Overview

Based on the new highly integrated VIA VT82C590 VP2, the PAK-2005 mainboard combines blistering Intel Pentium® processor performance with support for intelligent diagnostic and power management features to provide a powerful and versatile LPX-size platform for leading-edge PC '97 compliant multi-media systems.

With its switching voltage regulator, the PAK-2005 runs a complete range of Intel Pentium® processors, including the Intel Pentium processor with MMX™ technology, as well as the AMD-K5™/-K6™ and Cyrix/IBM 6x86™/6x86MX™ processors. For added power and performance, the PAK-2005 takes up to 1MB Pipeline Burst Level II cache and up to 256MB DRAM via two 72-pin SIMM sockets and two 168-pin DIMM sockets which accepts high-speed EDO, and lightning-fast SDRAM memory types.

Built on the highly concise LPX form factor, the PAK-2005 comes with a full set of I/O features conveniently integrated on the rear I/O panel. The board also has an integrated PCI Bus Master Enhanced IDE controller with support for the new Ultra DMA/33 protocol, which doubles ATA-2 Hard Disk Drive data transfer rates to 33MB/sec while maintaining full backwards compatibility with existing PIO Mode 3, PIO Mode 4 and DMA Mode 2 devices.

Fully compliant with the Microsoft PC'97 standard at both the hardware and BIOS levels, the PAK-2005 comes with support for intelligent Hardware Monitoring and DMI features which continuously check the thermal status of your system and reduce the cost of ownership through improved manageability.

The S3® Trio64 V2/DX™ VGA controller offers 135MHz output pixel data rates with non-interlaced screen resolutions of up to 1280x1024x256 colors at 75Hz (2MB video RAM). The S3 Trio64 enables the system to have a higher performance under Windows and other GUI (Graphics User Interface) environments.

This chapter gives a you a brief overview of the PAK-2005 mainboard. In addition to basic information on the board's main components and features, it also provides advice on how to upgrade and expand it. For updated BIOS, drivers, or product release information, please visit FIC's home page at: http://www.fic.com.tw. Congratulations on your decision to adopt the PAK-2005 mainboard. With its high-speed EISA local bus architecture and ultra-fast I/O connections, the PAK-2005 provides the ultimate solution for optimizing the performance of your high-end system.

Main Features

The PAK-2005 mainboard comes with the following high-performance features:

■ **Easy Installation**
Award BIOS with support for Plug and Play, auto detection of Hard Drive and IDE features, MS Windows 95®, and Windows NT® compatible to make setup of hard drives, expansion cards, and other devices virtually automatic.

■ **Flexible Multi-Processor/Multi-Speed Support**
Onboard 321-pin ZIF socket and switching voltage regulator supports a complete range of leading-edge processors:
Intel Pentium® with MMX™ technology (P55C) 166/200/233 MHz processors.
Intel Pentium® (P54C/P54CS) 90/100/120/133/150/166/200 MHz processors.
Cyrix® 6x86™ PR133+ - PR166+ (Rev 2.7 and later) processors.
Cyrix® 6x86MX™ PR166-PR266 processors.
AMD-K5™ 90-200MHz processors.
AMD-K6™ 166-300MHz processors.

■ **Various External Bus and CPU to Bus Frequency Ratio Support**
The mainboard supports the Bus frequency for 55 / 60 / 66.6 MHz and CPU to Bus frequency ratio of 1x / 1.5x / 1.75x / 2x / 2.5x / 3x / 3.5x / 4x / 4.5x. (Refer to Select Frequency and Voltage of Chapter 2 for more information.)

■ **Leading Edge Chipset**
VIA VT82C590 VP2 chipset, including a CPU interface controller, advanced cache controller, integrated DRAM controller, synchronous EISA bus controller, integrated power management unit.

■ **Ultra-fast Level II Cache**
Supports 256KB/512KB/1MB (onboard 512KB) synchronous Pipelined Burst SRAM direct-mapped write-back cache memory.

■ **Versatile Main Memory Support**
Accepts up to 256MB RAM in two banks using 72-pin Fast Page Mode (FPM) or Extended Data Out (EDO) SIMMs of 4, 8, 16, 32, 64MB or using two 168-pin 3.3Volt DIMMs for SDRAM or EDO memory modules up to 128MB. SIMMs and DIMMs cannot be used at the same time.

■ **EISA Expansion Slot**
One 32-bit EISA expansion slot provides all the room you need to install a full range of add-on cards by first inserting a riser card.

■ **USB Support**
Onboard support for two Universal Serial Bus connectors via a plug-in connector.

■ **Enhanced Master Mode PCI IDE Controller**
Comes with an onboard **Ultra DMA/33 Bus Master IDE** controller with two connectors that supports four IDE devices such as Hard Disk via two channels for high speed (33MB/sec) data throughput. This controller supports PIO Modes 3 and 4, and Bus Master IDE DMA Mode 2 for optimized system performance.

■ **Super Multi I/O**
Integrated SMC FDC37C932 Plug and Play Super I/O chipset features two high-speed 16550A UART compatible serial ports, one EPP/ECP capable parallel port, one IR port, and one Floppy Disk Drive connector. UART2 can also be directed from COM2 to the Infrared Module for wireless connections.

■ **Onboard IrDA Connector**
An optional infrared port module for wireless interface is available.

Advanced Features

This mainboard comes equipped with the most advanced new features that not only optimize the performance of the latest processors but also enhance the manageability, power management capabilities, and user-friendliness of your system. This section provides detailed information on these features, and how they are implemented on the mainboard.

■ **Optimized Intel MMX™ Performance**
The mainboard utilizes the advanced features of the VIA VT82C590 VP2 to optimize the unrivaled performance of the Intel Pentium® processor with MMX™ technology, allowing you to enjoy a richer video, audio, digital imaging and communications experience from the latest generation of multimedia software. To provide you with additional flexibility, the mainboard also supports other leading-edge processors featuring Intel's MMX™ technology, including the AMD-K6™ processor.

■ **Lightning-Fast SDRAM Performance**
The mainboard supports the new generation of lightning-fast SDRAM (Synchronous Dynamic Random Access Memory) via its two onboard 168-pin DIMM sockets. SDRAM delivers an added boost to overall system performance by increasing the CPU-to-memory data transfer rate to 528MB/sec compared to 264MB/sec for conventional EDO DRAM. SDRAM performance on the PAK-2005 is further boosted by the mainboard's integrated IC controller, which optimizes the memory timing settings.

■ **Blistering Ultra DMA/33 Hard Disk Drive Performance**
With its integrated Enhanced PCI Bus Master IDE controller that supports the new Ultra DMA/33 protocol, this mainboard doubles Hard Disk Drive data transfer rates to 33MB/sec, compared to 16MB/sec for conventional PIO Mode 3, PIO Mode 4, and DMA Mode 2 devices. By reducing the CPU's workload and increasing CPU utilization, Ultra DMA/33 significantly improves system performance when running applications under Windows 95® and Windows NT® environments. The Ultra DMA/33 protocol is completely backward compatible with conventional ATA-2 Hard Disk Drive devices; so the mainboard also supports existing PIO Mode 3, PIO Mode 4 and DMA Mode 2 devices using the same cable.

With the integrated Enhanced PCI Bus Master IDE controller you can connect up to four Enhanced IDE peripheral devices to your system. All devices are categorized in the same way that IDE hard disks were configured in the past, with one device set as the master device and the other as the slave device. We recommend that Hard Disk Drives use the primary IDE connector and that CD-ROM Drives utilize the secondary IDE connector for optimum system performance.

■ **Concurrent PCI Architecture**
The mainboard's Concurrent PCI Architecture enables more efficient operation of CPU, PCI and ISA transactions for faster and smoother multimedia performance. It also allows the use of PCI 2.1 and 2.0 compatible add-in cards for long system life, built-in scalability and the flexibility to adapt your system for future applications.

■ **PC '97 Compliant**
This mainboard is fully compliant with the new PC '97 standard at both the BIOS and hardware levels. PC '97 is a set of hardware, Bus and device design requirements set by Microsoft in conjunction with other industry leaders aimed at making PCs easier to use by maximizing cooperation between the operating system and hardware.
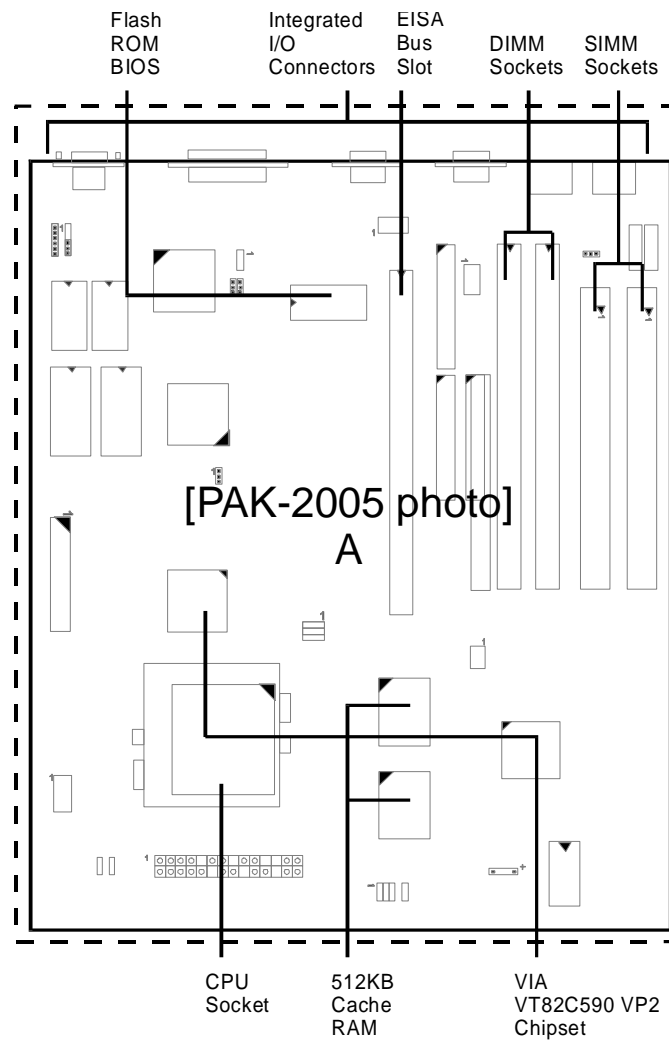
The system design requirements under PC '97 supports a synergy among PC hardware, Microsoft Windows® Operating Systems, and Windows®-based software. Key elements include support for Plug and Play compatibility and power management for configuring and managing all system components, and 32-bit device drivers and installation procedures for both Windows® 95 and Windows® NT.
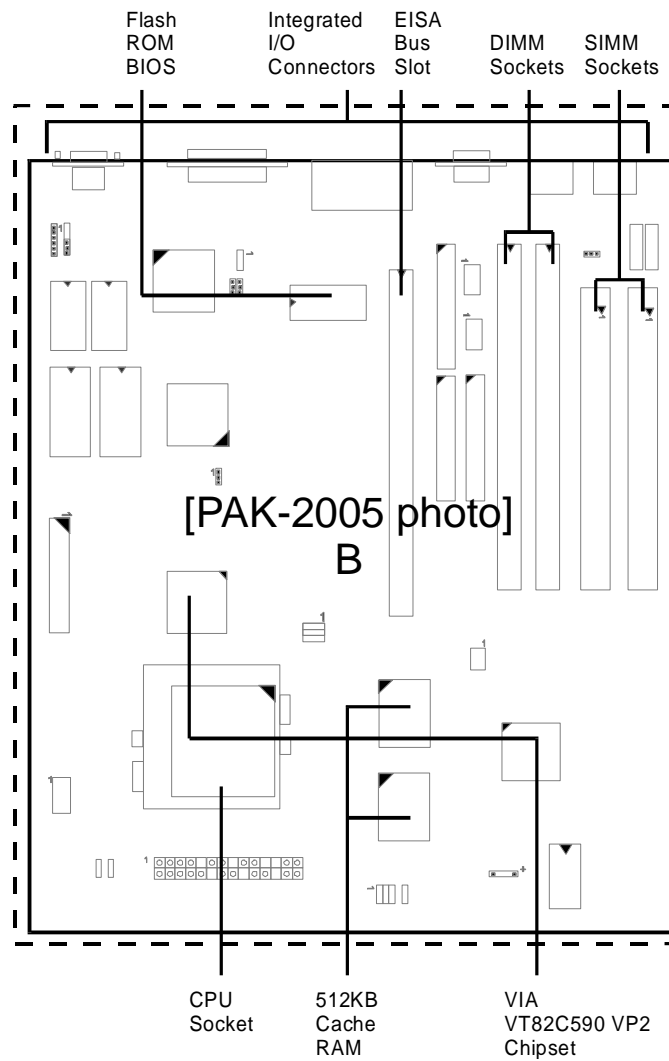
Package Checklist

Please check that your package contains all the items listed below. If you discover any item is damaged or missing, please contact your vendor.

- ☑ The PAK-2005 mainboard

- ☑ This user's manual

- ☑ Support software drivers and utilities

- ☑ One floppy disk drive ribbon cable

- ☑ One IDE hard disk drive ribbon cable

- ☑ One COM2 cable (optional – if the current mainboard has an onboard USB port)

- ☑ One USB cable (optional – if the current mainboard has an onboard COM1 and COM2 port)

Mainboard Layout
(with onboard COM1 and COM2 ports)

Flash   Integrated   EISA   DIMM   SIMM
ROM   I/O   Bus   Sockets   Sockets
BIOS   Connectors   Slot

[PAK-2005 photo]
A

CPU   512KB   VIA
Socket   Cache   VT82C590 VP2
               RAM   Chipset

Mainboard Layout (with onboard USB port)

Flash ROM BIOS   Integrated I/O Connectors   EISA Bus Slot   DIMM Sockets   SIMM Sockets

[PAK-2005 photo]
B

CPU Socket   512KB Cache RAM   VIA VT82C590 VP2 Chipset

This User's Manual

This manual is designed to guide you and facilitate your use of the PAK-2005 mainboard. It contains a description of the design and features of the mainboard, and also includes useful information for changing the configuration of the board and the system it is installed in. The manual is divided into three chapters, which contain the main body of information normally referred to by users.

■ Chapter 1 — **Overview**
gives an overview of the mainboard and describes its major components and features.

■ Chapter 2 — **Installation Procedures**
gives instructions on how to set up the mainboard, including jumper settings and CPU installation guides.

■ Chapter 3 — **Award BIOS Setup**
briefly explains the mainboard's BIOS system setup in general and tells you how to run it and change the system configuration settings.

> **NOTE :** The materials in this manual are for information only and is subject to change without notice. We reserve the right to make changes in the product design without reservation and without notification to its users. We shall not be liable for technical or editorial omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

Something Interesting

This section provides useful information that you will need to know should you decide to modify or upgrade the configuration of the mainboard and the system it is installed in. If you do not have the confidence to upgrade the mainboard yourself, we advise that you consult a qualified service technician for assistance.

The BIOS Setup Utility

The BIOS (Basic Input Output System) is the basic firmware that instructs the computer on how to operate. For the BIOS to work properly, there must be a record of the computer's hardware and configuration settings for it to refer to. This record is created using the Setup Utility, a program that is stored permanently in the BIOS ROM chip on the mainboard.

The system configuration record created by the Setup Utility is also stored on the mainboard, but not permanently. This section of the memory it is stored in is the NVRAM.

When you buy your computer, the system configuration record will already be set and may in some cases differ from the basic defaults. The first time you use your computer or when you need to re-configure your system, you should run the Setup Utility and write down the settings. Please see Chapter 3 for an explanation on how to run the Setup Utility.

IRQ Functionality

As you read through this manual, you will see the term IRQ on a number of occasions. It is important for you to know what this term means, particularly if you intend to upgrade your system.

IRQ stands for Interrupt Request, the process in which an input or output device tells the processor to temporarily interrupt its current task and immediately process something from the source of the interrupt. When it has completed this, the processor returns to the task it was already processing. Devices that need an IRQ line to operate sometimes need to have exclusive use of that line.

A large number of add-on cards, such as sound cards and LAN cards, require the use of an IRQ line to function. Some number of IRQs may already be in use by components in the system such as the keyboard and mouse. Add-on cards that need to use an IRQ draw from the unused group of IRQs. When installing a card that uses an IRQ, it will have a default IRQ setting which you might have to change if that IRQ is already in use and cannot be shared.

An ISA add-on card may need to use IRQs. System IRQs are available to add-on cards installed on the ISA bus. There are two categories of ISA add-on cards: so-called Legacy ISA cards, which need to be configured manually and then installed in the available ISA slot; and Plug and Play (PnP) ISA cards, which are configured automatically by the system. As a result, when you install Legacy ISA cards, you have to carefully configure the system to ensure that the installed cards do not conflict with each other by having the same IRQ. With PnP cards, on the other hand, IRQs are assigned automatically from the ones available in the system.

DMA Channels of ISA Cards

Some Legacy and PnP ISA add-on cards may also need to use a Direct Memory Access (DMA) channel. DMA assignments for this mainboard are handled in the same way as the IRQ assignment process outlined above. For more information, please refer to Chapter 3 of this manual.

Enhanced IDE

This mainboard features an integrated Enhanced IDE controller that provides convenient, high-speed connections with up to four IDE devices, such as Hard Disk, CD-ROM and Tape Backup Drives. Enhanced IDE is an upgrade of the original IDE specification and provides increased capabilities and performance in a number of areas, including support for Hard Disk Drives utilizing the PIO Mode 4 timing scheme.

With the integrated IDE controller, you can connect up to four IDE peripheral devices to your system. All devices are categorized in the same way that IDE Hard Disks were configured in the past, with one device set as the Master device and the other as the Slave device. We recommend that Hard Disk Drives use the Primary IDE connector and that CD-ROM drives utilize the Secondary IDE connector for improved system performance.

Infrared Connections

This mainboard features support for highly-sophisticated IR technology, which allows bi-directional and cordless data transactions with other IrDA compliant computers and peripheral devices using infrared as a medium. This transmission is carried out in either Full Duplex Mode or Half Duplex Mode. The former allows simultaneous data transmission and reception, while the latter disables the reception when transmission occurs.

The I/O chipset on this mainboard features an IR (SIR and FIR) interface that is fully compliant with the IrDA standard. An IrDA device can be installed via a 9-pin D-SUB connector in the rear panel of the computer which is linked by a cable to the onboard IrDA pinhead.

The serial port COM2 on this mainboard is designed to be an IR compliant port. If you wish to install the IR connection feature, you need to adjust the BIOS option for high-speed performance.
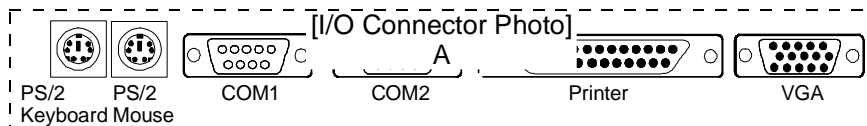
Highly Convenient Integrated I/O Connectors

This mainboard features an integrated rear I/O panel that incorporates a full set of I/O ports to allow simple and convenient connections to a complete selection of external peripheral devices. It supports state-of-the-art USB technology which provides high-speed and easy-to-use Plug & Play connections to the future generation of external peripherals, such as keyboards, mouse, monitors, game devices, scanners, printers, and fax/modems.
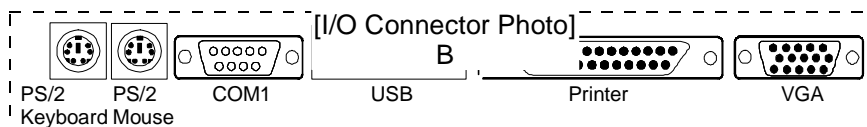
USB overcomes conventional I/O bottlenecks by combining the I/O ports into a single dual-channel connector that supports up to 120 devices. For optimum ease of use and flexibility, USB not only allows the automatic detection and configuration of peripherals after installation, but also enables the simultaneous connection of up to 63 devices.

This mainboard comes with either an onboard USB port (for the exact location see page 42 of chapter 2) or an optional USB connector bracket that is connected by a cable to the onboard USB pinhead. The bracket can be installed in one of the I/O expansion slots on the rear panel of the system. It provides fast and convenient Plug and Play peripheral connections outside the computer, allowing you to take full advantage of the universal functionality and flexibility of USB technology.

I/O Connector With Onboard COM1 and COM2 Ports

[I/O Connector Photo]
A

PS/2 Keyboard   PS/2 Mouse   COM1   COM2   Printer   VGA

I/O Connector With Onboard USB Port

[I/O Connector Photo]
B

PS/2 Keyboard   PS/2 Mouse   COM1   USB   Printer   VGA

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