

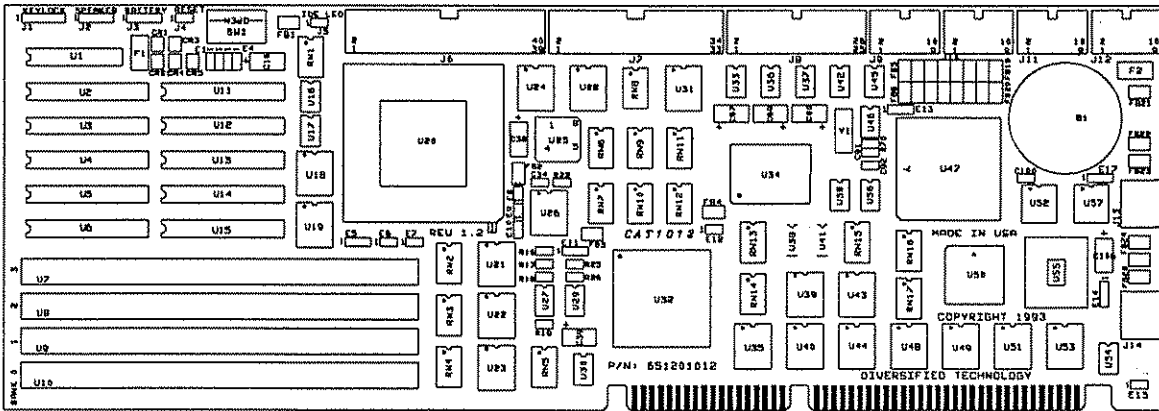
DIVERSIFIED TECHNOLOGY®

INCORPORATED

CAT1012

REV. 1.2

1/AT COMPATIBLE Configuration Guide



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PREFACE

This configuration guide provides general characteristics and specifications, information for configuration, installation and operation, and service information.

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MANUAL REVISION HISTORY

RELEASE DATE	SUMMARY OF CORRECTIONS	PAGE NO.
1/21/93	Initial Manual Release (Rev. 1.0)	
4/26/93	Added 50 MHz Option Information (Rev. 1.1)	1-1; 2-4,5; 4-5 5-4,5,27
12/03/93	SIMM Module Update (Rev. 1.2)	2-6

HOW TO USE THIS MANUAL

This manual is a product of Diversified Technology, Inc. and is designed help you, the end user, configure your system with the least amount of effort and be up and running in the shortest time possible. A great deal of effort has been put in to achieve this end, and if you have any comments that would help us improve this manual please let us know so that we can better serve you, our customer. This manual is organized for ease of use but you may find some sections redundant. We have included sections for each level of user from expert to novice, and in the process of doing this some redundancy is created. The sections of the manual, with a brief outline of content, are listed below:

SECTION 1: This is a general overview of the CAT1012. While little hard technical information is included, it should provide you with a concept of the features of the CAT1012.

SECTION 2: This section contains a step-by-step description of how to set the physical jumpers and switches on the board and what they really mean. This section will be of most use to a first-time user of the board, and to users that need detailed information. Those who have configured a CAT1012 board before may find Section 4 faster to use.

SECTION 3: Section 3 contains a description of the ports and connectors on the CAT1012. This information is mostly for the more technical user who needs to know the pinout of the ports.

SECTION 4: This is a highly condensed reference which describes the connectors, switches and jumpers with a minimum of verbiage.

SECTION 5: Section 5 is a complete description of the built-in SETUP utilities. This section should be consulted to make sure that the board is set up properly.

SECTION 6: This section is a troubleshooting guide, intended to help with those rare problems you might experience with the CAT1012.

SECTION 7: These four "maps" detailing the memory and I/O locations used by the CAT1012 and those available for your use can be used as quick reference when installing expansion cards or assembling your system. This section was definitely designed for more experienced users.

SECTION 8: This section describes how to return your CAT1012 for service.

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SECTION 1

CAT1012 PRODUCT OVERVIEW

The CAT1012 is a single board PC/AT integrated computer system which offers high speed cached 80486 performance on a single /AT form factor card. The CAT1012 is unique in that it supports the 20/25 MHz 80486SX, 25/33/50 MHz 80486DX, and 50/66 MHz 80486DX/2 Intel processors. In all cases, the 8 Kbytes of internal four-way set associative cache increases the execution speed of most programs.

In addition to the internal 8 Kbytes of cache, the CAT1012 supports an optional secondary cache. The CAT1012 supports both 64KB and 256KB secondary cache options. The secondary cache architecture is based on a "write-back" scheme. This "write-back" architecture derives its superior performance by optimizing write cycles. There is no performance penalty in the cache write cycle since the processor can complete a write cycle and continue execution without waiting on the slower DRAM controller.

Sixty-four megabytes of system DRAM may be installed on the CAT1012. The CAT1012 accepts 256K, 1M, and 4M by 36 SIMM modules providing up to four banks of memory. At all operating speeds, the CAT1012 requires 80 nsec (or faster) DRAM SIMMs for near zero wait state performance. Two-way and four-way page mode interleaving is supported by the memory controller unit, and is configured automatically if either two or four like-sized SIMMs are installed.

The high level of integration provided on the CAT1012 enables the user to configure most systems with no more than a CAT1012 and an appropriate video interface card. In addition to the high performance CPU/cache logic, the CAT1012 provides an IDE hard disk port, a floppy disk controller, two serial ports, a parallel port, and a PS/2 compatible mouse port. Also, the CAT1012 supports a "FLASH" BIOS which allows new BIOS releases to be downloaded through an easy to use utility.

An onboard lithium battery with a projected life of five years maintains setup data. External connections are provided for external reset, speaker, keylock, and optional external battery. The keyboard, mouse, and speaker ports are provided with short-circuit protection.

The following sections will provide an overview of the various features of the CAT1012 and how the user configures these features.

SECTION 2

CAT1012 CONFIGURATION

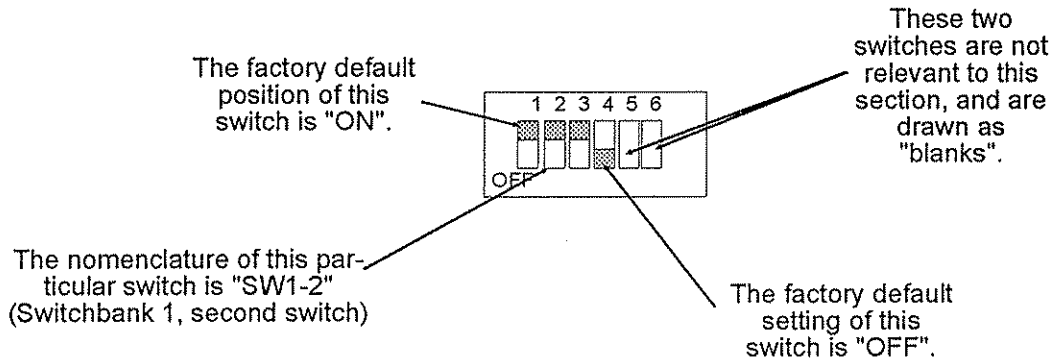
The following section explains the various hardware configuration requirements for the CAT1012. Configuration changes are made in one of two ways: software setup through the CAT1012 ROM based setup utility or by jumper settings and DIP switches.

In the following hardware configuration instructions, board outline drawings and tables will indicate on a per section basis which switches and jumpers are used in configuring different options. Note that some sections have no switches because all of the configuration is done through software. This section does not deal with ROM utility configuration. Section 5 contains instructions on the software-based setup utilities. As it is quite often necessary to set both the hardware and software configuration of the board, the user should make a point of also reading Section 5.

NOTATIONAL CONVENTIONS

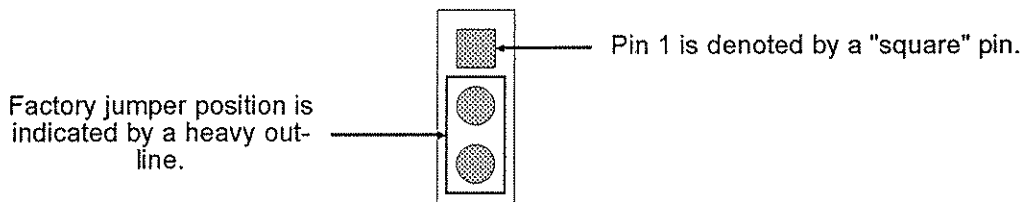
In the material following, certain notational conventions are used which bear some explanation.

Whenever a particular functional section uses DIP switches in configuration, only those DIP switches which affect the section are shown. The relevant switches are drawn in the factory configuration position. For example:



Most places in the text will refer to switch positions as ON or OFF. It should be understood that "OPEN" and "OFF" are equivalent, as are "CLOSED" and "ON".

Some configuration choices are made by jumpers or shunts. The drawing convention for these is as follows:



In configuration tables associated with switches and jumpers, the factory default configuration is also marked with a "*".

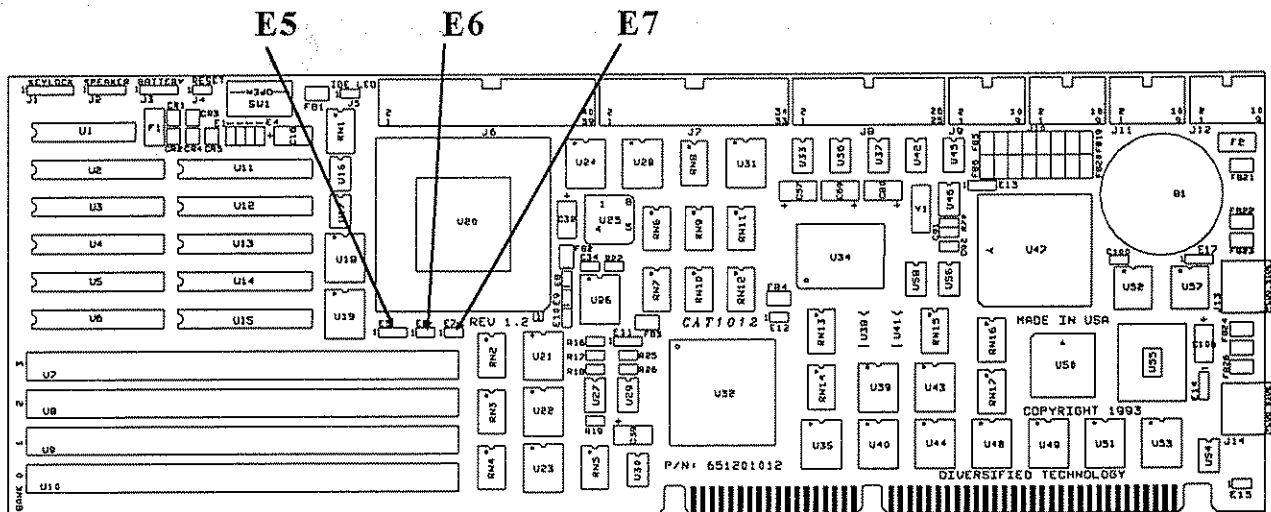
2.0 Processor Configuration

As mentioned in the overview, the CAT1012 supports the 80486SX, 80486DX, and 80486DX/2 Intel processors. Three jumpers are used to configure the appropriate type of processor -- E5, E6, E7.

For 80486SX processors, E6 and E7 should not be installed and a shunt should be placed across pins 2 and 3 of E5.

For 80486DX and 80486DX/2 processors, E6 and E7 should be installed and a shunt should be placed across pins 1 and 2 of E5.

80486SX , 80486DX, 80486DX/2 CONFIGURATION		
E5	2-3	80486SX INSTALLED
	1-2	80486DX, 80486DX/2 INSTALLED
E6	ON	80486DX, 80486DX/2 INSTALLED
	OFF	80486SX INSTALLED
E7	ON	80486DX, 80486DX/2 INSTALLED
	OFF	80486SX INSTALLED



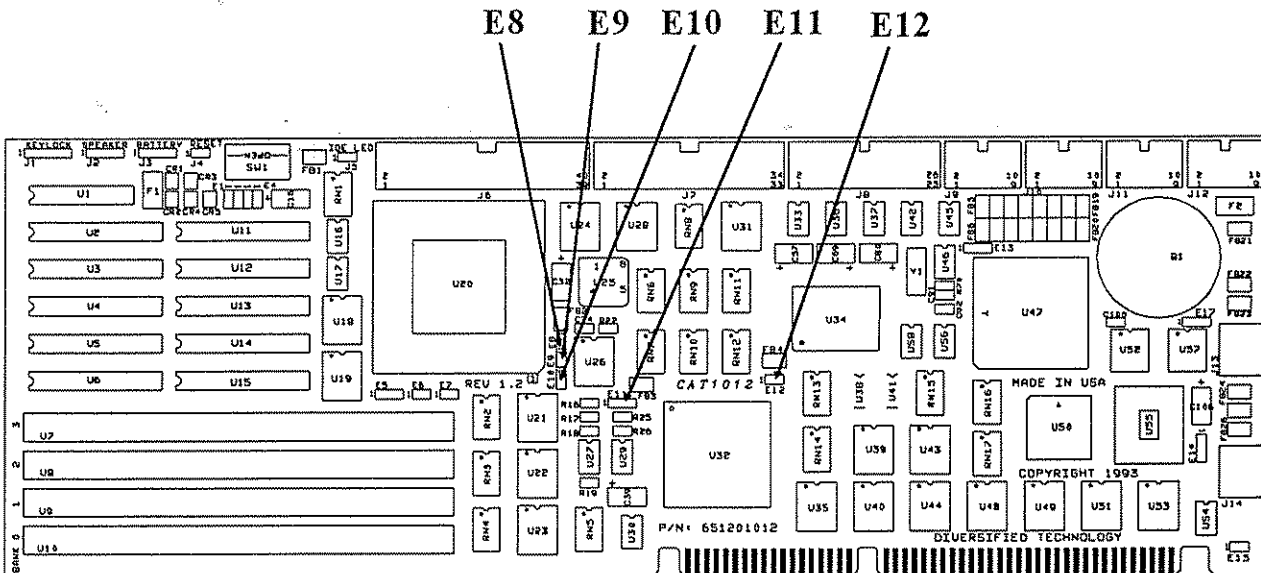
2.1 System Speed Configuration

The CAT1012 supports system speeds of 25, 33, and 50 MHz. Setting the system speed involves configuring five jumpers.

Jumpers E8, E9, and E10 are actually inputs to the clock synthesis chip used on the CAT1012. Jumpers E11 and E12 are inputs to the chip set and communicate what type of relationship exists between the processor clock and the system memory clock. The jumpers should be set as follows:

SYSTEM SPEED	E8	E9	E10	E11	E12
25 MHz	ON	ON	OFF	1-2	OFF
33 MHz	OFF	ON	OFF	1-2	OFF
50 MHz	ON	ON	OFF	2-3	ON

NOTE: With a DX/2-50 MHz, the system speed is actually 25 MHz, and with a DX/2-66 MHz, the system speed is 33 MHz.



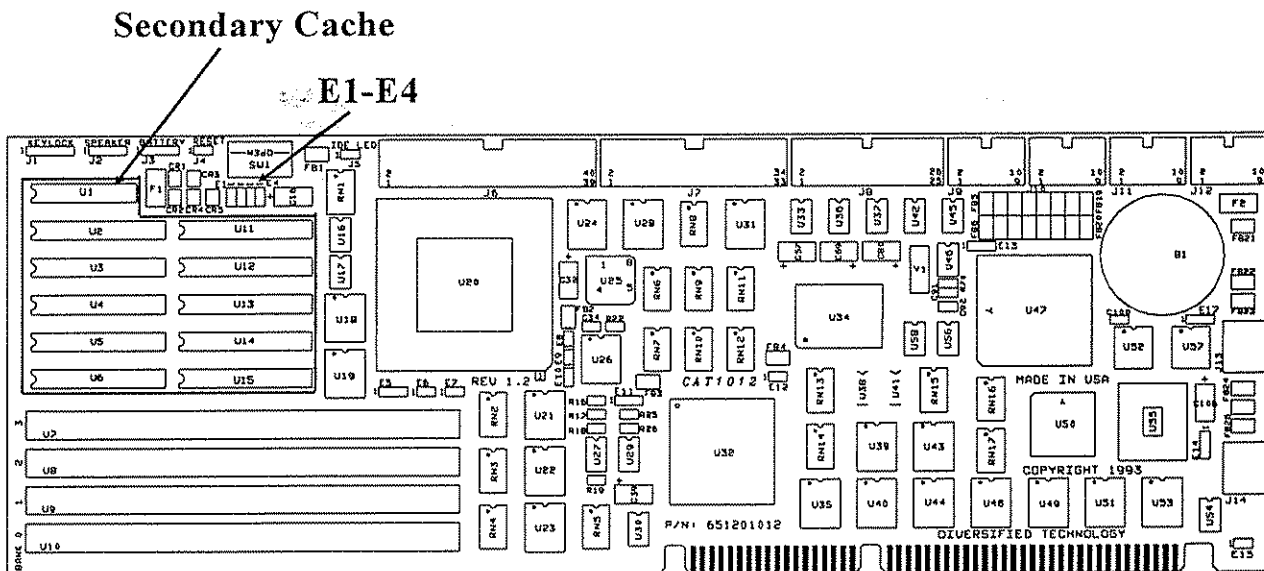
2.2 Secondary Cache Configuration

The CAT1012 supports optional cache sizes of 64K and 256K. The secondary cache architecture consists of eight data SRAMs, one tag SRAM for 64K cache (two with the 256K option), and a "dirty" bit SRAM.

The secondary cache is configured through the ROM based CAT1012 utility and by four jumpers, E1-E4. The user can enable or disable the secondary cache through the CAT1012 setup utility. The cache size is configured as follows:

CACHE SIZE	CACHE DATA SRAM U3-U6, U12-U15	TAG SRAM U2, U11	JUMPERS E1-E4
64K	8Kx8	8Kx8 @ U2 ONLY	REMOVED
256K	32Kx8	8Kx8 @ U2, U11	INSTALLED

The CAT1012 requires 25 nanosecond data SRAMs and 20 nanosecond tag SRAM(s) at speeds of 33 MHz and lower. For 50 MHz operation, the CAT1012 requires 20 nanosecond data SRAMs and 15 nanosecond tag SRAM(s). The CAT1012 utilizes a 64K x 1 "dirty" bit SRAM (U1) that is speed rated identical to the tag SRAM(s).

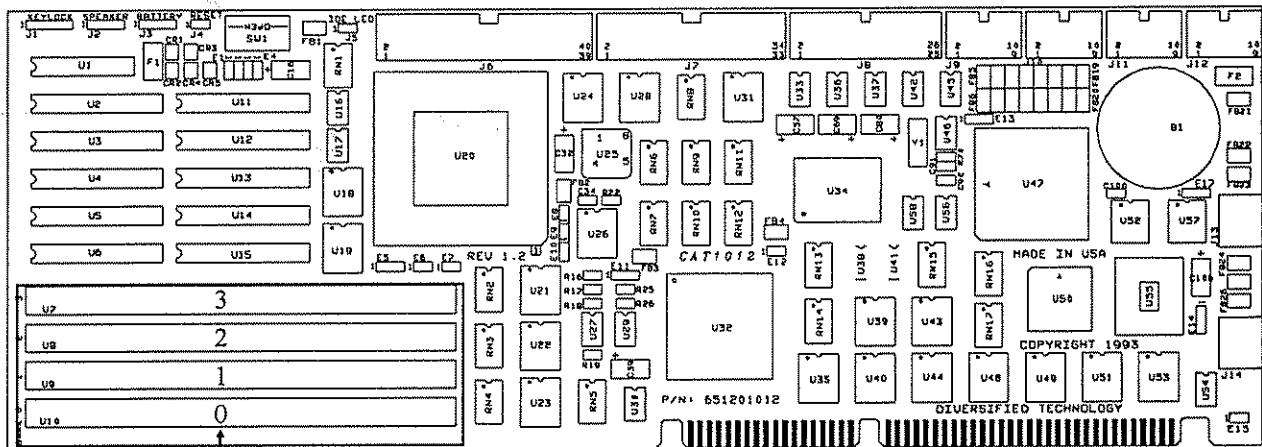


2.3 System Memory Configuration

The CAT1012 supports up to 64 megabytes of system DRAM. The board provides four "by 36" SIMM sockets, thus, each socket appears as its own bank. The SIMM sockets are located at U7 (bank 3), U8 (bank 2), U9 (bank 1), and U10 (bank 0). **The CAT1012 supports "single density" 256K, 1M, and 4M by 36 device types.** Also, the user can mix any two combinations of SIMM device size --- as long as the smaller of the two device types is installed in the lower bank(s). For instance, the user could configure the CAT1012 for 13 Mbytes of system memory by installing a 256K x 36 SIMM at location U10 (bank 0) and three 1M x 36 devices at locations U7-U9 (banks 1-3). Since each SIMM represents a memory bank, SIMM devices can be installed one at a time.

The system memory is automatically sized by the CAT1012 BIOS and requires no hardware configuration. Refer to Table 2.1 for DRAM configurations supported.

NOTE: SIMM modules with auxiliary parts such as programmable devices and logic IC's should not be used. Such devices cause timing deficiencies on DRAM timing parameters and are deemed unstable.



System DRAM Memory

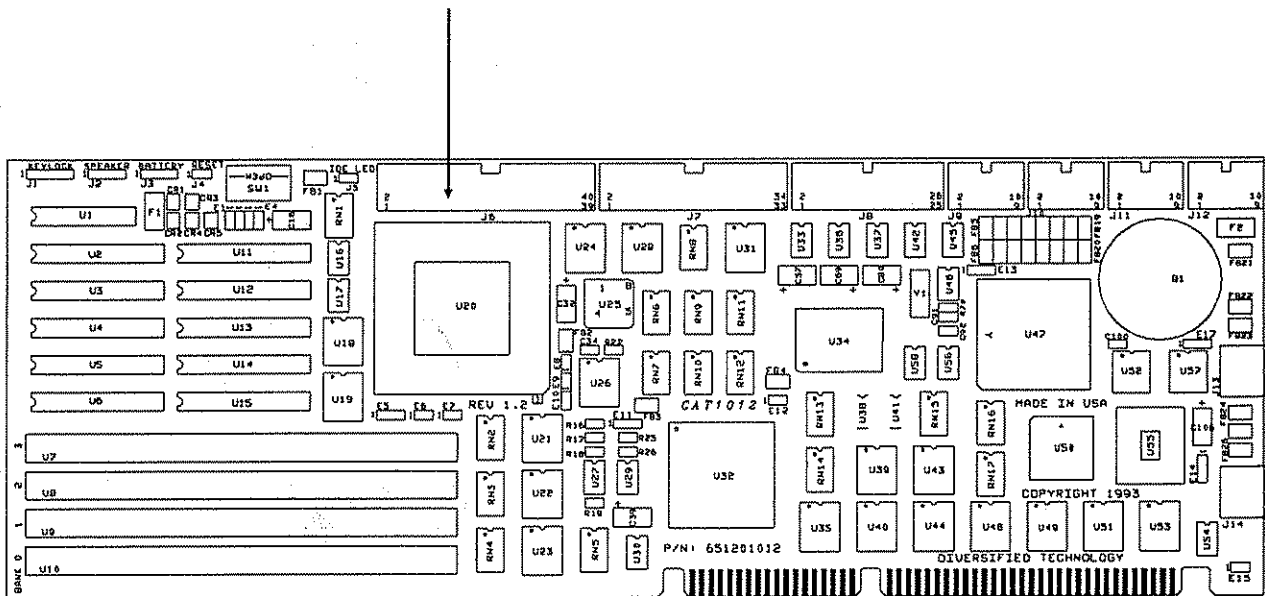
BANK 0	BANK 1	BANK 2	BANK 3	TOTAL
256K	X	X	X	1M
256K	256K	256K	256K	4M
1M	X	X	X	4M
256K	1M	X	X	5M
256K	256K	1M	X	6M
256K	256K	256K	1M	7M
1M	1M	X	X	8M
256K	1M	1M	X	9M
256K	256K	1M	1M	10M
1M	1M	1M	X	12M
256K	1M	1M	1M	13M
1M	1M	1M	1M	16M
4M	X	X	X	16M
256K	256K	4M	X	18M
1M	4M	X	X	20M
1M	1M	4M	X	24M
4M	4M	X	X	32M
1M	1M	4M	4M	40M
4M	4M	4M	X	48M
4M	4M	4M	4M	64M

Table 2.1 : CAT1012 DRAM Configuration

2.4 IDE Hard Disk Interface

The CAT1012 supports an /AT compatible IDE hard disk. The IDE interface can be enabled or disabled using the CAT1012 Configuration Utility. When enabled, the IDE interface utilizes IRQ14. The IDE drive is connected via a 40-pin ribbon cable at J6.

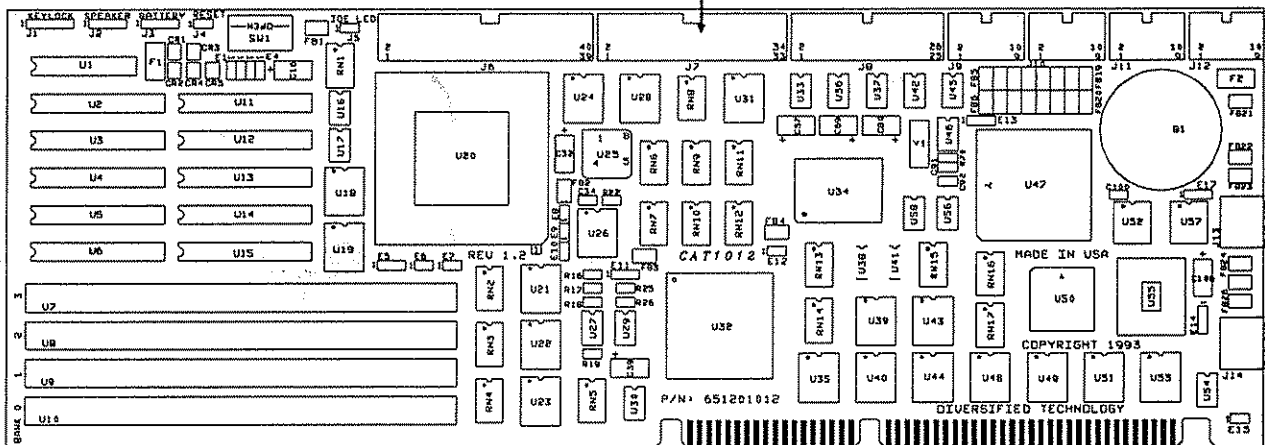
IDE Hard Disk Interface (J6)



2.5 Floppy Disk Interface

The CAT1012 supports an /AT compatible floppy disk. The floppy disk interface supports 360K, 720K, 1.2M, and 1.4M disk drives. The floppy interface can be enabled or disabled using the CAT1012 Configuration Utility. When enabled, the floppy interface utilizes IRQ6 and DMA channel 2. The floppy drive is connected via a 34-pin ribbon cable at J7.

Floppy Disk Interface
(J7)

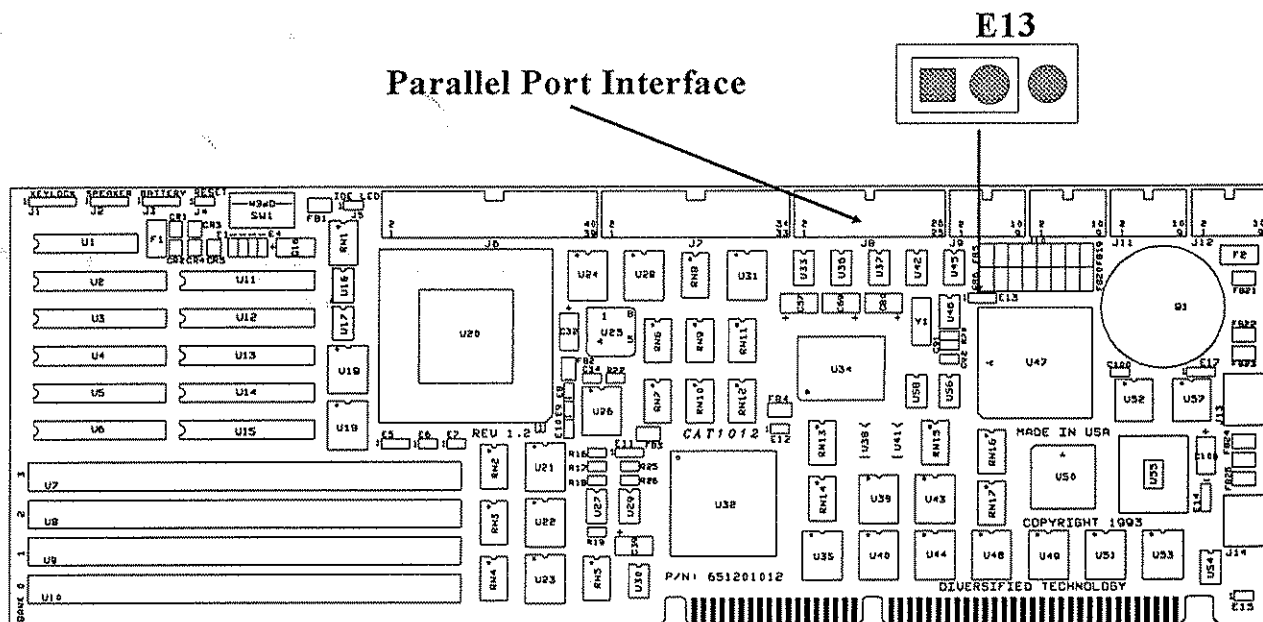


2.6 Parallel Port

The printer port interface on the CAT1012 is configured via a single jumper setting and by the CAT1012 Configuration Utility. The printer port interrupt is set by jumper E13. Strapping a shunt across pins 1-2 selects IRQ7, whereas, strapping a jumper across pins 2-3 selects IRQ5.

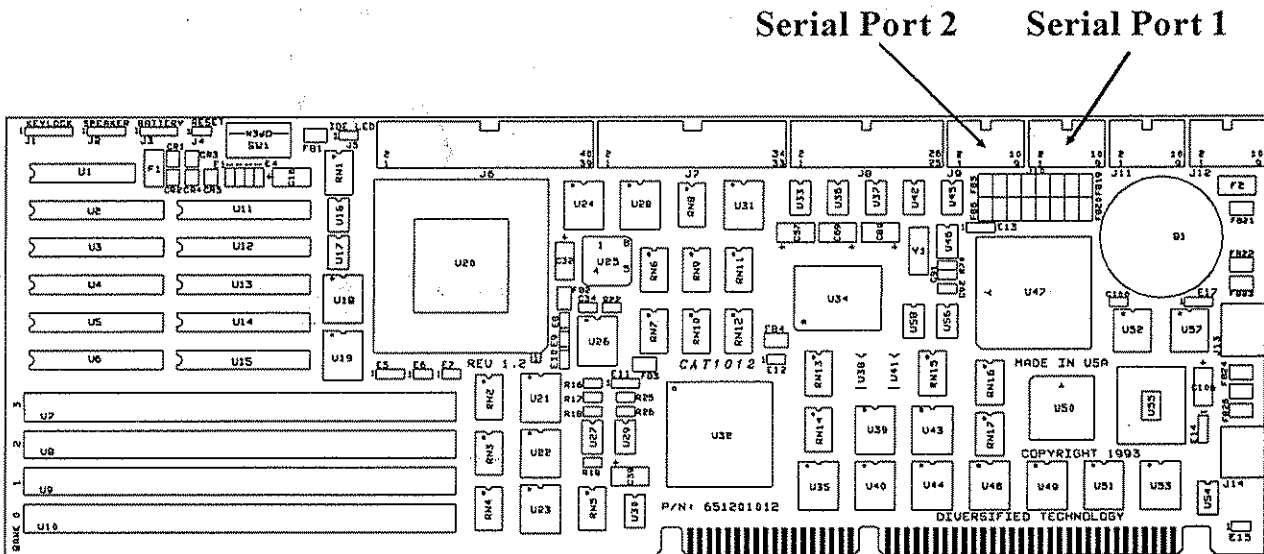
The address of the parallel port may be set in the CAT1012 Configuration Utility to any "standard" printer port address. It may also be disabled entirely through the utility.

PRINTER PORT INTERRUPT	
E13 POSITION	INTERRUPT
1-2	IRQ7*
2-3	IRQ5



2.7 Serial Ports

Two high speed serial ports are available on the CAT1012. These ports are fully IBM compatible. The serial ports are configured via the CAT1012 Configuration Utility. Serial port 1 can be configured as COM1 (3F8h) or COM3 (3E8h), and utilizes interrupt vector IRQ4. Serial port 2 can be configured as COM2 (2F8h) or COM4 (2E8h), and utilizes interrupt vector IRQ3. Both ports can be entirely disabled.



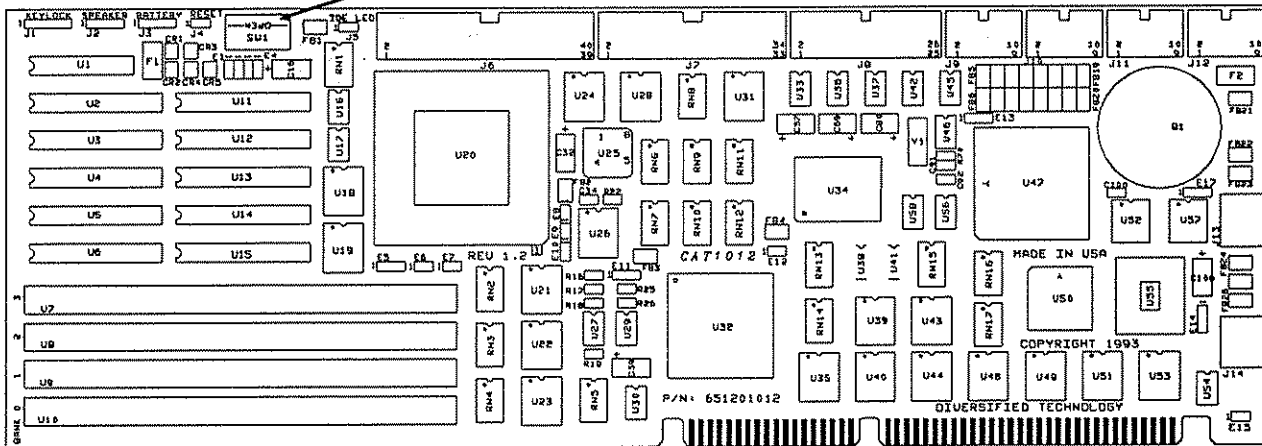
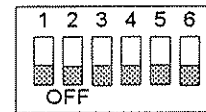
2.8 CAT1012 Keyboard/Mouse Configuration

/AT or PS/2 type keyboards may be used with the CAT1012. Most multi-function keyboards that select between /XT and /AT modes with a switch, usually on the underside of the keyboard, will function properly with the CAT1012 when SW1-4 is in the /AT position.

PS/2 mouse devices use Interrupt 12. This interrupt is configured with switch SW1-1. When a PS/2 mouse is connected, switch SW1-1 must be set as shown in the figure below.

SWITCH	IF CLOSED(ON)	IF OPEN(OFF)
1	USE IRQ12 FOR MOUSE	MOUSE DISABLED *
4	/XT KEYBOARD	/AT KEYBOARD *

* - Factory default



2.9 Onboard Battery

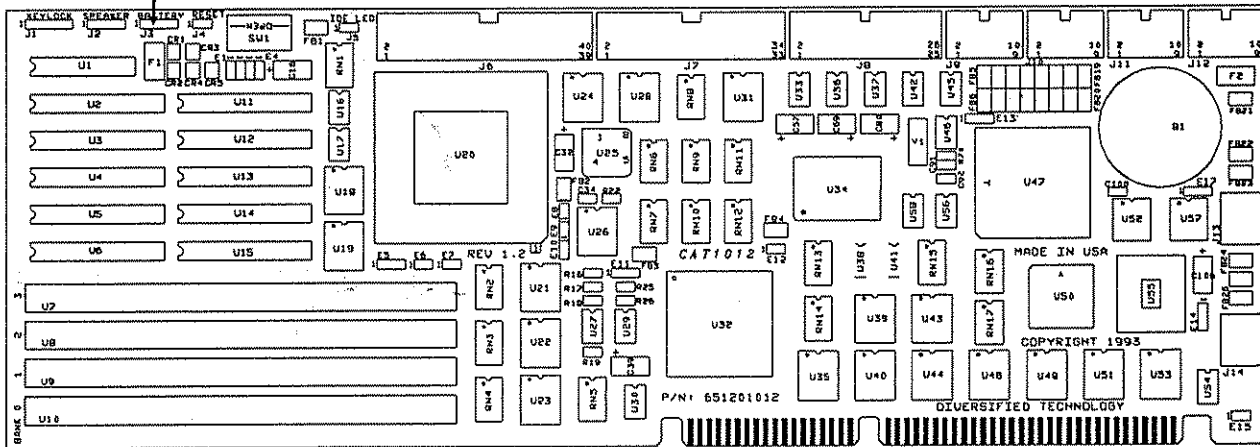
Onboard battery backup for configuration data and the real time clock is provided on the CAT1012. In the event that this is not desirable, such as long term storage or to reset bad setup information, the battery may be disconnected by removing the jumper normally connected to J3. An external battery may be used for backup in place of the onboard battery. The CAT1012 can accept external batteries in the range of 3.0 to 4.5 volts. The connection to J3 depends on the voltage of the battery to be used.

The battery supplied has projected life of 2 years in normal service. Elevated temperatures or mishandling of the card can shorten the life of the battery. Placing the board on conductive surfaces can dramatically shorten battery life. While the battery was chosen for safety as well as energy density, some simple safety precautions should be followed:

- Do not expose the CAT1012 to temperatures over 100°C.
- Do not puncture the onboard lithium battery.
- Do not attempt to recharge the onboard lithium battery.
- Do not attempt to replace the battery. If the battery must be replaced, return the unit to Diversified Technology.

J3-BATTERY PORT	
J3 CONNECTION	CONFIGURATION
REMOVE JUMPER	NO BACKUP
JUMPER BETWEEN PINS 2 AND 3*	ONBOARD BATTERY BACKUP
+3.0 - 4.5 VOLTS ON PIN 2, GND ON PIN 4	EXTERNAL 3.0 - 4.5 VOLT BATTERY

Battery Port



2.10 Miscellaneous

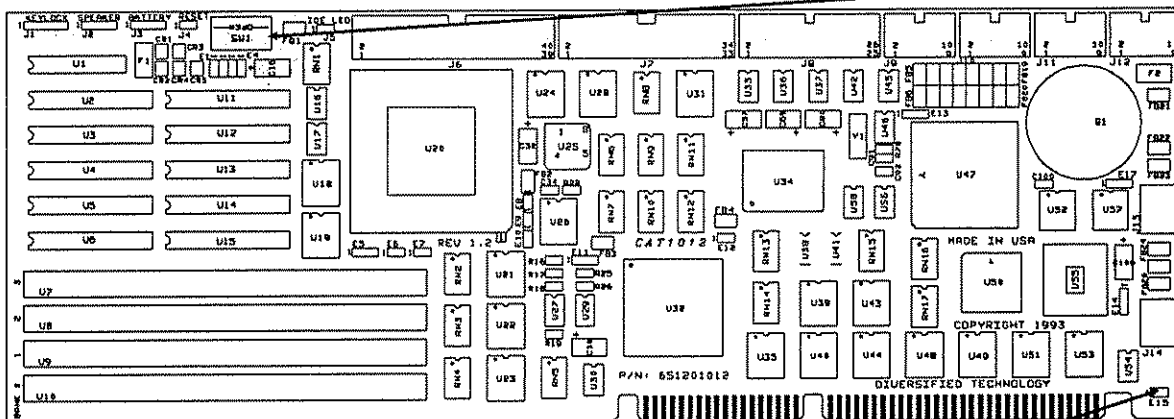
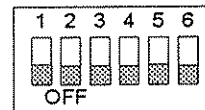
There are some configuration steps which do not fit into neat groupings, and these are included here.

Some software packages identify the video monitor type through a switch input. The BIOS will also indicate an equipment mismatch if the monitor type selection does not match the /AT setup information. This input is configured using a switch as shown in the figure below. It should be OPEN(OFF) for TTL monochrome adapters, or multi-function video adapters (i.e., EGA, VGA) that are emulating monochrome. For all other video modes, this switch should be CLOSED (ON).

The BIOS includes a manufacturing test used at the factory. The test mode is selected by means of a switch. This test is not useful to the customer, and therefore the switch should be left in the OPEN(OFF) position as shown in the accompanying figure.

It is possible to have the board mounting bracket connected to /AT bus ground, or left floating. A jumper is used to connect bracket ground to /AT bus ground. This is set at E15.

SWITCH	IF CLOSED(ON)	IF OPEN(OFF)
SW1-2	COLOR MONITOR	MONO MONITOR *
SW1-3	MFG TEST	NORMAL*

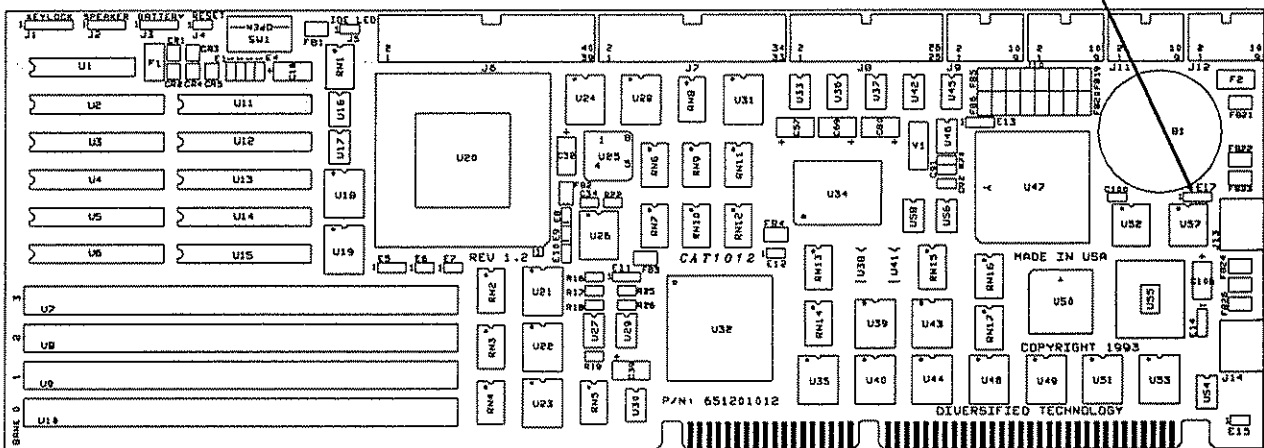


E15 - BRACKET GROUND	
*ON	GROUNDED
OFF	FLOATING

2.11 Master Mode Jumper

An anomaly was identified during product validation with a Western Digital WD7000 SCSI controller card. A 3-pin header was added at location E17 to allow the memory write command from the WD7000 (or any Master Mode card) to be delayed a clock cycle before being presented to the CAT1012 system controller. This allows the WD7000 to provide "stable" data before the CAT1012 writes the data into the secondary cache.

E17 - MASTER MODE	
1-2	DISABLE MASTER MODE FIX
2-3*	ENABLE MASTER MODE FIX



SECTION 3

CAT1012 CONNECTORS

In the following chapter, a description and pin-out is provided for each connector.

3.0 Keylock Port

Pin 4 of the keylock port may be grounded through a switch to lock the keyboard. By connecting a switch between pins 3 and 4 of the connector, the keyboard may be inhibited as a protection feature. The keylock port connector is a 5 pin 0.1" spacing connector. Also included in the keylock port is an output for driving a power indication LED. This LED connection delivers 5 volts through a 330 ohm dropping resistor. The pin out for the keylock port is as follows:

J1 - KEYLOCK PORT	
PIN	SIGNAL
1	POWER LED
2	N/C
3	GND
4	KEYLOCK
5	GND

3.1 Speaker Port

A speaker may be connected through the speaker port connection J2. J2 is a 4 pin 0.1" spacing connector. The pinout for J2 is given in the table below. Speakers are typically connected between the speaker data pin 1 and ground on pin 3. Some speakers may emit slightly more volume when connected between speaker data and 5 volts (pin 4). The 5 volt supply for the speaker is protected against short circuits. If an overload condition is sensed, the speaker's 5 volt supply will be disconnected until the overload is removed. The system power should be turned off for approximately 30 seconds in order to reset the protection device.

J2 - SPEAKER PORT	
PIN	SIGNAL
1	SPEAKER DATA
2	N/C
3	GND
4	5 VOLTS

3.2 Battery Port

Onboard battery backup for configuration data and the real time clock is provided on the CAT1012 board. In the event that this is not desirable, such as long term storage or to reset bad setup information, the battery can be disconnected by removing the shunt that is strapped across pins 2 and 3 on J3. Also, an external battery may be used for backup in place of the onboard battery.

J3 - BATTERY PORT	
J3 CONNECTION	CONFIGURATION
REMOVE JUMPER	NO BACKUP/ERASE CMOS STORAGE
JUMPER BETWEEN PINS 2 AND 3	ONBOARD BATTERY BACKUP
+3.0-4.5 VOLTS ON PIN 2, GND ON PIN 4	EXTERNAL BATTERY

3.3 Reset Port

The CAT1012 provides a hardware reset input at J4. This input is designed for a switch closure input and is debounced and buffered.

J4 - RESET PORT	
PIN	SIGNAL
1	RESET
2	GND

3.4 IDE Activity LED port

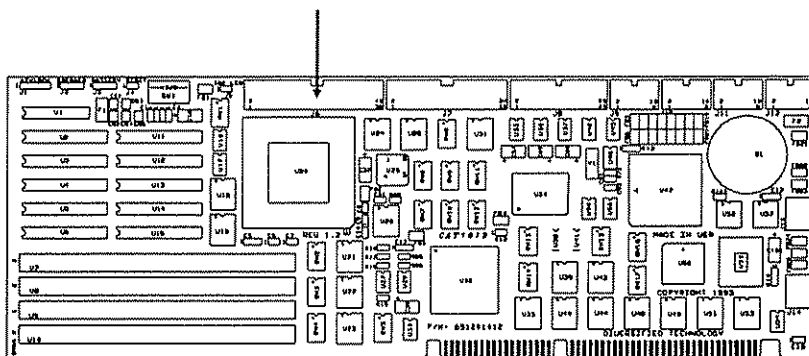
An output is provided to drive a LED when the IDE drive is selected. The output can provide approximately 15 mA at 2 volts.

J5 - IDE ACTIVITY LED	
PIN	SIGNAL
1	LED DRIVE
2	GND

3.5 IDE Drive Port

J6 - IDE CONNECTOR PINOUT			
FUNCTION	PIN	PIN	FUNCTION
IDE RESET/	1	2	GND
DATA(7)	3	4	DATA(8)
DATA(6)	5	6	DATA(9)
DATA(5)	7	8	DATA(10)
DATA(4)	9	10	DATA(11)
DATA(3)	11	12	DATA(12)
DATA(2)	13	14	DATA(13)
DATA(1)	15	16	DATA(14)
DATA(0)	17	18	DATA(15)
GND	19	20	N/C
N/C	21	22	GND
I/O WRITE/	23	24	GND
I/O READ/	25	26	GND
N/C	27	28	ALE
N/C	29	30	GND
IRQ(14)	31	32	IOCS16/
A1	33	34	N/C
A0	35	36	A2
IDE CHIP SELECT 0/	37	38	IDE CHIP SELECT 1/
IDE ACTIVE/	39	40	GND

IDE Port

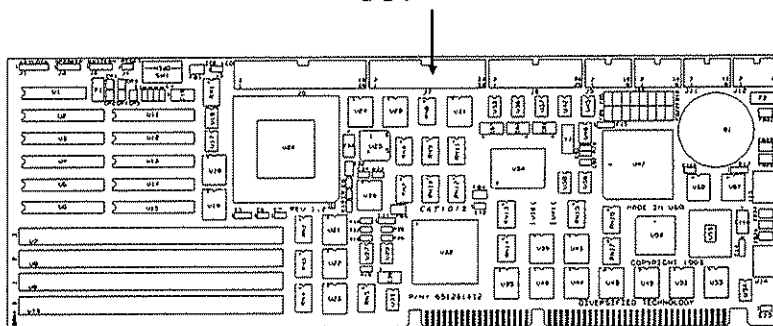


3.6 Floppy Disk Connector

J7 - FLOPPY CONNECTOR PINOUT			
FUNCTION	PIN	PIN	FUNCTION
GND	1	2	RPM
GND	3	4	N/C
GND	5	6	N/C
GND	7	8	INDEX
GND	9	10	MOTOR1
GND	11	12	DRIVE2
GND	13	14	DRIVE1
GND	15	16	MOTOR2
GND	17	18	DIRECTION
GND	19	20	STEP
GND	21	22	WRITE DATA
GND	23	24	WRITE ENABLE
GND	25	26	TRACK0
GND	27	28	WRITE PROTECT
GND	29	30	READ DATA
GND	31	32	HEAD SELECT
GND	33	34	DISK CHANGE

Two floppy disk drives may be connected to the CAT1012 board via the J7 connector. The cable should be a standard IBM /AT type floppy cable with a twist in conductors 10-16. The last drive must be terminated. Some 5.25" drives, especially older models, use pin 34 to carry a RDY signal. Consequently, the CAT1012's floppy controller, which expects a DCHNG signal, will not work with these drives. This may also be seen with very old /XT type floppy drives. Some drives can supply either RDY or DCHNG depending on configuration. Consult the drive manual to determine how to configure any particular drive.

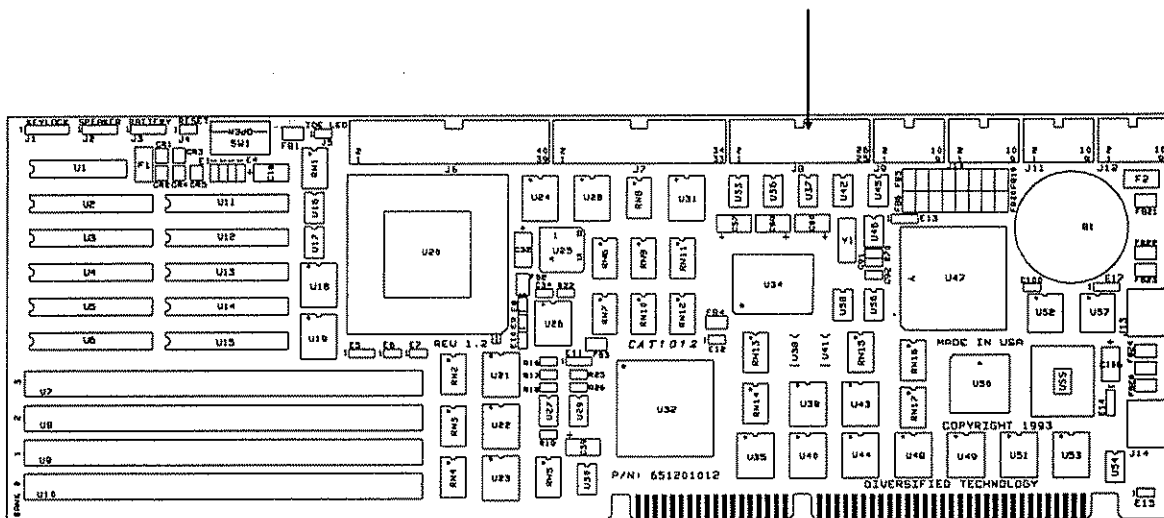
Floppy Disk Port



3.7 Parallel Port Connector

J8 - PARALLEL PORT CONNECTOR			
FUNCTION	PIN	PIN	FUNCTION
STROBE/	1	2	AUTOFEED/
DATA(0)	3	4	ERROR/
DATA(1)	5	6	INIT/
DATA(2)	7	8	SELECT IN/
DATA(3)	9	10	GND
DATA(4)	11	12	GND
DATA(5)	13	14	GND
DATA(6)	15	16	GND
DATA(7)	17	18	GND
ACK/	19	20	GND
BUSY	21	22	GND
PAPER EMPTY	23	24	GND
SELECT	25	26	GND

Parallel Port

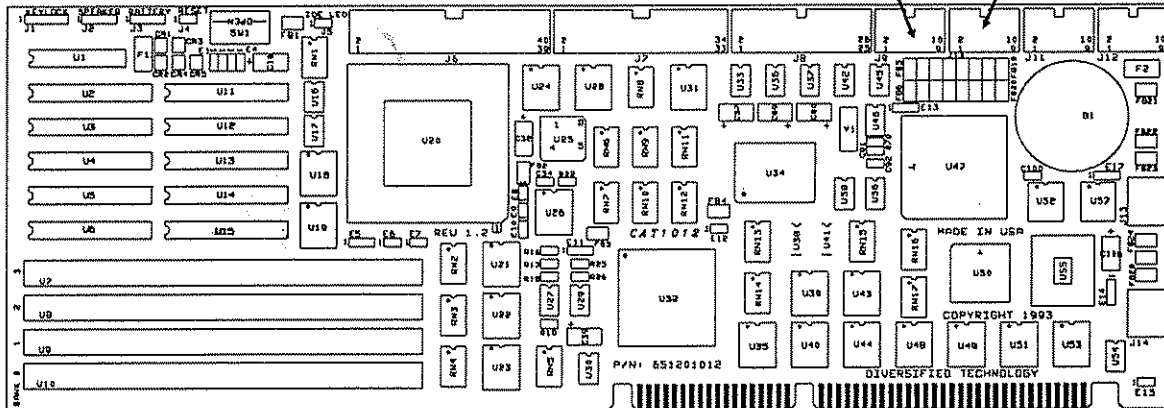


3.8 Serial Port Connectors

J9, J10 SERIAL PORT CONNECTOR PINOUT		
PIN	FUNCTION	I/O
1	GND	
2	RING DETECT	IN
3	DATA TERMINAL READY	OUT
4	CLEAR TO SEND	IN
5	TX DATA	OUT
6	REQUEST TO SEND	OUT
7	RX DATA	IN
8	DATA SET READY	IN
9	DATA CARRIER DETECT	IN
10	GND	

Serial Port 2

Serial Port 1

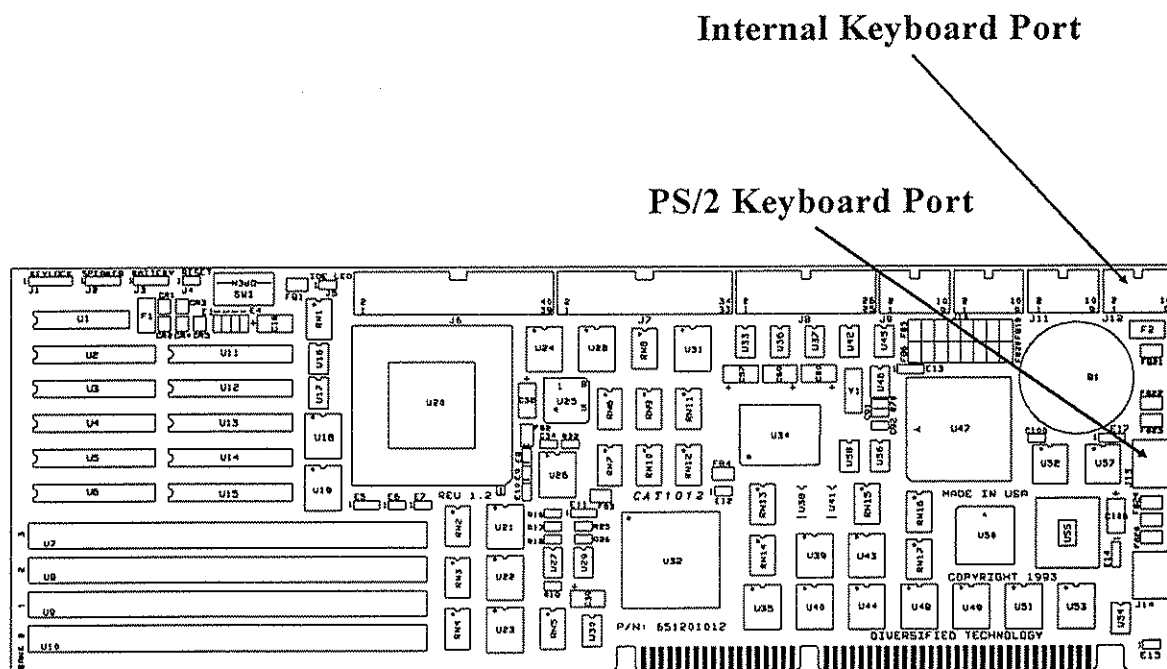


3.9 Keyboard Port

The CAT1012 supports most common keyboards. PS/2 style keyboards are supported directly by connection to J13 on the bracket. /AT keyboards may be connected by means of adapter cables to J12 on the top edge of the board. These adapter cables may be easily constructed by use of the table below, or suitable cables may be obtained from Diversified Technology.

J12 - INTERNAL KEYBOARD PORT				J13 - PS/2 KEYBOARD PORT	
SIGNAL	PIN	PIN	SIGNAL	PIN	SIGNAL
+5 VOLTS	1	2	DATA	1	DATA
CLOCK	3	4	N/C	2	N/C
GND	5	6	N/C	3	GND
N/C	7	8	N/C	4	+5 VOLTS
N/C	9	10	+5 VOLTS	5	CLOCK
				6	GND

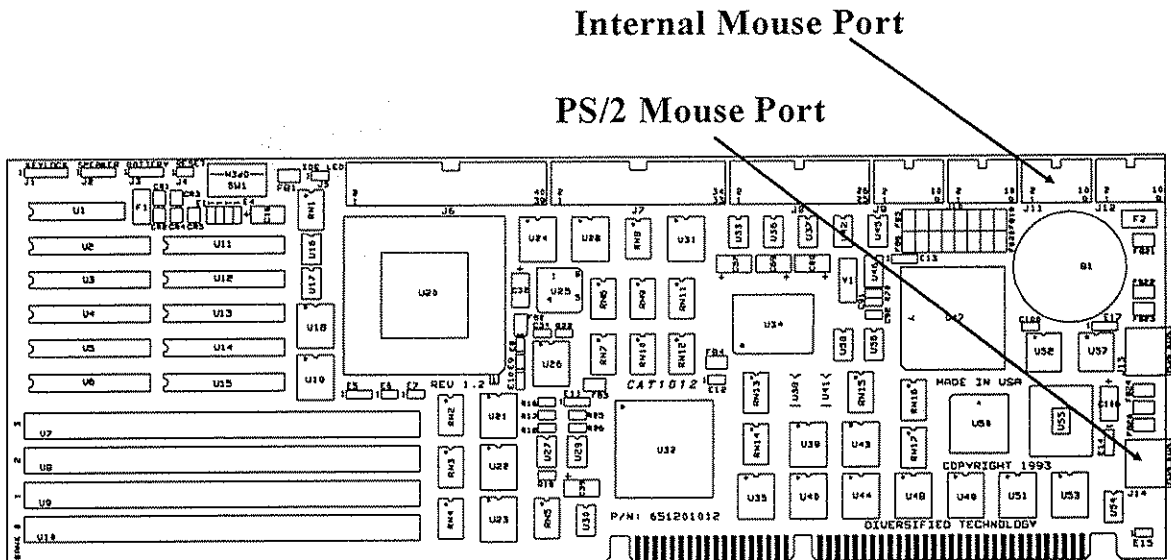
The 5 volt supply for the keyboard is protected from short circuits by a current limiting device. This device limits the total current available to the keyboard and mouse to approximately 1.2 A. If more current than this is drawn, the current limiting device will reduce the current output of the keyboard and mouse port to a few milliamps. In order to reset the current limiting device, remove the short circuit and power down the system for approximately 30 seconds.



3.10 Mouse Port

Hardware is provided to attach PS/2 style mouse devices to the CAT1012. A PS/2 mouse may be connected directly to the CAT1012 by connection to J14 on the bracket. Internally, a 10 pin port is provided for attaching a PS/2 mouse by means of adapter cables. The PS/2 mouse port is enabled/disabled in the CAT1012 ROM Utilities. The table below gives the pinout for the mouse ports:

J11- INTERNAL MOUSE PORT				J14 - PS/2 MOUSE PORT	
SIGNAL	PIN	PIN	SIGNAL	PIN	SIGNAL
+5 VOLTS	1	2	DATA	1	DATA
CLOCK	3	4	N/C	2	N/C
GND	5	6	N/C	3	GND
N/C	7	8	N/C	4	+5 VOLTS
N/C	9	10	+5 VOLTS	5	CLOCK
				6	GND



SECTION 4 QUICK REFERENCE

This chapter is intended to be a quick reference to the connectors, jumpers, and switches used to connect and configure the CAT1012. Industry standard pinout connectors such as the floppy and IDE ports will not be documented in depth here; pinouts will be provided for connectors for which there is no standard.

Peripheral Connector Pinouts:

J1 - KEYLOCK PORT	
PIN	SIGNAL
1	POWER LED
2	N/C
3	GND
4	KEYLOCK
5	GND

J2 - SPEAKER PORT	
PIN	SIGNAL
1	SPEAKER DATA
2	N/C
3	GND
4	5 VOLTS

J3 - BATTERY PORT	
J3 CONNECTION	CONFIGURATION
REMOVE JUMPER	NO BACKUP/ERASE CMOS STORAGE
JUMPER BETWEEN PINS 2 AND 3	ONBOARD BATTERY BACKUP
+3.0-4.5 VOLTS ON PIN 2, GND ON PIN 4	EXTERNAL BATTERY

J4 - RESET PORT	
PIN	SIGNAL
1	RESET
2	GND

J5 - IDE ACTIVITY LED	
PIN	SIGNAL
1	LED DRIVE
2	GND

J6 - IDE CONNECTOR PINOUT			
FUNCTION	PIN	PIN	FUNCTION
IDE RESET/	1	2	GND
DATA(7)	3	4	DATA(8)
DATA(6)	5	6	DATA(9)
DATA(5)	7	8	DATA(10)
DATA(4)	9	10	DATA(11)
DATA(3)	11	12	DATA(12)
DATA(2)	13	14	DATA(13)
DATA(1)	15	16	DATA(14)
DATA(0)	17	18	DATA(15)
GND	19	20	N/C
N/C	21	22	GND
I/O WRITE/	23	24	GND
I/O READ/	25	26	GND
N/C	27	28	ALE
N/C	29	30	GND
IRQ(14)	31	32	IOCS16/
A1	33	34	N/C
A0	35	36	A2
IDE CHIP SELECT 0/	37	38	IDE CHIP SELECT 1/
IDE ACTIVE/	39	40	GND

J7 - FLOPPY CONNECTOR PINOUT			
FUNCTION	PIN	PIN	FUNCTION
GND	1	2	RPM
GND	3	4	N/C
GND	5	6	N/C
GND	7	8	INDEX
GND	9	10	MOTOR1
GND	11	12	DRIVE2
GND	13	14	DRIVE1
GND	15	16	MOTOR2
GND	17	18	DIRECTION
GND	19	20	STEP
GND	21	22	WRITE DATA
GND	23	24	WRITE ENABLE
GND	25	26	TRACK0
GND	27	28	WRITE PROTECT
GND	29	30	READ DATA
GND	31	32	HEAD SELECT
GND	33	34	DISK CHANGE

J8 - PARALLEL PORT CONNECTOR			
FUNCTION	PIN	PIN	FUNCTION
STROBE/	1	2	AUTOFEED/
DATA(0)	3	4	ERROR/
DATA(1)	5	6	INIT/
DATA(2)	7	8	SELECT IN/
DATA(3)	9	10	GND
DATA(4)	11	12	GND
DATA(5)	13	14	GND
DATA(6)	15	16	GND
DATA(7)	17	18	GND
ACK/	19	20	GND
BUSY	21	22	GND
PAPER EMPTY	23	24	GND
SELECT	25	26	GND

J9, J10 SERIAL PORT CONNECTOR PINOUT		
PIN	FUNCTION	I/O
1	GND	
2	RING DETECT	IN
3	DATA TERMINAL READY	OUT
4	CLEAR TO SEND	IN
5	TX DATA	OUT
6	REQUEST TO SEND	OUT
7	RX DATA	IN
8	DATA SET READY	IN
9	DATA CARRIER DETECT	IN
10	GND	

J12 - INTERNAL KEYBOARD PORT			
SIGNAL	PIN	PIN	SIGNAL
+5 VOLTS	1	2	DATA
CLOCK	3	4	N/C
GND	5	6	N/C
N/C	7	8	N/C
N/C	9	10	+5 VOLTS

J13 - PS/2 KEYBOARD PORT	
PIN	SIGNAL
1	DATA
2	N/C
3	GND
4	+5 VOLTS
5	CLOCK
6	GND

J11 - INTERNAL MOUSE PORT			
SIGNAL	PIN	PIN	SIGNAL
+5 VOLTS	1	2	DATA
CLOCK	3	4	N/C
GND	5	6	N/C
N/C	7	8	N/C
N/C	9	10	+5 VOLTS

J14 - PS/2 MOUSE PORT	
PIN	SIGNAL
1	DATA
2	N/C
3	GND
4	+5 VOLTS
5	CLOCK
6	GND

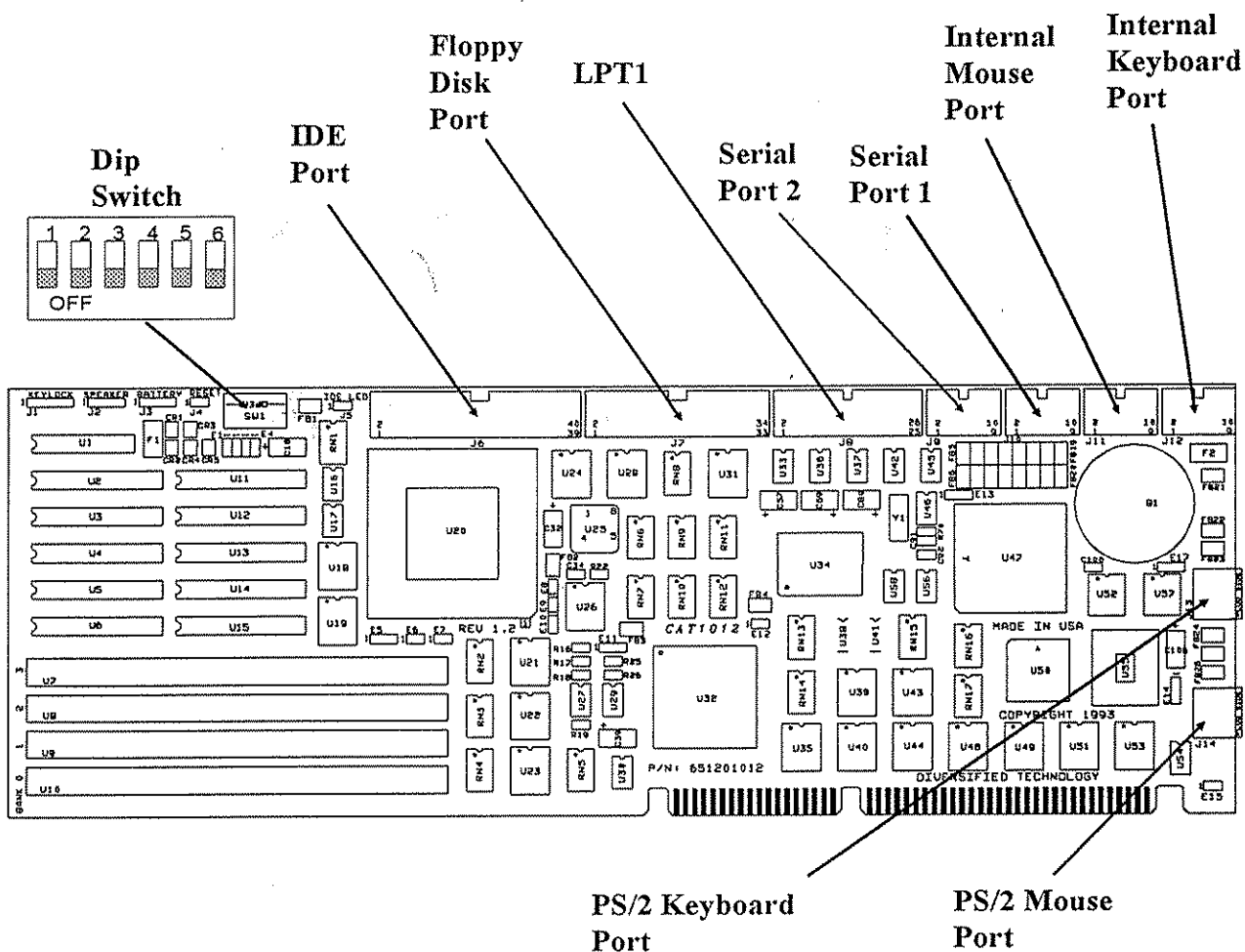
PROCESSOR TYPE			
CPU	E5	E6	E7
80486DX 80486DX2	1-2	ON	ON
80486SX	2-3	OFF	OFF

PRINTER INTERRUPT	
E13	INTERRUPT
1-2	IRQ7
2-3	IRQ5

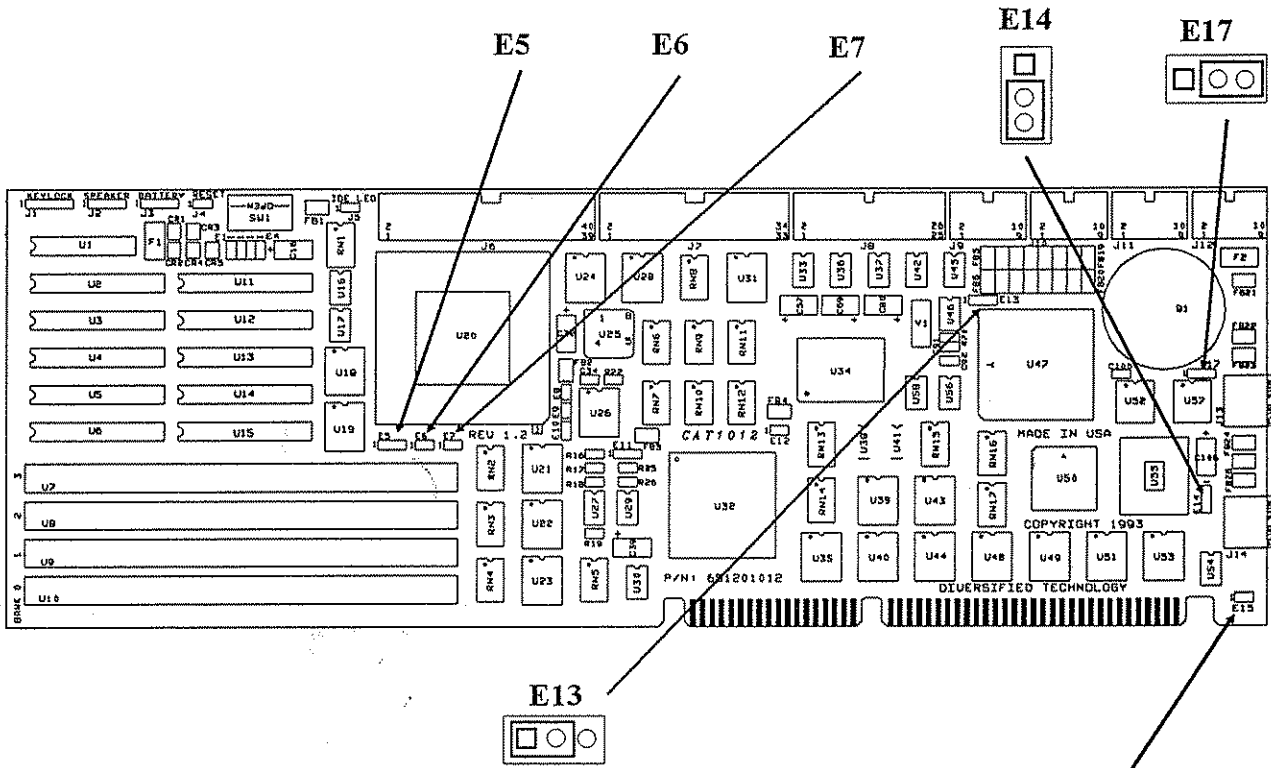
CACHE SIZE	CACHE DATA SRAM U3-U6, U12-U15	TAG SRAM U2, U11	JUMPERS E1-E4
64K	8K x 8	8K x 8 @ U2 ONLY	REMOVED
256K	32K x 8	8K x 8 @ U2, U11	INSTALLED

SYSTEM SPEED	E8	E9	E10	E11	E12
25 MHz DX/2-50	ON	ON	OFF	1-2	OFF
33 MHz DX/2-66	OFF	ON	OFF	1-2	OFF
50 MHz	ON	ON	OFF	2-3	ON

CAT1012 SWITCH SETTINGS		
SWITCH	POSITION	FUNCTION
1	ON	ENABLE PS/2 MOUSE INTERRUPT IRQ12
	OFF	DISABLE PS/2 MOUSE INTERRUPT IRQ12
2	ON	COLOR MONITOR
	OFF	MONOCHROME MONITOR
3	ON	ENABLE MFG TEST
	OFF	NORMAL
4	ON	/XT KEYBOARD
	OFF	/AT KEYBOARD
5, 6	N/A	NOT USED



80486SX , 80486DX, 80486DX/2 CONFIGURATION		
E5	2-3	80486SX INSTALLED
	1-2	80486DX, 80486DX/2 INSTALLED
E6	ON	80486DX, 80486DX/2 INSTALLED
	OFF	80486SX INSTALLED
E7	ON	80486DX, 80486DX/2 INSTALLED
	OFF	80486SX INSTALLED



PARALLEL PORT INTERRUPT		
E13	1-2	ENABLES IRQ7*
	2-3	ENABLES IRQ5

E15 - BRACKET GROUND		
E15	ON*	BRACKET CONNECTED TO BUS GROUND
	OFF	BRACKET NOT GROUNDED

SECTION 5

ROM UTILITIES

FEATURES

- Automatic IDE Hard Disk Detection and Configuration
- Automatic Configuration of Onboard Disk Controllers and I/O Ports
- Automatic Mouse Detection
- ROM Based Utilities
- Override Mechanism
- Security

DTI BIOS

The DTI BIOS Software supports all of the IBM /AT standard functions as well as DTI specific functions and features. Features of the DTI BIOS include built-in utilities, security, and an override mechanism.

Upon initial execution the DTI BIOS runs a Power-On-Self-Test (POST) which consists of a battery of tests to check and initialize the various functions of the system. As soon as the video initialization portion of the POST is complete, the DTI BIOS will sign on by displaying the DTI sign on messages in the upper left corner of the screen. Throughout the POST, messages will be displayed at the bottom of the screen describing key strokes that can be used to terminate the memory test or to gain access to the ROM Utilities. As the POST executes various tasks, error messages will be displayed for any failures that occur. The user will be prompted to press the <F1> key before the BIOS initiates the boot sequence if errors are detected. At the conclusion of the POST, the BIOS will check to see if the security feature has been enabled. If it is enabled, the user will be prompted to enter the BOOT PASSWORD before continuing with the boot process.

The DTI BIOS has a built-in mechanism to automatically detect the presence of serial and parallel ports, floppy controllers and /AT compatible hard drive controllers on installed adapter cards. The auto detection is done so that the BIOS can configure the 2 serial ports, parallel port, floppy controller and IDE interface onboard the CAT1012 in such a way to prevent conflicts. For example, if a floppy/hard disk controller is installed in one of the expansion slots, the BIOS would detect the presence of the floppy and the hard disk controller and disable the onboard floppy and hard disk controllers.

NOTE: Auto configuration will only occur when the CMOS RAM is corrupt or unprogrammed.

The BIOS automatically looks for the presence of a mouse and, if found, enables the mouse support in the BIOS. Otherwise, mouse support is disabled. The status of the mouse is displayed on the SYSTEM INFORMATION screen.

The ROM Utilities are provided for the user to have easy access to all of the necessary utilities to setup and configure the CAT1012. One of the features of the ROM Utilities is its ability to sense the presence of IDE Hard Disk Drives and automatically configure the hard drive parameters in the CMOS SETUP Utility. The ROM Utilities are accessible during the POST as long as the following string is displayed.

< TO ENTER ROM UTILITIES BEFORE BOOT PRESS CTRL+ALT+ESC >

Access to the ROM Utilities will not take place until after the POST. This might cause a short delay from the time the CTRL+ALT+ESC is pressed until the utilities are actually entered. However, the following message will be displayed during the waiting period.

< THE ROM UTILITIES WILL BE ACCESSED AFTER POST >

The BIOS has a built-in mechanism to override the use of the chipset timing parameters stored in CMOS by the ROM Utilities. Whenever the BIOS fails to complete the POST five consecutive times, the BIOS will automatically put itself into the Extended CMOS Override Mode. This means that each subsequent time the system is powered up, the BIOS default parameters will be used to configure the chipset instead of using the parameters and options settings selected in the ROM Utilities and stored in CMOS. An override message will be displayed whenever this occurs to indicate that the current configuration in CMOS is invalid. To disable the override mode, run the ROM Utilities then select and save valid parameters for the system. Features not related to system timing such as password protection, and the boot color scheme will not be affected in the Extended CMOS Override Mode.

Another feature of the DTI BIOS is its ability to provide optional password protection to prevent unauthorized access to system boot, the ROM Utilities and to the Hard Disk Prep Utility.

5.0 ROM UTILITIES

The ROM Utilities consist of various easy-to-use utilities required in the configuration of the CAT1012. The ROM Utilities are broken into two categories. The basic utilities consist of the utilities displayed in the main menu, and the advanced utilities consist of the utilities displayed in the advanced setup menu. The advanced setup utilities provide access directly to the chipset configuration options and should be used with extreme caution. Invalid configuration of parameters in these utilities could cause system malfunctions. The function of each utility is briefly described in Table 5.1. Battery backed CMOS RAM is used to store the configuration/setup parameters selected in the ROM Utilities. On power-up the CMOS RAM parameters are used to configure the system. If the CMOS RAM is corrupt, default parameters stored in ROM are used to configure the system. If no errors occurred during the POST, the System Information Screen will be displayed as shown in Figure 5.1, else, ROM Utility configuration errors detected during the POST will be displayed and the default values loaded. As each utility is selected using the arrow keys, the contents of the utility will be displayed. This allows the user to view the current settings of each utility without having to actually execute the utility. To execute a specific utility, either press the function key associated with the utility or move the highlighted bar onto the utility and press < ENTER >.

Basic Utilities	
SYSTEM INFO	Displays various information about the system installed
CMOS SETUP	Used to configure the Time/date, drive types, and the video type
PERIPHERALS	Setup for onboard serial/parallel ports and disk controllers
BIOS OPTIONS	Used to setup various BIOS features
PASSWORD SETUP	Used to enable password protection and change current password
HARD DISK PREP	Low level format utility for non-SCSI disk drives
Advanced Utilities	
TIMING CONTROL	Provides access to the chipset timing parameters, such as DRAM timing and bus speed/wait states
SHADOW CONTROL	Allows selection of shadow RAM in 16K blocks
CACHE CONTROL	Used to setup non-cacheable block areas

Table 5.1 : Utility Description

CAT1012 ROM UTILITIES		SYSTEM INFORMATION	
F1 - SYSTEM INFO F2 - CMOS SETUP F3 - PERIPHERALS F4 - BIOS OPTIONS F5 - PASSWORD SETUP F6 - HARD DISK PREP F7 - ADVANCED SETUP F10 - SAVE & EXIT	Processor Type	: 80486DX DSTEP 50 MHz	<u>Expansion ROMs</u>
	Processor Rev.	: 0404	C000:0h . 32K
	Secondary Cache	: 256K	C800:0h . 12K
	Floppy Drive 0	: 360 - 5 1/4	
	Floppy Drive 1	: NOT INSTALLED	
	Hard Disk 0 Type	: 17 42 MB	
	Hard Disk 1 Type	: NOT INSTALLED	
	Installed Memory	: 1 MB	
	Serial Ports	: 3F8h, 2F8h	
	Parallel Ports	: 378h, 3BCh	
F5 - PASSWORD SETUP	PS/2 Mouse	: Not Installed	
F6 - HARD DISK PREP	BIOS Release	: 1.00	
F7 - ADVANCED SETUP	BIOS Date	: 1/1/93	
F10 - SAVE & EXIT	F(KEY) : SELECT/EXECUTE, ↑↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING		
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Figure 5.1 : ROM UTILITIES Main Menu Screen

5.1 SYSTEM INFO

The SYSTEM INFORMATION utility provides valuable information about the system resources installed. The information supplied can also be useful in preventing I/O and expansion ROM conflicts when installing adapter cards. The SYSTEM INFORMATION screen is shown in Figure 5.2, followed by a brief description of information supplied.

CAT1012 ROM UTILITIES	SYSTEM INFORMATION																																							
F1 - SYSTEM INFO F2 - CMOS SETUP F3 - PERIPHERALS F4 - BIOS OPTIONS F5 - PASSWORD SETUP F6 - HARD DISK PREP F7 - ADVANCED SETUP F10 - SAVE & EXIT	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Processor Type</td> <td style="width: 40%;">: 80486DX DSTEP 50 MHz</td> <td style="width: 30%; text-align: right;">Expansion ROMs</td> </tr> <tr> <td>Processor Rev.</td> <td>: 0404</td> <td style="text-align: right;">C000:0h . 32K</td> </tr> <tr> <td>Secondary Cache</td> <td>: 256K</td> <td style="text-align: right;">C800:0h . 12K</td> </tr> <tr> <td>Floppy Drive 0</td> <td>: 360 - 5 1/4</td> <td></td> </tr> <tr> <td>Floppy Drive 1</td> <td>: NOT INSTALLED</td> <td></td> </tr> <tr> <td>Hard Disk 0 Type</td> <td>: 17 42 MB</td> <td></td> </tr> <tr> <td>Hard Disk 1 Type</td> <td>: NOT INSTALLED</td> <td></td> </tr> <tr> <td>Installed Memory</td> <td>: 1 MB</td> <td></td> </tr> <tr> <td>Serial Ports</td> <td>: 3F8h, 2F8h</td> <td></td> </tr> <tr> <td>Parallel Ports</td> <td>: 378h, 3BCh</td> <td></td> </tr> <tr> <td>PS/2 Mouse</td> <td>: Not Installed</td> <td></td> </tr> <tr> <td>BIOS Release</td> <td>: 1.00</td> <td></td> </tr> <tr> <td>BIOS Date</td> <td>: 1/1/93</td> <td></td> </tr> </table>	Processor Type	: 80486DX DSTEP 50 MHz	Expansion ROMs	Processor Rev.	: 0404	C000:0h . 32K	Secondary Cache	: 256K	C800:0h . 12K	Floppy Drive 0	: 360 - 5 1/4		Floppy Drive 1	: NOT INSTALLED		Hard Disk 0 Type	: 17 42 MB		Hard Disk 1 Type	: NOT INSTALLED		Installed Memory	: 1 MB		Serial Ports	: 3F8h, 2F8h		Parallel Ports	: 378h, 3BCh		PS/2 Mouse	: Not Installed		BIOS Release	: 1.00		BIOS Date	: 1/1/93	
Processor Type	: 80486DX DSTEP 50 MHz	Expansion ROMs																																						
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Parallel Ports	: 378h, 3BCh																																							
PS/2 Mouse	: Not Installed																																							
BIOS Release	: 1.00																																							
BIOS Date	: 1/1/93																																							
F(KEY) : SELECT/EXECUTE, ↑ ↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING																																								
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Figure 5.2 : SYSTEM INFORMATION Screen

SYSTEM INFORMATION Display

- **PROCESSOR TYPE:** Displays the type and speed of 80486 processor installed.
- **PROCESSOR REVISION:** Displays the revision code for the 80486 processor installed.
- **SECONDARY CACHE:** Displays the amount of secondary cache detected by the BIOS.
- **FLOPPY DRIVE TYPES:** Displays the media type of the floppy drive(s) installed.
- **HARD DISK TYPES:** Displays the drive type and size of installed /AT hard disks.
- **INSTALLED MEMORY:** Displays the total amount of memory in the system.
- **SERIAL PORTS:** Displays the I/O addresses of all installed serial ports.
- **PARALLEL PORTS:** Displays the I/O addresses of all installed parallel ports.
- **PS/2 Mouse:** Displays whether or not a mouse was detected by the BIOS during POST tests.
- **BIOS RELEASE:** Displays the release number of the DTI BIOS installed.
- **BIOS DATE:** Displays the date on which the CAT1012 BIOS was generated.
- **EXPANSION ROMS:** Displays the starting location and size of all installed expansion ROMs.

5.2 CMOS SETUP

The CMOS SETUP utility is used to configure the system date/time, type of floppy and hard disk drives installed, and type of video controller installed, and used to select whether or not the keyboard is installed. The amount of memory installed will automatically be determined and displayed. Therefore, if the amount of installed memory changes, causing an invalid configuration to occur, just run the ROM Utilities and press < F10 > to save the new memory size. Figure 5.3 shows the CMOS SETUP Screen.

CAT1012 ROM UTILITIES	CMOS SETUP
F1 - SYSTEM INFO	DATE (mth/day/year) 01/01/92
F2 - CMOS SETUP	TIME (hour:min:sec) 12:00:00
F3 - PERIPHERALS	DAYLIGHT SAVINGS DISABLED
F4 - BIOS OPTIONS	DISKETTE 1 360K
F5 - PASSWORD SETUP	DISKETTE 2 NONE
F6 - HARD DISK PREP	HARD DISK 1 17 977 5 17 300 42MB
F7 - ADVANCED SETUP	HARD DISK 2 NONE
F10 - SAVE & EXIT	VIDEO COLOR 80
	KEYBOARD INSTALLED
	BASE MEMORY : 640 KB EXT. MEMORY : 0 KB
	F(KEY) : SELECT/EXECUTE, ↑ ↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING
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Figure 5.3 : CMOS SETUP Utility

CMOS SETUP Options

- **DATE:** New dates are selected by typing in the new date as MONTH/DAY/YEAR and then pressing < ENTER >. If one of the parameters is out of range, the new date will not be entered.
- **TIME:** To enter a new time, type in the new time as HOUR:MINUTE:SECONDS and then press < ENTER >. The time is displayed in 24 hour format; therefore, AM hours range from 0 through 11 and the PM hours range from 12 through 23. Invalid times cannot be entered.
- **DAYLIGHT SAVINGS:** Use the arrow keys < ← → > to ENABLE or DISABLE the daylight savings feature in the real time clock.
- **FLOPPY DISKS:** Drive types 360k, 720k, 1.2M and 1.44M are supported and are selected using the arrow keys < ← → >. A NONE option is also available for diskless workstations. No floppy error messages will be displayed if NONE is selected.
- **HARD DISKS:** Drive types 0 through 49 are supported with types 48 and 49 being user-configurable. Drive type 0 is used for diskless systems or when SCSI drives are being used. To select a drive type, type in the desired drive type, use the arrow keys < ← → > to scroll through the drive type table, or press the < A > key to indicate the automatic IDE drive configuration. Use of custom drive types will require the user to enter drive parameters for the hard disk being used unless the automatic IDE drive configuration is used. To edit the custom drive table, select drive type 48 or 49 and then press < ENTER >. Press the arrow keys < ↑ ↓ >, or < ESC > to exit the edit mode.
- **VIDEO:** Mono, Color 40, Color 80, and VGA/EGA video types are supported and are selected using the arrow keys. A NOT INSTALLED option is provided for embedded systems or network file servers which do not require the presence of a video controller. No error messages will be displayed during the POST if NOT INSTALLED is selected.
- **KEYBOARD:** Use the arrow keys to set the keyboard for INSTALLED or NOT INSTALLED. If NOT INSTALLED, no keyboard error messages will be displayed during the POST.

Automatic IDE Detection

IDE hard disk drives installed can be automatically configured in the /AT CMOS Utility. The hard disk drive type and, if necessary, the custom drive parameters will be configured if an IDE drive is detected. To use this feature, move the highlighted bar over the HARD DISK option and press the < A > key to engage the auto detection process. If an IDE drive is found, the HARD DISK Type is modified to identify the parameters of the drive installed. For CONNER 20 Mb and 40 Mb IDE drives the /AT Setup will use types 2 and 17 respectively from the ROM based drive parameter table. Drive parameters for all other IDE drives detected will be defined using the custom drive types (type 48 and 49).

5.3 PERIPHERALS

The PERIPHERALS SETUP utility allows the user to select the I/O address and interrupt of the onboard serial ports and parallel port, select the mode of the parallel port and turn ON or OFF the onboard IDE and floppy controllers.

If the data stored in configuration CMOS RAM is corrupt on power up, the BIOS will automatically configure the serial and parallel ports and the drive interfaces. The BIOS will detect the presence of I/O ports and drive interfaces on adapter cards installed in the system (offboard peripherals) and configure the CAT1012 (onboard) peripherals such that no conflicts exists.

The PERIPHERALS SETUP screen is displayed in Figure 5.4 and is followed by a description of the PERIPHERALS SETUP options.

<p>CAT1012 ROM UTILITIES</p> <p>F1 - SYSTEM INFO</p> <p>F2 - CMOS SETUP</p> <p>F3 - PERIPHERALS</p> <p>F4 - BIOS OPTIONS</p> <p>F5 - PASSWORD SETUP</p> <p>F6 - HARD DISK PREP</p> <p>F7 - ADVANCED SETUP</p> <p>F10 - SAVE & EXIT</p>	<p>PERIPHERALS SETUP</p> <table style="width: 100%; border: none;"> <tr> <td></td> <td style="text-align: right;">ADDRESS</td> <td style="text-align: right;">INTERRUPT</td> </tr> <tr> <td>SERIAL PORT 1</td> <td style="text-align: right;">3F8</td> <td style="text-align: right;">IRQ4 COM1</td> </tr> <tr> <td>SERIAL PORT 2</td> <td style="text-align: right;">2F8</td> <td style="text-align: right;">IRQ3 COM2</td> </tr> </table> <table style="width: 100%; border: none;"> <tr> <td></td> <td style="text-align: right;">ADDRESS</td> </tr> <tr> <td>PARALLEL PORT</td> <td style="text-align: right;">378</td> </tr> <tr> <td>PARALLEL MODE</td> <td style="text-align: right;">PRINTER PORT</td> </tr> </table> <table style="width: 100%; border: none;"> <tr> <td>IDE INTERFACE</td> <td style="text-align: right;">ENABLED</td> </tr> <tr> <td>FLOPPY INTERFACE</td> <td style="text-align: right;">ENABLED</td> </tr> </table>		ADDRESS	INTERRUPT	SERIAL PORT 1	3F8	IRQ4 COM1	SERIAL PORT 2	2F8	IRQ3 COM2		ADDRESS	PARALLEL PORT	378	PARALLEL MODE	PRINTER PORT	IDE INTERFACE	ENABLED	FLOPPY INTERFACE	ENABLED
	ADDRESS	INTERRUPT																		
SERIAL PORT 1	3F8	IRQ4 COM1																		
SERIAL PORT 2	2F8	IRQ3 COM2																		
	ADDRESS																			
PARALLEL PORT	378																			
PARALLEL MODE	PRINTER PORT																			
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<p>F(KEY) : SELECT/EXECUTE, ↑↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING</p>																				
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Figure 5.4 : PERIPHERALS SETUP Screen

Description of PERIPHERALS SETUP Options

Refer to the Serial/Parallel Info Table to find the address and interrupt of the I/O ports listed in the descriptions below.

SERIAL/PARALLEL INFO TABLE		
NAME	ADDRESS	INTERRUPT
COM1	3F8h	IRQ4
COM2	2F8h	IRQ3
COM3	3E8h	IRQ4
COM4	2E8h	IRQ3
LPT1	3BCh	IRQ5 or IRQ7
LPT2	378h	IRQ5 or IRQ7
LPT3	278h	IRQ5 or IRQ7

- **SERIAL PORT 1:** The onboard serial port 1 can be configured as COM1, COM3 or disabled. Use the arrow keys to select the I/O port address.

If auto configuration has occurred, serial port 1 will be configured as follows:

COM1	If no offboard ports are installed or the offboard serial port is configured as COM3.
COM3	If the offboard serial port is configured as COM1.
NONE	If both COM1 and COM3 are already installed.

- **SERIAL PORT 2:** The onboard serial port 2 can be configured as COM2, COM4 or disabled. Use the arrow keys to select the I/O port address.

If auto configuration has occurred serial port 2 will be configured as follows:

COM2	If no offboard serial ports are installed or the offboard serial port is configured as COM4.
COM4	If the offboard serial port is configured as COM2.
NONE	If both COM2 and COM4 are already installed.

- **PARALLEL PORT:** The onboard parallel port can be configured as LPT1, LPT2, LPT3 or disabled. Use the arrow keys < ← → > to select the I/O port address.

If auto configuration has occurred the parallel port will be configured as follows:

LPT2	If no offboard parallel port is installed or the offboard parallel port is configured as LPT1.
LPT3	If an offboard parallel port is configured as LPT2
NONE	If both LPT2 and LPT3 are already installed.

If one of the parallel ports has been enabled, configure the parallel port interrupt as shown below. Normally IRQ7 should be used with I/O address 3BCh or 378h and IRQ5 should be used with I/O address 278h.

Install jumper E13 on Pins 1-2 to use IRQ7 for parallel port.
Install jumper E13 on Pins 2-3 to use IRQ5 for parallel port.

- **PARALLEL MODE:** The mode of the parallel port determines the direction which the data is transferred. Two modes are available: In PRINTER PORT mode, the parallel port is a standard Centronics compatible printer port. In BI-DIRECTIONAL mode, the port is compatible with the PS/2 printer port, and is capable of operating as a printer port or a parallel input port. Use the arrow keys to select the parallel port mode.
- **IDE INTERFACE:** The IDE (Integrated Drive Electronics) interface on the CAT1012 can be ENABLED or DISABLED. Enabling the IDE interface activates the /AT hard disk chip select. Use the arrow keys to configure the IDE interface.

If auto configuration has occurred, the IDE Interface will be configured as follows:

ENABLED	If no /AT hard disk controller detected.
DISABLED	If an /AT hard disk controller installed.

- **FLOPPY INTERFACE:** The floppy interface on the CAT1012 can be **ENABLED** or **DISABLED**. Enabling the floppy interface activates the floppy chip select and also enables the floppy interrupt, IRQ6. Use the arrow keys to configure the floppy interface.

If auto configuration has occurred, the floppy interface will be configured as follows:

ENABLED	If no floppy disk controller detected
DISABLED	If an floppy disk controller installed.

5.4 BIOS OPTIONS

The BIOS OPTIONS utility provides various features which affect performance and speed of the system. Below is the BIOS OPTIONS screen with the default parameters displayed. To change the BIOS OPTIONS settings, use the arrow keys to select and scroll the available parameters. See Figure 5.5 for the BIOS OPTIONS settings.

<p>CAT1012 ROM UTILITIES</p>	<p>BIOS OPTIONS</p>				
<p>F1 - SYSTEM INFO F2 - CMOS SETUP F3 - PERIPHERALS F4 - BIOS OPTIONS F5 - PASSWORD SETUP F6 - HARD DISK PREP F7 - ADVANCED SETUP F10 - SAVE & EXIT</p>	<table style="width: 100%;"> <tr> <td style="width: 60%;"> <p>ENABLE 486 CACHE YES SHADOW VIDEO BIOS YES NUMLOCK ON /AT BOOT N/A TYPEMATIC RATE DEFAULT DELAY (msec) N/A RATE (Chars/Sec) N/A</p> </td> <td style="width: 40%; vertical-align: top;"> <p>BOOT SCREEN COLORS</p> <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px auto;"></div> </td> </tr> <tr> <td> <p>EXECUTE MEMORY TEST . . . YES TEST FLOPPY BEFORE BOOT . YES PROMPT ON BOOT IF ERROR . YES SYSTEM BOOT SEQUENCE . . A;, C:</p> </td> <td> <p>SECONDARY CACHE YES CACHE VIDEO BIOS NO</p> </td> </tr> </table>	<p>ENABLE 486 CACHE YES SHADOW VIDEO BIOS YES NUMLOCK ON /AT BOOT N/A TYPEMATIC RATE DEFAULT DELAY (msec) N/A RATE (Chars/Sec) N/A</p>	<p>BOOT SCREEN COLORS</p> <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px auto;"></div>	<p>EXECUTE MEMORY TEST . . . YES TEST FLOPPY BEFORE BOOT . YES PROMPT ON BOOT IF ERROR . YES SYSTEM BOOT SEQUENCE . . A;, C:</p>	<p>SECONDARY CACHE YES CACHE VIDEO BIOS NO</p>
<p>ENABLE 486 CACHE YES SHADOW VIDEO BIOS YES NUMLOCK ON /AT BOOT N/A TYPEMATIC RATE DEFAULT DELAY (msec) N/A RATE (Chars/Sec) N/A</p>	<p>BOOT SCREEN COLORS</p> <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px auto;"></div>				
<p>EXECUTE MEMORY TEST . . . YES TEST FLOPPY BEFORE BOOT . YES PROMPT ON BOOT IF ERROR . YES SYSTEM BOOT SEQUENCE . . A;, C:</p>	<p>SECONDARY CACHE YES CACHE VIDEO BIOS NO</p>				
<p>F(KEY) : SELECT/EXECUTE, ↑ ↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING</p>					
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Figure 5.5 : BIOS OPTIONS Settings

Description of BIOS Options

- **ENABLE 486 CACHE:** The 80486 uses a built-in 8K cache to achieve its optimum speed performance. This option provides a way to turn the cache ON or OFF. Turning OFF the cache will severely degrade the system performance, but may be useful in some applications.
- **VIDEO BIOS SHADOWING:** BIOS shadowing refers to the copying the video BIOS from ROM into onboard RAM and then executing the BIOS from the RAM. This significantly increases the speed of displays on the monitor. Use the arrow keys to select YES or NO for the SHADOW VIDEO BIOS option.
- **NUMLOCK ON /AT BOOT:** NUMLOCK is a key on the keyboard which selects the function of the keypad on the right-hand side of the keyboard. The keypad serves two functions, one being a numerical keypad and the other being a cursor control keypad. If the NUMLOCK LED above the NUMLOCK key is ON, the keypad is in numerical mode. The NUMLOCK ON /AT BOOT option allows the user to choose the function of the keypad after the system boots. The available option YES and NO are selectable using the arrow keys.
- **TYPEMATIC RATE:** The Typematic rate refers to the speed at which keystrokes are repeated when a key is pressed for a period of time. The typematic delay is the length of time from the key being pressed to the beginning of the typematic rate. In other words, as a key is pressed and held down on the keyboard, the key will be displayed on the screen then there will be a noticeable pause (typematic delay) before the key pressed is repeated multiple times on the screen (typematic rate). The TYPEMATIC RATE option allows the user to choose between PROGRAM mode in which the user selects the settings for the delay and rate or the DEFAULT mode in which the default settings of the keyboard are used.
- **RATE (CHARS/SEC):** The available options for the typematic rate are 6, 8, 10, 12, 16, 20, 24, and 30 chars/sec. Use the arrow keys to set the typematic rate.
- **DELAY (MSEC):** The available options for the typematic delay are 250, 500, 750 and 1000 msec. Use the arrow keys to set the typematic delay.
- **EXECUTE MEMORY TEST:** One of the tests performed by the POST is a memory test. This test can be time consuming if large amounts of memory are installed. Therefore, the EXECUTE MEMORY TEST option allows the user to turn off the memory during the POST, thus speeding up the boot process. The available options YES and NO are selectable using the arrow keys.
- **TEST FLOPPY BEFORE BOOT:** During the POST, the BIOS tests the floppy drives to verify that the installed drives are functional and match the drive types selected in the CMOS SETUP. The TEST FLOPPY BEFORE BOOT option has been provided to allow the user to significantly speed up the boot process by disabling the test. The available options YES and NO are selectable using the arrow keys.

- **PROMPT ON BOOT IF ERROR:** This option enables or disables the prompting for the < F1 > key prior to booting after errors have occurred during the post. The available options YES and NO are selectable using the arrow keys.
- **SYSTEM BOOT SEQUENCE:** The boot sequence refers to the order in which the BIOS tries to boot from the drives installed. If the BIOS is unsuccessful in booting from the first drive in the sequence, the BIOS attempts to boot from the second drive. The possible boot drives are A: (first installed floppy) or C: (first installed hard disk). The available options for the SYSTEM BOOT SEQUENCE are A:, C:, and C:, A:. Use the arrow keys to boot sequence selections.
- **BOOT SCREEN COLORS:** The foreground and background colors used during the POST and after the system boots are configured using the BOOT SCREEN COLORS option. The < ← > key changes the foreground colors while the < → > key changes the background colors.
- **SECONDARY CACHE:** The secondary cache is used to cache data transferred between system memory and the processor. The secondary cache significantly improves system performance. The available options are YES to enable or NO to disable the secondary cache.
- **CACHE VIDEO BIOS:** The video BIOS for EGA/VGA adapters is located from C0000h to C8000h in the ROM address space. Some adapters might not work correctly if the BIOS is cached. This option is a switch for turning ON or OFF the cachability of the memory in this address range. The available options YES and NO are selectable using the arrow keys.

5.5 PASSWORD SETUP

The DTI BIOS allows password security to be enabled to prevent unauthorized system boot, unauthorized access to the ROM Utilities, and unauthorized access to the Hard Disk Prep Utility. If the system boot password is enabled, the user will be prompted to enter the password each time the system boots. If either the ROM Utility or the Hard Disk Prep password is enabled, the user will be denied access to the respective utility until the password is entered. As the password is entered, asterisks (*) will be displayed in the password window. The default state of all passwords is disabled. The password consists of six alpha-numeric characters and is stored in CMOS RAM. The default password, "ERGON1" is installed if the CMOS RAM is invalid and one of the passwords has been enabled. The following is the PASSWORD CONFIGURATION screen.

CAT1012 ROM UTILITIES	PASSWORD CONFIGURATION
F1 - SYSTEM INFO F2 - CMOS SETUP F3 - PERIPHERALS F4 - BIOS OPTIONS F5 - PASSWORD SETUP F6 - HARD DISK PREP F7 - ADVANCED SETUP F10 - SAVE & EXIT	REQUIRED FOR SYSTEM TO BOOT NO REQUIRED TO ACCESS ROM UTILITIES NO REQUIRED TO ACCESS HARD DISK PREP NO CHANGE CURRENT PASSWORD *****
	F(KEY) : SELECT/EXECUTE, ↑↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING
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Figure 5.6 : PASSWORD CONFIGURATION Screen

PASSWORD CONFIGURATION Options

- **SYSTEM BOOT PASSWORD:** If enabled, each time the system tries to boot the user will be required to enter the password. The available options, ON and OFF, are selectable using the arrow keys.
- **ROM UTILITIES PASSWORD:** If enabled, the user will be prompted to enter the currently installed password before access to the ROM Utilities will be allowed. The available options, ON and OFF, are selectable using the arrow keys.
- **HARD DISK PREP PASSWORD:** If enabled, access to the Hard Disk Prep Utility within the ROM Utilities will require the user to enter the currently installed password. If both the Hard Disk Prep and ROM Utility passwords are enabled, the user will not be forced to re-enter the password to access the Hard Disk Prep Utility since the password had to be entered to access the utilities initially. The available options, ON and OFF, are selectable using the arrow keys.
- **CHANGE CURRENT PASSWORD:** To change the currently installed password, select the CHANGE CURRENT PASSWORD option and press ENTER. The following prompt will appear.

Enter Current Password : <input type="text"/> (six alpha-numeric characters) ESC : exit

After the current password has been successfully entered the following prompt will be displayed to enter the new password.

Enter New Password : <input type="text"/> (six alpha-numeric characters) ESC : exit

The password will be verified by forcing the new password to be entered a second time. The following prompt will be displayed if the password has been correctly changed.

New Password Has Been Installed
ESC : exit

Messages will be displayed if any errors occur in the password changing process. The <ESC> key can be pressed at any time to abort the changing of the password. To store the new password in CMOS, return to the Main Menu and press <F10> to save and exit.

WARNING: Make sure and store a copy of the new password in a safe place.

Password Security Usage

Whenever the ENTER PASSWORD prompt is displayed, enter the six digit password. If the password is forgotten, the only way to override the password is to clear the CMOS RAM. This is accomplished by turning off the system and removing the battery jumper from J3 Pins 2-3 for 30 minutes. Then replace the jumper, turn the system on, and run the ROM Utilities to reconfigure the system.

5.6 HARD DISK PREP

WARNING! The HARD DISK PREP utility may result in the loss of data on a hard disk drive! It should only be used the first time a drive is installed in a system or to change the interleave factor.

The DTI BIOS supports low level formatting of /AT type hard disk drives. This includes ST-506 (MFM and RLL) and ESDI drives. IDE drives may be formatted, but typically do not require low level formatting. SCSI drive controllers typically have their own utilities for low level formatting SCSI drives. Use of the HARD DISK PREP utility on drives that are not ST-506 or ESDI will produce unknown results.

The HARD DISK PREP Utility interfaces closely with the system BIOS. This means that a disk must be recognized by the BIOS before it can be formatted. Each time the HARD DISK PREP utility is accessed, the drive to be formatted is reset and initialized. This is done to prepare both the disk drive and the BIOS for disk accesses.

The HARD DISK PREP utility guides the user through a series of questions to get the information needed to properly format a drive. The remainder of this section will follow the flow of the HARD DISK PREP utility and describe each step involved.

CAT1012 ROM UTILITIES	<h4 style="margin: 0;">/AT Hard Disk Low Level Drive Prep</h4> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">Drive 1</th> <th style="width: 50%;"></th> <th style="width: 25%;">Drive 2</th> </tr> </thead> <tbody> <tr> <td>17</td> <td>Drive Type</td> <td>NONE</td> </tr> <tr> <td>977</td> <td># of Cylinders</td> <td></td> </tr> <tr> <td>5</td> <td># of Heads</td> <td></td> </tr> <tr> <td>17</td> <td># of Sectors</td> <td></td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%; text-align: center;"> This utility is used to low level format /AT hard drives only. Data on the hard drive may be lost. </div> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%; text-align: center;"> F(KEY) : SELECT/EXECUTE, ↑ ↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING </div>	Drive 1		Drive 2	17	Drive Type	NONE	977	# of Cylinders		5	# of Heads		17	# of Sectors	
Drive 1		Drive 2														
17	Drive Type	NONE														
977	# of Cylinders															
5	# of Heads															
17	# of Sectors															
F1 - SYSTEM INFO F2 - CMOS SETUP F3 - PERIPHERALS F4 - BIOS OPTIONS F5 - PASSWORD SETUP F6 - HARD DISK PREP F7 - ADVANCED SETUP F10 - SAVE & EXIT																
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Figure 5.7 : HARD DISK PREP Screen

5.6.1 !!!WARNING!!!

Upon entering the HARD DISK PREP utility, a warning message is displayed. This is to prevent accidental formatting of a drive by users who "didn't know what would happen." Press the < P > key to proceed into the HARD DISK PREP utility. Press any other key to return to the ROM Utilities Main Menu.

5.6.2 Which drive do you wish to format (1 or 2)?

If there is more than one drive in the system, the HARD DRIVE PREP utility will ask for the correct drive. Pressing the < 1 > or < 2 > key to select the drive to be formatted.

If there is only one drive in the system, (this question is not asked), the HARD DRIVE PREP utility assumes the only drive installed is the correct drive to format.

Pressing the < ESC > key to return to the ROM Utilities Main Menu.

5.6.3 Are the parameters for Drive N correct (Y/N)?

The parameters for the selected drive will be highlighted in the parameter display box. These parameters must be correct to properly format the drive. If they are correct, press < Y > to continue with the formatting process.

If the parameters are incorrect, press < N > to return to the Main Menu, then run the CMOS SETUP utility to set the correct drive parameters.

5.6.4 Scan Drive N for bad tracks (Y/N)?

The HARD DISK PREP utility can search for bad tracks on the drive. Press < Y > to start the search for bad tracks. Any track that has previously been marked bad will be found and entered into the bad track table. The cylinder number and head number currently being checked are displayed at the bottom of the screen, while any bad tracks found are displayed in the upper portion. After the search is complete, the utility will ask for additional bad tracks.

Press < N > to skip the automatic scan for bad tracks.

5.6.5 Would you like to enter any bad tracks (Y/N)?

If there are any known bad tracks that the automatic scan did not find, or if the scan was not done and there are known bad tracks, press < Y >. If no bad tracks need to be entered, press < N > to continue with the format process. Most IDE and ST506 drives are shipped with a list of bad tracks which were found during manufacturing. These should be entered manually if not found during a bad track scan.

5.6.5.1 Enter bad track info, press "ESC" when done...

At this point, it is necessary to enter any bad tracks. The bottom window on the screen shows the current track (cylinder and head). Type in the cylinder number and head number for any bad tracks that need to be entered. As each track is entered, it will be displayed in the upper window on the screen. After all bad track information has been entered, press < ESC > to continue with the format process.

Cylinder and head numbers range from zero (0) to one less than the number of cylinders or heads in the drive.

5.6.5.1.1 Entered track already listed in table!

This message will be displayed at the bottom of the window if the bad track entered is already listed in the bad track table.

5.6.5.1.2 Entered cylinder does not exist!

If the cylinder number typed in is greater than or equal to the number of cylinders on the drive, this message will be displayed at the bottom of the window.

5.6.5.1.3 Entered head does not exist!

This message will be displayed at the bottom of the window if the head number typed in is greater than or equal to the number of heads in the drive.

5.6.6 Auto-determine optimum interleave (Y/N)?

The interleave factor determines how fast data on successive tracks can be accessed. This is usually a function of the hard drive controller or the drive itself in the case of IDE drives. The DTI BIOS can attempt to automatically determine the best interleave factor. Press < Y > to do this. As the optimum interleave is being determined, the interleave currently being tested and the best found so far are displayed in the window at the bottom of the screen.

If the interleave factor is already known, time can be saved by entering it manually. Press < N > to skip the auto-determine feature.

5.6.6.1 Unable to determine interleave!

This message will be displayed in the window at the bottom of the screen if the optimum interleave factor could not be determined. The interleave factor must then be manually entered.

5.6.7 Enter an interleave factor between 1 and XX.

This is where an interleave factor is manually entered. "XX" is the number of sectors per track on the drive. Lower interleave factors are typically faster than higher values. However, a value too low for a particular hard drive controller will result in extremely slow performance as the controller can not handle the data fast enough.

5.6.7.1 Entered interleave factor out of range!

This message will be displayed if the manually entered interleave factor is zero (0) or greater than the number of sectors per track. Type a correct interleave factor to clear this message and continue with the format process.

5.6.8 Save data while formatting (Y/N)?

It is possible to low level format a hard drive without losing the data contained on the drive. If this is desirable, press < Y >. While every effort is made to preserve all of the data on the drive, it is still possible that the information could be corrupted during the format. It is advisable to back-up a hard drive before attempting a low level format with the data save option.

If a new hard drive is being formatted or data does not need to be preserved, press < N > to completely clear the drive.

5.6.9 Are you sure you want to format Drive N (Y/N)?

This is the last chance to back out of the format process. At this point, no data has been lost, so exiting the routine will have no effect on the hard drive. Press < N > to abort the format process and return to the ROM Utilities Main Menu. If any information has been incorrectly entered, press < N > and restart the format process from the beginning.

Pressing < Y > immediately begins the format process. During the format process, the track being formatted is displayed in the window at the bottom of the screen. The head numbers will cycle quickly. The cylinder number will decrement as all the heads are done for a cylinder.

If an error occurs, one of the following messages will be displayed:

5.6.9.1 Undetermined Error!

This message indicates that an uncorrectable error has occurred. The format process is unable to continue. If this occurs, verify that all cables are properly connected to the hard drive and hard drive controller.

5.6.9.2 Unable to save data to drive !

This message indicates that data could not be restored to a newly formatted track. This error will only occur if the save data option is chosen.

5.6.9.2.1 Continue formatting (Y/N)?

If data could not be restored to the drive while formatting, the format process can be terminated. Pressing < N > will quit the format and return to the ROM Utilities Main Menu. The data that was on the current track will be lost, but the rest of the data on the hard drive will be intact.

Press < Y > to continue with the format process, regardless of data loss.

5.6.9.2.1.1 Continue saving data (Y/N)?

If it is chosen to continue formatting after a data loss error, it may not be desirable to continue trying to save the data on the hard drive. Press < N > to finish the format process without saving the data. Any tracks formatted before the data loss error will contain valid data. All other tracks will be empty.

Press < Y > to continue saving the data while formatting.

5.7 ADVANCED SETUP

The ADVANCED SETUP utility provides access to parameters and options which may effect system performance. The utilities included in the Advanced Setup are the TIMING CONTROL, SHADOW CONTROL, and the CACHE CONTROL. Before the user is allowed access to these utilities, a warning screen is displayed and < F5 > must be pressed as shown in the screen below.

CAT1012 ROM UTILITIES	WARNING ! USE THE ADVANCED SETUP UTILITY WITH EXTREME CAUTION. INCORRECT SETTINGS CAN CAUSE SYSTEM MALFUNCTIONS. PRESS F5 TO ENTER EXTENDED SETUP
F1 - SYSTEM INFO F2 - CMOS SETUP F3 - PERIPHERALS F4 - BIOS OPTIONS F5 - PASSWORD SETUP F6 - HARD DISK PREP F7 - ADVANCED SETUP F10 - SAVE & EXIT	F(KEY) : SELECT/EXECUTE, ↑ ↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING
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Figure 5.8 : F7 - ADVANCED SETUP Screen

After changes have been made in ADVANCED SETUP, the user can either press the < ESC > key to return to the main menu or press < F10 > to save changes made and exit. Pressing < ESC > to return to the main menu does not cause the changes made in ADVANCED SETUP to be lost. Changes will be saved whenever < F10 > is pressed to save and exit from the Main Menu.

5.8 TIMING CONTROL

The TIMING CONFIGURATION utility gives the user access to chipset level timing registers. Invalid configuration of these parameters could cause the system not to boot up. The screen below shows the TIMING CONFIGURATION utility with the default parameters displayed.

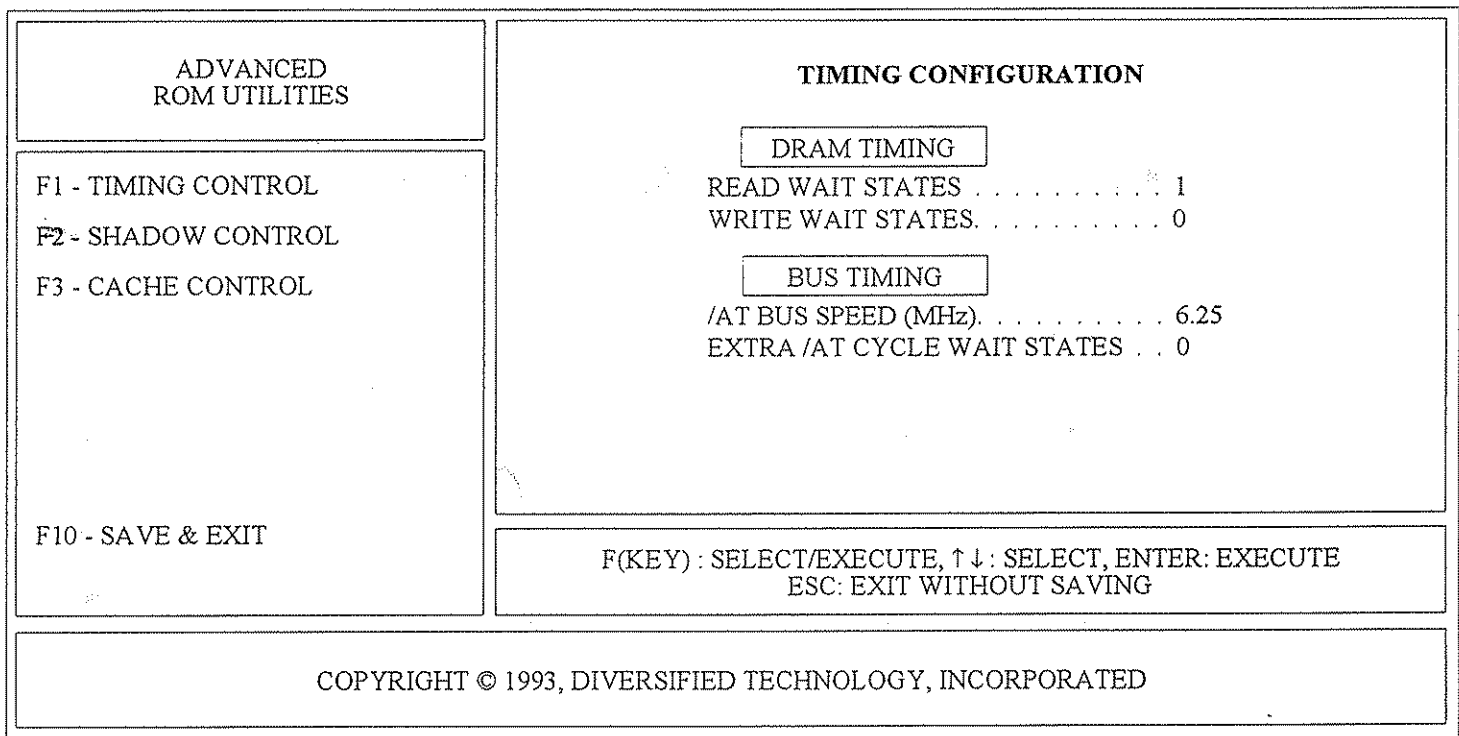


Figure 5.9 : TIMING CONFIGURATION Screen

TIMING CONTROL Options

- **READ WAIT STATES:** DRAM wait states define the number of clock cycles inserted on memory accesses. For DRAM reads, the number of wait states that can be inserted range from 0 to 3. Use the arrow keys to select wait state configuration.
- **WRITE WAIT STATES:** DRAM wait states defines the number of clock cycles inserted on memory accesses. For DRAM writes the number of wait states that can be inserted range from 0 to 3. Use the arrow keys to select wait state configuration.
- **/AT BUS SPEED:** The /AT bus speed determines the operating speed of expansion cards. Most expansion cards can run at 8 MHz, but there are some cards that can operate normally at speeds greater than 8 MHz. Therefore, bus speed options available for the CAT1012 are:

CPU SPEED	CLOCK SPEEDS			
25 MHz	6.25 MHz	8.33 MHz	10 MHz	12.5 MHz
33 MHz	8.25 MHz	11 MHz	N/A	N/A
50 MHz	6.25 MHz	8.33 MHz	10 MHz	12.5 MHz

- **/AT BUS CYCLE WAIT STATES:** Wait states are /AT bus clock cycles inserted on the /AT bus after a command goes active. This option allows one extra wait state to be inserted. The need for an extra wait state is dependent on the adapter cards installed. Use the arrow keys to select the extra wait state.

5.9 SHADOW CONTROL

The SHADOW RAM CONFIGURATION Utility provides the user with the ability to selectively enable and disable shadow RAM in 16k blocks from C000:0000h to E000:FFFFh. The shadow video BIOS option in the BIOS OPTIONS enables shadow RAM from C000:0000h to C000:7FFFh. RAM shadowing refers to the copying of the BIOS code from slow ROM into fast RAM and then executing the BIOS from the RAM. The SHADOW RAM CONFIGURATION screen is shown below.

ADVANCED ROM UTILITIES	SHADOW RAM CONFIGURATION SELECT SHADOW RAM AREAS IN 16 K BLOCKS
F1 - TIMING CONTROL F2 - SHADOW CONTROL F3 - CACHE CONTROL	C0000-C3FFF : ENABLED C8000-CBFFF : DISABLED C4000-C7FFF : ENABLED CC000-CFFFF : DISABLED D0000-D3FFF : DISABLED D8000-DBFFF : DISABLED D4000-D7FFF : DISABLED DC000-DFFFF : DISABLED E0000-E3FFF : DISABLED E8000-EBFFF : DISABLED E4000-E7FFF : DISABLED EC000-EFFFF : DISABLED
F10 - SAVE & EXIT	F(KEY) : SELECT/EXECUTE, ↑↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING
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Figure 5.10 : SHADOW RAM CONFIGURATION Screen

Use the arrow keys to select and modify the SHADOW RAM options.

5.10 CACHE CONTROL

The CACHE CONFIGURATION utility provides the user with the ability to enable the cache and to set up two non-cacheable memory ranges. Non-cacheable areas are vital for adapter cards with onboard memory areas that won't function properly if they are cached. The CACHE CONFIGURATION utility allows the user to choose specific address ranges to non-cache. The following screen displays the CACHE CONFIGURATION utility screen and is followed by a description of the available options.

ADVANCED ROM UTILITIES	CACHE CONFIGURATION 486 CACHE ENABLED SECONDARY CACHE ENABLED NON-CACHEABLE AREAS <table border="1"><thead><tr><th><u>BLOCK</u></th><th><u>SIZE</u></th><th><u>STARTING ADDRESS</u></th></tr></thead><tbody><tr><td>0</td><td>128 KB</td><td>00A0000H</td></tr><tr><td>1</td><td>256 KB</td><td>00C0000H</td></tr></tbody></table>	<u>BLOCK</u>	<u>SIZE</u>	<u>STARTING ADDRESS</u>	0	128 KB	00A0000H	1	256 KB	00C0000H
<u>BLOCK</u>	<u>SIZE</u>	<u>STARTING ADDRESS</u>								
0	128 KB	00A0000H								
1	256 KB	00C0000H								
F1 - TIMING CONTROL F2 - SHADOW CONTROL F3 - CACHE CONTROL F10 - SAVE & EXIT	F(KEY) : SELECT/EXECUTE, ↑↓ : SELECT, ENTER: EXECUTE ESC: EXIT WITHOUT SAVING									
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Figure 5.11 : CACHE CONFIGURATION Screen

CACHE CONFIGURATION Options

- **486 CACHE:** The 486 cache can be ENABLED or DISABLED using this option. Use the arrow keys to make selections.
- **SECONDARY CACHE:** The secondary cache can be ENABLED or DISABLED using this option. Use the arrow keys to make selection.
- **NON-CACHE SIZE:** The available non-cache block sizes are 64K, 128K, 256K, 512K, 2M, 4M, and 8M. They are selectable using the arrow keys.
- **NON-CACHE ADDRESS:** The non-cache address is the starting memory address of the non-cache block. The start address must be a multiple of the non-cache block size, (i.e., A 2M non-cache block cannot be started at 1M, 3M, 5M and so forth.) To set the start address, either enter the desired address and press <ENTER> or use the arrow keys to scroll to the desired address in block size increments.

SECTION 6

TROUBLESHOOTING GUIDE

IN THIS TROUBLESHOOTING GUIDE

Capitalized, italicized statements within quotation marks are messages that are displayed on your screen. Statements not in quotation marks are problems, or problem areas, that are encountered.

NO VIDEO

1. Verify that power is connected to the computer.
2. Verify that the monitor is ON and has power.
3. Verify that all the add-in cards are fully inserted into the /AT Bus Expansion Slot.
4. Remove all connectors from reset, battery, keylock and speaker ports. If the video works after removing the connectors, review the port connections in Section 2.
5. Verify that the monitor type is the same as the video card type being used (i.e., a monochrome monitor with a monochrome card or a color monitor with a CGA card, etc.).

CAT1012 APPEARS TO HAVE LOCKED UP (NO ACTION GENERATED BY PRESSING A KEY)

1. If an add-in video card is installed (e.g., MONO or CGA), verify that the primary monitor is connected. With the power OFF, remove the unused or secondary video card.
2. Make sure the SECONDARY CACHE is disabled if secondary cache is not installed.
3. If secondary cache is installed, turn it off. If the system does not lock up, the CAT1012 may require service.

PARITY PROBLEMS

1. Verify that the memory SIMMs are inserted properly in their respective sockets (refer to the CAT1012 memory configuration).
2. Verify that the DRAM is fast enough to operate at the speed for which the CAT1012 is configured. The required DRAM speed is dependent on the wait states set in the /AT setup screen. See Section 2 for the correct values.

"KEYBOARD FAILURE"**"KEYBOARD CONTROLLER FAILURE"****"KEYBOARD DATA LINE FAILURE"****"KEYBOARD CLOCK LINE FAILURE"****"KEYBOARD STUCK KEY FAILURE"**

These messages indicate that the POST was unable to complete the initialization of the keyboard.

1. Verify that there are no "stuck" keys on the keyboard.
2. Verify that the keyboard is properly connected to the computer.
3. If a switchable keyboard is used, verify that the switch is positioned for an /AT computer.

"CMOS CONFIGURATION ERROR"

This message typically indicates that the CMOS SETUP information stored in CMOS RAM does not match the hardware identified by the POST.

1. Use the CMOS SETUP utility to verify that the FLOPPY DRIVE TYPE, FIXED DRIVE TYPE, VIDEO TYPE, and MEMORY SIZE are set correctly. If the memory configuration has changed, the CMOS SETUP information will appear to be correct. If everything appears to be correct, save the displayed configuration.
2. If an add-in memory card is used to extend the memory capabilities of the CAT1012, verify that the add-in card is properly configured and the CMOS SETUP utility reflects the size of the installed memory. The memory test which executes on power-up will indicate the size of both the BASE and EXTENDED memory found by the Power-ON-Self-Test (POST).
3. If this error only occurs on a power cycle, see CONFIGURATION INFORMATION.

"FLOPPY DRIVE CONTROLLER NOT FOUND"

This message indicates that the POST was unable to initialize the floppy disk controller.

1. If no external disk controller is being used, verify that the onboard floppy controller is ENABLED in the PERIPHERALS SETUP utility.
2. If an external floppy disk controller is being used, verify that the onboard floppy controller is DISABLED in the PERIPHERALS SETUP utility, and that the controller card is properly inserted into the expansion slot.

"FLOPPY DRIVE 0 NOT FOUND"**"FLOPPY DRIVE 1 NOT FOUND"**

This message indicates that the POST was unable to access the designated floppy disk drive.

1. Use the CMOS SETUP utility to verify that no drive type is specified for a drive that does not exist.
2. Verify that the floppy cable is properly connected to the drive and controller and that conductors 10 through 16 are twisted between the controller and drive A.
3. Verify that the power connector is connected to the drive.

"FLOPPY DRIVE CONFIGURATION ERROR"

This message indicates that the drive(s) specified in the CMOS SETUP utility does not match the type of floppy detected by the POST.

1. Use the CMOS SETUP utility to select the appropriate floppy drive installed.
2. If no floppy drives are installed, use the CMOS SETUP utility to verify that no FLOPPY DISK TYPE is specified.

**"NO BOOT DISK PRESENT -
PRESS F1 TO RETRY OR CTRL+ALT+ESC TO ENTER ROM UTILITIES"**

This message indicates that no floppy disk or hard disk could be found to boot from.

1. If booting from a floppy disk, verify that the disk is properly inserted and the drive door is closed.
2. Insert a different bootable floppy disk into the drive and press <F1>.
3. If attempting to boot from a hard disk, insert a bootable floppy disk into drive A and press ENTER. After booting from the floppy disk, verify that drive C is accessible. Use the FDISK (or similar) utility to verify that a bootable partition exists and is ACTIVE. Remove the floppy disk from drive A and reset the system. If the drive cannot be accessed or partition cannot be found, the drive may need to be reformatted.

CAUTION: Reformatting a drive causes the data on the drive to be lost.

4. If attempting to boot from a hard disk, use the CMOS SETUP utility to verify that the correct FIXED DISK TYPE is configured.

**"ERROR READING FLOPPY DISK -
PRESS F1 TO RETRY OR CTRL+ALT+ESC TO ENTER ROM UTILITIES"**

or

**"INVALID BOOT SECTOR ON FLOPPY DISK -
PRESS F1 TO RETRY OR CTRL+ALT+ESC TO ENTER ROM UTILITIES"**

This message indicates that a floppy disk appeared to be in the drive, but a valid boot sector could not be read from the disk.

1. Verify that the disk is properly inserted and the drive door is closed.
2. Insert a different bootable floppy disk into drive and press <F1>.
3. Use the CMOS SETUP utility to verify that the correct FLOPPY DISK TYPE is configured.

**"ERROR READING HARD DISK -
PRESS F1 TO RETRY OR CTRL+ALT+ESC TO ENTER ROM UTILITIES"**

or

**"INVALID BOOT SECTOR ON HARD DISK -
PRESS F1 TO RETRY OR CTRL+ALT+ESC TO ENTER ROM UTILITIES"**

This message indicates that the POST was unable to access the hard disk using the FIXED DISK TYPE parameters specified in the CMOS SETUP utility.

1. Use the CMOS SETUP utility to verify that the correct FIXED DISK TYPE is configured.
2. Insert a bootable floppy disk into drive A and press <F1>. After booting from the floppy disk, verify that drive C is accessible. Use the FDISK (or similar) utility to verify that a bootable partition exists and is ACTIVE. Remove the floppy disk from drive A and reset the system. If the drive cannot be accessed or a partition cannot be found, the drive may need to be reformatted. Use the HARD DISK PREP utility to low level format MFM/AT drives.
CAUTION: Reformatting a drive causes the data on the drive to be lost.

"HARD DRIVE CONTROLLER NOT FOUND"

1. If no hard disk is installed, use the CMOS SETUP utility to specify NONE for FIXED DISK TYPE.
2. If an add-in /AT hard disk controller is being used, verify that it is properly inserted into the expansion slot.
3. If an add-in 8-bit /XT hard disk controller is being used, use the CMOS SETUP utility to set the FIXED DISK TYPE to NONE. In some cases, the /XT hard disk controller may have to be removed from the system in order for the system to enter the CMOS SETUP utility.
4. If using the CAT1012's IDE hard disk port, be sure the IDE port is enabled using the PERIPHERALS SETUP utility.
5. If using an external /AT type hard disk interface, be sure the CAT1012 IDE interface is disabled.

"HARD DRIVE FAILURE"

This message indicates that the POST was unable to access the hard disk using the FIXED DISK TYPE parameters specified in the CMOS SETUP utility.

1. Verify that the hard drive has power connected to it.
2. Verify that the hard disk cables are connected properly.
3. Enter the CMOS SETUP utility and verify the hard disk type. Refer to the manufacturers specifications on the hard drive for configuration information.
4. The drive may need to be formatted.
WARNING: This will cause loss of all data on the drive.

"HARD DRIVE CONFIGURATION ERROR"

This message indicates that the FIXED DISK TYPE specified in the CMOS SETUP Utility was not valid. This typically occurs when the specified type has 0 for the number of cylinders.

1. If no hard disk is being used, use the CMOS SETUP utility to set the FIXED DISK TYPE to NONE.
2. The parameters listed in the CMOS SETUP utility must never exceed the specifications for the number of cylinders or heads. The CUSTOM DRIVE TYPE utility will allow the exact parameters of the drive to be entered.
3. If using the CAT1012's IDE hard disk port, be sure the IDE port is enabled using the PERIPHERALS SETUP utility.
4. If using an external /AT type hard disk interface, be sure the CAT1012 IDE interface is disabled.

"REAL TIME CLOCK IS STOPPED"

"REAL TIME CLOCK IS NOT SET"

These messages indicate that the battery backed real time clock is not set correctly or has failed.

1. Use the CMOS SETUP utility to set the time and date.

"XXXX0h OPTIONAL BAD CHECKSUM = Y"

This message indicates that the POST identified an expansion ROM signature at segment XXXX, but the checksum was not 0. This typically indicates that the ROM is invalid or is too slow to be accessed by the current configuration of the CAT1012.

1. Set the /AT bus speed to the lowest speed in the TIMING CONTROL utility.
2. For eight bit boards, use the ADVANCED SETUP utility to increase the 8 bit wait-states. Use the minimum number of wait states which provide reliable operation.
3. For sixteen bit board, use the ADVANCED SETUP utility to increase the 16 bit wait states. Use the minimum number of wait states which provide reliable operation.

"I/O CARD PARITY ERROR"

This message indicates that an I/O card activated the I/O channel check signal, which is typically used to indicate a RAM-parity error on an add-in card. This may occur if the card is too slow to be accessed by the current configuration of the CAT1012.

1. Set the /AT bus speed to the lowest speed in the TIMING CONTROL utility.
2. For eight bit boards, use the ADVANCED SETUP utility to increase the 8 bit wait states. Use the minimum number of wait states which provide reliable operation.
3. For sixteen bit boards, use the ADVANCED SETUP utility to increase the number of 16 bit wait states. Use the minimum number of wait states that provides reliable operation.

"KEYBOARD IS LOCKED"

This message indicates that the keyboard appears to be in the LOCKED position.

1. Verify that the system key is not in the locked position.
2. Verify that the keylock wires are connected to pins 4 and 5 of connector J1.

"Non-System disk or disk ERROR**Replace and strike any key when ready"**

This message indicates that a floppy disk appeared to be in the drive, but a valid boot sector could not be read from the disk.

1. Verify that the disk is properly inserted and the drive door is closed.
2. Insert a different bootable floppy disk into the drive and press a key.
3. Use the CMOS SETUP utility to verify that the correct FLOPPY DISK TYPE is configured.

SERIAL OR PARALLEL (PRINTER) PORT PROBLEMS

1. Verify that the peripheral device has power and is turned on.
2. Verify that the peripheral device is properly connected to the serial or parallel port.

POWER LED DOES NOT WORK

1. Verify that the LED is connected to pins 1 and 3 of connector J1.
2. Verify that the polarization of the connection is correct. This can be checked by reversing the pin connections.

RESET BUTTON DOES NOT WORK

1. Verify that the RESET button is connected into pins 1 and 2 of connector J4.

CONFIGURATION INFORMATION IS NOT RETAINED

1. If using the onboard battery, make sure that a jumper is placed between pins 2 and 3 of J3.
2. If using an offboard battery, check the voltage on the battery. If it is low, replace it. Also be sure that the battery is connected to the proper pin on J3.
3. When setting the configuration, you must save the new setting by pressing the proper F keys. If the setup menu is exited using CTRL-ALT-DEL, the settings are not retained.

SERVICE CALL PREPARATIONS

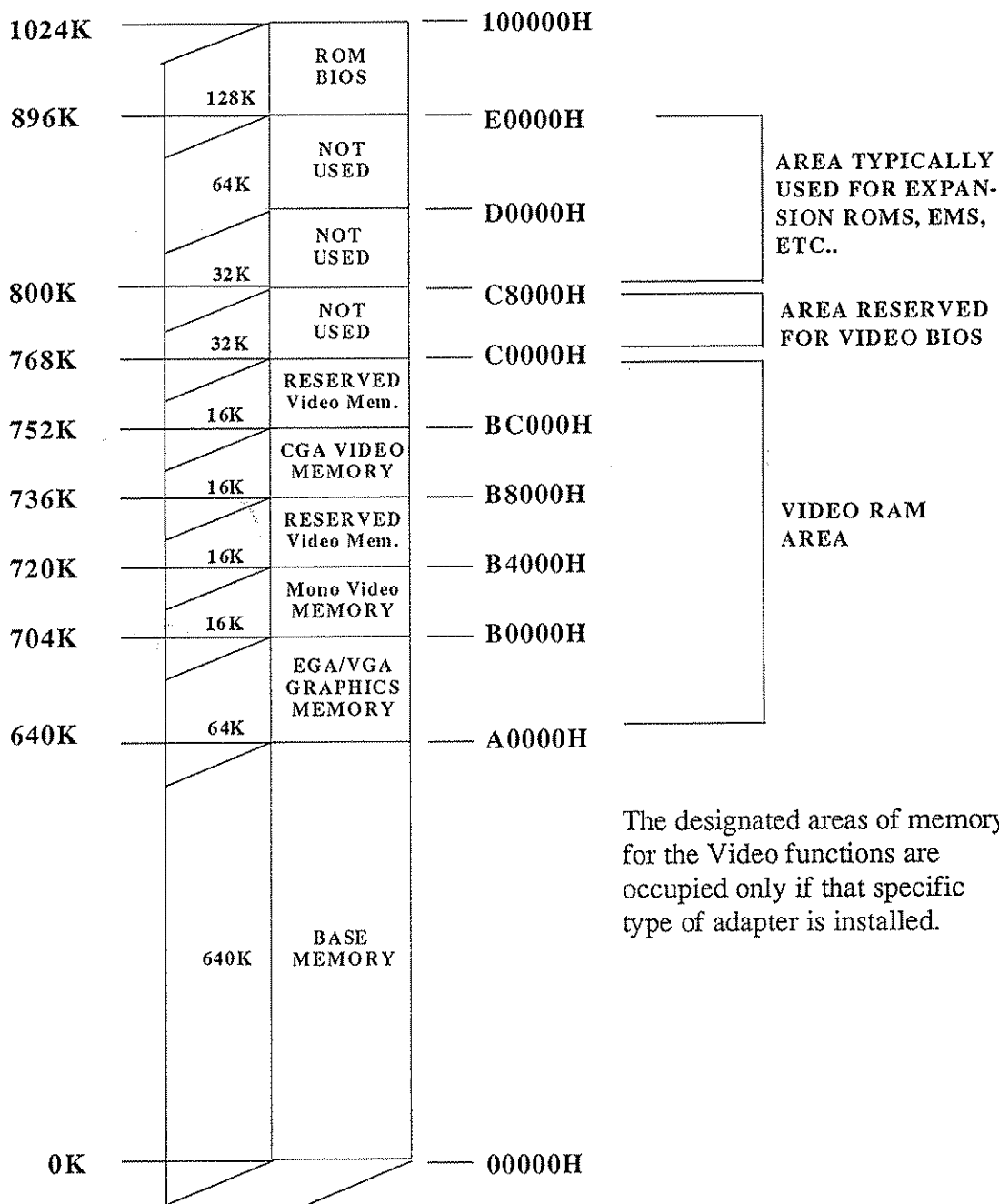
If you are still having problems with your CAT1012, you can call one of our service representatives. Before you make this call, we ask that you please take the following steps to insure that your problem can be solved promptly.

1. Write down the equipment that you are using in your computer such as model of hard drive, hard drive controller, video card, floppy card, etc.
2. Write down the jumper settings of the CAT1012. Refer to Section 2 for jumper configurations.
3. Write down the configuration information contained in the CAT1012 ROM utilities.
4. If possible, have the system near the telephone when you call.

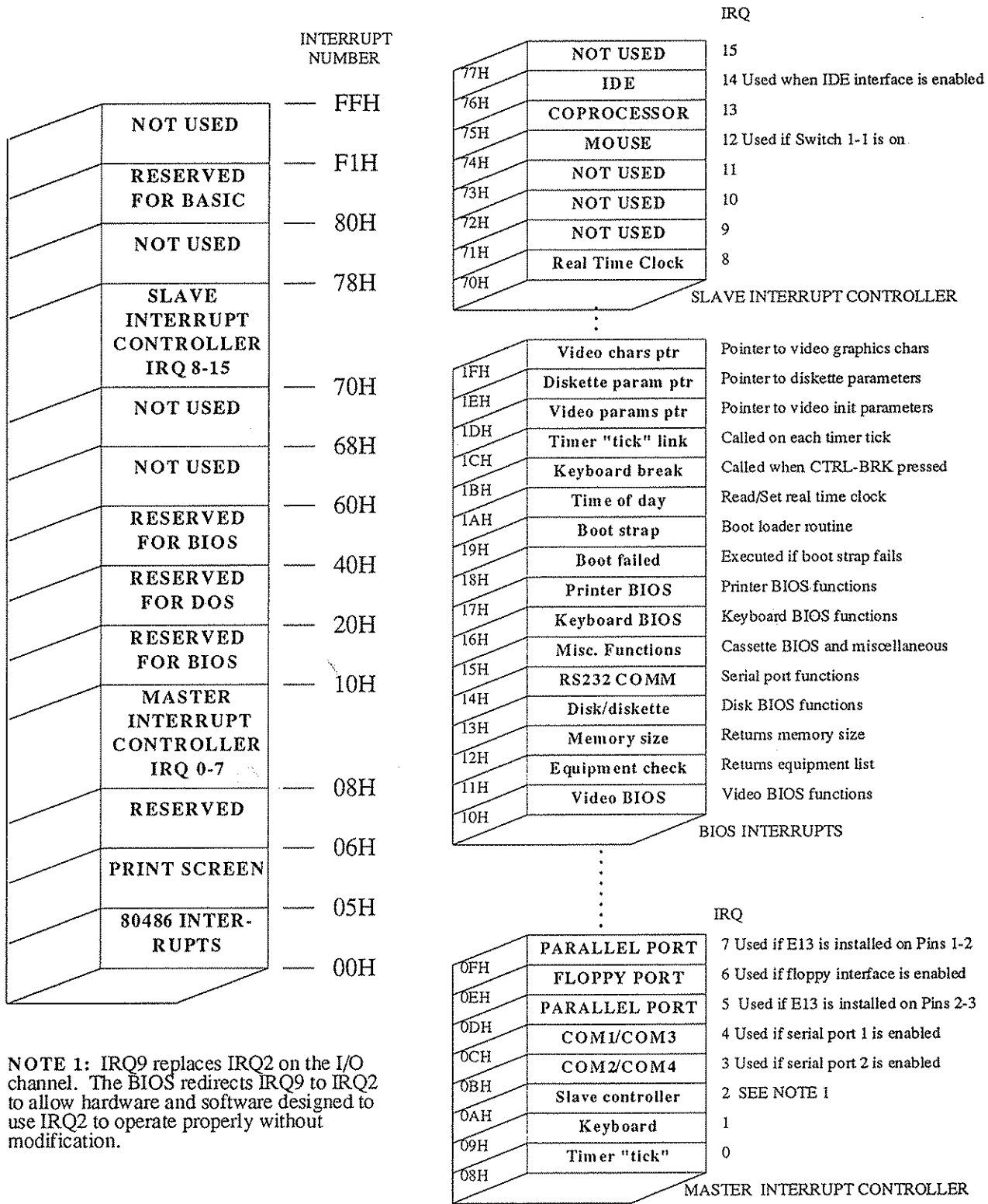
For technical information, call 601-856-4121 and ask to speak to one of our service representatives.

SECTION 7 SYSTEM RESOURCES MAPS

CAT1012 MEMORY MAP



CAT1012 INTERRUPT MAP



NOTE 1: IRQ9 replaces IRQ2 on the I/O channel. The BIOS redirects IRQ9 to IRQ2 to allow hardware and software designed to use IRQ2 to operate properly without modification.

CAT1012 I/O ADDRESS MAP

0	SERIAL COM 1	— 400H
0	FLOPPY DISK CONTROLLER	— 3F8H
1	UNUSED	— 3F0H
2	ENHANCED GRAPHICS	— 3E0H
2	COLOR GRAPHICS	— 3D0H
0	MDPA PRINTER PORT	— 3C0H
2	MONOCHROME DISPLAY	— 3BCH
1	UNUSED	— 3B0H
0	PRIMARY PRINTER PORT	— 380H
1	UNUSED	— 378H
0	SERIAL COM 2	— 300H
1	UNUSED	— 2F8H
0	ALTERNATE PRINTER PORT	— 280H
1	UNUSED	— 278H
0	FIXED DISK CONTROLLER	— 1F8H
1	UNUSED	— 1F0H
0	RESERVED FOR SYSTEM	— 100H
		— 000H

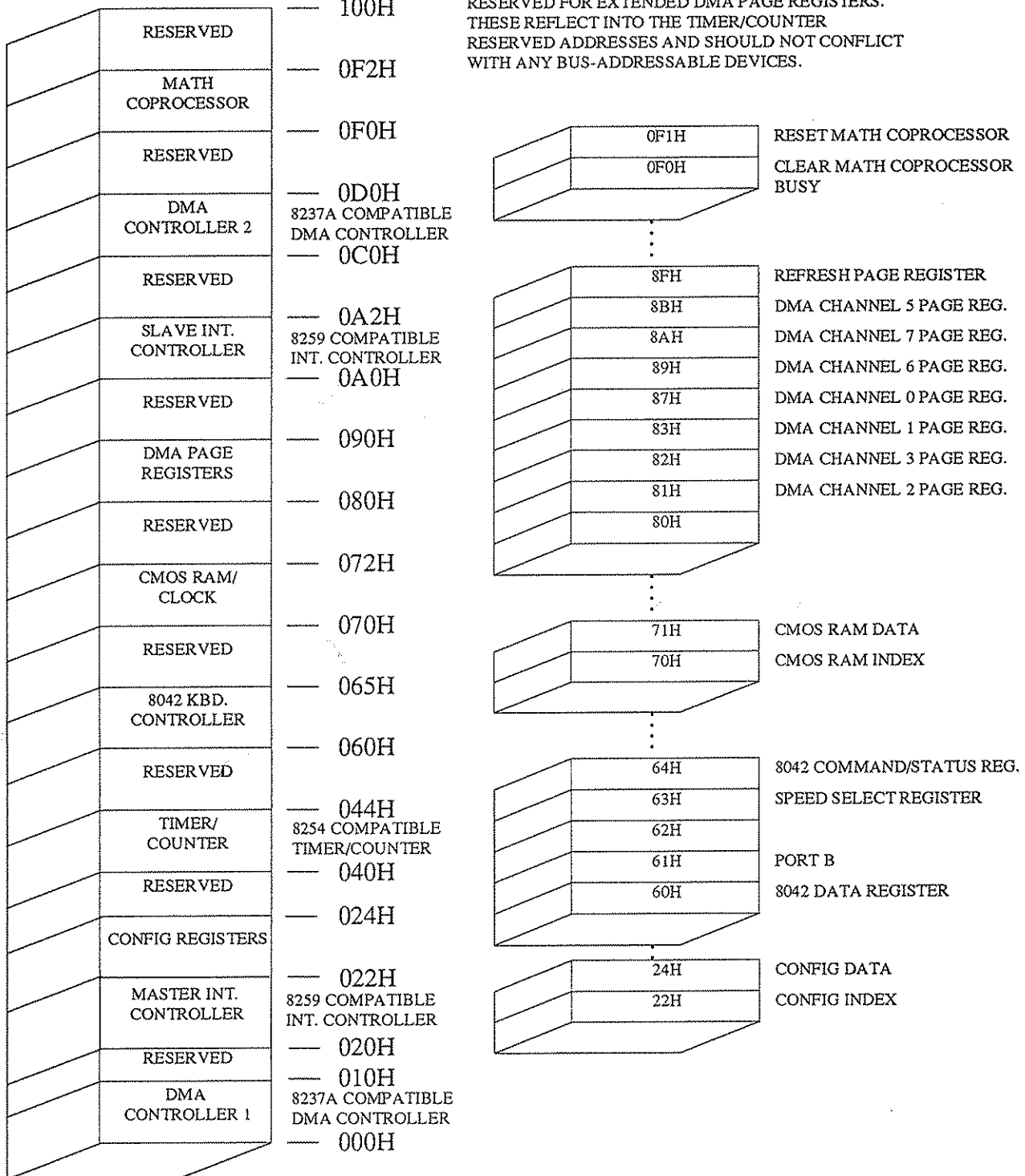
0 - These I/O locations are reserved for ONBOARD functions and must not be used by expansion I/O cards unless the onboard address is disabled.

1 - These I/O locations are unused by the CAT1012, and may be used by expansion I/O cards or for custom configuration of onboard peripherals (serial and parallel ports).

2 - These I/O locations are unused by the CAT1012, but are typically used by common expansion I/O cards.

CAT1012 SYSTEM I/O MAP

I/O ADDRESSES 0840H THROUGH 084FH ARE RESERVED FOR EXTENDED DMA PAGE REGISTERS. THESE REFLECT INTO THE TIMER/COUNTER RESERVED ADDRESSES AND SHOULD NOT CONFLICT WITH ANY BUS-ADDRESSABLE DEVICES.



SECTION 8

CAT1012 SERVICE INFORMATION

RETURN SHIPMENT

If service or repair is required, contact DTI's Service Department for a Return Material Authorization (RMA) number and shipping instructions. If the product is out of warranty, or was damaged during shipment, a purchase order will be required for the repair. The product should be returned in its original shipping materials if available. Otherwise, the board should be placed in a conductive anti-static material, wrapped in a cushioning material and enclosed in a corrugated carton suitable for shipping. Seal the carton securely and ship prepaid to the following address with the RMA number on the label.

Diversified Technology, Inc.
Service Department
476 Highland Colony Parkway
P. O. Box 748
Ridgeland, MS 39157
RMA# _____

Contact the Service Department at the following numbers:

Telephone: (601)-856-4121
FAX: (601)-856-2888

Items determined to be covered under warranty will be returned freight prepaid. Items not in warranty will be returned freight collect, contact DTI's Service Department.