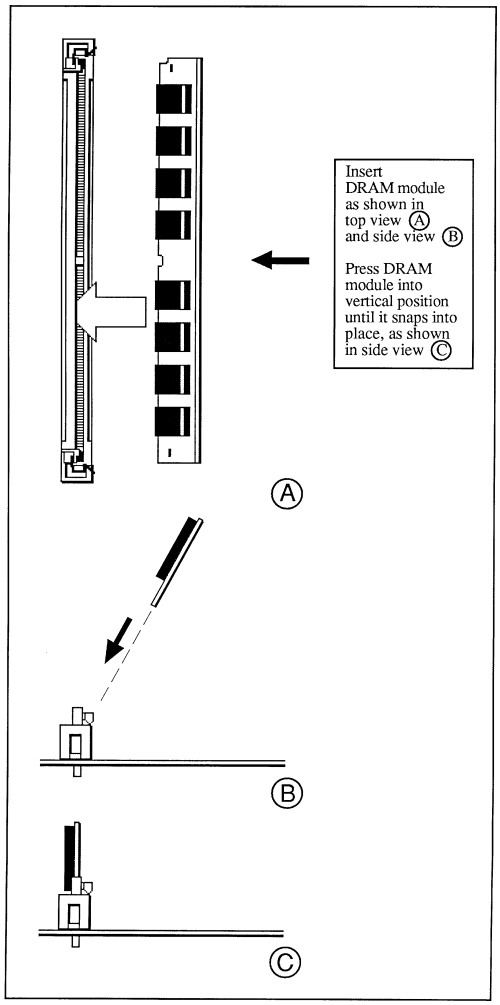


Figure B- 1. DRAM Installation

To remove a strip, pull outward on the plastic tab while lifting the end. Loosen one side, then the other.

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Appendix C – Installation of External Cache (COAST)

External Cache

The Xycom AT5+ provides support for 256K of cache in socket U3, cache on a stick site (COAST). AT5+ external cache is supplied on a printed circuit board similar to the DRAM modules. This printed circuit board is designed to plug into the socket at U3, which is next to the two DRAM sockets.

To install the cache, line up the COAST module with the socket and apply light steady pressure until the COAST module is seated. The socket is keyed so that the module can only be plugged into the correct orientation.

Recommended manufacturers for the COAST modules used in the AT5+, along with the respective part numbers, are listed below:

COAST Manufacturers/Part Numbers

Mfg.	Cache 256K Synchronous 66 MHz (COAST)
Corsair	C53Q256K3C
1st Tech.	29-256-05
Xycom	104330

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Cache Installation

The following figure shows cache installation.

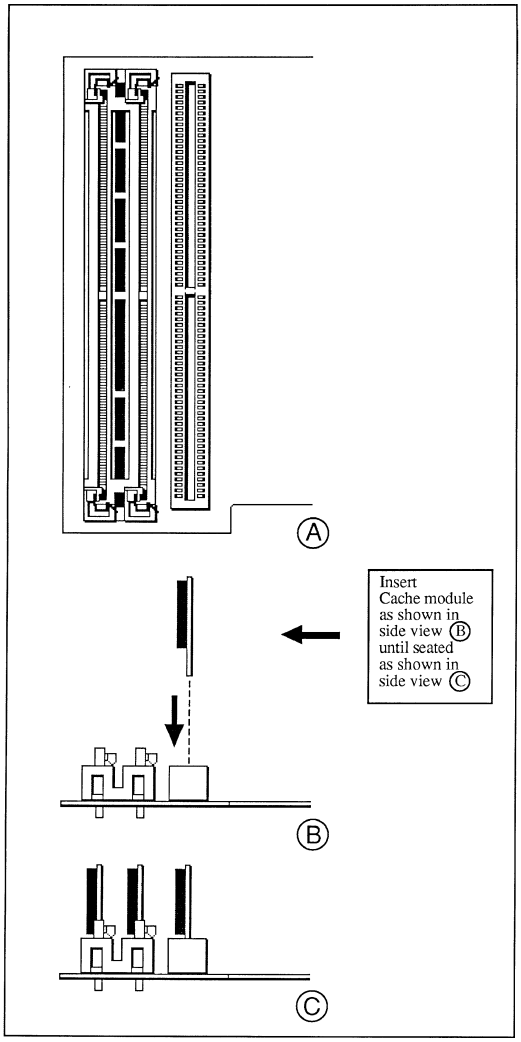


Figure C- 1. Cache Installation

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