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## 1. INTRODUCTION

### 1.1. PREFACE

Welcome to use the **5SMM** motherboard. The motherboard is a Pipeline 512 KB CACHE Pentium® Processor based PC / AT compatible system with ISA bus and PCI Local Bus, and has been designed to be the fastest PC / AT system. There are some new features allow you to operate the system with the performance you want.

This manual also explains how to install the motherboard for operation, and how to set up your CMOS CONFIGURATION with BIOS SETUP program.

### 1.2. KEY FEATURES

- ❑ Pentium® Processor based PC / AT compatible mainboard with PCI / ISA / BUS.
- ❑ 3 PCI Bus slots, 2 ISA Bus slots.
- ❑ Supports :
  - Pentium® Processor :133/166/200 MHz; MMX (166 / 200 / 233)
  - AMD :K6-(166 / 200 / 233 / 266 / 300)  
K6-2(266 / 300 / 333 / 350 / 366 / 380 / 400 / 450 / 475 / 500 / 550)  
K6-III(400 / 450 / 475 / 500 / 550)
  - Cyrix/IBM :6x86MX (PR166 / PR200 / PR233 / PR266) ;  
MC 4PR300 / PR333 / PR350 / PR366 / PR400
  - IDT :Winchip 2-(200 / 225 / 233 / 266 / 300)  
Winchip 3-(266)
  - RISE :MP6-(266)
- ❑ Supports true 64 bits CACHE and DRAM access mode.
- ❑ Supports 321 Pins (Socket 7) ZIF white socket on board.
- ❑ Supports 512 KB Pipeline Burst Sync. 2<sup>nd</sup> Level Cache.
- ❑ CPU L1 / L2 Write-Back cache operation.
- ❑ Built-in PCI **ESS SOLO-1 ES1938S** audio chip.

- ❑ Support Modem Ring-On. (Include internal Modem and external modem on COM A)
- ❑ Supports Wake-up on LAN (JP4).
- ❑ Supports 16 - 768 MB DRAM memory on board.
- ❑ Supports 3x168 pin 64/72 Bit DIMM module.
- ❑ Supports 2-channel Enhanced PCI IDE ports for 4 IDE Devices.
- ❑ Supports 1xCOM (16550), 1xLPT (EPP / ECP), 1x1.44MB Floppy port.
- ❑ Supports Green function, Plug & Play function.
- ❑ Integrated 2D/3D super AGP VGA.
- ❑ Integrated 8MB SDRAM (Optional)
- ❑ Support shared memory for Video Display; When shared memory is used, the system memory (SDRAM DIMM) must be installed in DIMM 1; ❑
- ❑ Support Ultra DMA 33/66.
- ❑ Licensed AWARD BIOS, 2Mbit FLASH RAM for BIOS update.
- ❑ 24.5cmx21cm, Micro ATX Form factor.
- ❑ Supports USB port & PS/2 Mouse and K/B port.

### 1.3. PERFORMANCE LIST

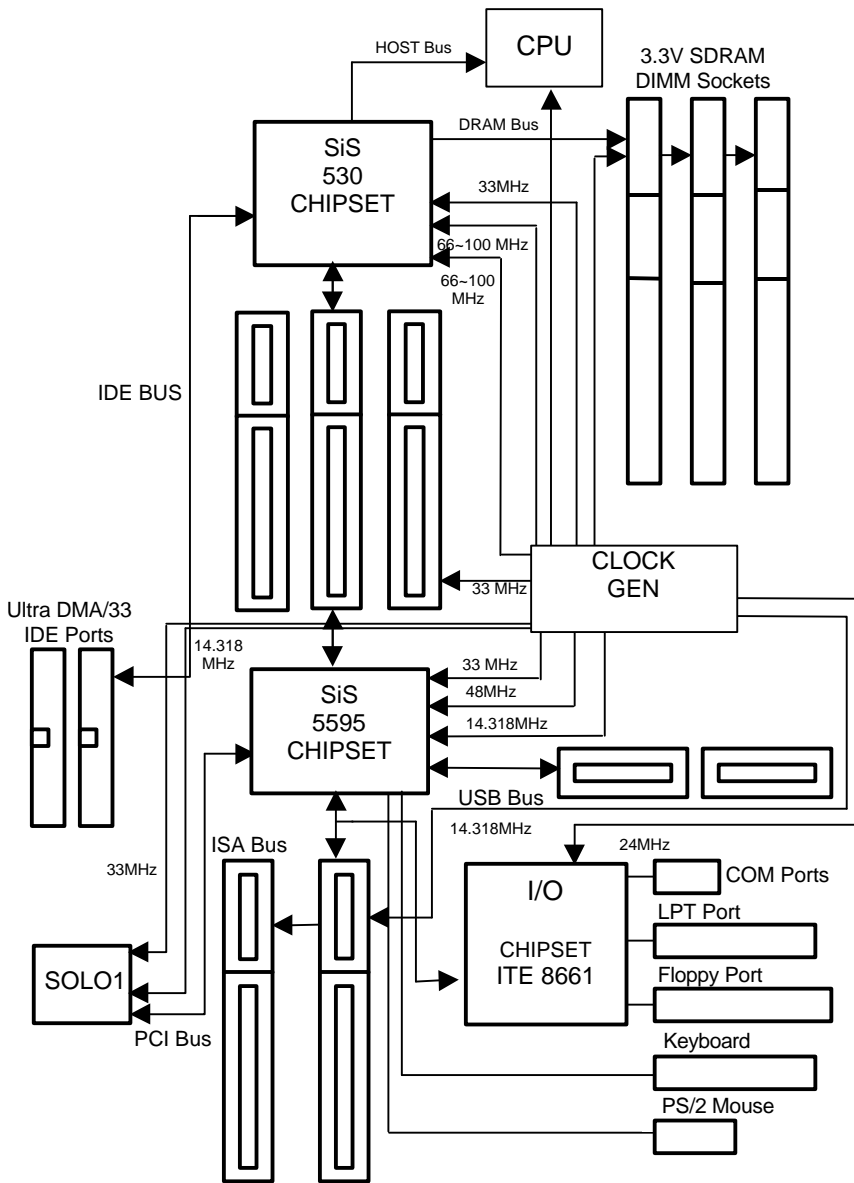
The following list of performance data is the testing results of some popular benchmark testing programs.

These data are just referred by users, and there is no responsibility for different testing data values gotten by users. (The different Hardware & Software configuration will result in different benchmark testing results.)

- CPU Pentium® Processor MMX-233 MHz, Cyrix 6x86MX-PR333, AMD K6-3 400, AMD K6-2 450
- DRAM (32 x 3) MB SDRAM (MICRON MT48LC2M8A-8)
- CACHE SIZE 512 KB
- DISPLAY Onboard SIS530 AGP Card
- STORAGE Onboard IDE (Seagate ST34520A)
- O.S. Windows® NT 4.0
- DRIVER Display Driver at 1024 x 768 x 64K colors x 75Hz.  
SIS Bus Master IDE Driver

Processor	Intel-MMX 233MHz (66x3.5)	AMD K6-2 450 (100x4.5)	AMD K6-3 400 (100x4)	Cyrix 6x86MX- PR333 (83x3)
Winbench99 CPU mark32	312	555	1220	470
FPU Winmark	876	1480	1360	573
Business Disk	3270	3750	4320	3680
Hi-End Disk	8280	9520	10500	9520
Business Graphics	53.8	82.9	111	89.1
Hi-End Graphics	106	199	319	187
Winstone99 Business	13.1	20.2	27	19.1
Hi-End	11.4	18.5	23.9	14.6

### 1.4. BLOCK DIAGRAM



### **1.5. INTRODUCE THE PCI - BUS**

Connecting devices to a CPU local bus can dramatically increase the speed of I/O-bound peripherals with only a slight increase in cost over traditional systems.

This price / Performance point has created a vast market potential for local bus products.

The main barrier to this market has been the lack of an accepted standard for local bus peripherals.

Many mainboard and chipset manufactures developed their own local bus implementations, but they are incompatible with each other.

The VL (Video Electronics Standards Association) local bus and PCI (Peripheral Component Interconnect) bus specification was created to end this confusion.

The PCI - bus standard, under development since Jun. 1992, which is designed to bring workstation-level performance to standard PC platform. The PCI - bus removes many of the bottlenecks that have hampered PC for several years.

On the PCI - bus, peripherals operate at the native speed of the computer system, thus enabling data transfer between peripherals and the system at maximum speed.

This performance is critical for bandwidth-constrained devices such as video, multimedia, mass storage, and networking adapters.

PCI - bus standard provides end-users with a low-cost, extendible and portable local bus design, which will allow system and peripherals from different manufactures to work together.

### **1.6. FEATURES**

- 32 bits bus transfer mode.
- Bus Master or Slave access.
- Memory burst transfer to 132 MB/sec.
- 33 MHz operation speed.
- 10 device loading ability.
- CPU independent.





## 2. SPECIFICATION

### 2.1. HARDWARE

- CPU
  - Pentium® Processor  
133 / 166 / 200 MHz ; MMX(166 / 200 / 233)
  - AMD  
K6 (166 / 200 / 233 / 266 / 300)  
K6-2 (266 / 300 / 333 / 350 / 366 / 380 / 400 / 450  
/ 475 / 500 / 550)  
K6-III (400 / 450 / 475 / 500 / 550)
  - Cyrix / IBM  
6x86MX (PR166 / PR200 / PR233 / PR266)  
MC PR300 / PR333 / PR350 / PR366 / PR400
  - IDT  
Winchip 2-(200 / 225 / 233 / 266 / 300)  
Winchip 3-(266)
  - RISE  
MP6-(266)  
– 321 pins (socket 7) ZIF white socket on board.  
– 1.3V-3.5V Dual Power Ready.
- COPROCESSOR
  - Included in processor.
- SPEED
  - 66 / 75 / 83 / 90 / 95 / 100MHz system speed.
  - 33 MHz PCI-Bus speed.
  - 8 MHz AT bus speed.
- DRAM MEMORY
  - 3 banks 168 pins DIMM module socket on board.
  - Use 16 / 32 / 64 / 128 / 256 MB DIMM module  
DRAM.
  - 16 ~ 768 MB DRAM size.
  - Onboard 8MB SDRAM. (Optional)
- CACHE MEMORY
  - 16 / 24 / 32 / 64KB L1cache included in CPU.
  - 512 KB 2<sup>nd</sup> Level cache on board.
  - Supports Write Back cache function for both CPU  
& on board cache.
- I/O BUS SLOTS
  - 3 xMaster / Slave PCI-BUS Slots.
  - 2 x16 bits ISA BUS Slots.
- IDE PORTS
  - 2-channel Enhanced IDE port on board.(Using  
IRQ14,15)
  - Supports Mode 3,4 IDE & ATAPI CD – ROM.
  - Supports Ultra DMA 33 / 66.

- I/O PORTS
  - Supports 1 x16550 COM ports. (Using IRQ4, 3)
  - Supports 1 x EPP/ECP LPT port. (Using IRQ7 or 5 and DMA3)
  - Supports 1 x 1.44/2.88 MB Floppy port. (Using DMA2 & IRQ6)
  - Supports PS/2 Mouse. (Using IRQ12 )
- Audio Ports (Optional)
  - 1x Line in
  - 1x Line out
  - 1x Micro in
  - 1x Game Port
  - 2x CD Line in
  - 1x TEL
- GREEN FUNCTION
  - Suspend mode support.
  - Green switch & Green LED support.
  - IDE & Display power down support.
  - Monitor all IRQ / DMA / Display / I/O events.
- BIOS
  - 2Mbit FLASH RAM.
  - Supports Plug & Play Function.
- SOUND
  - Onboard ESS SOLO-1 ES1938S PCI Sound.
- DIMENSION
  - Micro ATX Form Factor, 4 layers PCB.

## 2.2. SOFTWARE

- BIOS
  - Licensed AWARD BIOS.
  - AT CMOS Setup, BIOS / Chipset Setup, Green Setup, Hard Disk Utility included.
- O.S.
  - Operation with MS-DOS®, Windows®95, Windows®98, WINDOWS™ NT, OS/2, NOVELL and SCO UNIX.

## 2.3. ENVIRONMENT

- Ambient Temp.
  - 0°C to +50°C (Operating).
- Relative Hum.
  - 0 to +85% (Operating).
- Altitude
  - 0 to 10,000 feet (Operating).
- Vibration
  - 0 to 1,000 Hz.
- Electricity
  - 4.9 V to 5.2 V.
  - Max. 20A current at 5V.

## 3. HARDWARE INSTALLATION

### 3.1. UNPACKING

The mainboard package should contain the following:

- The **5SMM** mainboard.
- USER' S MANUAL for mainboard.
- Cable set for IDE ; ~~F~~loppy.
- CD for Mainboard Utility.

The mainboard contains sensitive electric components which can be easily damaged by static electricity, so the mainboard should be left in its original packing until it is installed.

Unpacking and installation should be done on a grounded anti-static mat.

The operator should be wearing an anti static wristband, grounded at the same point as the anti-static mat.

Inspect the mainboard carton for obvious damage. Shipping and handling may cause damage to your board. Be sure there are no shipping and handling damage on the board before proceeding.

After opening the mainboard carton, extract the system board and place it only on a grounded anti-static surface component side up. Again inspect the board for damage.

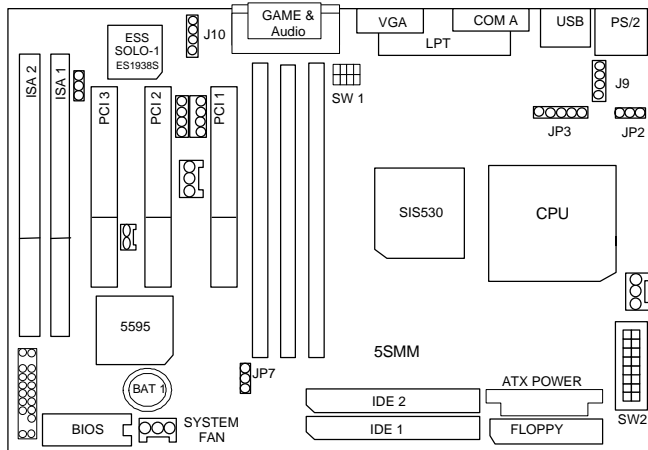
Press down on all of the socket IC' s to make sure that they are properly seated. Do this only on with the board placed on a firm flat surface.

#### ● **DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.**

It is assumed that the chassis is designed for a standard ATX 2.0 mainboard mounting. Place the chassis on the anti-static mat and remove the cover.

Take the plastic clips, Nylon stand-off and screws for mounting the system board, and keep them separate.

### 3.2 MAINBOARD LAYOUT



<Figure 3.1>

### 3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS

◆ I/O Ports Connector	
IDE 1	For Primary IDE port.
IDE 2	For Secondary IDE port.
Floppy	For Floppy port.
USB	For USB port.
COM A	For Serial port1 (COM A).
VGA	For VGA port.
GAME	For GAME port.
AUDIO	For MIC,LINE-IN,LINE-OUT port.
LPT	For LPT port.
PS/2	For PS/2 Mouse & Keyboard Connector.
ATX Power	For ATX Power Connector.

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◆ JP4: Wake on Lan	
Pin	Function
1	+5V SB
2	GND
3	Signal

◆ JP5 :Internal MODEN WAKE UP	
Pin	Function
1	Signal
2	GND

◆ FAN1: CPU cooling FAN Power Connector	
Pin	Function
1	GND
2	+12V
3	Signal

◆ JP2: Keyboard Power On Connector	
Pin	Function
1,2 Close	Enabled Keyboard power on.
2,3 Close	Disabled Keyboard power on.

◆ FAN2 : SYSTEM FAN	
Pin	Function
1	GND
2	+12V
3	Signal

◆ JP7 : CLEAR CMOS	
Pin	Function
1-2	CLEAR CMOS
2-3	Normal

◆ JP1 : On-Board Sound Function Connector	
Pin No.	Function
1-2	Enabled On-Board Sound Function.
2-3	Disabled On-Board Sound Function.

◆ JP3 : Infrared Connector (Optional)	
Pin No.	Function
1	IR Data Output
2	GND
3	IR Data Input
4	NC
5	Power (+)

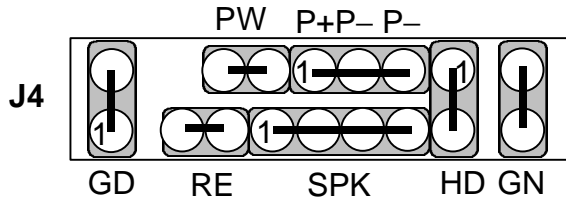
◆ J9 : PS/2 Mouse by Connector (Optional)	
Pin	Function
1	VCC
2	GND
3	Data
4	Clock

◆ J10 : TEL:The Connector is for Modem with internal Voice connector	
Pin	Function
1	Signal
2	GND
3	GND
4	Signal

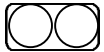
◆ J1 : CD Audio Line In	
Pin	Function
1	GND
2	Right
3	GND
4	Left

◆ J2 : CD Audio Line In	
Pin	Function
1	Right
2	GND
3	GND
4	Left

J4 : 2\*11 PIN Jumper

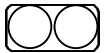


PW : Soft Power Connector



On - Off : For POWER ON or Suspend IN / OUT.  
 On 4 sec : For POWER OFF before VGA Enable or CMOS setup select "delay 4sec." for POWER OFF mode.

RE : Reset Switch



Open: Normal Operation  
 Short: For Hardware Reset System

P+P- P-: Power LED



PIN 1: anode (+)  
 PIN 2: cathode (-)  
 PIN 3: cathode (-)

SPK: Speaker Connector



PIN 1: VCC  
 PIN 2: NC  
 PIN 3: NC

PIN 4: Data

HD: IDE Hard Disk Active LED

PIN 1: LED anode (+)  
PIN 2: LED cathode (-)

GN: Green Switch

Open: Normal operation  
Short: Entering Green Mode

GD: Green Function Active LED

PIN 1: LED anode (+)  
PIN 2: LED cathode (-)

### 3.4. SRAM INSTALLATION

#### *Sync. SRAM (Pipeline Burst SRAM)*

If Sync SRAM Chip is installed, it consists of Pipeline Burst 1 Pc 64 K x 64 512KByte.

### 3.5. DRAM INSTALLATION

The mainboard can be installed with 16 / 32 / 64 / 128 / 256 MB 168 pins DIMM module DRAM, and the DRAM speed must be 67~100 MHz for SDRAM. The DRAM memory system on mainboard consists of bank 0 & bank1; Bank2 .

Because the 168 pins DIMM module is 64 bits width, using 1 PCS which can match a 64 bits system. The total memory size is 16 MB ~ 768 MB DRAM. The DRAM installation position refer to Figure 3.1, and notice the Pin 1 of DIMM module must match with the Pin 1 of DIMM socket. Insert the DRAM DIMM module into the DIMM socket at Vertical angle. If there is a wrong direction of Pin 1, the DRAM DIMM module couldn't be inserted into socket completely.



### 3.6. CPU INSTALLATION AND JUMPERS SETUP

The system speed depends on the frequency of CLOCK GENERATOR. The user can change SW selection to set up the system speed to 66 / 75 / 83 / 90 / 95 / 100MHz for 3.3V/2.5V Pentium® Processor (133 / 166 / 200 MHz) ;MMX(166 / 200 / 233 MHZ) , AMD K6-(166 / 200 / 233 / 266 / 300 ; K6-2(266 / 300 / 333 / 350 / 366 / 380 / 400 / 450 / 475 / 500 / 550) ; K6-III(400 / 450 / 475 / 500 / 550) , Cyrix / IBM 6x86MX (PR166 / PR200 / PR233 / PR266 ) ; Mç ²PR300 / PR333 / PR350 / PR366 / PR400) ; IDT Winchip 2-(200 / 225 / 233 / 266 / 300) ; IDT Winchip 3-(266) ; RISE MP6-(266).

The mainboard can use Pentium® Processor, MMX , AMD-K6, AMD-K6-2, AMD-K6-III Cyrix / IBM 6x86MX, Cyrix Mç ², IDT Winchip 2 , IDT Winchip 3 , RISE MP6 CPU, and the CPU speed must match with the frequency of CLOCK GEN. It will cause system hanging up if the CLOCK GEN.'S frequency is faster than CPU's.

- **The CPU is a sensitive electric component and it can be easily damaged by static electricity, so users must keep it away from metal surface when the CPU is installed onto mainboard.**
- **When the user installs the CPU on socket, please notice that the PIN 1 of CPU is in the same corner as the PIN 1 of socket!**
- **Before the CPU is installed, the mainboard must be placed on a flat plane in order to avoid being broken by the pressure of CPU installation.**

SW: CPU INT./ EXT. FREQ. RATIO

O: ON

X: OFF

SW2	4	5	6	7	8	SW2	4	5	6	7	8
1.3V	X	X	X	X	O	2.5V	O	X	O	X	X
1.4V	X	O	X	X	O	2.6V	X	O	O	X	X
1.5V	X	X	O	X	O	2.7V	O	O	O	X	X
1.6V	X	O	O	X	O	2.8V	X	X	X	O	X
1.7V	X	X	X	O	O	2.9V	O	X	X	O	X
1.8V	X	O	X	O	O	3.0V	X	O	X	O	X
1.9V	X	X	O	O	O	3.1V	O	O	X	O	X
2.0V	X	O	O	O	O	3.2V	X	X	O	O	X
2.1V	O	X	X	X	X	3.3V	O	X	O	O	X
2.2V	X	O	X	X	X	3.4V	X	O	O	O	X
2.3V	O	O	X	X	X	3.5V	O	O	O	O	X

2.4V	X	X	O	X	X	---	---	---	---	---	---
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SW2	1	2	3
X1.5	X	X	X
X2	O	X	X
X2.5	O	O	X
X3	X	O	X
X3.5	X	X	X
X4	O	X	O
X4.5	O	O	O
X5	X	O	O
X5.5	X	X	O

**SW 1 :**

CPU	SDRAM	PCI	1	2	3	4
66.8	66.8	33.4	O	O	O	X
75	75	30	X	O	O	X
83.3	83.3	33.3	O	X	O	X
95	95	31.7	X	X	O	X
100	100	33.4	O	O	X	X
112	112	37.3	X	O	X	X
124	124	31	O	X	X	X
133	133	33.3	X	X	X	X
90	90	30	O	O	O	O

- ◆ Note: If Cyrix 6x86 is being used, please check the CPU Date Code after 605.
- ◆ Note: It's strongly recommended that set the system speed according to your hardware configuration: CPU, SDRAM, Cards, etc.

**3.7. CMOS RTC & ISA CFG CMOS SRAM**

Built-in Real Time Clock (RTC) With 256B CMOS SRAM in SIS 5595.

### 3.8. SPEAKER CONNECTOR INSTALLATION

There is a speaker in AT system for sound purpose. The 4 - Pins connector **SPK** is used to connect speaker. The speaker can work well in both direction of connector when it is installed to the connector **SPK** on mainboard.

### 3.9. HARDWARE RESET SWITCH CONNECTOR INSTALLATION

The RESET switch on panel provides users with HARDWARE RESET function which is almost the same as power-on/off. The system will do a cold start after the RESET switch is pushed and released by user. The RESET switch is a 2 PIN connector and should be installed to **RE** on mainboard.

### 3.10. GREEN FUNCTION INSTALLATION

There is one jumper for the purpose of power saving, **GN**, to indicate the power saving function . If the **GD** is lighted on, the system is in green mode. The **GN** switch will force the system into green mode .

### 3.11. PERIPHERAL DEVICE INSTALLATION

After installation of the device and setup of the jumpers, the mainboard can be mounted into the case and fixed by screw. To complete the mainboard installation, the peripheral devices could be installed now. The basic system needs a display interface card and a storage device.

If a PCI - Bus device is to be installed in the system, any one of three PCI - Bus slots can be used for Slave or Master PCI - Bus device.

After installing the peripheral device, the user should check everything again and prepare to power-on the system.