1 Introduction

The 486 PCI mainboard is a high-performance system board that supports Intel 486DX2/DX/SX/SL enhanced 486, P24T, P24D, DX4, Cyrix, AMD, and UMC CPUs. The mainboard is fully compatible with industry standards, while incorporating many technical enhancements.

The 486 PCI mainboard offers superior system performance, compatibility, and reliability, and is the ideal choice for a wide variety of system applications.

Key Features

- Supports Power Management Mode
  - Supports the SMM and the SM
  - CPU Stop Clock Function
  - Four Power Saving States (normal / dose / standby / suspend)
  - Supports the APM control
  - Supports Sleep Switch control
  - Power Saving also on non-SMM CPU
  - More System Event Monitoring and Power Saving Control
- Direct map cache controller that supports 256K, 512K, and 1M cache size
- Fast page burst mode DRAM controller
- Memory configurations from 1MB to 255MB using combinations of 80ns, 256K, 512K, 1M, 2M, 4M, and 16M SIMM modules. Uses four 72-pin DRAM modules in unrestricted configurations.
- Video ROM Cacheable
- Shadow RAM in increments of 32KB
- Hardware turbo speed switch
- Four 16-bit ISA slots, three master PCI slots 1 slave PCI slot
- Support for 5V and 3.45V / 3.6V / 4.0V microprocessors
- On-board local bus IDE Controller and floppy controller
- Built-in NCR 810 PCI SCSI driver
- On-board support for two high speed UARTS (W/16550 FIFO) and multimode parallel port for standard, Enhanced (EPP) and high speed (ECP) modes

Introduction

Unpacking the Mainboard

The mainboard package contains:

- The 486 PCI Mainboard
- This User's Guide

Note: Do not unpack the mainboard until you are ready to install it.

Follow the precautions below while unpacking the mainboard.

1. Before handling the mainboard, ground yourself by grasping an unpainted portion of the system's metal chassis.
2. Remove the mainboard from its anti-static packaging and place it on a grounded surface, component side up.
3. Check the mainboard for damage. If any chip appears loose, press carefully to set it firmly in its socket.

Do not apply power if the mainboard appears damaged. If there is damage to the board, contact your dealer immediately.

Electrostatic Discharge Precautions

Make sure you ground yourself before handling the mainboard or other system components. Electrostatic discharge can easily damage the components. Note that you must take special precautions when handling the mainboard in dry or air-conditioned environments.

Adhere to the precautions below to protect your equipment from electrostatic discharge:

- Do not remove the anti-static packaging until you are ready to install the mainboard and other system components.
- Ground yourself before removing any system component from its protective anti-static packaging. To ground yourself, grasp the expansion slot covers or other unpainted portions of the computer chassis.
- Frequently ground yourself while working, or use a grounding strap.
- Handle the mainboard by the edges and avoid touching its components.

Introduction

Mainboard Layout w/ Default Settings*

*Default setting are for an Intel DX2-66 SL Enhanced CPU, 256K cache, IDE on board, and power saving controlled by SMOUT (JP15).
2 Hardware Setup

This chapter explains how to set jumpers, install a processor and memory on the mainboard and make case connections. Refer to this chapter whenever you upgrade or reconfigure the system.

**CAUTION:** Turn off power to the mainboard, system chassis, and peripheral devices before performing any work on the mainboard or system.

### Jumper Settings
- **JP27, JP28:** Factory fixed at pins 2-3
- **JP6:** Factory setting at short
- **JP7:** Factory setting at open
- **JP12:** Factory setting at 1-2

#### J7: Sleep Switch Connector
Toggle this jumper to force the system to enter suspend mode. Any interrupt or move the input device to wake up the system to full speed mode.

#### JP5: CMOS Reset Jumper
JP5 lets you discharge CMOS memory in the event you forget your password or encounter a BIOS Setup problem. Before you install the mainboard make sure that JP5 is set to retain CMOS memory.

<table>
<thead>
<tr>
<th>CMOS Setting</th>
<th>JP5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retain CMOS Data (Default)</td>
<td>2 1 3</td>
</tr>
<tr>
<td>Discharge CMOS</td>
<td>2 1 3</td>
</tr>
</tbody>
</table>

6

### Hardware Setup

**JP9, JP10, JP11:** ECP DMA Select
These jumpers set the ECP DMA for DRQ3/DACK3 or for DRQ7/DACK7.

<table>
<thead>
<tr>
<th>ECP/DMA Select</th>
<th>JP9</th>
<th>JP10</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRQ3/DACK3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>DRQ7/DACK7</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>None (Default)</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

### Multi I/O Port Address

Default settings for multi-I/O port addresses are shown in the following table.

<table>
<thead>
<tr>
<th>Port</th>
<th>I/O Address</th>
<th>IRQ</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPT1*</td>
<td>3BCH</td>
<td>7</td>
<td>Standard Parallel Port</td>
</tr>
<tr>
<td>COM1</td>
<td>3F8h</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>COM2</td>
<td>2F8h</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

* LPT1 is default for standard mode. If you want ECP/EPP functions, you must use the BIOS or drivers settings. You must also set JP6-9JP8 and JP10 to configure DRQ/DACK. If the default I/O port addresses conflict with other I/O cards (e.g., sound cards or I/O cards), you must adjust one of the I/O addresses to avoid address conflict. (You can adjust those I/O port addresses from the BIOS. See page 24.)

### CPU Type Configuration
Configure the 486 PCI mainboard’s CPU by inserting the specified CPU and setting jumpers as described in the diagrams that follow. Note that the CPU Type jumpers on the mainboard have red caps.

Intel 486SX/SX SL-Enhanced CPU
486SX-25/33 Setting
486SX-25*66* Setting

- 486SX-25
- 486SX-25*66*
- 486SX-33
- 486SX-33

* For these CPUs a cooling fan is necessary for system stability.
Intel 486DX/DX SL Enhanced, DX4 ODP (5V) CPU
DX2-53/33/40°/50°, DX2-50°/66°/80° Setting

Figure 2-2: 486DX/DX SL-Enhanced, DX4 ODP (5V) CPU

* For these CPUs, a cooling fan is necessary for system stability.

Note: Do not change the JP40 setting, the Intel DX4 ODP is a 5V CPU.

Intel P24D CPU (Internal Write-back Cache)
P24D-50°/66° Setting

Figure 2-4: Intel P24D CPU Settings

* For these CPUs, a cooling fan is necessary for system stability.

Intel DX4 (3.45V) CPU
DX4-75°/100° Settings

Figure 2-3: Intel DX4 (3.45V) CPU Jumper Setting

Note: The DX4-75°/100° is a 3.45V CPU. We recommend that you set the JP29/JP40 as shown above.

Intel P24T CPU (Pentium Overdrive 238-pin, Internal 2.5x clock, internal write-back cache)
P24T-63°/83° Settings

Figure 2-5: Intel P24T CPU Jumper Settings

* For these CPUs, a cooling fan is necessary for system stability.
Cirrus DX2 DX2 CPU Setting
DX-33/40/50, DX2-50/66/66e (5V)
DX2-50/66/66e (3.6V)
DX2-80 (4V) Settings

Figure 2-6: Cirrus DX2 DX2 CPU Setting

* For these CPUs, a cooling fan is necessary for system stability.

AMD 486DX2-66/80e (5V)
DX4-75/100° (N) V8T (3.45V)
DX2-66/80° (N) V8T (3.45V)

Figure 2-8: AMD DX2-80, DX4-100 (3.45V) CPU Jumper Settings

* For these CPUs, a cooling fan is necessary for system stability.
Note: If the AMD CPU has (N)V8T marked on the surface, it indicates a 3.45V CPU. You must set JP39/JP40 as shown above.

Figure 2-9: AMD DX2-66/80, DX4-75/100 CPU Jumper Settings

* For these CPUs, a cooling fan is necessary for system stability.
Note: If the AMD CPU has (N)VB marked on the surface, it indicates a 3.45V CPU. You must set JP39/JP40 as shown above.
The 486 PCI motherboard has a write-back caching scheme. You can configure the motherboard's external cache for 256KB, 512KB, or 1MB by setting jumper switches and installing cache chips. Refer to the following pages for jumper switch settings and cache socket locations.

**Cache Jumper Settings**

You must set jumpers JP25, JP26, JP29 to configure cache size. See the illustrations below. Note that cache jumpers on the motherboard have white jumper caps.

**Cache Size and RAM Locations**

You can configure cache size using 32Kx8, 64Kx8, or 128Kx8 cache chips. The table below describes chip type and socket locations for each configuration.

<table>
<thead>
<tr>
<th>Cache Size</th>
<th>Cache RAM</th>
<th>Tag RAM</th>
<th>WB Cacheable Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>256KB</td>
<td>32K x 8 / U18, U21, U22, U23, U26, U28, U30</td>
<td>32K x 8 / U32 or 16K x 8 / U32</td>
<td>64MB</td>
</tr>
<tr>
<td>512KB</td>
<td>64K x 8 / U18, U20, U22, U23</td>
<td>32K x 8 / U32 or 16K x 8 / U32</td>
<td>64MB</td>
</tr>
<tr>
<td>512KB</td>
<td>64K x 8 / U18, U20, U22, U23, U26, U28, U30</td>
<td>32K x 8 / U32</td>
<td>128MB</td>
</tr>
<tr>
<td>512KB</td>
<td>128K x 8 / U18, U20, U22, U23, U26, U28, U30</td>
<td>64K x 8 / U32</td>
<td>256MB</td>
</tr>
</tbody>
</table>

*Note: Tag and Data RAM use 20ns for all conditions.*

**512K Cache (64Kx8, 8pcs, 2 Bank) Configuration**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>64Kx8</td>
<td>64Kx8</td>
<td>64Kx8</td>
</tr>
</tbody>
</table>

**512K Cache (128Kx8 4pcs, 1 Bank) Configuration**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>128Kx8</td>
<td>128Kx8</td>
<td>64Kx8</td>
</tr>
</tbody>
</table>

**Memory Configuration**

The motherboard supports four banks of 72-pin SIMM (Single In-Line Memory Modules). The motherboard requires SIMM of at least 80ns access time. Also support with parity (x36) or without parity (x32). There are no restrictions on memory configuration. You can install DRAM in any combination without having to rely on a memory configuration table. Memory configuration is thus "Table-Free".
3 BIOS Setup

The mainboard's BIOS setup program is the ROM ISA BIOS from Award Software Inc. Enter the Award BIOS program's Main Menu as follows:

1. Turn on or reboot the system. After a series of diagnostic checks, you are asked to press <DEL> to enter Setup.
2. Press the <DEL> key to enter the Award BIOS program and the main screen appears:

```
<table>
<thead>
<tr>
<th>Standard CMOS Setup</th>
<th>Standard CMOS Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date (mm/dd/yy)</td>
<td>Date (mm/dd/yy)</td>
</tr>
<tr>
<td>Time (hh:mm:ss)</td>
<td>Time (hh:mm:ss)</td>
</tr>
<tr>
<td>Master &amp; Slave</td>
<td>Master &amp; Slave</td>
</tr>
<tr>
<td>Drive A &amp; B</td>
<td>Drive A &amp; B</td>
</tr>
<tr>
<td>Video</td>
<td>Video</td>
</tr>
</tbody>
</table>

**ROM BIOS / ISA BIOS**

**A/D Conversion Setup**

**I/O Connector Selection**

**PCI Configuration Setup**

**Load Setup Defaults**

**Load Optimized Defaults**

3. Choose an option and press <Enter>. Modify the system parameters to reflect the options installed in the system. (See the following sections.)
4. Press <ESC> at anytime to return to the Main Menu.
5. In the Main Menu, choose "SAVE AND EXIT SETUP" to save your changes and reboot the system. Choosing "EXIT WITHOUT SAVING" ignores your changes and exits the program.

The Main Menu options of the Award BIOS are described in the sections that follow.

BIOS Setup

Standard CMOS Setup

Run the Standard CMOS Setup as follows,

1. Choose "STANDARD CMOS SETUP" from the Main Menu. A screen appears.

2. Use arrow keys to move between items and select values. Modify selected fields using PgUp/PgDn+/-. Some fields let you key in values directly.

   **Date (mm/dd/yy)**
   Type the current date.

   **Time (hh:mm:ss)**
   Type the current time.

   **Primary (Secondary)**
   Choose from the standard hard disk types

   **Master & Slave**
   47 is user definable. If a hard disk is not installed choose "Not installed". (default)

   **Drive A & B**
   Choose 360KB, 5 1/4", 1.2MB, 5 1/4", 720KB, 3 1/2", 1.44M, 3 1/2" or Not installed

   **Video**
   Choose Monochrome, Color 40x25, VGA/EGA (default), Color 80x25

3. When you finish, press the <ESC> key to return to the Main Menu.
BIOS Features Setup

Run the BIOS Features Setup as follows.

1. Choose "BIOS FEATURES SETUP" from the Main Menu and a screen with a list of items appears. (The screen below shows BIOS default settings.)

2. Use the arrow keys to move between items and select values. Modify selected fields using PgUp/PgDn+/-. keys. <F> keys explained below:

   <F1>: "Help" gives options available for each item.

   <F2>: Change color.

   <F3>: Get the old values. These values are the values with which the user started the current session.

   <F6>: Load all options with the BIOS Setup default values.

   <F7>: Load all options with the Setup default values.

A short description of screen items follows:

- **CPU Internal**: This option enables/disables the CPU’s internal cache memory. (The default setting is Enabled.)
- **External Cache**: This option enables/disables the external cache memory. (The default setting is Enabled.)
- **Quick Power**: Enabled provides a fast POST at boot-up.

Chipset Features Setup

The Chipset Features Setup option changes the values of the chipset registers. These registers control system options in the computer.

Note: Change these settings only if you are familiar with the Chipset.

Run the Chipset Features Setup as follows.

1. Choose "CHIPSET FEATURES SETUP" from the Main Menu and the following screen appears. (The screen below shows default settings.)

ROM PCI / ISA BIOS
CHIPSET FEATURES SETUP

A short description of screen items follows:

- **Auto Configuration**: Enable this option (strongly recommended) and the system automatically sets all options on the left side of the screen (except cache update mode & BIOS cacheable). If this option is Enabled you must boot from Turbo mode.

- **ISA Bus Clock**: The default setting is 1/4 PCLK (assuming PCLK is 33 MHz). It is recommended that you do not change this setting. This value should be close to 8MHz.

- **LBD# Sample Point**: Use the default setting.

- **DRAM Speed**: Automatically set by BIOS.

- **DRAM Write Cycle**: Automatically set by BIOS.

- **CPU Burst Write**: Choose Enabled or Disabled. The default is Disabled.

- **L2 Cache Policy**: Choose Write-through or Write-back. The default is Write-back.

- **Write Cache**: Use the default setting.

- **Cache Read Cycle**: Use the default setting.

- **IDE 0/1 Master/Slave Mode**: Choose Auto (default) or 0,1,2,3,4. The 0-4 settings are for IDE mode speed. (Mode 0 is the slowest speed, Mode 4 is the fastest). Unless you know the HDD speed, Mode is the fastest). Unless you know the HDD speed, you should use the Auto setting for more reliable and better performance.

2. Use the arrow keys to move between items and select values. Modify selected fields using the PgUp/PgDn+/-. keys.
Onboard FDC Control
Enabled: Use the on-board floppy controller (default).
Disabled: Turn off the on-board floppy controller.

Onboard Serial Port 1
Choose serial port 1 & 2's I/O address Do not set port 1 & 2 to the same value except for
Disabled.

Onboard Serial Port 2
COM 1/3F8H  COM/3E8H
COM 2/2F8H  COM/2E8H (default)

Onboard Parallel Port
Choose the printer I/O address:
3BCH/IRQ7 (default), 278H/IRQ7, 278H/
IRQ5

Onboard Printer Mode
Choose Compatible (default), Extend or
EPP, ECP mode. The mode depends on your
external device that connects to this port.

3. After you have finished with the Chipset Features Setup, press the <ESC> key and follow the screen instructions to save or disregard your settings.

2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn/+/- keys.

Power Management

The Power Management Setup option sets the system's power saving functions.

Run the Power Management Setup as follows.

1. Choose "POWER MANAGEMENT SETUP" from the Main Menu

ROM PCI / ISA BIOS
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management
Disabled
Fast C ache By APM
3s
Video Off Method
 Till 24Hrs - Mans
Suspend Drink
Disabled

ROM PCI / ISA BIOS
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management
Disabled
Fast C ache By APM
3s
Video Off Method
 Till 24Hrs - Mans
Suspend Drink
Disabled

2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn/+/- keys.

A short description of selected screen items follows:

Power Management Options are as follows:

User Define

Let's you define the HDD and system power
down times.

Disabled

Disables the Green PC Features.

Min Saving

Dose Mode = 40 Min.,
Standby Mode = 40 Min.

Suspend Mode = 40 Min.

PCI Configuration Setup

This option sets the mainboard's PCI Slots. Run this option as follows:

1. Choose "PCI CONFIGURATION SETUP" from the Main Menu and the

following screen appears. (The screen below shows default settings.)

ROM PCI / ISA BIOS
PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.

PCI Master Activity
xxx Ports Activity
IRQs

The hardware monitors the master signals for
activity. If activity occurs from the Enabled item the system
will not enter Green mode (power saving).

The BIOS monitors these ports for activity.
If activity occurs from the Enabled item the system
will wake up from Green mode (power saving).

The BIOS monitors these IRQs for activity. If activity occurs from the Enabled item the system
will wake up from Green mode (power saving).

3. After you have finished with the Power Management Setup, press the

<ESC> key to return to the Main Menu.
**BIOS Setup**

**PCI IDE IRQ Map**

Select PCI-AUTO, ISA, or assign a PCI number (depending on which slot the PCI IDE is inserted). The default setting is PCI-AUTO. If PCI-AUTO does not work, then assign an individual PCI SLOT number.

**Primary IDE INT#**

Choose INTA#, INTB#, INTC#, or INTD#.
The default setting is INTA#.

**Secondary IDE**

Choose INTA#, INTB#, INTC#, or INTD#.
The default setting is INTB#.

**Master Arbitration**

Choose Weak (default) or Strong. Protocol Choose Weak and the CPU has 1st priority, 2nd is PCI and 3rd is Master Device. Choose Strong and the CPU, PCI, and Master Device all have the same priority.

**CPU -> PCI Mem Post Write Buf**

Choose Enabled or Disabled.

**CPU -> PCI Mem Burst/Write**

Choose Enabled or Disabled.

**PCI Master Burst Read/Write**

Choose Enabled or Disabled.

3. After you have finished with the PCI Slot Configuration, press the <ESC> key and follow the screen instructions to save or disregard your settings.

**Load Setup Defaults**

This item loads the system values you have previously saved. Choose this item and the following message appears:

"Load SETUP Defaults (Y/N)? N"

To use the SETUP defaults, change the prompt to "Y" and press <<Enter>>.

---

**BIOS Setup**

**Password Setting**

This Main Menu item lets you configure the system so that a password is required every time the system boots or an attempt is made to enter the Setup program. Change the password as follows:

1. Choose "PASSWORD SETTING" in the Main Menu and press <Enter>. The following message appears:<R>

   "Enter Password:"

2. Enter a password and press <<Enter>>. (If you do not wish to use the password function, you can just press <Enter> and a "Password disabled" message appears.)

3. After you enter your password, the following message appears prompting you to confirm the new password:<R>

   "Confirm Password:"

4. Re-enter your password and then press <<ESC>> to exit to the Main Menu.

**Important:** If you forget or lose the password, the only way to access the system is to set jumper JP5 to clear the CMOS RAM. All setup information is lost and you must run the BIOS setup program again.

**IDE HDD Auto Detection**

This Main Menu item automatically detects the hard disk type and configures the STANDARD CMOS SETUP accordingly.

**Note:** This function is only valid for IDE hard disks.