CONTENTS

CHECKLIST

The GSH286 main board package should contain the following :

* The GSH286 main board
* This manual

CHAPTER 1

INTRODUCTION

1-1 Introduction

The GSH286 main board is an cost-effective compromise between the power of a 16-bit internal architecture and the convenience of full compatibility with the IBM PC/AT and OS/2. The board therefore allows the microprocessor to operate with all the advantages of a high speed memory page interleave system, with multi-tasking and multi-user capabilities.

This manual has been designed to be useful for two purpose. If your GSH286 main board is already set up in a functioning system you may want to review the manual to familiarize yourself with the features of the board and where things are. For those who want to alter the board's configuration or upgrade it, the manual will serve as a guide to both procedure and specifications.

1-2 Features

* Haif size 4 layers PCB.
* System speed would be adjusted by software or hardware.
* 8 bit signal BIOS PROM.
* Optional for 80287 math coprocessor socket.
* Support on-board up to 5MB memory include 1MB DIP RAM & 4MB SIMM.
* On-board LIM EMS 4.0 hardware support.
* On-board shadow RAM support.
* Real time clock and calendar circuit.

* Sixteen interrupts.

* Seven DMA channel.

1-3 Specification

Base board central processor : 80286-16 (20)

Main memory

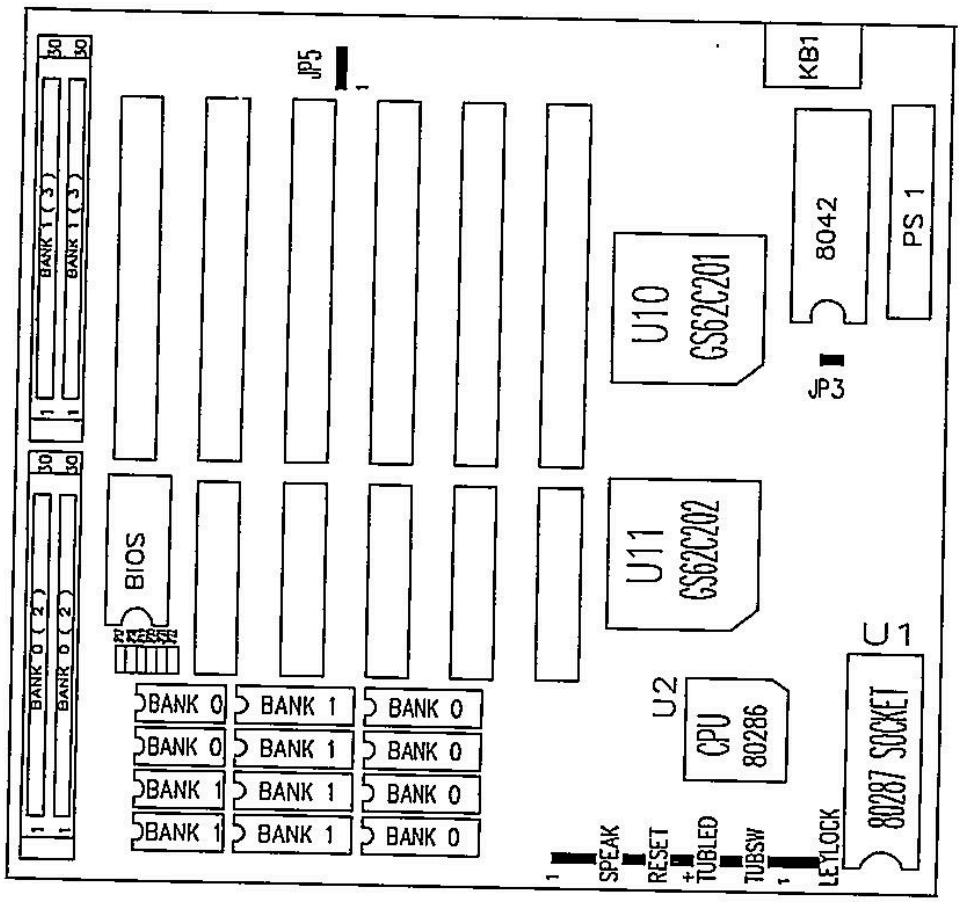
On board memory model	: 512K,1M,2M,3M,4M,5M
Maximum memory	: 16M
DRAM access cycle time	: 100ns (80ns For 20MHz)
Memory type	: 1MB DIP RAM & 4MB SIP
Data bus width	: 16 bits
Corprocessor	: Synchronous model running at CPU clock
I/O slots	: 6 expansion slots 16 bits * 5 8 bits * 1

Environment

Ambient Temperature	
operating	: 0 to +55 C
non-operating	: -30 to +70 C
Relative Humidity	: 0 to +85 % nonocondensing
Altitude	: 0 to 10,000 feet

Vibration	:	ramdom variation 0 to 1000 Hz
Physical characteristics	:	lenth 330 mm
		width 218 mm
Power requirements	:	+5V +- 5%
	:	180W

1-4 Board Layout



1-5 Jumper Setting

JP17 - JP22 : Setting On Board Memory Size

1 - 2 : on board 4MB

2 - 3 : on board 5MB

JP3 - Display Mode Select

OPEN : MONO CLOSE : COLOR

JP5 - External Battery Connector

SPEAK - Speaker Connector

RESET - Reset Connector

TUBLED - Turbo LED Indicator Connector

TUBSW - Turbo Switch Connector

KEYLOCK - Keyboard Inhibited And Power On LED Indicator Connector

KB1 - Keyboard Connector

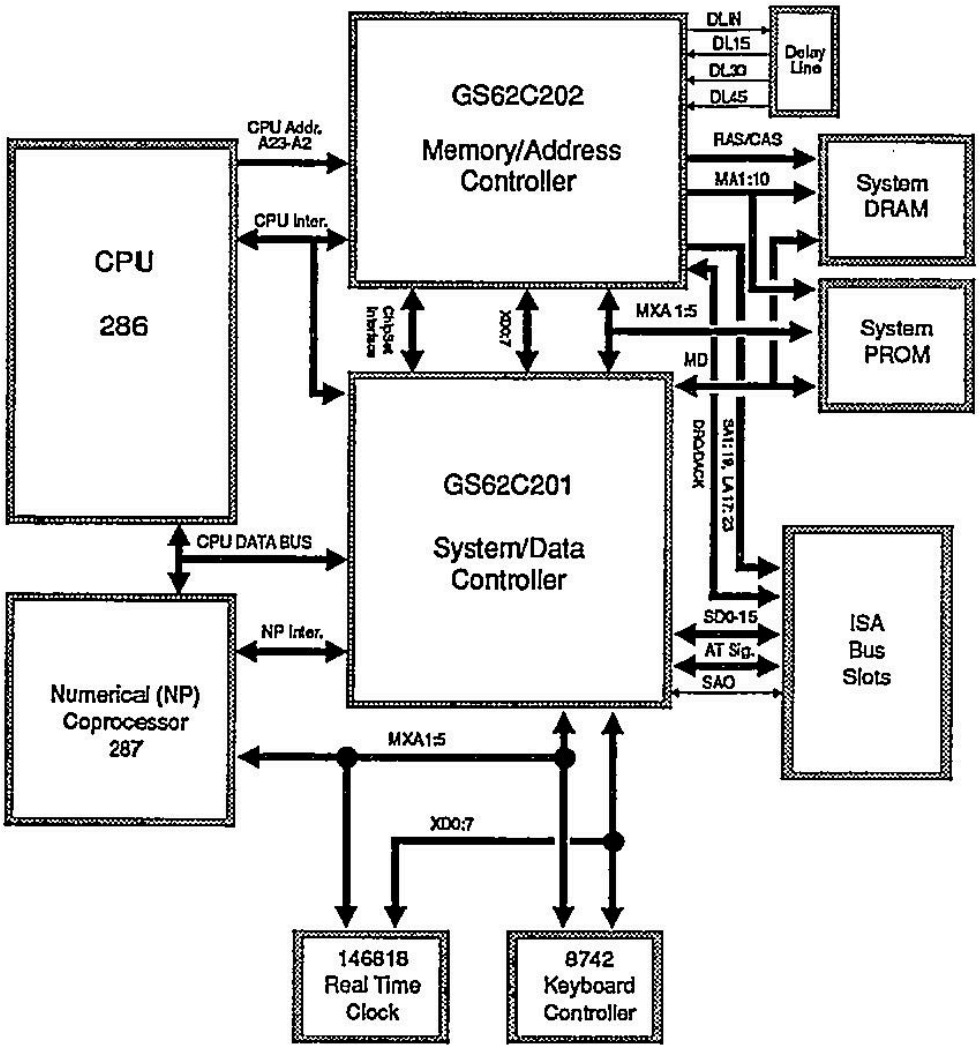
PS1 - Power Supply Connector

CHAPTER 2

HARDWARE SETUP

This board is designed using two state-of-the-art highly integrated CMOS VLSI devices such that the dimension of the board can be minimize to half size. The board would fit in virtually any system unit case from standard AT to tower cases.

2-1 System Block Diagram



2-2 Installing Memory

This section covers types of memory applicable to the GSH286 mainboard and the structure of the memory subsystem.

The board support on board up to 4MB or 5MB total memory depend on the setting of jumper JP17 through jumper JP22. Default setting for the on board memory size will be 4MB. The on board memory subsystem has four banks that use DIP RAM chips and SIP memory modules. Please refer to following FIG 2-2.1 and FIG 2-2.2 board layout for where the four banks physically located. DRAM access time can be used 100ns or 80ns.

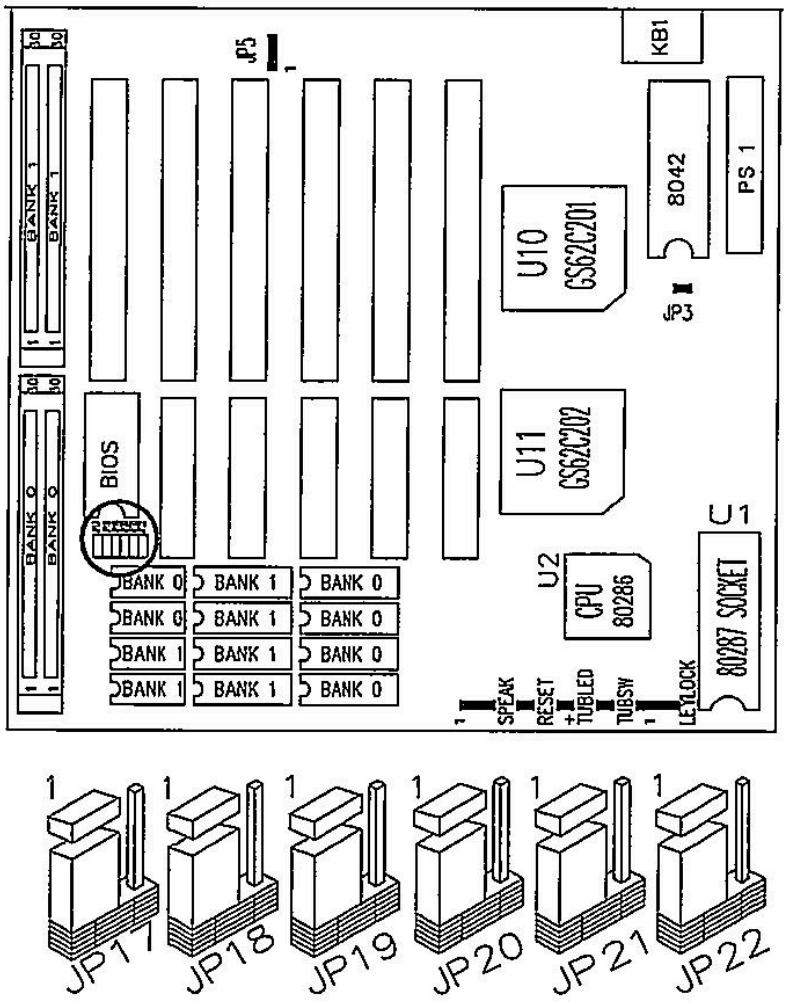
*** Memory configuration for 4MB maximum ***

JP17 - JP22 : Setting on board memory size

1 - 2 short : For 4MB Maximum (Default)

Total size	bank 0	bank 1
512K	44256 DIP or 256K SIP	*
1MB	44256 DIP or 256K SIP	44256 DIP or 256K SIP
2MB	1MB SIP	*
2.5MB	256K SIP	1MB SIP
4MB	1MB SIP	1MB SIP

FIG 2-2.1:


BANK 1
BANK 1
BANK 0
BANK 0
JP5
KB1
8042
PS 1
JP3
U10
GS62C201
U11
GS62C202
BIOS
BANK 0
BANK 1
BANK 0
BANK 0
BANK 1
BANK 0
BANK 1
BANK 1
BANK 0
BANK 1
BANK 1
BANK 0
U2
CPU
80286
U1
80287 SOCKET
SPEAK
RESET
+TUBLED
TUBSW
KEYLOCK
1
JP17
JP18
JP19
JP20
JP21
JP22

*** Memory configuration for 5MB maximum ***

JP17 - JP22 : Setting on board memory size

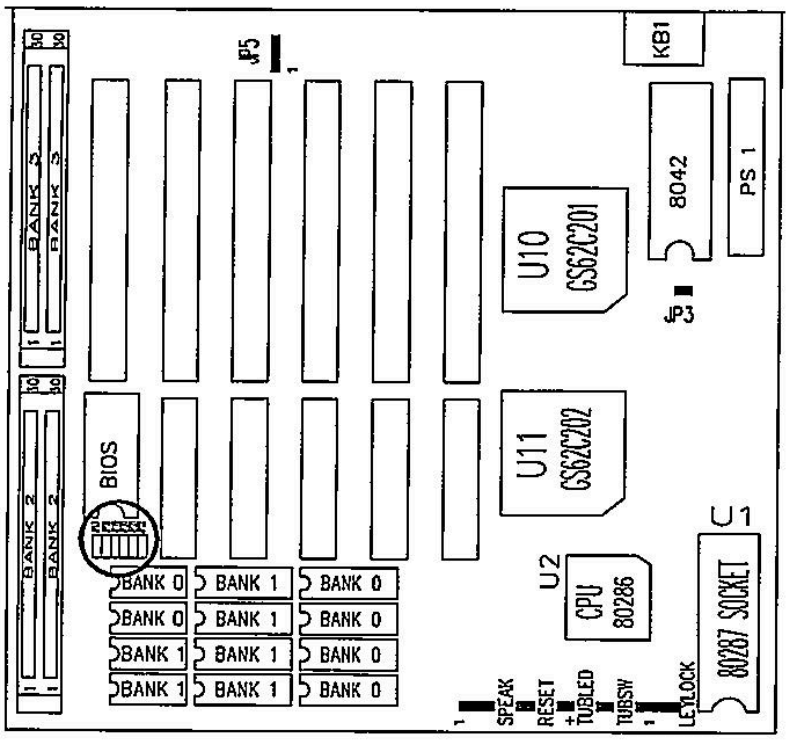
2 - 3 short : For 5MB Maximum

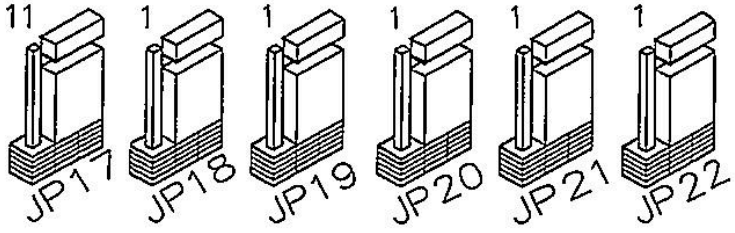
Total size	bank 0	bank 1	bank 2	bank3
512K	44256 DIP	*	*	*
1MB	44256 DIP	44256 DIP	*	*
2MB	44256 DIP	44256 DIP	256K SIP	256K SIP
3MB	44256 DIP	44256 DIP	1MB SIP	1MB SIP
5MB	44256 DIP	44256 DIP	1MB SIP	1MB SIP

NOTE:

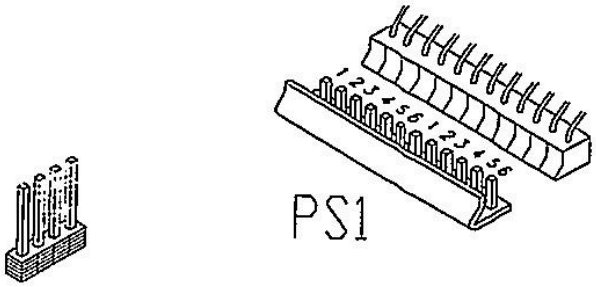
If set for 5MB maximum memeory space, bank 0 and bank 1 must be filled with 44256K and 41256K first.

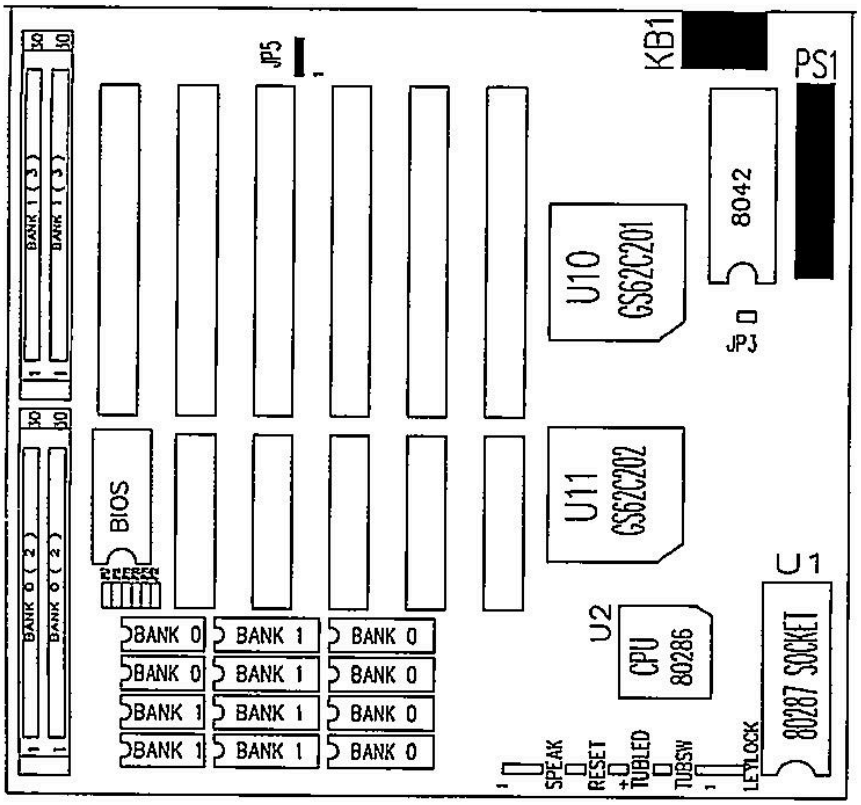
FIG 2-2.2


JP5
KB1
8042
PS 1
U10
GS62C201
U11
GS62C202
BIOS
U2
CPU
80286
C1
80287 SOCKET
BANK 3
BANK 2
BANK 0
BANK 1
SPEAK
RESET
+TURBLED
TURBSW
KEYLOCK


11
1
JP17
JP18
JP19
JP20
JP21
JP22

2-3 Peripheral Connections





*** Power Supply Connector (PS1) ***

Pin	Description
1	Power Good
2	+ 5 V
3	+ 12 V
4	- 12 V
5	Ground
6	Ground
7	Ground
8	Ground
9	- 5 V
10	+ 5 V
11	+ 5 V
12	+ 5 V

*** Keyboard Connector (KB1) ***

Pin	Description
1	KEYCLK (Clock)
2	KEYDAT (Data)
3	N/C
4	Ground
5	+ 5 V

*** External Battery Connector (JP5) ***

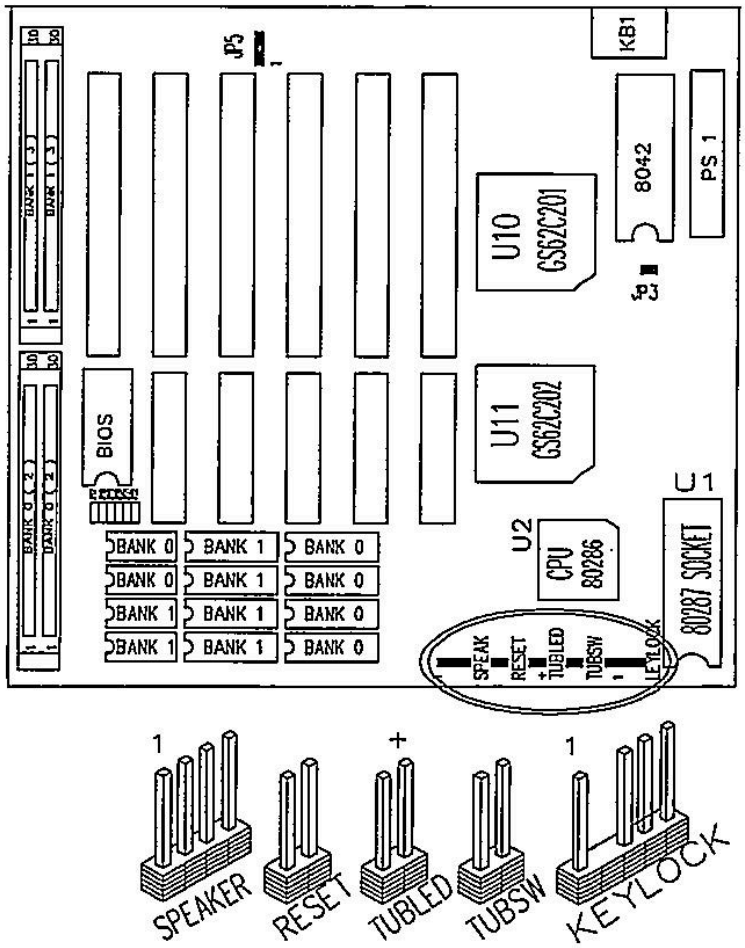
There is an internal battery already inside GSH-286. This internal battery will charge automatically as you turn the system power on. But please be understood that it later system configuration will loss because this internal battery has discharged all electricity. It will take six to twelve hours to recharge the internal battery as you turn on the system power again. In order to prevent from above phenomena , you could connect an external battery when you do not use this system.

NOTE : Please take out the jumper cap of JP6 when you could connect an external battery to JP5.

Pin	Description
1	Battery (+)
2	Key
3	Ground
4	Ground

2-4 Case Connections

There are five connectors on the GSH286 board that can be attached to indicators or devices on a system case if they are presented. Following are these five connector :



*** Speaker Connector (SPEAK) ***

Pin	Description
1	Speaker data out
2	Key
3	Ground
4	+ 5 V

*** Reset Connector (RESET) ***

There are two ways to reset system. One is hardware reset. The other is software reset.

1. Hardware : Set short jumper RESET for reset
2. Software : Hold down the <Ctrl> and <Alt> and the press the <Del> key.

*** Tubro LED Connector (TUBLED) ***

It indicates turbo mode (high speed) when TURBO LED lights. Otherwise it indicates normal mode (low speed) when TURBO LED does not light.

*** Turbo Switch Connector (TUBSW) ***

The speed of the system can be charge by either the software or the hardware switch.

1. Hardware : Setting TUBSW jumper

   Turbo mode - Close

   Normal mode - Open

2. Software : Using keyboard

   Turbo mode - Hold down the <Ctrl> and <Alt> keys and the press the < + > key

   Normal mode - Hold down the <Ctrl> and <Alt> keys and the press the < - > key

*** Keylock Connector (KEYLOCK) ***

There are two function of keylock connector. One is keyboard inhibition (pin 4 and pin 5). The other one is power on indication by LED (pin 1 and pin 3). The keyboard will be locked when pin 4 and pin 5 short so that no data could be keyed in. The specifications of keylock connector pin-out are below :

Pin	Description
1	Power for LED Power-ON light
2	Key (pin removed)
3	Ground
4	Keylock
5	Ground

CHAPTER 3

SOFTWARE SETUP

3-1 BIOS Setup

The AMI 286 BIOS setup program is used to establish the system hardware setup. In general, you will not to modify the configuration in CMOS RAM, unless following cases happen:

* CMOS options not set
* Memory size mismatch
* Hard Disk or Floppy disk type set-up error
* Display configuration mismatch
* CMOS battery is low
* To increase hard disk of floppy disk driver
* Set EMS to enable or disable

The AMI 286 BIOS provides not only the standard IBM AT configuration setup but also the also the ex-

tended setup such as shadow RAM, 287 wait state, fast /normal page mode select and even more: the diagnostic program. The initial prompt after turning on will tell to press <DEL> key if you wish to run the setup program . Once the setup screen is brought up (please refer to table 3-1), you can use the cursor key and the <PgUp>, < PgDn> keys to modify the conten of each field. Please select the appropriate configuration according to you hardware components (i.e. harddisk, flpooy drive , display card...)

*** BIOS Shadow ***

If enabled, the BIOS will deduct 64K memory from total memory and make a copy of either the main BIOS or the video BIOS into this 64K memory.
This will improve the system performance since now the BIOS is executed from the RAM.

Table 3-1 Configuration Setup

CMOS SETUP (C) Copyright 1985-1990, American Megatrends Inc.,

```
Date (mn/date/year): Tue, May 28 1991
Time (hour/min/sec): 13 : 22 : 44
Floppy drive A:     : 1.2  MB, 5h"
Floppy drive B:     : Not Installed

Hard disk C: type   : 17
Hard disk D: type   : Not Installed
Primary display     : VGA or EGA
Keyboard            : Installed
BIOS shadow option  : Main Shadow
Scratch RAM option  : 1
Co-processor wait   : Disabled
Fast Page mode      : Enabled
EMS function        : Disabled
```

```
Base memory size  : 640 KB
Ext. memory size  : 320 KB
Numeric processor : Not Installed
```

Cyln	Head	WPcom	LZone	Sect	Size
977	5	300	977	17	41 MB

Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

```
Options:-
360 KB 5h",  1.2  MB 5h",
720 KB 3ℓ",  1.44 MB 3ℓ",  Not Installed
```

```
ESC = Exit, ↓ → ↑  = Select, PgUp/PgDn = Modify
```

*** Fast/Normal Page Mode Select ***

If enabled, the BIOS will arrange the memory space higher than 640K as EMS memory. You will also need to install the EMS driver in order to make EMS memory usable by application program. Installation the EMS driver will be described in in the later section.

*** Coprocessor Wait State ***

The field provide you the selection of wait states for the 80287 math coprocess.

3-2 How To Install The EMS Driver

If you need to install the EMS driver in order to make EMS memory usable by application program, please connect with the supplier which will support you the master EMS driver. The

driver file is nameed "GEMM.sys" and it's compatible with the "EMS LIM 4.0" specifications. To install the driver, use text editor to modify the "CONFIG. SYS " to include the following line :

DEVICE = [d:][path]GEMM.SYS[options]

Where [d:] and [path] is the disk drive and the path containing the GEMM.SYS file. If you copy the GEMM.SYS into the root directory of your boot disk drive, you may ignore these two terms.

When no option is given, GEMM.SYS will automatically enable all available EMS page between segment C000 to DFFF. If any BIOS exist in those segment , that segment window will be disabled. Four option available in this EMS driver. They are described as follows:

/E:# EMS page mode

0 = C000 - DFFF max 8 physical pages
1 = C000 - EFFF max 12 physical pages
2 = 4000 - 7FFF max 32 physical pages

/R:# Set Shadow RAM area

0	=	C000	ON
1	=	C400	ON
2	=	C800	ON
3	=	CC00	ON
4	=	F000 - F7FF	ON
5	=	F800 - FFFF	ON

/U:# User memory area set

0	=	C000	ON
1	=	C400	ON
2	=	C800	ON
3	=	CC00	ON
4	=	D000	ON
5	=	D400	ON
6	=	D800	ON
7	=	DC00	ON

/X:# Driver HMA set

0 = This option will copy the EMS driver to segment F400-F7FF. This option will save about 16K in the bsae memory.

1 = This option will install the EMS driver in the conventional manner . The EMS driver will occupy the system memory.

2 = This option will install the EMS driver in the segment EC00-EFFF.

Examples :

DEVICE = GEMM.SYS

Default setting, no any other shadow RAM is set in addition to BIOS's setup. The driver is copied to segment F400-F7FF.

DEVICE = GEMM.SYS /R:0 /R:5

This will set the shadow RAM at location C000 - C3FF (video BIOS) and F800-FFFF (system BIOS). The driver is stored in segment F400-F7FF.

DEVICE = GEMM.SYS /R:0 /R:5 /X:1

This line will gives the same function as previous line except that the driver is loaded in the system memory.

3-3 Run The AMI Diagnostic

The on-board AMI BIOS support not only the basic

setup program for maintaining system configuration but also provide you a versatile diagnostic program allow you to check the system components includes harddisk, floppy drive, display card, CPU and peripherals. The diagnostic program also provide a harddisk low level format utility that allow you to low level format the harddisk. To invoke diagnostic program, follow the same direction as described in section 3-1. The screen after depress the <Del> key will prompt following :

```
Exit for Boot
Run setup
Run diagnostic
```

Use cursor key to select "Run diagnostic" program.

Appendix A : Service Information

Before calling Custome Support Service, have this information ready :

* *Part and serial number of the product.*
* *Purchase order number, for repair and shipping charges.*
* *Your shipping and billing address.*
* *Your telephone number and contract person.*

Shipping To Customer Service

When corresponding with Customer Support Service, refer to the authorization number on the packing slip, the purchase order , and any other related documents.

Because the repaired or replacement board will be in the default configuration, return your board in its original state :

1. *Put the jumpers in the default positions.*
2. *Remove all optional equipment, such as expansion cards and the math coprocessor.*
3. *Disconnect the battery from the real-time clock.*
4. *Write a note to describe the problem as detail as possible*

Protect the equipment from damage during transportation

1. *Place boards in antistatic bags and then in padded shipping bags.*
2. *Protect the product with protective padding such as flow pack or foam.*

INFORMATION OF CUSTOMER'S SYSTEM PROBLEM SETTLEMENT SHEET

To : _____ Attn : _____ FAX #Reception : _____
From : _____ CC : _____ Ref No : _____
Date : _____ /_____ /_____ Page : ___ of : _____

1. CUSTOMER DATA

   Name : _____ Tel No : _____ FAX No : _____
   Address : _____
   Contact person : _____

2. SPECIFICATION OF MOTHER BOARD

   Model No : _____ Serial No : _____
   On board memory : _____ KB CPU type & brand _____
   RAM : type _____ KB - _____ ns ☐ DIP ☐ MODULE brand _____
   CACHE memory : ____ KB part No ___*___-___ns brand _____

3. ADD ON CARD

   Viedo : type _____ Model No _____ brand _____
   Controller : type _____ Model No _____ brand _____
   LAN card : type _____ Model No _____ brand _____

4. POWER SUPPLY : _____ watts _____ brand _____

5. OTHER : _____

6. APPLICATION SOFTWARE : _____

   _____

7. DESCRIPTION OF PROBLEM : _____

   _____

   _____

8. SOLUTION : _____

   _____

   _____