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4. BIOS CONFIGURATION

1. INTRODUCTION

1.1. PREFACE

Welcome to use the **6LMM7** motherboard. It is a Celeron™ Socket 370 Processor based PC / AT compatible system with AGP/ PCI / ISA Bus, and has been designed to be the fastest PC / AT system. There are some new features allow you to operate the system with just 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

❑ Intel Celeron™ Socket 370 Processor based PC / AT compatible mainboard.

❑ Socket 370 Pins ZIF white socket on board.

❑ Supports Celeron™ Socket 370 processor running at 366-566 MHz.

❑ Intel 440LX chipset, Supports SDRAM / Ultra DMA/33 IDE.

❑ Built-in **ATi RAGE PRO** 3D graphics acceleration chip.

❑ Built-in PCI **YAMAHA** audio chip.

❑ Supports external Modem Ring-On on COM A&B and internal Modem Ring-On.

❑ Supports Wake-up on LAN .

❑ Supports 3xDIMMs using 3.3V EDO or SDRAM DIMM module.

❑ Supports EDO 16MB ~ 768 MB, SDRAM 16MB~384MB memory on board.

❑ 3xPCI Bus slots, 1xISA Bus slots.

❑ Supports 2 channels Ultra DMA/33 IDE ports for 4 IDE Devices.

❑ Supports 2xCOM (16550), 1xLPT (EPP / ECP), 1x Floppy port.

❑ Supports1x Line in, 1x Line Out, 1x Mic in, 2x CD Line in,1x GAME Port, 1x TEL Port.

❑ Supports 2xUSB ports, 1xPS/2 Mouse, 1xPS/2 Keyboard.

❑ Licensed AWARD BIOS, 2Mbits FLASH RAM.

❑ 24.3 cm x 21 cm Micro-ATX form factor, 4 layers PCB.

1.3. PERFORMANCE LIST

The following performance data list 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   Intel® Celeron™ 366MHz Socket 370 processor
- DRAM   (128x 1) MB SDRAM (SEC KM48S8030BT-GH)
- CACHE SIZE   128 KB included in CPU
- DISPLAY   Onboard ATi AGP 3D graphics acceleration chip (4MB SDRAM)
- STORAGE   Onboard IDE (IBM DHEA 38451)
- O.S.   Windows NT™4.0 SPK3
- DRIVER   Display Driver at 1024 x 768 x 256 colors x 75Hz.

TRIONES Bus Master IDE Driver 3.70

Processor	Intel® Celeron™ 366MHz Socket 370 366MHz (66x5.5)
Winbench98	
CPU mark32	705
FPU Winmark	1970
Business Disk	1850
Hi-End Disk	4410
Business Graphics	198
Hi-End Graphics	229
Winstone98	
Business	33.1
Hi-End	36.7

1.4. BLOCK DIAGRAM

```
                                    66MHz
                                                          14.318MHz

        ┌──────────────────┐              3.3V EDO/SDRAM
        │     PGA 370      │              DIMM Sockets
        └──────────────────┘
                  ↕ Host Bus
┌──────────┐  ┌──────────────┐
│  VIDEO   │  │     PAC      │   DRAM Bus
│ MEMORY   │  │   82443LX    │ ←─────────→
└──────────┘  │   CHIPSET    │
      │       └──────────────┘
   100MHz
┌──────────┐                              33MHz
│   ATi    │
│ RAGE PRO │
└──────────┘
      │                                   66MHz
   ┌─────┐            66MHz        ┌──────────────────┐
   │ VGA │                         │     Winbond      │
   └─────┘                         │   W83193R-04     │
                                   └──────────────────┘
  AGP Bus          66MHz

MIC                       66MHz
L-IN   ┌────┐  ┌────────┐     PCI Bus          33MHz
L-OUT  │AC-2│  │ YAMAHA │                      48MHz
       └────┘  └────────┘  ┌──────────────┐  14.318MHz
Game                      │    PIIX4      │                USB Ports
Port                      │   82371EB     │
                          │   CHIPSET     │     USB Bus
       24.576MHz          └──────────────┘
                  ISA Bus        14.318MHz
                                              COM Ports      24MHz
Ultra DMA/33                   ┌──────────────┐
IDE Ports                      │     I/O      │
                               │   CHIPSET    │  LPT Port
                               │   Winbond    │
                               │   83977EF    │  Floppy Port
                               └──────────────┘
                                                Keyboard

                                                PS/2 Mouse
```

1.5. INTRODUCE THE INTEL^â Celeron^{TM} Socket 370 Processor
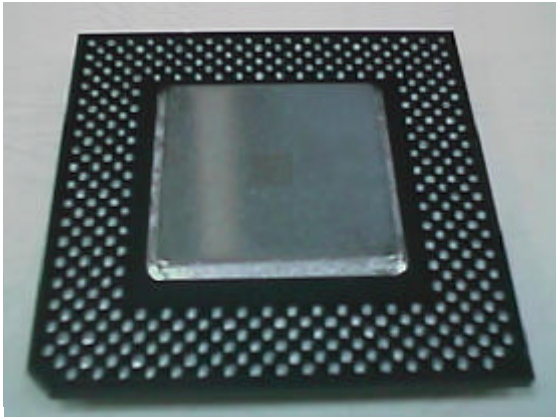

Figure 1: INTEL® Celeron^{TM} Socket370 Processor

1.6 What is AGP?

The Accelerated Graphics Port (AGP) is a new port on the Host-To-PCI bridge device that supports an AGP port. The main purpose of the AGP port is to provide fast access to system memory.

The AGP port can be used either as fast PCI port (32-bits at 66MHz vs. 32-bits at 33MHz) or as an AGP port which supports 2x data-rate, a read queue, and side band addressing. When the 2x-data rate is used, the port can transmit data at 533MB/sec (66.6*2*4). The read-queue can be used to pipeline reads – removing the effects of the reads-latency. Side band addressing can be used to transmit the data address on a separate line in order to speed up the transaction.

2. SPECIFICATION

2.1. HARDWARE

- CPU
  - − Celeron™ Socket 370 processor 366− 566 MHz.
  - − 66MHz Socket 370 on board.

- SPEED
  - − 66 MHz system speed.
  - − 66 MHz AGP bus speed. (2X mode 133MHz)
  - − 33 MHz PCI-Bus speed.
  - − 8 MHz AT bus speed.

- PROTECTION
  - − Speaker Alarm when detect "CPU FAN Failure" or "CPU Overheat".
  - − Automatically slow down CPU speed when "CPU Overheat".
  - − H/W monitor power status ($\pm5V$, $\pm12V$, VGTL,5VSB, CPU voltage & CMOS battery voltage).(Optional)

- DRAM MEMORY
  - − 3 banks 168 pins DIMM module sockets on board.
  - − Use 16 / 32 / 64 / 128 / 256 /512 MB
  - − Supports EDO 16MB ~ 768 MB,
    SDRAM 16MB~384MB.
  - − Supports 3.3V SDRAM / EDO type DRAM.

- CACHE MEMORY
  - − 32 KB 1st cache memory included in CPU.
  - − 128KB 2nd cache in CPU.
  - − Supports DIB speed mode for L2 Cache.

- I/O BUS SLOTS
  - − 3 33MHz Master / Slave PCI-BUS.
  - − 1 8MHz 16 bits ISA BUS.

- IDE PORTS
  - − 2 Ultra DMA/33 Bus Master IDE channels on board.(Using IRQ14,15)
  - − Support Mode 3,4 IDE & ATAPI CD − ROM.

- I/O PORTS
  - Supports 2 16550 COM ports.
  - Supports 1 LPT port.
  - Supports 1 Floppy port.
  - Supports 2 USB ports.
  - Supports 1 PS/2 Mouse.
  - Supports 1 PS/2 Keyboard.

- VGA
  - Built-in ATi 3D RAGE PRO 3D graphics acceleration chip.
  - Built-in 8M high speed SDRAM.
  - For AGP 1.0 Interface compliant.

- SOUND
  - Built-in YAMAHA PCI audio chip.
  - Supports Line Out, Line In, MIC, Joystick and CD-Line, TEL Port.

- GREEN FUNCTION
  - Suspend mode support.
  - Green switch & Green LED support.
  - IDE & Display power down support.
  - Monitor all IRQ / DMA / Display / I/O events.

- BIOS
  - 2M bits FLASH RAM.
  - Supports Plug & Play, DMI Function.

- DIMENSION
  - Micro ATX Form Factor, 4 layers PCB.

2.2. SOFTWARE

- DRIVER
  - YAMAHA Sound Driver.
  - ATi RAGE PRO Driver.

- 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 **6LMM7** mainboard.

- The Retention Mechanism & Attach Mount

- USER'S MANUAL for mainboard.

- Cable set for IDE, Floppy devices. (Cable for COMB is optional)

- CDs or diskettes for Mainboard ¡ (Sound and VGA 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 damages 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.

3.2. MAINBOARD LAYOUT
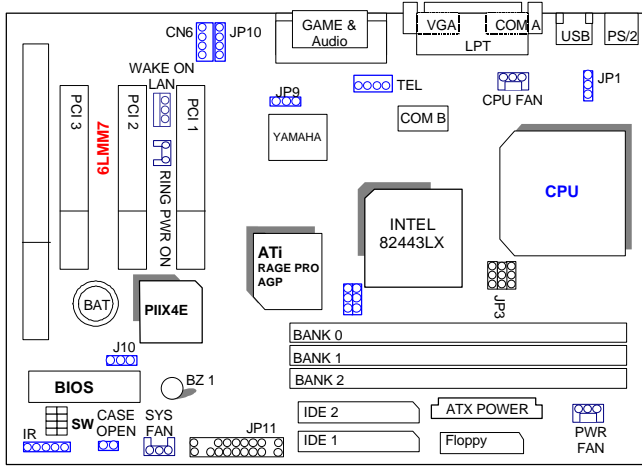
3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS

♦ I/O Ports Connector	
USB	USB port.
IDE1	For Primary IDE port.
IDE2	For Secondary IDE port.
PS/2	For PS/2 Keyboard / Mouse port.
FLOPPY	For Floppy port
COMB	For Serial port2 (COM B).[Support Modem Ring On]
COMA	For Serial port1 (COM A).[Support Modem Ring On]
LPT	For LPT port.
VGA	For VGA port.
GAME	For GAME port.
AUDIO	For MIC,LINE-IN,LINE-OUT,TEL port.

♦ CPU FAN : CPU cooling FAN Power Connector	
Pin No.	Function
1	GND.
2	+12V
3	SENSE

♦ PWR FAN : Power cooling FAN Power Connector	
Pin No.	Function
1	GND.
2	+12V
3	SENSE

♦ SYS PWR : System cooling FAN Power Connector	
Pin No.	Function
1	GND.
2	+12V
3	SENSE

♦ Wake on Lan	
Pin No.	Function
1	+5V SB
2	GND
3	Signal

♦ JP5 : Release Onboard VGA from occupying IRQ Resource	
Pin No.	Function
1-2 short	Disable Onboard VGA INT.(Default)
2-3 short	Enable Onboard VGA INT.

♦ JP6 : On-Board VGA Function	
Pin No.	Function
1-2 short	Disabled On-Board VGA Function.
2-3 short	Enabled On-Board VGA Function.(Default)

♦ JP9 : Onboard Sound Function Selection	
Pin No.	Function
1-2 short	Onboard Sound Function Enabled.(Default)
2-3 short	Onboard Sound Function Disabled.

♦ JP1 : Keyboard Power On Selection	
Pin No.	Function
1-2 short	Enabled Keyboard power on.
2-3 short	Disabled Keyboard power on. (Default)

♦ J10 : Clear COMS Function	
Pin No.	Function
1-2 short	Clear CMOS.
2-3 short	Normal Optional.(Default)

♦ CN6 : CD Audio Line In	
Pin No.	Function
1	GND
2	Right
3	GND
4	Left

♦ JP10 : CD Audio Line In	
Pin No.	Function
1	Left
2	GND
3	GND
4	Right

♦ JP13 : CASE OPEN Function	
Pin No.	Function
1	Signal
2	GND

JP11 : For 2X11 PINs Jumper
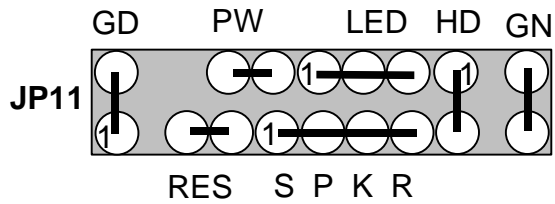
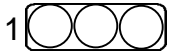## PW: Soft Power Connector

Open: Normal Operation
Short: Power On/Off
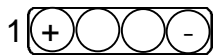
RES: Reset Switch

Open: Normal Operation
Short: For Hardware Reset System

LED: Power LED

1

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

SPKR: Speaker Connector

1 (+   -)

PIN 1 : VCC
PIN 2 : VCC
PIN 3 : NC
PIN 4 : Data

SPKR : Internal Speaker Connector (Default)

1 (+ ●● −)

PIN 1 : VCC (+)
PIN 2-PIN3 : Short
PIN 4 : Data (−)

HD: IDE Hard Disk Active LED

1

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

GN: Green Function Switch

Open : Normal operation
Short : Entering Green Mode

GD: Green LED

PIN 1 : LED anode (+)

PIN 2 : LED cathode (-)

1

3.4. 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 50 or 60 ns for EDO & 66~100 MHz for SDRAM. The DRAM memory system on mainboard consists of bank 0, 1 & bank 2.

Since 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 ~ 384MB SDRAM, EDO DRAM size is 16MB ~ 768MB. 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.

3.5. CPU SPEED SETUP

The default system bus speed is 66.6MHz. The user can change the DIP SWITCH **(SW)** selection to set up the CPU speed for 366 - 566MHz processor. The CPU speed must match with the frequency RATIO. It will cause system hanging up if the frequency RATIO is higher than CPU's.

DIP SWITCH (SW)				FREQ. RATIO	EXT.CLK. MHz	INT.CLK. MHz
1	2	3	4			
OFF	ON	OFF	ON	4.5	66	300
ON	OFF	OFF	ON	5	66	333
OFF	OFF	OFF	ON	5.5	66	366
ON	ON	ON	OFF	6	66	400
OFF	ON	ON	OFF	6.5	66	433
ON	OFF	ON	OFF	7	66	466
OFF	OFF	ON	OFF	7.5	66	500
ON	ON	OFF	OFF	8	66	533
OFF	ON	OFF	OFF	8.5	66	566

●※**JP2, JP3, JP4** (Select the system speed¡ 66, 75, 83 MHz)

MAIN CLOCK	JP4	JP3	JP2
66MHz	2-3	2-3	2-3
75MHz	2-3	1-2	2-3
83MHz	1-2	2-3	1-2

●※ **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.**

●※ **We don't recommend you to setup your system speed to 75 or 83 MHz because these frequencies are not the standard specifications for CPU, Chipset and most of the peripherals. Whether your system can run under 75 or 83MHz properly will depend on your hardware configurations: CPU, SDRAM, Cards, etc.**

3.6. CMOS RTC & ISA CFG CMOS SRAM

The mainboard contains RTC & CMOS SRAM on board. They have a power supply from external battery to keep the DATA inviolate & effective. The RTC is a REAL-TIME CLOCK device, which provides the DATE & TIME to system. The CMOS SRAM is used for keeping the information of system configuration, so the system can automatically boot OS every time. Since the lifetime of internal battery is 5 years, the user can change a new Battery to replace old one when it has consumed.

3.7. SPEAKER CONNECTOR INSTALLATION

There is a speaker in AT system for sound purpose. The 4 - Pins connector **SPKR** is used to connect speaker.

3.8. HARDWARE RESET SWITCH CONNECTOR INSTALLATION

The RESET switch on panel provides users with HARDWARE RESET function. The system will do a cold start after the RESET switch is press and released by user. The RESET switch is a 2 PINS connector and should be installed to **RES** on mainboard.

3.9. POWER LED CONNECTOR INSTALLATION

System has power LED lamp on the panel of case. The power LED will light on off or flash to indicate which step on the system. The connector should be

connected to **LED** of mainboard in correct direction.

3.10. IDE & ATAPI DEVICE INSTALLATION

There are two-Enhanced PCI IDE ports (**IDE1, IDE2**) on board, which following ATAPI standard SPEC. Any one IDE port can connected to two ATAPI devices (IDE Hard Disk, CD-ROM & Tape Driver), so total four ATAPI devices can exist in a system. The **HD** is the active LED port for ATAPI devices.

3.11. PERIPHERAL DEVICE INSTALLATION

After the I/O device installation and jumpers setup, the mainboard can be mounted into the case and fixed by screw. To complete the mainboard installation, the peripheral device could be installed now. The basic system needs a display interface card. If the PCI - Bus device is to be installed in the system, any one of three PCI - Bus slots can be used.

3.12.PS/2 KEYBOARD & MOUSE INSTALLATION

The main board supports PS/2 Mouse. The BIOS will auto detect whether the PS/2 Mouse is installed or not & assign IRQ12 for PS/2 Mouse port if it is installed. After installing the peripheral device, the user should check everything again, and prepare to power-on the system.