Chapter 1
Introduction

P5/P54C-SP motherboard is a high performance system hardware based on Intel Pentium processor and is equipped with four PCI slots and four standard ISA slots for the future expansion. The hardware dimension is 220mm * 270mm with four layer design technology.

PCI (Peripheral Component Interconnect) interface provides 32-bits data path to the CPU which increases system performance and keeps compatibility with standard PC system.

Specification

- Intel **Pentium** Processor at 60/66Mhz(**P5-SP**) with 273 pins ZIF socket or 90/100Mhz(**P54C-SP**) with 320 pins ZIF socket.
- Supports up to 128 MegaBytes (minimum of 2 MB) on board. The combination of memory could be 72 pins 32-bits SIMM module (32M*4 - double bank) or 72 pins 32-bits SIMM module (64M*2 - single bank).
- Supports Secondary level **Write Through** and **Write Back** Cache mode. The cache memory combination could be 256KB/512KB/1MB (32KB*8, 64KB*8, or 128KB*8 DIP SRAM respectively).
- Support four 16 bits ISA slots and four 32 bits PCI slots. P5-SP supports four PCI Bus Masters and **"Rotating Priority Mechanism"** - a jumperless PCI INT# control scheme which reduces configuration confusion when plug in PCI I/O controller card(s).
- Support Award BIOS . The BIOS is stored either in ROM or in Flash ROM (optional) form. It provides better upgradeability for the user when Flash ROM is installed in the system.
- Supports Pentium CPU SMM (System Management Mode).
- Supports hardware Turbo switch as well as BIOS hot key switching.
- P5/P54C-SP utilizes Lithium battery which provides environmental protection and longer life time.

P5-SP Layout

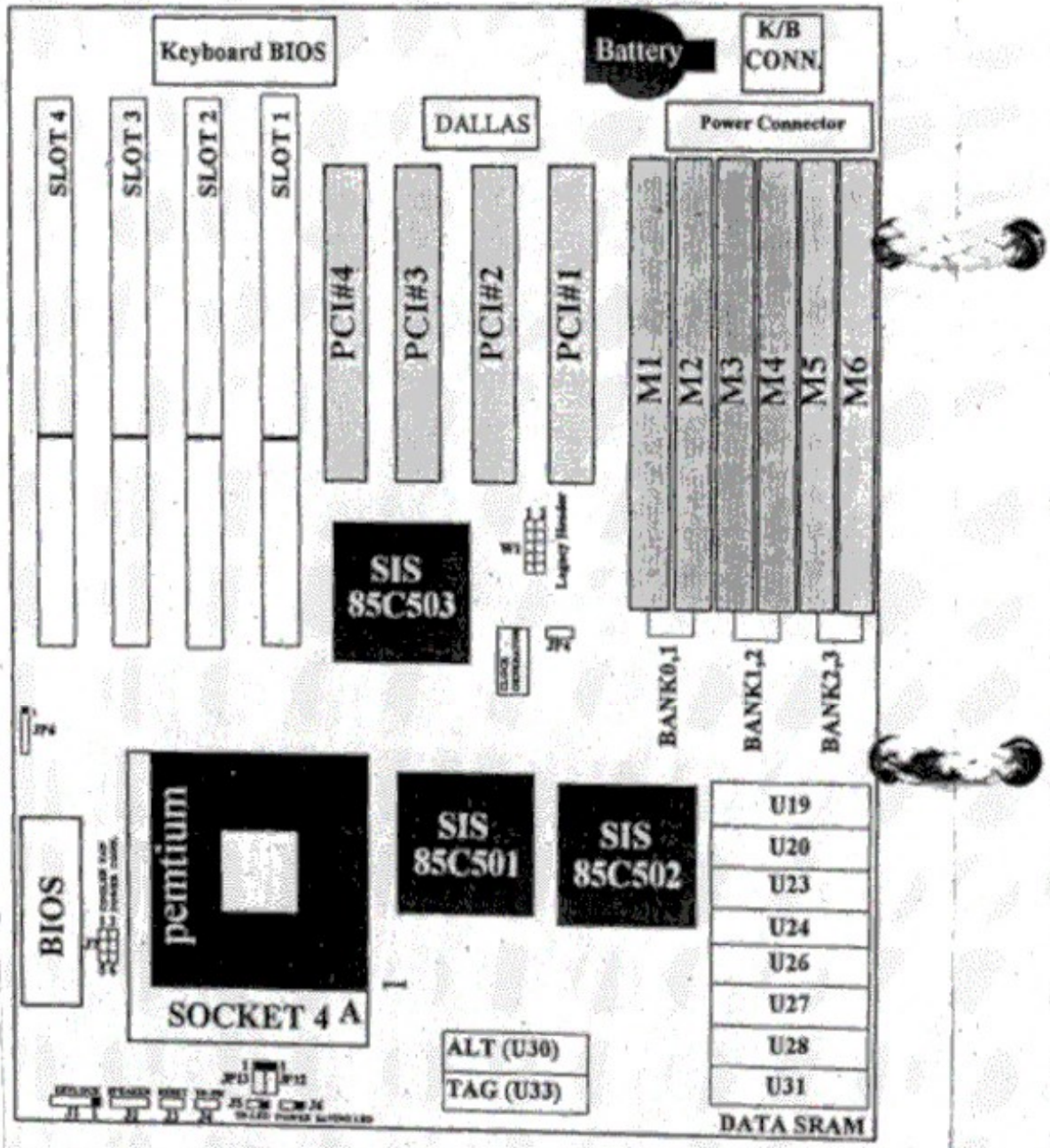


Figure 1-1

P54C-SP Layout

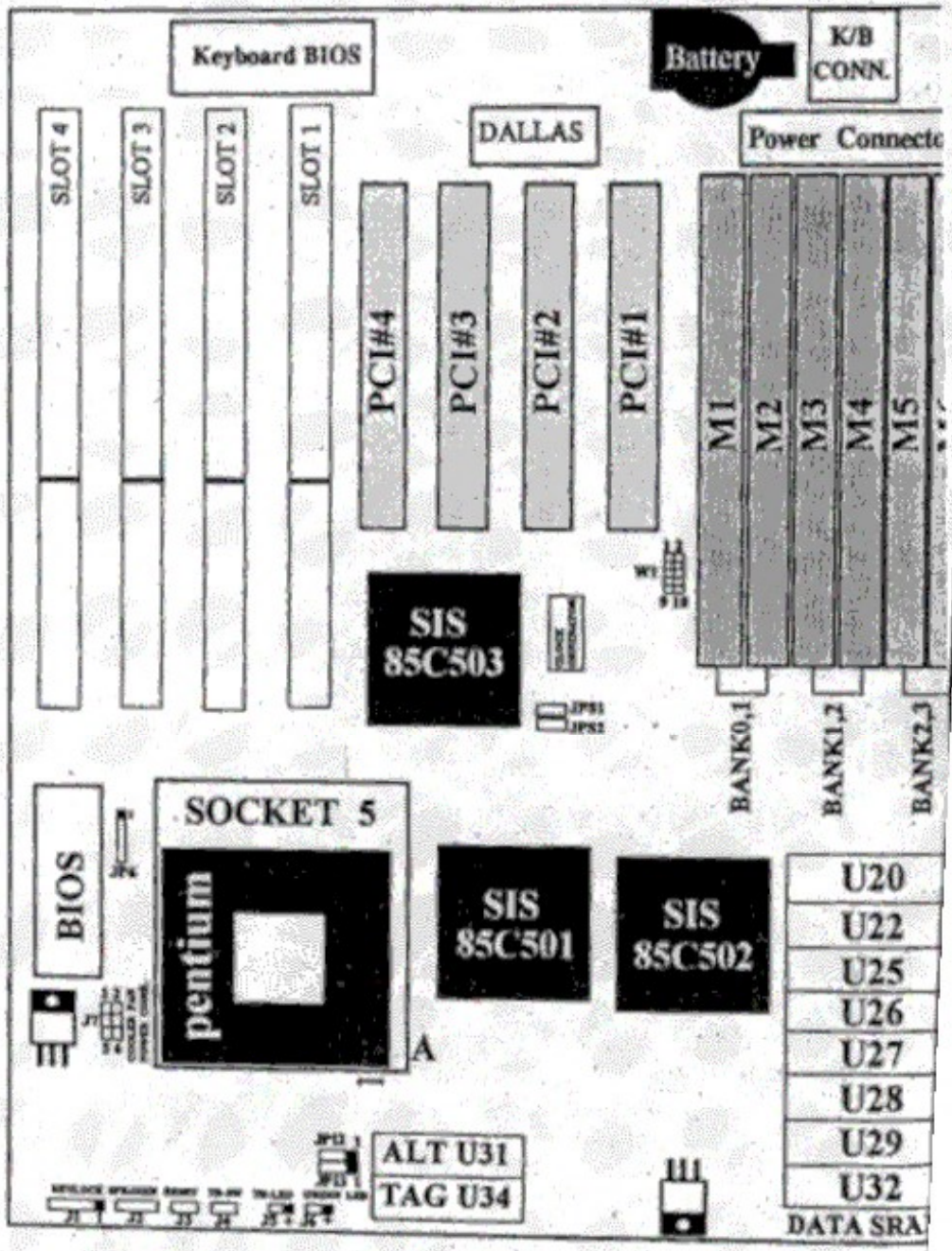


Figure 1-2

Chapter 2
Hardware design

2-1 Motherboard Layout

The P5/P54C-SP is designed with SiS85C501/502/503 PCI/ISA chipset which is developped by SiS Corporation to fully support Intel Pentium PCI/ISA system. The P5/P54C-SP utilize the green functions provided in the chipset to support power saving features when the system is in standby state. The P5-SP layout is shown in previous page (left page) for user's reference. **Care must be taken** when inserting memory modules, inserting Intel P5/P54C processor or even plugging PCI card into associated slots to avoid damaging any circuits or sockets on board. A cooling fan is strongly recommended when installing P5/P54C processor due to possible overheat.

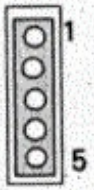
The P5/P54C-SP supports minimum of 2MB of System Memory and maximum of 128MB while Cache Memory can be 256KB up to 1MB to increase system performance.

A "Legacy card" (defined by PCI SIG) is a card with PCI interface but utilize system IRQ signal instead of interrupt signal from PCI bus. The P5/P54C-SP motherboard equipped with a "Legacy card" connector for a possible "PCI IDE card" present in the system. The advantage of having this connector is to prevent from loosing an ISA slot. Because "PCI IDE card" required to connect IRQ signal to ISA bus even it is plugged in the PCI slot. Instead of connecting to ISA bus, the card can connect signals directly to the provided "Legacy" connector on board.

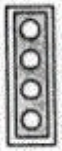
The P5/P54C-SP supports Award BIOS. The BIOS can be located in EPROM or Flash ROM. The advantage of having Flash ROM is much easier to replace BIOS code if necessary.

2-2 Connectors and Jumpers

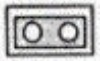
This section describes all of the connectors and jumpers equipped in the motherboard. Please refer to **Figure 1-1(P5-SP)** or **Firure 1-2(P54C-SP)** for actual location of each connector and jumper.

J1 

KeyLock - Keyboard lock switch & Power LED connector.
1. Power LED(+)
2. N/C
3. GND
4. KeyLock
5. GND

J2 

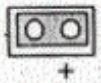
Speaker - connect to the system's speaker for beeping.
1. Speaker
2. N/C
3. GND
4. GND

J3 

Reset : Close to restart system.

J4 

Turbo Switch : Close for higher speed while Open for slower speed. A BIOS hot key <CTRL><ALT><+> also brings system to a higher speed while <CTRL><ALT><-> set system to a slower speed.

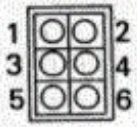
J5 

Turbo LED indicator - LED ON when higher speed is selected.

J6 

Power Saving LED indicator - LED ON when system is in any Saving mode.

J7 **Power supply of the CPU cooling fan**



1,2. GND
3,4. +12V
5,6. GND

JP6 

ROM type selection : 1-2,5-6 for Flash BIOS or 2-3,4-5 for EPROM/Flash ROM.

JP4 

(P5-SP) CPU clock selection :(refer to Figure 1-1)

CPU clock	60Mhz	66Mhz
JP4	Open	Close

JPS1 

JPS2 

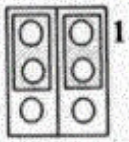
(P54C-SP) CPU clock selection :(refer to Figure 1-2)

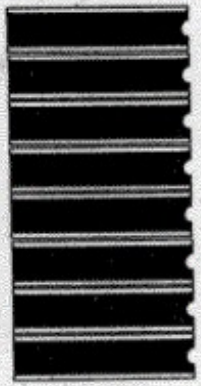
CPU clock	75Mhz	90Mhz	100Mhz
JPS1	Open	Open	Close
JPS2	Open	Close	Close

2-3 Cache Memory Configuration

The second level of cache is installed in the motherboard to increase the system performance. The P5/P54C-SP supports different type of combinations for the cache installation. Jumper 12 and Jumper 13 settings are used to differential such combinations. Please refer to following configurations for the details.

J12 J13



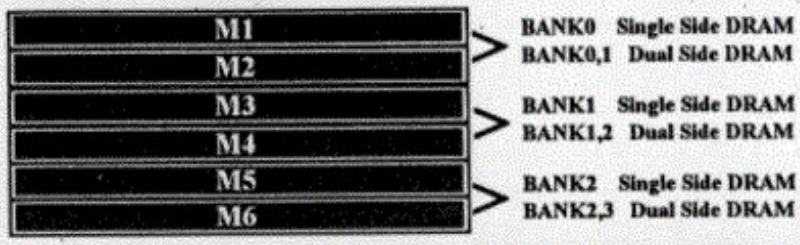


DATA SRAM

CACHE	JP12	JP13	Data SRAM	TAG	ALT
256KB	1-2	1-2	32K8 x 8	8K8 x 1	8K8 x 1
512KB	2-3	1-2	64K8 x 8	16K8 x 1	16K8 x 1
1MB	2-3	2-3	128K8 x 8	32K8 x 1	32K8 x 1

2-4 System Memory Configuration

The P5/P54C-SP supports different type of settings for the system memory. There no jumper nor connector needed for memory configuration. Following figures provides all possible memory combinations.



M1,M2	M3,M4	M5,M6	Total Size
1MB-S x 2			2MB
1MB-S x 2	1MB-S x 2		4MB
2MB-D x 2			4MB
1MB-S x 2	1MB-S x 2	2MB-D x 2	8MB
2MB-D x 2		2MB-D x 2	8MB
4MB-S x 2			8MB
1MB-S x 2	1MB-S x 2	4MB-S x 2	12MB
2MB-D x 2		4MB-S x 2	12MB
4MB-S x 2	4MB-S x 2		16MB
8MB-D x 2			16MB
1MB-S x 2	1MB-S x 2	8MD-D x 2	20MB
2MB-D x 2		8MB-D x 2	20MB
4MB-S x 2	4MB-S x 2	4MB-S x 2	24MB
4MB-S x 2	8MB-D x 2		24MB
4MB-S x 2	4MB-S x 2	8MB-S x 2	32MB
8MB-D x 2		8MB-D x 2	32MB
16MB-S x 2			32MB
1MB-S x 2	1MB-S x 2	16MB-S x 2	36MB
2MB-D x 2		16MB-S x 2	36MB
4MB-S x 2	16MB-S x 2		40MB
4MB-S x 2	4MB-S x 2	16MB-S x 2	48MB
8MB-D x 2		16MB-S x 2	48MB

M1,M2	M3,M4	M5,M6	Total Size
16MB-S x 2	16MB-S x 2		64MB
32MB-D x 2			64MB
4MB-S x 2	16MB-S x 2	16MB-S x 2	72MB
4MB-S x 2	32MB-D x 2		72MB
4MB-S x 2	4MB-S x 2	32MB-D x 2	80MB
8MB-D x 2		32MB-D x 2	80MB
16MB-S x 2	16MB-S x 2	16MB-S x 2	96MB
16MB-S x 2	32MB-D x 2		96MB
16MB-S x 2	16MB-S x 2	32MB-D x 2	128MB
32MB-D x 2		32MB-D x 2	128MB
64MB-S x 2			128MB

NOTE : 1. "-S" : Single Side DRAM Module
2. "-D" : Dual Side DRAM Module
3. "BANK" = 64 BIT = M1,M2 = M3,M4 = M5,M6

2-5 Integrated PCI Bridge

The P5/P54C-SP utilizes SiS85C501/502/503 PCI/ISA chipset to support Intel Pentium/P5/P54C PCI/ISA system. It provides an interface which translates CPU cycle into PCI bus cycle, and PCI burst read/write capability. In addition, it provides high performance PCI arbitor to support four PCI Masters, Rotating Priority Mechanism, and Hidden Arbitration Scheme Minimizes Arbitration Overhead.

There are four interrupts in each PCI slot : INTA#, INTB#, INTC#, and INTD#. Since the P5/P54C-SP adapts RPM (Rotating Priority Mechanizm. refer to Page 3-7 for circuit diagram) design, each slot can be configured to any one of INT#. The RPM is a method to automatically direct proper INT signals to presenting PCI cards. For example, if a PCI card is plugged in the slot 1, the board will be assigned INTA while second card will be assigned INTB and so on without any change in the BIOS. You can simply just plug and play with a proper driver supplied by the PCI card vendor.

If however, a "Legacy card" is plugged in the system, modification in the **ROM SETUP UTILITY** become necessary. There are two ways to insert "Legacy card" into the system : First, remove all the INT# Jumper caps from the card and then enter **PCI CONFIGURATION SETUP** utility from **ROM SETUP UTILITY** main menu to set the **"PCI IDE IRQ MAP TO : ISA"**. You can then connect the "Legacy Header" to the W1 connector on board. The connection will then redirect the interrupt signals to the ISA bus IRQ14 and IRQ15 for both INTA and INTB respectively.

Second, you can set the system interrupt request (IRQ) on the "Legacy card" (refer to user's manual of the card) to a proper system IRQ level (in general, Primary assigned to INTA and Secondary assigned to INTB). If the card is plugged into slot 1(marked PCI#1), you can not use second slot (marked PCI#2) because the Secondary INT signal takes INTB from the slot (refer to Page 3-7 for circuit diagram). The user then enter **PCI CONFIGURATION SETUP** utility from **ROM SETUP UTILITY** main menu and set the **"PCI IDE IRQ MAP TO : PCI-Slot 1"** (depend on the slot # where the Legacy card is plugged).

A built_in 2x5 "Legency Header" connector is equipped on board (W1, near by 85C503 chip, in between PCI#1 and PCI#2) for any possible "Legacy card". The advantage of having this connector on board is to save one ISA slot and provide an ISA interface to the system IRQ14 and IRQ15 signals.

CHAPTER 3
AWARD BIOS SETUP

Award's ROM BIOS provides a built-in Setup program which allows user modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS RAM so data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM stay unchanged unless there is configuration change in the system, such as hard drive replacement or new equipment is installed.

It is possible that CMOS had a battery failure which cause data lose in RAM. If so, re_enter system configuration parameters become necessary.

To enter Setup Propgram

Power on the computer and press **<Del>** key immediately will bring you into BIOS **CMOS SETUP UTILITY**.

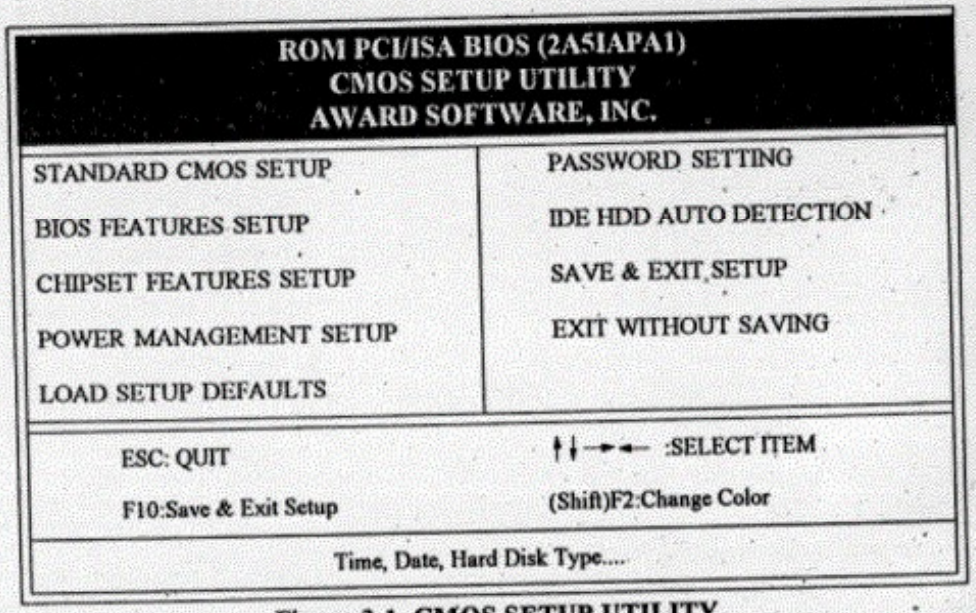


Figure 3-1 CMOS SETUP UTILITY

The menu displays all the major selection items and allow user to select any one of shown item. The selection is made by moving cursor (press any direction key) to the item and press 'Enter' key. An on_line help message is displayed at the bottom of the screen as cursor is moving to various items which provides user better understanding of each function. When a selection is made, the menu of selected item will appear so the user can modify associated configuration parameters.