

1. INTRODUCTION

The R-418 PCI 486 mainboard is a high performance PC system board that supports all 486 serials CPU, and offers CPU voltage Auto-Detect 5v to 3.3v/3.45v/3.6v/3.75v/3.9v.

This board is designed with chipset 85C496/497. Which is based on PC/AT fully compatible with ISA Bus and PCI Local Bus, On-board Local Bus IDE two ports, two serial and one parallel.

There are some new feature allows you to operate the system with just the performance you want, and this manual also explains how to install the mainboard hardware for operation, and how to setup CMOS Configuration with BIOS Setup program.

Main Features

The R418 PCI486 has many performance and system features integrated onto the mainboard, includeing the following:

- Supports most 486-type CPUs including Pentium OverDrive CPUs and SL enhanced versions, both 5-volt and 3.3-volt degree, Intel CPU and others. (AMD and Cyrix...)
- Power management "Green" features controlled via the BIOS Setup utility. Four Power Saving states.
- Supports the APM control and Sleep (Break) switch devices.
- On-board voltage regulator for low-voltage CPUs.
- High-performance write-back "Level 2" external static RAM cache in 128K, 256KB 512K and 1M options.
- Uses 72-pin and 30-pin DRAM modules in multiple configurations up to 255MB, "Table Free" DRAM SIMMs configuration.
- Four 16-bit ISA slots and three 32-bit PCI expansion slots, with one shared slot position. The PCI slots are Bus Master capable.
- On-board Local Bus IDE controller with two connectors supports four IDE devices in two channels at faster data transfer rates and direct support for large hard disk and other Enhanced IDE devices.
- On-board I/O chip: 16550 Fast UART compatible, supports 2 serial ports, 1 parallel port with EPP and ECP capabilities, a floppy disk drive connector which supports 2 drives up to 2.88MB.
- System BIOS support for Enhanced IDE up to four IDE hard disks or other IDE devices, and support for hard disks larger than 528MB and up to 8.4GB.

- Auto detection of installed IDE hard disk drives with an auto-detection utility into the system BIOS.
- Support floppy disk with the Flash Memory Writer BIOS update utility and Enhanced IDE software drivers for DOS, Windows, Netware and OS/2.

Static Electricity Precautions

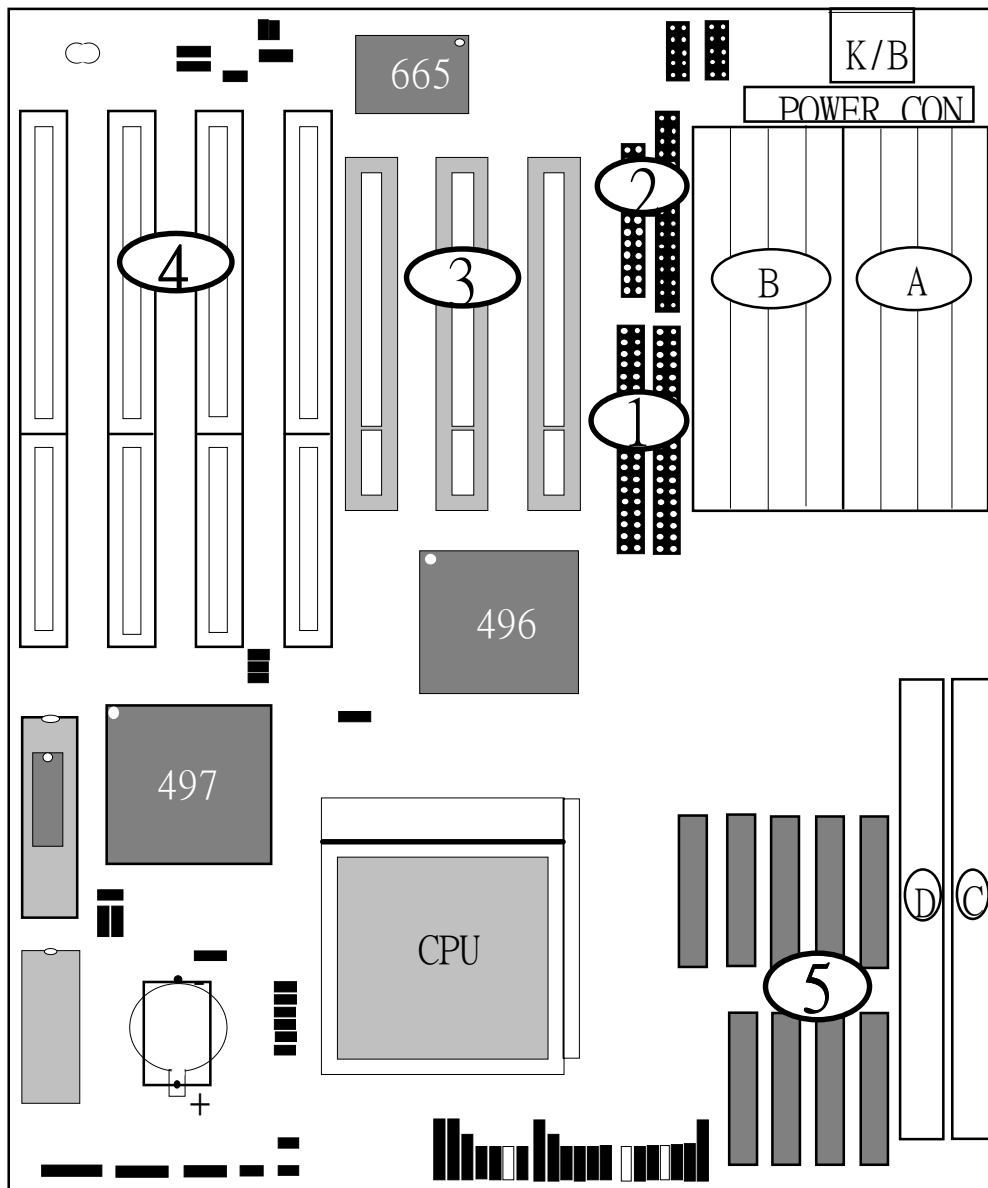
Make sure you ground yourself before handling the system board or other system components.

Electrostatic discharge can easily damage the components. Note that you must take special precaution when handling the system board in dry or air-conditioned environments.

Take these precautions to protect your equipment from electrostatic discharge:

- Do not remove the anti-static packaging until you are ready to install the system board 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 system board by the edges and avoid touching its components.

R418 Mainboard Layout



1. Local Bus IDE ports
2. I/O Connectors
3. PCI Bus slots
4. ISA Bus slots
5. L2 External Cache sockets

A,B : 30 Pin SIMM banks
C,D : 72 Pin SIMM banks

Insert the card into the slot by pressing it firmly downward. If there is a lot of resistance, make sure the slot connectors are lined up correctly. PCI cards require very little pressure to insert.

5. Attach the card's mounting bracket to the case using the slot cover screw you put aside in Step 2.

6. Close the case, turn on the computer and check to see if the card is working properly, and do any software set up required.

Assigning System IRQs for Expansion Cards

Both the ISA and PCI buses may need to use IRQs. You must configure any IRQ assignments so that the system can know which bus is using a particular IRQ. You must assign IRQs correctly, or the mainboard will not work properly.

As mentioned in Chapter 1, there are 16 IRQs available. In an ISA design, some of them are already in use by standard parts of the system such as the keyboard or mouse. Drawing from the unused group of System IRQs, you can assign an IRQ to either bus. Since both bus designs use IRQs, we differentiate them by referring to the IRQs assigned to the ISA bus as ISA IRQs and to the PCI IRQs. There is an IRQ reference chart in Chapter 4.

The two bus designs deal with IRQs differently. In the ISA bus, the IRQs are available to every slot and you define which IRQ is in use by configuring the IRQ number on the expansion card you want to install. You can then install the card in any available slot.

In the PCI design you assign an IRQ to a PCI slot rather than doing it on a card. For PCI cards, you only need to set something called the "INT" assignments. Since all the PCI slots on this mainboard use "INTA#", you only need to make sure that any PCI card you install is set to INTA, for PCI cards that use an IRQ, you can assign IRQs by using the BIOS Setup Utility. See the section on PCI Slot Configuration in Chapter 3.

You do not need to assign a System IRQ to a PCI slot unless you install a card in it that needs an IRQ. The default IRQs for the PCI slots will not be used if there is no card installed in the slot and the IRQ routing method is not set to 'Level/Forced'. If you don't assign System IRQ to a PCI slot in the Setup Utility, the unused IRQs are available to the ISA bus.

Upgrading System Memory

This section explains how to install more system memory. There are instructions on how to configure and install memory and explanation of the technical specifications required.

System DRAM is the main source of data for the CPU. Data remains stored in DRAM as long as the system is turned on, and is lost when you turn it off. The Level 2 cache memory is Static RAM (SRAM), which is faster than DRAM memory. When the CPU looks for data, it first searches the cache. If the information is not there,

the search continues in the DRAM. With this design, the CPU looks in the fastest source of data first, which lets it operate as fast as possible.

The DRAM subsystem uses memory chips permanently mounted on small circuit boards to form "SIMMs" (Single In-line Memory Modules). The memory chips have a speed rating that is measured in nanoseconds(ns). This mainboard requires fast page mode DRAM with a speed of at least 70ns.

This mainboard can use 72-pin SIMMs in seven sizes:1MB,2MB,4MB,8MB,16MB,32MB and 64MB(megabytes). Depending on the combination of modules you use, you can install between 1MB and 128MB. The 32-bit modules used for this board come with memory chips on either one or both sides of the module.

Configuring System Memory

If you want to add system memory, use the configuration options and specifications shown in this section.

Memory Combinations

You can configure the system memory in a variety of ways, using different combinations of SIMM modules. You can use any combination of modules as long as they are the same speed. You can install a single module in either socket without regard to socket order.

The only restrictions are:

- . Both modules must be the same speed.
- . Required Memory Specifications:
 - Module Size:1MB,2MB,4MB,8MB,16MB,32MB or 64MB
 - DRAM Mode:Fast page Mode
 - DRAM Speed:70ns(or faster)
 - RAS access time (Trac):60ns-70ns
 - CAS access time (Tcac):10ns-25ns
 - Parity:Either parity or non-parity

Installing SIMMs

To install SIMMs follow these instructions:

1. The modules will only insert in a socket in one orientation. An orientation cut-out will prevent you from inserting them the wrong way. See the figures at right.
2. Press the module edge connector into the socket at a moderate angle to the board. See the figures below.
3. Press the module forward onto the socket's vertical posts, so that the alignment pins at the top of each post go into the circular holes at each end of the module.
4. The module should click into place, as the retaining clips at each end of the socket snap behind the module to secure it.
5. Repeat this procedure for each module you install.

Updating the Flash BIOS

This mainboard has two BIOS ROMchip options. It can use either of two programmable 'flash' EPROM chips, 5-volt or 12-volt, either of which you can update when BIOS upgrades are available.

Jumpers JP32&33 enable programming for the voltage of the BIOS ROM chip installed. With programming enabled, you use the Flash Memory Writer utility to update the BIOS. The jumper settings are in Chapter 4 and instructions for the FMW utility are in Chapter 3.

Note: When you finish programming, always set the JP32&33 back to the default EPROM setting which disables programming and is also for Normal Read of either voltage flash chip.

Installing A CPU Upgrade

If you want to improve your system performance, you can install an upgrade CPU in the ZIP socket. You must first remove the existing CPU, and then set the CPU selection jumpers for the new CPU.

Be sure to follow static electricity precautions very carefully. The CPU is one of the most expensive parts of your system and can be damaged or destroyed by static electric discharge.

There are several jumpers you need to set when changing the CPU. The jumpers settings define these specifications:

CPU type-the kind of CPU is installed

External Clock Speed-the external operation speed. This is also the speed the VL and PCI bus will operate at.

Intel DX4 Internal Clock Speed-the number by which the external clock speed is multiplied, the result of which is the internal clock speed.

You must have all of this information ready before you can install a CPU upgrade. Remember that the chip speed will be listed according to the faster internal clock speed. The chart below shows some examples:

To check what jumper settings are required to upgrade the CPU, refer to the Jumper Setting Summary in Chapter 4. Make sure to take full precautions against static electric discharge before you work on the board. To install an upgrade CPU first do as follows:

1. Identify the existing external clock speed setting on the board. The external clock speed is set by jumpers JP26,JP27 and JP28,

the options are 25MHz,40MHz and 50MHz.

2. Identify the external clock speed of the CPU you will install. If the external clock speed is the same as the mainboard's existing setting, proceed. If it is different, change the JP26-28 setting to the required speed.
3. Identify the CPU type and check what the required jumper settings for JP18 through JP24 are for that type. If you are installing any IntelDX4 or a Cyrix DX2-V CPU you will also need to set JP7 for the correct voltage.
4. Once you have made any required jumper settings, you can install the CPU chip in the Socket 3 ZIF socket. Refer to the next page for unstructions on this if you're not familiar with how to use the Zero Insertion Force socket.

Software Guide

This chapter explains the Setup Utility for the Award BIOS, the SCSI BIOS and drivers, and the system BIOS flash memory update utility.

Award BIOS Setup

All computer mainboards of this type have a 'Setup' utility program stored in the BIOS ROM that is used to create a record of the system configuration and settings. If you received your mainboard installed as part of a system, the proper entries have probably already been made. If so, you might want to call up the Setup Utility, as described later, to take a look at them, and perhaps record them for future reference, particularly the hard disk specifications.

If you are installing the board or reconfiguring your system, you'll need to enter new setup information. This section explains how to use the program and make the appropriate entries.

The Setup Utility is stored in the BIOS ROM. When you turn the computer on, a screen message appears to give you an opportunity to call up the Setup Utility. It displays during the POST (Power On Self Test). If you don't have a chance to respond, reset the system by simultaneously typing the <Ctrl>, <Alt> and <Delete> keys or by pushing the 'Reset' button on the system cabinet. You can also restart by turning the system OFF then ON.

This message will then reappear:

TO ENTER SETUP BEFORE BOOT PRESS CTRL-ALT-ESC OR DEL KEY

After you press the key the main program screen will appear, displaying the following choices.

This screen provides access to the utility's various functions.

Note: The 'BIOS Defaults' are minimized settings for troubleshooting. Use the 'Setup Defaults' to load optimized defaults for regular use. If you choose defaults at this level, it modifies all applicable settings.

A section at the bottom of the screen explains the controls for this screen. Use the arrow keys to move between items, <Shift>+<F2> to change the color scheme of the display and <Esc> to exit the utility.

If you want to save changes, press the <F10> key to save the changes you made and exit the utility. Another section at the bottom of the screen displays a brief explanation of the item highlighted in the list.

Standard CMOS Setup

'STANDARD CMOS SETUP' records some basic system hardware information and sets the system clock and error handling. If your mainboard is already installed in a working system you will not need to do this. If the configuration record which gets stored in the CMOS memory on the board is lost or corrupted, or if you change your system hardware configuration record can be lost or corrupted if the onboard battery that maintains it weakens or fails.

'STANDARD CMOS SETUP' displays a screen with a list of entries. Follow the on-screen instructions to move around the screen. Instructions at the bottom of the screen list the controls for this screen. Use the arrow keys to move between fields, and

the<Page Up> ('PU'),<Page Down>('PD') or plus and minus keys to change the option shown in the selected field. Pressing<shift>+<F2> changes the color scheme of the display, and <Esc> exits this level and returns to the main screen.

Modifiable fields appear in a different color. If you need information about what changes to make, press the<F1>key. The help menu will then give you information on the item highlighted. The display of available memory at the lower right-hand side of the screen functions automatically.

Date & Time

the first two lines on the screen are the date and time settings for the system clock. You can correct them if they are wrong.

Hard Drive Type

You must enter the specifications of certain types of hard disk drive if they are installed in your system. MFM,ESDI and IDE hard disks all need to have their specifications recorded here.

If you have one or more SCSI hard disks installed in your system, you do not need to enter their specifications here. SCSI drives operate using device drivers and are not supported directly by any current PC BIOS. If your mainboard has the SCSI controller card option, and you will use it, see the SCSI instructions that follow later in this section. If you have some other SCSI controller, follow the instructions that came with it on how to install any required SCSI driver.

There are four hard disks listed "Primary Master", "Primary Slave", "Secondary Master" and "Secondary Slave". For each IDE channel, the first device is the 'master' and the second device the 'slave'. Note that these refer to the physical drive (think of them as 'Drive 1' and 'Drive 2' etc.), not to any logical drives or partitions you might create under an operating system such as MS-DOS. You can install only two MFM or ESDI hard disks, which require a separate controller card, as "Primary Master" or "Primary Slave". If you use the onboard Local Bus IDE controller which supports Enhanced IDE features, you can install four IDE hard disk drives.

To enter the specifications for an MFM or ESDI hard disk drive, you must first select a 'type'. You can select the "User" option and enter the specifications yourself manually or there are 46 pre-defined drive specifications which you can look through to see if the specifications for your drive are assigned a type number. Do this by using the<Page Up> or <Page Down> key to change the option listed after the drive letter.

For an IDE hard drive, you should use the auto-detection utility described later to enter the drive specifications automatically. If you want to do this, leave the drive set to "None". You can enter the specifications yourself manually by using the User option if you want to.

There are six categories of information you must enter. "Cyls" (number of cylinders), "Heads"(number of read/write heads), "Precomp"(write precompensation), "LandZone"(landing zone), "Sectors"(number of sectors) and "Mode". The hard disk vendor's or system manufacturer's documentation should provide you with the drive specifications. If you have an IDE drive, unless your drive is already formatted with specifications different from those detected by the auto-detection feature to enter the drive specifications.

