386-SC - HG
386-SC - HQ

Mainboard
User's Manual

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INTRODUCTION

1.1   SYSTEM GUIDE

The 386-SC-H* Cache System Motherboard

The 386-SC-H Cache system board is a high performance system board, utilizing the Symphony 80386 PC/AT chipset, that offers outstanding features and performance for building advanced personal computers or workstations. It features an Intel/AMD 80386DX microprocessor, a numeric coprocessor socket for an Intel 80387 or Weitek 3167 coprocessor, and a CPU/Cache/DRAM controller.

High-speed Memory

The 386-SC-H Cache system board is capable of accommodating 1 to 32 megabytes of on board memory, using 256MB, 1MB or 4MB SIMMs.

* 386-SC-H represents the 386-SC-HG and 386-SC-HQ two cache system motherboards.

1.2   SPECIFICATIONS

The 386-SC-H Cache System board comes with the following features:

- Intel/AMD 80386DX microprocessor.

- Socket for Intel 80387DX or Weitek 3167 math coprocessor.

- Symphony 80386 PC/AT Chipset for high performance.

- Supports 32K/128KB of direct mapped cache memory.

- Supports 1MB up to 32MB of DRAM memory; provides buffered write DRAM updating scheme to minimize write cycle penalty, and page/page-interleaved DRAM operation.

- Shadow RAM for fast BIOS access.

- 64KB User-friendly BIOS.

- Six 16-bit expansion slots.

- Real time clock/calendar.

1.3 MOTHERBOARD LAYOUT

386-SC - HG & 386-SC - HQ

1.4 SYSTEM BLOCK DIAGRAM

AT BUS SLOT

| 80386DX CPU | A BUS / D BUS | 82C461 System controller | LA SA BUS / MA BUS / XA BUS | 32MB DRAM SIMM |

| WT3167 / 80387DX | A BUS / D BUS | 82C362 AT Bus controller | SD BUS / MD BUS / XA BUS / XD BUS | BIOS EPROM |

| 82C465 Cache controller | | 8742 Keyboard controller |

| Cache SRAM | | Real Time Clock |
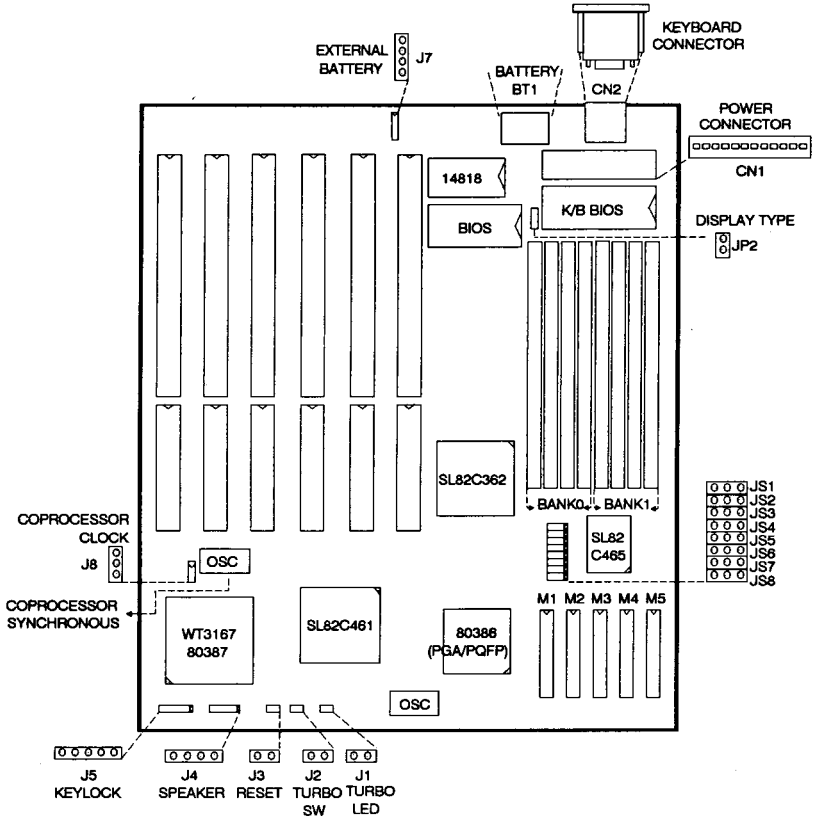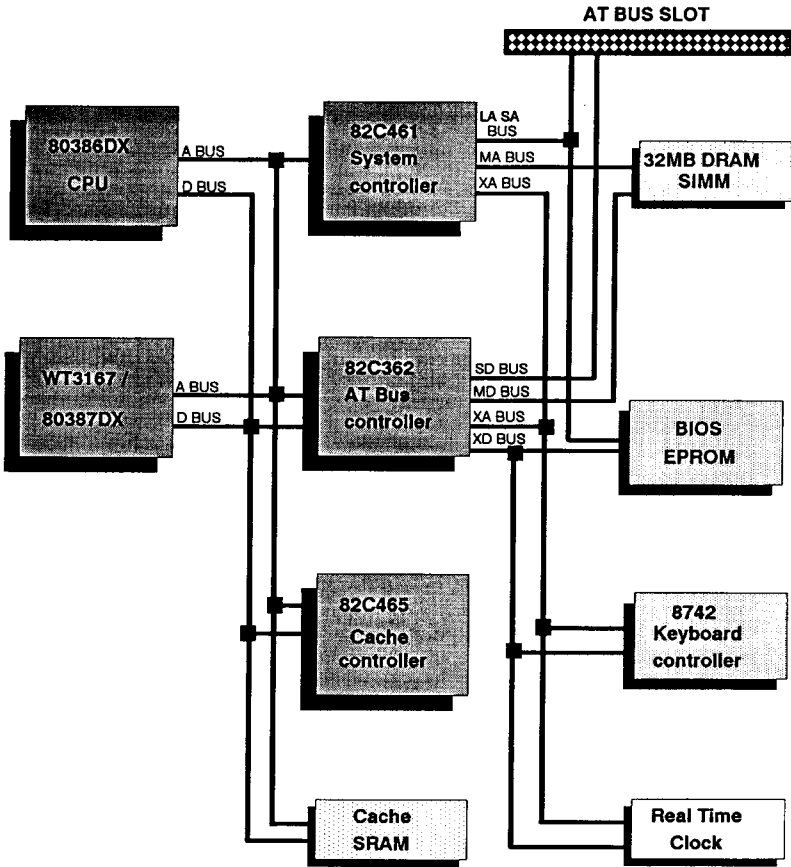
SYSTEM INSTALLATION

2.1 INSTALLING THE SYSTEM BOARD IN THE CHASSIS

Follow the instructions from your chassis manufacturer to install the system board in your chassis. Be careful not bend the system board.

2.1.1 Connecting The Power Supply

Follow the instructions from your power supply manufacturer to connect the power supply to the system board.

2.1.2 Installing A Video Card

Install your chioce of video card following the manufacturer's instructions in one of the slots available.

2.1.3 Installing And Connecting Drives

Install all your floppy and hard drives and their controller cards,following the manufacturer's instructions.

Floppy disk controllers

Most floppy disk controllers can support two floppy drives of different capacity.

Hard disk controllers

Most hard disk controllers are designed to interface with two hard disk drives. Unless otherowise specified, the interface is desiged to be compatible with Technology's ST506 interface. The drivers need not be the same capacity or configuration.

Hard Disks

Many different types of hard disks are supported. A detailed table of all devices support is in BIOS Setup"Device Supported". They must be properly configured in your CMOS configurations. Run the setup utility "Setup System Configuration" to change the configurations.

Floppy disks

Four basic types of floppy drives are supported (BIOS Setup "Device supported"). They also have to be properly configured for use.

2.1.4 Complete Installation

Make sure everything is connected correctly. Now you can close up the classis and setup your system configuration.

2.2   INSTALLING WEITEK 3167 & INTEL 80387 COPROCESSOR

The 386-SC-H Cache system board provides a socket for Weitek 3167 or Intel 80387 numeric coprocessor. Intel 80387 may run in both synchronous mode and asynchronous mode; Weitek 3167 run in synchronous mode only.

To plug the coprocessor into the 121-pin PGA socket, please note that the allignment and position are as follows:
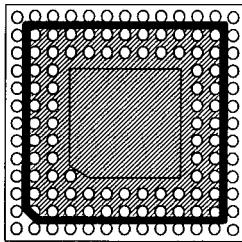
Intel 80387DX
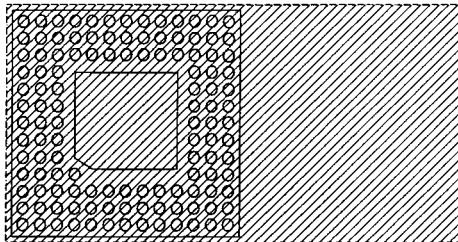
Weitek 3167

2.3   CONNECTOR DESCRIPTION

Jumper	Function	Pin outs	Signal name
J1	Turbo LED	1. 2.	VCC Turbo signal
J3	Hardware reset	1. 2.	Ground Reset signal
J4	Speaker connector	1. 2. 3. 4.	Speaker signal NC Ground +5V
J5	Key lock & power LED	1. 2. 3. 4. 5.	+5V Spare Ground Keylock Ground
J7	Ext. battery	1. 2. 3. 4.	+5V NC NC GND
CN1	Power connector	1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.	Power good +5V +12V -12V Ground -5V +5V
CN2	Keyboard connector	1. 2. 3. 4. 5.	Keyboard clock Keyboard data No connection Ground +5V

2.4   JUMPER DESCRIPTION

Jumper	Function	Open	Close
J2	CPU speed (Turbo switch)	Turbo	Normal
J3	Hardware reset (Reset)	Normal	Reset
JP2	Display type	Mono/EGA/ VGA (default)	Color
J8	Coprocessor clock	**1-2 short** Sync mode (default)	**2-3 short** Async mode

MEMORY SYSTEM

3.1 INSTALLING DRAM MEMORY

3.1.1 DRAM Type

The 386-SC-H Cache system board supports up to 32M bytes of the system DRAM in two 32-bit banks. Each bank can be composed of 256K/1M/4MB SIMM Module RAMs. Different sizes of DRAMs can be mixed in different banks with only one restriction.

3.1.2 DRAM Configuration

Arbitrary mixing of 256K/1M/4MB DRAM in the two banks is allowed. The BIOS determines the configuration automatically. No jumper or register setting is required.

Note !
Total memory = bank 0 / 1 subtotal

3.1.3 DRAM Access Speed Specification

System Speed	DRAM Access Time	DRAM Timing Setup (default value)
25MHz	80ns	1 Wait
33MHz	80ns	1 Wait
40MHz	80ns	2 Wait

3.1.4   Using SIMM Module RAM As Main Memory

Memory	Bank 0	Bank 1
1MB	256Kx4	
2MB	256Kx4	256Kx4
5MB	256Kx4	1Mx4
17MB	256Kx4	4Mx4
4MB	1Mx4	
5MB	1Mx4	256Kx4
8MB	1Mx4	1Mx4
20MB	1Mx4	4Mx4
16MB	4Mx4	
17MB	4Mx4	256Kx4
20MB	4Mx4	1Mx4
32MB	4Mx4	4Mx4

3.2   INSTALLING CACHE MEMORY

The 386-SC-H Cache System board provides direct mapped cache orginization, with data cache size rangeing from 32KB to 128KB.

3.2.1   Cache RAM Speed Requirement

System Speed	25MHz	33MHz	40MHz
TAG RAM	25ns	20ns	20ns
DATA RAM	25ns	25ns	20ns

3.2.2 Inserting Cache RAM & Configuring Cache Size

The 386Q-SC Cache System board use mini jumper to configure the Cache size.

Cache Size	32K	128K
SRAM	8K x 8	32K x 8
TAG RAM	8K x 8	8K x 8
JS1- JS 8	1-2 pin short	2-3 pin short

32Kbytes Direct Mapped Cache

The 32Kbytes direct mapped Cache option is achieved by installing four 8Kx8 SRAM (DATA RAM) in M1, M2, M3, M4. Installing one 8Kx8 SRAM (TAG RAM) in M5. Refer to figure 1 below:

Figure 1 : 32Kbytes Direct Mapped Cache
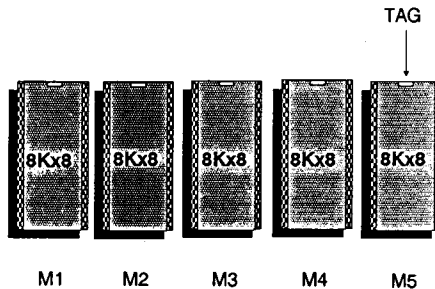
128Kbytes Direct Mapped Cache

The 128Kbytes Direct Mapped Cache option is achieved by installing four 32Kx8 SRAM (DATA RAM) in M1, M2, M3, M4. Installing one 8Kx8 SRAM (TAG RAM) in M5. Refer to Figure 2 below:

Figure 2 : 128Kbytes Direct Mapped Cache

TAG

32Kx8   32Kx8   32Kx8   32Kx8   8Kx8

M1   M2   M3   M4   M5

AMI BIOS SETUP

A.1   SETUP SYSTEM CONFIGURATION

A setup program has been built into the system BIOS so the configurations stored in the CMOS RAM can be changed. This program should be executed only after:
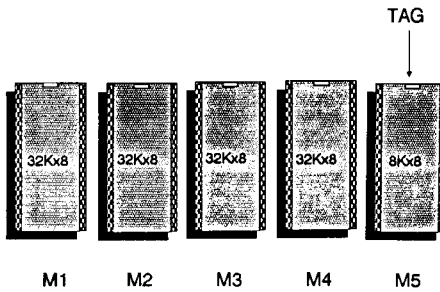
(1)   User has changed system configuration.

(2)   User has changed system backup battery.

(3)   System has detected a configuration error and has asked the user to run the setup program.

After power-on RAM testing, the message: "Press <DEL> if you want to run SETUP/EXTD" is displayed on the screen. Press "DEL" to run setup or do nothing to bypass. If the "DEL" key pressed, the following message will be displayed:

```
┌────────────────────────────────────────────────────────────┐
│       BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES          │
│      (C) 1990 American Megatrends Inc., All Rights Reserved   │
├────────────────────────────────────────────────────────────┤
│                  STANDARD CMOS SETUP                         │
│                  ADVANCED CMOS SETUP                         │
│                  ADVANCED CHIPSET SETUP                      │
│           AUTO CONFIGURATION WITH BIOS DEFAULTS             │
│         AUTO CONFIGURATION WITH POWER-ON DEFAULTS           │
│                  CHANGE PASSWORD                             │
│                  HARD DISK UTILITY                           │
│                  WRITE TO CMOS AND EXIT                      │
│                  DO NOT WRITE TO CMOS AND EXIT               │
├────────────────────────────────────────────────────────────┤
│  Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc. │
│     ESC : Exit  ↓ → ↑  Sel  F2/F3 : Color  F10 : Save & Exit    │
│                                                              │
└────────────────────────────────────────────────────────────┘
```

Use ↓ and ↑ keys to select and press "Enter" to run the selected program.

A.2 STANDARD CMOS SETUP

```
BIOS SETUP PROGRAM - STANDARD CMOS SETUP
(C) 1990 American Megatrends Inc., All Rights Reserved

Date (mn/date/year)    :  Mon, Jul 29 1991          Base memory : 640KB
Time (hour/min/sec)    :  16:08 :10                  Ext. memory : 3328KB
Daylight saving        :  Disabled            Cyln Head WPcom LZone Sect Size
Hard disk C: type      :  Not Installed
Hard disk D: type      :  Not Installed
Floppy drive A:        :  Not Installed       Sun Mon Tue Wed Thu Fri Sat
Floppy drive B:        :  Not Installed        26  27  28  29  30  31   1
Primary display        :  VGA/PGA/EGA           2   3   4   5   6   7   8
Keyboard               :  Installed             9  10  11  12  13  14  15
                                               16  17  18  19  20  21  22
                                               23  24  25  26  27  28  29
                                               30   1   2   3   4   5   6


           Esc : Exit  ↓ → ↑  Select F2/F3 : Color  PU/PD : Modify
```

The setup program is completely menu driven; use arrow keys to select entry; "PgUp/PgDn" keys to change entry; and "Esc" key to exit. Help messages are displayed in the window on the screen.

If this option is chosen then the screen above is displayed. System BIOS automatically detects memory size, no changes are necessary. After the changes are made, press "Esc" key to exit.

A.3 ADVANCED CMOS SETUP

```
         BIOS SETUP PROGRAM - ADVANCED CMOS SETUP
        (C) 1990 American Megatrends Inc., All Rights Reserved

  Typematic Rate Programming   :  Disabled      Adaptor ROM Shadow CC00, 16K :  Disabled
  Typematic Rate Delay (msec)  :  500           Adaptor ROM Shadow D000, 16K :  Disabled
  Typematic Rate (Chars/Sec)   :  15            Adaptor ROM Shadow D400, 16K :  Disabled
  Above 1 MB Memory Test       :  Disabled      Adaptor ROM Shadow D800, 16K :  Disabled
  Memory Test Tick Sound       :  Enabled       Adaptor ROM Shadow DC00, 16K :  Disabled
  Memory Parity Error Check     :  Enabled       Adaptro ROM Shadow E000, 64K :  Disabled
  Hit <DEL> Message Display     :  Enabled       System ROM Shadow F000, 64K  :  Enabled
  Hard Disk Type 47 RAM Area    :  0:300         Timing Parameter Selection   :  Extended
  Wait For <F1> If Any Error    :  Enabled       DRAM Wait State Selection    :  1 W/S
  System Boot Up Num Lock       :  On            BUS Clock Selection          :  CLK 2/5
  Weitek Processor              :  Absent        Decoupled Refresh Option     :  Disabled
  Floppy Drive Seek At Boot     :  Enabled
  System Boot Up Sequence       :  A: , C:
  Enternal Cache Memory         :  Present
  Fast Gate A20 Option          :  Enabled
  Video ROM Shadow C000, 16K    :  Enabled
  Video ROM Shadow C400, 16K    :  Enabled
  Adaptor ROM Shadow C800, 16K  :  Disabled


    ESC: Exit  ↓ → ↑  Sel  (Ctrl) Pu/Pd :Modify  F1 : Help  F2/F3 : Color
      F5 : Old Values  F6 : BIOS Setup Defaults  F7 : Power-on Defaults
```

The Advance CMOS Setup program shown on the screen above works in the same way as the standard CMOS setup.

Users are not encouraged to run Advanced CMOS setup program, your system should have been fine-tuned before shipping. Improper setup may cause the system to fail, consult your dealer before making any changes.

System speed	BUS Clock Selection	DRAM Wait State Selection
25MHz	CLK 2/3	1 Wait State
33MHz	CLK 2/4	1 Wait State
40MHz	CLK 2/5	2 Wait State

A.4 WRITE TO CMOS AND EXIT

If you completed Setup , press ESC return to the main menu, move cursor to "Write to CMOS and Exit ", and answer "y" to change the CMOS Setup. if you didn't change anything, press ESC again and answer "y", then the CMOS Setup will not change.

```
BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES
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                    STANDARD CMOS SETUP
                    ADVANCED CMOS SETUP
          AUTO CONFIGURATION WITH POWER ON DEFAULTS
          Write to CMOS and Exit (Y/N) ? Y


              Write the settings to the CMOS and Exit


     ESC : Exit   ↓ → ↑ Sel    F2/F3 : Color   F10 : Save & Exit
```