VIPer808

486/5x86 PROCESSOR
INDUSTRIAL SINGLE BOARD COMPUTER
TECHNICAL REFERENCE MANUAL
VERSION 1.2, MARCH 1997

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FOREWORD

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READ ME FIRST

WARNINGS & IMPORTANT INFORMATION

Take heed of these warnings which concern the VIPer808:

Warning: CPU Voltage Selection

W1 jumper selects CPU voltage (shorted = 5V, open = 3.3V). Incorrect CPU voltage can damage your CPU!

Important: CPU Fan Voltage

You must use a 5V CPU fan on the VIPer808. Pin 1 of the fan connector at J11 is supplied with 5V (not 12V). A 5V CPU fan assembly (including cables) is available from TEKNOR.

Before operating your Single Board Computer, please note the following:

Battery Configuration

Your computer board is equipped with a standard non-rechargeable lithium battery. To preserve the useful life of the battery, **the jumper which enables the battery is not installed when you receive the board**. If you need a jumper cap, we suggest you use the one on the Watchdog Timer jumper since it is rarely needed; if you wish to purchase jumper caps, you can contact TEKNOR's Sales department to order them.

Preventing Viruses

TEKNOR INDUSTRIAL COMPUTERS takes every precaution against computer viruses. For your protection, we have *safety sealed* all utility diskettes. If the seal is broken, **do not use the diskette**. Destroy the diskette immediately and contact our Technical Support department for further instructions at (514) 437-5682 (Canada) or at +49 811 / 600 15-0 (Germany).

To safeguard against computer viruses in general, do not freely lend your utility diskettes and regularly perform virus scans on all your computer systems.

CHANGES BETWEEN REVISIONS OF THE BOARD

Revision 0

Revision 0 is the first VIPer808 in production.

INTRODUCTION

The VIPer808 Single Board Computer is a high performance, fully IBM AT compatible, PC/AT industrial single board computer. VIP stands for Very Integrated Processor. This board includes the following features:

- The VIPer808 supports the following microprocessors (maximum internal CPU clock speed and CPU voltage are indicated):
  - AMD 486DX2SV running at 66 MHz (3.3V);
  - AMD 486DX4SV running at 100 MHz (3.3V);
  - AMD 5x86 running at 133 MHz (3.3V)).
    This processor is also referred to as a 486DX5;
  - Intel 486DX running at 33 MHz (5V);
  - Intel 486DX2 running at 66 MHz (5V);
  - Intel 486DX4 running at 100 MHz (3.3V);
  - SGS 486DX2V running at 66 MHz (3.3V);
  - SGS 486DX4V running at 100 MHz (3.3V).
- Each microprocessor has Internal Cache Memory.
- The VIPer808 board supports the 16-bit standard ISA bus.
- BIOS is stored in a Boot-Block Flash device.
- System memory can be configured from 1MB to 128MB of Dynamic RAM (DRAM) with 36-bit modules installed on the board's two vertical, 72-pin SIMM sockets.
- The VIPer808 is a multi-purpose computer board:
  - It can be used as a single board computer in conjunction with a passive backplane;
  - Or as part of a stand-alone system with no backplane.
- The VIPer808 provides operating systems compatibility for: PC and MS-DOS, Windows 95, Windows NT, OS/2 Warp, SCO UNIX, QNX, NOVELL and UnixWare.

- The board is ideal for industrial applications; it is designed to operate in environments where a sturdy and compact system is essential with features like:
  - Compact half-card format (7.125" x 4.800");
  - Watchdog timer;
  - SMM (System Management Mode) support and full SMI (System Management Interrupt) interface for power management;
  - Power failure detector;
  - Low battery detector;
  - Shadow RAM BIOS support for fast execution;
  - Real-Time Clock (RTC) with battery backup.
- The VIPer808 has a multi-function connector which provides all the necessary signals for keyboard, speaker, reset button, and hard disk LED connections.
- The local bus SVGA Video Controller is from Cirrus Logic® and supports high resolution CRT displays (1024x768 - 256 colors). The board comes with 1MB Video Memory DRAM (optional 512KB).
- The VIPer808 includes a local bus IDE hard disk interface for a high performance disk subsystem.
- The VIPer808 includes an enhanced super Floppy Controller which supports two Floppy Disk Drives of up to 2.88MB each, 16 bytes of FIFO buffering and a 48mA drive buffer.
- The VIPer808 board has one Parallel Printer port (ECP and EPP modes are supported), incorporating ChipProtect™ circuitry to protect against damage due to printer power-on.
- Serial Port 1 and Serial Port 2 are 16550 compatible with internal 16-byte FIFO buffers and can be defined as two of the following: COM1, COM2, COM3 or COM4.
- The onboard Ethernet port, compliant with IEEE 802.3 / ANSI 8802-3, can function with either the 10 Base-T or 10 Base-2 interface.
- The Super I/O Controller and the Ethernet Controller support the Plug and Play standard. Onboard devices are used to store Plug and Play configuration information: the boot-block Flash for the Super I/O and a serial EEPROM for the Ethernet.
- The board also includes a PS/2 Mouse port.

The VIPer808 TECHNICAL REFERENCE MANUAL's Sections are divided into two parts. The first part - INSTALLING & SETTING UP VIPer - includes ten Sections which give a full overview of the VIPer808 board, plus installation and setup procedures. A topical index of these Sections is included below:

TOPICS	SECTIONS
Cable connections	5, 6, and 7
Cache	4
CPUs	4
CRT screen	7
Ethernet	5
Floppy Disk Drives	6
Hard Disk (IDE)	6
Jumpers	3
Memory	2
Mouse	4
Parallel port	5
Power Supply	8
Serial ports	5
Static electricity	1
Unpacking	1
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Following the Sections are Appendices A to F which contain information you can consult when needed. These include:

- Appendix A: VIPer808 SPECIFICATIONS;
- Appendix B: MEMORY & I/O MAPS;
- Appendix C: MECHANICAL LAYOUT & BLOCK DIAGRAM;
- Appendix D: CONNECTOR PINOUTS;
- Appendix E: RECOMMENDED DEVICES & MATING CONNECTORS;
- Appendix F: ERROR CODES.

At the end of the manual, there is a GETTING HELP section which includes Technical Support information, the warranty and instructions on returning merchandise.

PART ONE

INSTALLING & SETTING UP VIPer

SECTION 1
INSTALLATION & SETUP

1.01 GETTING STARTED

Part One of this manual (Sections 1 to 9) groups the various aspects of the VIPer808 board, with special emphasis put on installation and setup procedures. Wherever possible, technical information is given in these nine Sections to describe the various features of the board.

Depending on your level of experience and expertise, you will want to spend more or less time with the manual.

More advanced users will undoubtedly find Section 3 - SETTING JUMPERS - most helpful for locating the connectors and jumpers of the board and understanding how the board can be configured via the jumpers. Then, they can consult the TABLE OF CONTENTS at the beginning of this manual for specific information concerning the VIPer808 board, or refer to the topical index of Part One found on page 3 of the INTRODUCTION.

For less advanced users, we recommend to read through Part One of the manual while installing and setting up the VIPer808 board. These Sections have been organized in a chronological order with respect to the steps that should be taken to install and set up the board. Some Sections or sub-sections dealing with devices or peripherals installations should be studied in greater detail, while those describing devices can be skipped.

1.02 HOW THE BOARD CAN BE USED

The VIPer808 board is a multi-purpose computer board:

- The VIPer808 can be used as a **single board computer** in conjunction with a passive backplane. Power is drawn directly from the AT bus.

- The VIPer808 can be used as part of a **stand-alone system** with no backplane. The board has its own power connector, through which power can be drawn. The VIPer808 can also operate without any user interface.

1.03 IMPORTANT PRECAUTIONS WHEN WORKING WITH A BOARD

1.03.1 STATIC ELECTRICITY PRECAUTIONS

Since static electricity can damage a board, the following precautions should be taken:

- Keep the board in its antistatic package, until you are ready to install it.
- Touch a grounded surface before removing the board from its package or wear a grounding wrist strap; this will discharge any static electricity that may have built up on your body.
- Handle the board by the edges.
- When handling the board, touch a grounded surface often or wear a grounding wrist strap.

1.03.2 POWER PRECAUTIONS

Before hardware setup and installation, make sure the board is completely powered down.

1.04 UNPACKING

Follow these recommendations while unpacking:

- Observe the Static Electricity Precautions in section 1.03.1.
- Open the box, remove the board from its antistatic wrapping and place it on a grounded surface.
- Inspect the board for damage. If there is any damage, or items are missing, notify TEKNOR immediately.
- Save box and packing material for possible future shipment.

SECTION 2
INSTALLING MEMORY

2.01 TYPES OF MEMORY ON BOARD

Various types of memory are installed or supported on the VIPer808 board.

2.01.1 SYSTEM MEMORY (DRAM)

Dynamic Random Access Memory (DRAM) is essential system memory. It can be configured from 1MB to 128MB using 36-bit SIMMs (Single In-line Memory Modules). This is the only type of memory which can be installed by the user. See section 2.02 for instructions on installing SIMMs.

The location of the two 72-pin vertical SIMM sockets appears on Diagram 2-1 and are labeled U10 and U11.

2.01.2 VIDEO MEMORY (DRAM)

Video RAM is factory installed. The VIPer808 comes with 1MB of video memory (optional 512KB).

The location of the Video RAM appears on Diagram 2-2 at U24 and U23 (both on solder side).

2.01.3 BIOS (BOOT-BLOCK FLASH)

The Boot-Block Flash BIOS is also factory installed. It appears at U17 on Diagram 2-1.

DIAGRAM 2-1: Assembly (Top)

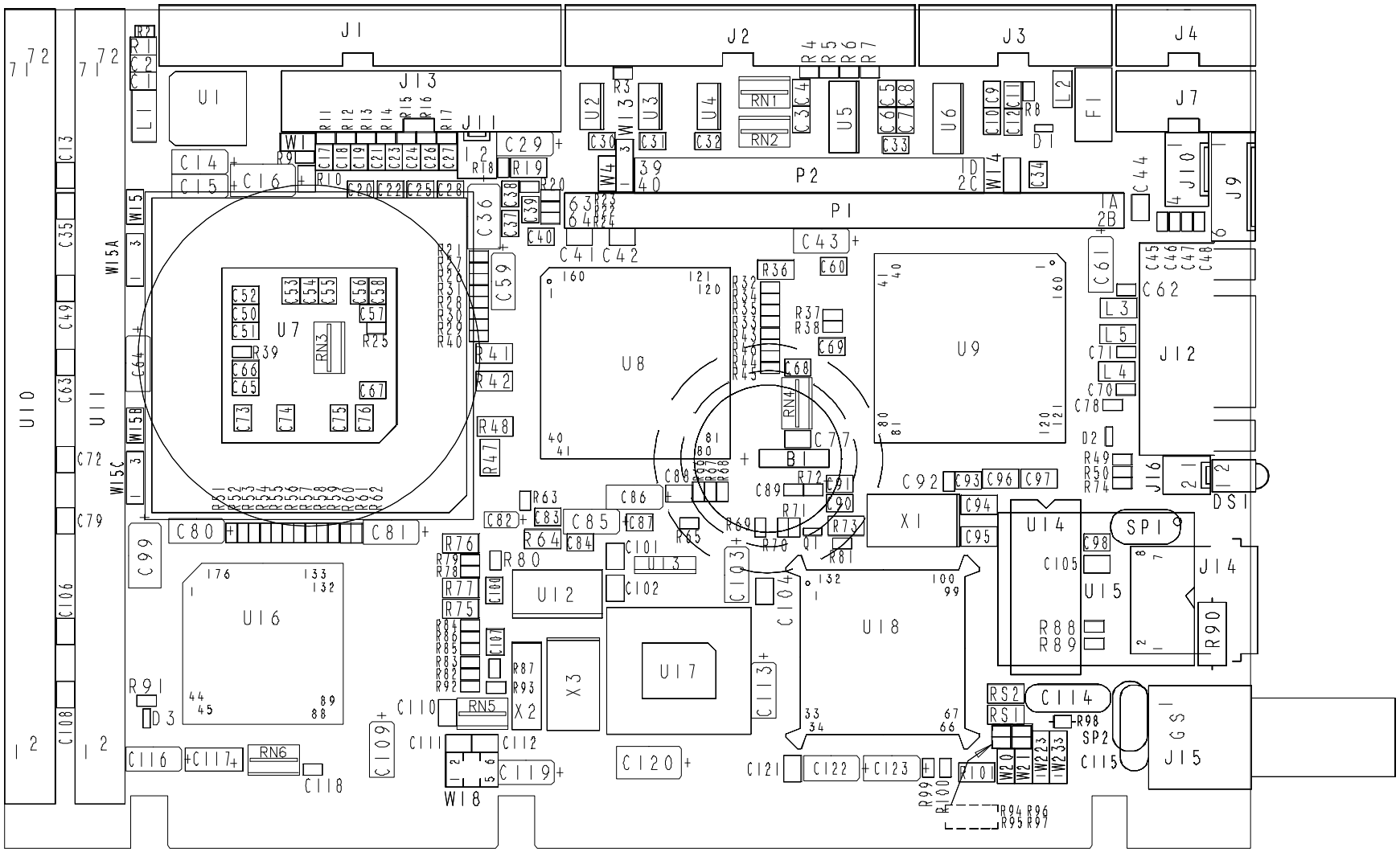
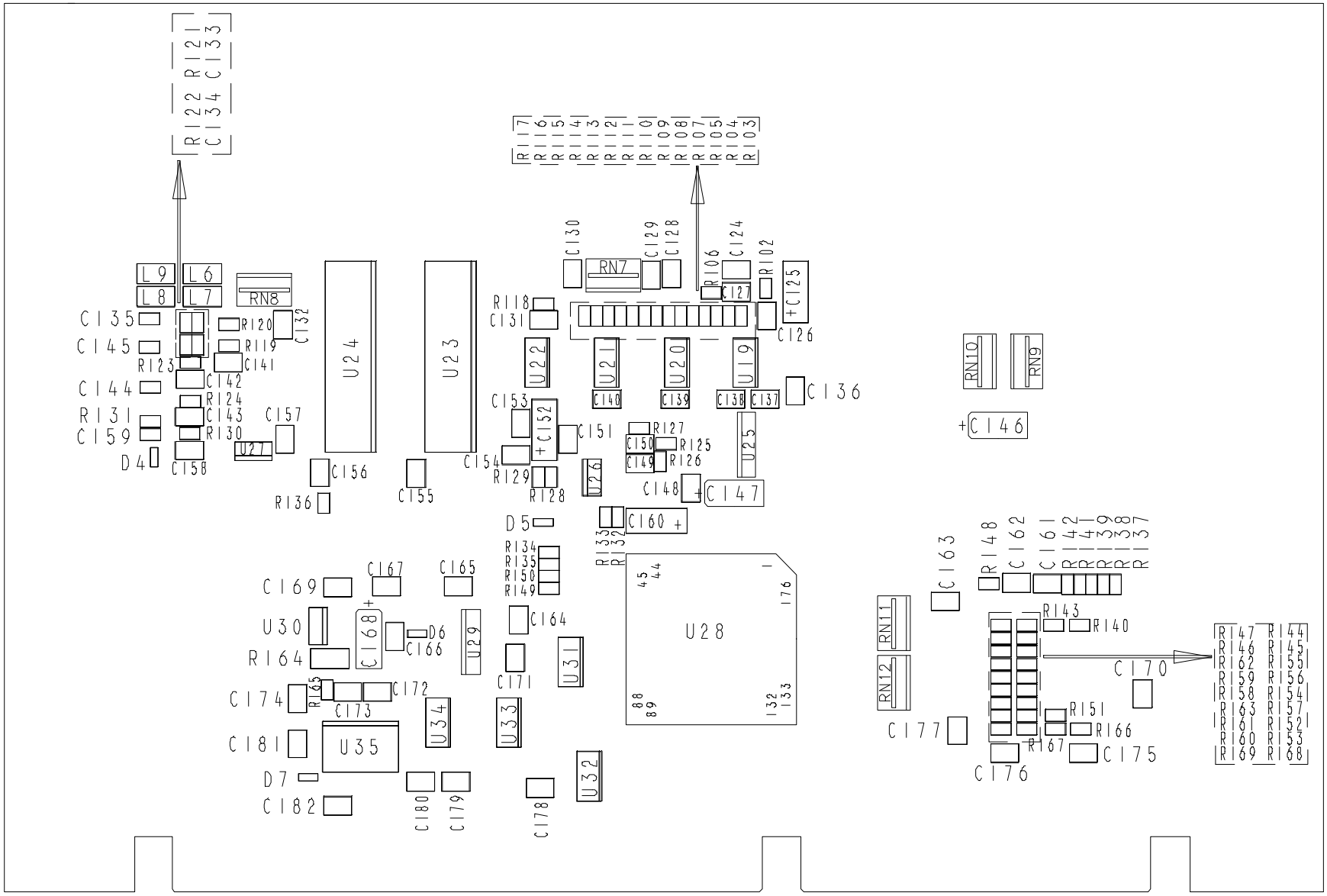


DIAGRAM 2-2: Assembly (Bottom)



2.02 SIMM CONFIGURATION & INSTALLATION

At least 1MB of system memory must be installed on the VIPer808 for proper operation.

Total System Memory can be configured as 1MB, 2MB, 3MB, 4MB, 8MB, 12MB, 16MB, 32MB, 48MB, 64MB or 128MB using 36-bit SIMM devices.

There are two SIMM (Single In-line Memory Module) sockets; these can accept the following 36-bit modules:

- 256K x 36-bit = 1MB module,
- 512K x 36-bit = 2MB module,
- 1M x 36-bit = 4MB module,
- 2M x 36-bit = 8MB module,
- 4M x 36-bit = 16MB module, and
- 8M x 36-bit = 32MB module.

Note: The VIPer808 board, will also support a total of 128MB of System Memory when 64MB modules will be available.

Consult the table on the following page to see which SIMM configurations are available on the VIPer808.

DRAM devices with page mode at 70ns maximum access time is recommended. Please refer to Appendix E for a list of recommended devices.

When you are ready to install the SIMMs in the sockets, follow the steps outlined below.

- With the board flat on the table, turn it so that the end of the board with the sockets is near you.
- Hold the module with the notch on the bottom right facing you, and insert the connector into the socket at a 70° angle from the board (pin 1 on the module lines up with pin 1 on the socket).
- Snap the module forward to a vertical position in the socket. The module is fully inserted when the retaining pegs snap into the holes at each end of the module.

TABLE 2-1: SIMM Configuration

Total System Memory	U11 Socket - Bank 0 / 2 SIMM Module Installed	U10 Socket - Bank 1 / 3 SIMM Module Installed
1MB	1MB (256Kx36)	--
1MB	--	1MB (256Kx36)
2MB	1MB (256Kx36)	1MB (256Kx36)
2MB	2MB (512Kx36)	--
2MB	--	2MB (512Kx36)
3MB	1MB (256Kx36)	2MB (512Kx36)
3MB	2MB (512Kx36)	1MB (256Kx36)
4MB	2MB (512Kx36)	2MB (512Kx36)
4MB	4MB (1Mx36)	--
4MB	--	4MB (1Mx36)
8MB	4MB (1Mx36)	4MB (1Mx36)
8MB	8MB (2Mx36)	--
8MB	--	8MB (2Mx36)
12MB	4MB (1Mx36)	8MB (2Mx36)
12MB	8MB (2Mx36)	4MB (1Mx36)
16MB	8MB (2Mx36)	8MB (2Mx36)
16MB	16MB (4Mx36)	--
16MB	--	16MB (4Mx36)
32MB	16MB (4Mx36)	16MB (4Mx36)
32MB	32MB (8Mx36)	--
32MB	--	32MB (8Mx36)
48MB	16MB (4Mx36)	32MB (8Mx36)
48MB	32MB (8Mx36)	16MB (4Mx36)
64MB	32MB (8Mx36)	32MB (8Mx36)
64MB	64MB (16Mx36)	--
64MB	--	64MB (16Mx36)
128MB	64MB (16Mx36)	64MB (16Mx36)

SECTION 3
SETTING JUMPERS

This Section describes how to configure hardware options by setting jumper switches on the VIPer board.

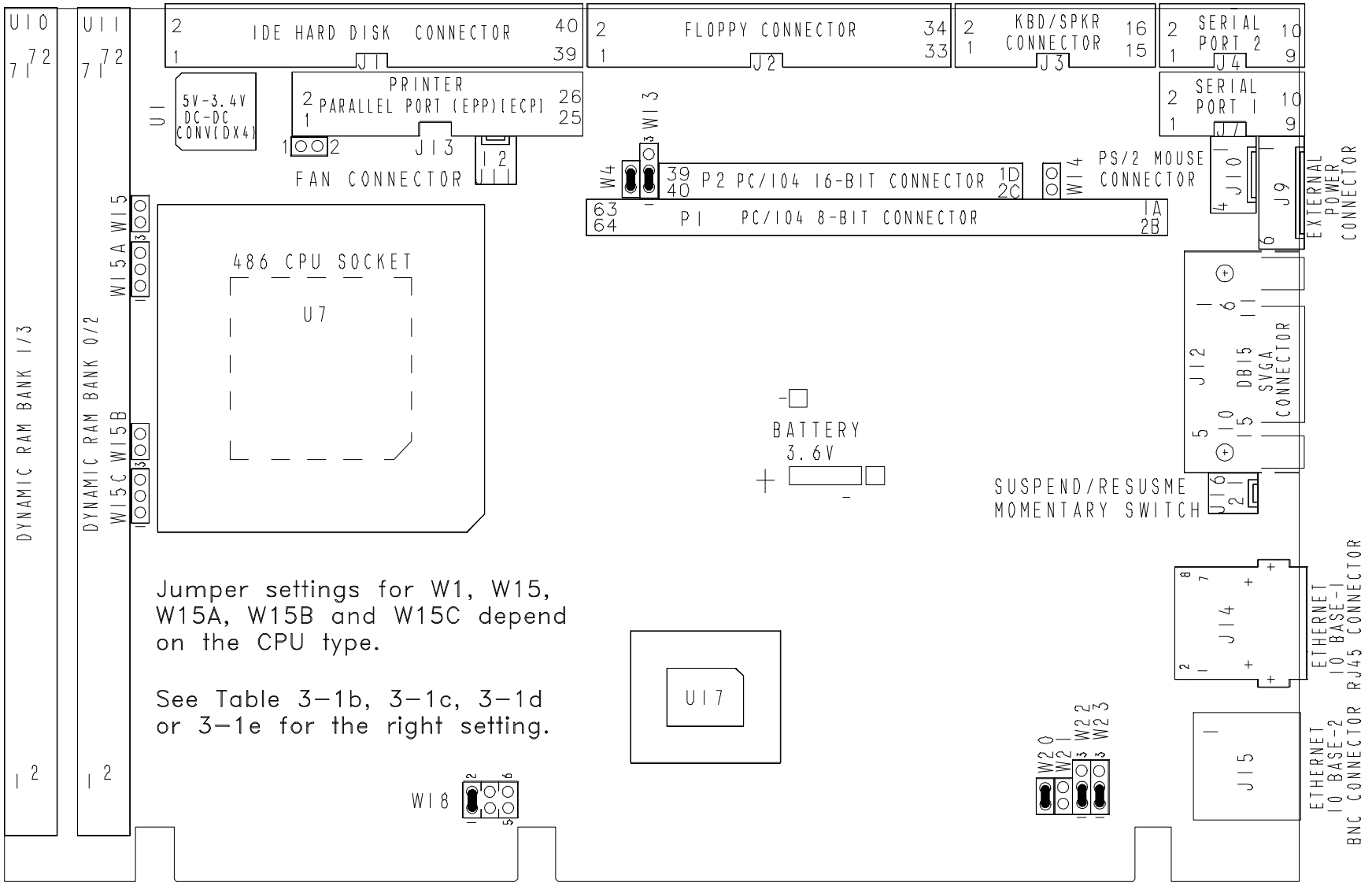
3.01 TERMINOLOGY

Jumper switches are small pins that you can set by using jumper caps. Two pins can be joined by a jumper cap, thereby closing or shorting a circuit. So you **short** (or close) a jumper by placing a plastic jumper cap over two pins of the jumper switch, and you **open** a jumper switch by removing a jumper cap.

3.02 JUMPER LOCATIONS ON THE BOARD

Diagram 3-1 on the next page shows 13 jumpers. These appear as rectangular boxes containing small circles which represent the pins. The jumpers are labeled on the board as well. When there are more than two pins in a jumper, then some of the pins are also numbered on the diagram and on the board, so that it will be possible to locate each pin and its number.

DIAGRAM 3-1: VIPer808 Jumper Locations with Default Settings



3.03 JUMPER SETTINGS

Table 3-1a to 3-1f on the following pages 3-6 to 3-11 show the jumper settings.

TABLE 3-1a: Jumper Settings: W1, W4, W13, W14

NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W1	CPU Power	 5V  3.3V **WARNING:** **Incorrect CPU voltage can damage your CPU!.**
W4	VGA Enable	 Enable Onboard VGA Controller *  Disable Onboard VGA Controller
W13	VGA Ready / Local Ready Select	 Ready *  Local Ready
W14	IOCHRDY Signal to IDE Interface	 Enabled  Disabled *

TABLE 3-1b: AMD DX2-DX4 CPU Jumper Settings: W1, W15-W15C

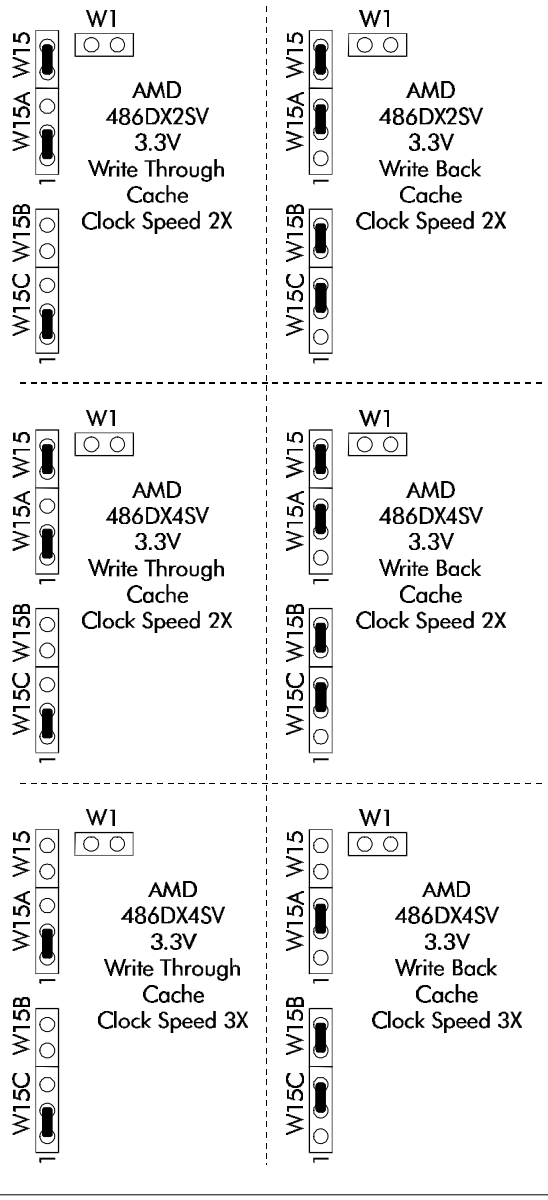
NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W1 W15 W15A W15B W15C	CPU Type AMD	

TABLE 3-1c: AMD 5x86 CPU Jumper Settings: W1, W15-W15C

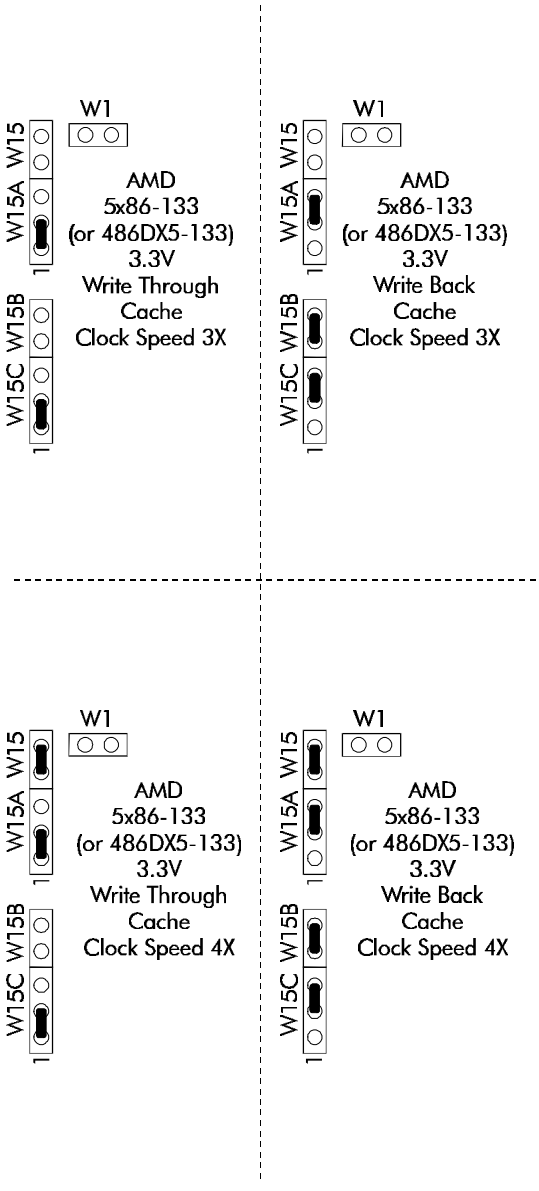
NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W1 W15 W15A W15B W15C	CPU Type AMD (continued)	

TABLE 3-1d: Intel CPU Jumper Settings: W1, W15-W15C

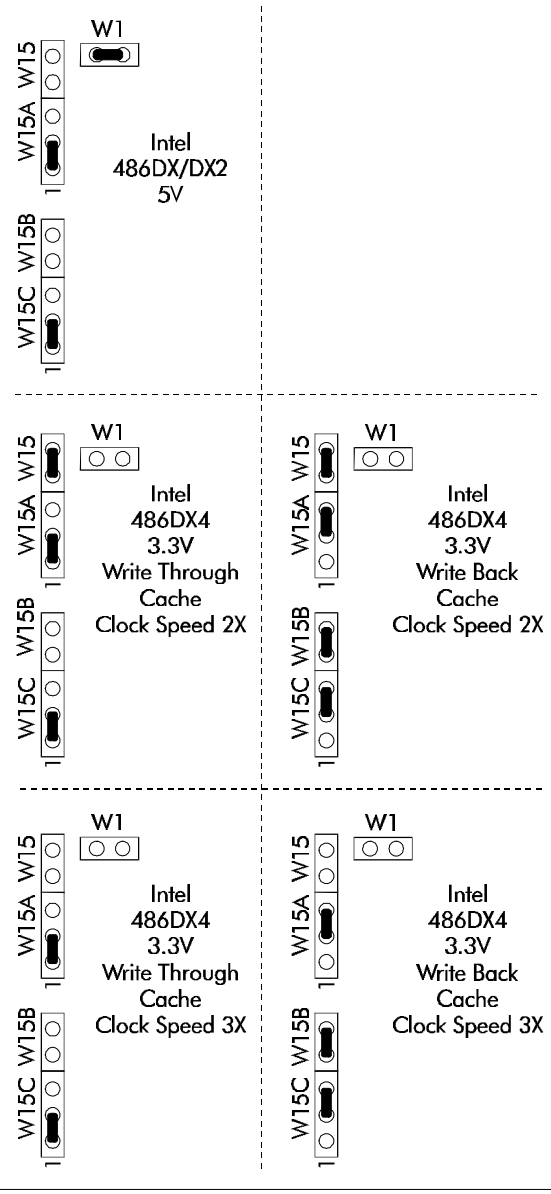
NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W1 W15 W15A W15B W15C	CPU Type Intel	

TABLE 3-1e: SGS CPU Jumper Settings: W1, W15-W15C

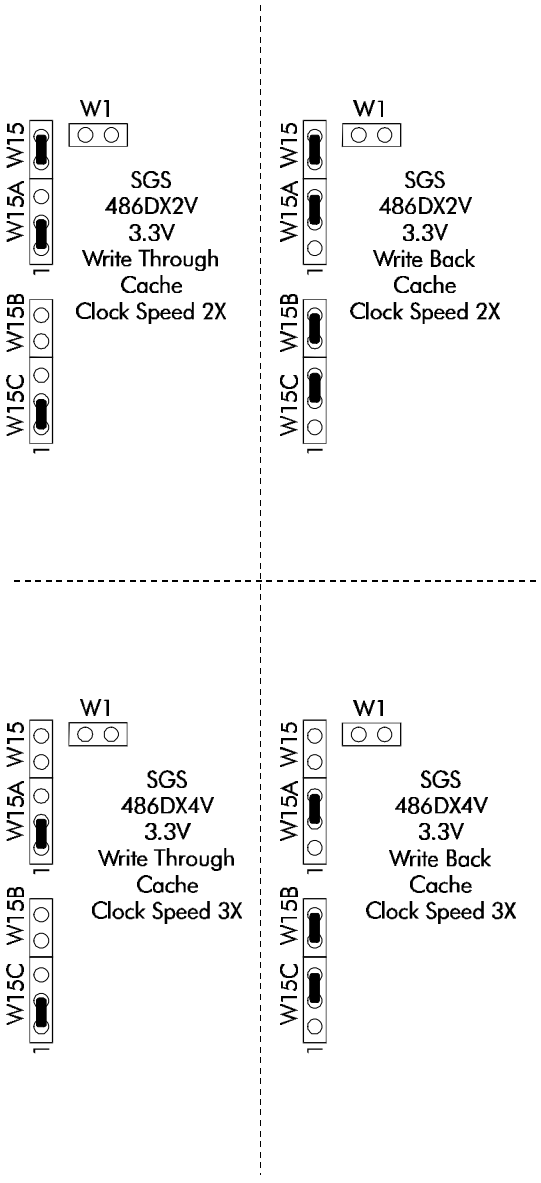
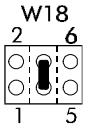
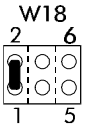
NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W1 W15 W15A W15B W15C	CPU Type SGS	

TABLE 3-1f: Jumper Settings: W18, W20-W23

NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W18	External CPU Bus Speed	 25MHz  33MHz*
W20	Watchdog Timer	 Enabled *  Disabled
W21	Non Maskable Interrupt on Power Fail Output	 Enabled  Disabled *
W22	Battery Selection	 Internal Battery *  External Battery
W23	Power Fail Detection Source	 External Power Fail Input to Pin 6 of J9 *  Internal/external battery when less than 3 volts

SECTION 4
INSTALLING & WORKING WITH SYSTEM COMPONENTS

4.01 MICROPROCESSOR & FAN

4.01.1 MICROPROCESSOR

The VIPer808 supports the following microprocessors (maximum internal CPU clock speed and CPU voltage are indicated):

- AMD 486DX2SV running at 66 MHz (3.3V);
- AMD 486DX4SV running at 100 MHz (3.3V);
- AMD 5x86 running at 133 MHz (3.3V) .
  This processor is also referred to a 486DX5;
- Intel 486DX running at 33 MHz (5V);
- Intel 486DX2 running at 66 MHz (5V);
- Intel 486DX4 running at 100 MHz (3.3V);
- SGS 486DX2V running at 66 MHz (3.3V);
- SGS 486DX4V running at 100 MHz (3.3V).

The Math Co-processor is internal to the CPU (Central Processing Unit).

The above processors also have Internal Cache Memory available.

The following jumpers are related to the CPU:

- W1: Selects the voltage for powering CPU:
  - Shorted: 5V,
  - Or open: 3.3V.

  WARNING: Incorrect CPU voltage can damage your CPU!
- W18: Selects the desired external CPU bus speed:
  - W18 pins 3 and 4 shorted: 25MHz,
  - Or W18 pins 1 and 2 shorted: 33MHz.
- W15A, W15B and W15C: These jumpers are used in conjunction with W15 to select CPU Type. See Jumper Settings tables in Section 3 for supported types and their settings.

- W15: Selects the desired multiplier to set the internal CPU clock speed (2, 3 or 4 times the external bus speed):
  - Shorted: 2X (or 4X for AMD 5x86-133 only),
  - Or open: 3X.

For DX microprocessors, external bus speed is set to the maximum CPU internal clock speed or less.

For DX2 microprocessors, external bus speed is set to half the maximum CPU internal clock speed or less.

For DX4 microprocessors, external bus speed is set to one third the maximum CPU internal clock speed or less.

For 5x86 microprocessors, external bus speed is set to one fourth the maximum CPU internal clock speed or less.

Jumper locations and settings appear in Section 3 of this manual.

4.01.2 CPU FAN

You must use a 5V CPU fan on the VIPer808. Pin 1 of the fan connector at J11 is supplied with 5V (not 12V). A 5V CPU fan assembly (including cables) is available from TEKNOR.

IMPORTANT: Use a 5V CPU fan on the VIPer808.

4.02 CONFIGURING CACHE

The microprocessors have Internal Cache Memory available for faster execution of applications.

Cache copies the most recently accessed data and places it in its fast Internal Cache Memory. The CPU can then access this data at a very high speed. Since most program executions are sequential and repetitive, the likelihood is great that the CPU will find data already stored in Cache.

When the CPU retrieves data from Cache, a **Cache hit** occurs. On the other hand, when the CPU must access data from System Memory, a **Cache miss** occurs .

Internal Cache Memory is enabled or disabled in the Advanced Setup screen of the AMIBIOS Setup program. To run the AMIBIOS Setup program, boot-up your computer and hit the DELETE key before or when the message - "Hit <DEL> if you want to run SETUP" - appears near the top of the screen. Set the Internal Cache option in the Advanced Setup screen to Enabled or Disabled.

Internal Cache Memory is configured as Write Through or Write Back with VIPer808 jumpers. The jumper settings for various CPUs appear on pages 3-7 to 3-10.

4.03 SYSTEM CONTROLLER OVERVIEW

The PicoPower (Cirrus Logic subsidiary) PT86C768/PT86C718 System Controller used on the VIPer808 board is a two-chip solution packaged in 176-pin VQFP's. This chipset contains power management features making it ideal for designing energy efficient computer systems and high performance applications.

The System Controller was designed to support 32-bit 486 CPUs, capitalizing on the unique features found in the SL-Enhanced series. It incorporates PicoPower's Power On Demand™ technology, providing unsurpassed power management features (explained in section 8).

The System Controller also includes features like a high performance DRAM Controller, Clock and Reset Interface, a Local Bus IDE Drive Interface for high performance disk subsystem, and integrated 82C206 functions.

The System Controller is 100% IBM PC/AT compatible. It includes three 8254 Counter/Timers, two 8237 DMA Controllers and two 8259 Interrupt Controllers.

4.03.1 DMA CONTROLLERS

The VIPer808 supports seven Direct Memory Access (DMA) channels. The parallel port's ECP mode can be configured to use Channel 1 or 3. Channel 2 is reserved for the Floppy controller. Channel 4 is used to cascade Channels 0 through 7 to the microprocessor. Channel 5 is available for the Ethernet port. Note that with Plug and Play, DMA channels for I/O devices and the Ethernet can be modified via software per system requirements.

TABLE 4-1: 8237 DMA Controllers

DMA 0	Available
DMA 1	Available (ECP)
DMA 2	Floppy controller
DMA 3	Available (ECP)
DMA 4	Cascade controller # 1
DMA 5	Available (Ethernet)
DMA 6	Available
DMA 7	Available

4.03.2 INTERRUPT CONTROLLERS

Two 8259 interrupt controllers handle the interrupts on the VIPer808. Six interrupt lines are directly linked to the keyboard controller, timer, the real-time clock, both serial ports and the parallel port. Note that with Plug and Play, interrupt lines for I/O devices and the Ethernet can be modified via software per system requirements.

TABLE 4-2: 8259 Interrupt Controllers

CONTROLLER # 1		CONTROLLER # 2	
IRQ 0	Timer 0	IRQ 8	Real-time clock
IRQ 1	Keyboard	IRQ 9	Available (Ethernet)
IRQ 2	Cascade controller # 2	IRQ 10	Available
IRQ 3	COM 2*	IRQ 11	Available
IRQ 4	COM 1*	IRQ 12	PS/2 Mouse
IRQ 5	Available (LPT2)*	IRQ 13	Coprocessor
IRQ 6	Floppy controller*	IRQ 14	IDE*
IRQ 7	LPT 1*	IRQ 15	Available

* All functions marked with an asterisk (*) can be disabled or reconfigured.

4.03.3 COUNTER/TIMERS

There are three independent 16-bit 8254 Counter/Timers: Counter/Timer 0 is tied to Interrupt 0, Counter/Timer 1 is used to generate the refresh with DMA Channel 0, and Counter/Timer 2 is used for the Speaker Port.

4.04 MULTI-FUNCTION CONNECTOR (KEYBOARD, SPEAKER, RESET & LED)

Connector J3 on the VIPer provides all the necessary signals for connecting the keyboard, speaker, reset, and keylock interface devices. The following diagram shows the signal connections at J3 (referred to as the Keyboard / Speaker Connector):

TABLE 4-3: Keyboard / Speaker Connector (J3)

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
KBCLK	I/O	1		2	-	GND
KBDATA	I/O	3		4	-	GND
VCC (+5V)	-	5		6	-	VCC (+5V)
SPKR	O	7		8	-	VCC (+5V)
KBDINH	I	9		10	-	GND
Not Connected	-	11		12	-	GND
PBRES*	I	13		14	-	GND
HDD ACTIVE	O	15		16	-	VCC (+5V)

* Active low signal

The following functions are available on the connector:

- Speaker: An 8 ohm speaker can be directly connected to pins 7 and 8 of J3. All necessary drivers are on the VIPer.
- Keyboard Disable: The keyboard can be disabled or locked up by shorting pins 9 and 10 of J3.
- Hard Disk LED: The onboard IDE interface activates an external LED. The LED must be connected anode on pin 16 (J3) and cathode on pin 15 (J3). No external current limiting resistor is required since one is already present on the VIPer.
- Reset: The VIPer can be reset by shorting pins 13 and 14 of J3.

4.05 PC/104 EXPANSION CARDS

The VIPer808 was designed with provisions for PC/104 connectors, which are available as an option. PC/104 offers full architecture, hardware and software compatibility with PC Bus, in ultra-compact stackable modules (3.6" x 3.8"). PC/104 is being advanced as a proposed Appendix to the IEEE-P996 draft specification. Products compatible with the PC/104 are already offered by over 70 companies.

If you require additional information on the PC/104 standard, please contact our Technical Support department.

4.06 PS/2 MOUSE

The board supports a mouse, through the PS/2 connector at J10. With the PS/2 Mouse Cable (available from TEKNOR), this feature is compatible with the standard IBM PS/2 mouse. The cable may be ordered by contacting our Sales department.

During installation of the mouse, you must install the driver provided by the mouse manufacturer.

To enable the mouse, set the Mouse Support option to Enabled in the Advanced Setup screen of the AMIBIOS Setup program.

SECTION 5
INSTALLING PERIPHERALS (PARALLEL/SERIAL/ETHERNET)

5.01 PARALLEL PORT

5.01.1 MODES

The parallel port is a multi-mode parallel port supporting the following modes:

- Standard Parallel Port (SPP): This mode is IBM XT/AT compatible and PS/2 compatible (bi-directional);
- Enhanced Parallel Port (EPP);
- Extended Capabilities Port (ECP).

5.01.2 CONNECTOR

The parallel port connector (J13) is a male 26-pin header located at the top left side of the board.

The following table shows the pinout for this connector, when it is in Standard mode:

TABLE 5-1: Printer Parallel Port (J13) - Standard Mode

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
STROBE*	O	1		2	O	AUTOFD*
D0	I/O	3		4	I	ERROR*
D1	I/O	5		6	O	INIT*
D2	I/O	7		8	O	SELECTIN*
D3	I/O	9		10	-	GND
D4	I/O	11		12	-	GND
D5	I/O	13		14	-	GND
D6	I/O	15		16	-	GND
D7	I/O	17		18	-	GND
ACK*	I	19		20	-	GND
BUSY	I	21		22	-	GND
PE	I	23		24	-	GND
SELECT	I	25		26	-	GND

* Active low signal

The following table shows the pinout for this connector, when it is in EPP mode:

TABLE 5-2: Printer Parallel Port (J13) - EPP Mode

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
WRITE*	O	1		2	O	DATASTB*
D0	I/O	3		4	-	Not Used
D1	I/O	5		6	-	Not Used
D2	I/O	7		8	O	ADDRSTRB*
D3	I/O	9		10	-	GND
D4	I/O	11		12	-	GND
D5	I/O	13		14	-	GND
D6	I/O	15		16	-	GND
D7	I/O	17		18	-	GND
INTR	I	19		20	-	GND
WAIT*	I	21		22	-	GND
Not Used	-	23		24	-	GND
Not Used	-	25		26	-	GND

* Active low signal

The following table shows the pinout for this connecter, when it is in ECP mode:

TABLE 5-3: Printer Parallel Port (J13) - ECP Mode

Pin Number	Signal Flow			Pin Number	Signal Flow	
Signal						Signal
STROBE*	O	1		2	O	AUTOFD*, HOSTACK[3]
D0	I/O	3		4	I	FAULT*[1], PERIPHRQST*[3]
D1	I/O	5		6	O	INIT*[1], REVERSERQST*[3]
D2	I/O	7		8	O	SELECTIN*[1,3]
D3	I/O	9		10	-	GND
D4	I/O	11		12	-	GND
D5	I/O	13		14	-	GND
D6	I/O	15		16	-	GND
D7	I/O	17		18	-	GND
ACK*	I	19		20	-	GND
BUSY, PERIPHACK[3]	I	21		22	-	GND
PERROR, ACKREVERSE[3]	I	23		24	-	GND
SELECT	I	25		26	-	GND

* Active low signal
[1] Compatible Mode
[2] High Speed Mode

Note: For more information on the ECP protocol, please refer to the Extended Capabilities Port Protocol and ISA Interface Standard (available from Microsoft Corporation) or contact our Technical Support department.

5.01.3 AMIBIOS SETUP

Follow these steps, from the AMIBIOS Setup program's main menu:

- From the Setup window, select the Peripheral icon.
- In the Peripheral Setup screen, these options may be set: ONBOARD PARALLEL PORT, PARALLEL PORT IRQ, PARALLEL PORT MODE and PARALLEL PORT DMA CHANNEL.

For more detail, refer to section 9.01 - AMIBIOS SETUP PROGRAM.

5.02 SERIAL PORTS

There are two 16550 compatible serial ports. These have internal 16-byte FIFO buffers for more efficient data transfers.

5.02.1 CONNECTORS

Serial Port 1 (J7) RS-232

The Serial Port 1 is configured as RS-232, and is 100% compatible to the IBM-AT serial port, with the use of the IBM 9-pin DSUB Standard. The following tables show their pinouts:

TABLE 5-4a: Serial Port 1 (J7) RS-232

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
DCD	I	1		2	I	DSR
RX	I	3		4	O	RTS
TX	O	5		6	I	CTS
DTR	O	7		8	I	RI
GND	-	9		10	-	Not Connected

TABLE 5-4b: IBM 9-Pin DSUB Standard

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
DCD	I	1		2	I	RX
TX	I	3		4	O	DTR
GND	-	5		6	I	DSR
RTS	O	7		8	I	CTS
RI	I	9				

TEKNOR offers a 10-pin header to 9-pin DSUB cable for IBM-AT compatibility. This can be purchased from TEKNOR or a cable can be made with a flat cable, a 10-pin flat cable crimp header and a 9-pin DSUB flat cable crimp connector. The use of Taïwanese adapter cables is not recommended, since the pinout is often incorrect. The direct crimp design offered by TEKNOR allows the simplest cable assembly. All these cables are available from TEKNOR by contacting the Sales department.

Serial Port 2 (J4) RS-232

The Serial Port 2 is configured as RS-232, and is 100% compatible to the IBM-AT serial port, with the use of the IBM 9-pin DSUB Standard. The following tables show their pinouts:

TABLE 5-5a: Serial Port 2 (J4) RS-232

Pin Number	Signal Flow			Pin Number	Signal Flow	
Signal						Signal
DCD	I	1		2	I	DSR
RX	I	3		4	O	RTS
TX	O	5		6	I	CTS
DTR	O	7		8	I	RI
GND	-	9		10	-	Not Connected

TABLE 5-5b: IBM 9-Pin DSUB Standard

Pin Number	Signal Flow			Pin Number	Signal Flow	
Signal						Signal
DCD	I	1		2	I	RX
TX	I	3		4	O	DTR
GND	-	5		6	I	DSR
RTS	O	7		8	I	CTS
RI	I	9				

TEKNOR offers a 10-pin header to 9-pin DSUB cable for IBM-AT compatibility. This can be purchased from TEKNOR or a cable can be made with a flat cable, a 10-pin flat cable crimp header and a 9-pin DSUB flat cable crimp connector. The use of Taïwanese adapter cables is not recommended, since the pinout is often incorrect. The direct crimp design offered by TEKNOR allows the simplest cable assembly. All these cables are available from TEKNOR by contacting the Sales department.

5.02.2 AMIBIOS SETUP

Follow these steps, from the AMIBIOS Setup program's main menu:

- From the Setup window, select the Peripheral icon.
- In the Peripheral Setup screen, these options may be set: ONBOARD SERIAL PORT 1 and ONBOARD SERIAL PORT 2.

For more detail, refer to section 9.01 - AMIBIOS SETUP PROGRAM.

5.03 ETHERNET PORT

5.03.1 ETHERNET FEATURES

The onboard Ethernet controller and port has these features:

- Supports IEEE 802.3 / ANSI 8802-3 and Ethernet standards.
- Individual 136-byte transmit and 128-byte receive FIFOs optimize system overhead, providing sufficient latency during packet transmission and reception, and minimizing intervention during normal network error recovery.
- Supports Microsoft's Plug and Play System configuration for jumperless designs. Information stored in the serial EEPROM is used to identify the card and to describe the system resources required by the Plug and Play card, such as I/O space, Memory space, IRQs and DMA channels. This information is stored in a standardized read only format.

5.03.2 SETTING UP ETHERNET

Cabling

The VIPer808 is configured with either the Ethernet 10 Base-T or 10 Base-2 interface. The 10 Base-T interface uses UTP (Unshielded Twisted Pair) cables, category 5,4 or 3 (5 is better). The 10 Base-2 interface uses Thin Ethernet coaxial cables (RG-58). The impedance is 50 ohms.

Configuration

The Ethernet controller on the VIPer808 is Plug and Play, therefore no manual configuration is normally required. A diskette entitled “Network Drivers for AM79C961” is included with the Ethernet option. This diskette contains several operating system network drivers. You must refer to the READ_NET.TXT (ASCII) or READ_NET.DOC (WORD 6.0) file, also on the diskette, for instructions on installing the drivers.

Once the proper Ethernet driver is installed, the onboard Plug and Play BIOS and the driver automatically allocates resources - I/O addresses, IRQ and DMA channels - to the Ethernet device.

In some cases, it might be absolutely necessary to manually configure the Ethernet Controller. This is the case when several ISA cards (non Plug and Play) use resources that might be allocated to the Ethernet controller. A special utility called the PCNETCFG.EXE was designed for such situations; it will allow you to manually configure the Ethernet controller.

For the PCNETCFG.EXE utility, other operating system drivers and installation instructions, or for more information, contact TEKNOR’s Technical Support department.

5.03. 3 CONNECTORS

The pinout for the 10 Base-T connector appears in Table 5-7.

TABLE 5-6: Ethernet 10 Base-T RJ45 Connector (J14) - Pinout

Pin Number	Signal Flow			Pin Number	Signal Flow	
Signal						Signal
TXD+	O	1		5	-	Not Connected
TXD-	O	2		6	I	RXD-
RXD+	I	3		7	-	Not Connected
Not Connected	-	4		8	-	Not Connected

The Ethernet 10 Base-2 Connector (J15) is a standard BNC connector.

SECTION 6
INSTALLING IDE & FLOPPY DEVICES

6.01 INSTALLING IDE DEVICES

6.01.1 TYPE OF HARD DISK SUPPORTED

The VIPer808 supports AT Integrated Disk Drives. The AT embedded drive architecture incorporates drive electronics and controller circuitry on a single printed circuit board which is mounted directly to the disk drive chassis.

The integration of drive and controller functions increases reliability and performance by eliminating redundant circuitry, thus providing increased performance at reduced cost.

6.01.2 IDE CONNECTOR PINOUT

TABLE 6-1: IDE Hard Disk Connector (J1) - Pinout

Pin Number	Signal Flow	Signal	Pin Number	Signal Flow	Signal
1	I	RESET*	2	-	GND
3	I/O	HD7	4	I/O	HD8
5	I/O	HD6	6	I/O	HD9
7	I/O	HD5	8	I/O	HD10
9	I/O	HD4	10	I/O	HD11
11	I/O	HD3	12	I/O	HD12
13	I/O	HD2	14	I/O	HD13
15	I/O	HD1	16	I/O	HD14
17	I/O	HD0	18	I/O	HD15
19	-	GND	20	-	Not Connected
21	-	Not Connected	22	-	GND
23	I	IOW*	24	-	GND
25	I	IOR*	26	-	GND
27	O	IOCHRDY	28	I	BALE
29	-	Not Connected	30	-	GND
31	O	IRQ14	32	O	IOCS16*
33	I	SA1	34	-	Not Connected
35	I	SA0	36	I	SA2
37	I	CS0*	38	I	CS1*
39	O	ACTIVE*	40	-	GND

* Active low signal

6.01.3 IDE HOOK-UP

For the hook-up, a 40-pin dual row header signal connector is required. This connector handles all command, data and status I/O lines. Its recommended maximum cable length is 18-24 inches. It connects directly with the onboard 40-pin male header connector at J1.

The drive itself can be mounted in any horizontal or vertical plane.

For a list of recommended devices and connectors, see Appendix E - RECOMMENDED DEVICES & MATING CONNECTORS.

6.01.4 IDE JUMPER

IDE Controller jumper and its setting appears below:

- W14 IOCHRDY signal to IDE interface:
  - Shorted: Enabled.
  - Or open: Disabled: This is the initial setting.

For location and setting of jumper, refer to Section 3 of this manual.

6.01.5 IDE SOFTWARE SETUPS

AMIBIOS Setup

Follow these steps, from the AMIBIOS Setup program's main menu:

- From the Setup window, select the Standard icon.
- From the Standard Setup screen, select the appropriate hard disk drive icon.
- For each hard disk, these options can be defined: TYPE, LBA/LARGE MODE, BLOCK MODE, 32BIT MODE and PIO MODE. TYPE and PIO MODE can be Auto detected if the hard disk drive is an IDE drive: the Auto option automatically finds all of the IDE drive parameters for that hard disk. You should check your hard disk data sheets to know if any of the other options - LBA/LARGE MODE, BLOCK MODE and 32BIT MODE - should be set to ON; if your hard disk supports these modes, enabling them will optimize your system.
- Return to the main menu, and select the Chipset icon from the Setup window.
- From the Chipset Setup screen, you can set these options: TURBO IDE FUNCTION, ONBOARD IDE COMMAND WIDTH and ONBOARD IDE BACK TO BACK DELAY.
- Return to the main menu, and select the Peripheral icon from the Setup window.
- In the Peripheral Setup screen, the ONBOARD IDE option may be set to Primary, Secondary or Disabled.

For more detail, refer to section 9.01 - AMIBIOS SETUP PROGRAM.

6.02 INSTALLING FLOPPY DEVICES

6.02.1 TYPES OF FLOPPY DEVICES SUPPORTED

The floppy disk controller is IBM PC XT/AT compatible (single and double density) and supports Enhanced Floppy Mode (2.88MB). It handles 3.5 inch and 5.25 inch, low and high density drives. Up to two drives can be supported in any combination.

6.02.2 FLOPPY CONNECTOR

TABLE 6-2: Floppy Connector (J2) - Pinout

Pin Number	Signal Flow	Signal	Pin Number	Signal Flow	Signal
1	-	GND	2	O	DRV DENS.SEL.0*
3	-	GND	4	-	Not Connected
5	-	GND	6	-	Not Connected
7	-	GND	8	I	INDEX*
9	-	GND	10	O	MOTOR ON 0*
11	-	GND	12	O	DRIVE SELECT B*
13	-	GND	14	O	DRIVE SELECT A*
15	-	GND	16	O	MOTOR ON 1*
17	-	Not Connected	18	O	DIR CONTROL*
19	-	GND	20	O	STEP*
21	-	GND	22	O	WRITE DATA*
23	-	GND	24	O	WRITE ENABLE*
25	-	GND	26	I	TRACK0*
27	-	Not Connected	28	I	WRITE PROTECT*
29	-	Not Connected	30	I	READ DATA*
31	-	GND	32	O	HEAD SELECT*
33	-	Not Connected	34	I	DSKCHG*

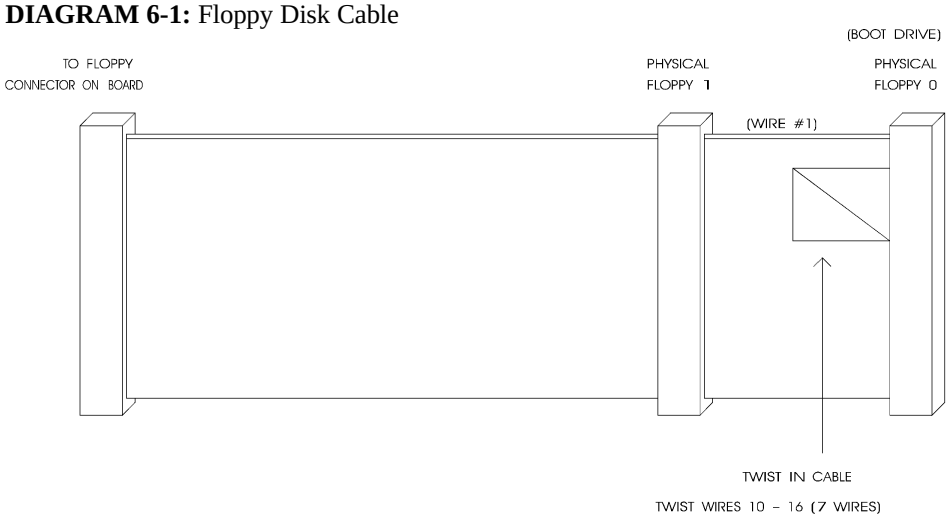
* Active low signal

6.02.3 FLOPPY HOOK-UP

Mechanical Floppy Disk Installation:

The installation of the floppy drives is done via a standard IBM 34-pin flat ribbon cable that connects to J2.

DIAGRAM 6-1: Floppy Disk Cable



Enhanced Floppy Mode:

In order to connect your 2.88MB floppy drive, simply indicate the proper floppy disk drive in the AMIBIOS Setup program (Section 9).

6.02.4 FLOPPY AMIBIOS SETUP

Follow these steps, from the AMIBIOS Setup program's main menu:

- From the Setup window, select the Standard icon.
- From the Standard Setup screen, select the Floppy A icon (or the Floppy B icon).
- The settings are 360KB 5¼ inch, 1.2MB 5¼ inch, 720KB 3½ inch, 1.44MB 3½ inch, or 2.88MB 3½ inch.
- Return to the main menu, and select the Peripheral icon from the Setup window.
- In the Peripheral Setup screen, the ONBOARD FDC option may be set to Auto, Enabled (enable Floppy Drive Controller) or Disabled.

For more detail, refer to section 9.01 - AMIBIOS SETUP PROGRAM.

SECTION 7
INSTALLING VIDEO

The VIPer808 video system includes a local bus CRT video controller and 1MB of video memory (optional 512KB).

7.01 CRT SVGA CONTROLLER

The VIPer808's CRT Super VGA controller is a single-chip video controller from Cirrus Logic® (CL-GD5429). It is fully compatible with the IBM™ VGA standard at the hardware and BIOS level.

7.01.1 CRT SUPPORT

The video controller supports both monochrome and color VGA/SVGA displays with resolution of up to 1280 x 1024 (256 colors). However, since the video controller outputs only analog signals for CRT display, it will not drive TTL level signals. This means it does not function with CGA, EGA and Hercules monitors.

7.01.2 DISABLING VIDEO

The video controller can be disabled by removing the W4 jumper. See Section 3 for jumper location and settings.

This feature is useful when an external video card is required for testing or other purposes.

7.02 CONNECTING CRT VIDEO DISPLAY

Connecting CRT video to the VIPer808 is simple. Merely connect the standard VGA DB15 male connector to the board's J12 high density, right angle, female connector. See Diagram 7-1 on the following page for the location of J12.

7.02.1 SVGA CONNECTOR (J12)

The VGA connector's pinout appears in Table 7-1.

TABLE 7-1: SVGA Connector (J12) - Pinout

Pin Number	Signal	Pin Number	Signal	Pin Number	Signal
1	RED	6	GND	11	Not Connected
2	GREEN	7	GND	12	Not Connected
3	BLUE	8	GND	13	HSYNC
4	Not Connected	9	Not Connected	14	VSYNC
5	GND	10	GND	15	Not Connected

SECTION 8
POWER MANAGEMENT

8.01 POWER SUPPLY SOURCE

The VIPer808 is powered from one of two sources:

- Power connector (J9): Stand-alone systems are powered from an outside power supply through the J9 connector.
- ISA (AT) bus: When the board is in a passive backplane system, it is powered through the ISA bus.

The pinout for the J9 power connector is shown in the table below:

TABLE 8-1: External Power Connector (J9) - Pinout

Pin Number	**Signal**
1	VCC (+5V)
2	GND
3	GND
4	+12V
5	-12V
6	PD (Power Fail Detection Input)

8.02 POWER MANAGEMENT MODES

The VIPer808 supports a very flexible and powerful power management scheme. The System Controller provides progressively higher levels of power conservation whenever the system is idle through the following special power saving modes: Doze Mode, Sleep Mode and Suspend Mode (power management test results are given in Table A-2 on page A-2). These modes are fully programmable through the AMIBIOS Setup Program.

The CPU power consumption is reduced through the STOPCLOCK protocol, which is used to shut down the CPU's internal clock during the various power management modes. In general, each progressive level of power management is entered when inactivity is detected by the System Controller which monitors activity from the Keyboard, Video, Serial and Parallel I/O, and the Hard and Floppy Drives.

The timeouts which are used to enter into Doze Mode, then Sleep Mode, and finally Suspend Mode, are programmable via the AMIBIOS Power Management Setup screen. Each mode is described below.

8.02.1 DOZE MODE

The Doze Mode is the System Controller's first level of power conservation. During Doze Mode, the display and hard drive will remain active. In fact, this mode is transparent to the user. Exit from Doze Mode is by a keypress or a serial port interrupt (e.g., mouse movement). Exit from Doze Mode is immediate.

8.02.2 SLEEP MODE

The Sleep Mode is the System Controller's second level of power conservation. During Sleep Mode, the display becomes inactive and the hard drive motor is stopped. Exit from Sleep Mode is by a keypress or a serial port interrupt (e.g., mouse movement). Exit from Sleep Mode takes approximately 5 seconds.

8.02.3 SUSPEND MODE

The Suspend Mode is the System Controller's third and deepest level of power conservation. During Suspend Mode, the display and the hard drive motor remain inactive. Exit from Suspend Mode is via a contact closure on the J16 Suspend / Resume Momentary Switch Connector (see Diagram 7-1) or via the RING signal from an external modem. Thus, if Suspend Mode is to be used, a Normally Open momentary switch should be connected to this connector. Exit from Suspend Mode takes approximately 7 seconds.

8.03 RESET CIRCUIT

8.03.1 EXTERNAL RESET CIRCUIT SWITCH

The VIPer can be reset by activating an external reset switch.

This switch should be connected between pin 13 (PBRES*) and pin 14 (GND) on the Keyboard / Speaker Connector (J3).

This provides an easy and effective way of resetting the system.

See Section 4.04 for more information.

8.03.2 ONBOARD POWER DETECTION

An onboard device, which is part of the reset circuit, constantly monitors the voltage which powers the board. Normally, the board is powered with 5V; if the supply voltage drops below 4.65V (a typical threshold), the onboard circuitry will reset the VIPer board and the system. This reset has the same effect on the system as the reset button.

8.04 POWER FAIL DETECTION CIRCUIT

The Power Failure Detector always monitors:

- The backup battery to warn of a low battery condition, and
- The +5V power supply to detect when it falls below 4.75V.

If either of the two above conditions occur, the PFO (Power Fail Output signal) goes low. In the case of the +5V power supply, a reset will result as explained in the previous section (8.03.2). In the case of the low battery, what happens will depend on the setting of the W21 jumper and user-defined algorithm.

The W21 jumper, when shorted, will generate a NMI (Non Maskable Interrupt), through the IOCHK* line, when the PFO goes low. In turn, this NMI may be serviced by an interrupt handler to locate the source and notify the user or the system.

If the W21 jumper is left open, no NMI is generated, however an algorithm could be used to detect a low battery condition and respond accordingly. An example of such an user-defined program appears below.

```
INDEXREGISTER = 0x24;
DATAREGISTER = 0x26;

boolean Good;
word Data;

outport( INDEXREGISTER , 0x111 );   Set bit 13 Pin Select Register to Low;
Data = inport( DATAREGISTER );      that sets the GPIO1 pin to Enabled.
Data = Data &(~0x2000);             Mask on bit 13.
outport( INDEXREGISTER , 0x111 );
outport( DATAREGISTER , Data );

outport( INDEXREGISTER , 0x007 );   Set bit 15 Gen. Purp.Ctrl Reg. to High;
Data = inport( DATAREGISTER );      that puts the GPIO1 pin in Input.
Data = Data &(~0x2000);             Mask on bit 15.
outport( INDEXREGISTER , 0x007 );
outport( DATAREGISTER , Data );

Read the PF0 signal …

outport( INDEXREGISTER , 0x007 );   Read the GPIO1 signal (Pwr Fail 0utput).
Data = inport( DATAREGISTER );      If Good is True then the battery is OK,
If (Data & 0x200) Good = True;      else the battery voltage is Low.
 else Good = False;
```

The W22 jumper is used to select whether the battery is onboard (1-2) or external (2-3).

The W23 jumper is used to select what voltage is monitored:

- Short pins 1-2 to monitor an external voltage that is present on the power fail input, through pin 6 of the J9 power connector,
- Or short pins 2-3 to monitor the internal/external battery.

There are three ways to set the Power Fail and Battery circuit:

- **Using Internal Battery & Monitoring External Source:**
  Internal Battery (set by W22 jumper with pins 1-2 shorted) and External Power Fail Input to Pin 6 of J9 connector (set by W23 jumper with pins 1-2 shorted).

  The power detection input can only accept DC voltage. The line is monitored via a resistor network made up of a user-defined resistor (R98) and a fixed 1KΩ resistor connected to GND. The junction of these two resistors is connected to the input of the power fail circuit which has its threshold set to 1.25V. R98 can be calculated as follows:

  $$R98 = 1K\Omega \frac{(VI-1.25)}{1.25}$$

  where VI is input voltage on pin 6 of the power connector.

- **Using Internal Battery & Monitoring Internal Battery:**
  Internal Battery (set by W22 jumper with pins 1-2 shorted) and Power fail detect when battery is less than 3V (set by W23 jumper with pins 2- 3 shorted).

  When the internal battery is selected as being the source of the power fail circuit, it is set to trip when the battery goes lower that 3V.

- **Using External Battery & Monitoring External Battery:**
  External Battery (set by W22 jumper with pins 2-3 shorted) and Power fail detect when battery is less than 3V (set by W23 jumper with pins 2-3 shorted).

  When the external battery is selected as being the source of the power fail circuit, it is set to trip when the battery drops below 3V.

This means that when an external battery is used, the voltage needs to be monitored on the battery.

Jumper locations and settings are illustrated in Section 3.

8.05 WATCHDOG TIMER

The Watchdog Timer is extremely useful in embedded systems where human supervision is not required.

Following a reset, the Watchdog is always disabled. If a hardware or software failure occurs such that the Watchdog is not refreshed, a reset pulse is generated by the Watchdog to restart the processor.

Jumper W20 must be installed to permit activation of the Watchdog. If jumper W20 is removed, the Watchdog is disabled.

An user-defined program such as the one appearing below, must also be used in order to enable and refresh the Watchdog.

```
INDEXREGISTER = 0x24;
DATAREGISTER = 0x26;

word Data;

outport( INDEXREGISTER , 0x111 );   Set bit 15 of Select Register to Low;
Data = inport( DATAREGISTER );      that sets the GPIO3 pin to Enabled.
Data = Data &(~0x8000);             Mask on bit 15.
outport( INDEXREGISTER , 0x111 );
outport( DATAREGISTER , Data );


outport( INDEXREGISTER , 0x007 );   Set bit 15 Gen. Purp. Ctrl Reg. to High;
Data = inport( DATAREGISTER );      that puts the GPIO3 pin in Output.
Data = Data | 0x8000;               Mask on bit 15.
outport( INDEXREGISTER , 0x007 );
outport( DATAREGISTER , Data );
```

Every 1.6 second (at least), toggle the bit 11 of the GPIO3 pin.

```
outport( INDEXREGISTER , 0x007 );   Toggle GPIO3 pin for the Watchdog;
Data = inport( DATAREGISTER );      that puts the GPIO3 pin High or Low.
Data = Data ^ 0x800;                Toggle bit 11 with XOR.
outport( INDEXREGISTER , 0x007 );
outport( DATAREGISTER , Data );
```

To disable the Watchdog, just put the bit 15 of the General Purpose Control Register Low.

The default timeout period is 1.6 seconds; however the timeout period can be changed. Shorting C173 and leaving R165 opened changes the timeout to 100 ms. Shorting R165 and installing a capacitor at C173 will change the timeout period according to the following formulae:

Timeout (milliseconds) = (400/47pF) * C

or

C173 = (Timeout (milliseconds) * 47pF) / 400ms

For instance, an external capacity of 100pF will lengthen the timeout to 851ms and a 1000pF will bring it to 8.5 seconds.

SECTION 9
VIPer SOFTWARE SETUP

The VIPer808 is fully software configurable. The setup program allows for minimal hardware configuration.

The AMIBIOS Setup program which is used to change operating parameters is explained in section 9.01.

The procedure for updating or restoring the VIPer808 BIOS in the Boot-Block Flash is given in section 9.02.

9.01 AMIBIOS SETUP PROGRAM

9.01.1 ACCESSING AMIBIOS SETUP PROGRAM

The VIPer808 uses the AMIBIOS Setup program, a setup utility in ROM that is accessed by pressing the DELETE key at the appropriate time during system boot. This utility is used to set configuration data in CMOS RAM.

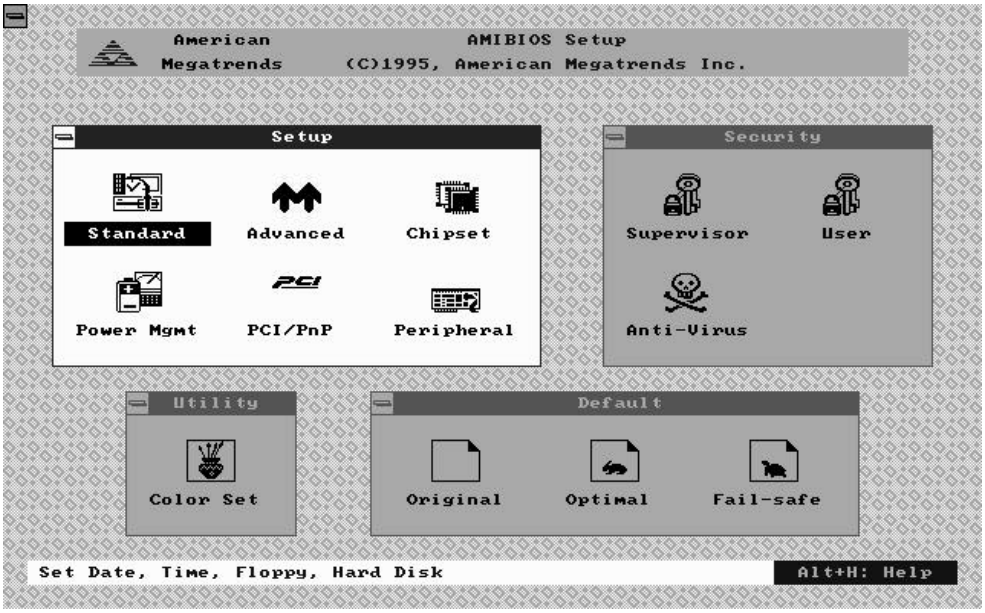
The system BIOS (Basic Input Output System) provides an interface between the operating system and the hardware of the VIPer808 single-board computer. The interface provided by AMIBIOS is 100% IBM AT compatible: All functions accept similar inputs as IBM and provide the same results, although the program code itself is different.

To run the AMIBIOS Setup program incorporated into the ROM BIOS:

- Turn on or reboot the system.
- Hit the DELETE key before or when the message - "Hit <DEL> if you want to run SETUP" appears near the top of the screen (DELETE will work, even if the message display is disabled in AMIBIOS SETUP).
- The main menu appears on the screen.

9.01.2 AMIBIOS SETUP MAIN MENU

The main menu screen looks as follows:



Four windows appear on the above screen:

- Setup window (explained in section 9.01.4)
- Security window (section 9.01.5)
- Utility window (section 9.01.6)
- Default window (section 9.01.7).

The Setup window is highlighted on the screen displayed above, meaning that you can select items in that window. To highlight the other windows, press the TAB key on the keyboard, or if a supported mouse[1] was detected, move the arrow cursor over the desired window, and click the left mouse button.

☞ **Press TAB to select a window (Setup, Security, Utility, or Default) or click the mouse inside that window.**

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[1] All PS/2-type mice are supported, as well as bus mice that use IRQ 3, 4 or 5 (not 2), Microsoft-compatible mice (M, V, W Series), Logitech C-series-compatible mice and many serial mice.

9.01.3 MAKING SELECTIONS, SAVING CONFIGURATIONS & EXITING AMIBIOS SETUP

MAKING SELECTIONS

Each of the windows displayed in the main menu screen contains icons (small drawings under which an identifying label appears). For example, the Setup window has the following icons and labels: Standard, Advanced, Chipset, Power Mgmt, PCI/PnP and Peripheral. Each of these icons corresponds to various setups available within AMIBIOS Setup, i.e. the Standard Setup, the Advanced Setup, the Chipset Setup, the Power Management Setup, the PCI/PnP Setup and the Peripheral Setup. Selecting one of these icons gives access to the corresponding Setup and its options.

To select an icon within a window, you must press one of the arrow keys on the keyboard until the desired icon is highlighted, and then press the ENTER key, or move the mouse to highlight the icon and click the left button to select. This method of selection basically applies for all selectable items (icons, options, and settings).

☞ **Icons, options and settings are selected by using one of the arrow keys to highlight the desired item, then by pressing the ENTER key, or by clicking the mouse over the desired selection.**

The windows in the program have layers, like boxes inside boxes. Selecting an icon, may display another window with icons; in turn, selecting one of these icons can display a window which contains a list of options. Selecting an option will in turn open a window containing a list of possible settings. To return to a previous window, you press the ESC key on the keyboard, or click the small box on the top left corner of the window.

☞ **To close the current window and move to the previous window, press the ESC key or click the small box on the top left corner of the window.**

Mostly all selections and settings will be done using the special keys (TAB, ESC, →, ←, ↑, ↓ and ENTER) or using the mouse's left button. There are a few exceptions, for example while entering the date and time (Standard Setup option), you need to use the + or - keys or click the + or - boxes to change the values. Another example is when characters need to be entered at the keyboard, such as a password (a window appears which ressembles a keyboard; as you enter the characters, "*" is displayed for each character entered; then to accept the password, press ENTER).

SAVING CONFIGURATIONS & EXITING AMIBIOS SETUP

If you press the ESC key from the main menu screen or click the small box on the upper left corner of one of the main menu windows, an EXIT SETUP window appears.

The EXIT SETUP window displays the following options:

- Save changes and Exit
- Do not save changes and Exit
- Continue

Each is explained below:

Save changes and Exit

After having modified the AMIBIOS Setup, you can save the configuration in CMOS RAM, by selecting this option. After the information is saved, the computer is automatically rebooted. This option will not change the default values saved in Boot-Block Flash.

Do not save changes and Exit

This option is used to exit AMIBIOS Setup without saving the configuration to CMOS RAM.

Continue

To return to the main menu without saving or exiting, select this option.

☞ **To save changes and write the new configuration to CMOS RAM, select the "Save changes and Exit" option from the EXIT SETUP window.**

The four windows of the main menu, will now be described in the remainder of this section.

9.01.4 SETUP WINDOW

This section describes the six options of the Setup Window. These are:

- **Standard Setup**: offers the options to set the time, date, hard disk parameters, and floppy drives.
- **Advanced Setup**: handles options and features such as key repetition settings, boot sequence, NUM LOCK and password checking, shadowing, ...
- **Chipset Setup**: sets chipset-specific options and features.
- **Power Management Setup**: sets power conservation options.
- **PCI/PnP Setup**: sets the Plug and Play related options.
- **Peripheral Setup**: sets I/O controller-related options.

STANDARD SETUP

This part of the setup allows you to set the time, date, hard disk type, types of floppy drives, monitor type, and whether the keyboard is installed.

The Standard Setup screen displays seven icons as follows:

Pri Master Sec Master
Pri Slave Sec Slave

These four hard disk drive icons are for configuring hard disks connected to the VIPer808 or to a peripheral board. Select the appropriate hard disk drive icon (Pri Master = C: drive).

For each hard disk, these options can be defined: TYPE, LBA/LARGE MODE, BLOCK MODE, 32BIT MODE and PIO MODE. TYPE and PIO MODE can be Auto detected if the hard disk drive is an IDE drive: the Auto option automatically finds all of the IDE drive parameters for that hard disk. You should check your hard disk data sheets to know if any of the other options - LBA/LARGE MODE, BLOCK MODE and 32BIT MODE - should be set to ON; if your hard disk supports these modes, enabling them will optimize your system.

☞ **It is possible that the parameters provided by Auto detection do not match the ones found in your drive's literature. This should not be considered an error. As a matter of fact, different combinations of heads, cylinders and sectors that match the disk's size will work when formatting an IDE hard drive. But if the disk is already formatted, it is not possible to use different parameters than the ones that were used when the drive was originally formatted.**

Date/Time

The current values for each category are displayed. To change the date or time, highlight the values you want to change, and press the + or - key or click the + or - box, until the desired value is displayed.

Floppy A
Floppy B

The settings are: 360KB 5¼ inch, 1.2MB 5¼ inch, 720KB 3½ inch, 1.44MB 3½ inch, 2.88MB 3½ inch, or not installed.

ADVANCED SETUP, CHIPSET SETUP, POWER MANAGEMENT SETUP, PCI/PNP SETUP & PERIPHERAL SETUP

The Advanced Setup, Chipset Setup, Power Management Setup, PCI/PnP Setup and Peripheral Setup are described in the following pages with both Fail-Safe Defaults and Optimal Defaults values.

Whenever you are not sure about a certain setting, you may refer to the list of default values. The list of defaults is provided in the event that a value has been changed and one wishes to set this option to its original value. Loading the Optimal or Fail-Safe defaults will affect all the options and will reset options previously altered.

The Fail-Safe default settings consist of the safest set of parameters. Use them if the system is behaving erratically. They should always work but do not provide optimal system performance.

The Optimal default values provide optimum performance settings for all devices and system features.

These default values have been provided to give control over the system. However, the values for these options should be changed only if the user has a full understanding of the timing relationships involved.

TABLE 9-1: Advanced Setup

Option	Fail-safe Defaults	Optimal Defaults	Possible Settings	Description
Quick Boot	Disabled	Enabled	Enabled, Disabled	This option allows AMIBIOS to boot faster than usual (from power on to adaptor ROM initialization in less than five seconds). It also supports the Instant On features as specified in the Intel power management specifications. When Quick Boot is enabled, AMIBIOS does not test memory above 1MB and does not wait up to 40 seconds for a READY signal from the IDE hard drive (as a result, AMIBIOS does not configure that drive if a READY signal is not received immediately).
Boot Up Sequence	A:, C:, CDROM	C:, A:, CDROM	C:, A:, CDROM A:, C:, CDROM CDROM, C:, A:	This option specifies the boot sequence for drive A:, C:, CDROM after AMIBIOS POST completes and attempts to boot DOS. When booting from the CDROM drive, the CDROM behaves like drive A: if it has a floppy boot image. The CDROM drive now becomes drive A: and the first floppy drive becomes drive B:. On the other hand, the CDROM behaves like a hard drive if the CDROM has a hard disk boot image. The CDROM drive now becomes drive C: and all other hard drives are shifted one letter (the hard disk drive becomes drive D:).
Boot CPU Speed	Low	High	Low, High	This option sets the speed at which the system boots.
Boot Up Num-Lock	On	On	On, Off	If this option is set to Off, the NUM LOCK key on the keyboard is turned off when the system is powered on; you can use the →, ←, ↑, ↓ keys on both the numeric keypad and the keyboard.
Floppy Drive Swap	Disabled	Disabled	Enabled, Disabled	By enabling this option, floppy drive A: becomes drive B:, and drive B: (if present) becomes drive A:. Thus you are allowed to boot from drive B:.
Floppy Drive Seek	Enabled	Disabled	Enabled, Disabled	This option, when enabled, specifies that a SEEK instruction will be performed on the floppy drive A: at system boot time.
Mouse Support	Disabled	Enabled	Enabled, Disabled	When enabled, this option specifies that a PS/2 mouse is supported.
Typematic Rate	Fast	Fast	Slow, Fast	This option sets the rate at which characters displayed on the screen repeat, when a key is pressed and held down.
Primary Display	VGA/EGA	VGA/EGA	VGA/EGA, CGA 40x25, CGA 80x25, MONO	This option specifies the type of display adapter card installed in the system.
Password Check	Setup	Setup	Always, Setup	This option enables a password check every time the system boots of if AMIBIOS Setup is executed. If always is chosen, a user password prompt appears every time the computer is turned on. If Setup is chosen, the password prompt appears if AMIBIOS is executed. The password feature is disabled by default but can be enabled by using the SUPERVISOR and USER options (SECURITY window) for the first time.
Parity Check	Disabled	Disabled	Enabled, Disabled	This option enables or disables parity error checking for system memory (DRAM).
OS/2 Compatible Mode	Disabled	Disabled	Enabled, Disabled	When there is more than 16MB system memory and you wish to boot with OS2 operating system, you must set this option to Enabled.
Wait for “F1” If Error	Enabled	Disabled	Enabled, Disabled	When this option is Enabled, a failure during boot-up automatically displays an error with the message “RUN SETUP UTILITY Press F1 to RESUME”; pressing the F1 key runs the AMIBIOS Setup Program, so that the Setup can be updated.
Hit “DEL” Message Display	Enabled	Enabled	Enabled, Disabled	Disabling this option prevents the “Hit<DEL> if you want to run Setup” message from appearing when the system boots.
Internal Cache	Disabled	WriteThru or Write Back (CPU dependant)	WriteThru, WriteBack (only available if supported by the CPU), Disabled	This option enables or disables the CPU Internal Cache Memory. WriteBack Cache provides better performance than WriteThru Cache. Some CPUs support only WriteThru Cache, while others support WriteBack and WriteThru Cache.
Video Shadow C000, 32K	Enabled	Enabled	Enabled, Disabled	When this option is set to Enabled, the video BIOS ROM area at the specified address is copied (shadowed) from ROM to RAM for faster execution.
Shadow C800, 16K	Disabled	Disabled	Enabled, Disabled	These options enable shadowing of the contents of the ROM area beginning at the address named in the option title. For example, the C800, 16K SHADOW option enables shadowing of the contents of ROM from C8000h-CBFFFh to RAM. **Not all BIOS can be shadowed. In some cases, it can result in erratic operation. For example, if the expansion board has built-in “scratchpad memory”, which is used internally, shadowing may cause unpredictable results.**
Shadow CC00, 16K	Disabled	Disabled	Enabled, Disabled	
Shadow D000, 16K	Disabled	Disabled	Enabled, Disabled	
Shadow D400, 16K	Disabled	Disabled	Enabled, Disabled	
Shadow D800, 16K	Disabled	Disabled	Enabled, Disabled	
Shadow DC00, 16K	Disabled	Disabled	Enabled, Disabled	

TABLE 9-2: Chipset Setup

Option	Fail-safe Defaults	Optimal Defaults	Possible Settings	Description
DRAM Wait State	2 wait	1 wait	1 wait, 2 wait	This option allows the selection of a wait state for DRAM reads and writes.
SYSCLK Divisor Select	Auto	Auto	Auto, CLOCK2IN/2, CLOCK2IN/3, CLOCK2IN/4, CLOCK2IN/5, CLOCK2IN/6, CLOCK2IN/8	Sets the speed of the ISA bus clock (SYSCLK) signal, which must be set to approximately 8MHz. The appropriate divisor depends on the CPU external bus speed.
AT Ready Delay Selects	2HS1XCLK	No Delay	No Delay, 1HS1XCLK, 2HS1XCLK	Sets the number of SYSCLK wait states to add, after a ready is received on the AT bus.
Back to Back I/O Delay	3 SYSCLK	0 SYSCLK	0 SYSCLK, 1 SYSCLK, 2 SYSCLK, 3 SYSCLK	Sets the delay, in terms of ISA bus clock, between consecutive ISA bus I/O cycles. This option is used for older ISA devices which require longer delays between consecutive I/O cycles. Due to the higher speed of new processors, it may be necessary to add the Back to Back I/O Delay for these older adaptor card.
ISA Refresh	Enabled	Disabled	Enabled, Disabled	This option enables the refresh cycle on the ISA bus. Some ISA peripheral boards use the ISA Refresh signal (for example, bus mouse).
Turbo IDE Function	Disabled	Enabled	Enabled, Disabled	This option enables the Local Bus IDE.
Turbo IDE Command Width	9HS1XCLK	9HS1XCLK	2HS1XCLK, 3HS1XCLK, 4HS1XCLK, 5HS1XCLK, 6HS1XCLK, 7HS1XCLK 8HS1XCLK, 9HS1XCLK	Sets the pulse width of read and write accesses from and to the hard drisk. HS1XCLK is the same speed as the CPU bus clock. The minimum required pulse width varies from drive to drive. Consult your hard disk specifications for minimum pulse width.
Turbo IDE Back to Back Delay	16HS1XCL	16HS1XCL	2HS1XCLK, 4HS1XCLK, 6HS1XCLK, 8HS1XCLK, 10HS1XCLK, 12HS1XCLK 14HS1XCLK, 16HS1XCLK	Sets the delay between hard disk accesses. HS1XCLK is the same speed as the bus clock. The minimum required delay varies from drive to drive.Consult your hard disk specifications for minimum delay.

TABLE 9-3: Power Management Setup

Option	Fail-safe Defaults	Optimal Defaults	Possible Settings	Description
Power Management /APM	Disabled	Disabled	Enabled, Disabled	When Enabled, activates power saving modes: DOZE, SLEEP and SUSPEND.
DOZE Mode Time Out	Disabled	4 sec.	Disabled, 1, 4, 8. and 16 sec.	This option sets the time-out period to enter into Doze Mode when inactivity is detected.
SLEEP Mode Time Out	Disabled	1 min.	Disabled, 1, 2, 4, 6, 8, 12, and 16 min.	This option sets the time-out period to enter into Sleep Mode from Doze Mode.
Hard Disk Time Out	Disabled	Disabled	Disabled, 1, 2, 3, 4, 5, 6, 7 min.	This option enables a non-activity timeout, after which the hard disk is put into Standby mode. Note that once the hard disk has entered Standby mode, the next hard disk access will take a few extra seconds to occur.
Video Standby Time Out	Disabled	Disabled	Disabled, 5, 10, 15 30, 45, 60, 90 sec.	This option enables a non-activity timeout, after which a video display is put into Standby mode. Any subsequent detected activity will reenable the display.
SUSPEND Time Out	Disabled	5 min.	Disabled, 5, 10, 15 20, 30, 40 and 60 min.	This option sets the time-out period to enter into Suspend Mode from Sleep Mode.
Resume with Modem Ring	Disabled	Disabled	Disabled, 1, 2 and 4 Rings	Enables and specifies the number of modem rings required to re-activate the CPU when in Suspend Mode
Suspend Warning Beeps	Enabled	Enabled	Enabled, Disabled	When Enabled, warning beeps will be sounded before entering Suspend Mode.

TABLE 9-4: PCI/PnP Setup

Option	Fail-safe Defaults	Optimal Defaults	Possible Settings	Description
Plug and Play Aware O/S	Yes	Yes	Yes, No	This option allows AMIBIOS to know if the operating system installed in the computer is Plug and Play-aware.
IRQ3	PnP	PnP	PnP, ISA/EISA	This option indicates which the bus is used by the IRQ and allows you to specify IRQs for use by legacy ISA adapter cards. To remove IRQs from the pool of available IRQs passed to BIOS configurable devices, set this option to ISA/EISA.
IRQ4	PnP	PnP	PnP, ISA/EISA	
IRQ5	PnP	PnP	PnP, ISA/EISA	
IRQ7	PnP	PnP	PnP, ISA/EISA	
IRQ9	PnP	PnP	PnP, ISA/EISA	
IRQ10	PnP	PnP	PnP, ISA/EISA	
IRQ11	PnP	PnP	PnP, ISA/EISA	
IRQ14	PnP	PnP	PnP, ISA/EISA	
IRQ15	PnP	PnP	PnP, ISA/EISA	
Reserved Memory Size	Disabled	Disabled	Disabled, 16K, 32K, 64K	This option sets the size of the memory area reserved for legacy ISA adapter cards (this area cannot be used by PnP ISA adapter cards).
Reserved Memory Address	C8000	C8000	C0000, C4000, C8000, CC000, D0000, D4000, D8000, DC000	This option indicates the beginning address (in hex) of the reserved memory area. This memory area (part of ROM memory) is reserved for use by legacy ISA adapter cards.

TABLE 9-5: Peripheral Setup

Option	Fail-safe Defaults	Optimal Defaults	Possible Settings	Description
OnBoard IDE	Primary	Primary	Primary, Secondary, Disabled	This option enables the use of the onboard IDE Controller.
OnBoard FDC	Enabled	Auto	Enabled, Disabled, Auto	This option enables the use of the onboard Floppy Drive Controller.
OnBoard Serial Port 1	3F8h	Auto	Auto, Disabled, 3F8h, 2F8h, 3E8h, 2E8h (if one of these addresses is used by Serial Port 2, it is not available)	This option enables Serial Port 1.
OnBoard Serial Port 2	2F8h	Auto	Auto, Disabled, 3F8h, 2F8h, 3E8h, 2E8h (if one of these addresses is used by Serial Port 1, it is not available)	This option enables Serial Port 2.
OnBoard Parallel Port	378h	Auto	Auto, Disabled, 378h, 278h, 3BCh	This option enables the Parallel Port.
Parallel Port IRQ	7	Auto	Auto, IRQ5, IRQ7	This option defines which IRQ line is to be used for the Parallel Port.
Parallel Port Mode	Normal	ECP	Norma, Bi-Dir (bi-directional), EPP (Enhanced Parallel Port), ECP (Extended Capabilities Port)	This option specifies the Parallel Port Mode.
Parallel Port DMA Channel	None	Auto	Auto, None, 0, 1, 2, 3	This option defines which DMA channel will be used for the Parallel Port's ECP mode.

9.01.5 SECURITY WINDOW

When the Supervisor or User icon is selected from the Security window in the main menu, the user can enable the password feature or change the password itself. By default, the user can boot the system and enter the AMIBIOS Setup without any restrictions. Choosing a password for the first time will automatically enable the password feature. At the next bootup, the user will be prompted to enter his password on bootup or when he attempts to enter AMIBIOS Setup, depending on the setting of the PASSWORD CHECK option in the ADVANCED SETUP (see the PASSWORD CHECK option description for the available settings).

☞ **To disable the password, use this option: 1) At the prompt "Enter CURRENT Password", enter your password, 2) Then at the prompt "Enter NEW Password", press ENTER, 3) Then at the prompt "Confirm NEW Password", press ENTER, 4) The screen then displays "Password uninstalled". Make sure you select Save Changes and Exit from the EXIT SETUP window. If you forget your current password, the password feature can be disabled by removing jumper W22 for several minutes; however this will also clear the CMOS Setup, which will then be configured at the BIOS default values.**

SUPERVISOR

This option allows you to enable the main password of the supervisor user. You must set a supervisor password before attempting to set user passwords. If you disable this password, all user passwords will automatically be disabled as well.

USER

This option allows you to enable and disable a password for each user. A supervisor password must be set before attempting to set user passwords.

ANTI-VIRUS

This option allows you to enable and disable anti-virus protection for the hard disk boot sector.

9.01.6 UTILITY WINDOW

COLOR SET

If you select Color Set, it allows you to set up the background/foreground colors of the screen. The settings are: LCD, Army, Pastel, and Sky.

9.01.7 DEFAULT WINDOW

The Default window of the main menu has three options available for automatically reconfiguring the AMIBIOS Setup (the settings are loaded in the program and displayed in their respective fields, but they are not saved in CMOS):

- Original: This option allows you to reset all options to the values which were last saved in the CMOS Setup; it will be used to restore the values saved in CMOS, after a number of settings have been changed in the AMIBIOS Setup program.

- Optimal: This option allows you to load the Optimal Default values. These are common recommended values and should optimize system performance. This feature might be useful in instances where a quick reconfiguration is needed.

- Fail-Safe: This option allows you to load the Fail-Safe Default settings. These are worst-case values that are the most stable values that can be chosen. Use this option as a diagnostic aid if the system is behaving erratically.

9.02 UPDATING OR RESTORING BIOS IN BOOT-BLOCK FLASH

The Boot-Block Flash device contains a non-erasable boot-strap loader which can reprogram the device with a BIOS file from a floppy drive diskette.

All VIPer808 BIOSes are stored in the file SEQ256.BIN in the Boot-Block Flash device. For the Main BIOS (AMIBIOS), only the default values are stored (fail-safe and optimal) in Boot-Block Flash; therefore if changes are made to the settings, these will not be saved in the Boot-Block Flash BIOS file.

If you need to update or restore the VIPer808 BIOS file SEQ256.BIN in the Boot-Block Flash, follow this procedure:

1. Turn off your computer system.
2. Place diskette with SEQ256.BIN file in drive A. Make sure the SEQ256.BIN file is on the diskette.
3. Hold the CTRL and HOME keys simultaneously and power on your computer system. Release the CTRL-HOME keys after a few seconds.
4. After the three audible beeps, remove diskette from drive A. Boot-up will proceed. The Boot-Block Flash BIOS is now updated or restored.

APPENDICES

APPENDIX A
VIPer808 SPECIFICATIONS

A.01 SPECIFICATIONS

Operating Temperature: The maximum operating ambient temperature of the board is limited by the temperature of the CPU itself, as shown on Table A-1.

TABLE A-1: Maximum Operating Temperature (°C)

Processor	Heatsink	Frequency (MHz)	Airflow - feet / minute			
			0	200	400	600
Intel						
486DX	Yes	33	50	65	71	74
486DX	No	33	38	46	52	59
486DX2	Yes	66	19	48	59	65
486DX2	No	66	-4	11	22	36
486DX4	Yes	100	35.5	57	65.5	70
486DX4	No	100	18.5	29	37.5	44
AMD						
5X86	Yes	133	54.3	69.6	75.8	78.9
5X86	No	133	37.4	46.6	52.7	57.3
SGS						
486DX4	Yes	100	57	65	70	72
486DX4	No	100	47	57	62	65

Noncondensing Relative Humidity: 5% to 95%

Electrical: Conforms to the IEEE P996 PC/AT bus electrical specifications

Supply Voltage: + 5V ±5%

Supply Current:

TABLE A-2: Supply Current

SUPPLY CURRENT*	Intel DX-33	Intel DX2-66	Intel DX4-100	AMD DX2-66	AMD DX4-100	AMD 5x86-133
ICC Typical (+5V)	1.4A	1.8A	1.9A	1.1A	1.4A	1.5A
DOZE Mode	n/a	0.7A	0.7A	0.6A	0.6A	0.7A
SLEEP Mode	n/a	0.6A	0.7A	0.5A	0.5A	0.6A
SUSPEND Mode	n/a	0.4A	0.4A	0.4A	0.4A	0.4A

* Measured with 4 MB System Memory, 1 MB Video Memory and no CPU Fan.

Mechanical:

- Conforms to the IEEE P996 PC/AT bus mechanical specifications.
- 7.125 in. x 4.8 in. / 181mm x 122mm.

A.02 BATTERY

The VIPer808 comes with a 360mAh TL5186 TADIRAN battery. It powers the System Controller's Real Time Clock and CMOS Setup, whenever the board is powered down.

The TADIRAN TL5186 has a shelf life of approximately 10 years (under "no-load" conditions). The actual life of the battery depends on environmental (temperature) conditions. The TADIRAN TL5186 has an operating range of -55^{o} to 75°C and discharge characteristics vary with temperature.

The voltage supplied by the battery is 3.6 volts. This can be verified with a standard voltmeter at the battery socket's two extreme pins (if you use the pin on the soldered side, you do not have to remove the battery).

The TADIRAN TL5186 is UL recognized. Its UL component recognition is MH12193.

Jumper W22 enables the Internal Battery's power. Removing the W22 jumper has the same effect as putting the battery in storage; TEKNOR always ships its board with battery jumper removed in order to increase the life of the battery.

An External Battery may be used. In such a case, pins 2 and 3 of jumper W22 should be shorted.

Please refer to Section 3 for jumper location and setting.

A.03 MTBF (MEAN TIME BETWEEN FAILURES)

The reliability analysis performed on the VIPer808 reflects all available options and has resulted in the following predicted reliability:

TABLE A-3: Reliability Prediction

Board Configuration	**Basic Board**		**Ethernet Interface 10Base 2**		**Ethernet Interface 10Base-T**	
Video Memory	**512KB**	**1MB**	**512KB**	**1MB**	**512KB**	**1MB**
CPU Type	MTBF (hour) / Failure Rate ($x10^{-6}$)		MTBF (hour) / Failure Rate ($x10^{-6}$)		MTBF (hour) / Failure Rate ($x10^{-6}$)	
486DX33 5V (INTEL)	140570 7.1139	139169 7.1855	130121 7.6851	128920 7.7567	132655 7.5384	131407 7.6100
486DX2-66 5V (INTEL)	125359 7.9771	124243 8.0487	116982 8.5484	116010 8.6200	119025 8.4016	118020 8.4732
486DX4-100 3.3V (INTEL)	137515 7.2719	136174 7.3435	127499 7.8432	126346 7.9148	129931 7.6964	128733 7.7680
486DX2-66 3.45V (AMD)	160330 6.2371	158510 6.3087	146878 6.8084	145349 6.8800	150114 6.6616	148518 6.7332
486DX4-100 3.45V (AMD)	150551 6.6423	148945 6.7139	138629 7.2135	137266 7.2851	141508 7.0667	140089 7.1383
5X86-133 3.45V (AMD)	134686 7.4247	133399 7.4963	125064 7.9959	123954 8.0675	127402 7.8491	126251 7.9207

The MTBF is estimated using the prediction data from MIL-HDBK-217F, Reliability Prediction of Electronic Equipment (Dec. 1991).

The VIPer808 board is considered functioning in a Ground Fixed environment as defined in MIL-HDBK-217F. The calculations are performed at 20°C with a temperature rise of 10°C which is due to heat dissipated by active components.

It is assumed that only one failure at a time can occur and that the failure of any component will result in the system becoming inoperative or, as a minimum, resulting in a degraded mode of operation requiring repair action. All components are considered as having an exponential distribution of time to failure, with a constant failure rate. A failure rate is attributed to each component called in the parts list, according to the stress levels it is submitted during normal operation.

The components with the highest calculated failure rate in the VIPer808 reliability prediction are: the 486 CPU, the SVGA (GD5429), the Sequoia chip set (PT86C718) and the chip set (PT86C768).

The quality factors for commercial components on the VIPer808 has been adjusted in order to represent the impact of burn-in. TEKNOR submits each processor board produced to a 12 hour burn-in at 40°C. The boards are powered during this phase to precipitate latent failures. It is well known that a burn-in performed under these conditions improves board and component quality. Since there is a correlation between quality and reliability, it is generally accepted in the industry to reflect this in the reliability prediction.

A.04 MEETING INDUSTRY STANDARDS

TEKNOR Quality Standards insist that our products meet or exceed industry standards set by such respected agencies, organizations and associations as UL and CSA.

As a result, the VIPer808 has the following built-in features to help ensure that the conditions required for approval are met:

- A current block diode on the battery circuit,
- A current limiter resistor on the battery,
- A protection fuse on the keyboard controller.

TEKNOR computer cards are designed to meet industry standards for customers requiring approval for their equipment.

APPENDIX B
MEMORY & I/O MAPS

B.01 MEMORY MAPS

DIAGRAM B-1: Memory Map Diagram

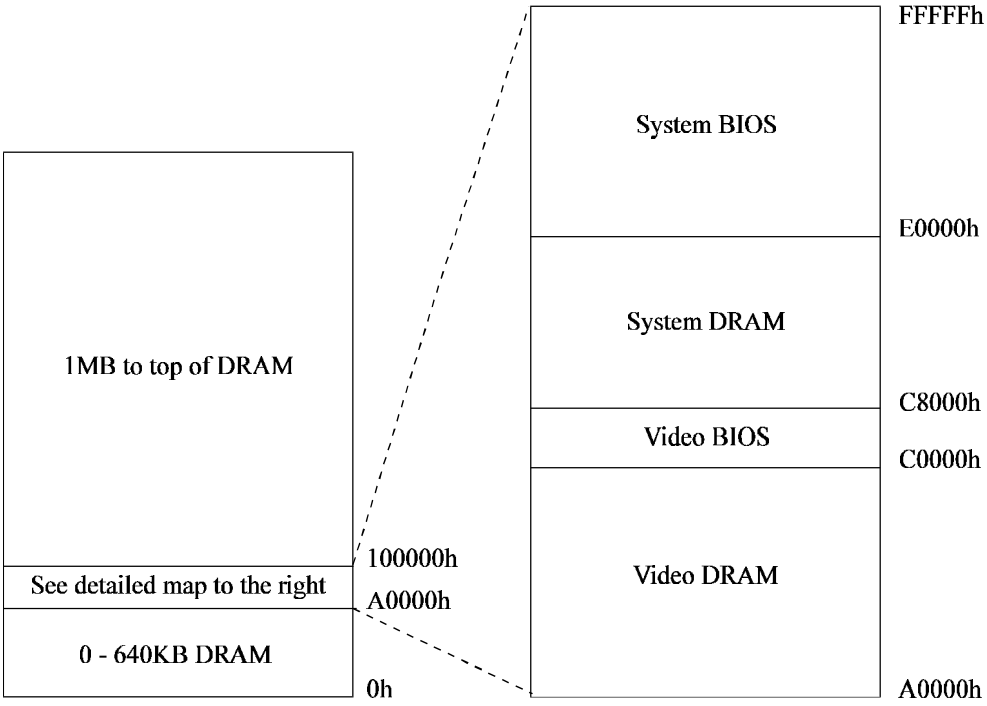


Table B-1 displays the memory map in a table format.

TABLE B-1: Memory Map

Address	Optional Address	Function
00000-0FFFF		0-640 KB DRAM
A0000-BFFFF		Video DRAM
C0000-C7FFF		Video BIOS
C8000- DFFFF		System DRAM
E0000-FFFFF		System BIOS
100000 - Top of DRAM		1MB - Top of DRAM

B.02 I/O MAP

TABLE B-2: I/O Map

Address	Optional Address	Optional Address	Optional Address	Function
000-00F				DMA Controller 1
024, 026				Chipset Configuration Registers
020-03F				Interrupt Controller 1
040-043				Counter/Timers
060-064				Keyboard (8742)
070-071				Real-time clock, NMI mask
080-09F				DMA Page Register
0A0-0BF				Interrupt Controller 2
0C0-0DF				DMA Controller 2
0F0-0FF				Math Coprocessor
1F0-1F7, 3F6-3F7				IDE Hard Disk
300-317	320-337	340-357	See Note 1	Ethernet Port
3F0-3F7	370-377			Floppy Disk
378-37A	3BC-3BE	278-27A		Parallel Port (LPT1 by default)
3F8-3FF (COM1)	2F8-2FF (COM2)	3E8-3EF (COM3)	2E8-2EF (COM4)	UART1 (COM1 by default)
2F8-2FF (COM2)	3F8-3FF (COM1)	3E8-3EF (COM3)	2E8-2EF (COM4)	UART2 (COM2 by default)
3C0-3CF, 3D0-3DF, 3B0-3BB, 46E8h				Graphics Controller

Note 1: Other address ranges: 360-377, 380-397, 3A0-3B7, 3C0-3D7 and 3E0-3F7.

Note 2: In the function “Graphics Controller”, 46E8h is the address for Sleep Mode.

APPENDIX C
MECHANICAL LAYOUT & BLOCK DIAGRAM

In this appendix, two diagrams are included in the following pages.

DIAGRAM C-1: Mechanical Specifications

DIAGRAM C-2: Block Diagram VIPer808

DIAGRAM C-1: Mechanical Specifications

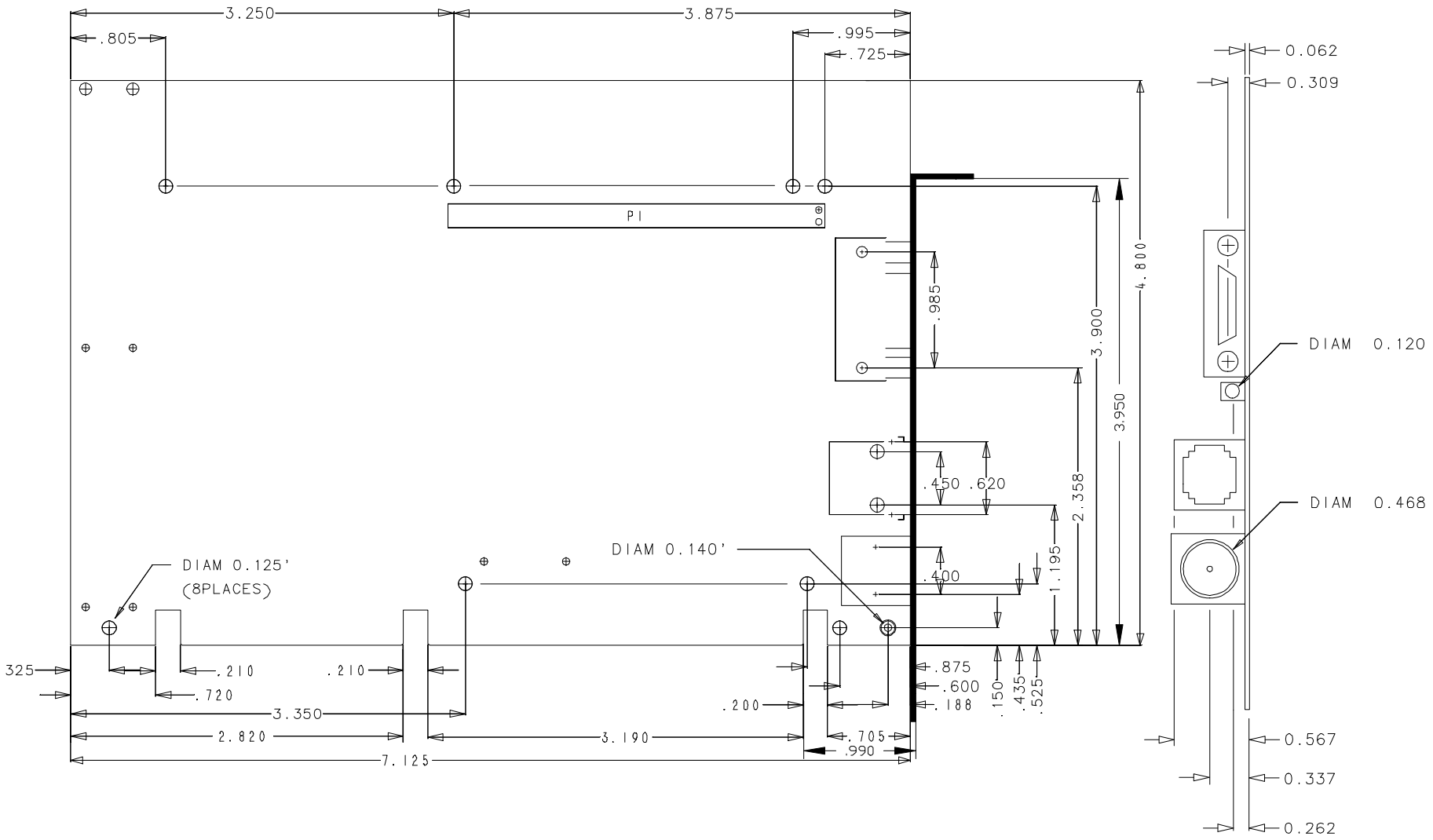
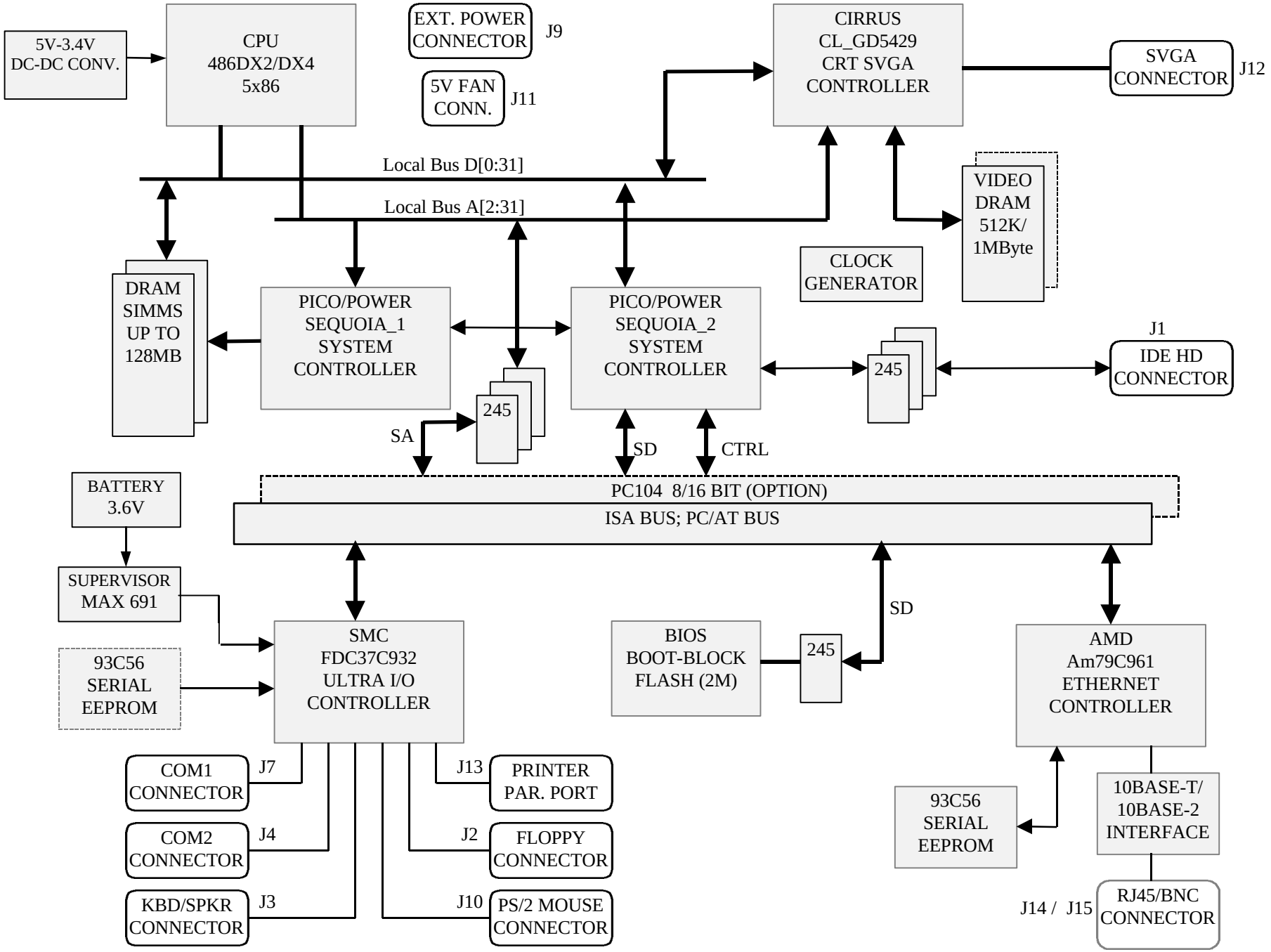


DIAGRAM C-2: Block Diagram VIPer808



APPENDIX D
CONNECTOR PINOUTS

IDE Hard Disk Connector (J1) - Pinout

Pin Number	Signal Flow	Signal	Pin Number	Signal Flow	Signal
1	I	RESET*	2	-	GND
3	I/O	HD7	4	I/O	HD8
5	I/O	HD6	6	I/O	HD9
7	I/O	HD5	8	I/O	HD10
9	I/O	HD4	10	I/O	HD11
11	I/O	HD3	12	I/O	HD12
13	I/O	HD2	14	I/O	HD13
15	I/O	HD1	16	I/O	HD14
17	I/O	HD0	18	I/O	HD15
19	-	GND	20	-	Not Connected
21	-	Not Connected	22	-	GND
23	I	IOW*	24	-	GND
25	I	IOR*	26	-	GND
27	O	IOCHRDY	28	I	BALE
29	-	Not Connected	30	-	GND
31	O	IRQ14	32	O	IOCS16*
33	I	SA1	34	-	Not Connected
35	I	SA0	36	I	SA2
37	I	CS0*	38	I	CS1*
39	O	ACTIVE*	40	-	GND

* Active low signal

Floppy Connector (J2) - Pinout

Pin Number	Signal Flow	Signal	Pin Number	Signal Flow	Signal
1	-	GND	2	O	DRV DENS.SEL.0*
3	-	GND	4	-	Not Connected
5	-	GND	6	-	Not Connected
7	-	GND	8	I	INDEX*
9	-	GND	10	O	MOTOR ON 0,1*
11	-	GND	12	O	DRIVE SELECT B*
13	-	GND	14	O	DRIVE SELECT A*
15	-	GND	16	O	MOTOR ON 2*
17	-	Not Connected	18	O	DIR CONTROL*
19	-	GND	20	O	STEP*
21	-	GND	22	O	WRITE DATA*
23	-	GND	24	O	WRITE ENABLE*
25	-	GND	26	I	TRACK0*
27	-	Not Connected	28	I	WRITE PROTECT*
29	-	Not Connected	30	I	READ DATA*
31	-	GND	32	O	HEAD SELECT*
33	-	Not Connected	34	I	DSKCHG*

* Active low signal

Keyboard / Speaker Connector (J3) - Pinout

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
KBCLK	I/O	1		2	-	GND
KBDATA	I/O	3		4	-	GND
VCC (+5V)	-	5		6	-	VCC (+5V)
SPKR	O	7		8	-	VCC (+5V)
KBDINH	I	9		10	-	GND
Not Connected	I	11		12	-	GND
PBRES*	I	13		14	-	GND
HDD ACTIVE	O	15		16	-	VCC (+5V)

* Active low signal

Serial Port 2 (J4) RS-232 - Pinout

Pin Number	Signal Flow			Pin Number	Signal Flow	
Signal						Signal
DCD*	I	1		2	I	DSR
RX	I	3		4	O	RTS*
TX	O	5		6	I	CTS*
DTR*	O	7		8	I	RI
GND	-	9		10	-	Not Connected

* Active low signal

Serial Port 1 - (J7) RS-232 - Pinout

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
DCD*	I	1		2	I	DSR
RX	I	3		4	O	RTS*
TX	O	5		6	I	CTS*
DTR*	O	7		8	I	RI
GND	-	9		10	-	Not Connected

* Active low signal

External Power Connector (J9) - Pinout

Pin Number	Signal
1	VCC (+5V)
2	GND
3	GND
4	+12V
5	-12V
6	PD (Power Fail Detection Input)

PS/2 Mouse Connector (J10) - Pinout

Error! Bookmark not defined.Pin Number	Signal
1	MCLK
2	GND
3	MDATA
4	VCC (+5V)

Fan Connector (J11) - Pinout

Pin Number	Signal
1	+5V
2	GND

SVGA Connector (J12) - Pinout

Pin Number	Signal	Pin Number	Signal	Pin Number	Signal
1	RED	6	GND	11	Not Connected
2	GREEN	7	GND	12	Not Connected
3	BLUE	8	GND	13	HSYNC
4	Not Connected	9	Not Connected	14	VSYNC
5	GND	10	GND	15	Not Connected

Printer Parallel Port (J13) - Standard Mode - Pinout

Pin Number	Signal Flow			Pin Number	Signal Flow	
Signal						Signal
STROBE*	O	1		2	O	AUTOFD*
D0	I/O	3		4	I	ERROR*
D1	I/O	5		6	O	INIT*
D2	I/O	7		8	O	SELECTIN*
D3	I/O	9		10	-	GND
D4	I/O	11		12	-	GND
D5	I/O	13		14	-	GND
D6	I/O	15		16	-	GND
D7	I/O	17		18	-	GND
ACK*	I	19		20	-	GND
BUSY	I	21		22	-	GND
PE	I	23		24	-	GND
SELECT	I	25		26	-	GND

* Active low signal

Printer Parallel Port (J13) - EPP Mode - Pinout

Error! Bookmark not defined.Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
WRITE*	O	1		2	O	DATASTB*
D0	I/O	3		4	-	Not Used
D1	I/O	5		6	-	Not Used
D2	I/O	7		8	O	ADDRSTRB*
D3	I/O	9		10	-	GND
D4	I/O	11		12	-	GND
D5	I/O	13		14	-	GND
D6	I/O	15		16	-	GND
D7	I/O	17		18	-	GND
INTR	I	19		20	-	GND
WAIT*	I	21		22	-	GND
Not Connected	-	23		24	-	GND
Not Connected	-	25		26	-	GND

* Active low signal

Printer Parallel Port (J13) - ECP Mode - Pinout

Error! Bookmark not defined.Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
STROBE*	O	1		2	O	AUTOFD*, HOSTACK[3]
D0	I/O	3		4	I	FAULT*[1], PERIPHRQST*[3]
D1	I/O	5		6	O	INIT*[1], REVERSERQST*[3]
D2	I/O	7		8	O	SELECTIN*[1,3]
D3	I/O	9		10	-	GND
D4	I/O	11		12	-	GND
D5	I/O	13		14	-	GND
D6	I/O	15		16	-	GND
D7	I/O	17		18	-	GND
ACK*	I	19		20	-	GND
BUSY, PERIPHACK[3]	I	21		22	-	GND
PERROR, ACKREVERSE[3]	I	23		24	-	GND
SELECT	I	25		25	-	GND

* Active low signal

[1] Compatible Mode

[2] High Speed Mode

Ethernet 10 Base-T RJ45 Connector (J14) - Pinout

Error! Bookmark not defined.Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
TXD+	O	1		5	-	Not Connected
TXD-	O	2		6	I	RXD-
RXD+	I	3		7	-	Not Connected
Not Connected	-	4		8	-	Not Connected

Ethernet 10 Base-2
BNC Connector (J15) - Pinout

Signal Name
Center Conductor
Shield

The Ethernet 10 Base-2 connector is a standard BNC connector.

Suspend / Resume Momentary Switch (J16) - Pinout

Error! Bookmark not defined.Pin Number	Signal
1	VCC (+5V)
2	SWITCH

PC/104 Card Connector (P1)

A Side

P1 Pin	I/O PIN	Signal Name	I/O
1	A1	IOCHK*	I
3	A2	SD7	I/O
5	A3	SD6	I/O
7	A4	SD5	I/O
9	A5	SD4	I/O
11	A6	SD3	I/O
13	A7	SD2	I/O
15	A8	SD1	I/O
17	A9	SD0	I/O
19	A10	IOCHRDY	I
21	A11	AEN	O
23	A12	SA19	I/O
25	A13	SA18	I/O
27	A14	SA17	I/O
29	A15	SA16	I/O
31	A16	SA15	I/O
33	A17	SA14	I/O
35	A18	SA13	I/O
37	A19	SA12	I/O
39	A20	SA11	I/O
41	A21	SA10	I/O
43	A22	SA9	I/O
45	A23	SA8	I/O
47	A24	SA7	I/O
49	A25	SA6	I/O
51	A26	SA5	I/O
53	A27	SA4	I/O
55	A28	SA3	I/O
57	A29	SA2	I/O
59	A30	SA1	I/O
61	A31	SA0	I/O
63	A32	GND	-

B Side

P1 Pin	I/O PIN	Signal Name	I/O
2	B1	GND	-
4	B2	RESET DRV	O
6	B3	VCC (+5V)	-
8	B4	IRQ9	I
10	B5	-5V	-
12	B6	DRQ2	I
14	B7	-12V	-
16	B8	OWS*	I
18	B9	+12V	-
20	B10	Not Connected	-
22	B11	SMEMW*	O
24	B12	SMEMR*	O
26	B13	IOW*	I/O
28	B14	IOR*	I/O
30	B15	DACK3*	O
32	B16	DRQ3	I
34	B17	DACK1*	O
36	B18	DRQ1	I
38	B19	REFRESH*	I/O
40	B20	SYSCLK	O
42	B21	IRQ7	I
44	B22	IRQ6	I
46	B23	IRQ5	I
48	B24	IRQ4	I
50	B25	IRQ3	I
52	B26	DACK2*	O
54	B27	T/C	O
56	B28	BALE	O
58	B29	VCC (+5V)	-
60	B30	OSC	O
62	B31	GND	-
64	B32	GND	-

* Active low signal

PC/104 Card Connector (P2)

C Side

P2 Pin	I/O PIN	Signal Name	I/O
2	C0	GND	-
4	C1	SBHE*	I/O
6	C2	SA23	I/O
8	C3	SA22	I/O
10	C4	SA21	I/O
12	C5	SA20	I/O
14	C6	SA19	I/O
16	C7	SA18	I/O
18	C8	SA17	I/O
20	C9	MEMR*	I/O
22	C10	MEMW*	I/O
24	C11	SD8	I/O
26	C12	SD9	I/O
28	C13	SD10	I/O
30	C14	SD11	I/O
32	C15	SD12	I/O
34	C16	SD13	I/O
36	C17	SD14	I/O
38	C18	SD15	I/O
40	C19	Not Connected	-

D Side

P2 Pin	I/O PIN	Signal Name	I/O
1	D0	GND	-
3	D1	MEMCS16*	I
5	D2	IOCS16*	I
7	D3	IRQ10	I
9	D4	IRQ11	I
11	D5	IRQ12	I
13	D6	IRQ15	I
15	D7	IRQ14	I
17	D8	DACK0*	O
19	D9	DRQ0	I
21	D10	DACK5*	O
23	D11	DRQ5	I
25	D12	DACK6*	O
27	D13	DRQ6	I
29	D14	DACK7*	O
31	D15	DRQ7	I
33	D16	VCC (+5V)	-
35	D17	MASTER*	I
37	D18	GND	-
39	D19	GND	-

* Active low signal

PC Bus Connector

A Side

I/O PIN	Signal Name	I/O
A1	IOCHK*	I
A2	SD7	I/O
A3	SD6	I/O
A4	SD5	I/O
A5	SD4	I/O
A6	SD3	I/O
A7	SD2	I/O
A8	SD1	I/O
A9	SD0	I/O
A10	IOCHRDY	I
A11	AEN	O
A12	SA19	I/O
A13	SA18	I/O
A14	SA17	I/O
A15	SA16	I/O
A16	SA15	I/O
A17	SA14	I/O
A18	SA13	I/O
A19	SA12	I/O
A20	SA11	I/O
A21	SA10	I/O
A22	SA9	I/O
A23	SA8	I/O
A24	SA7	I/O
A25	SA6	I/O
A26	SA5	I/O
A27	SA4	I/O
A28	SA3	I/O
A29	SA2	I/O
A30	SA1	I/O
A31	SA0	I/O

B Side

I/O PIN	Signal Name	I/O
B1	GND	-
B2	RESET DRV	O
B3	VCC (+5V)	-
B4	IRQ9	I
B5	-5V	-
B6	DRQ2	I
B7	-12V	-
B8	OWS*	I
B9	+12V	-
B10	GND	-
B11	SMEMW*	O
B12	SMEMR*	O
B13	IOW*	I/O
B14	IOR*	I/O
B15	DACK3*	O
B16	DRQ3	I
B17	DACK1*	O
B18	DRQ1	I
B19	REFRESH*	I/O
B20	SYSCLK	O
B21	IRQ7	I
B22	IRQ6	I
B23	IRQ5	I
B24	IRQ4	I
B25	IRQ3	I
B26	DACK2*	O
B27	T/C	O
B28	BALE	O
B29	VCC (+5V)	-
B30	OSC	O
B31	GND	-

* Active low signal

PC Bus Connector

C Side

I/O PIN	Signal Name	I/O
C1	SBHE*	I/O
C2	SA23	I/O
C3	SA22	I/O
C4	SA21	I/O
C5	SA20	I/O
C6	SA19	I/O
C7	SA18	I/O
C8	SA17	I/O
C9	MEMR*	I/O
C10	MEMW*	I/O
C11	SD8	I/0
C12	SD9	I/O
C13	SD10	I/O
C14	SD11	I/O
C15	SD12	I/O
C16	SD13	I/O
C17	SD14	I/O
C18	SD15	I/O

D Side

I/O PIN	Signal Name	I/O
D1	MEMCS16*	I
D2	IOCS16*	I
D3	IRQ10	I
D4	IRQ11	I
D5	IRQ12	I
D6	IRQ15	I
D7	IRQ14	I
D8	DACK0*	O
D9	DRQ0	I
D10	DACK5*	O
D11	DRQ5	I
D12	DACK6*	O
D13	DRQ6	I
D14	DACK7*	O
D15	DRQ7	I
D16	VCC (+5V)	-
D17	MASTER*	I
D18	GND	-

* Active low signal

APPENDIX
RECOMMENDED DEVICES & MATING CONNECTORS

The following is a list of recommended devices and connectors for use on the VIPer808. Many other models are available and function equally well. Users are encouraged to check with their local distributors for comparable substitutes.

DRAM (U10 and U11)

DRAM devices with parity bit and with page mode at 70ns maximum access time are recommended. For example:

MICRON	MT10D25636M-7	(256K*36)
NEC	MC-42255A36B-70	(256K*36)
SAMSUNG	KMM536256C-7	(256K*36)
TOSHIBA	THM362500AS-70	(256K*36)
MICRON	MT18D51236M-7	(512K*36)
MICRON	MT9D136M-7	(1M*36)
NEC	MC-421000A36B-70	(1M*36)
SAMSUNG	KMM5361000B-7	(1M*36)
TI	TM124MBK36R-70	(1M*36)
TOSHIBA	THM361020AS-70	(1M*36)
HITACHI	HB56D236B2-7C	(2M*36)
HITACHI	HB56D236BS-7BC	(2M*36)
HITACHI	HB56D236BW-7B	(2M*36)
HITACHI	HB56D236BW-7C	(2M*36)
HYUNDAI	HYM536220W-70	(2M*36)
MICRON	MT18D236M-7	(2M*36)
NEC	MC422000A36B-70	(2M*36)
SAMSUNG	KMM5362000B-7	(2M*36)
TOSHIBA	THM362040AS-60	(2M*36)
TOSHIBA	THM362040AS-70	(2M*36)
HYUNDAI	HYM536410AM-70	(4M*36)
MITSUBISHI	MH4M36ANXJ-7	(4M*36)

NEC	MC-424000A36BH-70	(4M*36)
NEC	MC-424000A36BJ-70	(4M*36)
SAMSUNG	KMM5364100-7	(4M*36)
TOSHIBA	THM364020S-70	(4M*36)
HITACHI	HB56D836BR-70A	(8M*36)
TOSHIBA	THM368020S-70	(8M*36)
TOSHIBA	THM368020SG-70	(8M*36)

INTERFACE CONNECTORS

The following connectors are recommended for interfacing with the I/O devices. The parts shown here do not have a strain relief but one may be added.

Connector	Recommended Mating Part
Hard Disk (J1)	Robinson Nugent IDS-C40PK-TG Amp 746285-9 [499252-1*] Thomas & Betts 622-4030 [622-4041*] (40-pin flat cable connector)
Floppy Disk (J2)	Robinson Nugent IDS-C34PK-TG Amp 746285-8 [499252-6*] Thomas & Betts 622-3430 [622-3441*] (34-pin flat cable connector)
Keyboard /Speaker (J3)	Robinson Nugent IDS-C16PK-TG Amp 746285-3 [499252-8*] Thomas & Betts 622-1630 [622-1641*] (16-pin flat cable connector)
Serial Ports (J4 & J7)	Robinson Nugent IDS-C10PK-TG Amp 746285-1 [499252-5*] Thomas & Betts 622-1030 [622-1041*] (10-pin flat cable connector)
Power Connector (J9)	Leoco 2530 S060013 (housing) Leoco 2533 TCB00A0 (crimp) Molex 22-01-3067 (housing) Molex 08-50-0114 (crimp)
PS/2 Connector (J10)	Molex 22-01-3047 (connector) Molex 08-50-0114 (crimp)

* optional strain relief part number shown in square brackets

Connector	Recommended Mating Part
Parallel Port (J13)	Robinson IDS-C26PK-TG Amp 746285-6 [499252-3*] Thomas & Betts 622-2630 [622-2641*] (Polarized IDC female socket connector)

* optional strain relief part number shown in square brackets

APPENDIX F
POST CODES & ERROR CODES

When you power on your system, the Power On Self Test (POST) diagnostic routines check to make sure your system is running properly. A number of check points are covered during these tests. These POST codes are described in F.01.

Fatal errors, which halt the boot process, are communicated through a series of audible beeps. If POST can initialize the system video display, it will display the error message. Beep error codes are described in F.03.

F.01 POST CODES

POST codes can be displayed by installing a PC diagnostic POST card. This card includes a small display, which indicates the POST code number of specific check-points in the POST routines as they are passed.

POST CODE	DESCRIPTION
	Uncompressed INITIALIZATION code check-points
D0	NMI is Disabled. CPU ID saved. Init code Checksum verification starting.
D1	To do DMA init, Keyboard controller BAT test, start memory refresh and going to 4GB flat mode.
D3	To start Memory sizing.
D4	To comeback to real mode. Execute OEM patch. Set stack.
D5	E000 ROM enabled. Init code is copied to segment 0 and control to be transfered to segment 0.
D6	Control is in segment 0. To check <CTRL><HOME> key and verify main BIOS checksum. If either <CTRL><HOME> is pressed or main BIOS checksum is bad, go to check point E0 else goto check point D7.
D7	Main BIOS runtime code is to be decompressed and control to be passed to main BIOS in shadow RAM.

POST CODE **DESCRIPTION**

Boot block recovery code check points

E0	OnBoard Floppy Controller (if any) is initialzed. To start base 512K memory test.
E1	To initialise interrupt vector table.
E2	To initialise DMA and interrupt controllers.
E6	To enable floppy and timer IRQ, enable internal Cache.
ED	Initialize floppy drive.
EE	Start looking for a diskette in drive A: and read 1st sector of the diskette.
EF	Floppy read error.
F0	Start searching 'AMIBOOT.ROM' file in root directory.
F1	'AMIBOOT.ROM' file not present in root directory.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by 'AMIBOOT.ROM' file.
F3	Start reading 'AMIBOOT.ROM' file cluster by cluster.
F4	'AMIBOOT.ROM' file not of proper size.
F5	Disable internal Cache.
FB	Detect Flash type present.
FC	Erase Flash.
FD	Program Flash.
FF	Flash program successful. BIOS is going to restart.

BEEP CODE :

Post code	BeepCode	Description
ED	*-*-*-*-*-*-*-*--- …	Error when initializing the floppy drive A:
EE	*	Started looking for a diskette in drive A:
EE	*--*--…	Didn't find a diskette in drive A:
F0	*	Started searching for 'AMIBOOT.ROM' file in root directory.
F1	*	'AMIBOOT.ROM' file not present in root directory. Retry search for 'AMIBOOT.ROM' file in root directory (Post code F0)
F3	*-*-*-*-*---*--*-- …	Didn't find the 'AMIBOOT.ROM' file anymore, when reading.
FF	*-*-*-*	Flash program successful. BIOS is going to restart.

LEGEND

Symbol	Description
*	1 Beep code
…	Repeat the last part until error corrected or Power down
-	Silence

Runtime code is uncompressed in F000 shadow RAM

03	NMI is Disabled. To check soft reset/power-on.
05	BIOS stack set. Going to disable Cache if any.
06	POST code to be uncompressed.
07	CPU init and CPU data area init to be done.
08	CMOS checksum calculation to be done next.
0B	Any initialization before Keyboard BAT to be done next.
0C	KB controller I/B free. To issue the BAT command to Keyboard controller.
0E	Any initialization after KB controller BAT to be done next.
0F	Keyboard command byte to be written.
10	Going to issue Pin-23,24 blocking/unblocking command.
11	Going to check pressing of <INS> , <END> key during power-on.
12	To init CMOS if “Init CMOS in every boot” is set or <END> key is pressed. Going to disable DMA and Interrupt controllers.
13	Video display is disabled and port-B is initialized. Chipset init about to begin.
14	8254 timer test about to start.
19	About to start memory refresh test.
1A	Memory Refresh line is toggling. Going to check 15us ON/OFF time.
23	To read 8042 input port and disable Megakey GreenPC feature. Make BIOS code segment writeable.
24	To do any setup before Int vector init.
25	Interrupt vector initialization about to begin. To clear password if necessary.
27	Any initialization before setting video mode to be done.
28	Going for monochrome mode and color mode setting.
2A	Different BUSes init (system, static, output devices) to start if present. *(Please see Section F.02 for details of different BUSes).*
2B	To give control for any setup required before optional video ROM check.
2C	To look for optional video ROM and give control.
2D	To give control to do any processing after video ROM returns control.
2E	If EGA/VGA not found then do display memory R/W test.

POST CODE	DESCRIPTION
2F	EGA/VGA not found. Display memory R/W test about to begin.
30	Display memory R/W test passed. About to look for the retrace checking.
31	Display memory R/W test or retrace checking failed. To do alternate Display memory R/W test.
32	Alternate Display memory R/W test passed. To look for the alternate display retrace checking.
34	Video display checking over. Display mode to be set next.
37	Display mode set. Going to display the power on message.
38	Different BUSes init (input, IPL, general devices) to start if present. *(Please see Section F.02 for details of different BUSes).*
39	Display different BUSes initialization error messages. *(Please see Section F.02 for details of different BUSes).*
3A	New cursor position read and saved. To display the Hit <DEL> message.
40	To prepare the descriptor tables.
42	To enter in virtual mode for memory test.
43	To enable interrupts for diagnostics mode.
44	To initialize data to check memory wrap around at 0:0.
45	Data initialized. Going to check for memory wrap around at 0:0 and finding the total system memory size.
46	Memory wrap around test done. Memory size calculation over. About to go for writing patterns to test memory.
47	Pattern to be tested written in extended memory. Going to write patterns in base 640k memory.
48	Patterns written in base memory. Going to findout amount of memory below 1M memory.
49	Amount of memory below 1M found and verified. Going to findout amount of memory above 1M memory.
4B	Amount of memory above 1M found and verified. Check for soft reset and going to clear memory below 1M for soft reset. (If power on, go to check point# 4Eh).
4C	Memory below 1M cleared. (SOFT RESET) Going to clear memory above 1M.
4D	Memory above 1M cleared. (SOFT RESET) Going to save the memory size. (Goto check point# 52h).
4E	Memory test started. (NOT SOFT RESET) About to display the first 64k memory size.
4F	Memory size display started. This will be updated during memory test. Going for sequential and random memory test.

POST CODE	DESCRIPTION
50	Memory testing/initialization below 1M complete. Going to adjust displayed memory size for relocation/ shadow.
51	Memory size display adjusted due to relocation/ shadow. Memory test above 1M to follow.
52	Memory testing/initialization above 1M complete. Going to save memory size information.
53	Memory size information is saved. CPU registers are saved. Going to enter in real mode.
54	Shutdown successful, CPU in real mode. Going to disable gate A20 line and disable parity/NMI.
57	A20 address line, parity/NMI disable successful. Going to adjust memory size depending on relocation/shadow.
58	Memory size adjusted for relocation/shadow. Going to clear Hit <DEL> message.
59	Hit <DEL> message cleared. <WAIT...> message displayed. About to start DMA and interrupt controller test.
60	DMA page register test passed. To do DMA#1 base register test.
62	DMA#1 base register test passed. To do DMA#2 base register test.
65	DMA#2 base register test passed. To program DMA unit 1 and 2.
66	DMA unit 1 and 2 programming over. To initialize 8259 interrupt controller.
7F	Extended NMI sources enabling is in progress.
80	Keyboard test started. clearing output buffer, checking for stuck key, to issue Keyboard reset command.
81	Keyboard reset error/stuck key found. To issue Keyboard controller interface test command.
82	Keyboard controller interface test over. To write command byte and init circular buffer.
83	Command byte written, Global data init done. To check for lock-key.
84	Lock-key checking over. To check for memory size mismatch with CMOS.
85	Memory size check done. To display soft error and check for password or bypass setup.
86	Password checked. About to do programming before setup.
87	Programming before setup complete. To uncompress SETUP code and execute CMOS setup.

POST CODE	DESCRIPTION
88	Returned from CMOS setup program and screen is cleared. About to do programming after setup.
89	Programming after setup complete. Going to display power on screen message.
8B	First screen message displayed. <WAIT...> message displayed. PS/2 Mouse check and extended BIOS data area allocation to be done.
8C	Setup options programming after CMOS setup about to start.
8D	Going for hard disk controller reset.
8F	Hard disk controller reset done. Floppy setup to be done next.
91	Floppy setup complete. Hard disk setup to be done next.
95	Init of different BUSes optional ROMs from C800 to start. *(Please see Section F.02 for details of different BUSes).*
96	Going to do any init before C800 optional ROM control.
97	Any init before C800 optional ROM control is over. Optional ROM check and control will be done next.
98	Optional ROM control is done. About to give control to do any required processing after optional ROM returns control and enable external Cache.
99	Any initialization required after optional ROM test over. Going to setup timer data area and printer base address.
9A	Return after setting timer and printer base address. Going to set the RS-232 base address.
9B	Returned after RS-232 base address. Going to do any initialization before Coprocessor test.
9C	Required initialization before Coprocessor is over. Going to initialize the Coprocessor next.
9D	Coprocesor initialized. Going to do any initialization after Coprocessor test.
9E	Initialization after Coprocessor test is complete. Going to check extended Keyboard, Keyboard ID and num-lock. Keyboard ID command to be issued next.
A2	Going to display any soft errors.
A3	Soft error display complete. Going to set Keyboard typematic rate.
A4	Keyboard typematic rate set. To program memory wait states.
A5	Going to enable parity/NMI.
A7	NMI and parity enabled. Going to do any initialization required before giving control to optional ROM at E000.

POST CODE	DESCRIPTION
A8	Initialization before E000 ROM control over. E000 ROM to get control next.
A9	Returned from E000 ROM control. Going to do any initialization required after E000 optional ROM control.
AA	Initialization after E000 optional ROM control is over. Going to display the system configuration.
AB	To uncompress DMI data and execute DMI POST init.
B0	System configuration is displayed.
B1	Going to copy any code to specific area.
00	Copying of code to specific area done. Going to give control to INT-19 boot loader.

F.02 WORD CHECK-POINTS

Additional WORD check-points are output to port 80h while control is inside the different BUS routines. The LOW BYTE of check-point is the POST code (section F.01) representing the system BIOS check-point from where the control is passed to different BUS routines.

The HIGH BYTE of check-point is the indication of which routine is being executed in different BUSes. The details of HIGH BYTE ('XY') are explained below.

The upper nibble 'X' indicates the function number being executed:

0 Disable all devices on the BUS concerned.
1 Static devices initialization on the BUS concerned.
2 Output device initialization on the BUS concerned.
3 Input device initialization on the BUS concerned.
4 IPL device initialization on the BUS concerned.
5 General device initialization on the BUS concerned.
6 Error reporting for the BUS concerned.
7 Add-on ROM initialization for all BUSes.

The lower nibble 'Y' indicates the BUS on which the different routines are being executed:

0 Generic DIM (Device Initialization Manager).
1 On-board System devices.
2 ISA devices.
3 EISA devices.
4 ISA PnP devices.
5 PCI devices.

F.03 BEEP ERROR CODES

All beep codes, except number 8, are fatal errors.

If your system starts beeping during POST, count the number of beeps and check the table below to identify the error. Note that it is not guaranteed that these errors will always generate beeps.

TABLE F-1: Beep Error Codes

BEEPS	ERROR MESSAGE	DESCRIPTION
1	Refresh Failure	The memory refresh circuitry is faulty.
2	Parity Error	Parity error in the base memory (the first 64KB block of memory)
3	Base 64KB Memory Failure	Memory failure in the first 64KB.
4	Time Not Operational	A memory failure in the first 64KB of memory, or Timer 1 is not functioning.
5	Processor error	The CPU generated an error.
6	8042 - Gate A20 Failure	Cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU on the CPU Card generated and exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Cheksum Error	The ROM checksum value does not match the value encoded in AMIBIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM has failed.
11	Cache memory bad - do not enable Cache	The Cache memory test failed. Cache memory is disabled. Do not press the CTRL, ALT, SHIFT and + keys (simultaneously) to enable Cache memory.

GETTING HELP

At TEKNOR we take great pride in our customer's successes. We strongly believe in providing full support at all stages of your product development.

If at any time you encounter difficulties with your application or with any of our products, or if you simply need guidance on system setups and capabilities, you may contact our Technical Support department at:

CANADIAN HEADQUARTERS

Tel.: (450) 437-5682
Fax: (450) 437-8053

EUROPEAN REGIONAL OFFICE

Tel.: +49 811 / 600 15-0
Fax: +49 811 / 600 15-33

If you have any questions about TEKNOR, our products or services, you may reach us at the above numbers or by writing to:

TEKNOR INDUSTRIAL COMPUTERS INC.
616 Cure Boivin
Boisbriand, Quebec
J7G 2A7 CANADA

TEKNOR INDUSTRIAL COMPUTERS INC.
Zeppellin Str. 4
D-85399 Hallbergmoos
GERMANY

LIMITED WARRANTY

TEKNOR INDUSTRIAL COMPUTERS INC. ("the seller") warrants its products to be free from defects in material and workmanship for a period of two (2) years commencing on the date of shipment. The liability of the seller shall be limited to replacing or repairing, at the seller's option, any defective units. Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, or unauthorized repair are not covered by this warranty. This warranty is in lieu of all other warranties expressed or implied.

Returning Defective Merchandise

If your TEKNOR product malfunctions, please do the following before returning any merchandise:

1) Call our Technical Support department in Canada at (450) 437-5682 or in Germany at +49 811 / 600 15-0. Make certain you have the following at hand: the TEKNOR Invoice #, your Purchase Order #, and the Serial Number of the defective unit.

2) Give the serial number found on the back of the card and explain the nature of your problem to a service technician.

3) If the problem cannot be solved over the telephone, the technician will further instruct you on the return procedure.

4) Prior to returning any merchandise, make certain you receive an RMA # from TEKNOR's Technical Support and clearly mark this number on the outside of the package you are returning. To request a number, follow these steps: make a copy of the request form on the following page, fill it out and fax it to us.

5) When returning goods, please include the name and telephone number of a person whom we can contact for further explanations if necessary. **Where applicable, always include all duty papers and invoice(s) associated with the item(s) in question.**

6) When returning a TEKNOR card:

   i) Make certain that the card is properly packed: Place it in an antistatic plastic bag and pack it in a rigid cardboard box.

   ii) Ship prepaid to (but not insured, since incoming units are insured by TEKNOR):

TEKNOR INDUSTRIAL COMPUTERS INC.
616 Cure Boivin
Boisbriand, Quebec
J7G 2A7 CANADA

TEKNOR INDUSTRIAL COMPUTERS INC.
Zeppelin Str. 4
D-85399 Hallbergmoos
GERMANY

TEKNOR
INDUSTRIAL COMPUTERS INC.

RETURN TO MANUFACTURER AUTHORISATION REQUEST

Contact Name : _____

Company Name : _____

Street Address _____

City : _____ **Province / State :** _____

Country : _____ **Postal / Zip Code** _____

Phone Number : _____ **Fax Number:** _____

Serial Number	Failure or Problem Description	P.O. # (if not under warranty)

Fax this form to TEKNOR's Technical Support department in Canada at (450) 437-8053 or in Germany at +49 811 / 600 15-33