VIPer800

386SX / 486SLC SINGLE BOARD COMPUTER
HARDWARE REFERENCE MANUAL
VERSION 2.0, NOVEMBER 1996

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

ref: M800S_2-0

FOREWORD

The information in this document is provided for reference purposes only. TEKNOR does not assume any liability for the application of information or the use of products described herein.

This document may contain information or refer to products protected by the copyrights or patents of others and does not convey any license under the patent rights of TEKNOR, nor the rights of others.

This manual does not discuss standard features of the IBM family of Personal Computers. Instead, it focuses on the superset of features that TEKNOR has implemented into its single board computers.

For information on IBM standard features, please refer to the following books:

- IBM AT Technical Reference Manual
- DOS Technical Reference
- Peter Norton's Programming the IBM PC

This is by no means an exhaustive list. Many titles exist on these subjects and just as many titles deal with specialized applications such as extended memory transfers, disk drives, ems, and so on.

If you require information not covered in this manual or in our Application Notes, contact our Technical Support department at (450) 437-5682.

Printed in Canada.

TABLE OF CONTENTS

PART TWO
SPECIAL SOFTWARE & ONBOARD UTILITIES

APPENDIXES

LIST OF DIAGRAMS

LIST OF TABLES

LIST OF TABLES (Continued)

INTRODUCTION

The Viper800 Single Board Computer is a high performance, fully IBM AT compatible, PC/AT single board computer. VIP stands for Very Integrated Processor. This board includes the following features:

- The Viper800 has microprocessor support for these CPUs:
  - 80486SLC running at 33 MHz;
  - 80386DX running at 33 MHz.

- The 486SLC is made by Cyrix and has these features:
  - 80486SX instruction set compatible;
  - 1 KB of Internal Cache Memory;
  - 32-bit internal and 16-bit external data path.

- The Viper800 has a coprocessor socket for installing an 80387SX Math Coprocessor.

- System memory can be configured as 1 MB, 2 MB, 4 MB, 8 MB or 16 MB of Dynamic RAM (DRAM) on 9-bit socketed SIMMs.

- The Viper800 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;
  - It can also operate without any mechanical disks by performing disk operations on solid state disks (Flash, SRAM).

- 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:
  - A compact half-card format (7.1" x 4.8") with double-sided surface mount;
  - A watchdog timer;
  - A power failure detector;
  - Solid state disks (optional): 128 or 512 KB of SRAM and 1 MB of Flash EPROM.

- The local bus SVGA video controller is from Cirrus Logic and provides high resolution CRT display. The board also comes with 1 MB of video memory (DRAM), and a feature connector for video overlay and color keying.

- The Viper800 includes an onboard IDE interface.

- The Viper800 includes an enhanced super floppy controller which supports two floppy disk drives of up to 2.88 MB each, 16 bytes of FIFO buffering and a 48mA drive buffer.

- An optional onboard SCSI controller supports up to seven SCSI peripherals and Fast SCSI II.

- The Viper800 board has one parallel printer port (ECP and EPP modes are supported).

- Two 16550 compatible serial ports with internal 16-byte FIFO buffers can be defined as two of the following: COM1, COM2, COM3 or COM4.

- The board's PC/104 expansion header accepts any PC/104 mezzanine card.

- The Viper800 board also includes a real-time clock with battery backup.

The Viper800 HARDWARE 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 Viper800 board, plus installation and setup procedures. A topical index of these Sections is included below:

Part Two - SPECIAL SOFTWARE & ONBOARD UTILITIES - contains information and instructions for using special software and onboard utilities; it has the following five Sections:

- Section 11: VFLASH SOFTWARE;
- Section 12: FLASH FILE SYSTEM II;
- Section 13: UPDATING BIOS;
- Section 14: VT100 MODE;
- Section 15: DOWNLOAD MODE.

Following the Sections are Appendixes A to F which contain information you can consult when needed. These include:

- Appendix A: Viper800 SPECIFICATIONS;
- Appendix B: MEMORY & I/O MAPS;
- Appendix C: MECHANICAL LAYOUT & BLOCK DIAGRAM;
- Appendix D: CONNECTOR OVERVIEW;
- 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 Services/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 10) groups the various aspects of the Viper800 board, with special emphasis put on installation and setup procedures. Wherever possible, technical information is given in these ten 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 experienced 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 Viper800 board, or refer to the topical index of Part One found on page 2 of the INTRODUCTION.

For less experienced users, it is recommended that they read through Part One of the manual as they install and set up the Viper800 board. These Sections have been organized in a chronological order with respect to the steps that would be taken to install and set up the board. Certain Sections or sub-sections which deal with devices or peripherals that one wants to install can be studied in greater detail, while those describing devices that are not of interest can be skipped.

1.02 HOW THE BOARD CAN BE USED

The Viper800 board is a multi-purpose computer board:

- The Viper800 can be used as a **single board computer** in conjunction with a passive backplane. Power is drawn directly from the AT bus.

- The Viper800 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 board has a PC/104 expansion header which accepts any PC/104 mezzanine card. The Viper800 can also operate without any user interface.

- The Viper800 can also operate **without any mechanical drives** by performing disk operations on solid state disks (user Flash EPROM and SRAM). A Flash EPROM partition created with the VFLASH utility is a read-only disk, while an MS-Flash partition created with the FLASH FILE SYSTEM II utility is a read/write disk that can be accessed via the MS-DOS commands. You can even set up your board to boot from the VFLASH partition. As for the SRAM disk, a read/write partition can be created using FDISK; it can then be accessed with the DOS commands.

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 in 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 installation and setup, ensure that the board is unplugged by turning off the power supply or unplugging any power cords.

1.04 UNPACKING

Follow these recommendations while unpacking:

- Observe the Static Electricity Precautions in section 1.03.1.
- After opening the box, save it and the packing material for possible future shipment.
- 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.

SECTION 2
INSTALLING MEMORY

2.01 TYPES OF MEMORY ON BOARD

Various types of memory are installed or supported on the Viper800 board.

2.01.1 SYSTEM MEMORY (DRAM)

Dynamic Random Access Memory (DRAM) is essential system memory. It can be configured as 1 MB, 2 MB, 4 MB, 8 MB or 16 MB, on standard SIMM sockets. 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 four standard 9-bit SIMM sockets appears on Diagram 2-1 at U8, U9, U10 and U11.

2.01.2 VIDEO MEMORY (DRAM)

Video RAM is factory installed. The Viper800 is configured with 1 MB of video memory.

The location of the Video RAM appears on Diagram 2-1 at U4 and U6.

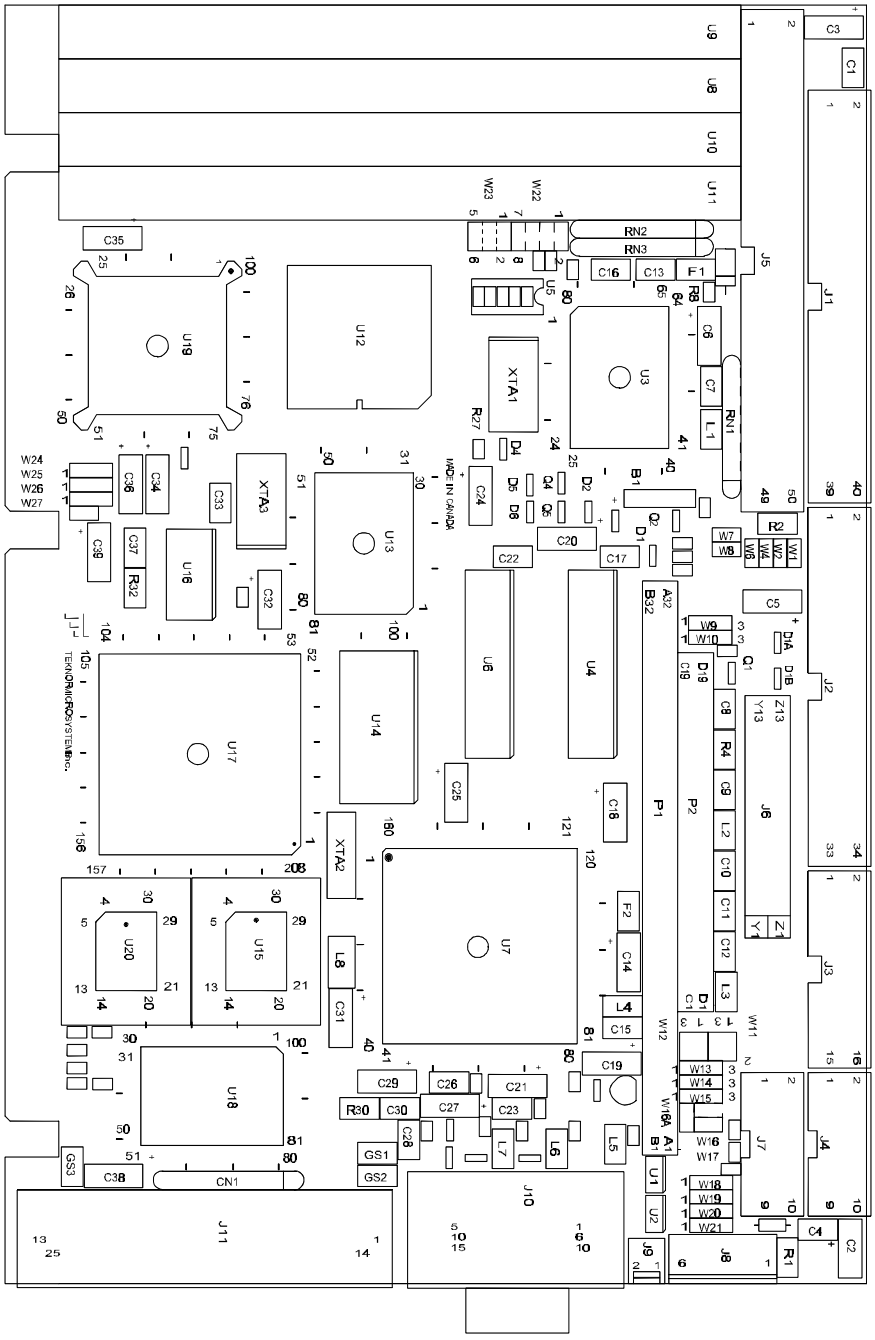
2.01.3 BIOS (FLASH EPROM & EPROM)

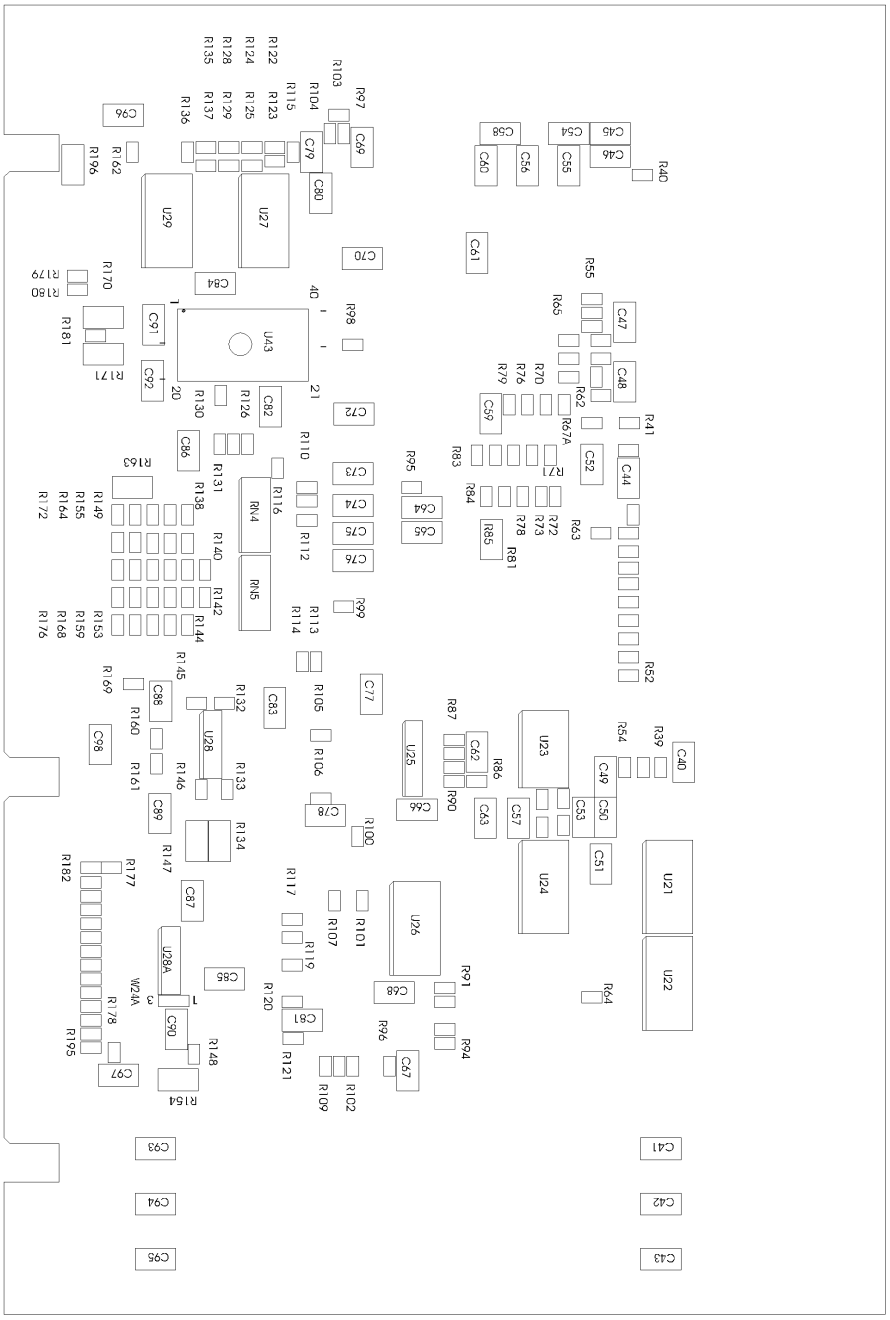
The Flash EPROM and the EPROM BIOS are also factory installed. The Flash EPROM appears on Diagram 2-1 at U15 and the EPROM BIOS at U20.

2.01.4 SOLID STATE DISKS (SRAM & FLASH EPROM DISKS)

Optional solid state disks which can be ordered from TEKNOR include SRAM (Static Random Access Memory) and Flash EPROM (user). See Section 7 for more information.

SRAM appears on Diagram 2-1 at U14 and the 1 MB user Flash EPROM disk on Diagram 2-2 at U43.




C96
R162
R196
R103
R97
C49
R104
C79
C80
R122
R124
R128
R135
R115
R123
R125
R129
R137
R136
U29
U27
C70
C84
R170
C180
C179
R181
R171
C91
C92
U43
40
21
20
R98
R130
R126
C82
C72
C86
R110
R131
R138
R140
R142
R144
R163
R116
R112
RN4
RN5
C73
C74
C75
C76
R99
R113
R114
R145
R132
R133
R146
R134
R147
R177
R182
C87
U28A
W24A
R178
R195
C90
R148
C97
R154
C93
C94
C95
R169
C88
R160
R161
C98
C89
U28
C83
R105
R106
C78
R100
C77
R117
R119
R120
R121
C81
R107
R101
R109
R102
C85
C68
C67
R96
R91
R94
U26
U25
C66
R87
C62
R90
R86
C43
R54
R39
C40
U23
U24
C49
C50
C53
C57
C51
R52
U21
U22
R64
C41
C42
C43
R40
C58
C60
C54
C56
C55
C45
C46
R55
R65
C47
C48
R62
R67A
R79
R76
R70
C59
R41
C52
C44
R83
R95
R84
C64
C65
R85
R81
R78
R72
R73
R63
R71
C61

2.02 INSTALLING SIMMS

At least 1 MB of system memory must be installed on the Viper800 for proper operation.

Memory can be configured from 1 to 16 MB on the Viper800 board using 9-bit SIMM devices. There are four SIMM (Single In-line Memory Module) sockets; these can accept either 256 KB, 1 MB or 4 MB modules. Please refer to Appendix E for a list of recommended devices. Note that all SIMMs must be of the same capacity and installed in sockets 2 and 4 or in all four sockets.

Consult the following table when installing SIMMs. Note that U9 is near the edge of the board.

TABLE 2-1: SIMM Configuration

MEMORY SIZE	U9 BANK 1	U8 BANK 0	U10 BANK 1	U11 BANK 0
1 MB	256 KB	256 KB	256 KB	256 KB
2 MB	--	1 MB	--	1 MB
4 MB	1 MB	1 MB	1 MB	1 MB
8 MB	--	4 MB	--	4 MB
16 MB	4 MB	4 MB	4 MB	4 MB

Follow these steps to install SIMMs on the sockets:

- Turn the board so that the sockets are at the end of the board farthest from you.
- Hold the module at a 70^{o} angle to the socket, with the chips on the module facing you, and insert the connector into the socket.
- Snap the module 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.

Eventually, VIPer setups will have to be executed to tell the system how much memory you have installed (Section 10).

SECTION 3
SETTING JUMPERS

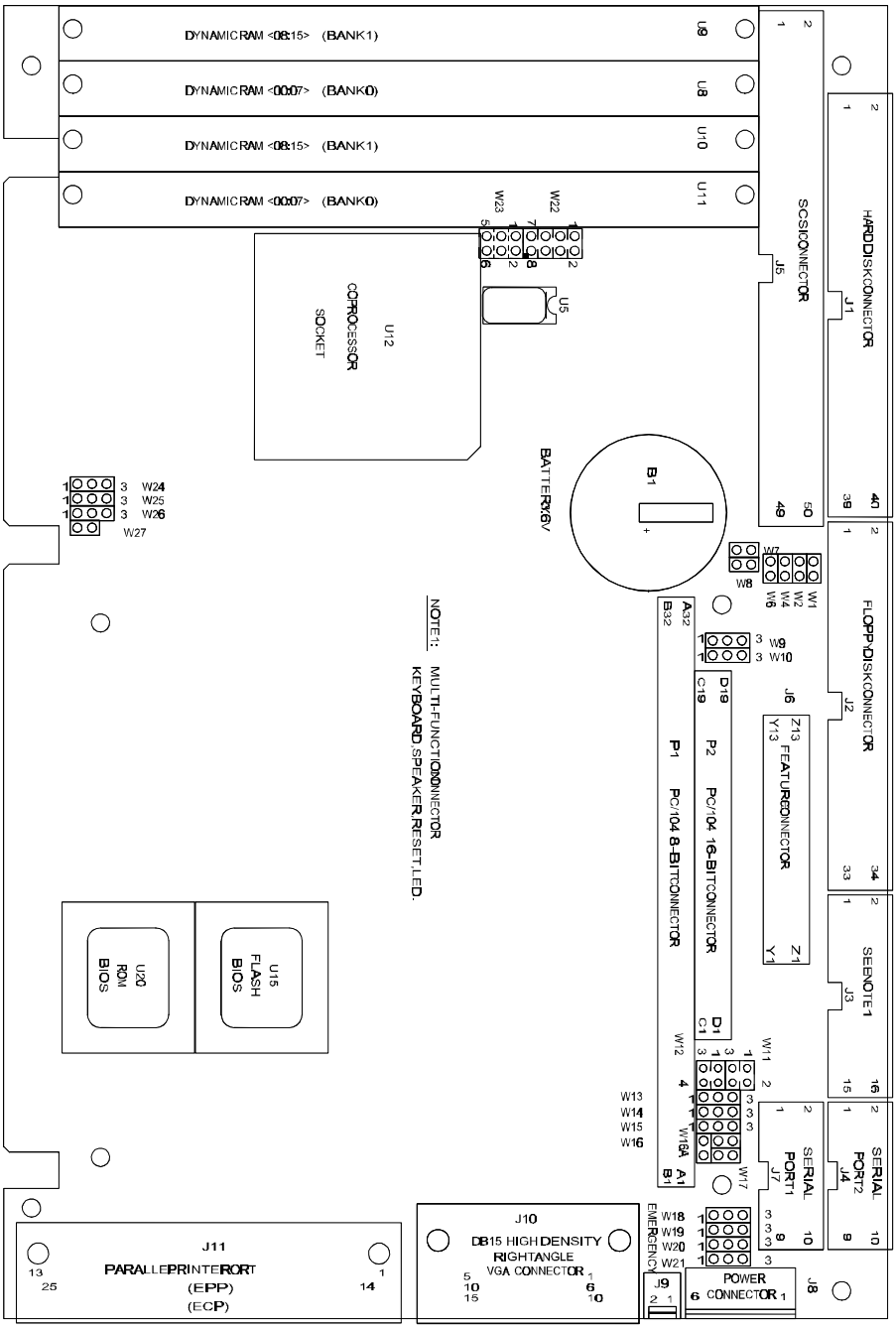
This Section describes how to configure hardware options by setting jumper switches on the VIPer board.

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

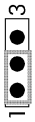
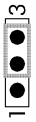
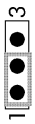
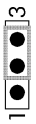
Diagram 3-1 on the next page shows 26 jumpers labeled from W1 to W27 and J9 (W3 and W5 do not exist). These appear as rectangular boxes containing small circles which represent the pins. The jumpers are labeled on the board as well. When there are more than two pins in a jumper, then some of the pins are also numbered on the diagram and on the board, so that it will be possible to locate each pin by its number.

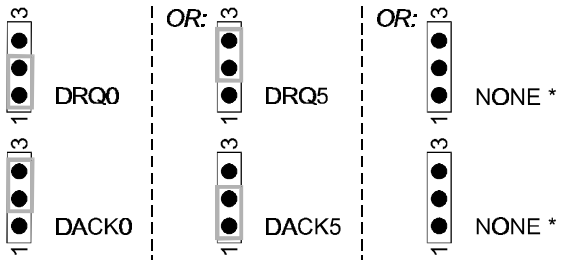
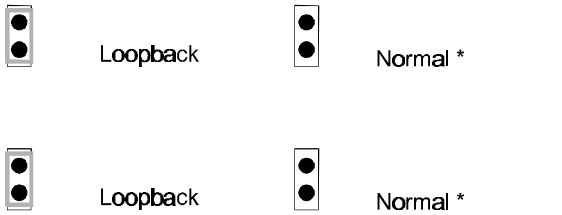
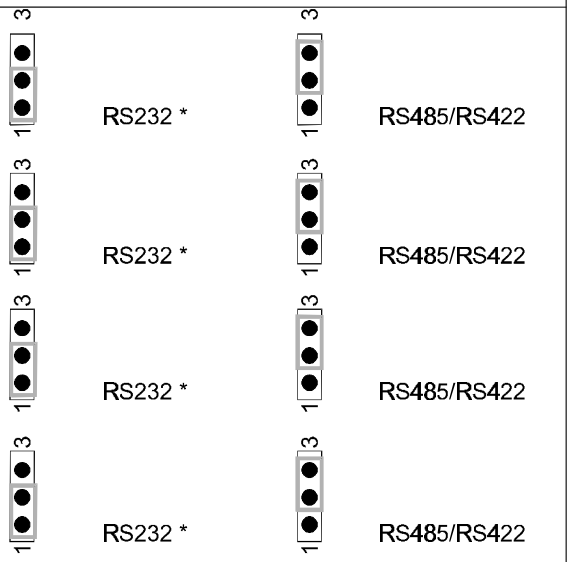


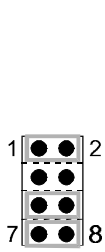
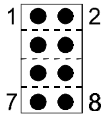
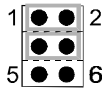
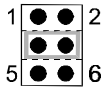
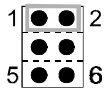
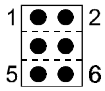
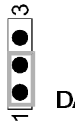
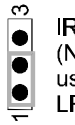
Setting Jumpers 3-2

3.03 JUMPER SETTINGS

TABLE 3-1a to 3-1c on the following pages 3-3 to 3-5 show the jumper settings for W1 to W27 and J9.

NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)			
W1	Watchdog Timer		Enabled *		Disabled
W2	Flash Disk write		Enabled *		Disabled
W4	Flash BIOS write		Enabled *		Disabled
W6	IOCHRDY signal to IDE interface		Enabled		Disabled
W7	Power fail monitoring (Non Maskable Interrupt on Power Fail Output)		Enabled		Disabled
W8	SCSI I/O: Base address		140H		340H *
W9	Battery selection		Internal battery *		External battery
W10	Power fail detection source (enabled with W7)		External Power Fail Input to Pin 6 of J8 *		Internal/e battery wl less than
W11 & W12	2.88 MB High Density Floppy, EDOUT signal 2.88 MB High Density Floppy, HDOUT signal	EDOUT left to software* HDOUT left to software*	 	OR: 1-3: EDOUT to Pin 29 (J2); 2-4: Ground to Pin 17 (J2) 1-3: HDOUT to Pin 33 (J2); 2-4: Ground to Pin 27 (J2)	 	OR: 1-2: I to Pin 3-4: (to Pin 1-2: I to Pin 3-4: (to Pin

NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W13 & W14	DMA Request Signal for SCSI Controller DMA Acknowledge Signal for SCSI Controller	
W15	SCSI IRQ Channel	
W16A	IRQ9 from Video	
W16 W17	RTS2-CTS2 Serial Port 2 RS485/RS422 Loopback DSR2-DTR2 Serial Port 2 RS485/RS422 Loopback	
W18 W19 W20 W21	Serial Port 2 Configuration Serial Port 2 Configuration Serial Port 2 Configuration Serial Port 2 Configuration	

NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W22	Extended BIOS Modes (These jumpers are configured separately, even though they are grouped together here)	 1-2: Disable Onboard VGA Controller 3-4: Not used 5-6: VT100 Mode 7-8: Serial Download Mode  1-2: Enable Onboard VGA Controller * 3-4: Not used 5-6: Standard Mode * 7-8: Normal Mode *
W23	1-4: Supervisor I/O Base address --- 5-6: Not used	 190H *  390H  290H  390H
W24 & W26	DMA Acknowledge Signal for ECP Mode DMA Request Signal for ECP Mode	 DACK1 OR:  DACK3 OR:  NONE *  DRQ1  DRQ3  NONE *
W25	Interrupt Signal from onboard Parallel Port	 IRQ5 (Normally used for LPT2)  IRQ7 (Normally used for LPT1) *  NONE: IRQ5 & IRQ7 are free
W27	System Clock (SYSCLK)	 8 Mhz Standard; Asynchronous *  Frequency programmable in AMI BIOS Setup (Section 10); Synchronous
J9	BIOS boot selection	 Emergency boot (from ROM BIOS)  Normal boot (from Flash BIOS) *

SECTION 4
INSTALLING & WORKING WITH SYSTEM COMPONENTS

4.01 MICROPROCESSOR

The microprocessor available on the VIPer board is an 80386SX 33 MHz CPU (Central Processing Unit) or a Cyrix/TI 80486SLC 33 MHz CPU.

The 486SLC microprocessor is manufactured by Cyrix and has these features:
- 80486SX instruction set compatible,
- 32-bit internal/16-bit external data path,
- 1 KB of Internal Cache Memory: explained in section 4.03.

4.02 INSTALLING MATH COPROCESSOR

The board's coprocessor socket (U12) accepts an 80387SX Math Coprocessor. Mathematical calculations are performed by this coprocessor.

To install an 80387SX math coprocessor, follow these steps:
- Make sure that power to the computer board is off.
- Align the coprocessor so that the notched corner of the chip matches the notched corner of the socket.
- Carefully press the chip into the socket.
- Please refer to Appendix E - RECOMMENDED DEVICES & MATING CONNECTORS - for a list of coprocessors.

4.03 CONFIGURING CACHE

The 486SLC microprocessor has 1 KB of 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 CMOS 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 Internal Cache Memory in the Advanced CMOS Setup screen to Enabled or Disabled.

Cache is configured in the second screen of VIPer Setup (to run VIP-UP, hit the the CTRL and V keys simultaneously during boot-up before or when the message - "Press CTRL-V to enter TEKNOR VIP-UP" - appears near the top of the screen). VIPer Setup allows definition of non-cacheable blocks of system memory.

Section 10 - VIPer SOFTWARE SETUPS - documents the AMIBIOS Setup and the VIPer Setup, and should be consulted to configure Cache.

4.04 SYSTEM CONTROLLER OVERVIEW

The VL82C315A System Controller used on the VIPer board is a true single chip AT high-performance controller intended primarily for low-power applications which require a high degree of integration. It is also an excellent choice for high integration, low-cost desktop systems.

The System Controller includes two DMA controllers, two interrupt controllers, a timer, a clock generator and ready interface, a bus controller, a keyboard controller and a real-time clock. Some of these features are explained below.

4.04.1 DMA CONTROLLERS

The VIPer supports seven Direct Memory Access (DMA) channels. Two DMA controllers, functionally equivalent to the 8237, are used with four channels on each chip.

The SCSI controller can be configured for Channel 0 or 5. The parallel port's ECP mode can be configured to use Channel 1 or 3. Channel 2 is reserved for the floppy controller and Channel 4 is used to cascade Channels 0 through 7 to the microprocessor.

TABLE 4-1: 8237 DMA Controller

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

4.04.2 INTERRUPT CONTROLLERS

Two 8259 interrupt controllers handle the interrupts on the VIPer801. Six interrupt lines are directly linked to the keyboard controller timer, the real-time clock, both serial ports and the parallel port.

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
IRQ 2	Cascade controller # 2	IRQ 10	Available (SCSI)*
IRQ 3	COM 2*	IRQ 11	Available (SCSI)*
IRQ 4	COM 1*	IRQ 12	Available
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.

4.04.3 TIMER/COUNTER

The 8254 timer features three independent 16-bit timer/counters. Timer 0 is tied to Interrupt 0, Timer 1 is used to generate the refresh with DMA Channel 0, and Timer 2 is used for the speaker port.

4.04.4 KEYBOARD CONTROLLER

The keyboard controller on the VIPer801 is compatible to Intel 8042 and is programmed to support the keyboard serial interface. The standard IBM AT® keyboard is supported. It can be hooked up using the supplied DIN connector cable.

The keyboard controller receives serial data from the keyboard, checks data parity, translates scan codes, and presents the data to the system as a byte of data in its output buffer. The controller can interrupt the system when data is placed in its output buffer, or wait for the system to poll its status register to determine when data is available.

TABLE 4-3: Keyboard Controller

ADDRESS		**REGISTER**
060	Read	Keyboard output buffer register
060	Write	Data write
064	Read	Status register
064	Write	Command write

4.04.5 REAL-TIME CLOCK

The Real-Time Clock (RTC) is compatible with the popular MC146818 used on the IBM AT®. It combines a complete time-of-day clock with a one-hundred year calendar, an alarm, a programmable periodic interrupt, and 114 bytes of low-power static RAM. A battery backup facility is provided for the RTC. The internal clock circuitry uses 14 bytes of this RAM, and the rest is reserved for configuration information.

4.05 SUPERVISOR UTILITIES

The VIPer series incorporates features that are usually not found on commercial PCs. TEKNOR computers utilize address space 190H, 290H or 390H to enable these special features. The I/O address is jumper selectable (W23 jumper - Section 3).

TABLE 4-4: Register x90 (hex)

Bit #	**Bit Value (Default)**	**Function:** WRITE	READ
0	0	Enable Watchdog 1=enable, R/W bit	Same
1	1	Watchdog activate 1-0-1 to toggle, R/W bit	Same
2	0	Flash VPP enable	Same
3	0	Enable direction control RS-485 1=enable RS-485 only, write only	Power Detection Output or Battery Low output
4	0	Reserved, ENWF	W22(1-2) Status
5	0	Reserved, ENWB	W22(3-4) Status
6	1	Reserved, B64/16	W22(5-6) Status
7	1	Reserved, STANDBY 535*	W22(7-8) Status

* Active low signal

☞ **Not all bits are R/W. Therefore, be certain to keep a mirror image of register x90(hex) when programming it.**

☞ **All bits are 0 after a hardware RESET or power up condition.**

☞ **Write the values shown in the "Bit Value (Default)" column if you are unsure.**

4.06 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 Header):

TABLE 4-5: J3 Keyboard Header

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
KBDCLK	I/O	1		2	-	GND
KBDDATA	I/O	3		4	-	GND
VCC	-	5		6	-	VCC
SPKR	O	7		8	-	VCC
KBDINH	I	9		10	-	GND
DOWNLD*	I	11		12	-	GND
PBRES*	I	13		14	-	GND
ACT*	O	15		16	-	VCC

* Active low signal

The following functions are available on the keyboard header, J3:

- 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.

4.07 PC/104 EXPANSION CARDS

The VIPer accepts PC/104 Expansion cards. PC/104 offers full architecture, hardware and software compatibility with PC Bus, but 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.

SECTION 5
INSTALLING PERIPHERALS (PARALLEL/SERIAL)

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).

For more information on parallel port modes, the following Application Note is available from TEKNOR's Technical Support department: #AN95001A "Using the FDC37C665/666 Parallel Port".

5.01.2 CONNECTOR

The connection is done through a DB-25 connector located at the edge of the board (J11).

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

TABLE 5-1: Parallel Port Connector (J11) - Standard Mode

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

* Active low signal

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

TABLE 5-2: Parallel Port Connector (J11) - EPP Mode

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

* Active low signal

The following table shows the pin-out for this connector, when it is in ECP mode:

TABLE 5-3: Parallel Port Connector (J11) - ECP Mode

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

* 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 JUMPERS

Parallel port jumpers and their settings appear below:

- W25 Interrupt Signal from onboard Parallel Port:

  - Pins 1-2 shorted: IRQ5 (normally used for LPT2), or

  - Pins 2-3 shorted: IRQ7 (normally used for LPT1): This is the initial setting, or

  - No jumpers: No interrupt used: IRQ5 and IRQ7 are free.

- W26 DMA Request Signal for ECP mode &
  W24 DMA Acknowledge Signal for ECP mode:

  - No jumpers: This is the initial setting.

  - Or: W26: Pins 1-2 shorted: DRQ1, and
    W24: Pins 1-2 shorted: DACK1.

  - Or: W26: Pins 2-3 shorted: DRQ3, and
    W24: Pins 2-3 shorted: DACK3.

For location and settings of jumpers, refer to Section 3 of this manual.

5.01.4 VIPer SETUP

In the last screen of the VIPer Setup utility, these parameters are configured:

- Parallel Port Address:

  - 378H is the initial setting;
  - Other settings are: 278H, 3BCH or Disabled.

- Parallel Port Mode:

  - Printer Mode (standard) is the initial setting;
  - Other setting is Extended Mode (for ECP and EPP).

- Parallel Port Extended Mode Select:

  - Standard and SPP (bi-directional) is the initial setting;
  - Other settings are: - EPP (Enhanced Parallel Port) and SPP,
    - ECP (Extended Capabilities Port), and
    - ECP Mode & EPP Mode.

  This parameter is only in effect if Parallel Port Mode parameter is Extended.

- IRQ3, IRQ4, FINTR & PINTR Polarity:

  - Active High, Inactive Low is the initial setting;
  - Other setting is Active Low, Inactive hi-z (high impedance).

For more detail on the VIPer Setup, refer to Section 10 of this manual.

5.02 SERIAL PORTS

There are two 16C550 compatible serial ports. These have internal 16-byte FIFO buffers for more efficient data transfers.

For information on the programming of serial ports with the use of FIFO buffers, you can ask for Application Note # AN93007 from TEKNOR's Technical Support department.

5.02.1 CONNECTORS

Serial Port 1 (J7) RS232

The Serial Port 1 is configured as RS232, and is 100% compatible with the IBM-AT serial port, with the IBM 9-pin DSUB Standard. The following tables show their pin-outs:

TABLE 5-4a: Serial Port 1 (J7) RS232

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				

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 pin-out 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) RS232

The Serial Port 2 can be configured as RS232 or RS485. When it is configured as a RS232 port, it is 100% compatible with the IBM-AT serial port, with the IBM 9-pin DSUB Standard. The following tables show their pin-outs:

TABLE 5-5a: Serial Port 2 (J4) RS232

Pin Number / Signal Flow / Signal				Pin Number / Signal Flow / 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				

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

Pin Number / Signal Flow / Signal				Pin Number / Signal Flow / 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 pin-out 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) RS485

If Serial Port 2 is configured for RS485 operation, it can support either full-duplex or party line communication.

Full Duplex Operation (RS422): Upon power-up or reset, the COM2 interface circuits are automatically configured for full duplex operation. Pins 3 and 4 of J4 act as the receiver lines and pins 5 and 6 act as the transmitter lines.

Party Line Operation (RS485): In order to enable party line operation, the user must first write "1" to bit 3 at I/O Port x90H. This allows the transceiver (pins 3 and 4 of J4) to be controlled by the RTS signal. Upon power-up or reset, the transceiver is by default in "receiver mode" in order to prevent unwanted perturbation on the line.

In party line operation, termination resistors R5 and R7 must be installed only on the boards at both ends of the network.

The following table shows this connector's pin-out:

TABLE 5-6: Serial Port 2 (J4) RS485/RS422

Pin Number / Signal Flow / Signal				Pin Number / Signal Flow / Signal		
DCD	I	1	2	I	DSR
RXD(-)	I/O	3	4	I/O	RXD(+)
TXD(-)	O	5	6	I	TXD(+)
DTR	O	7	8	I	RI
GND	-	9			

5.02.2 JUMPERS

Serial ports jumpers and their settings appear below:

- W16 DSR2-DTR2 &
  W17 RTS2-CTS2:

    - W16 and W17 shorted: Loopback, or

    - W16 and W17 open: Normal: This is the initial setting.

- W18, 19, W20 & W21 Serial Port 2 Configuration:

    - Pins 1-2 shorted: RS232: This is the initial setting.

    - Or Pins 2-3 shorted: RS485/RS422.

For location and settings of jumpers, refer to Section 3 of this manual.

5.02.3 VIPer SETUP

In the last screen of the VIPer Setup utility, these parameters are initially configured as follow:

- COM3 & COM4 Addresses: - COM3: 3E8H, COM4: 2E8H.
- UART 1 Interface: - Enabled.
- UART 1 Address: - COM1: 3F8H.
- UART 2 Interface: - Enabled.
- UART 2 Address: - COM2: 2F8H.
- IRQ3, IRQ4, FINTR & PINTR Polarity: - Active High, Inactive Low.

For more detail on the VIPer Setup, refer to section 10.01 of this manual.

SECTION 6
INSTALLING IDE, FLOPPY & SCSI DEVICES

6.01 INSTALLING IDE DEVICES

6.01.1 TYPE OF HARD DISK SUPPORTED

The Viper800 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.

6.01.1 CONNECTOR

TABLE 6-1: Hard Disk Connector (J1) - Pin-Out

Pin Number	Signal Flow	Signal	Pin Number	Signal Flow	Signal
1	I	RESET*	2	-	GND
3	I/O	SD7	4	I/O	SD8
5	I/O	SD6	6	I/O	SD9
7	I/O	SD5	8	I/O	SD10
9	I/O	SD4	10	I/O	SD11
11	I/O	SD3	12	I/O	SD12
13	I/O	SD2	14	I/O	SD13
15	I/O	SD1	16	I/O	SD14
17	I/O	SD0	18	I/O	SD15
19	-	GND	20	-	Not Used
21	-	Not Used	22	-	GND
23	I	IOW*	24	-	GND
25	I	IOR*	26	-	GND
27	O	IOCHRDY	28	I	BALE
29	-	Not Used	30	-	GND
31	O	IRQ14	32	O	IOCS16*
33	I	SA1	34	-	Not Used
35	I	SA0	36	I	SA2
37	I	CS0*	38	I	CS1*
39	O	ACTIVE*	40	-	GND

* Active low signal

6.01.2 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.

6.01.3 JUMPERS

IDE Controller jumper and its setting appears below:

- W6 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.

6.01.4 VIPer SETUP

In the second screen of the VIPer Setup utility, the drive letter position C, D, E and F can be changed, when the first parameter "Disks C: to F: Configuration (BIOS Int 13h)" is set to Enabled.

In the last screen, these parameters are initially configured as follow:

- IDE Interface: - Enabled.

- IDE Address Space: - 1st: 1F0H-1F7H, 3F6H, 3F7H.

- IRQ3, IRQ4, FINTR & PINTR Polarity: - Active High, Inactive Low.

For more detail on the VIPer Setup, refer to Section 10.01 of this manual.

6.01.5 AMIBIOS SETUP

When installing a hard disk, certain parameters need to be set in the AMIBIOS Setup program, on the following screens:

- Standard CMOS Setup screen:
  - Select a standard drive type in the setup screen
  - Or use type 47 (user defined) type and enter the required parameters: # of cylinders, heads, write precompensation, landing zone, sectors per track and size. The information (drive type and parameters) can be supplied by the drive manufacturer
  - Or select AUTO HARD DISK DETECT from the main menu. This utility will provide the user with a complete set of parameters for the hard drive. The newly found parameters are then displayed with the message: "ACCEPT PARAMETERS FOR C: (Y/N) ?" If the answer is yes, the parameters are stored in the user defined type 47.

- Advanced CMOS Setup screen: This is the parameter of interest:
  - Hard Disk Type 47 RAM Area: The end user can specify a user-definable hard disk for drive C or D. The data for the type 47 disk type is stored in 0:300H in lower system DRAM or in the top 1 KB of applications memory, starting at address 639 KB.

For more detail, refer to Section 10.02 - 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 (2.88 MB). 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 CONNECTOR

TABLE 6-2: Floppy Disk Connector (J2) - Pin-Out

Pin Number	Signal Flow	Signal	Pin Number	Signal Flow	Signal
1	-	GND	2	O	RPM/LC
3	-	GND	4	-	Not Used
5	-	GND	6	-	Not Used
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	-	N. C. [1]	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	-	N. C. [1]	28	I	WRITE PROTECT*
29	-	N. C. [1]	30	I	READ DATA*
31	-	GND	32	O	HEAD SELECT*
33	-	N. C. [1]	34	I	DSKCHG*

* Active low signal

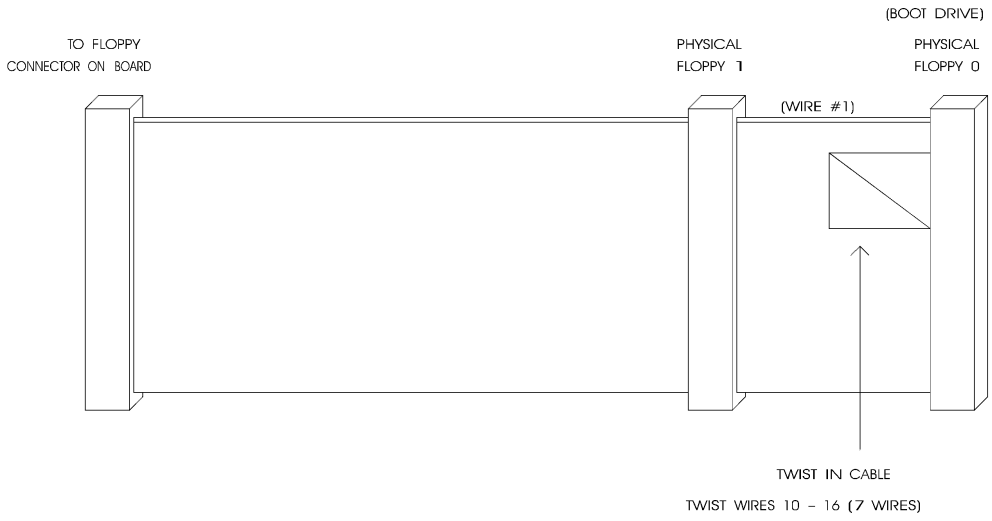
[1] By default, these pins are not connected, however, by installing the W11 and W12 jumpers, these configurations are possible (see also page 6-8 in the manual):

17 GND	Or:	17 EDOUT (2.88 MB)	
27 GND		27 HDOUT (2.88 MB)	
29 EDOUT (2.88 MB)		29 GND	
33 HDOUT (2.88 MB)		33 GND	

6.02.3 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.



Enhanced Floppy Mode:

In order to connect your 2.88 MB floppy drive, simply indicate the proper floppy disk drive in the AMIBIOS Setup program (Section 10); it is not necessary to set the HDOUT and EDOUT media detection signals jumpers.

6.02.4 JUMPERS

There are three possible jumper configurations for the 2.88 MB High Density Floppy EDOUT and HDOUT signals:

(1) W11: No jumper: EDOUT left to software, and
W12: No jumper: HDOUT left to software. This is the initial setting.

(2) W11: Short Pins 1 and 3: EDOUT to Pin 29 (J2), and
Short Pins 2 and 4: Ground to Pin 17 (J2), and

W12: Short Pins 1 and 3: HDOUT to Pin 33 (J2), and
Short Pins 2 and 4: Ground to Pin 27 (J2).

(3) W11: Short Pins 1 and 2: EDOUT to Pin 17 (J2), and
Short Pins 3 and 4: Ground to Pin 29 (J2), and

W12: Short Pins 1 and 2: HDOUT to Pin 27 (J2), and
Short Pins 3 and 4: Ground to Pin 33 (J2).

These jumpers are optional. Your 2.88 MB Floppy Drive will operate correctly if 2.88 MB is indicated in the AMIBIOS - STANDARD CMOS SETUP screen. Not installing these jumpers will work for all floppy disk drives, as long as the proper floppy type is indicated in AMIBIOS Setup. We recommend you not install these jumpers, for proper operation.

For location and settings of jumpers, refer to Section 3 of this manual.

6.02.5 VIPer SETUP

In the last screen, these parameters are initially configured as follow:

- Floppy Disk
  Controller Interface: - Enabled.

- Floppy Disk Controller
  Address Space: - 1st: 3F0H-3F7H.

- IRQ3, IRQ4, FINTR
  & PINTR Polarity: - Active High, Inactive Low.

For more detail on the VIPer Setup, refer to Section 10.01 of this manual.

6.02.6 AMIBIOS SETUP

- Standard CMOS Setup:

- Floppy drive A & B: Choose the correct drive.

For more detail, refer to Section 10.02.

6.03 INSTALLING SCSI DEVICES

The SCSI Controller is optional equipment on the Viper800 board.

The Viper800 board provides an interface between a host or peripheral device, and the Small Computer System Interface (SCSI) bus. An impressive combination of hardware and firmware features makes this a truly powerful card.

The Viper800 uses the popular Adaptec 6360, giving you a burst data transfer rate of 10 MB/second in synchronous mode, at a clock rate of 32 MHz, and 3.9 MB/second in asynchronous mode. Built using proven CMOS low-power technology, the board also integrates the SCSI II standard command set.

In addition, a SCSI Host Adapter allows you to connect up to seven SCSI peripherals with your computer system.

What's more, the Viper800 SCSI can co-exist with other hard disk/controller combinations: such as ST-506, RLL, ESDI and IDE.

6.03.1 INSTALLING A FIXED SCSI HARD DISK

This section will explain how to go about installing a fixed SCSI Hard Disk on your system. No additional hardware or drivers are necessary if no more than two IDE/SCSI hard disks will be present in your system.

To install your fixed SCSI hard disk, these steps must be followed:

1 - VIPer Setup

It is important that you configure your VIPer properly with the VIPer Setup utility prior to physically installing your SCSI hard disk. This software is explained and its screens are displayed in Section 10.01 of this manual.

When done, update your VIPer Setup by pressing the F10 key.

You should not "install" your SCSI hard disk type in AMIBIOS Setup (only your IDE hard disk).

2 - Jumpers (Power Off)

Now power off your computer. The VIPer board's initial jumper settings should be kept in most cases, unless there is a conflict with other devices you have installed.

- W8: Sets up the SCSI I/O Port Address:
  - Shorted: 140H,
  - Or open: 340H: This is the initial setting.
- W15: Sets up the SCSI IRQ Channel:
  - Pins 1-2 shorted: IRQ10, or
  - Pins 2-3 shorted: IRQ11: This is the initial setting, or
  - No jumpers: No interrupt used: Free up IRQ10 and IRQ11.
- W13 and W14 are not used since the SCSI BIOS does not use the DMA signals.

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

3 - Connect SCSI Cable (Power Off)

Make certain that both ends of the SCSI cable are terminated and that all devices in between the ends are non-terminated. The SCSI connector on the VIPer board is terminated.

Attach one end of the SCSI cable to the J5 SCSI 50-pin connector (see Diagram 8-1 for the location). Make sure line 1 of the cable is matched with pin 1 of connector J5.

Attach the other end to your SCSI device, making sure line 1 is matched with pin 1 on your device.

You must also install a cable from your power supply to your device.

4 - Follow Specific Device Installation Instructions (Power On)

Follow installation instructions provided with your SCSI peripheral device to install it in the host.

☞ **Each device being installed must be assigned a unique identifier called a SCSI Target ID. The lower the ID, the lower the priority level of the device in the SCSI subsystem. The host adapter is usually assigned the highest priority level (i.e. 7). Table 6-3 lists common SCSI Target IDs.**

TABLE 6-3: Common SCSI Target IDs

SCSI Device	**Commonly Used IDs**
Host Adapter	7
Hard Disks	0,1,2,3
CD-ROM	4,5
Tape drive	5,6

6.03.2 INSTALLING OTHER SCSI DEVICES

To install any of the following: CD-ROM, Magneto-Optical/Removable Disk Drive, Tape Drive, Write Once Read Many (WORM) and scanners, contact TEKNOR's Sales or Technical Support department for the SCSI manual and a software utilities diskette which includes any device driver you may need.

6.03.3 SCSI CONNECTOR

TABLE 6-4: SCSI Connector (J5) - Pin-Out

Pin Number	Signal	Pin Number	Signal
1	GND	2	SCSI D0
3	GND	4	SCSI D1
5	GND	6	SCSI D2
7	GND	8	SCSI D3
9	GND	10	SCSI D4
11	GND	12	SCSI D5
13	GND	14	SCSI D6
15	GND	16	SCSI D7
17	GND	18	SCSI DP*
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	Term Power	26	Term Power
27	GND	28	GND
29	GND	30	GND
31	GND	32	ATN*
33	GND	34	GND
35	GND	36	BSY*
37	GND	38	ACK*
39	GND	40	RESET*
41	GND	42	MSG*
43	GND	44	SEL*
45	GND	46	C/D*
47	GND	48	REQ*
49	GND	50	I/O*

* Active low signal

SECTION 7
INSTALLING SOLID STATE DISKS (SRAM/FLASH)

Solid State Disks (SSDs) have no moving parts and are far less susceptible to dirt, moisture, vibration and temperature variations than mechanical floppy disks. Two types of SSDs are available: Static-RAM (SRAM) and Flash EPROM. The VIPer supports up to 512 KB of SRAM and 1 MB of Flash EPROM.

7.01 SRAM DISK

The VIPer comes optionally with 128 KB or 512 KB of SRAM, which can be used as a semiconductor disk. The advantage of a semiconductor disk over a mechanical drive is that it is much faster. It also has a major advantage over a regular RAM drive (made of DRAM): SRAM is battery-backed, which means that all your data will be retained even if you power down your system.

The SRAM disk also "looks" just like a hard disk since you can partition and format it, and read and write directly to it, all using regular DOS commands.

Creating a SRAM disk is just a matter of using the FDISK and FORMAT commands as detailed in the following steps:

- First, you must assign a drive letter to your SRAM drive. This can be done in the second screen of the VIPer Setup utility (explained in Section 10.01 of this manual). If you want the SRAM disk to be bootable, then assign the C drive letter to it.

- Then, from the DOS prompt, invoke FDISK.

    - If more than one disk are present in your system, you will first have to select option 5 -Change current fixed disk drive - by typing "5" and pressing ENTER. The capacity of the SRAM disk will be displayed as 0 MB for a 128 KB disk or 1 MB for a 512 KB disk (this is normal, since DOS FDISK was designed to work with larger disks; it will work anyway). To change the current fixed disk drive, type the corresponding number from the option list and press ENTER; to return to the main menu press ESC.

- From the main menu, select option 1 - Create DOS partition or logical DOS drive - by typing "1" and pressing ENTER.

- Then, from the - Create DOS partition or logical DOS drive - menu, select option 1 - Create primary DOS partition - by typing "1" and pressing ENTER. The capacity of the disk is displayed as 0 MB for a 128 KB disk or 1 MB for a 512 KB disk. Enter the percentage of the available SRAM memory you wish to use for the disk; this should be 100% most of the time. If you use less than 100%, the remaining memory will be free and may be used as "scratch pad memory" by your application.

- FDISK will not automatically set the newly created partition as an active partition. If you want to make SRAM bootable, select option 2 - Set active partition - from the main menu, by typing "2" and pressing ENTER.

• Finally, from the DOS prompt, use the FORMAT command with the appropriate drive letter; do not forget to use the /s switch if you wish to make it bootable.

☞ **Files transferred to the battery-backed SRAM disks will be preserved as long as the battery is good. The battery can typically last two years. However, actual life depends on the consumption of the SRAM devices installed, as well as the amount of time the board is powered off.**

7.02 FLASH EPROM DISK

The non-volatile characteristics of Flash memory eliminate the risk of losing valuable data updates (a concern with battery-backed SRAM). As a result, Flash memory offers major advantages in applications like automated factories, remote systems, portable equipment and similar environments. Also, Flash memory is obtainable at a much lower cost than EPROM or battery-backed SRAM.

The VIPer comes optionally with 1 MB of Flash EPROM for use as Flash disks. Two special software utilities are available for creating Flash disks: TEKNOR's VFLASH software and Microsoft's FLASH FILE SYSTEM II. FLASH FILE SYSTEM II files are not part of the standard VIPer package, but can be purchased from TEKNOR.

A Flash EPROM disk created with VFLASH is very much like a hard disk. A partition is created and data is stored in files, just like on a hard disk. The main differennce between the two is that a Flash disk is a read-only drive. Therefore, in order to write software to Flash devices you must use VFLASH. VFLASH must also be used if you want to make the Flash EPROM disk bootable, after which you must configure the Flash Disk as C: in the VIPer Setup (see section 10.01).

With the FLASH FILE SYSTEM II software, Flash EPROM disks are read/write and may be accessed via DOS commands. For information on using this utility, see Section 12.

☞ **Jumper W2 on the VIPer must be installed when the Flash EPROM device is present. This jumper enables +12 V VPP for writing to Flash with the proper utilities and drivers.**

SECTION 8
INSTALLING VIDEO

8.01 CRT SVGA CONTROLLER

The VIPer800's Local Bus True Color CRT SVGA controller is a single-chip video controller from CIRRUS LOGIC (CL-GD5424).

It is 100% IBM hardware- and BIOS-compatible with IBM® VGA display standards and therefore will function with any IBM compatible VGA/SVGA monitor.

The VIPer800 works with both color and monochrome VGA/SVGA displays. 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 Hercules, CGA and EGA monitors. While programs written for other resolutions (e.g., CGA and EGA) will operate on VGA monitors, the VIPer800 will not drive non-VGA monitors.

The video controller features also include the following:

- High-performance, Write Buffer architecture;
- Integrated Palette DAC and Dual-frequency Synthesizer;
- 1 MB of display memory;
- Built-in feature connector support (VESA/VGA pass-through connector);
- 132-column text modes;
- Video subsystem - 46E8 sleep mechanism;
- 64 x 64 pixel hardware cursor;
- Resolutions of up to 1280 x 1024 pixels. These are supported:
  - 1280 x 1024 x 16 color interlaced,
  - 1024 x 768 x 16 and 256 colors interlaced and non-interlaced,
  - 800 x 600 x 32 KB, 64 KB color,
  - 640 x 480 x 16.8 million colors;
- 16-bit '386 and '486 local bus interface.

8.02 CONNECTING CRT VIDEO DISPLAY

8.02.1 CONNECTOR

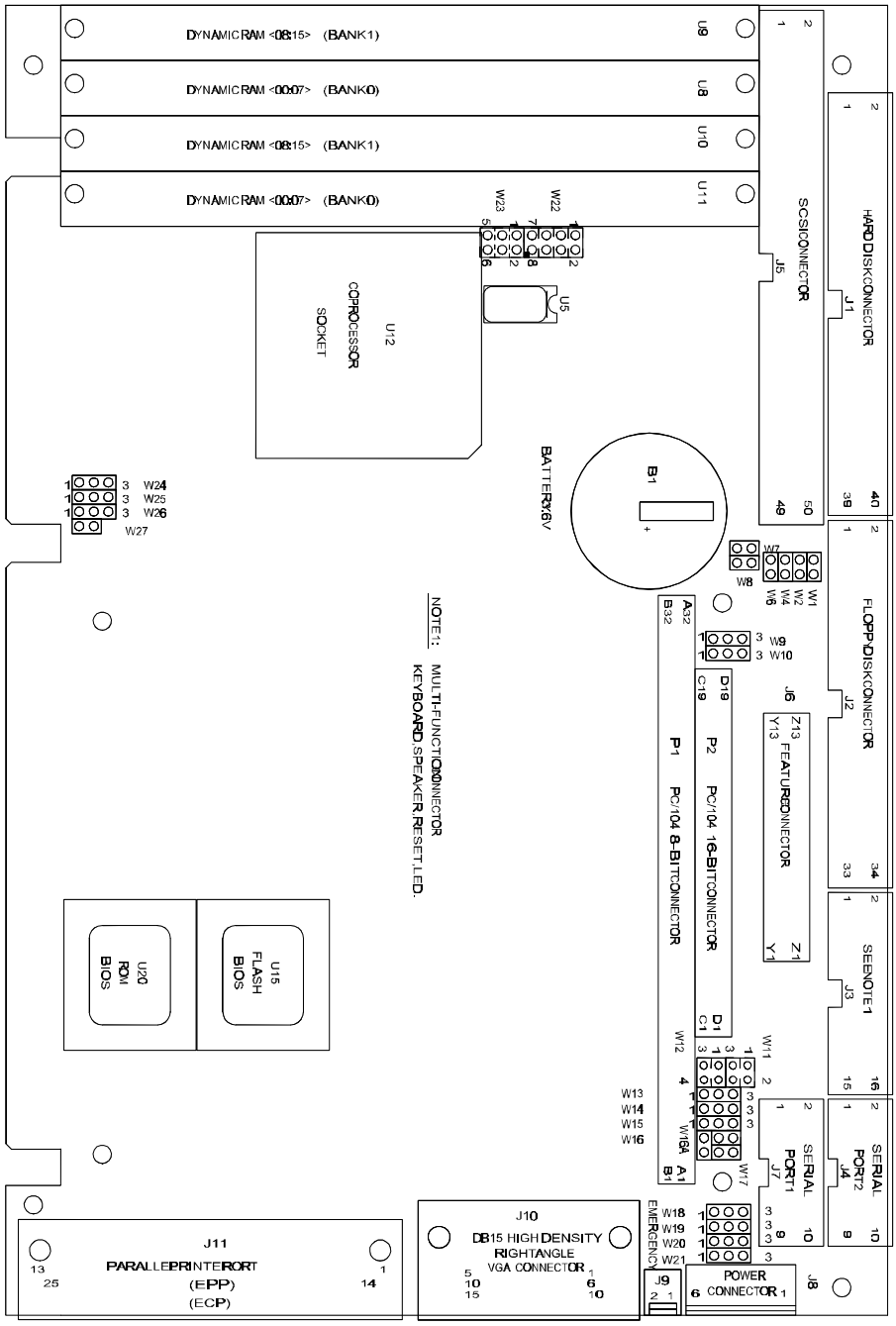
See Diagram 8-1 on the following page for the location of J10.

TABLE 8-1: VGA Connector (J10) - Pin-Out

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

8.02.2 INSTALLATION

Connecting CRT video to the VIPer800 is simple. Merely connect the standard VGA DB15 male connector to the board's J10 high density, right angle, female connector.


DYNAMIC RAM <08:15> (BANK1)
DYNAMIC RAM <00:07> (BANK0)
DYNAMIC RAM <08:15> (BANK1)
DYNAMIC RAM <00:07> (BANK0)
U9
U8
U10
U11
SCSI CONNECTOR
J5
HARD DISK CONNECTOR
J1
U12
COPROCESSOR SOCKET
U5
W22
W23
BATTERY 3.6V
B1
W24
W25
W26
W27
W7
W8
W1
W2
W4
W6
W9
W10
J6
FEATURE CONNECTOR
Z13
Y13
Z1
Y1
FLOPPY DISK CONNECTOR
J2
SERIAL PORT 1
J7
SERIAL PORT 2
J4
SERIAL
J3
NOTE1: MULTI-FUNCTION CONNECTOR
KEYBOARD SPEAKER RESET LED.
P1 PC/104 8-BIT CONNECTOR
P2 PC/104 16-BIT CONNECTOR
D19
C19
D1
C1
A32
B32
A1
B1
W11
W12
W13
W14
W15
W16
W17
W18
W19
W20
W21
EMERGENCY
J9
POWER CONNECTOR
J8
U20
ROM BIOS
U15
FLASH BIOS
J11
PARALLEL PRINTER PORT
(EPP)
(ECP)
J10
DB15 HIGH DENSITY
RIGHT ANGLE
VGA CONNECTOR

8.03 DISABLING VIDEO DISPLAY

The video controller can be disabled by shorting pins 1 and 2 on the W22 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.

8.04 FEATURE CONNECTOR (J6)

The feature connector at J6 is a VESA/VGA pass-through connector. It supports these video overlay functions:

- VESA Pass-through;
- Dynamic Overlay with EVIDEO;
- On-chip Window Timing Generator;
- Dynamic Overlay with Color Key;
- Dynamic Overlay with Color Key and EVIDEO Pin.

Through the J6 feature connector the VIPer makes possible dynamic overlay. In dynamic overlay configurations, the video signal can be overlayed on a pixel basis. This makes it possible to overlay a portion of the frame and mix the signal with externally generated video signal. Both the video source and the choice of pixels to overlay can be changed dynamically.

The connector's pin out is described below.

TABLE 8-2: Feature Connector (J6) - Pin-Out

I/O PIN	Signal Name	I/O PIN	Signal Name
Y1	VPO	Z1	GND
Y2	VP1	Z2	GND
Y3	VP2	Z3	GND
Y4	VP3	Z4	EVIDEO*
Y5	VP4	Z5	ESYNC*
Y6	VP5	Z6	EDCLK*
Y7	VP6	Z7	Not Used
Y8	VP7	Z8	GND
Y9	DOT CLK	Z9	GND
Y10	BLANK	Z10	GND
Y11	HSYNC	Z11	GND
Y12	VSYNC	Z12	Not Used
Y13	GND	Z13	Not Used

* Active low signal

See Diagram 8-1 for the location of J6.

SECTION 9
POWER MANAGEMENT

9.01 POWER SUPPLY SOURCE

The VIPer board is powered from one of two sources:

- Power connector (J8): Stand-alone systems are powered from an outside power supply through the J8 connector.

- ISA (AT) bus: When the board is in a passive backplane system, it is powered through the ISA bus.

The pin-out for the J8 power connector is shown in the table below:

TABLE 9-1: Power Connector (J8) - Pin-Out

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

9.02 SLEEP MODE

CMOS technology consumes more power when it is made to oscillate faster. Therefore, by reducing the oscillating speed of the chip set and processor, overall power consumption is also greatly reduced.

Average system power consumption can be reduced by halting or slowing the chip set and processor clock during idle periods.

This feature can be very interesting where power consumption is crucial, for example in portable units like laptop computers.

The CPU is put in Sleep Mode by software with the following steps:

• 1. The Sleep Frequency divider is set to the desired frequency.

• 2. The Sleep Mode feature is enabled by setting the appropriate register in the chipset.

• 3. A HALT instruction will automatically switch the CPU to the Sleep Frequency (initialized in step 1). The CPU will exit Sleep Mode when an interrupt is encountered (the keyboard, mouse or any other device can generate interrupts).

Most of the controllers on the board can individually be put to sleep by accessing their internal registers. Application Note #AN94003 describes sleep mode for TEKNOR boards; it is available through the Technical Support department.

In Appendix A, results are given for current drawn during Sleep Mode.

9.03 RESET CIRCUIT

9.03.1 EXTERNAL RESET CIRCUIT SWITCH

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

This switch should be connected between pin 13 (PBRESET) and pin 14 (GND) on the keyboard header.

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

See Section 4.06 for more information.

9.03.2 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 5 V; if the supply voltage drops below 4.65 V (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.

9.04 POWER FAIL DETECTION CIRCUIT

The power fail circuit can be used to determine if a voltage crosses a pre-determined threshold. The output of the power fail circuit can be connected to the IOCHK* line to generate a non-maskable interrupt (NMI) when the monitored voltage crosses this threshold.

Power fail monitoring is enabled by shorting the W7 jumper.

The power failure detector, which generates a NMI when a failure occurs, provides a 1.25 V threshold for DC power fail warning when the system monitors:

• Low battery detection, or
• A power supply other than +5 V DC.

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

- Internal Battery (set by W9 jumper with pins 1-2 shorted) and External Power Fail Input to Pin 6 of J8 connector (set by W10 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 (RS1) 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 1.25 V. RS1 can be calculated as follows:

  $RS1 = 1K\Omega \frac{(VI-1.25)}{1.25}$ where VI is input voltage on pin 6 of the power connector.

- Internal Battery (set by W9 jumper with pins 1-2 shorted) and Power fail detect when battery is less than 3 V (set by W10 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 3.0 V.

- External Battery (set by W9 jumper with pins 2-3 shorted) and Power fail detect when battery is less than 3 V (set by W10 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 goes lower that 3.0 V.

The W9 jumper is used to select whether the battery is onboard (1-2) or external (2-3).

The W10 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 J8 power connector,
- Or short Pins 2-3 to monitor the internal/external battery.

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.

9.05 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. The Watchdog is enabled once you write "1" in bit "0" at I/O Port x90(hex) the first time. When enabled, the microprocessor must refresh the Watchdog. This is done by writing alternatively "0" and "1" to bit 1 at I/O Port x90(hex), once every 1.6 seconds to verify proper software execution.

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.

☞ **The user program must provide the first access to I/O Port x90(hex), and must also include the refresh routine. In addition, be certain to keep a mirror image of register x90(hex) when programming it. This is necessary since register x90(hex) is a write-only user register and, as a result, is not used by the system BIOS.**

TABLE 9-2: Watchdog Timer Register

ADDRESS		**REGISTER**
x90 bit 0	Read/Write	Watchdog enable
x90 bit 1	Read/Write	Watchdog refresh

Jumper W1 must be installed to permit activation of the Watchdog. If jumper W1 is removed, the Watchdog is disabled.

The default timeout period is 1.6 seconds; however the timeout period can be changed. Shorting C62 and leaving R86 opened changes the timeout to 100 ms. Shorting R86 and installing a capacitor at C62 will change the timeout period according to the following formulae:

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

or

C76 = (Timeout (milliseconds) * 47pF) / 400ms

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

SECTION 10
VIPer SOFTWARE SETUPS

The Viper800 is fully software configurable. The setup programs allow for minimal hardware configuration.

The two software setups are explained in this Section; first the VIP-UP program - TEKNOR's own VIPer Setup program for enabling / disabling / readdressing various hardware features on the VIPer - and then the AMIBIOS Setup program which is used to change operating parameters.

10.01 VIP-UP PROGRAM

This program can be executed during boot-up.

During boot-up, hit the CTRL and V keys simultaneously, before or when you see the message "Press CTRL-V to enter TEKNOR VIP-UP" at the top of the screen (CTRL-V will work, even if the message display is disabled in VIP-UP).

There are three screens in the VIP-UP program. The values appearing on the right side of each screen can be modified: Follow the instructions found at the bottom of the screen to select another value.

Use the ↑ and ↓ keyboard keys to move up and down the screen, and on to subsequent or preceding screens. As you do, the value of the selected field is highlighted. If you press the ↓ key when the last field of the screen is highlighted, the next screen is displayed. Pressing the ↑ key when the first field is highlighted will display the first field of the preceding screen; in this way you can move quickly from screen to screen.

Once a field value is highlighted, you can change it by pressing PgDn or typing "+" on the keyboard (in VT100 mode, only "+" will work); this will usually display a higher value. You can also press the PgUp key or type "-" ("-" in VT100 mode), which will usually display a lower value.

Press F10 to save the current configuration and exit (type "U" in VT100 mode). The configuration is not saved until F10 is pressed or "U" is typed. Press ESC to exit without saving the setup.

10.01.1 FIRST SCREEN

TEKNOR MICROSYSTEMS INC --- VIPer SETUP	
TEKNOR BIOS Extension Address	E0000H-E3FFFH
TEKNOR BIOS Window Address	E8000H-EBFFFH
On Board SCSI BIOS	Enabled
SCSI BIOS Address	C8000H-CBFFFH
SCSI Base I/O Address (W8)	340H (Default BIOS)
SCSI ID Select	ID7 (Default)
SCSI IRQ Channel (W15)	IRQ 11
SCSI DMAChannel (W13 & W14)	DMA 0
SCSI Parity	Enabled
SCSI Disconnect	No Disconnect
SCSI Synchronous Negociation	Respond Only
SCSI Floptical Drive Support	Enabled
SCSI Compatibility Mode	6360 Features
↑↓ to select options	ESC - Quit without saving
PgDn(+), PgUp(-) to change an option	F10 - (U)pdate Flash BIOS

There are two parts to the screen:

1. Selection of TEKNOR BIOS addresses: The addresses of the TEKNOR BIOS extension and the TEKNOR BIOS window are set in the top part of the screen.

2. Selection of SCSI BIOS addresses and parameters:

   On Board SCSI BIOS: All the parameters in this part are Disabled or Enabled depending on the setting of this first parameter.

   SCSI BIOS Address: Sets the SCSI BIOS address.

   SCSI Base I/O Address (W8): This option specifies which I/O base address the SCSI Controller will use. You must first set this option at the desired address and then set jumper W8 at the same address.

   SCSI ID Select: This option sets the SCSI bus ID that the SCSI Controller will use in SCSI operation. The number must be unique on the SCSI bus and is usually set to 7 since this is the highest priority ID.

SCSI IRQ Channel (W15): This option specifies which interrupt channel will be used in the system. You must first set this option at the desired address and then set jumper W15 at the same address.

SCSI DMA Channel (W13 & W14): This option specifies which DMA channel will be used in the system for DMA data transfers. Currently, the BIOS does not support DMA data transfers (so open W13 and W14 jumpers).

SCSI Parity: This option selects whether parity should be checked on the SCSI bus coming into the SCSI Controller. Parity is required in SCSI-2.

SCSI Disconnect: This option allows SCSI targets to disconnect from the Controller if they will take a long time to complete the operation requested, and later reconnect when ready to finish. In single user, non-multitasking systems such as DOS it is more efficient not to allow disconnection.

SCSI Synchronous Negociation: This option selects whether the Controller should initiate synchronous data transfer negotiations with the SCSI targets. If disabled from initiating synchronous negotiations (respond only), the Controller still responds to negotiations initiated by the targets.

SCSI Floptical Drive Support: When this option is set to Enabled and at least one floptical drive is detected, then the standard floppy vector is chained and the floptical drive is installed. The physical drive number of the installed floptical drive is determined by the floppy CMOS RAM configuration during initialization. SCSI Compatibility Mode must be set to 6360 Features for this option to work.

SCSI Compatibility Mode: When this option is set to 6260 Compatibility, none of the AIC-6360's new features will be enabled in the BIOS. When this option is set to 6360 Features, these features are enabled: Up to 10 MB/s transfer rate; 20 MB floptical support (set SCSI Floptical Drive Support to Enabled); and greater than 1 GB drive support.

10.01.2 SECOND SCREEN

TEKNOR MICROSYSTEMS INC --- VIPer SETUP	
Disks C: to F: Configuration (BIOS Int 13h)	Disabled
Disk C: Configuration	Not Installed
Disk D: Configuration	Not Installed
Disk E: Configuration	Not Installed
Disk F: Configuration	Not Installed
Enter VIP-UP Message	Displayed 3 seconds
VT100 & Serial Download Speed	19200 BPS
VT100 & Serial Download Serial Port	COM1: 3F8H
Use Flash To Store CMOS RAM SETUP	No
↑↓ to select options	ESC - Quit without saving
PgDn(+), PgUp(-) to change an option	F10 - (U)pdate Flash BIOS

There are four parts to the screen:

1. Disks C: to F: Configuration (BIOS Int 13h): The Disk Configuration locations (C, D, E, F) can be user-defined by setting the first parameter "Disks C: to F: Configuration .." to "Enabled". You can then associate the disks present (e.g., Hard Disk 0, Hard Disk 1, Flash disk, SRAM disk) to the drive letter desired. The disk you want to boot from must be configured as "Disk C:". Never assign a letter to a disk that is not present. Never skip a drive letter (e.g., the following is not valid: C: assigned to a disk, D: "Not Installed", E: to another disk).

   Although the BIOS does not prevent it, you should not configure the same disk (Hard Disk 0, Hard Disk 1, Flash Disk or SRAM Disk) at two or more locations (C, D, E or F), for example, Hard Disk 0 at D and E.

2. Enter VIP-UP message: This option allows the user to enable or disable the message "Press CTRL-V to enter TEKNOR VIP-UP" at the top of the screen upon boot-up.

3. VT100 & Serial Download: The VT100 & Serial Download Speed option is for selecting the desired speed for the VT100 and Download modes. The VT100 & Serial Download Serial Port option allows the use of either COM2 or COM1 for the VT100/Serial Download Mode hookup.

4. Use Flash To Store CMOS RAM SETUP: When this option is set to "Yes", the AMIBIOS Setup will be restored during each power up (only the time and date could be lost, if the battery fails). However, modifying and saving the AMIBIOS Setup does not change the Flash copy; to update it, you must return to VIP-UP and update it while "Use Flash To Store CMOS RAM SETUP" is set to "Yes".

10.01.3 THIRD SCREEN (486 SLC ONLY)

TEKNOR MICROSYSTEMS INC --- VIPer SETUP	
Cache Organization	2-Way Set Associative
Non-Cacheable Region 1 Starting Address Non-Cacheable Region 1 Block Size	A0000 128 Kbytes
Non-Cacheable Region 2 Starting Address Non-Cacheable Region 2 Block Size	C0000 256 KBytes
Non-Cacheable Region 3 Starting Address Size n-Cacheable Region 3 Block Size	0 Disabled
No Non-Cacheable Region 4 Starting Address Non-Cacheable Region 4 Block	0 Disabled
↑↓ to select options PgDn(+), PgUp(-) to change an option	ESC - Quit without saving F10 - (U)pdate Flash BIO

This screen allows the user to define certain system memory regions as non-cacheable and to specify Cache organization. We can divide this screen into two parts:

1. Cache Organization: You can select "2-Way Set Associative" (two sets of 128, four-byte lines, which run a Least Recently Used (LRU) algorithm), or "Direct-Mapped" (a single set of 256, four-byte lines).

2. Non-Cacheable Region x: Up to four non-cacheable regions may be defined (region 1, 2, 3 and 4). The Cache memory will be located in system memory (1 to 16 MB depending on your hardware configuration), but only in regions that are not defined as "non-cacheable".

   Initial setting by TEKNOR has the two regions between 640 KB and 1 MB defined as non-cacheable (Address A0000H is 640 KB and address C0000H is address 768 KB). The reason for this setting is that many third party BIOS are located between 768 KB and 1 MB, and caching of these areas could cause various problems.

   Other regions may be defined as non-cacheable by selecting their starting address and block size. The starting address of the non-cacheable block is restricted to block size boundary alignment. For example, a 128 KB non-cacheable block is permitted to have a starting address of 0 KB, 128 KB, 256 KB and so on.

The relationship between block size and starting address is true for all block sizes except 4 GB (Gigabytes). When the block is set to 4 GB (Gigabytes), all physical memory is non-cacheable, regardless of the setting of the starting address (however, one can disable/enable the Cache simply by an AMIBIOS Setup option in the "Advanced CMOS Setup" menu).

In order to optimize Cache, you could define only those memory blocks which do not support Cache in your specific hardware configuration (check your BIOS and hardware reference manuals), however in most cases Region 1 and 2 should retain their initial settings, leaving Region 3 and 4 open for defining other non-cacheable memory blocks.

10.01.4 LAST SCREEN: THIRD SCREEN (386 SX) OR FOURTH SCREEN (486 DLC)

TEKNOR MICROSYSTEMS INC --- VIPer SETUP	
IDE Interface	Enabled
IDE Address Space	1st: 1F0H-1F7H, 3F6H, 3F7H
Floppy Disk Controller Interface	Enabled
Floppy Disk Controller Address Space	1st: 3F0H-3F7H
Parallel Port Address	378H
Parallel Port Mode	Printer Mode
Parallel Port Extended Modes Select	Standard & SPP
COM3 & COM4 Addresses	COM3: 3E8H, COM4: 2E8H
UART 1 Interface	Enabled
UART 1 Address	COM1: 3F8H
UART 2 Interface	Enabled
UART 2 Address	COM2: 2F8H
IRQ3, IRQ4, FINTR & PINTR Polarity	Active High, Inactive Low
↑↓ to select options	ESC - Quit without saving
PgDn(+), PgUp(-) to change an option	F10 - (U)pdate Flash BIOS

All the parameters in this screen are related to the Super I/O Controller; here addresses and other parameters can be defined. There are four parts to the screen:

1. IDE/Floppy: The first part allows the user to enable or disable the hard disk interface and floppy disk controller interface, and to select their respective address (primary or secondary).

2. Parallel Port: The second part allows the user to specify the parallel port's address (or to disable the port) and then specify the parallel port mode(s) for operation. The parallel port mode can be "Printer Mode" (standard) or "Extended Modes". When "Extended Modes" is selected, the "Parallel Port Extended Modes Select" field value is in effect; various combinations are available: Standard & SPP (bi-directional), EPP (Enhanced Parallel Port) & SPP, ECP (Extended Capabilities Port), and ECP & EPP.

3. Serial Ports: The third part of the screen allows the user to enable or disable the serial ports (UART 1 and UART 2), to associate them to two of the following (COM1, COM2, COM3, COM4), and to select the addresses for COM3 and COM4.

4. IRQ3, IRQ4, FINTR & PINTR Polarity: This option allows the user to define the polarity for these signals: IRQ3 (associated to UART 2), IRQ4 (associated to UART 1), FINTR (associated to Floppy) and PINTR (associated to Printer). There are two possible selections: Active High, Inactive Low; Active Low, Inactive hi-Z (high impedance).

10.02 AMIBIOS SETUP PROGRAM

The Viper800 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 Viper800 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.

10.02.1 MAIN MENU

The main menu options are:

STANDARD CMOS SETUP
ADVANCED CMOS SETUP
ADVANCED CHIPSET SETUP
AUTO CONFIGURATION WITH BIOS DEFAULTS
AUTO CONFIGURATION WITH POWER-ON DEFAULTS
CHANGE PASSWORD
AUTO DETECT HARD DISK
WRITE TO CMOS AND EXIT
DO NOT WRITE TO CMOS AND EXIT

These options will first be described briefly.

STANDARD CMOS SETUP

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

Use the →, ←, ↑ or ↓ keys to select the item you want to change. When the item is highlighted, press the PgDn or PgUp keys to change values.

☞ **If there is no video card in the system and setup is not set accordingly, the VIPer will not boot past the Power On Self Test (POST) because it will be looking for the video memory. The default for this option is "Video card: not installed" which will let the system boot with or without a video card in the system.**

ADVANCED CMOS SETUP

This part of the setup handles options and features such as key repetition settings, boot sequence, Num Lock, password, shadowing, ...

Use the →, ←, ↑ or ↓ keys to select the item you want to change. When the item is highlighted, press the PgDn or PgUp keys to change values.

For more information, see section 10.02.2.

ADVANCED CHIPSET SETUP

This part of the setup sets chipset-specific options and features.

Use the →, ←, ↑ or ↓ keys to select the item you want to change. When the item is highlighted, press the PgDn or PgUp keys to change values.

For more information, see section 10.02.3.

AUTO CONFIGURATION WITH BIOS DEFAULTS

This option lets you load the BIOS default values. They are common recommended values and should optimize system performance. This feature might be useful in instances where a quick reconfiguration is needed.

☞ **After you load the BIOS DEFAULTS, you need to save the changes. This can be done by selecting WRITE TO CMOS AND EXIT in the main menu or with the F10 key.**

AUTO CONFIGURATION WITH POWER ON DEFAULTS

This option lets you load all the power on defaults values. They 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.

☞ **After you load the POWER ON DEFAULTS, you need to save the changes. This can be done by selecting WRITE TO CMOS AND EXIT in the main menu.**

CHANGE PASSWORD

This option is used to enable the password feature or to 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 CHECKING OPTION in the ADVANCED CMOS SETUP (see the PASSWORD CHECKING 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) The screen then displays "Password Now Disabled". Make sure you press F10 to save this configuration. If you forget your current password, the password feature can be disabled by removing jumper W9 for several minutes; however this will also clear the CMOS Setup, which will then be configured at the BIOS default values.**

AUTO HARD DISK DETECT

This is a utility that will provide the user with a complete set of parameters for the IDE hard drives C and D.

The utility first scans the C drive. The newly found parameters are then displayed on the screen followed by the message "ACCEPT PARAMETERS FOR C: (Y/N) ?".

If the user answers yes, the displayed parameters are then stored in the user defined drive TYPE 47. TYPE 47 then becomes the current type for the C drive. The same sequence is then repeated for the D drive.

☞ **It is possible that the parameters provided do not match the ones found in your drive's literature. This should not be considered an error. As matter of fact, different combinations of heads, cylinders and sectors that match the disk's capacity in MB 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.**

WRITE TO CMOS AND EXIT

This option is used to save the configuration in the CMOS RAM. After the infomation is saved, the computer is automatically rebooted. This option will not change the values saved in Flash EPROM. To update the values in Flash, enter the VIP-UP program and perform a save (press F10 or type "U").

DO NOT WRITE TO CMOS AND EXIT

This option is used to exit AMIBIOS Setup without saving the configuration to CMOS RAM. After the infomation is saved, the computer is automatically rebooted.

10.02.2 ADVANCED CMOS SETUP

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 BIOS or Power-On defaults will affect all the options and will reset options previously altered.

The Power-on 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 BIOS Setup default values provide optimum performance settings for all devices and system features.

The first column to the left displays these options:

FIELDS	**POWER-ON DEFAULTS**	**BIOS SETUP DEFAULTS**
Typematic Rate Programming:	Disabled	Enabled
Typematic Rate Delay (msec):	500	500
Typematic Rate (chars/sec):	15	30
Above 1MB Memory Test:	Disabled	Disabled
Memory Test Tick Sound:	Enabled	Enabled
Memory Parity Error Check:	Enabled	Enabled
Hit <DEL> Message Display:	Enabled	Enabled
Hard Disk Type 47 RAM Area:	0:300	0:300
System Boot Up Num Lock:	Off	Off
Numeric Processor Test:	Enabled	Enabled
Floppy Drive Seek At Boot:	Enabled	Enabled
System Boot Up Sequence:	A:,C:	A:,C:
System Boot Up CPU Speed:	High	High
Internal Cache (486SLC)	Disabled	Disabled
Fast Gate A20 Option:	Disabled	Enabled
Password Checking Option:	Setup	Setup

The second column to the right displays these options:

FIELDS	POWER-ON DEFAULTS	BIOS SETUP DEFAULTS
Adaptor ROM Shadow C800, 16K:	Disabled	Disabled
Adaptor ROM Shadow CC00, 16K:	Disabled	Disabled
Adaptor ROM Shadow D000, 16K:	Disabled	Disabled
Adaptor ROM Shadow D400, 16K:	Disabled	Disabled
Adaptor ROM Shadow D800, 16K:	Disabled	Disabled
Adaptor ROM Shadow DC00, 16K:	Disabled	Disabled
Adaptor ROM Shadow E000, 32K:	Disabled	Disabled
Adaptor ROM Shadow E800, 32K:	Disabled	Disabled
Shadow RAM Option:	Disabled	Both

The various options in the ADVANCED CMOS SETUP are described below.

TYPEMATIC: RATE PROGRAMMING, RATE DELAY & RATE

Typematic Rate Programming enables or disables the Typematic Rate Delay and Typematic Rate. These control the speed at which a keystroke is repeated. The selected character is displayed when a key is held down longer than the delay set by Typematic Rate Delay. It then repeats at a rate set by the Typematic Rate value.

ABOVE 1MB MEMORY TEST

This feature, when enabled, executes the POST memory routines on the DRAM above 1MB. If disabled, the AMIBIOS only tests the first 1MB of DRAM and clears memory above 1MB.

MEMORY TEST TICK SOUND

This option enables the ticking sound during the memory test.

MEMORY PARITY ERROR CHECKING

This option enables or disables parity error checking for all system DRAM. Disabling the parity is not recommended in normal operation. Consequently, this option should be left to Enabled.

HIT <DEL> MESSAGE DISPLAY

Disabling this option will prevent the message "Hit <DEL> if you want to run Setup" from appearing when the system reboots.

HARD DISK TYPE 47 RAM AREA

The end user can specify a user-definable hard disk for drive C: and drive D: . The data for the type 47 disk type is stored in 0:300H in lower system DRAM or in the top 1 KB of applications memory, starting at address 639 KB. The options are 0:300H or Upper 1 KB.

SYSTEM BOOT UP NUM LOCK

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 then use the →, ←, ↑ or ↓ keys on both the numeric keypad and the keyboard.

NUMERIC PROCESSOR TEST

This option performs the coprocessor test during the AMIBIOS POST if it is set to Enabled.

FLOPPY DRIVE SEEK AT BOOT

This option specifies that a SEEK instruction will be performed on the floppy drive A: at system boot time.

SYSTEM BOOT UP SEQUENCE

This option specifies the boot sequence for drive A: and C: after AMIBIOS POST completes and attempts to boot DOS. The settings are C:, A: or A:, C.

SYSTEM BOOT UP CPU SPEED

This option sets the speed at which the system boots.

INTERNAL CACHE (486SLC)

This option enables the 486SLC Internal Cache Memory.

FAST GATE A20 OPTION

This option enables the system's Fast Gate A20 circuitry. Normally, the keyboard controller is used to switch between real and protected mode with Gate A20. Fast Gate A20 substitutes a faster method for address mode switching. This option speeds up programs that constantly change from real address mode to protected address mode.

PASSWORD CHECKING OPTION

This option enables a password check every time the system boots or if AMIBIOS Setup is executed. The settings are Always or Setup. The password feature is disabled by default but can be enabled by using the CHANGE PASSWORD option for the first time (for more information on the CHANGE PASSWORD option, see page 10-10).

ADAPTOR ROM SHADOW <ADDRESS>, 16K/32K

ROM shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM, thus, allowing faster execution. The code that resides in the 16 or 32 KB segment of ROM specified by the address is therefore shadowed to RAM, if that option is enabled. If a card in the system has an onboard BIOS, it can be shadowed for greater speed. Depending on the size of the BIOS, you might have to enable shadowing on more than one 16 or 32 KB block. For instance, if the BIOS is 64 KB, you will need to shadow 4 blocks of 16 KB or 2 blocks of 32 KB.

☞ **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 RAM OPTION

The settings for this option are Disabled, Video, Main or Both. If this option is set to Main, the system BIOS ROM at F0000H - FFFFH is shadowed from ROM to RAM for faster execution. If this option is set to Video, it enables shadowing of the video ROM at C0000H - C7FFFH to RAM. This will significantly improve video performance. If the option is set to Both, both video and system ROM are shadowed. If it is set to Disabled neither are shadowed.

10.02.3 ADVANCED CHIPSET SETUP

Whenever you are not sure about a certain setting, you may refer to the list of defaults 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 BIOS or Power-On defaults will affect all the options and will reset options previously altered.

The Power-On 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 BIOS Setup default values provide optimum performance settings for all devices and system features.

☞ **These parameters have been provided to give control over the system. However, the timing relationships involved.**

FIELDS	**POWER-ON DEFAULTS**	**BIOS SETUP DEFAULTS**
DRAM Wait States:	Mode4	Mode4
Page mode:	Enabled	Enabled
Refresh Period:	15.625	15.625
Non-Turbo Mode CLK2 Divider:	Clk2/4	Clk2/4
Fast Clock Divider:	/6	/6
Ext BUS Oscillator Control:	Slow	Slow
Slow Clock Divider:	/2	/2
ROM Wait States:	3 W/S	3 W/S
8-Bit DMA Wait States:	3 W/S	3 W/S
16-Bit DMA Wait States:	3 W/S	3 W/S
DMA Clock:	SCLK/2	SCLK/2
Disk Timing:	Normal	Normal
16-Bit Wait I/O States:	0 W/S	0 W/S
8-Bit Wait I/O States:	4 W/S	4 W/S

The various options in the ADVANCED CHIPSET SETUP are described below.

DRAM WAIT STATES

This option provides five different sets of timing that will accomodate various SIMMs. The choices are MODE 1 through MODE 5. MODE 1 should be selected for fast (60 ns) dynamic RAM SIMMs, while MODE 5 should be used for slower modules. The default setting is MODE 4 (for 70 ns SIMMs).

PAGE MODE

Page mode is a mode that reduces the time required by multiple read or write memory cycles that are in the same memory page. This option should be set to Enabled in order to take advantage of this feature.

REFRESH PERIOD

This option selects the period at which the memory is being refreshed. The settings are 15.625 µs or 125 µs.

NON-TURBO MODE CLK2 DIVIDER

The CLK2 divider determines the CLK2 frequency, which is the clock signal used by the CPU. Lowering the CLK2 frequency threfore slows down the processor's speed. The following table shows the possible settings for the CLK2 divider when SYSTEM BOOT UP CPU SPEED is set to LOW (Non-Turbo mode) in the Advanced CMOS Setup, and the corresponding CLK2 frequencies.

Non-Turbo Mode CLK2 Divider	**CLK2 Frequency**
Clk2/1	33MHz
Clk2/2	16MHz
Clk2/3	11MHz
Clk2/4	8MHz

FAST CLOCK DIVIDER

This option enables you to select the SYSCLK frequency. The following table shows the possible settings for the Fast Clock Divider when the EXT BUS OSCILLATOR CONTROL option is set to Fast, and the corresponding SYSCLK frequencies.

Fast Clock Divider	**SYSCLK Frequency**
/2	7.99 MHz
/4	3.99 MHz
/6	2.66 MHz

Note: The Bus control signals BALE, IOR*, IOW*, MEMR* and MEMW* are syncronized to SYSCLK. According to the P996 specifications, the SYSCLK must be between 8.33 and 5.99 MHz.

The W27 jumper must be left to Asynchronous mode; removing this jumper will make the board behave strangely (no access to floppy drives and IDE, no boot, ...).

EXT BUS OSCILLATOR CONTROL

This option enables you to select between the Slow or Fast Clock Divider. The settings are Slow and Fast.

SLOW CLOCK DIVIDER

This option enables you to select the SYSCLK frequency. The following table shows the possible settings for the Slow Clock Divider when the EXT BUS OSCILLATOR CONTROL option is set to Slow, and the corresponding SYSCLK frequencies.

Slow Clock Divider	**SYSCLK Frequency**
/2	7.99 MHz
/4	3.99 MHz
/6	2.66 MHz
/8	1.99 MHz

Note: The Bus control signals BALE, IOR*, IOW*, MEMR* and MEMW* are syncronized to SYSCLK. According to the P996 specifications, the SYSCLK must be between 8.33 and 5.99 MHz.

The W27 jumper must be left to Asynchronous mode; removing this jumper will make the board behave strangely (no access to floppy drives and IDE, no boot, ...).

ROM WAIT STATES

This option selects how many waits states are inserted in the ROM read cycles. The settings are 3 W/S, 2 W/S and 1 W/S.

8/16 BIT DMA WAIT STATES

These options select how many wait states are being inserted in the 8-bit or 16-bit DMA cycles. The settings are 2 W/S, 3 W/S and 4 W/S.

DMA CLOCK

This option lets the user select a divider that will determine the DMA clock. The settings are SCLK/2 and SCLK.

DISK TIMING

This option allows the system to support slower disks by providing slower timing. The default for this option is Fast.

8/16-BIT I/O WAIT STATES

This option selects how many wait states are being inserted in the I/O commands.

PART TWO

SPECIAL SOFWARE & ONBOARD UTILITIES

SECTION 11
VFLASH SOFTWARE

11.01 INTRODUCTION

VFLASH is TEKNOR's Flash EPROM transfer utility program for VIPer single board computers. Its main function is to download DOS files to the 1 MB Flash EPROM device (U43 - Diagram 2-2), also referred to as data Flash.

A Flash EPROM disk created with VFLASH is very much like a hard disk. A partition is created and data is stored in files, just like on a hard disk. The main difference between the two is that this Flash disk is a read-only drive. Therefore, in order to write software to this Flash disk, you must use VFLASH.

However, with the FLASH FILE SYSTEM II software from Microsoft, Flash EPROM disks are read/write and may be accessed via DOS commands (this utility is covered in Section 12).

This Section will describe how to use the VFLASH software utility.

11.01.1 VFLASH SOFTWARE OVERVIEW

Depending on your particular configuration, VFLASH can transfer information to the Flash disk in one of two methods:

1. If your VIPer is equipped with hard or floppy drives, then VFLASH downloads data directly on the board's Flash EPROM disk.

2. If your VIPer does not have floppy or hard disks, then VFLASH must be run from a remote computer which downloads data to the VIPer board via a serial link on COM1 or COM2. This mode is recognized in the BIOS extension as Download Mode and is enabled by installing jumper W22 (7-8) on the VIPer; in this mode, the VIPer board waits for signals from the remote computer's VFLASH software.

The first screen of the VFLASH software allows you to choose between direct and serial downloading (the screen is explained in section 11.02 - OUTPUT SELECTION/FIRST SCREEN).

The next screen is where the address and size of the Flash partition to create are determined (explained in section 11.03 - OUTPUT SELECTION/SECOND SCREEN).

The next step is to select the files in the FILE SELECTION screen, which are to be transferred to the Flash EPROM disk (explained in section 11.04 - FILE SELECTION SCREEN).

The next screen is the LIST OF SELECTED FILES; here the file listing can be verified and modified, duplicate files can be renamed or erased, and the Flash disk can be written (explained in section 11.05 - LIST OF SELECTED FILES).

Finally, the last screen to appear is the TRANSFER STATUS OF ONBOARD FLASH PROGRAMMING or the TRANSFER STATUS OF EXTERNAL FLASH PROGRAMMING; this screen displays each of the transfer operations in progress (explained in section 11.06 - TRANSFER STATUS SCREENS).

The above sections explain how to run the program in interactive mode via menus, but it is also possible to run the program without menus by a command which specifies the selected options and files with parameters; this mode is called Batch Mode (explained in section 11.07 - BATCH MODE).

11.01.2 TYPES OF FLASH EPROM DISKS

With VFLASH, you can create two types of Flash EPROM disks:

1 - Bootable Flash Disk: This type of Flash EPROM disk must start from the first block and is recognized by the BIOS. Like a hard disk, an active Flash EPROM disk can boot your system. A typical system setup would contain a CONFIG.SYS file to start device drivers, an AUTOEXEC.BAT file to start your software, plus all driver files required (e.g., EMM386.EXE, a MOUSE driver, etc).

To boot from Flash EPROM three conditions must be met:

• You must have the optional 1 MB Flash EPROM installed at U43.

• The bootable Flash EPROM partition must start from the first block.

• The Flash disk must be configured in the VIPer Setup as the C: drive (section 10.01.2).

2 - Non-bootable Flash Disk: Unlike bootable Flash disks which must begin at the first Flash block, non-bootable disks can begin anywhere.

11.01.3 VFLASH REQUIREMENTS

VFLASH is designed to operate in an IBM compatible environment.

The MS-DOS® operating system has been successfully tested with VFLASH; MS-DOS compatible operating systems such as DR-DOS® and PC-DOS® should therefore support VFLASH. Operating systems such as QNX® and OS-9000® are not supported by VFLASH (other utility programs are available for such operating systems; please contact our Technical Support department for more information).

If you intend to directly program Flash device on the VIPer, VFLASH must be running on board.

☞ **To properly run VFLASH, you need at least 1 floppy drive, 1 MB of DRAM, MS-DOS® or PC-DOS® (version 2 or greater) or DR-DOS® (version 3. 41 or greater).**

11.02 OUTPUT SELECTION/FIRST SCREEN

To run VFLASH, simply type "VFLASH" at the DOS prompt and press ENTER.

The first OUTPUT SELECTION FOR THE TRANSFER screen appears with the following options:

On board Flash devices.

External Flash devices via serial link.

Quit VFLASH and return to DOS.

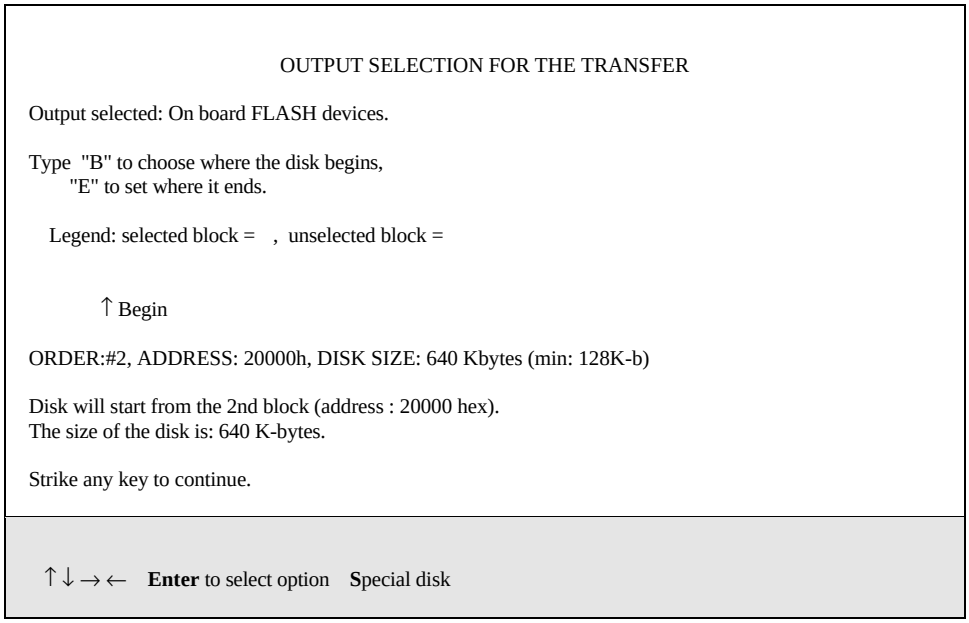
Use the ↑ and ↓ keys to highlight the option and then press ENTER to select.

On board Flash Devices: Use this option when VFLASH is run on a VIPer with Flash EPROM to be programmed directly on the board.

External Flash Devices via a Serial Link: Use this option when VFLASH is run from a remote computer, or when your VIPer board has no floppy or hard disks, or simply because the data to transfer is on a different computer than the VIPer and Flash EPROM disk. The transfer takes place via a serial link on COM1 (3F8H) or COM2 (2F8H) from the remote computer to the VIPer.

11.03 OUTPUT SELECTION/SECOND SCREEN

Once onboard or external Flash is selected, a second screen appears as follow.



On the first line, the output selected will be displayed ("On board FLASH devices" or "External FLASH devices via serial link".

The rest of the screen allows you to divide or partition the Flash disk according to your needs. The default disk always starts at the beginning of the Flash space and the size is all Flash selected. Therefore, a full bar will be displayed below the legend.

To set the size of the disk, type "E" and move the END pointer to the end of the disk with the horizontal keys to set the size of the disk.

11.04 FILE SELECTION SCREEN

Once you have selected the output, the following information is displayed on screen:

```
Selected files (max 240):0;                Free Space to copy:  522240 bytes

      DRIVE A: COMPLETE COPY                    DRIVE A: TO CHOOSE FILES
      DRIVE B: COMPLETE COPY                    DRIVE B: TO CHOOSE FILES
      DRIVE C:                                  DRIVE D:
      DRIVE E:                           BIOS 700   <DIR>
DOS         <DIR>                        PCAD       <DIR>
QAPLUS    <DIR>                          SKEY       <DIR>
TEMP       <DIR>                         TEST       <DIR>
TP          <DIR>                        TYPESET  <DIR>
VENTURA  <DIR>                           WIN        <DIR>
ATTR2        PAS     569 1-04-91    9:32 AUTOEXEC  BAK     59  2-14-91  16:11
AUTOEXEC  BAT      74  2-14-91  16:12   BOOT_DIR   PAS    158  1-25-91  16:58
BOOTDIR     PAS    6508  3-03-91  13:31 CHOIXMED  PAS 19797  3-06-91   1:11
COMMAND  COM  25308  2-02-91  12:25    COMMANDE PAS  6110  2-21-91  15:57
CONFIG      SYS      128  1-01-91  14:42 CONFIG      SYS    128  1-23-91  17:45


21 Files, D:\*.*

(Tag Untag New dir) or Enter  Block  Make bootable Done  Esc to quit
↑ ↓ → ←  Home PgUp PgDn  Volume label
```

This menu allows the user to choose the files that will eventually make up the Flash disk. Files can be chosen from the various drives on the system.

The top line in this menu gives size information about the Flash partition. SELECTED FILES indicates how many files have been chosen up to this point. FREE SPACE TO COPY indicates the available Flash space found, minus the space used up by the selected files.

The largest block of information (center screen) is the FILE AREA. It lists the files in the current directory.

Highlighted files are marked for copying to Flash devices.

Entries marked with a "<DIR>" extension indicate a subdirectory. When you select a subdirectory, the first two entries are displayed as ". <DIR>" and ". . <DIR>". As with DOS, "." refers to the actual directory and ". ." to the parent directory. Thus, if you do a "Newdir" command on the ". . <DIR>" you will return to the previous directory.

Entries marked as "Drive A:" or "Drive B:" allow you to change drives/directories or to select files. "DRIVE A/B: TO CHOOSE FILES" is used to select files. "DRIVE A/B: COMPLETE COPY" is used to make an exact copy of a floppy disk to Flash. This last function resembles a DOS DISKCOPY command. When this mode of transfer is chosen, no other files can be sent along with the diskette files.

The bottom of the screen is dedicated to the MESSAGE AREA and MENU COMMANDS.

The MESSAGE AREA gives indications and warnings with respect to file selection operations.

The MENU COMMANDS begin with a highlighted letter or identifier which indicates the key to press in order to execute the desired function. The following commands are available:

TAG: Use this function to select a file from the above file list. Simply move the cursor over the desired field and type "T" on your keyboard. The file will then be highlighted - indicating it was selected. If you type "T" again, you deselect the file.

UNTAG: This function is used to deselect a chosen file from the above list of files. To use this function, simply move the cursor over the desired file and type "U".

BLOCK: This function is used to mark a group of files for selection or deselection. Move the cursor to the beginning of the first file you wish to select and type "B" (a "➢" symbol will be displayed after "Block" in the command area to remind you that a block has been entered). Then, move the cursor to the last file of the group and type "B" again (a "➢" will appear next to the "➢" indicating that a block definition is now complete). The block of outlined files are now ready to be "Tagged" or "Untagged".

MAKE BOOTABLE: Choose this function (by typing "M") to move files you wish to make bootable into the FILE SELECTION area (to appear in the LIST OF SELECTED FILES screen). The system will then prompt you for the drive which contains the system files (Note that the source should not be a Flash disk, since these are read-only and write protected). Once the selected files are found, the "MAKE BOOTABLE" command will be changed to "BOOTABLE DISK". This confirms that the Flash disk will be bootable.

NEWDIR: This function lets you enter or exit a drive or directory. To change directories, place the cursor at the desired entry and type "N". The listing will automatically change to the new directory's content.

ENTER: Press ENTER to either tag, untag, or change directory. When the cursor is on a directory, ENTER is equivalent to the NEWDIR command. When the cursor is on a file, pressing ENTER will tag/untag it.

DONE: Use this function when the file selection is terminated. Type "D" and the next screen will appear (LIST OF SELECTED FILES).

ESC: Press the ESC key to abort VFLASH without modifying any information in the Flash devices. The system will prompt you before exiting to DOS.

VOLUME LABEL: Use this function to include a disk volume label for the Flash EPROM disk. Simply type "V" on your keyboard to bring the message into the following format:

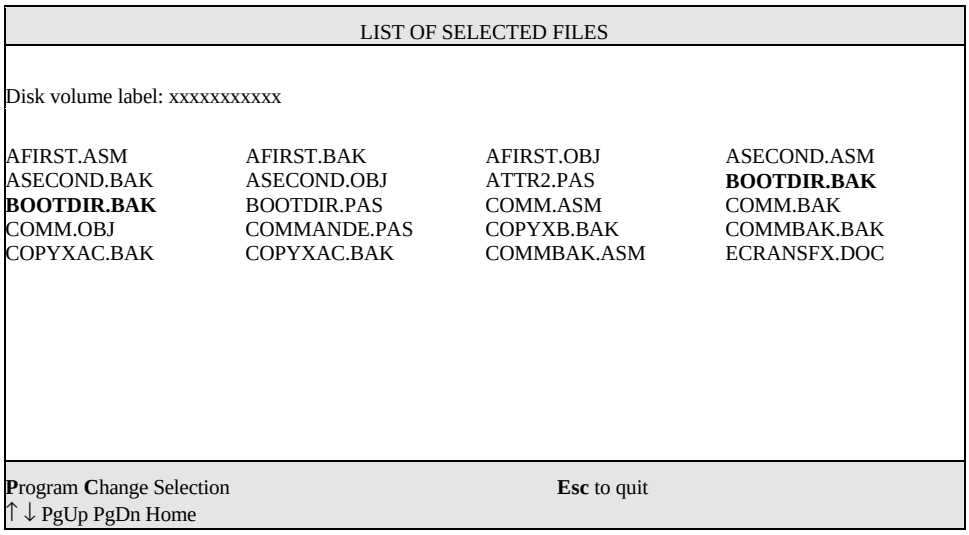
Volume is xxxxxxxxxxx
Volume label (11 characters, ENTER for none)?

The same operating system limitations on volume label names apply.

The cursor can be moved within the FILE SELECTION screen by using the ↑, ↓, →, ←, PAGE UP, PAGE DOWN and HOME keys.

11.05 LIST OF SELECTED FILES SCREEN

The LIST OF SELECTED FILES screen shows you the list of files that the Flash disk will contain.



The list of previously selected files appears in the center of the screen.

You can browse through the list by using the ↑, ↓, PAGE UP, PAGE DOWN and HOME keys.

The following commands are also available:

CHANGE SELECTION: This option allows you to return to the FILE SELECTION screen by typing "C".

PROGRAM: Type "P" to enter the Programming (TRANSFER STATUS ...) screen. This will begin programming the Flash devices - according to the transfer mode selected (on board or external Flash).

ESC: The ESC key allows you to abort VFLASH and exit to DOS without modifying the contents of the Flash devices.

If duplicate files are found, the DUPLICATE FILES MENU section appears below the list of selected files. This section will appear only if two or more files with the same name are found. When this occurs, a menu will automatically appear in the bottom section to solve the conflict:

LIST OF SELECTED FILES

Disk volume label: xxxxxxxxxxx

AFIRST.ASM	AFIRST.BAK	AFIRST.OBJ	ASECOND.ASM
ASECOND.BAK	ASECOND.OBJ	ATTR2.PAS	**BOOTDIR.BAK**
BOOTDIR.BAK	BOOTDIR.PAS	COMM.ASM	COMM.BAK
COMM.OBJ	COMMANDE.PAS	COPYXB.BAK	COMMBAK.BAK
COPYXAC.BAK	COPYXAC.BAK	COMMBAK.ASM	ECRANSFX.DOC

DUPLICATE FILES MENU

E:\BOOTDIR.BAK
E:\TP\BOOTDIR.BAK

1:Rename duplicate(s) (file.ext,file1.ext,etc)
2:Rename or erase duplicate(s)
3:Erase remaining duplicates
Esc to quit **S**elect list

Make a selection by choosing the corresponding number. Choosing:

1. Will force a rename by appending a numeral at the end of the filename.
2. Will erase or rename files manually.
3. Will erase all duplicates.

When the final selection has been made and the final listing is displayed, the Flash disk can then be written.

11.06 TRANSFER STATUS SCREENS

11.06.1 TRANSFER STATUS OF ONBOARD FLASH PROGRAMMING SCREEN

TRANSFER STATUS OF ONBOARD FLASH PROGRAMMING
Erasing of all Flash devices installed, please wait. . . Erasing nth device. . . Erase completed Creating a bootable flash disk Transferring the BOOT sector, FAT and root DIR . . . Completed Copying selected files. . . Transfer completed: XX. X% Transferring: FILENAME Transfer complete

This screen displays each of the transfer operations in progress:

1. First, the Flash devices are erased. This operation can take some time to complete. Only the Flash devices of the actual disk to be programmed will be erased, however.

2. The base system information is then transferred. This is followed by the file data itself.

3. The transfer in progress is displayed by XX%, and the actual file being copied is also shown (unless a complete diskette copy is performed).

Restart the system if the disk is to be recognized by the TEKNOR BIOS extension. Although rebooting is not necessary if Flash disks were not created, it is a recommended procedure in all circumstances.

11.06.2 TRANSFER STATUS OF EXTERNAL FLASH PROGRAMMING SCREEN

When a serial link is used, the following screen will be displayed:

TRANSFER STATUS OF EXTERNAL FLASH PROGRAMMING
Erasing of all Flash devices installed, please wait. . . Erase completed Creating a bootable flash disk Transferring the BOOT sector, FAT and root DIR. . . Completed Copying selected files. . . Transfer completed: XX. X% Transferring: FILENAME Elapsed time: Xmin XXsec Transfer complete

The above screen is used to display the transfer operation status. It shows each step in progress:

1. The devices are erased (this may take some time).

2. The base system information is transferred, followed by the file data itself.

3. The data progress is displayed by XX% up to 100%. The actual file being sent is also shown (unless a complete diskette copy is performed). In addition, the elapsed time of the transfer is displayed.

If an error occurs during transfer, the system beeps twice to warn the user.

To signal the end of a successful transfer, a single beep is heard.

☞ **This operation can be time consuming in Serial Mode due to the serial transfer speed and protocol.**

4. When the transfer is 100% complete, the following message is displayed:

Do you want to Reset the receiving system?

This software command is made available to restart the receiving system by remote. In order for a new Flash disk to be recognized by the BIOS and DOS, the system must be rebooted.

The receiving system can be put in Download Mode by any of the following options:

1. Short pins 7 and 8 on jumper W22. This forces Download Mode at boot up.

2. Download Mode is automatically enabled when VT100 Mode is activated by shorting pins 5 and 6 on jumper W22. In this case, the communications port will recognize the Download Mode commands and activate it.

☞ **Reset is the only way to exit from Download Mode which is forced on at setup by the W22(7-8) jumper. If Download Mode was entered by recognition of the code sequence, you can simply exit Download Mode and continue processing.**

11.07 BATCH MODE

While files can be manually selected using the Interactive Mode, automatic transfers of a predefined area (a sub-directory or preferably a diskette) can be achieved through Batch Mode.

In Batch Mode, a user or field technician with no previous knowledge of the system can easily effect a transfer to the Flash disk. This can be done either by calling a batch file (*.bat) or by simply issuing the proper command line parameters directly from DOS.

When the transfer is complete, reset the system. This allows the BIOS and DOS to recognize the new Flash disk.

Keep in mind that Batch Mode can be called directly from a floppy or hard disk, from a remote computer, or from a portable computer. In each case, the selected files can be downloaded to the Flash devices.

Batch Mode returns error codes (errorlevel) that can be read by a DOS batch file or by a high level language program.

11.07.1 BATCH MODE COMMAND LINE PARAMETERS

The command line format is as follows:

VFLASH [drive:] [\directory] [destination] [options]

where:

[drive:] is the source drive from which a complete copy will be made if no directory is specified (see section 11.04, for more information).

[\directory] is the path used to show from which directory the source files will be taken and transferred to the Flash or EPROM files. If you do not specify a directory (for example, VFLASH B:\), only the files in the root directory will be transferred to the Flash disk. Also, if the Flash disk is to be bootable, the /B option must be used.

Each option or switch starts with a '/' character followed by one or more letters. These letters are in uppercase and are used by VFLASH to identify a specific option.

A colon ':' or pound '#' character is also a necessary part of the switch. Lowercase letters represent a variable field that must be entered. Each switch may be separated by a space if you so choose.

The switches may be written in random order except for switches that are linked together. For example a /S must be followed by either /#order or /sizeK or both. Thus, a command line such as VFLASH B: /M /S/#2/128K is valid, however, VFLASH B: /S/M/#2/128K is not. The following list of options provides complete descriptions.

The first three options listed are not required to execute a disk. They can be used either in Interactive Mode or Batch Mode.

[options]

/G:group Specifies how many Flash blocks will be grouped together as a cluster. The Group Factor will set the smallest disk size available. Valid group values are defined as 1, 2, 4, 8, 16... and so on.

/M Instructs VFLASH to use a monochrome display pattern. This option is useful with LCDs since it may be difficult to distinguish colors with such displays.

/VT100 This option allows a visual monitoring of the transfer operation in progress while in VT100 mode. Use this switch when you make an onboard Flash disk.

The following options identify disk or file parameters to be executed in Batch Mode.

/B/bootdrive:
Makes the disk bootable by transferring the bootable files from the 'bootdrive' specified. Note that the source should not be a Flash disk, since these are read-only and write protected.

/E Performs an external transfer by serial link to the remote system. This switch must be present in order to use any of the next three options (/RATE, /COM2 and /R).

/rate The value entered corresponds to the desired baud rate for transfer. Any one of the following can be used: 300, 1200, 2400, 9600, 19200, 38400. It is set at 19200 by default.

/COM2 This option instructs COM2 to be used instead of the default value COM1.

/R Instructs VFLASH to reset the VIPer board upon completion of download operation. This is valid only in VT100 Mode. In Download Mode, the remote system is always reset.

/S Used to create a special disk or partition. This option precedes the starting device number option (/#order) or the disk size option (/sizeK), or both.

/#order Specifies the Flash block to be used as the starting point for a disk partition (default setting is #1).

/sizeK Specifies a special disk size, in KB, for the Flash disk. The default setting is the largest disk size following the designated starting disk as selected in the /#order option).

/V:volume label
This switch specifies a volume label for the disk to be created. This option will report an invalid command line error if it is used while transferring a complete copy of a floppy disk. Since it is acceptable to have spaces in a volume label, do not place this switch before [drive:], [\directory] or [destination] since VFLASH would not be able to determine when the label ends and when these options begins.

To get a summary of the Batch Mode options from VFLASH, simply run VFLASH with the command line '/?' or '/HELP' (type 'VFLASH/?' or 'VFLASH/HELP'). Either command will display a Batch Mode options summary and some examples of valid VFLASH command lines. The same help information will also be displayed each time VFLASH detects an error in the command line.

11.07.2 BATCH MODE ERROR CODES

The following error messages are returned by the VFLASH Batch Mode function. They can be detected with a DOS errorlevel condition.

ERROR (HEX)	NUMBER (DECIMAL)	DESCRIPTION
0	0	No error
1	1	Bad command line
2	2	Invalid drive choice for recovering boot information
3	3	Unable to establish communication (serial download mode only)
4	4	No Flash memory found (verify jumper)
5	5	Mixed memory types detected in Flash bank
6	6	Unable to find system files on specified disk
7	7	Specified output file already exists
8	8	Error reading transfer source drive
9	9	Insufficient data space or directory space to copy all desired files
A	10	Bad checksum (problem with serial link)
B	11	Non Hex code received (problem with serial link)
C	12	Error transferring data. Unusable Flash drive
D	13	No files to transfer in selected directory
E	14	Unable to open a file to be copied
F	15	Media not yet supported
10	16	Communications or device error while transferring files. Unusable flash drive.
11	17	Unable to read transfer source drive
12	18	Insufficient Flash space to store files
13	19	Unrecognized Flash device type
14	20	Programming failure on devices
15	21	Cannot select any file from actual Flash disk
16	22	Unable to find sourcefiles
17	23	Cannot specify starting device on remote system
18	24	Cannot find starting flash bank address
19	25	Communication error while reading flash bank content
1A	26	External device cannot be erased properly
1B	27	Unsupported serial download function
1C	28	Flash content does not verify with source
1D	29	No device found in specified starting socket

ERROR (HEX)	NUMBER (DECIMAL)	DESCRIPTION
1E	30	Cannot create a flash disk of specified size
1F	31	Communication error when reading flash identification code
20	32	Cannot use 8086 or 8088 CPU with flash memory
21	33	No serial port or card attached for transfer
22	34	/S switch not supported with this BIOS
23	35	/G:group value on command line is invalid
24	36	Insufficient Flash or EPROM space to include the volume label entry
25	37	Cannot make EPROM with same [source] and [destination] path
26	38	EPROM filename already exist
27	39	EPROM filename path not found
28	40	Selected drive for EPROM files not ready
29	41	Invalid EPROM filename or disk error
2A	42	Not enough disk space to copy EPROM files
2B	43	Not enough memory for data buffer.
2C	44	Command line option "/TEKXXX" is invalid.
2D	45	486SLC internal registers are different from BIOS setup.
2E	46	The 486SLC cache is not disabled over the Flash device(s).
2F	47	Unable to erase the nth device.
30	48	No VIPer BIOS found.
31	49	The source diskette must be DOS Version 4 and up.
32	50	Flash ID command to BIOS or data Flash must be issued first.

SECTION 12
FLASH FILE SYSTEM II

With FLASH FILE SYSTEM II, a read/write MS-Flash partition can be created in the 1 MB Flash EPROM device (located at U43 on Diagram 2-2 and on the Viper800 board). Such a partition can be accessed via the DOS commands.

FLASH FILE SYSTEM II files are not part of the standard VIPer package, but can be purchased from TEKNOR.

Section 11 - VFLASH Software - explained how a read-only Flash partition is created with VFLASH and how data can be stored in files with the VFLASH Transfer Utility.

The 1 MB user or data Flash device can be configured in one of four ways:

- As one read-only partition, created by VFLASH. This partition can be created as a bootable or non-bootable disk. See Section 11 for more information.

- As one read/write MS-Flash partition created by FLASH FILE SYSTEM II.

- As a combination of the above two: one read-only VFLASH partition, followed by one MS-Flash read/write partition. The system will set up both as a different drive, with the MS-Flash disk always the last. For example, VIP-UP can set up the VFLASH disk as C:, other hard disks as D: and E:, SRAM as F:, while the MS-Flash disk, in this case, would automatically be set up as the next drive letter, that is G:. Another example could be only one hard disk, with the following setup: hard disk (C:), VFLASH disk (D:), SRAM disk (E:) and MS-Flash disk (F:).

- The fourth possible configuration is similar to the previous one except that space (one or more memory block) is left between the VFLASH disk and the MS-Flash disk. This non-partitioned space can be used by special applications to store data; this can only be done safely if one knows the exact address of these memory blocks.

The following sections explain how to create and format an MS-Flash partition with MEMCARD.EXE, and how to set up your partition in CONFIG.SYS.

12.01 SETTING UP CONFIG.SYS FOR FLASH FILE SYSTEM II

Two lines must be included in your CONFIG.SYS file in order to set up the MS-Flash partition and to install the Microsoft FLASH FILE SYSTEM on your computer.

The first line differs depending on whether the Flash device has a VFLASH partition or not:

- If there is only the one MS-Flash partition on the device, these two lines must be included in CONFIG.SYS:

  ```
  device=FFS_VIP.EXE
  device=MS-FLASH.SYS
  ```

- If there is a VFLASH partition as well as an MS-Flash partition on the device, these two lines must be included in CONFIG.SYS:

  ```
  device=FFS_VIP.EXE /start=X
  device=MS-FLASH.SYS
  ```

  where X can be replaced by the appropriate number of blocks which must be skipped from the beginning of the device. For example, a user created a bootable disk using VFLASH in the first four blocks of the Flash device; the size of each block is 64 KB. This leaves twelve 64 KB blocks for an MS-Flash partition which will begin at the fifth block. The two lines to add in CONFIG.SYS are therefore:

  ```
  device=FFS_VIP.EXE /start=4
  device=MS-FLASH.SYS
  ```

  By default, the system uses start=0, meaning no blocks are skipped and the MS-Flash partition begins at the first block. That is why the /start switch is not needed if there is one MS-Flash partition on the Flash device.

12.02 CREATING & FORMATTING AN MS-FLASH PARTITION

FLASH FILE SYSTEM II on the Viper800 allows only one MS-Flash read/write partition on the data Flash device.

The MEMCARD software is used to create and format an MS-Flash partition. The program can be used in one of two ways, by: 1) Running the program interactively and making selections in the menus, or 2) Executing the command from the DOS prompt with switches to specify the drive letter and volume label of the drive you want to format or to check the Flash device for errors.

Prior to creating a new or expanded MS-Flash partition, you must erase any non MS-Flash section it will occupy. To do this, select option 5 - Erase entire memory card - in the MEMCARD program. This erases the whole partition that will be used by FLASH FILE SYSTEM, not the whole Flash disk. For example, if one had specified FFS_VIP/START=10 in CONFIG.SYS, only the 384KB used by this partition will be erased.

12.02.1 USING MEMCARD MENU OPTIONS

To use the MEMCARD program with the menu options, follow these steps:

1. Type MEMCARD at the command prompt. The main menu appears as follow:

PC Memory Card Setup Program Version 2.00
(C) 1991-1992 Microsoft Corporation

Memcard Options

Current memory card slot: 1 of 2 slots

Choose one of the following:

1. Create and format a new partition
2. Format an existing partition
3. Delete a partition
4. Display partition information
5. Erase entire memory card
6. Check memory card and fix errors
7. Select next memory card slot

Enter your choice. [4]

To quit Memcard, press ESC.

If your computer includes only one memory card slot, option 7 will not appear on the main menu.

To choose a menu option, type its number, and then press ENTER. When you choose menu options 1 through 6, another menu appears. To return to the main menu, press ESC. To quit MEMCARD, return to the main menu and press ESC.

2. To create and format an MS-Flash read/write partition, select 1 from the menu. A Create and Format a New Partition screen such as the following appears:

Current memory card slot: 1

Letter	Type	Status	Size
D	MS-Flash	Formatted	1024K

If the card already has one MS-Flash partition, the following message appears at the bottom of the screen:

This card has already been formatted.
Creating a partition will destroy all the data on the card.

Do you want to continue? (Y/N) [N]

Create a new partition only if you have backed up all the data that you want to save. To continue, type "Y", and then press ENTER.

3. If the card is unformatted or has one large partition, the following message appears:

Do you want to use the entire card for MS-Flash? (Y/N) [Y]

To create and format one large partition, type "Y", and then press ENTER; to create and format a partition that occupies only part of a memory card, type "Y", and then press ENTER.

4. This step is only if you are creating a partition that will occupy only part of the Flash device: Specify the size of the partition you want to create, and then press ENTER. The minimum size depends on the amount of free space available on the memory card. The number that appears on your screen is the largest amount of available space.

5. Specify the number of spare blocks that MS-Flash should reserve for memory card cleanup, and then press ENTER. The default is 1. Although reserving extra blocks may speed up the memory card slightly, you will not be able to use the reserved blocks for files. The default is recommended.

6. Specify a volume label for the partition, and then press ENTER. If you do not want to specify a volume label, leave the field blank, and press ENTER.

12.02.2 USING MEMCARD DIRECTLY FROM THE COMMAND PROMPT

If you use switches with the MEMCARD command directly from the command prompt, you can format memory cards and check Flash memory cards for errors.

Syntax MEMCARD /FMT=*drive*: [/V=*label*]
MEMCARD /CHK=*drive*: [/F]

Parameters *drive*: Specifies the drive you want to format.

label Specifies the volume label.

Switches /FMT= Formats the memory card partition associated with the specified drive.

/V= Specifies a volume name for the newly formatted memory card.

/CHK= Checks the specified Flash memory card partition for errors and displays a status report. If no drive is specified, MEMCARD will check the current drive.

/F Fixes errors found on a Flash memory card. If this switch is not specified, the errors are displayed, but not fixed.

For example, you can assign an entire memory card to drive D and specify the volume label CARD1, if you type the following at the command prompt:

```
MEMCARD /FMT=D:/V=CARD1
```

Here's another example: You can check partition E for errors, fix any errors that are found, and display the status of the partition, if you type the following at the command prompt:

```
MEMCARD /CHK=E: /F
```

SECTION 13
UPDATING BIOS

UBIOS is a utility that allows you to take BIOS files from a disk and update the Flash BIOS EPROM with them. It also allows the reverse operation - to copy the contents of the Flash BIOS to files on disk.

The program can be executed in one of two modes:

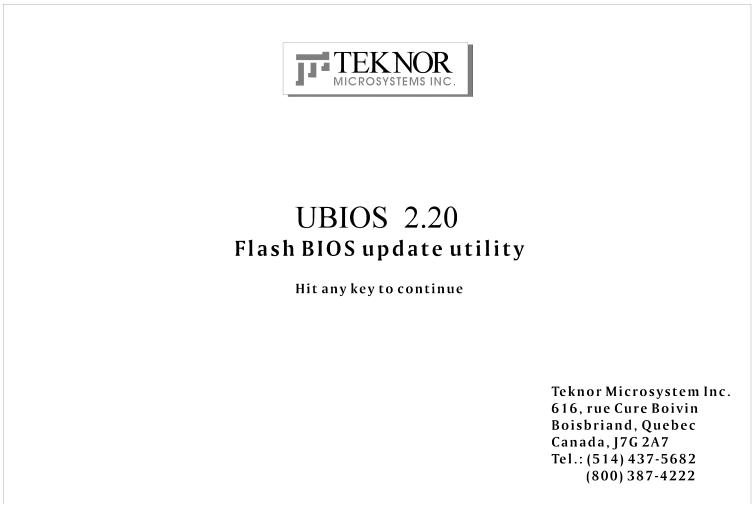
- Interactive Mode: In this mode the program is menu-driven. This mode is explained in section 13.01.

- Batch Mode: It is also possible to run the program without menus by a command which specifies the selected options and files with parameters. This mode is explained in section 13.02.

Both the Interactive Mode and the Batch Mode are available in VT100 mode (Section 14). The small differences will be explained in the sections noted above.

Using UBIOS 2.15 and up will clear the CMOS Setup in ROM. Therefore, it is recommended that you take note of your Setup parameters (especially Hard Disk parameters), so you can reset them afterwards.

13.01 UBIOS - INTERACTIVE MODE



To run the program in interactive mode, type "UBIOS" from the DOS prompt and the following screen will be displayed:
This is simply a presentation screen. To continue, hit any key on the keyboard. This brings you to the main menu.

In VT100 mode, type "UBIOS /VT", leaving a space between "UBIOS" and "/VT".

If you have a monochrome monitor or a CGA monitor, type "UBIOS/low", for low resolution.

The presentation screen in low resolution or VT100 mode is different from the one appearing above, but it works the same way: To continue, you must hit a key on the keyboard, which brings you to the main menu.

13.01.1 MAIN MENU

The main menu appears as follow:

```
                                    UBIOS 2.20
Write Flash BIOS device                 Retrieve a BIOS to a file

   1-Update all BIOS                      6-Copy all BIOS
   2-Update VGA BIOS                      7-Copy VGA BIOS
   3-Update Teknor's BIOS extension       8-Copy Teknor's BIOS extension
   4--Update SCSI BIOS                    9-Copy SCSI BIOS
   5-Update main BIOS                     0-Copy main BIOS
```

The main menu displays two groups of options: Write Flash BIOS device (options 1 to 5) and Retrieve a BIOS to a file (options 6 to 9 and 0). The first group includes five options which allow you to update the Flash BIOS EPROM with a BIOS file stored on disk. The second group includes five options which allow you to copy the contents of the Flash BIOS EPROM to files on disk.

All four BIOS can be accessed individually using the appropriate files. Note that the different BIOS files have different extensions:

- All four can be combined in a single file with the .BIN extension.
- SVGA CRT files have the .VGA extension.
- TEKNOR's BIOS extension file have the .EXT extension.
- SCSI BIOS files have the .SCS extension.
- MAIN BIOS files have the .ROM extension.

Selections are made in one of two ways:

- Enter the corresponding number (e.g. "1" for Update all BIOS).
- Use the ↓ or ↑ keys to highlight the desired option and press ENTER.

13.01.2 UPDATE MENU

If you select from the first group of options in the Main Menu (# 1 to # 6), a screen similar to the following appears:

```
                                        UPDATE
You are currently using :VGA version AAB
                        :SCSI version ABA
                        :Teknor's extension version 0.60
                        :main BIOS version 0.60
Directory:F:\LOGICIEL\UBIOS\UBIOS200.NOT
```

FILES	DOCUMENTATION
.. <DIR> B800_060.BIN B800_987.BIN B801_612.BIN	No documentation available

The screen displays three windows:

- UPDATE: This window displays the current BIOS files being used; it shows all types of BIOS, not just the one selected from the main menu. On the bottom of this window, the current directory is also displayed.

- FILES: This window displays the first fourteen files of the type selected in the main menu (All, VGA, TEKNOR, SCSI or Main) in the current directory.

- DOCUMENTATION: If there is no BIOS file for the type you wish to update, this message appears in the DOCUMENTATION window: "No corresponding file in that directory". However, when a filename is displayed in the top window, the DOCUMENTATION window will show the content of a .DOC file, if it is available. This file is a standard text file that can be created with a standard text editor; it must have the same filename as the BIOS file and the extension .DOC. If no .DOC file is available, then this message appears in the DOCUMENTATION window: "No documentation available".

The path and name of the current directory will be displayed next to "Directory:" in the top window.

The FILES window displays the files of the selected type (.BIN, .VGA, .EXT, .SCS or .ROM). Follow these instructions for selecting a file in the FILE window of the UPDATE screen:

- Letter for a drive: By typing the desired drive letter, you can change the current drive.

- ↑↓ to change files\directory: Use the ↑ or ↓ key to travel through the files of the current directory. When a directory is selected (see <ENTER> to select below), then the ↑ or ↓ key is used to scroll up or down the file list. To move quickly to a directory, press the F2 key and type the first letter of the desired directory next to "Scan:" (displayed in the FILES window).

- <ENTER> to select: Press ENTER to select the highlighted directory or file. When "..<Dir>" is displayed, pressing ENTER will bring you one level up to the parent directory. When a BIOS file is displayed, pressing ENTER will bring a pop-up message on the screen : "Do you really want to update: Flash BIOS, filename (Y/N)". If you type "Y", then the file will be used to update the Flash BIOS.

Aside from the ↑ or ↓ key, other keys can be used to travel through the FILES window of the current directory:

- HOME: This moves to the top of the current directory and displays the first fourteen files.

- END: This moves to the bottom of the current directory and displays the last fourteen files.

- PAGE UP: This moves up by fourteen in the current directory.

- PAGE DOWN: This moves down by fourteen in the current directory.

The above keys are displayed in a Help screen by pressing the F1 key.

After an update was made with a file of version 0.61 and up, the following message appears on the screen: "Do you want to reboot now (Y/N)". If you type "Y", the system reboots and the new configuration comes into effect; otherwise, if you type "N", a message appears to inform the user that he will have to reboot if he wants the new configuration to become operational and the program exits to the operating system prompt.

13.01.3 FLASH BIOS COPY MENU

If you select from the second group of options in the Main Menu (# 7 to # 9, and # 0), a screen similar to the following appears:

```
                                    FLASH BIOS COPY
You are currently using version 0.60

File name for extension BIOS file (.EXT):
```

The top part of the screen displays the current BIOS files being used; it shows all types of BIOS, not just the one selected from the main menu.

Then the following is displayed below: "File name for Flash BIOS file ( ):".

To copy the selected BIOS to a file, follow these instructions:

- File name for Flash BIOS file ( ): The file extension of the selected type will appear in the parentheses: .BIN, .VGA, .EXT, .SCS or .ROM.

- Type in the name of the BIOS file to create and press ENTER to proceed.

Once done, the program will exit to the operating system prompt.

13.02 UBIOS - BATCH MODE

While files can be manually selected using the Interactive Mode, Flash BIOS Update or Copy can be achieved through Batch Mode.

13.02.1 BATCH MODE COMMAND LINE PARAMETERS

The command line format is as follows:

UBIOS -B [operation] [filetype] [filename] [options]

where:

[operation] is the Flash BIOS operation you wish to perform, and can be replaced with one of two letters: U for Update, or
C for Copy.

[filetype] is the filetype of the BIOS file to program (with an update operation) or to create (with a copy operation), and can be replaced with one of the following:
ALL for All BIOS files in a single file with the .BIN extension,
VGA for VGA BIOS file with the .VGA extension,
TEKNOR for TEKNOR's BIOS extension with the .EXT extension,
SCSI for SCSI BIOS with the .SCS extension,
MAIN for Main BIOS with the .ROM extension.

[filename] is the name of the BIOS file to program (with an update operation) or to create (with a copy operation), and can be replaced with the filename which corresponds to the filetype. For example, if "VGA" was listed as filetype, then the filename could be "CRTFILE.VGA".

[options] these are optional parameters that may be added:

/R Instructs UBIOS to reset the VIPer board upon completion of an operation.

/VT This option allows a visual monitoring of the Flash BIOS update/copy operation in VT100 mode.

To get a summary of the Batch Mode options from UBIOS, simply call UBIOS with the command line '?'. The command will display a Batch options summary of valid UBIOS command lines. The same help information will also be displayed each time UBIOS detects an error in the command line.

SECTION 14
VT100 MODE

The VIPer utilizes a feature known as VT100 Mode. This mode enables your single board computer to run without a local keyboard or screen. That is, operation can be controlled via a remote terminal supporting VT100 Mode or a computer with a terminal emulation program (for example, Telix, Procomm).

14.01 REQUIREMENTS

To use VT100 Mode, the board must be supplied with ±12 volts. This is the voltage required by the RS232 drivers.

The terminal you are using should emulate a VT100 or ANSI terminal. Although this is not an absolute requirement, strange characters may appear on screen if it does not. This occurs because the VT100 recognizes these control characters, and causes them to perform a specific function, for example, screen erase, cursor position, and so on.

14.02 SETUP & CONFIGURATION

Follow these steps for setting up VT100 Mode:

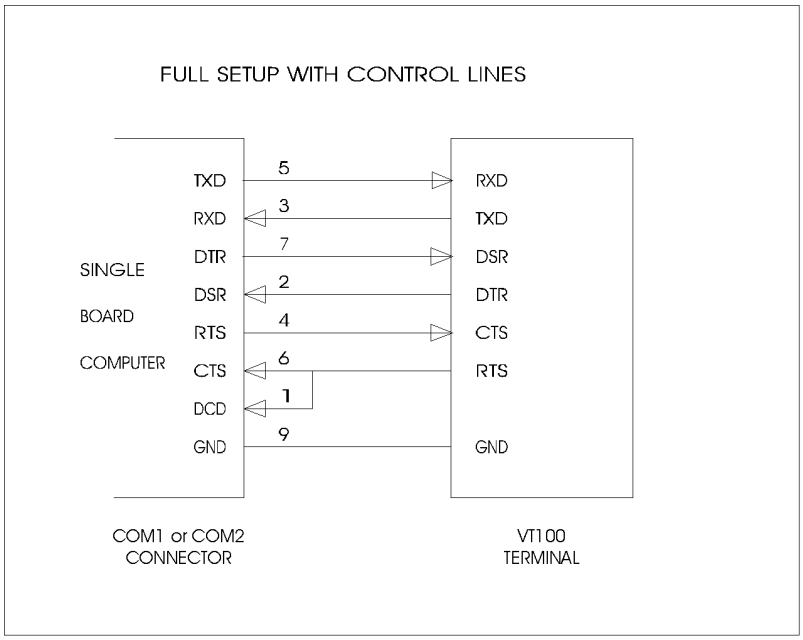
- Power off your VIPer and install jumper W22(5-6) to enable VT100 Mode. Note: VT100 Mode runs on UART1 and UART2.

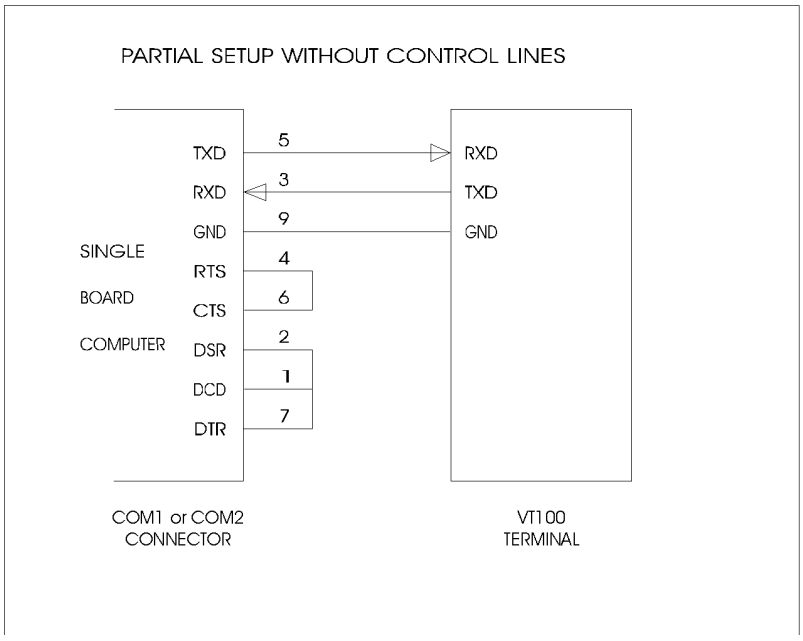
- Connect the communications cable as shown in Diagram 14-1. Note: If you do not require a full cable for your terminal, you can set up a partial cable by using only the TXD and RXD lines. The control lines can be ignored by looping them back as shown in Diagram 14-2.

- Power on your VIPer and run VIPer Setup by hitting the CTRL and V keys simultaneously, before or when you see the message "Press CTRL-V to enter TEKNOR VIP-UP" at the top of the screen. On the second screen, set the "VT100 & Serial Download Speed" at 19200 BPS or 9600 BPS.

- You must respect this protocol: 8 Bits
  No Parity
  Echo Off.

  If you are running a terminal emulation program, these parameters must be set in it.


FULL SETUP WITH CONTROL LINES
SINGLE
BOARD
COMPUTER
TXD
RXD
DTR
DSR
RTS
CTS
DCD
GND
5
3
7
2
4
6
1
9
RXD
TXD
DSR
DTR
CTS
RTS
GND
COM1 or COM2
CONNECTOR
VT100
TERMINAL


PARTIAL SETUP WITHOUT CONTROL LINES
SINGLE
BOARD
COMPUTER
TXD
RXD
GND
RTS
CTS
DSR
DCD
DTR
5
3
9
4
6
2
1
7
RXD
TXD
GND
COM1 or COM2
CONNECTOR
VT100
TERMINAL

14.03 RUNNING WITHOUT A TERMINAL

The VIPer can boot up without a screen or terminal attached. However, if VT100 Mode is desired, but the terminal is to be disconnected, you must ensure the control lines are in an active state. Failing this, the system may "hang" while waiting for the control lines to become active. Wiring the system according to Diagram 14-2 allows the lines to remain active. This does not apply if the VT100 jumper is not set.

Furthermore, you can run without any console at all simply by not enabling VT100 Mode and by not installing a video card.

SECTION 15
DOWNLOAD MODE

Information can be downloaded to the Flash EPROM disk on the VIPer by running VFLASH on a remote computer and using a serial link. This is referred to as Download Mode and is enabled by installing jumper W22(7-8).

Refer to Section 11 for more information on running VFLASH in Download Mode.

APPENDIXES

APPENDIX A: VIPer800 SPECIFICATIONS

APPENDIX B: MEMORY & I/O MAPS

APPENDIX C: MECHANICAL LAYOUT & BLOCK DIAGRAM

APPENDIX D: CONNECTOR OVERVIEW

APPENDIX E: RECOMMENDED DEVICES & MATING CONNECTORS

APPENDIX F: ERROR CODES

APPENDIX A
Viper800 SPECIFICATIONS

A.01 SPECIFICATIONS

Operating Temperature: 0^{o} to 70^{o}C

Noncondensing Relative Humidity: 5% to 95%

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

Supply Voltage: VCC =+ 5V ±5%
±12V ±5%

Supply Current:

TABLE A-1: Supply Current

SUPPLY CURRENT *	Viper800 386SX-33	Viper800 486SLC-33
ICC Typical (+5V)	1.34A	1.42A
IPP (+12V)	10mA	10mA
IPP (-12V)	5mA	5mA
ICC Sleep Mode (+5V)	.80A	.68A

* Measured with 4 MB DRAM, 1 MB Flash EPROM, 512 KB SRAM.

Mechanical:

- Conforms to the IEEE P996 PC/AT bus mechanical specifications.
- 4.8 in. x 7.125 in. / 121.92 mm x 180.975 mm.

A.02 BATTERY

The VIPer800 comes with a 360 mAh TL5186 TADIRAN battery. It powers the SRAM (if installed), as well as the Chipset's Real Time Clock and CMOS Setup, whenever the board is powered down.

The TL5186 TADIRAN battery has a shelf life of approximately 10 years (under "no-load" conditions). The actual life of the battery depends on the amount of time DC power is not applied and on environmental (temperature) conditions. The TADIRAN TL5186 has an operating range of -55^{o} to 75^{o}C and discharge characteristics vary with temperature. The SRAM and RTC typically draw 7µA while the specifications are 24µA maximum (20µA for the SRAM and 4µA for the RTC). Therefore, the expected life of the battery (360 mAh) would be typically 6 years, while the absolute worst case would be 1¾ years (21 months), when 512 KB SRAM are installed.

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 pins on te soldered side, you do not have to remove the battery).

An optional 1Ah can be obtained from TEKNOR (part number 100-003).

Shorting jumper W9: pins 1 and 2 enables the Internal Battery's power. Opening jumper W9: 1-2 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 W9 should be shorted. Please refer to Section 3 for jumper location and setting.

The VIPer board has a special feature that allows the CMOS RAM Setup to be saved in Flash EPROM memory. This feature eliminates battery dependance by saving and recovering the CMOS RAM Setup from Flash (only the time and date could be lost).

☞ **In order to save your current CMOS Setup in Flash, you must update the VIP-UP Setup (with F10), while the "Use Flash To Store CMOS RAM SETUP" (first screen) is set to "Yes". See section 10.01 for more information.**

A.03 MTBF

MEAN TIME BETWEEN FAILURE (MTBF)

The reliability analysis performed on the Viper800 has resulted in a predicted reliability greater than 65,120 hours for the 386SX microprocessor and 63,153 hours for the 486SLC.

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

The Viper800 board is considered functioning in a Ground Fixed environment as defined in MIL-HDBK-217F. The calculations are performed at 20^{o}C with a temperature rise of 10^{o}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 Viper800 reliability prediction are: the 78 resistors 10K, the 63 resistors 33R and the T1486SLC-33/80386SX-33.

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.

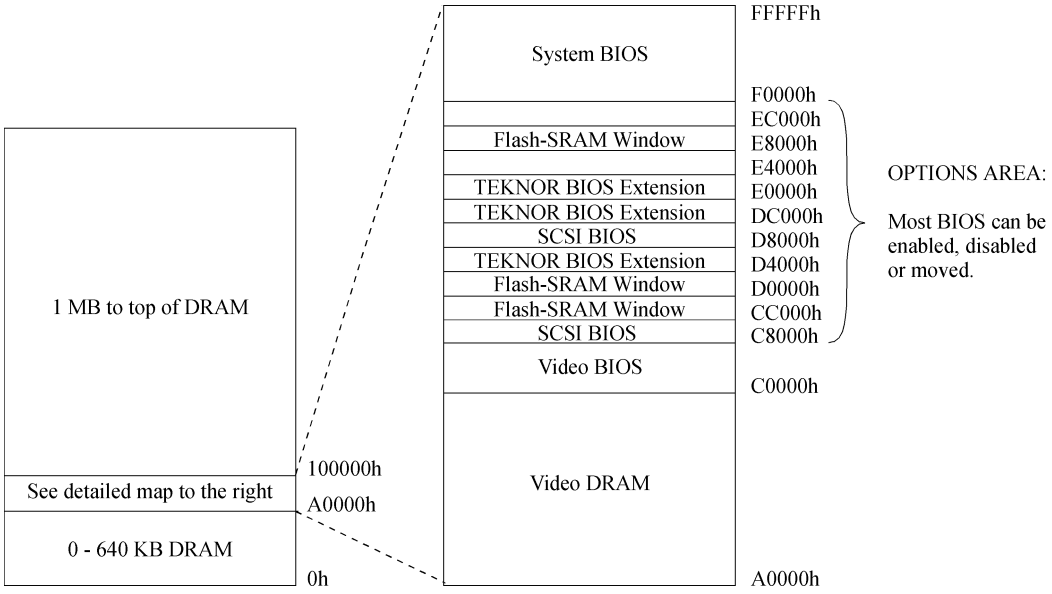
As a result, the Viper800 has the following built-in features to help ensure that the conditions required for approval are met:

- 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

In this appendix, the Memory Map Diagram, as well as the Memory Map and I/O Map tables, are included.



On the following page, the same memory map is showed, only in a table format.

TABLE B-1: Memory Map

ADDRESS	OPTIONAL ADDRESS	OPTIONAL ADDRESS	FUNCTION
00000-9FFFF			0-640 KB DRAM
A0000-BFFFF			Video DRAM
C0000-C7FFF			Video BIOS
C8000-CBFFF	D8000-DBFFF		SCSI BIOS
CC000-CFFFF	D0000-D3FFF	E8000-EBFFF	Flash-SRAM Window
D4000-D7FFF	DC000-DFFFF	E0000-E3FFF	TEKNOR BIOS Extension
F0000-FFFFF			System BIOS
100000-Top of DRAM			1 MB - Top of DRAM

TABLE B-2: I/O Map

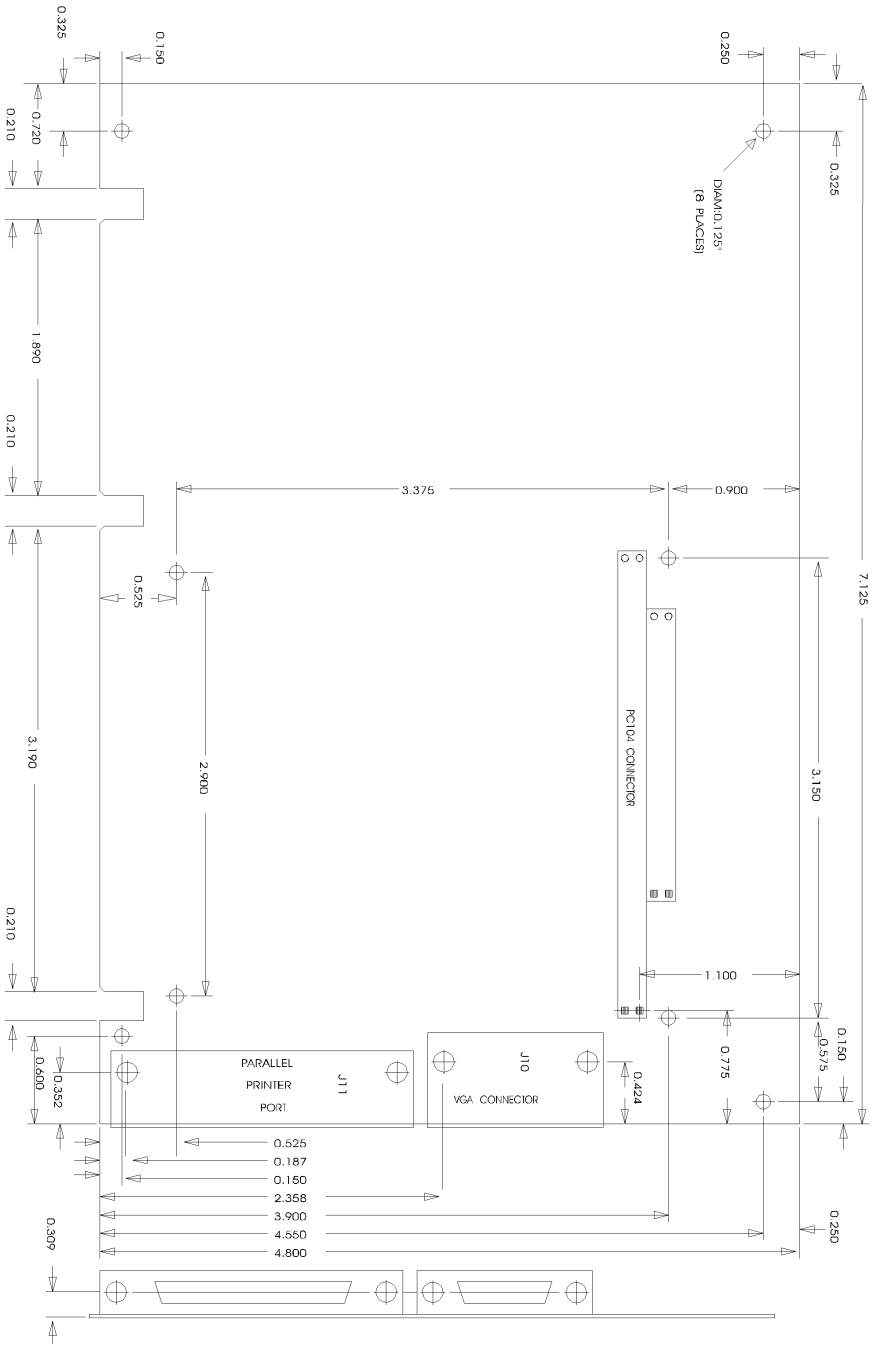
ADDRESS	OPTIONAL ADDRESS	OPTIONAL ADDRESS	OPTIONAL ADDRESS	FUNCTION
000-00F				DMA Controller 1
020-03F				Interrupt Controller 1
040-043				Timer
060-064				Keyboard (8742)
070-071				Real-time clock, NMI mask
080-09F				DMA Page Register
0A0-0BF				Interrupt Controller 2
0C0-0DF				DMA Controller 2
0EC-0EF				Configuration Registers
0F0-0FF				Math Coprocessor/ Configuration Registers
1F0-1F7, 3F6, 3F7	170-177, 376, 377			IDE Hard Disk
3F0-3F7	370-377			Floppy Disk
340-34F, 35A-35B	140-14F, 15A-15B			SCSI 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				Graphics Controller
190-193	290-293	390-393		TEKNOR Control Port

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 VIPer800


0.325
0.150
0.250
0.210
0.720
DIAM 0.125"
(8 PLACES)
0.325
1.890
0.210
3.375
0.900
0.525
7.125
PC104 CONNECTOR
3.190
2.900
3.150
0.210
1.100
0.150
0.575
0.775
0.600
0.352
PARALLEL
PRINTER
PORT
J11
J10
VGA CONNECTOR
0.424
0.525
0.187
0.150
2.358
3.900
4.550
4.800
0.309
0.250

APPENDIX D
CONNECTOR OVERVIEW

Hard Disk Connector (J1) - Pin-Out

Pin Number	Signal Flow	Signal	Pin Number	Signal Flow	Signal
1	I	RESET*	2	-	GND
3	I/O	SD7	4	I/O	SD8
5	I/O	SD6	6	I/O	SD9
7	I/O	SD5	8	I/O	SD10
9	I/O	SD4	10	I/O	SD11
11	I/O	SD3	12	I/O	SD12
13	I/O	SD2	14	I/O	SD13
15	I/O	SD1	16	I/O	SD14
17	I/O	SD0	18	I/O	SD15
19	-	GND	20	-	Not Used
21	-	Not Used	22	-	GND
23	I	IOW*	24	-	GND
25	I	IOR*	26	-	GND
27	O	IOCHRDY	28	I	BALE
29	-	Not Used	30	-	GND
31	O	IRQ14	32	O	IOCS16*
33	I	SA1	34	-	Not Used
35	I	SA0	36	I	SA2
37	I	CS0*	38	I	CS1*
39	O	ACTIVE*	40	-	GND

* Active low signal

Floppy Disk Connector (J2) - Pin-Out

Pin Number	Signal Flow	Signal	Pin Number	Signal Flow	Signal
1	-	GND	2	O	RPM/LC
3	-	GND	4	-	Not Used
5	-	GND	6	-	Not Used
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	-	N. C. [1]	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	-	N. C. [1]	28	I	WRITE PROTECT*
29	-	N. C. [1]	30	I	READ DATA*
31	-	GND	32	O	HEAD SELECT*
33	-	N. C. [1]	34	I	DSKCHG*

* Active low signal

[1] By default, these pins are not connected, however, by installing the W11 and W12 jumpers, these configurations are possible (see also page 6-8 in the manual):

17	GND	Or: 17	EDOUT (2.88 MB)
27	GND	27	HDOUT (2.88 MB)
29	EDOUT (2.88 MB)	29	GND
33	HDOUT (2.88 MB)	33	GND

Keyboard Connector (J3) - Pin-Out

Pin Number				Pin Number		
Signal Flow					Signal Flow	
SIGNAL						SIGNAL
KBDCLK	I/O	1		2	-	GND
KBDDATA	I/O	3		4	-	GND
VCC	-	5		6	-	VCC
SPKR	O	7		8	-	VCC
KBDINH	I	9		10	-	GND
DOWNLD*	I	11		12	-	GND
PBRES*	I	13		14	-	GND
ACT*	O	15		16	-	VCC

* Active low signal

Serial Port 2 (J4) RS232 - Pin-Out

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				

Serial Port 2 (J4) RS485 - Pin-Out

Pin Number				Pin Number		
Signal Flow					Signal Flow	
Signal						Signal
DCD	I	1		2	I	DSR
RXD(-)	I/O	3		4	I/O	RXD(+)
TXD(-)	O	5		6	I	TXD(+)
DTR	O	7		8	I	RI
GND	-	9				

Connector Overview D4

SCSI Connector (J5) - Pin-Out

Pin Number	Signal	Pin Number	Signal
1	GND	2	SCSI D0
3	GND	4	SCSI D1
5	GND	6	SCSI D2
7	GND	8	SCSI D3
9	GND	10	SCSI D4
11	GND	12	SCSI D5
13	GND	14	SCSI D6
15	GND	16	SCSI D7
17	GND	18	SCSI DP*
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	Term Power	26	Term Power
27	GND	28	GND
29	GND	30	GND
31	GND	32	ATN*
33	GND	34	GND
35	GND	36	BSY*
37	GND	38	ACK*
39	GND	40	RESET*
41	GND	42	MSG*
43	GND	44	SEL*
45	GND	46	C/D*
47	GND	48	REQ*
49	GND	50	I/O*

* Active low signal

Feature Connector (J6) - Pin-Out

I/O PIN	Signal Name	I/O PIN	Signal Name
Y1	VPO	Z1	GND
Y2	VP1	Z2	GND
Y3	VP2	Z3	GND
Y4	VP3	Z4	EVIDEO*
Y5	VP4	Z5	ESYNC*
Y6	VP5	Z6	EDCLK*
Y7	VP6	Z7	Not Used
Y8	VP7	Z8	GND
Y9	DOT CLK	Z9	GND
Y10	BLANK	Z10	GND
Y11	HSYNC	Z11	GND
Y12	VSYNC	Z12	Not Used
Y13	GND	Z13	Not Used

* Active low signal

Connector Overview D6

Serial Port 1 - (J7) RS232 - Pin-Out

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				

Power Connector (J8) - Pin-Out

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

Connector Overview D8

VGA Connector (J10) - Pin-Out

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

Parallel Port Connector (J11) - Standard Mode - Pin-Out

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

* Active low signal

Connector Overview D10

Parallel Port Connector (J11) - EPP Mode - Pin-Out

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

* Active low signal

Parallel Port Connector (J11) - ECP Mode - Pin-Out

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

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

Connector Overview D12

PC/104 Card Connector (P1)

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
A32	GND	-

B Side

I/O PIN	Signal Name	I/O
B1	GND	-
B2	RESET DRV	O
B3	VCC	-
B4	IRQ9	I
B5	-5 Vdc	-
B6	DRQ2	I
B7	-12 Vdc	-
B8	OWS*	I
B9	+12 Vdc	-
B10	Not Used	-
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	-
B30	OSC	O
B31	GND	-
B32	GND	-

* Active low signal

PC/104 Card Connector (P2)

C Side

I/O PIN	Signal Name	I/O
C0	GND	-
C1	SBHE*	I/O
C2	LA23	I/O
C3	LA22	I/O
C4	LA21	I/O
C5	LA20	I/O
C6	LA19	I/O
C7	LA18	I/O
C8	LA17	I/O
C9	MEMR*	I/O
C10	MEMW*	I/O
C11	SD08	I/O
C12	SD09	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
C19	Not Used	-

D Side

I/O PIN	Signal Name	I/O
D0	GND	-
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	-
D17	MASTER*	I
D18	GND	-
D19	GND	-

* Active low signal

Connector Overview D14

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	-
B4	IRQ9	I
B5	-5 Vdc	-
B6	DRQ2	I
B7	-12 Vdc	-
B8	OWS*	I
B9	+12 Vdc	-
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	-
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	LA23	I/O
C3	LA22	I/O
C4	LA21	I/O
C5	LA20	I/O
C6	LA19	I/O
C7	LA18	I/O
C8	LA17	I/O
C9	MEMR*	I/O
C10	MEMW*	I/O
C11	SD08	I/0
C12	SD09	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	-
D17	MASTER*	I
D18	GND	-

* Active low signal

Connector Overview D16

APPENDIX E
RECOMMENDED DEVICES & MATING CONNECTORS

The following is a list of recommended devices and connectors for use on the VIPer800. Many other models are available and function equally well. Users are encouraged to check with their local distributors for comparable substitutes.

DRAM (U8-U11)
DRAM devices with page mode at 70 nanoseconds maximum access time is recommended for 33 MHz boards. For example:

MOZEL	V104BJ9S70	(256K*9)
OKI	MSC2331A-70YS3	(256K*9)
OKI	MSC2331B-70YS3	(256K*9)

IBM	B1A10900A-70	(1M*9)
MOTOROLA	MCM91430S60	(1M*9)
MOTOROLA	MCM91430S70	(1M*9)
MOTOROLA	MCM91430S70JC	(1M*9)
NEC	MC-421000A9BA-70	(1M*9)
OKI	MJC23109B-70DS3B	(1M*9)
OKI	MSC23109-70DJ3	(1M*9)
OKI	MSC23109-70DS3	(1M*9)
OKI	MSC23109-70DS3A	(1M*9)
SAMSUNG	KMM591000AN-70	(1M*9)
SAMSUNG	KMM591000BN-60	(1M*9)

HITACHI	HB56A49BR7B	(4M*9)
OKI	MSC23409-70DS9	(4M*9)
TI	TM4100EAD9-70	(4M*9)
TI	TM497EU9-70	(4M*9)

MATH COPROCESSORS
IIT 3C87SX-33 for 33 MHz boards

CYRIX CX-83S87-33 for 33MHz boards

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 746286-9 (499252-1*) Thomas & Betts 609-1041 (40-pin flat cable connector)
Floppy Disk (J2)	Robinson Nugent IDS-C34PK-TG Amp 746286-8 (499252-6*) Thomas & Betts 609-3441 (34-pin flat cable connector)
Keyboard (J3)	Robinson Nugent IDS-C16PK-TG Amp 746286-3 (499252-8*) Thomas & Betts 609-1641 (16-pin flat cable connector)
Serial Port 2 (J4)	Robinson Nugent IDS-C10PK-TG Amp 746286-1 (499252-5*) Thomas & Betts 609-1041 (10-pin flat cable connector)
SCSI (J5)	Robinson Nugent IDS-C50PK-TG Amp 1-746286-0 (499252-4*) Thomas & Betts 609-5041
Serial Port 1 (J7)	Robinson Nugent IDS-C10PK-TG Amp 746286-1 (499252-5*) Thomas & Betts 609-1041 (10-pin flat cable connector)

* optional Amp strain relief part number shown in brackets

Connector	Recommended Mating Part
Power Connector (J8)	Leoco 2530 S060013 (housing) Leoco 2533 TCB00A0 (pins) Molex 22-01-2065 (housing) Molex 08-50-114 (pins)
Parallel Port (J11)	Robinson Nugent IDD-C25PM-440-TG30 Amp 747321-2 (747275-2*) Thomas & Betts 609-25P Amphenol 841-17-DBFR-B25P (25-pin flat cable connector)

* optional Amp strain relief part number shown in 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.02.

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
01	Processor register test about to start, and NMI to be disabled.
02	NMI is disabled. Power on delay starting.
03	Power on delay complete. Any initialization before keyboard BAT is in progress.
04	Any initialization before keyboard BAT is complete. Reading keyboard SYS bit, to check soft reset / power-on.
05	Soft reset / power-on determined. Going to enable ROM, i.e., disable shadow RAM/Cache if any.
06	ROM is enabled. Calculating ROM BIOS checksum, and waiting for KB controller input buffer to be free.
07	ROM BIOS checksum passed, KB controller I/B free. Going to issue the BAT command to keyboard controller.
08	BAT command to keyboard controller is issued. Going to verify BAT command.
09	Keyboard controller BAT result verified. Keyboard command byte to be written next.
0A	Keyboard command byte code is issued. Going to write command byte data.
0B	Keyboard controller command byte is written. Going to issue Pin-23, 24 blocking/unblocking command.
0C	Pin-23, 24 of keyboard controller is blocked/unblocked. NOP command of keyboard controller to be issued next.
0D	NOP command processing done. CMOS shutdown register test to be done next.

POST CODE	DESCRIPTION
0E	CMOS shutdown register R/W test passed. Going to calculate CMOS checksum, and update DIAG byte.
0F	CMOS checksum calculation is done, DIAG byte written. CMOS initialize to begin (If "INIT CMOS IN EVERY BOOT IS SET").
10	CMOS initialization done (if any). CMOS status register about to initialize Date and Time.
11	CMOS Status register initialized. Going to disable DMA and interrupt controllers.
12	DMA controller #1, #2, interrupt controller #1, #2 disabled. About to disable video display and initialize port-B.
13	Video display is disabled and port-B is initialized. Chipset initialization / automatic memory detection about to begin.
14	Chipset initialization / automatic memory detection over. 8254 timer test about to start.
15	CH-2 timer test halfway. 8254 CH-2 timer test to be complete.
16	CH-2 timer test over. 8254 CH-1 timer test to be complete.
17	CH-1 timer test over. 8254 CH-0 timer test to be complete.
18	CH-0 timer test over. About to start memory refresh.
19	Memory Refresh started. Memory Refresh test to be done next.
1A	Memory Refresh line is toggling. Going to check 15 micro second ON/OFF time.
1B	Memory Refresh period 30 microsecond test complete. Base 64 KB memory test about to start.
20	Base 64 KB memory test started. Address line test to be done next.
21	Address line test passed. Going to do toggle parity.
22	Toggle parity over. Going for sequential data R/W test.
23	Base 64 KB sequential data R/W test passed. Any setup before interrupt vector initialization about to start.
24	Setup required before vector initialization complete. Interrupt vector initialization about to begin.
25	Interrupt vector initialization done. Going to read I/O port of 8042 for turbo switch (if any).
26	I/O port of 8042 is read. Going to initialize global data for turbo switch.
27	Global data initialization is over. Any initialization after interrupt vector to be done next.
28	Initialization after interrupt vector is complete. Going for monochrome mode setting.
29	Monochrome mode setting is done. Going for color mode setting.
2A	Color mode setting is done. About to go for toggle parity before optional ROM test.
2B	Toggle parity over. About to give control for any setup required before optional video ROM check.

POST CODE	DESCRIPTION
2C	Processing before video ROM control is done. About to look for optional video ROM and give control.
2D	Optional video ROM control is done. About to give control to do any processing after video ROM returns control.
2E	Return from processing after the video ROM control. If EGA/VGA not found, then do display memory R/W test.
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. About to do alternate Display memory R/W test.
32	Alternate display memory R/W test passed. About to look for the alternate display retrace checking.
33	Video display checking over. Verification of display type with switch setting and actual card to begin.
34	Verification of display adapter done. Display mode to be set next.
35	Display mode set complete. BIOS ROM data area about to be checked.
36	BIOS ROM data area checked over. Going to set cursor for power on message.
37	Cursor setting for power on message id complete. Going to display teh power on message.
38	Power on message display complete. Going to read new cursor position.
39	New cursor position read and saved. Going to display the reference string.
3A	Reference string display is over. Going to display the Hit <ESC> message.
3B	Hit <ESC> message displayed. Virtual mode memory test about to start.
40	Preparation for virtual mode test started. Going to verify from video memory.
41	Returned after verifying from display memory. Going to prepare the descriptor tables.
42	Descriptor tables prepared. Going to enter in virtual mode for memory test.
43	Entered in the virtual mode. Going to enable interrupts for diagnostics mode.
44	Interrupts enabled (if diagnostics switch is on). Going to initialize data to check memory wrap around 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 640 KB memory.
48	Patterns written in base memory. Going to find out amount of memory below 1 MB memory.

POST CODE	DESCRIPTION
49	Amount of memory below 1 MB found and verified. Going to find out amount of memory above 1 MB memory.
4A	Amount of memory above 1 MB found and verified. Going for BIOS ROM data area check.
4B	BIOS ROM data area check over. Going to check <ESC> and to clear memory below 1 MB for soft reset.
4C	Memory below 1 MB cleared. (SOFT RESET.) Going to clear memory above 1 MB.
4D	Memory above 1 MB cleared. (SOFT RESET.) Going to save the memory size.
4E	Memory test started. (NO SOFT RESET.) About to display the first 64 KB memory test.
4F	Memory size display started. This will be updated during memory test. Going for sequential and random memory test.
50	Memory test below 1 MB complete. Going to adjust memory size for relocation/shadow.
51	Memory size adjusted due to relocation/shadow. Memory test above 1 MB to follow.
52	Memory test above 1 MB complete. Going to prepare to go back to real mode.
53	CPU registers are saved including memory size. Going to enter in real mode.
54	Shutdown successfull, CPU in real mode. Going to restore registers saved during preparation for shutdown.
55	Registers restored. Going to disable gate A20 address line.
56	A20 address line disable successful. BIOS ROM data area about to be checked.
57	BIOS ROM data area check halfway. BIOS ROM data area check to be complete.
58	BIOS ROM data area check over. Going to clear Hit <ESC> message.
59	Hit <ESC> message cleared. <WAIT...> message displayed. About to start DMA and interrupt controller test.
60	DMA page register test passed. About to verify from display mmemory.
61	Display memory verification over. About to go for DMA #1 base register test.
62	DMA #1 base register test passed. About to go for DMA #2 base register test.
63	DMA #2 base register test passed. About to go for BIOS ROM data area test.
64	BIOS ROM area check halfway. BIOS ROM data area check to be complete.
65	BIOS ROM data area check over. About to program DMA unit 1 and 2.
66	DMA unit 1 and 2 programming over. About to initialize 8259 interrupt controller.
67	8259 initialization over. About to start keyboard test.
80	Keyboard test started. Clearing output buffer, checking for stuck key. About to issue keyboard reset command.
81	Keyboard reset error/stuck key found. About to issue keyboard controller interface test command.
82	Keyboard controller interface test over. About to write command byte and initialize circular buffer.

POST CODE	DESCRIPTION
83	Command byte written, global data initialization done. About to check for lock-key.
84	Lock-key checking over. About to check for memory size mismatch with CMOS.
85	Memory size check done. About 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. Going to CMOS setup program.
88	Returned from CMOS setup program and screen is cleared. About to do programming after setup.
89	Programming after setkup complete. Going to display power on screen message.
8A	First screen message displayed. About to display <WAIT...> message.
8B	<WAIT...> message displayed. About to do Main and Video BIOS shadow.
8C	Main and Video BIOS shadow successful. Setup options programming after CMOS setup about to start.
8D	Setup options are programmed. Mouse check and initialization about to be done next.
8E	Mouse check and initialization complete. Going for hard disk, floppy reset.
8F	Floppy check returns that floppy is to be initialized. Floppy setup to follow.
90	Floppy setup is over. Test for hard disk presence to be done.
91	Hard disk presence test over. Hard disk setup to follow.
92	Hard disk setup complete. About to go for BIOS ROM data area check.
93	BIOS ROM data area check halfway. BIOS ROM data area check to be complete.
94	BIOS ROM data area check over. Going to set base and extended memory size.
95	Memory size adjusted due to mouse support, hdisk type-47. Going to verify from display memory.
96	Returned after verifying from display memory. Going to do any initialization before C800 optional ROM control.
97	Any initialization 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.
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 co-processor test.
9C	Required initialization before co-processor is over. Going to initialize the co-processor next.
9D	Co-processor initialized. Going to do any initialization after co-processor test.

POST DESCRIPTION CODE

9E	Initialization after co-processor test is complete. Going to check extended keyboard, keyboard ID and NUM-LOCK.
9F	Extended keyboard check is done, ID flag set. NUM-LOCK ON/OFF. Keyboard ID command to be issued.
A0	Keyboard ID command issued. Keyboard ID flag to be reset.
A1	Keyboard ID flag reset. Cache memory test to follow.
A2	Cache memory test over. Going to display any soft errors.
A3	Soft errors display complete. Going to set the keyboard typematic rate.
A4	Keyboard typematic rate set. Going to program memory wait states.
A5	Memory wait states programming over. Screen to be cleared next.
A6	Screen cleared. Going to enable parity and NMI.
A7	NMI and parity enabled. Going to do any initialization required before giving control to optional ROM at E000.
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.
00	System configuration displayed. Going to give control to INT 19H boot loader.

F.02 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.

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 64 KB block of memory)
3	Base 64 KB Memory Failure	Memory failure in the first 64 KB.
4	Time Not Operational	A memory failure in the first 64 KB 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.

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