



MT1386 System Board
Installation and Operations Guide

Version 2.0

P/N: 771008

PREFACE

Thank you for your choice of a Mylex 386 system board product. With proper installation and care, your Mylex system board will operate for years without any service requirement. This user's manual will guide you in the installation process. The information contained herein is subject to change without notice.

Mylex Corporation shall not be held liable for technical or editorial omissions or errors made herein, or for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this document may be photocopied or reproduced by mechanical, electronic, or other means, in any form, without prior written permission of Mylex Corporation, except as permissible by the United States Copyright Act of 1976 as amended.

Copyright© 1991
by
Mylex Corporation
34551 Ardenwood Boulevard
P.O. Box 5035
Fremont, California 94555-5035

Revision 2.0
4/91

P/N: 771008

Copyright Notice:

This manual is copyrighted by Mylex Corporation. It may not, in whole or in part, be copied, reproduced, photocopied, translated on paper, electronic media or computer-readable-form or be used to make a derivative work, without written permission from Mylex Corporation,

except as permitted by the United States Copyright Act of 1976, as amended.

FCC Notice:

This device has been tested and found to comply within the limits of a Class B device, pursuant to Part 15 of FCC regulations. Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference, and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been designed to provide reasonable protection against harmful interference in a residential area. This equipment generates, uses and can radiate radio frequency energy. This device, if not installed and used in accordance with the manufacturer's instructions, may cause harmful interference to radio communications. There is no guarantee, however, interference will not occur in a particular installation. Should it be determined that this equipment is causing interference to radio or television reception, the following suggested actions may be taken:

Reorient or relocate the receiving antenna. Increase the distance between the antenna and the computer. Plug the computer into a different AC outlet so that the two conflicting devices are using a different branch circuit. Contact the dealer that sold this equipment and/or a reputable radio/television service technician for additional suggestions.

Trademarks:

Mylex™ and MT1386™ are registered trademarks of Mylex Corporation. All other products and companies are trademarks of their respective owners and licensees.

Mylex Warranty - Customer Service Policy

One Year Limited Warranty

This product is guaranteed to be free from manufacturing or material defects for a period, of 1 (one) year after the date of purchase. Should the product fail during this period Mylex will repair or replace (at Mylex's option) the product free of charge with the following provisions:

- 1) Proof of purchase must be provided.
- 2) The product must have been properly installed in accordance to the documentation provided.
- 3) The product must not have been **modified** by any party except by Mylex or an authorized agent.
- 4) The product must be free of damage.

Any software, including firmware, is provided "as-is" without warranty of any kind, expressed or implied. The purchaser bears complete risk of the performance and **quality** of the software. Mylex's sole **responsibility**, and the purchaser's only remedy to any defect in workmanship, shall be replacement of the defective **medium** (diskette or ROM).

All expressed or implied warranties for the **MT1386**, including, but not limited to, warranties of merchantability and fitness for a **particular** purpose, are restricted to the duration of the warranty period. Under no circumstances shall Mylex be held liable, in any way, to the purchaser for damages, including any lost profits, lost savings, or other incidental or consequential damages arising out of the use of, or inability to use this product. Some states do not allow warranty or liability restrictions or limitations, so the preceding limitations may not apply to you.

Returned Merchandise Authorization (RMA)

All products returned to Mylex for warranty service or for other reasons, must be assigned an RMA number before shipment to Mylex. The **RMA number** may be obtained by contacting Mylex's Technical Support Department. Any product received without an RMA number will be returned to the shipper unopened.

Important Note: Only the company (or individual) that purchased the product directly from Mylex may obtain an RMA number. If the Mylex product was purchased from a reseller or distributor, you must contact that company for service.

The following rules/procedures apply to all RMAs:

- 1) The product must be returned in original packaging or other suitable materials.

- 2) Each returned unit will be inspected for damage or other irregularities. If a unit is shown to be modified, the customer will be notified before any action is taken.
- 3) RMA # should be visible outside the box.
- 4) Mylex will not be responsible for non-Mylex products shipped with an RMA unit. This includes memory, math coprocessors and other internal and external peripherals.

Products must be shipped to Mylex with freight paid. Upon completion of service, Mylex will ship the product back UPS Ground or similar service, at no charge, unless prior arrangements have been made.

Customer Service

Mylex Technical Support is available 8:00 a.m. to 5:00 p.m. pacific standard time, Monday through Friday except holidays. They can be reached at (415) 796-6100 or by FAX at (415) 745-8016. End Users are required to contact their suppliers before contacting Mylex for technical assistance.

Table of Contents

Introduction

Overview	I-1
Package Contents	I-1
Handling Precautions	I-2
If Troubles are Encountered	I-2
What You Will Need	I-3

Chapter 1: Installation

Planning the System	I-2
Installing Memory	I-2
Installing a Math Coprocessor	I-4
80387 Installation	I-5
Setting The Jumpers	I-5
Chassis Installation	I-6
Connecting Cables	I-6
Finishing Hardware Installation	I-7
Upgrading The Cache Memory	I-7
Configuring The BIOS	I-7

Chapter 2: Troubleshooting

Troubleshooting	2-1
-----------------------	-----

Appendix A: Technical Reference

Specifications	A-1
Benchmarks	A-3
I/O Port Connections	A-3

Appendix B: System Planning Worksheet

System Planning Worksheet	B-1
---------------------------------	-----

Figures and Tables

Figures

Figure I-1: MTI System Board	I-1
Figure I-2: Inserting a SIMM Module	I-3
Figure I-3: Math Co-Processor Installation	I-4
Figure I-4: 367 Installation	I-5
Figure I-5: Control Panel Connections	I-6
Figure I-6: Installing Cache Memory Chips	I-7

Tables:

Table I-1: SIMM Memory Configuration	I-3
Table A- 1: General System Specifications	A- 1
Table A-2: Memory Specifications	A-1
Table A-3: I/O Specifications	A-2
Table A-4: BIOS Specifications	A-2
Table A-5: Operating Environment Specifications	A-2
Table A-6: Physical Specifications	A-3
Table A-7: I/O Port Connections.	A-3
Table A-6: External Connections	A-4

Introduction

Thank you for making the decision to purchase the Mylex MT1386. With proper installation and maintenance, the MT1386 will provide years of trouble-free operation.

Overview

This manual is broken down into 4 major sections. The following is a description of each section.

Chapter 1: Installation — This describes the major steps for installing the MT1386 into a chassis and making all necessary hardware connections including I/O cables.

Chapter 2: Troubleshooting -This section provides hints on resolving technical problems with the MT1386 system board.

Appendix A: Technical Reference — This section covers some of the major aspects of the MT1386's design, as well as pin assignments and compatibility and benchmark information.

Appendix B: System Planning Worksheet — Use this form to help plan the system configuration.

Package Contents

- MT1386 System Board
- Cable Kit (2 serial cables and 1 parallel cable)
Mylex 386 ISA BIOS manual
- This manual
- Warranty Card

- Any pertinent release notes available at the time of shipment.
- System Problem Report Form



**STATIC
WARNING**

Handling Precautions

The MT1386 contains electronic components that are highly sensitive to electrostatic discharge. Use extra caution when handling the MT1386 to ensure there is adequate grounding around the work area the board is being installed. **ALWAYS** wear a ground strap or ground your body by touching a grounded object such as an unpainted metal device connected to power ground.

In addition, the MT1386 has delicate crystal oscillators that can break if subjected to sudden shock such as being tossed on a table. Use care when moving the MT1386 from point to point.

If Troubles are Encountered

If, during the course of installation or operation of the MT1386, the board displays improper operation, first consult this manual as well as the BIOS manual. Then contact your dealer or distributor for additional information. Should problems still exist, you may contact Mylex Technical Support Department at (415) 796-6100. Be sure to have the enclosed System Problem Report completely filled out.

What You Will Need

Before you begin to install the MT1386 in a chassis, the following tools will be required: A Phillips and flat blade screwdriver, plastic stand-offs (these are normally supplied with the chassis) and assorted screws.

A good working knowledge of computers is highly recommended for installing a system board. It is not advised that a novice attempt installation of the MT1386.

This page intentionally left blank.

Chapter 1: Installation

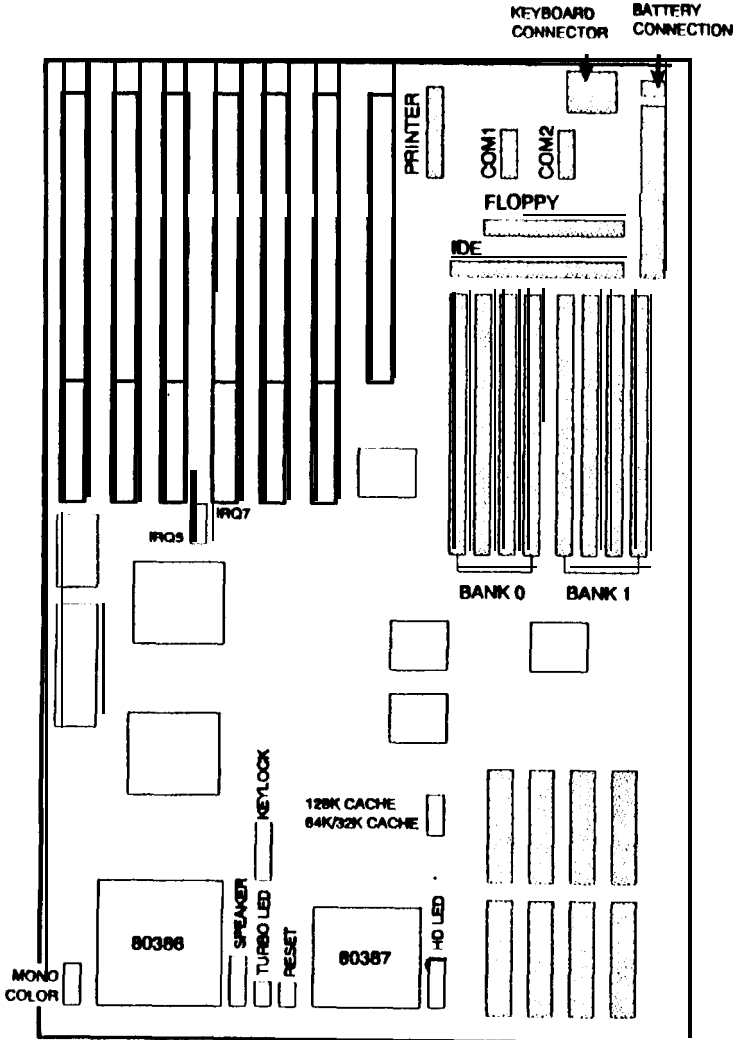


Figure 1-1: MT1386 System Board

There are 5 easy steps for installing the MT1386 system board into a chassis.

1. Planning the system configuration.
2. Installing SIMMs and a math coprocessor (if required).
3. Changing any of the hardware jumpers if the system configuration requires them to be changed.
4. Installing the board into the chassis.
5. Powering-up the system and setting the CMOS configuration information.

Planning the System

Using the simple form located in Appendix A, the resources available can be planned and any problems such as hardware conflicts can be avoided ahead of time.

Installing Memory

The MT1386 supports 80ns “page mode” SIMM memory. SIMMs are available in three common sizes, all of which are supported: 256K x 9, 1MB x 9, and 4MB x 9. These SIMMs should be available from your system supplier.

The MT1386 uses a 32-bit address bus for the memory. As a result, four or eight SIMMs must always be used in the system. The MT1386 supports nine different memory configurations: 1, 2, 4, 5, 8, 16, 17, 20 and 32MB. SIMM sizes can not be mixed in the same Bank.

Orient the SIMMs so that the RAM chips face toward the expansion slots. Make sure the SIMMs are firmly in place and even with each other. Review the figure on the next page for proper SIMM installation and table for proper configuration.

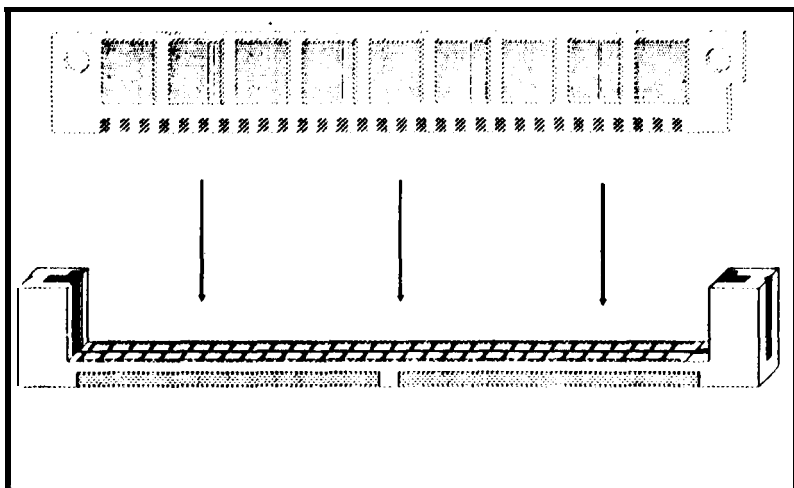


Figure 1-2: Inserting a SIMM Module

Table I-I : SIMM Memory Configuration

Size	Bank 0	Bank 1
1MB	4 x 256K	----
2MB	4 x 256K	4 x 256K
4MB	4 x 1MB	—
5MB*	4 x 1MB	4 x 256K
8MB	4 x 1MB	4 x 1MB
16MB	4 x 4MB	----
17MB*	4 x 4MB	4 x 256K
20MB	4 x 4MB	4 x 1MB
32MB	4 x 4MB	4 x 4MB

• Note: Bank 0 and Bank 1 can be swapped.

Installing a Math Coprocessor

The MT1386 supports two different types of math coprocessors: 1) An Intel 80387 or plug compatible or, 2) The Weitek™ 3167. The speed of the math coprocessor must be matched to that of the CPU.

A 33-Mhz system board will require a 33-MHz co-processor.

CAUTION: Improper installation of the math coprocessor can cause permanent damage to the system board.

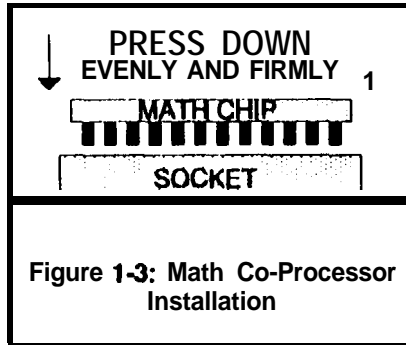


Figure 1-3: Math Co-Processor Installation

Locate the socket for the math coprocessor on the bottom of the board adjacent to the CPU. Using Figure 8 as a guide, ensure all the pins are perfectly lined up before pressing the chip down into the socket.

Then press down with firm and even pressure until the chip will no longer move. Normally this will leave less than 1/10" clearance between the chip and the socket.

80387 Installation

The socket for the math coprocessor is a “dual purpose” socket that supports the larger Weitek 3167 and the smaller 80387. Because of this, the 80387 must be installed within the interior ring of pin sockets leaving 1 row of pins exposed. Review Figure I-4. Note: Orient the chip such that the notch is toward Pin 1 of the socket, which is identified by the thick line on the corner of the socket.

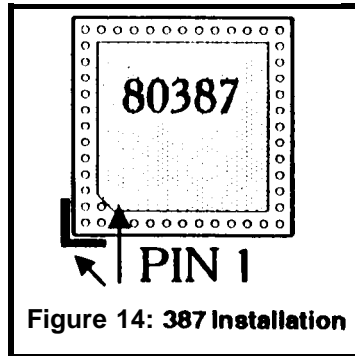


Figure 14: 387 Installation

Setting The Jumpers

The MT1386 has only two user selectable and 3 factory set jumpers. Refer to their locations on figure I-1.

Jumper JP1 selects the video display type. If a color video adapter such as CGA, EGA or VGA is installed, this jumper should be moved to cover Pins 1 and 2. If a monochrome board is installed, the jumper should be moved to the “MONO” position (Pins 2 and 3).

Jumper JP2 selects the interrupt line for the parallel port. *Note: Jumper JP2 does not need to be changed unless another parallel port is installed in the system as LPT1. If a second parallel port is installed and assigned as LPT1, the jumper should be moved to Pins 2 and 3.*

Jumper JP4 is used to enable or disable all of the I/O peripherals. The factory default is for pins 1 and 2 which enable the I/O. To disable all of the I/O, move the jumper to pins 2 and 3.

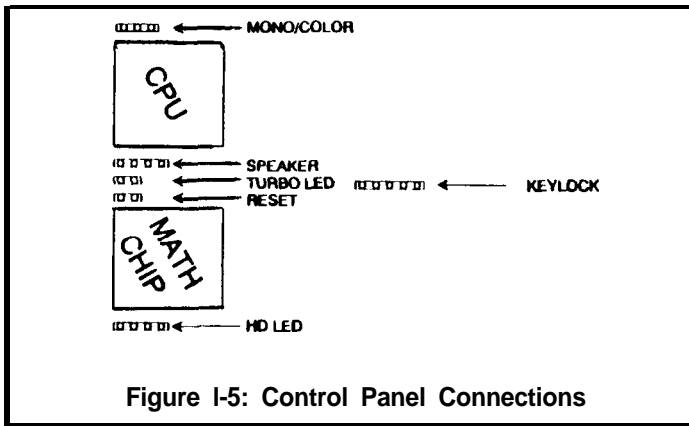
Jumpers JP5 is used to select the Cache memory size. Factory default is for position 2-3 which supports 32K or 64K of Cache. The jumper to position 1-2 will enable addressing for

32Kx8 SRAMs, if the board is upgraded for 128K of Cache, see section xxx.

Jumper JP3 is a factory jumper for "Pipe-Line-Mode" on the CPU and should not be altered.

Chassis Installation

Use caution when sliding the MT1386 into the chassis so as not to scrape the bottom of the board against any rough edges. Use as many plastic stand-offs as possible to better support the board. Use a minimum of two screws (preferably in opposing corners) to lock the board in place.



Connecting Cables

Connect the power cables from the power supply to the system board. Then install any ribbon cables from the internal peripheral controllers to the disk drive(s) and I/O port connectors. Be sure the red or blue stripe along the edge of the ribbon cable is connected to Pin 1.

Note: for all the I/O interfaces is marked by both the number 1 and 8 white triangle located in the corner of the connector.

Connect all the control panel cables, for Keylock, Speaker, Turbo LED and HD LED. Refer to Figure I-5 for their locations on the MT1386.

Finishing Hardware Installation

Once the system board has been mounted and screwed in place, install the video adapter and any other peripheral boards into the board. Check each of the cables to ensure they are properly installed.

Upgrading The Cache Memory

To upgrade Cache memory, four new 32K x 8 25ns SRAM's must be installed in place of the eight 8K x 8 SRAM's.

Locate the static memory (SRAM's), on the lower right hand section of the board. The four new chips should be installed in locations U36, U38, U46, and U48. Refer to figure I-6 for their placement.

IMPORTANT: Make sure the notch for pin 1 on each of the chips is correctly oriented toward the top of the system board.

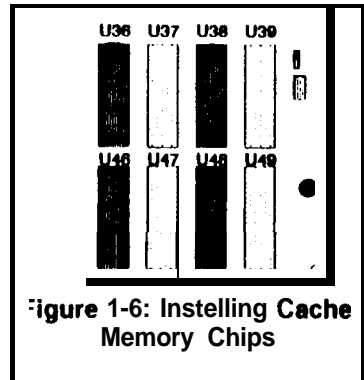


Figure 1-6: Installing Cache Memory Chips

Configuring The BIOS

Note: The Mylex BIOS has its own manual that was included with this board. There is only minimal information provided within this manual and the Mylex 386 ISA BIOS Users Manual should be consulted for more information.

The Mylex BIOS that is installed on the **MT1386** has a built-in CMOS setup program like many other BIOS's available. To access the setup screen, press the F2 function key at any time during the POST (Power On Self Test).

Use the setup screen to configure the floppy drives, hard drives, video display type, and I/O options. For cursor movement and other commands, follow the on-screen prompts.

Chapter 2: Troubleshooting

This section contains a brief series of problems and solutions that comprise the most common questions posed during the troubleshooting of an ISA bus system board. Please review these questions before contacting your supplier's technical support. In addition to this section, please review the BIOS Users Guide for additional information on BIOS generated error messages.

- P. - No video and a series of beeps.
- S. - Check the BIOS manual to identify the beep codes and follow the procedures identified; check the video card in a different slot and/or different computer.
- P. - Floppy light is always on.
- S. - The floppy cable was installed backwards. Reverse the cable.
- P. - System will not boot from floppy.
- S. - Confirm the setting within the CMOS table is correct; make sure the cable is good; make sure there is a terminating resistor on the floppy drive.
- P. - The IDE hard disk will not spin up.
- S. - Check the power cable and IDE cable.
- P. - The HD Led on the system board does not operate.
- S. - Some IDE disk drives do not support the LED function on the IDE cable. Rather they provide an LED on the disk drive itself or, an LED connection on the disk drive. Connect the control panel LED to the disk drive.
- P. - The system's I/O ports do not work.
- S. - Confirm the CMOS setup has been correctly configured; check the ribbon cable installation.

- P. - Ethernet adapter does not work.
- S. - Most ethernet cards use IRQ3 as a default setting. The MT1386 uses IRQ3 for the COM2 serial port. Either disable COM2 or change the ethernet adapter settings.
- P. - Serial ports will not properly run a serial mouse.
- S. - Make sure the power supply has adequate +/- 12 volt supply being delivered to the system board.
- P. - OS/2 will not print from the parallel port.
- S. - OS/2 requires the IRQ for the parallel port to be active. Make sure the parallel port(s) have the IRQ line correctly configured.

Appendix A: Technical Reference

The following pages of this section cover the basic specifications, benchmarks and pin-out assignments of connectors on the MT1386. Please note this data is provided for informational purposes only and is subject to change without notice.

Specifications

Table A-1 : General System Specification

system	Description
Processor type	Intel 80386DX
System Speed	25 a 33-MHz
Coprocessor	Optional Intel 80387 a Weitek 3167
Host Interface	ISA
Slots	Six 16-bit, one 8-bit

Table A-2: Memory Specifications

Memory	Description
Memory Type	9-bit, 80 ns. fast page-mode SIMM
Memory Sizes	256-Kbytes, 1 -Mbyte end 4-Mbytes
Configurations	1,2,4,5,8,16 and 32-Mbytes, bank interloaved
Cache Type	Two-way sel-associative, write through
Cache Size	64-Kbytes, upgradable to 128K

Table A-3: I/O Specifications

I/O Interfaces	Description
Serial Ports	Two COM1 and COM2, up to 19.2 Kbaud on DB9 connectors
Printer Port	Centronics-compatible DB25
Floppy	Controls two 5-1/4" or 3-1/2" high or low density
IDE	For drives with Integral Drive Electronics (AT BUS)
I/O settings	All I/O configurations executed through BIOS

Table A-4: BIOS Specifications

BIOS Subsystem	Description
BIOS Type	Mylex 366 ISA BIOS
BIOS Features	Built-in setup, Power-on self-test (POST), drive table optimized for IDE drives, user-definable drive type, Auto Memory Sizing, Auto IDE Driver definition, 2 non-cache region definitions, memory limiting.
BIOS Shadowing	System and video shadowing supported
Connections	Keyboard/Power, Turbo LED, Reset, Hard Drive LED, External 6-volt Battery end Speaker

Table A-5: Operating Environment Specifications

Operating Environment	Description
Power Requirements	3 Amps typical at 5 volts, 10 milliamps at 12 volts
Temperature	32°F to 132°F (0°C to 50°C)
Humidity	Up to 90% noncondensing

Table A-6: Physical Specifications

Physical Specifications	Description
Size	13" x 8.6" (Baby AT form factor)
Weight	1.6 lbs net
Humidity	Up to 90% noncondensing

Benchmarks

Power Meter v1.7

MIPS 7.9
 Dhtystones 1 0.2K/sec
 Whetstones 115.2K/sec*

**No floating point processor*

Landmark v2.0 52.0

I/O Port Connections

Table A-7: I/O Port Connections

Serial Port		Parallel Port		Parallel Can't	
PIn	Function	PIn	Function	PIn	Function
1	DCD	1	STB	8	SLIN
2	DSR	2	AFD	19	ACK
3	RxD	3,5,7	DO-7	21	BUSY
4	RTS	9,11,13		23	PE
5	TxD	15,17		25	SLCT
6	CTS	4	ERR	10,12	GND
7	DTR	6	INIT	14,16,18	
8	RI			20,22,24	
9	GND			26	
10	N/C				

Reference

Table A-8: External Connections

External Connections	
Location	Function
J1	External Battery
J2	Printer Port
J3	COM1
J4	COM2
J5	Floppy Disk Interface
J6	IDE Interlace
J7	Keylock
J8	Speaker
J9	Turbo LED
J10	Reset
J11	IDE Drive Activity LED

APPENDIX B: System Planning Worksheet

ADAPTER	IRQ	I/O Address	Memory Address
COM1	4	3F8-3FF	N/A
COM2	3	2F8-2FF	N/A
LPT1	7	378-37F	N/A
LPT2	5	278-27F	N/A
EGA/VGA-RAM	2/9	3C0-3CF	A000:0 - A7FF:0
EGA/VGA-ROM		3B0-3BF	C000:0 - C7FF:0
MONO			B000:0 - B7FF:0
Bus Mouse			
FAX/Modem			
Hard Disk Ctlr			
Network Card 1			
Network Card 2			
Other 1			
Other 2			

Instructions: For each adapter that is installed in the system, fill out the pertinent information in the space provided. Make sure that no two components occupy the same IRQ, I/O Address and Memory Address.