

TEK-AT4LVG (TEK735)

**INDUSTRIAL SINGLE BOARD COMPUTER
TECHNICAL REFERENCE MANUAL
VERSION 2.0, DECEMBER 1996**

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FOREWORD

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PART ONE
PRESENTATION OF THE TEK-AT4LVG

- 1 THE MANUAL
- 2 PRODUCT SPECIFICATIONS

1 THE MANUAL

1.01 HOW THE MANUAL IS ORGANIZED

The TEK-AT4LVG TECHNICAL REFERENCE MANUAL is divided as follows:

- Part One **PRESENTATION OF THE TEK-AT4LVG**
describes the different features and gives technical information about the board.

- Part Two **QUICK INSTALLATION**
includes essential information to get your TEK-AT4LVG up and running quickly.

- Part Three **ADVANCED INSTALLATION AND SETUP**
divides the TEK-AT4LVG PC/AT Single Board Computer according to functional units; it includes detailed information on the board's hardware and software features, and on installation and setup procedures.

- Part Four **SPECIAL SOFTWARE AND ONBOARD UTILITIES**
describes, in detail, special software and utilities that come with the TEK-AT4LVG board.

- Part Five **ADDITIONAL INFORMATION**
contains several appendices which comprise information you can consult when you need it.

The sections of this manual group the various aspects of the TEK-AT4LVG board, with special emphasis put on installation and setup procedures.

The 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 do not apply can be skimmed or skipped.

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2.01 PRODUCT DESCRIPTION

2.01.1 GENERAL

The TEK-AT4LVG (also called the TEK735) 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 EPROM).

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:

- Watchdog Timer;
- SMM (System Management Mode) support and full SMI (System Management Interrupt) interface for power management;
- Power failure detector;
- Low battery detector;
- Shadow RAM BIOS support for fast execution;
- Flash EPROM boot;
- Real-Time Clock (RTC) with battery backup;
- Solid state disks (optional): 2 or 4 MB of user Flash EPROM.

2.01.2 SYSTEM CHARACTERISTICS

MICROPROCESSORS SUPPORTED	<ul style="list-style-type: none">• Intel™: 486 DX2-66MHz ; DX4-100MHz.• AMD™: DX2-66MHz ; DX4-100MHz ; DX5-133MHz.
SYSTEM MEMORY	<ul style="list-style-type: none">• Standard 5V, 70 ns single sided or double sided SIMMs.- Two 72-pin SIMM sockets support memory configurations from 1 to 64 MB using 1MB, 2MB, 4MB, 8MB, 16MB and 32MB SIMM modules.OR- Four 30-pin SIMM sockets support memory configurations from 1 to 16 MB using 256KB, 1MB and 4MB SIMM modules.
CACHE MEMORY	<ul style="list-style-type: none">• Write -Through Internal Cache.• Write-Back/Write-Through System Cache available as 0KB, 128KB, 256KB or 512KB.
SUPERVISOR UTILITIES	<ul style="list-style-type: none">• Watchdog Timer.• Power fail/low battery detector circuit.
REAL TIME CLOCK	<ul style="list-style-type: none">• MC146818 compatible.• 128 bytes battery backup CMOS RAM.
BUS STANDARD SUPPORT	<ul style="list-style-type: none">• High-drive buffers to support up to 20 slots.• Standard 16-bit PC/AT ISA bus (P996 standard).

- | | |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BIOS | <ul style="list-style-type: none"> • System BIOS: Includes the AWARD Setup program, a utility in ROM which is used to set configuration data in CMOS RAM. • Video BIOS: From Cirrus Logic for the video controller. • TEKNOR BIOS <ul style="list-style-type: none"> - Includes VIP-UP, TEKNOR's own Setup program for enabling /disabling / relocating various hardware features on the Single Board Computer. - Also includes Flash disk and Flash BIOS support. |
| MULTI-FUNCTION CONNECTOR | <ul style="list-style-type: none"> • Provides all the necessary signals for connecting the keyboard, speaker, reset button and hard disk LED. |
| ULTRA I/O CONTROLLER | <ul style="list-style-type: none"> • Supports the Plug and Play standard and has a Serial EEPROM onboard for Plug and Play compatibility and configuration storage. |

2.01.3 IDE/FLOPPY/SCSI DEVICES

- FLOPPY DISKS
- Software compatible with N82077.
 - Enhanced super Floppy controller which supports two Floppy disk drives of up to 2.88MB each, 16 bytes of FIFO buffering and a 48 mA drive buffer.
- IDE (HARD DISKS)
- Includes a local bus IDE hard disk interface for a high performance disk subsystem.
 - Support for two IDE channels for up to four IDE drives.
- SCSI
- Adaptec AIC-6360 supports up to seven SCSI peripherals and the Fast SCSI II standard.
 - Passive Terminations.
 - Fast SCSI II, 8-bit bus.
 - 10MB/s synchronous transfers.
 - 5MB/s asynchronous transfers.
 - Can co-exist with other hard disk/controller combinations: such as ST-506, RLL, ESDI and IDE.

2.01.4 SERIAL AND PARALLEL PORTS

- SERIAL PORTS
- Two 16550 compatible serial ports with internal 16-byte FIFO buffers can be defined as two of the following: COM1, COM2, COM3 or COM4.
 - Serial Port 1 is configurable as RS-232.
 - Serial Port 2 is configurable as RS-232 or RS-485.
 - Support for VT100 mode through Serial Port 1 or 2.
- PARALLEL PORTS
- One bi-directional port (LPT1).
 - 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).

2.01.5 FLASH DISK AND UTILITIES

- | | |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SOLID STATE DISKS
(optional) | • 2 or 4 MB of user Flash EPROM. |
| FLASH FILE
SYSTEM II SUPPORT | • Used to create a read/write MS-Flash partition in the 2MB or 4MB Flash EPROM device. Such a partition can be accessed via the DOS commands. |
| VFLASH
SOFTWARE | • TEKNOR's Flash EPROM transfer utility program for single board computers. Its main function is to download DOS files to the 2 or 4 MB Flash EPROM disk, also referred to as data Flash. |
| UBIOS SOFTWARE | • Utility that allows taking 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 |

2.01.6 VIDEO COMPONENTS

- Cirrus Logic GD5430, GD5434 or 5440 video processor chip.
- The local bus SVGA video controller is from Cirrus Logic and provides high resolution CRT display. The board also comes with 1MB or 2MB of video memory (DRAM), and a feature connector for overlay and color keying.
- Enhanced GUI and Video accelerator with a 32/64-bit BitBLT engine (5430 and 5434).
- 32-bit direct-connect VL-Bus interface:
 - Zero-wait-state write buffer for CPUs up to 33 MHz.
- 32/64-bit DRAM display memory interface:
 - 1MB/2MB display memory support (5430 and 5434).
- Integrated 24-bit DAC.
- Hardware and BIOS compatible with IBM VGA display standard.
- Multimedia ready:
 - VESA Feature-Connector (VFC) support.
- Resolutions supported with 1MB of Video DRAM:
 - 640 x 480 (up to 16 Million colors).
 - 800 x 600 (up to 64000 colors).
 - 1024 x 768 (up to 256 colors).
 - 1280 x 1024 (up to 16 colors).
- Resolutions supported with 2MB of Video DRAM.
 - 640 x 480 (up to 16 Million colors).
 - 800 x 600 (up to 16 Million colors).
 - 1024 x 768 (up to 65536 colors).
 - 1280 x 1024 (up to 256 colors).

2.01.7 POWER MANAGEMENT

- Supports Stand-by and Suspend modes for the System Power Management.

STAND-BY • System Controller's first level of power management. In this mode, the CPU clock frequency is reduced. Also, if the VIDEO ON/OFF CONTROL is enabled, the video monitor will be deactivated.

SUSPEND • System Controller's second level of power management. In this mode, the CPU clock frequency is stopped.

- Supports Stand-by mode for the Hard Disk Power Management.

STAND-BY • In this mode, the Hard Disk is powered off. It is reactivated by the next disk access operation.

2.01.8 VT100 AND DOWNLOAD MODES

VT100 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.

DOWNLOAD MODE • Information can be downloaded to the Flash EPROM disk on the board by running VFLASH on a remote computer and using a serial link.

2.02 COMPATIBILITY WITH OTHER TEKNOR SINGLE BOARD COMPUTERS

Compatibility with former TEKNOR board designs is maintained at the driver level. The following features and devices have been taken from other TEKNOR products and integrated into the TEK-AT4LVG:

- The Ultra I/O Controller is the same as the one used on the VIPer806.
- The Flash File and Emergency BIOS are mapped like the TEK930 (PCI-930).

2.03 BOARD SPECIFICATIONS

Electrical

- ù Conforms to the electrical specifications in the IEEE P996 Bus Specification (PC/AT).
- ù Supply Current:

TABLE 2-1: Supply Current

SUPPLY CURRENT *	DX2-66	DX4-100	DX4-133
+5V Typical	2.1A	2.0A	2.2A
+5V Suspend	1.5A	1.5A	1.6A
+12V/-12V	10mA	10mA	10mA

* Measured with 8MB DRAM, 256k Cache, 2MB Video DRAM, keyboard, floppy, and one hard disk installed.

Mechanical

- ù Conforms to the mechanical specifications in the IEEE P996 Bus Specification (PC/AT).
- ù Dimensions: 13.330in. x 4.80in. / 339mm x 122mm.
- ù **Weight:**

Environmental

- ù Operating Temperature: 0 to 70°C (heatsink and fan), calculated with typical power consumption.
- ù Storage Temperature: Ambient temperature range of -30°C to +85°C.
- ù Noncondensing Relative Humidity: 5% - 95%.

Reliability

- ù MTBF (Mean Time Between Failure): Estimated at 100 000 hours.

PART TWO

QUICK INSTALLATION

- 3 INSTALLING SYSTEM MEMORY
- 4 SETTING JUMPERS
- 5 CONNECTING AND POWERING UP THE BOARD
- 6 SOFTWARE SETUP

3 INSTALLING SYSTEM MEMORY

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3.02 72-Pin SIMM Configuration and Location	3-4
3.03 30-Pin SIMM Configuration and Location	3-6
3.04 SIMM Installation.....	3-8

3.01 STATIC ELECTRICITY PRECAUTIONS

Static electricity can damage a board ; the following precautions should be taken whenever you handle the TEK-AT4LVG:

- Keep the board in its anti-static 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 upon your body.
- Handle the board by the edges.
- When handling the board, touch a grounded surface often or wear a grounding wrist strap.

3.02 72-PIN SIMM CONFIGURATION AND LOCATION

The location of the two 72-pin vertical SIMM sockets appears on Diagram 3-1 ; they are labeled U22 and U23.

At least 1MB of system memory must be installed on the TEK-AT4LVG for proper operation. Memory can be configured from 1 to 64 MB on the TEK-AT4LVG board using 36-bit SIMM devices.

Each of the 72-pin SIMM sockets on the board can accept the following 36-bit modules:

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

SIMM modules can be installed in either one of two 72-pin sockets (U22 and U23). If you install one SIMM, it must be located in socket U23.

☛ **If you are installing 72-pin SIMMs, do not install any 30-pin SIMMs.**

Consult Table 3-1 on the following page to see which SIMM configurations are supported by the TEK-AT4LVG with 72-pin vertical SIMMs.

DRAM devices with parity bit and page mode at 70ns maximum access time are recommended. Consult the following list for examples of recommended DRAM devices. Users are encouraged to check with their local distributors for compatible substitutes.

256K*36	MICRON NEC SAMSUNG	MT10D25636M-7 MC-42256A36B-70 KMM536256C-7	2M*36	MICRON SAMSUNG TOSHIBA	MT18D236M-7 KMM5362000B-7 THM362040AS-70
512K*36	MICRON	MT18D51236M-7	4M*36	NEC SAMSUNG TOSHIBA	MC-424000A36BH-70 KMM5364100-7 THM3640205-70
1M*36	MICRON NEC SAMSUNG TOSHIBA	MT9D136M-7 MC-4210000A36B-70 KMM5361000B-7 THM361020AS-70	8M*36	HITACHI TOSHIBA	HB56D836BR-70A THM368020SG-70

DIAGRAM 3-1: 72-Pin SIMM Sockets Location

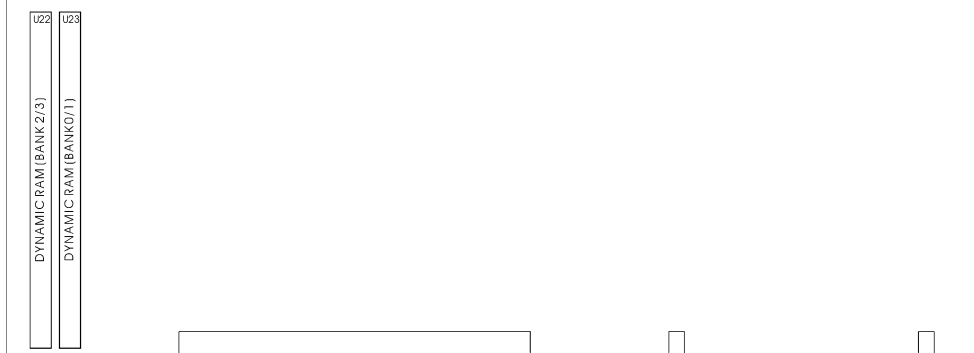


TABLE 3-1: 72-Pin SIMM Configuration

TOTAL SYSTEM MEMORY	U23 Bank 0/1	U22 Bank 2/3	TOTAL SYSTEM MEMORY	U23 Bank 0/1	U22 Bank 2/3
1MB	1MB (256Kx36)	--	17MB	16MB (4Mx36)	1MB (256Kx36)
2MB	1MB (256Kx36)	1MB (256Kx36)	17MB	1MB (256Kx36)	16MB (4Mx36)
2MB	2MB (512Kx36)	--	18MB	16MB (4Mx36)	2MB (512Kx36)
3MB	2MB (512Kx36)	1MB (256Kx36)	18MB	2MB (512Kx36)	16MB (4Mx36)
3MB	1MB (256Kx36)	2MB (512Kx36)	20MB	16MB (4Mx36)	4MB (1Mx36)
4MB	2MB (512Kx36)	2MB (512Kx36)	20MB	4MB (1Mx36)	16MB (4Mx36)
4MB	4MB (1Mx36)	--	24MB	16MB (4Mx36)	8MB (2Mx36)
5MB	4MB (1Mx36)	1MB (256Kx36)	24MB	8MB (2Mx36)	16MB (4Mx36)
5MB	1MB (256Kx36)	4MB (1Mx36)	32MB	16MB (4Mx36)	16MB (4Mx36)
6MB	4MB (1Mx36)	2MB (512Kx36)	32MB	32MB (8Mx36)	--
6MB	2MB (512Kx36)	4MB (1Mx36)	33MB	32MB (8Mx36)	1MB (256Kx36)
8MB	4MB (1Mx36)	4MB (1Mx36)	33MB	1MB (256Kx36)	32MB (8Mx36)
8MB	8MB (2Mx36)	--	34MB	32MB (8Mx36)	2MB (512Kx36)
9MB	8MB (2Mx36)	1MB (256Kx36)	34MB	2MB (512Kx36)	32MB (8Mx36)
9MB	1MB (256Kx36)	8MB (2Mx36)	36MB	32MB (8Mx36)	4MB (1Mx36)
10MB	8MB (2Mx36)	2MB (512Kx36)	36MB	4MB (1Mx36)	32MB (8Mx36)
10MB	2MB (512Kx36)	8MB (2Mx36)	40MB	32MB (8Mx36)	8MB (2Mx36)
12MB	8MB (2Mx36)	4MB (1Mx36)	40MB	8MB (2Mx36)	32MB (8Mx36)
12MB	4MB (1Mx36)	8MB (2Mx36)	48MB	32MB (8Mx36)	16MB (4Mx36)
16MB	8MB (2Mx36)	8MB (2Mx36)	48MB	16MB (4Mx36)	32MB (8Mx36)
16MB	16MB (4Mx36)	--	64MB	32MB (8Mx36)	32MB (8Mx36)

3.03 30-PIN SIMM CONFIGURATION AND LOCATION

The TEK-AT4LVG is equipped with an alternate means of implementing DRAM. 30-pin SIMM socket are included on the board for customers who wish to use their 30-pin devices.

Since this SBC is targeted for use in upgrade application, the overall cost of the upgrade is reduced by allowing reuse of older DRAM technology.

The location of the four 30-pin SIMM sockets is illustrated in Diagram 3-2. They are labeled U24, U25, U26 and U27.

At least 1MB of system memory must be installed on the TEK-AT4LVG for proper operation. Memory can be configured from 1 to 16 MB on the TEK-AT4LVG board using 9-bit SIMM devices.

The four SIMM sockets accept either 256KB, 1MB or 4MB modules.

SIMM modules must be installed in all four 30-pin sockets: U24, U25, U26 and U27.

☛ **If you are installing 30-pin SIMMs, do not install 72-pin SIMMs.**

Note that all SIMMs installed must be of the same capacity.

Consult Table 3-2 on the following page to see which 30-pin SIMM configurations are supported by the TEK-AT4LVG.

DRAM devices with parity bit and page mode at 70ns maximum access time are recommended. Consult the following list to see examples of recommended DRAM devices. Users are encouraged to check with their local distributors for compatible substitutes.

256K*9	MOZEL OKI	V104BJ9S-70 MSC2331A-70YS3-R
1M*9	MOTOROLA NEC OKI SAMSUNG	MCM91430S70 MC-421000A9BA-70 MSC23109B-70DS3B KMM591000AN-70
4M*9	HITACHI OKI TI TI	HB56A49BR7B MSC23409-70DS9 TM4100EAD9-70 TM497EU9-70

DIAGRAM 3-2: 30-Pin SIMM Sockets Location

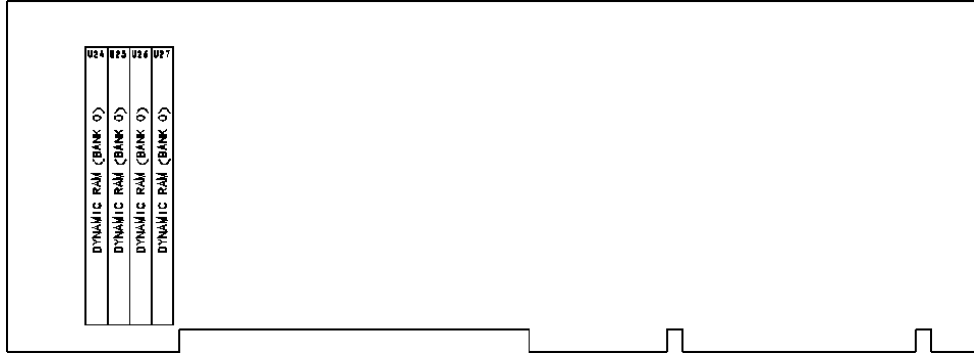


TABLE 3-2: 30-Pin SIMM Configuration

TOTAL SYSTEM MEMORY	U24	U25	U26	U27
1MB	256KB	256KB	256KB	256KB
4MB	1MB	1MB	1MB	1MB
16MB	4MB	4MB	4MB	4MB

3.04 SIMM INSTALLATION

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

- With the board flat on the table, turn it so that the sockets are at the end of the board farthest from you.
- Hold the module with the notch on the bottom left facing you, and insert the SIMM Module into the socket at a 70° angle from the board. Always start inserting the module in the socket nearest the center of the board. Then work your way by inserting the other modules, one by one, towards the exterior edge of the board.
- 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.

To remove the SIMMs from the sockets, pull on the retaining clips, located on each side of the SIMM socket. Once the module has snapped out of the socket, pull gently on it.

4 SETTING JUMPERS

4.01 Connecting the Battery.....	4-3
4.02 Jumper Settings.....	4-4
4.03 Jumper Locations With Default Settings.....	4-9

4.01 CONNECTING THE BATTERY

A battery can be connected on the board using the jumper W40:

- . an Internal Battery is set with pins 1-2 shorted
- . an External Battery is set with pins 2-3 shorted

Please refer to Table 4-1e to set W40.

Removing the W40 jumper has the same effect as putting the battery in storage; TEKNOR always ships its board with the battery jumper removed in order to increase the life of the battery.

4.02 JUMPER SETTINGS

The following pages show the TEK-AT4LVG jumpers and their initial setting. These jumpers are labeled from W1 to W36, W39, W40 and J13.

For jumper location, see Diagram 4-1 on page 4-11 (fold-out).

TABLE 4-1a: Jumper Settings: W1-W2, W27-W28, W32, W34-W36





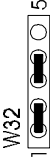

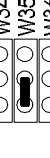
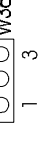





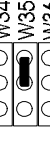
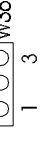



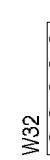


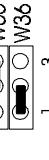
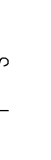







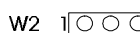






NAME	FUNCTION	CONFIGURATION (INITIAL SETTINGS: *)
W1	CPU Power	 W1 5V for all 486DX/DX2  W1 3.3V for all 486DX4, P24T
W2	CPU Type	<p>Note: When setting the CPU Type configuration jumpers, also set the W1 CPU power jumper for compatibility.</p> <p>Intel 486DX/DX2</p> <p>Intel 486DX2 Enhanced</p> <p>W2  4</p> <p>W27  2</p> <p>W32  1</p> <p>W28  1</p> <p>W34  1</p> <p>W35  1</p> <p>W36  1</p> <hr/> <p>Intel 486DX4 Clock Speed 2x</p> <p>W2  2</p> <p>W27  2</p> <p>W32  1</p> <p>W28  1</p> <p>W34  1</p> <p>W35  1</p> <p>W36  1</p> <hr/> <p>AMD 486DX2xxS & 486DX4xxS: CLK 2x & 486DX5</p> <p>W2  2</p> <p>W27  2</p> <p>W32  1</p> <p>W28  1</p> <p>W34  1</p> <p>W35  1</p> <p>W36  1</p> <hr/> <p>Intel 486DX4 Clock Speed 3x</p> <p>W2  4</p> <p>W27  2</p> <p>W32  3</p> <p>W28  3</p> <p>W34  3</p> <p>W35  3</p> <p>W36  3</p> <hr/> <p>AMD 486DX4xxS Clock Speed 3x</p> <p>W2  4</p> <p>W27  2</p> <p>W32  3</p> <p>W28  3</p> <p>W34  3</p> <p>W35  3</p> <p>W36  3</p> <p>WARNING: AMD DX2-66 is powered with 3.3V. W1 jumper must be set consequently.</p>

TABLE 4-1b: Jumper Settings: W3-W15































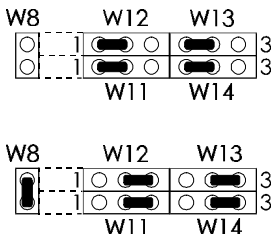
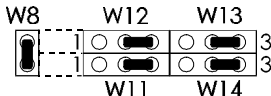
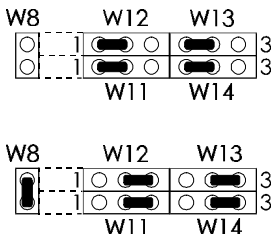
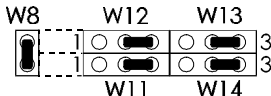
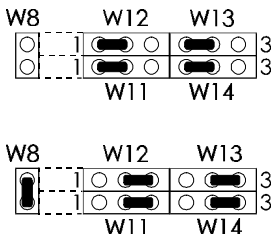
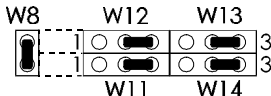













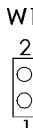

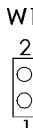

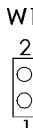
NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)																
W3 W4 W5 W6	Bi-Directional Data Channel (DDC) Support (VGA Controller)	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 50%;">  W3 </td> <td style="width: 10%; text-align: center;">Enabled</td> <td style="text-align: center; width: 50%;">  W3 </td> <td style="width: 10%; text-align: center;">Disabled *</td> </tr> <tr> <td style="text-align: center;">  W4 </td> <td></td> <td style="text-align: center;">  W4 </td> <td></td> </tr> <tr> <td style="text-align: center;">  W5 </td> <td></td> <td style="text-align: center;">  W5 </td> <td></td> </tr> <tr> <td style="text-align: center;">  W6 </td> <td></td> <td style="text-align: center;">  W6 </td> <td></td> </tr> </table>	 W3	Enabled	 W3	Disabled *	 W4		 W4		 W5		 W5		 W6		 W6	
 W3	Enabled	 W3	Disabled *															
 W4		 W4																
 W5		 W5																
 W6		 W6																
W7	CPU Bus Speed for VGA Controller	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 50%;">  W7 <= 33 MHz * </td> <td style="width: 10%;"></td> <td style="text-align: center; width: 50%;">  W7 > 33 MHz </td> </tr> </table>	 W7 <= 33 MHz *		 W7 > 33 MHz													
 W7 <= 33 MHz *		 W7 > 33 MHz																
W8 W11 W12 W13 W14	Serial Port 2 Configuration	<table style="width: 100%; border: none;"> <tr> <td style="width: 30%; vertical-align: top;"> RS-232 * </td> <td style="text-align: center;">  </td> </tr> <tr> <td style="width: 30%; vertical-align: top;"> RS-485 </td> <td style="text-align: center;">  </td> </tr> </table>	RS-232 *		RS-485													
RS-232 *																		
RS-485																		
W10 W9	RTS2-CTS2 Serial Port 2 RS-485 Loopback DSR2-DTR2 Serial Port 2 RS-485 Loopback	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 50%;">  W10  W9 Loopback </td> <td style="width: 10%;"></td> <td style="text-align: center; width: 50%;">  W10  W9 Normal * </td> </tr> </table>	 W10  W9 Loopback		 W10  W9 Normal *													
 W10  W9 Loopback		 W10  W9 Normal *																
W15	IOCHRDY Signal to IDE Interface	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 50%;">  W15 Enabled </td> <td style="width: 10%;"></td> <td style="text-align: center; width: 50%;">  W15 Disabled * </td> </tr> </table>	 W15 Enabled		 W15 Disabled *													
 W15 Enabled		 W15 Disabled *																

TABLE 4-1c: Jumper Settings: W16-W19, W23

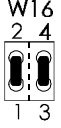
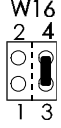
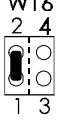
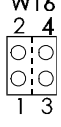
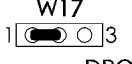
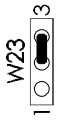
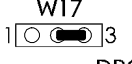
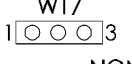
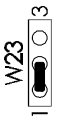
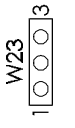
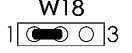
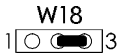
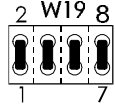
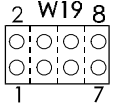
NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W16	Supervisor I/O: Base address	 190H *  390H  290H  390H
W17	DMA Request Signal for SCSI Controller	 DRQ0
W23	DMA Acknowledge Signal for SCSI Controller	 DACK0
OR:		 DRQ5
OR:		 NONE *
OR:		 DACK5
OR:		 NONE *
W18	SCSI IRQ Channel	 IRQ10  IRQ11 *
W19	Extended BIOS Modes (These jumpers are configured separately, even though they are grouped together here)	<p>1-2: Serial Download Mode 3-4: VT100 Mode 5-6: Disable TEKNOR Extension 7-8: Disable Onboard VGA Controller</p> 
		<p>1-2: Normal Mode * 3-4: Standard Mode * 5-6: Enable TEKNOR Extension * 7-8: Enable Onboard VGA Controller *</p> 

TABLE 4-1d: Jumper Settings: W20-W22, W24-W25

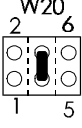
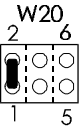
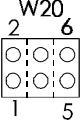
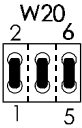







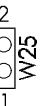
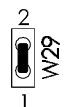
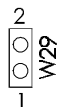
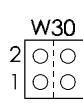
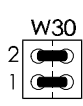
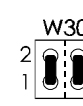
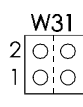
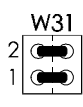
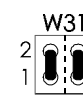




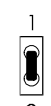
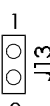
NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W20	External CPU Clock	 25 MHz  33 MHz  40 MHz  50 MHz
W21	VGA High Speed Write	 Zero Wait State  One Wait * State
W22	SCSI I/O Port	 140 HEX  340 HEX *
W24	Watchdog Timer	 Enabled *  Disabled
W25	Select 486 Frequency for AT Clock Generation	 20 / 25 MHz  33 MHz and up *

TABLE 4-1e: Jumper Settings: W29-W31, W39-W40, J13

NAME	FUNCTION	CONFIGURATION (INITIAL SETTING: *)
W29	Non Maskable Interrupt on Power Fail Output	 Enabled  Disabled *
W30	2.88 MB High Density Floppy, EDOUT signal	EDOUT left to software*  OR: 1-3: EDOUT to Pin 29 (J4); 2-4: Ground to Pin 17 (J4)  OR: 1-2: EDOUT to Pin 17 (J4); 3-4: Ground to Pin 29 (J4) 
W31	2.88 MB High Density Floppy, HDOUT signal	HDOUT left to software*  1-3: HDOUT to Pin 33 (J4); 2-4: Ground to Pin 27 (J4)  1-2: HDOUT to Pin 27 (J4); 3-4: Ground to Pin 33 (J4) 
W39	Power Fail Detection Source	 External Power Fail Input to Pin 6 of J12  Internal/external battery when less than 3 volts *
W40	Battery Selection	 Internal Battery  External Battery
J13	BIOS boot selection	 Emergency boot (from EPROM BIOS)  Normal boot (from Flash EPROM BIOS) *

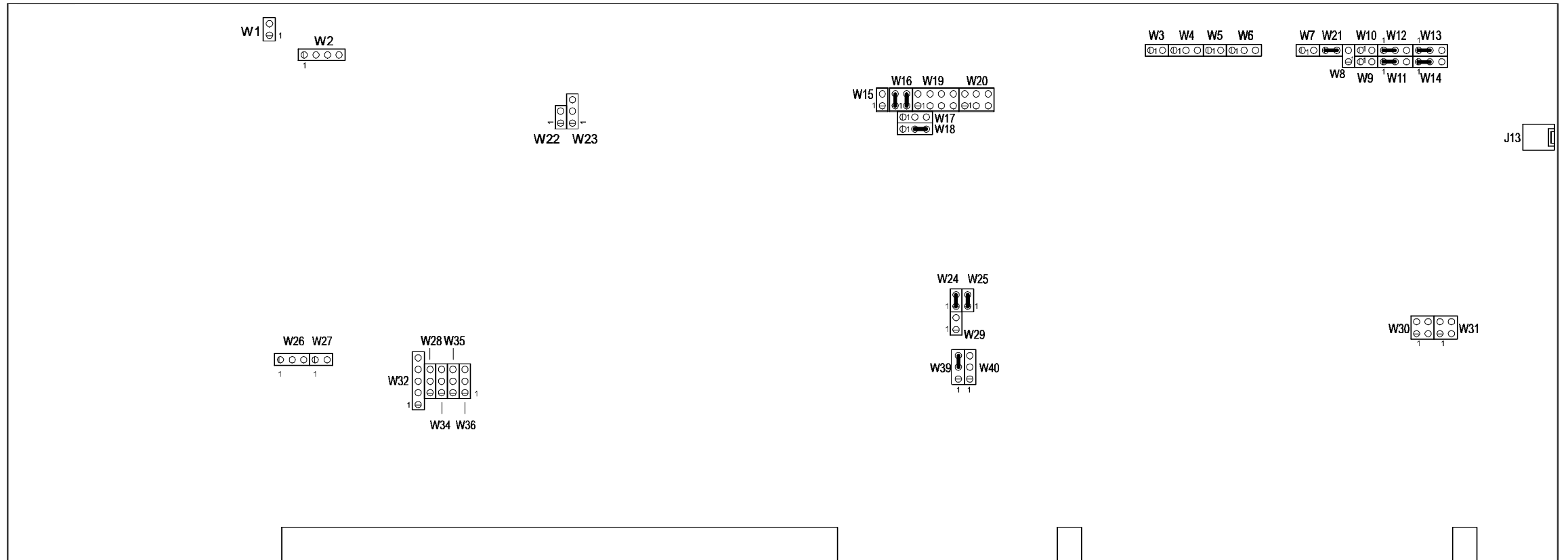
4.03 JUMPER LOCATIONS WITH DEFAULT SETTINGS

Diagram 4-1 on page 4-11 shows the jumper locations on the board. The jumpers appear as rectangular boxes containing small circles which represent the pin numbers.

The small black marks indicate the default setting for the jumpers. No black mark means that the jumper has no default setting.

The jumpers are labeled on the board as well. That way, it will be possible to locate each pin with its number.

DIAGRAM 4-1: Jumper Locations With Default Settings



5 CONNECTING AND POWERING UP THE BOARD

5.01 Installing TEK-AT4LVG in Passive Backplane.....	5-3
5.02 Connecting a Floppy Disk	5-4
5.03 Connecting Interface Devices (Keyboard, Speaker, Reset, LED).....	5-5
5.04 Connecting a Mouse.....	5-6
5.05 Connecting a Monitor	5-7
5.06 Powering Up the System	5-8

5.01 INSTALLING TEK-AT4LVG IN PASSIVE BACKPLANE

The TEK-AT4LVG AT Single Board Computer will work with any standard ISA passive backplane. For more information on the installation procedure, please consult the passive backplane's documentation.

Note that the installation into a passive backplane is optional. The TEK-AT4LVG can be used as a stand-alone board. In this case, the board must be connected to an external power source through the External Power Connector (J12).

The following list includes approved vendors for the J12 connector's mating parts:

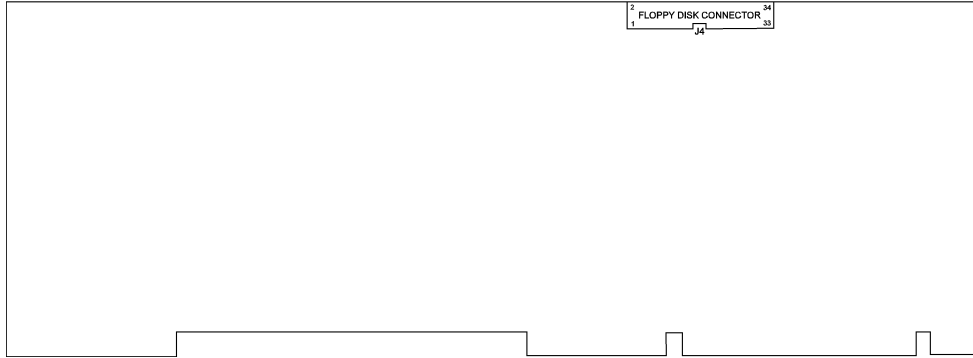
Leoco 2530 S060013 (housing),
Leoco 2533 TCB00A0 (pins);

Molex 22-01-2065 (housing),
Molex 08-50-114 (pins).

5.02 CONNECTING A FLOPPY DISK

The Floppy connector appears on Diagram 5-1 at J4.

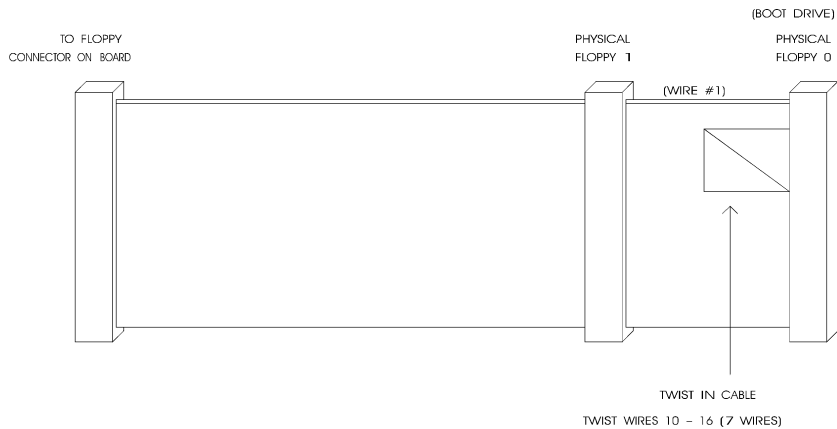
DIAGRAM 5-1: Floppy Connector Location



The installation of the floppy drives is done via a standard IBM 34-pin flat ribbon cable that connects to J4.

The following list includes approved vendors for the J4 connector's mating parts:
Amp 746285-8 [optional strain relief: 499252-6],
Robinson Nugent IDS-C34PK-TG,
Thomas & Betts 622-3430 [optional strain relief: 622-3441].
(34-pin flat cable connector).

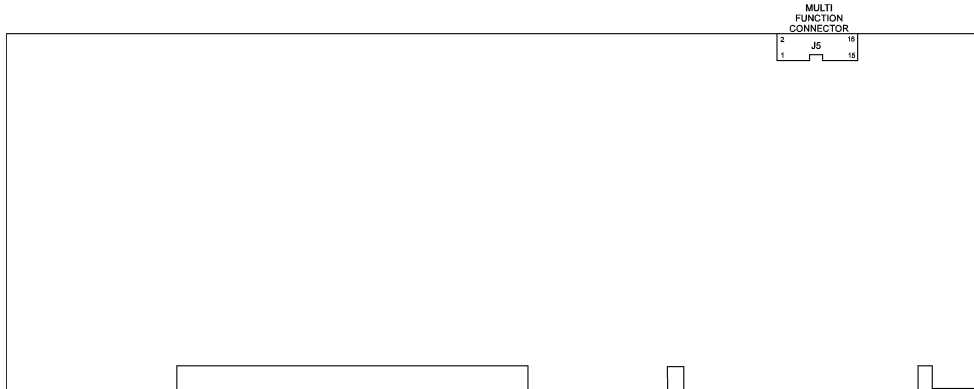
DIAGRAM 5-2: Floppy Disk Cable



5.03 CONNECTING INTERFACE DEVICES (KEYBOARD, SPEAKER, RESET, LED)

Connector J5 provides all the necessary signals for connecting the keyboard, speaker, reset, and keylock interface devices. The Multi-Function connector appears on Diagram 5-3 at J5.

DIAGRAM 5-3: Multi-Function Connector Location



The following list includes approved vendors for the J5 connector's mating parts:
Amp 746285-3 [optional strain relief: 499252-8],
Robinson Nugent IDS-C16PK-TG,
Thomas & Betts 622-1630 [optional strain relief: 622-1641].
(16-pin flat cable connector).

The following functions are available on the J5 Connector:

- Speaker: An 8 ohm speaker can be directly connected to pins 7 and 8 of J5. All necessary drivers are on the board.
- Keyboard Disable: The keyboard can be disabled or locked up by shorting pins 9 and 10 of J5.
- Hard Disk LED: The onboard IDE interface activates an external LED. The LED's anode must be connected to pin 16 (J5) and cathode to pin 15 (J5). No external current limiting resistor is required since one is already present on the board.
- Reset: Manually reset the system by driving PBRES* to low state (< 0.8 V).

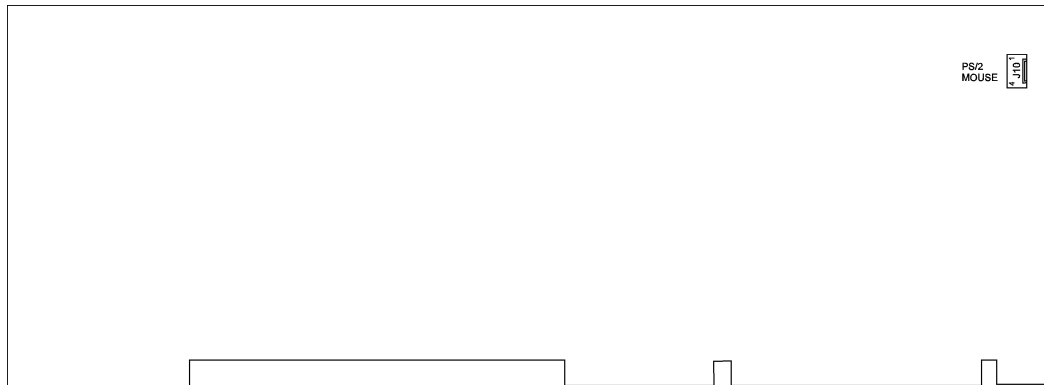
5.04 CONNECTING A MOUSE

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

To use the mouse, the driver provided by the mouse manufacturer must be installed.

The Mouse connector appears on Diagram 5-4 at J10.

DIAGRAM 5-4: Mouse Connector Location



The following list includes approved vendors for the J10 connector's mating parts:

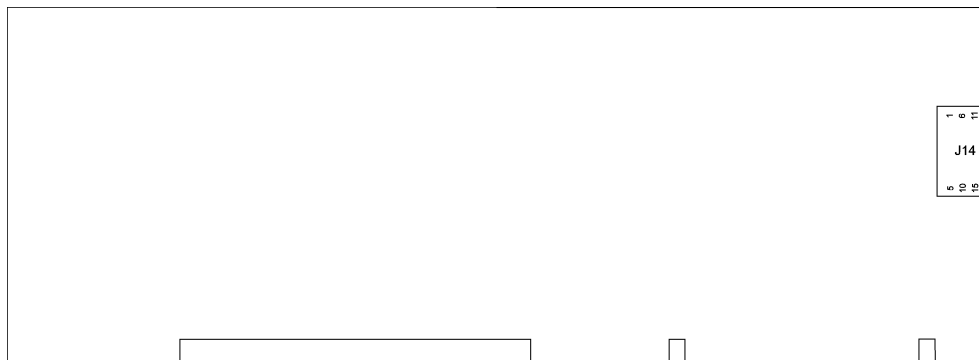
Molex 22-01-3047 (connector),
Molex 08-50-0114 (crimp).

5.05 CONNECTING A MONITOR

Connecting CRT video to the TEK-AT4LVG is simple. Plug the standard VGA DB15 male connector to the board's J14 high density, right angle, female connector, and secure with the connector screws.

See Diagram 5-5 for the location of J14.

DIAGRAM 5-5: VGA Connector Location



5.06 POWERING UP THE SYSTEM

Before powering up your system, make sure that the battery jumper is installed (Section 4.01).

1. Insert a bootable diskette in drive A to start your system with DOS.
2. Hit the DELETE key before or when this message appears near the bottom of the screen: "PRESS DEL TO ENTER SETUP". This will bring you to CMOS setup.
 - In Standard Setup, set the date and time.
 - In other menu choices, set other options (if necessary).
3. Exit CMOS setup. The system will continue the boot procedure.
4. Once the boot procedure is completed, reboot the system to make sure everything works properly.

If you should encounter a problem, verify the following items:

- Make sure that all connectors are properly connected. On the standard flat ribbon cable used for the floppy connector, pin 1 is indicated by small red stripe. Verify that this red stripe is located adjacent to pin 1 of the connector (On soldering side of the board, connector pin 1 is designated by a square pad instead of being round).
- Verify your boot diskette. It must be a system disk and it must be in proper working order.
- If the system still does not start up correctly, remove all the connectors except the power cord and the video monitor, and try again (this configuration is the minimum required to see if the board is working).
- If you still are not able to get your board up and running, contact our Technical Support department for assistance.

6 SOFTWARE SETUP

6.01 The Award Setup Program.....	6-3
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6.01.4 Standard CMOS Setup	6-8
6.01.5 BIOS Features Setup	6-9
6.01.6 Chipset Features Setup	6-11
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6.02 The VIP-UP Program.....	6-15
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6.02.3 VIP-UP Second Screen.....	6-17

6.01 THE AWARD SETUP PROGRAM

6.01.1 ACCESSING THE AWARD SETUP PROGRAM

The TEK-AT4LVG uses the AWARD 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.

- ☞ Before modifying CMOS setup parameters, insure that the W40 Battery Selection jumper is installed to enable the CMOS battery back-up (Short pin 1-2 for Internal Battery, pin 2-3 for External Battery)

To run the AWARD Setup program incorporated in the ROM BIOS:

1. Turn on or reboot the system.
2. Hit the DELETE key before or when the message - "PRESS **DEL** TO ENTER SETUP" appears near the bottom of the screen.
3. The main menu appears on the screen.

An example of the main menu screen appears below:

ROM PCI/ISA BIOS (2A4IB000)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP BIOS FEATURES SETUP CHIPSET FEATURES SETUP POWER MANAGEMENT SETUP LOAD BIOS DEFAULTS LOAD SETUP DEFAULTS	PASSWORD SETTING IDE HDD AUTO DETECTION SAVE & EXIT SETUP EXIT WITHOUT SAVING
Esc : Quit F10 : Save & Exit Setup	↑ ↓ → ← : Select Item (Shift)F2 : Change Color
Time, Date, Hard Disk Type...	

6.01.2 USING AWARD SETUP

The arrow keys (↑ ↓ → ←) are used to highlight items on the menu and the PageUp and PageDown keys are used to change the entry values for the highlighted item. To select an entry, press the Enter key. Also, you can press the F1 key to obtain help information or the Esc key to leave an option, close a menu or to quit the program.

Table 6-1 provides more details on how to navigate in the Setup program:

Table 6-1

Up arrow (↑)	Move to previous item.
Down arrow (↓)	Move to next item.
Left arrow (←)	Move to the item in the left hand.
Right arrow (→)	Move to the item in the right hand.
Esc key	In Main Menu: Quit settings (Answer 'Y' to save changes into CMOS). In sub-menus: Exit and return to Main Menu.
PgUp key	Increase the numeric value or make changes.
PgDn key	Decrease the numeric value or make changes.
+ key	Increase the numeric value or make changes.
- key	Decrease the numeric value or make changes.
F1 key	General help.
F2 and Shift F2 keys	Change color from total 16 colors: F2 to select color forward, Shift F2 to select color backward.
F4 key	Reserved.
F5 key	In sub-menu: Restore the previous setup values from BIOS Default Table.
F6 key	In sub-menu: Load the default setup values from BIOS Default Table.
F7 key	In sub-menu: Load the setup values from the Setup Default Table .
F8 key	Reserved.
F9 key	Reserved.
F10 key	When in Main Menu: Save all the CMOS changes.

The Main Menu includes the following categories:

<hr/> Standard CMOS Setup	This Setup page includes all the items in a standard, AT-compatible BIOS.
<hr/> BIOS Features Setup	This Setup page includes all the items of AWARD's special enhanced features.
<hr/> Chipset Features Setup	This Setup page includes all the items of the chipset's special features.
<hr/> Power Management Setup	This Setup page sets power conservation options.
<hr/> Load Bios Defaults	The BIOS defaults represent settings which provide the minimum requirements for your system to operate.
<hr/> Load Setup Defaults	The chipset defaults are settings which provide for maximum system performance.
<hr/> Password Setting	Change, set, or disable password. It allows you to limit access to the system and the Setup, or just to the Setup.
<hr/> IDE HDD Auto Detection	Automatically detect and configure hard disk parameters. This ability is included in the event you are uncertain of your hard disk's parameters.
<hr/> Save & Exit	Save CMOS value changes to CMOS and exit Setup.
<hr/> Exit Without Saving	Abandon all CMOS value changes and exit Setup.

6.01.3 SAVING CONFIGURATIONS & EXITING AWARD SETUP

Use one of the following options available from the Main Menu:

- Save & Exit** After having modified the AWARD Setup, you can save the configuration in CMOS RAM, by selecting this option. 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 (F10).
- Exit Without Saving** This option is used to exit AWARD Setup without saving the configuration to CMOS RAM.

6.01.4 STANDARD CMOS SETUP

This part of the setup allows you to set the time, date, hard disk type, types of floppy drives and video type.

Date/Time

The current values for each category are displayed. Enter new values through the keyboard.

Hard Disks

Two IDE controllers are defined on the TEK-AT4LVG board (Primary and Secondary), each can have two disks: Master Disk (bootable) or Slave Disk.

Drive A / Drive B

Select the category identifying the types of floppy disk drive A or drive B that have been installed in the computer.

Video

This option specifies the basic type of display adapter card installed in the system.

Halt on

This option specifies the type of errors that will stop the system during the BIOS booting procedure. The settings are All errors, No errors, All but keyboard (default setting), All but diskette and All but disk/key.

Memory

This display-only option determines the amount of Base, Extended and other types of memory installed in the system.

6.01.5 BIOS FEATURES SETUP

This part of the setup handles options and features such as boot sequence, NUM LOCK, security options, shadowing, ...

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 SETUP defaults will affect all the options and will reset options previously altered.

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

The scroll list displays these options:

OPTIONS	BIOS DEFAULTS	SETUP DEFAULTS
CPU Internal Cache	Enabled	Enabled
External Cache	Enabled	Enabled
Quick Power On Self Test	Disabled	Disabled
Boot Sequence	A, C	A, C
Swap Floppy Drive	Disabled	Disabled
Boot Up Floppy Seek	Enabled	Enabled
Boot Up NumLock Status	On	On
Boot Up System Speed	High	High
IDE HDD Block Mode	Disabled	Disabled
Memory Parity Check	Disabled	Disabled
Typematic Rate Setting	Disabled	Disabled
Typematic Rate (Chars/Sec)	6	6
Typematic Delay (Msec)	250	250
Security Option	Setup	Setup
Video BIOS Shadow	Enabled	Enabled
C8000-CBFFF Shadow	Disabled	Disabled
CC000-CFFFF Shadow	Disabled	Disabled
D0000-D3FFF Shadow	Disabled	Disabled
D4000-D7FFF Shadow	Disabled	Disabled
D8000-DBFFF Shadow	Disabled	Disabled
DC000-DFFFF Shadow	Disabled	Disabled
E0000-E3FFF Shadow	Disabled	Disabled
E4000-E7FFF Shadow	Disabled	Disabled
E8000-EBFFF Shadow	Disabled	Disabled
EC000-EFFFF Shadow	Disabled	Disabled

6.01.6 CHIPSET FEATURES SETUP

This part of the setup allows you to define chipset-specific options and features.

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 SETUP defaults will affect all the options and will reset options previously altered.

The BIOS 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 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 values for these options should be changed only if the user has a full understanding of the timing relationships involved.**

The scroll list displays these options:

OPTIONS	BIOS DEFAULTS	SETUP DEFAULTS
Auto Configuration	Enabled	Disabled
AT Bus Clock (486)	CLK/2 or CLK/4	CLK/2 or CLK/4
Cache Scheme	Write Back	Write Back
SRAM Read Burst	4333 Burst	3111 Burst
SRAM Write WS	1 WS	1 WS
Special DRAM WR Mode	Disabled	Disabled
F000 Cacheable	Disabled	Disabled
C000 Cacheable	Disabled	Disabled
Cacheable Range	0-128M	0-128M
DRAM Page Mode	Fast Page Mode	Fast Page Mode
DRAM Write WS	1 WS	1 WS
DRAM Read WS	3 WS	1 WS
RAS Precharge Time	3 SYSCLK	3 SYSCLK
RAS to CAS Delay	1 SYSCLK	2 SYSCLK
Hidden Refresh	Enabled	Enabled
15M-16M Access	Normal	Normal
Master IOCHRDY	Disabled	Disabled
Onboard FDD Controller	Enabled	Enabled
Onboard IDE Controller	Secondary	Secondary
Onboard Parallel Mode	ECP+EPP1.9	ECP+EPP1.9
Onboard Parallel Port	3BCh	3BCh
Onboard Serial Port 1	COM1/3F8h	COM1/3F8h
Onboard Serial Port 2	COM2/2F8h	COM2/2F8h
Serial Port 1 Interrupt	COM1/3=>IRQ4	COM1/3=>IRQ4
Serial Port 2 Interrupt	COM2/4=>IRQ3	COM2/4=>IRQ3

6.01.7 POWER MANAGEMENT SETUP

This part of the setup sets power conservation options.

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 SETUP defaults will affect all the options and will reset options previously altered.

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

The scroll list displays these options:

OPTIONS	BIOS DEFAULTS	SETUP DEFAULTS
Power Management	Disable	Disable
Video On/Off Control	Disable	Disable
HDD Standby Timer	Disable	Disable
System Standby Timer	7 Sec	7 Sec
System Suspend Timer	14 Sec	14 Sec
Keyboard Detection	Enable	Enable
Serial Port Detection	Disable	Disable
Parallel Port Detection	Disable	Disable
Hard Disk I/O Detection	Disable	Disable
DMA/ISA Master Detection	Disable	Disable
Non Motherboard Memory	Disable	Disable
Video Memory (Block A,B)	Enable	Enable
I/O Address Detection	Disable	Disable
VESA Master Detection	Disable	Disable

6.02 THE VIP-UP PROGRAM

6.02.1 ACCESSING THE VIP-UP PROGRAM

The VIP-UP program is TEKNOR's own Setup program for enabling / disabling / relocating various hardware features on the TEK-AT4LVG.

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).

At the DOS prompt, type "VIP-UP" and press ENTER. This program is available on the utility disk.

There are two 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.

6.02.2 VIP-UP FIRST SCREEN

TEKNOR MICROSYSTEMS INC --- VIPer SETUP	
TEKNOR BIOS Extension Address	C8000H-CBFFFFH
TEKNOR BIOS Window Adress	CC000H-CFFFFH
On Board SCSI BIOS	Enabled
SCSI BIOS Address	D8000H-DBFFFFH
SCSI Base I/O Address (W22)	340H (Default BIOS)
SCSI ID Select	ID7 (Default)
SCSI IRQ Channel (W18)	IRQ11
SCSI DMA Channel (W17 & W23)	DMA 0
SCSI Parity	Enabled
SCSI Disconnect	No Disconnect
SCSI Synchronous Negotiation	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. On Board SCSI BIOS: This option allows the user to enable or disable the on board SCSI controller. Once the controller is enabled, all other SCSI options can be defined by associating to them the desired value.

6.02.3 VIP-UP SECOND SCREEN

TEKNOR MICROSYSTEMS INC --- VIPer SETUP	
BIOS Interrupt 13h Configuration	Disabled
Flash Disk Support	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. **BIOS Interrupt 13h Configuration**: To configure the Flash Disk in VIP-UP, proceed as follows:
 - . set the 'BIOS Interrupt 13h Configuration' option to 'Enabled'
 - . set the 'Flash Disk Support' option to 'Installed' or 'Installed Bootable'For more information , please refer to Section 12.01.2.
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 CMOS RAM Setup will be restored from Flash during each power up, as long as the battery is good. If the battery fails, the system returns to the power on default configuration. However, when the battery is replaced, the CMOS RAM Setup is restored from Flash (only the time and date could be lost).

Please note that modifying and saving the CMOS RAM Setup in AWARD Setup does not change the Flash copy; to update Flash, you must return to the VIP-UP Setup and update it while "Use Flash To Store CMOS RAM SETUP" is set to "Yes".

PART THREE
ADVANCED INSTALLATION AND SETUP

- 7 INSTALLING AND WORKING WITH SYSTEM COMPONENTS

- 8 INSTALLING IDE, FLOPPY & SCSI DEVICES

- 9 INSTALLING PERIPHERALS

- 10 INSTALLING VIDEO

- 11 SETTING POWER MANAGEMENT MODES

7 INSTALLING AND WORKING WITH SYSTEM COMPONENTS

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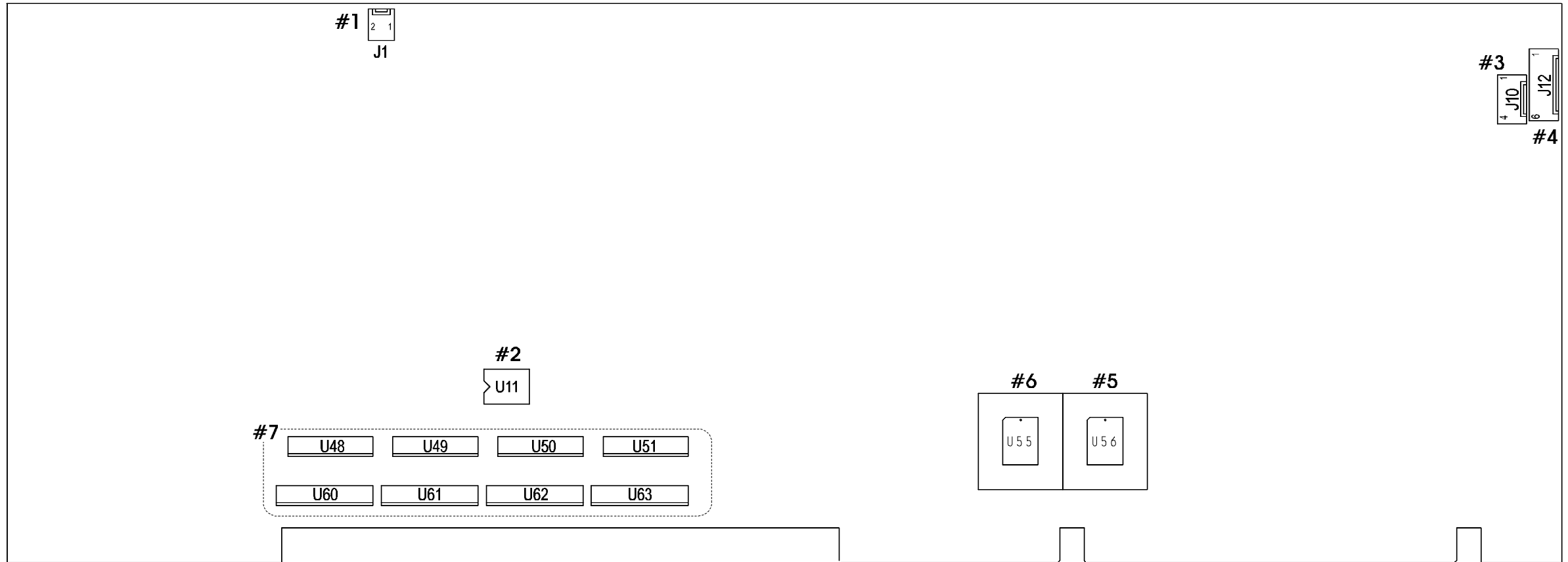
7.01 LOCATION OF SYSTEM COMPONENTS

Diagram 7-1 shows the location of the system components described in sections 7.02 to 7.09.

System components are numbered in Diagram 7-1. The following list shows which components these numbers correspond to, as well as the sub-section in which they are explained:

<u>#</u>	<u>COMPONENT</u>	<u>SUB-SECTION</u>
1	Fan Connector	7.02 - FAN CONNECTOR
2	Field Programmable Gate Array	7.05 - SUPERVISOR CIRCUIT
3	PS/2 Mouse Connector	7.06 - PS/2 MOUSE CONNECTOR
4	Power connector	7.07 - POWER CONNECTOR
5	Flash EPROM BIOS (Emergency)	7.04 - BOOT SELECTIONS
6	EPROM BIOS	7.04 - BOOT SELECTIONS
7	Cache Memory	7.03 - CACHE MEMORY

DIAGRAM 7-1: System Components Location



7.02 FAN CONNECTOR

The #1 component on Diagram 7-1 is for connecting a CPU fan. Its pinout is as follows:

TABLE 7-1: Fan Connector (J1) - Pinout

Pin Number	Signal
1	+12V
2	GND

The following list includes approved vendors for the J1 connector's mating parts:

Leoco 2530 S020013 (housing),
Leoco 2533 TCB00A0 (crimp);

Molex 22-01-3027 (housing),
Molex 08-50-0114 (crimp).

7.03 CACHE MEMORY

There are two separate Caches in the Host subsystem: Internal Cache and External Cache. The Cache inside the processor (Internal Cache) is referred to as the first level Cache (also primary Cache). The External Cache (called System Cache in this manual) comprises the System Controller's Cache control circuitry and associated external memory array; it is referred to as the second level Cache (also secondary Cache). The second level Cache is unified, which means that both CPU data and instructions are stored in the Cache.

7.03.1 SYSTEM CACHE

System Cache is located at U48, U49, U50, U51, U60, U61, U62 and U63 (#7) on Diagram 7-1; it accepts 0KB, 128KB, 256KB or 512KB of standard asynchronous SRAMs. The tag RAM is external to the System Controller and is situated at U36.

System Cache copies the most recently accessed data and places it in an area of high speed memory called SRAM (Static RAM). Cache SRAM is positioned between System Memory (DRAM) and the CPU. Data is transferred from System Memory to Cache and then from Cache to the CPU.

Since most program executions are sequential and repetitive, the likelihood is great that the CPU will find data already stored in either 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.

System Cache is enabled in the AWARD Setup program.

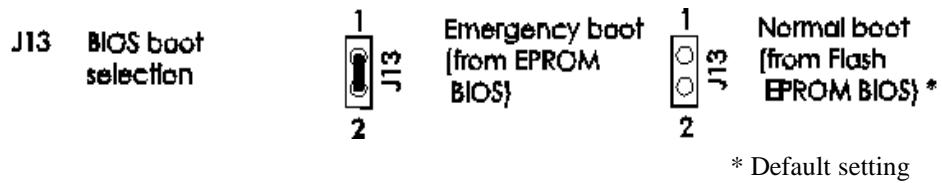
1. From AWARD's Main Menu, select the BIOS Features Setup option.
2. In the BIOS Features Setup Menu:
 - Select the CPU Internal Cache option, or
 - Select the External Cache option.In both cases, you will have the option to choose between **Disabled** and **Enabled** (Disabled is the default value).

7.04 BOOT SELECTIONS

The Flash EPROM BIOS and the EPROM BIOS are factory installed. The Flash EPROM BIOS appears on Diagram 7-1 at U56 (#5) and the EPROM BIOS at U55 (#6).

By default the TEK-AT4LVG boots from the Flash EPROM BIOS. This is set by the J13 Emergency BIOS boot selection jumper, as follows:

- J13 : Selects the BIOS to boot from:



The pinout for J13 appears below:

TABLE 7-2: Emergency BIOS Boot (J13) - Pinout

Pin Number	Signal
1	EMER*
2	GND

* Active low signal

7.05 SUPERVISOR CIRCUIT

7.05.1 FIELD PROGRAMMABLE GATE ARRAY

Component #2 on Diagram 7-1 is defined as Field Programmable Gate Array (FPGA); this memory device contains registers, one of which is described below.

TEKNOR computers utilize address space 190H, 290H or 390H (depending on the setting of W16 jumper for I/O base address) to enable special features (see Table 7-3 below).

TABLE 7-3: Register 190H, 290H or 390H

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	W19 (7-8) Status
5	0	Reserved, ENWB	W19 (5-6) Status
6	1	Reserved, B64/16	W19 (3-4) Status
7	0	Reserved	W19 (1-2) Status

- ☞ **Not all bits are R/W. Therefore, be certain to keep a mirror image of the register 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.**

7.05.2 ONBOARD POWER DETECTION

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

7.05.3 POWER FAIL DETECTION CIRCUIT

The Power Failure Detector monitors:

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

If either of the two above conditions occur, the PFO (Power Fail Output signal) goes low. In turn, the PFO is connected to the IOCHK* line to generate a non-maskable interrupt (NMI).

Power fail monitoring is enabled by using the W29 jumper. W29 is described in Section 4-9 (Setting Jumpers).

7.05.4 WATCHDOG TIMER

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

The Jumper Watchdog is set by using W24 jumper. Its setting is given in Section 4-8 (Jumper Settings).

The Watchdog must also be enabled and refreshed by software. To enable the Watchdog by software, first write "1" in bit "0" at address 190H (or at 290H or 390H depending on the W16 jumper setting).

When enabled, the microprocessor must refresh the Watchdog. This is done by writing alternatively "0" and "1" to bit 1 at address 190H (or at 290H or 390H), once every 1.6 seconds (or less) to verify proper software execution.

Following a reset, the Watchdog is always disabled.

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

☞ **The user program must provide the first access to address 190H (or at 290H or 390H depending on the W16 jumper setting), and must also include the refresh routine. In addition, be certain to keep a mirror image of register 190H (or 290H or 390H) when programming it. This is necessary since the register is a write-only user register and, as a result, is not used by the system BIOS.**

TABLE 7-4: Watchdog Timer Register

ADDRESS	REGISTER
190H, 290H OR 390H: Bit 0 Read/Write	Watchdog enable
190H, 290H OR 390H: Bit 1 Read/Write	Watchdog refresh

The default timeout is 1.6 seconds; however the timeout period can be changed. Shorting C138 and leaving R152 opened changes the timeout to 100 ms. Shorting R152 and installing a capacitor at C138 will change the timeout period according to the following formulae:

$$\text{Timeout (milliseconds)} = (400/47\text{pF}) * C$$

or

$$C138 = (\text{Timeout (milliseconds)} * 47\text{pF}) / 400\text{ms}.$$

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

7.06 PS/2 MOUSE CONNECTOR

The board supports a mouse, through the PS/2 connector at J10 (#3 on Diagram 7-1). With the PS/2 Mouse Cable (available from TEKNOR), this feature is compatible with the standard IBM PS/2 mouse. The cable may be ordered by contacting our Sales department.

To use the mouse, the driver provided by the mouse manufacturer must be installed.

TABLE 7-5: PS/2 Mouse Connector (J10) - Pinout

Pin Number	Signal
1	MCLK
2	GND
3	MDATA
4	VCC (+5V)

The following list includes approved vendors for the J10 connector's mating parts:

Molex 22-01-3047 (connector),
Molex 08-50-0114 (crimp).

7.07 POWER CONNECTOR

The TEK-AT4LVG board is powered from one of two sources:

- Power connector (J12): Stand-alone systems are powered from an outside power supply through the J12 connector (#4 on Diagram 7-1).
- ISA (AT) bus: When the board is in a passive backplane system, it is powered through the ISA bus.

The pinout for the J12 power connector is shown in the table below:

TABLE 7-6: External Power Connector (J12) - Pinout

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

The following list includes approved vendors for the J12 connector's mating parts:

Leoco 2530 S060013 (housing),

Leoco 2533 TCB00A0 (pins);

Molex 22-01-2065 (housing),

Molex 08-50-114 (pins).

7.08 ISA BUS CONNECTOR

The ISA bus connector appears on the Diagram 7-2.

DIAGRAM 7-2: ISA Bus Connector Location

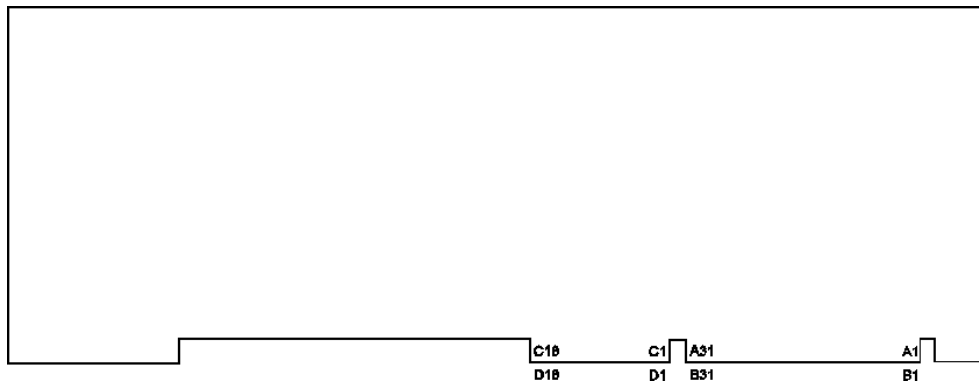


TABLE 7-7a: ISA Bus Connector (A, B) - Pin-Out

A SIDE

B SIDE

I/O PIN	Signal Name	I/O	I/O PIN	Signal Name	I/O
A1	IOCHK*	I	B1	GND	-
A2	SD7	I/O	B2	RESET DRV	O
A3	SD6	I/O	B3	VCC (+5V)	-
A4	SD5	I/O	B4	IRQ9	I
A5	SD4	I/O	B5	-5 V	-
A6	SD3	I/O	B6	DRQ2	I
A7	SD2	I/O	B7	-12V	-
A8	SD1	I/O	B8	OWS*	I
A9	SD0	I/O	B9	+12V	-
A10	IOCHRDY	I	B10	GND	-
A11	AEN	O	B11	SMEMW*	O
A12	SA19	I/O	B12	SMEMR*	O
A13	SA18	I/O	B13	IOW*	I/O
A14	SA17	I/O	B14	IOR*	I/O
A15	SA16	I/O	B15	DACK3*	O
A16	SA15	I/O	B16	DRQ3	I
A17	SA14	I/O	B17	DACK1*	O
A18	SA13	I/O	B18	DRQ1	I
A19	SA12	I/O	B19	REFRESH*	I/O
A20	SA11	I/O	B20	SYSCLK	O
A21	SA10	I/O	B21	IRQ7	I
A22	SA9	I/O	B22	IRQ6	I
A23	SA8	I/O	B23	IRQ5	I
A24	SA7	I/O	B24	IRQ4	I
A25	SA6	I/O	B25	IRQ3	I
A26	SA5	I/O	B26	DACK2*	O
A27	SA4	I/O	B27	T/C	O
A28	SA3	I/O	B28	BALE	O
A29	SA2	I/O	B29	VCC (+5V)	-
A30	SA1	I/O	B30	OSC	O
A31	SA0	I/O	B31	GND	-

* Active low signal

TABLE 7-7b: ISA Bus Connector (C, D) - Pin-Out

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/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

D Side

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

* Active low signal

The ISA Bus Interface on the TEK-AT4LVG board integrates the functionality of two 8237 DMA Controllers (see Table 7-8), two interrupt controllers (see Table 7-9) and one 8254 Counter/Timer.

TABLE 7-8: 8237 DMA Controllers

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

The parallel port's ECP mode can be configured to use DMA 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 7-9: 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 or SCSI
IRQ 3	COM 2 *	IRQ 11	Available or SCSI
IRQ 4	COM 1 *	IRQ 12	PS/2 Mouse Interface
IRQ 5	Available (LPT2)*	IRQ 13	Coprocessor Error
IRQ 6	Floppy controller *	IRQ 14	Primary IDE * or available
IRQ 7	LPT1*	IRQ 15	Secondary IDE * or available

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

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8.01 IDE DEVICES

8.01.1 IDE CONNECTORS LOCATION & PIN-OUT

The IDE connectors appear on Diagram 8-1 at J3 and J8.
The IDE Connectors' pin-outs appear in Tables 8-1a and 8-1b.

DIAGRAM 8-1: IDE Connectors Location

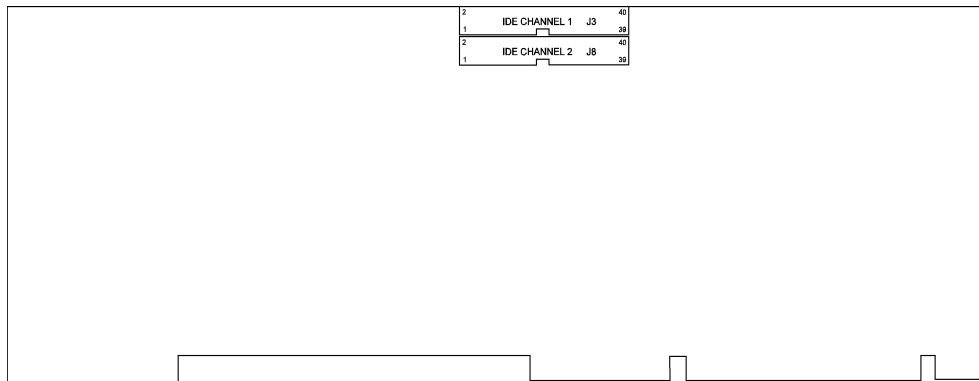


TABLE 8-1a: Hard Disk Connector #1 (J3) - Pin-Out

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	O	REQ A	22	-	GND
23	I	IOW*	24	-	GND
25	I	IOR*	26	-	GND
27	O	IOCHRDY*	28	-	Not Used
29	O	DACK A*	30	-	GND
31	O	IRQ14	32	O	IOCS16*
33	I	SA1	34	-	Not Used
35	I	SA0	36	I	SA2
37	I	CS0 A*	38	O	CS1 A*
39	O	ACTIVE*	40	-	GND

* Active low signal

TABLE 8-1b: Hard Disk Connector #2 (J8) - 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	O	REQ B	22	-	GND
23	I	IOW*	24	-	GND
25	I	IOR*	26	-	GND
27	O	IOCHRDY*	28	-	Not Used
29	O	DACK B*	30	-	GND
31	O	IRQ15	32	O	IOCS16*
33	I	SA1	34	-	Not Used
35	I	SA0	36	I	SA2
37	I	CS0 B*	38	O	CS1 B*
39	O	ACTIVE*	40	-	GND

* Active low signal

8.01.2 IDE HOOK-UP

For hooking up either IDE connector, 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 J3 or J8.

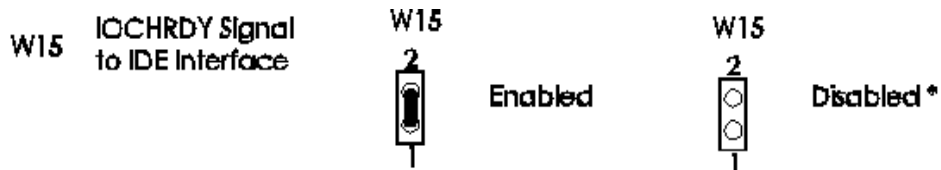
The following list includes approved vendors for the J3 and J8 connectors' mating parts:
Amp 746285-9 [optional strain relief: 499252-1],
Robinson Nugent IDS-C40PK-TG,
Thomas & Betts 622-4030 [optional strain relief: 622-4041].
(40-pin flat cable connector).

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

8.01.3 JUMPER SETTING

The W15 jumper, when set to Enabled will extend the current cycle on IDE READ/WRITE transfers. Its setting appears below:

- W15: IOCHRDY Signal to IDE Interface:



* Default setting

8.01.4 IDE SOFTWARE SETUP

AWARD Setup

There are two ways to configure hard disk parameters: use IDE hard disk auto detection (available from the main menu), or enter the parameters in the Standard CMOS Setup. The following explains how to enter the parameters in the Standard CMOS Setup:

- From the Main Menu, select the Standard CMOS Setup option.
- In the Standard CMOS Setup menu, use the arrow keys to highlight the Primary Master:, Primary Slave:, Secondary Master:, or Secondary Slave: option (depending on the installation of your hard drive).
- Use the PgUp or PgDn keys to select the desired value for each item associated to your hard drive setup:
 - There are 46 predefined types and a user definable type. Type 1 to Type 46 are predefinable and Type USER is user-definable.
 - Press PgUp or PgDn to select a numbered hard disk type or type the number and press Enter. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use Type USER to define your own drive type manually
 - If you select Type USER, you will need to know the information listed below. Enter the information directly from the keyboard and press Enter. This information should be included in the documentation from your hard disk vendor.

CYLS	Number of cylinders
HEADS	Number of heads
PRECOMP	Starting write precomp. cylinder
LANDZONE	Landing zone
SECTORS	Number of sectors

- If a hard disk has not been installed, select NONE and press <Enter>.

Once hard disk parameters are configured, you can enable/disable multiple sector reads/writes for IDE drives, as follow:

- Return to the Main Menu and select the BIOS Features Setup option.
- In the BIOS Features Setup menu, select the IDE HDD Block Mode option and set this option to Enabled or Disabled.

8.02 FLOPPY DEVICES

8.02.1 FLOPPY JUMPERS

The TEK-AT4LVG supports the 2.88MB High Density Floppy. The W30 and W31 jumpers EDOUT and HDOUT signals. The settings are as follows:

- 1- HDOUT and EDOUT left to software (default setting).
OR
- 2- HDOUT to Pin 33 (J4), and Ground to Pin 27 (J4), with
EDOUT to Pin 29 (J4), and Ground to Pin 17 (J4).
OR
- 3- HDOUT to Pin 27 (J4), and Ground to Pin 33 (J4), with
EDOUT to Pin 17 (J4), and Ground to Pin 29 (J4).

Please refer to Section 4 for information and about settings and location of these jumpers.

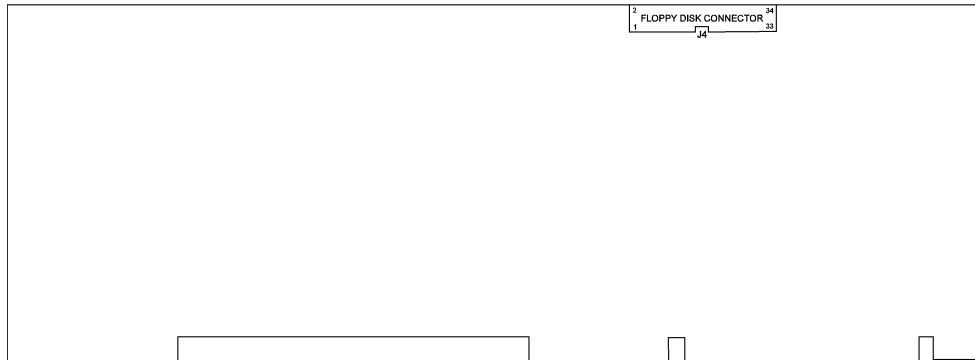
Note: Please notice that these jumpers are **optional**.
Since the software is smart enough to detect the different types of floppy drive, your 2.88MB Floppy Drive will operate correctly if 2.88MB is indicated in the BIOS Setup.
Not installing these jumpers will work for all floppy disk drives, as long as the proper floppy type is indicated in AWARD Setup. For proper operation, we recommend you **not** to install these jumpers.

Please refer to Table 4-1e to setup the W30 and W31 jumpers.

8.02.2 FLOPPY CONNECTORS LOCATION & PIN-OUT

The Floppy connector appears on Diagram 8-2 at J4.

DIAGRAM 8-2: Floppy Connector Location



The Floppy Connector's pin-out appears in Table 8-2.

TABLE 8-2: Floppy Disk Connector (J4) - 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 W30 and W31 jumpers, these configurations are possible:

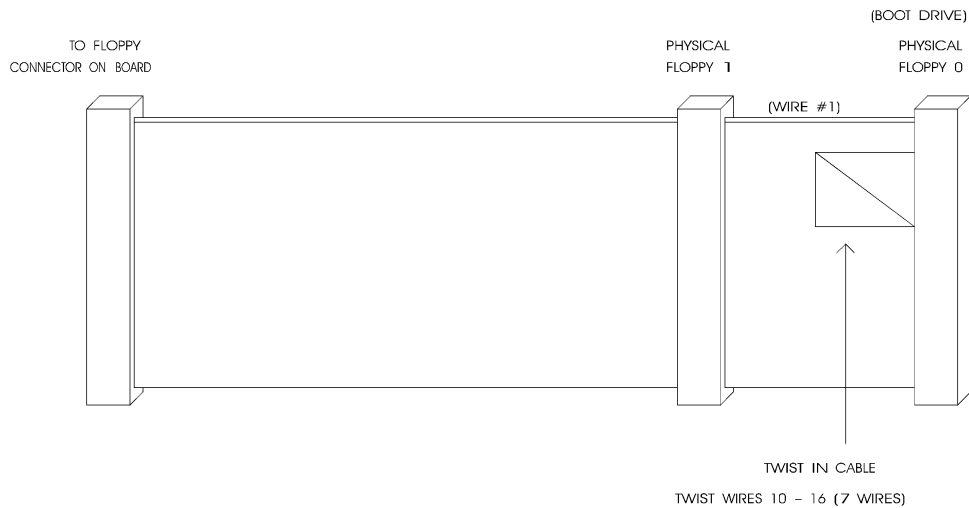
17	-	GND	Or:	17	I	EDOUT (2.88MB)
27	-	GND		27	I	HDOUT (2.88MB)
29	I	EDOUT (2.88MB)		29	-	GND
33	I	HDOUT (2.88MB)		33	-	GND

8.02.3 FLOPPY HOOK-UP

Mechanical Floppy Disk Installation:

The installation of the Floppy drives is done via a standard IBM 34-pin flat ribbon cable that connects to J4.

DIAGRAM 8-3: Floppy Disk Cable



The following list includes approved vendors for the J4 connector's mating parts:
Amp 746285-8 [optional strain relief: 499252-6],
Robinson Nugent IDS-C34PK-TG,
Thomas & Betts 622-3430 [optional strain relief: 622-3441].
(34-pin flat cable connector).

Enhanced Floppy Mode:

In order to connect your 2.88MB Floppy drive, simply indicate the proper Floppy disk drive in the AWARD Setup program. It is not necessary to set the HDOUT and EDOUT media detection signal jumpers, explained in the following pages.

8.02.4 FLOPPY SOFTWARE SETUP

AWARD Setup

Starting from the AWARD Setup program's main menu, use the following procedure to complete the setup:

- From the Main Menu, select the Standard CMOS Setup option.
- In the Standard CMOS Setup menu, use the arrow keys to highlight the Drive A: or Drive B: option (depending on the installation of your Floppy drive).
 - Select the category identifying the types of Floppy disk drive A or drive B that have been installed in the computer.

None	No Floppy drive installed.
360KB, 5.25 in.	5-1/4 inch PC-type standard drive; 360KB capacity.
1.2MB, 5.25 in.	5-1/4 inch AT-type high-density drive; 1.2MB capacity.
720KB, 3.5 in.	3-1/2 inch double-sided drive; 720KB capacity.
1.44MB, 3.5 in.	3-1/2 inch double-sided drive; 1.44MB capacity.
2.88MB, 3.5 in.	3-1/2 inch double-sided drive; 2.88MB capacity.

8.03 SCSI DEVICES

The SCSI Controller is optional equipment on the TEK-AT4LVG board.

The TEK-AT4LVG board provides an interface between a host or peripheral device, and the Small Computer System Interface (SCSI) bus.

You can obtain more information regarding the SCSI Controller, SCSI devices and their drivers in the SCSI manual available through TEKNOR's Sales or Technical Support department.

8.03.1 INSTALLING A FIXED SCSI HARD DISK

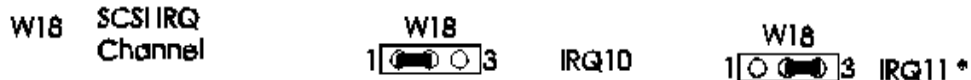
No additional hardware or drivers are necessary if no more than two IDE/SCSI hard disks will be present in your system.

1 - Jumpers (Power Off)

Power off your computer.

The board's initial jumper settings should be kept in most cases, unless there is a conflict with other devices you have installed. SCSI jumpers are shown below:

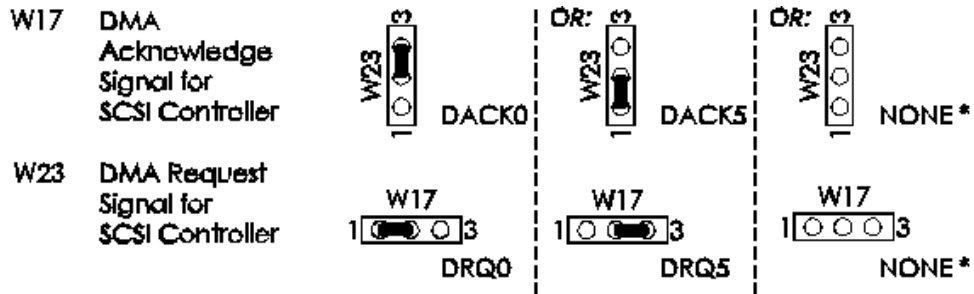
W18: Selects the SCSI IRQ Channel:



W22: Sets up the SCSI I/O Port Address:



W17 & W23: Selects the DMA channel for the SCSI Controller:



* Default setting

2 - 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 TEK-AT4LVG board is terminated.

The following list includes approved vendors for the J2 connector's mating parts:

Robinson Nugent IDS-C50PK-TG,

Amp 1-746285-0 [optional strain relief: 499252-4],

Thomas & Betts 622-5030 [optional strain relief: 622-55041].

(50-pin flat cable connector).

Attach one end of the SCSI cable to the J2 SCSI 50-pin connector. Make sure line 1 of the cable is matched with pin 1 of connector J2.

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.

3 - 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 sub-system. The host adapter is usually assigned the highest priority level (i.e. 7). Table 8-3 lists common SCSI Target IDs.**

TABLE 8-3: 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

8.03.2 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, you must use the EZ-SCSI software utilities diskette which came with your board. The diskette includes a README file in ASCII and WORD formats which contains setup and installation information. The diskette also includes any device driver you may need.

8.03.3 REMOVABLE TERMINATION RESISTORS

The TEK-AT4LVG has three termination resistors around the SCSI controller labeled RN12, RN21 and RN22 on the board. These red-colored resistors are removable. It is recommended that you remove them if your board is not located at the end of the SCSI cable.

- ☛ **RN12, RN21 and RN22 Termination Resistors should be removed when your board is not connected at either end of the SCSI cable.**

8.03.4 SCSI CONNECTOR

TABLE 8-4: SCSI Connector (J2) - 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

8.03.5 SCSI SOFTWARE SETUP

VIP-UP Setup

From the VIP-UP Setup program's first screen, you can control the following options:

SCSI options	Values available
On Board SCSI BIOS	Disabled / Enabled
SCSI BIOS Address	D8000H-DBFFFFH / 0C000-DFFFFH
SCSI Base I/O Address	340H (Default BIOS) / 140H (Special BIOS)
SCSI ID Select	ID0 / ID1 / ID2 / ID3 / ID4 / ID5 / ID6 / ID7
SCSI IRQ Channel	IRQ11 / IRQ10
SCSI DMA Channel	DMA0 / DMA5
SCSI Parity	Enabled / Disabled
SCSI Disconnect	No Disconnect / Allow Disconnect
SCSI Synchronous Negotiation	Respond Only / Initiate Negotiation
SCSI Floptical Drive Support	Enabled / Disabled
SCSI Compatibility Mode	6360 Features / 6260 Compatibility

9 INSTALLING PERIPHERALS

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9.01 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.

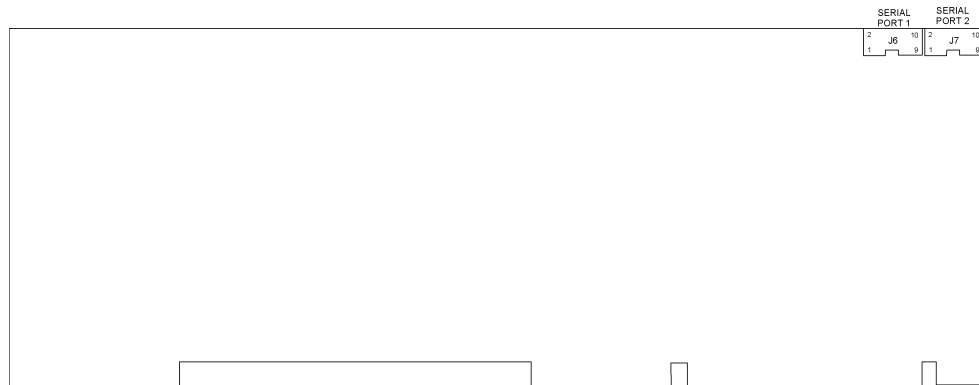
9.01.1 SERIAL PORT JUMPERS

Serial port jumpers and their settings are given in Section 4-6 (Setting Jumpers).

9.01.2 SERIAL PORTS LOCATION & PINOUTS

Serial Port 1 and Serial Port 2 appear on Diagram 9-1 at J6 and J7 respectively.

DIAGRAM 9-1: Serial Ports Location



The following list includes approved vendors for the J6 and J7 connectors' mating parts:
Amp 746285-1 [optional strain relief: 499252-5],
Robinson Nugent IDS-C10PK-TG,
Thomas & Betts 622-1030 [optional strain relief: 622-1041].
(10-pin flat cable connector).

Serial Port 1 (J6) RS-232

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

TABLE 9-1a: Serial Port 1 (J6) RS-232 - Pinout

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

TABLE 9-1b: IBM 9-Pin DSUB Standard - Pinout

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 Taiwanese adapter cables is not recommended, since the pinout is often incorrect. The direct crimp design offered by TEKNOR allows the simplest cable assembly. All these cables are available from TEKNOR by contacting the Sales department.

Serial Port 2 (J7) RS-232

The Serial Port 2 can be configured as RS-232 or RS-485. As a RS-232 port, and with the IBM 9-pin DSUB Standard, Serial Port 2 is 100% compatible with the IBM-AT serial port. The following tables show their pinouts:

TABLE 9-2a: Serial Port 2 (J7) RS-232 - Pinout

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

TABLE 9-2b: IBM 9-Pin DSUB Standard - Pinout

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 Taiwanese adapter cables is not recommended, since the pinout is often incorrect. The direct crimp design offered by TEKNOR allows the simplest cable assembly. All these cables are available from TEKNOR by contacting the Sales department.

Serial Port 2 (J7) RS-485

If Serial Port 2 is configured for RS-485 operation, it can support either full-duplex or party line communication.

Full Duplex Operation: Upon power-up or reset, the RS-485 interface circuits are automatically configured for full duplex operation. Pins 3 and 4 of J7 act as the receiver lines and pins 5 and 6 act as the transmitter lines.

Party Line Operation: In order to enable party line operation, the user must first write "1" to bit 3 at I/O address 190H (or at 290H or 390H depending on W16 jumper). This allows the transceiver (pins 3 and 4 of J6) 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 R110 and R112 must be installed only on the boards at both ends of the network.

The following table shows this connector's pinout:

TABLE 9-3: Serial Port 2 (J7) RS-485 - Pinout

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	10	-	Not Used

9.01.3 SERIAL PORTS SOFTWARE SETUP

AWARD Setup

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

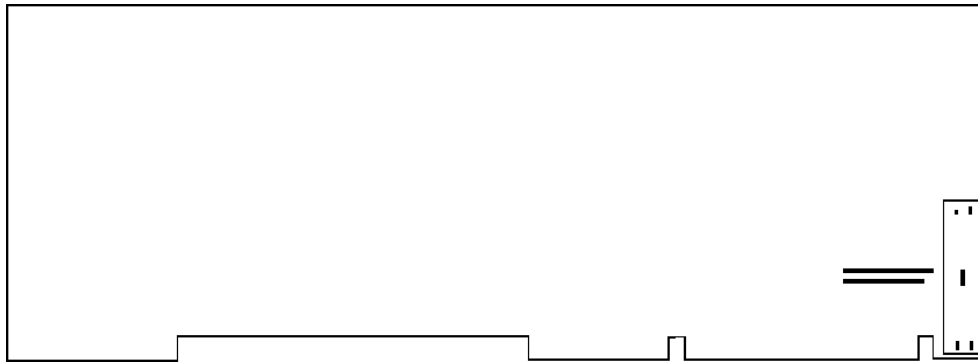
- Select the Chipset Features Setup option.
- In the Chipset Features Setup screen, the Onboard Serial Port 1 option allows you to set the Serial Port 1 address to None, COM1/3F8h, COM2/2F8h, COM3/2E8h, or COM4/3F8h.
- Also in the Chipset Features Setup screen, the Onboard Serial Port 2 option allows you to set the Serial Port 2 address to None, COM1/3F8h, COM2/2F8h, COM3/2E8h, or COM4/3F8h.
- Also in the Chipset Features Setup screen, the Serial Port 1 Interrupt option allows you to enable IRQ4 for Serial Port 1 (when set to COM1/3 → IRQ4) or to disable IRQ (when set to COM1/3 → None).
- Also in the Chipset Features Setup screen, the Serial Port 2 Interrupt option allows you to enable IRQ3 for Serial Port 2 (when set to COM2/4 → IRQ3) or to disable IRQ (when set to COM2/4 → None).

9.02 PARALLEL PORT

9.02.1 PARALLEL PORT LOCATION & PINOUT

The Parallel Port appears on Diagram 9-2 at J15.

DIAGRAM 9-2: Parallel Port Location



The parallel port connector (J15) is a DB-25 connector located at the edge of the board.

The following list includes approved vendors for the J15 connector's mating parts:
Robinson Nugent IDD-C25PM-440-TG30 [optional strain relief: SR-25M-IDD],
Amp 747321-2 [optional strain relief: 747275-2],
Thomas & Betts 609-25P,
Amphenol 841-17-DBFR-B25P.
(25-pin flat cable connector).

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

TABLE 9-4: Parallel Port Connector (J15) - Standard Mode - Pinout

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

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

TABLE 9-5: Parallel Port Connector (J15) - EPP Mode - Pinout

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 pinout for this connector when it is in ECP mode:

TABLE 9-6: Parallel Port Connector (J15) - ECP Mode - Pinout

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.

9.02.2 PARALLEL PORT SOFTWARE SETUP

AWARD Setup

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

- Select the Chipset Features Setup option.
- In the Chipset Features Setup screen, the Onboard Parallel Mode option allows you to set one or more parallel port modes. The settings are: SPP (Standard Parallel Port), ECP+EPP1.9 (Extended Capabilities Port plus Enhanced Parallel Port), ECP (Extended Capabilities Port), and EPP1.9/SPP (Enhanced Parallel Port/Standard Parallel Port).
- Also in the Chipset Features Setup screen, the Onboard Parallel Port option allows you to set the Parallel Port address to None, 3BCh, 378h or 278h.

10 INSTALLING VIDEO

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10.02 CRT VGA Controller	10-3
10.02.1 Disabling Video Display	10-4
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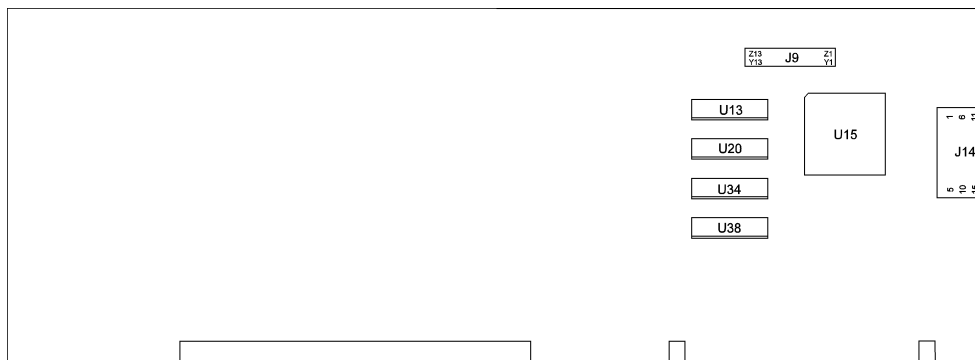
10.01 LOCATION OF VIDEO COMPONENTS

The TEK-AT4LVG video system includes a local bus VGA video controller, 1MB or 2MB of video memory (DRAM) and a video feature connector for video overlay and color keying.

Video components appear on Diagram 10-1 as follows:

- Video Controller at U15;
- Video Memory at U13, U20, U34 and U38;
- VGA Connector at J14;
- Video Feature Connector at J9.

DIAGRAM 10-1: Video Components Location



10.02 CRT VGA CONTROLLER

The TEK-AT4LVG's single-chip video controller from CIRRUS LOGIC is the CL-GD5430, 5434 or 5440 VGA controller.

The TEK-AT4LVG 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 TEK-AT4LVG will not drive non-VGA monitors.

The video controller supports CRT terminals with resolution of up to 1024 x 768 (256 colors). It is compatible with CGA, EGA, Hercules, MDA, VGA and SVGA monitors.

10.02.1 DISABLING VIDEO DISPLAY

Disabling Video Display is useful when an external video card is required for testing or other purposes.

The video controller can be disabled by shorting pins 7 and 8 on the W19 jumper (Extended BIOS Modes).

Please notice that the W19 jumper configures four options (including Video Display Disabling) :

- . pins 1-2: Serial Download Mode
- . pins 3-4: VT100 Mode
- . pins 5-6: Disable TEKNOR Extension
- . pins 7-8: Disable Video Display

The W19 jumper settings are given in Section 4-7.

10.02.2 VGA CONNECTOR

Connecting CRT video to the TEK-AT4LVG is simple. Merely connect the standard VGA DB15 male connector to the board's J14 high density, right angle, female connector. See Diagram 10-1 for the location of J14.

The VGA connector's pinout appears in Table 10-1.

TABLE 10-1: VGA Connector (J14) - Pinout

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

10.03 FEATURE CONNECTOR

The Video Feature Connector (also called a Dynamic Overlay Port) at J9 is a VESA/VGA pass-through connector. It directly supports the 8-bit mode; the connector also supports the 16-bit mode when using an external data multiplexer.

Through the Video Feature Connector, the TEK-AT4LVG makes possible dynamic overlay. In dynamic overlay configurations, the video signal can be overlaid 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 following list includes approved vendors for the J9 connector's mating parts:
Robinson Nugent IDS-C26PK-TG,
Amp 746286-6 [optional strain relief: 499252-3],
Thomas & Betts 622-2630 [optional strain relief: 622-2641].
(26-pin flat connector).

The connector's pinout is described below. See Diagram 10-1 for the location of J9.

TABLE 10-2: Video Feature Connector (J9) - Pinout

I/O Pin	Signal Name	I/O Pin	Signal Name
Y1	P0	Z1	GND
Y2	P1	Z2	GND
Y3	P2	Z3	GND
Y4	P3	Z4	EVIDEO*
Y5	P4	Z5	ESYNC*
Y6	P5	Z6	EDCLK*
Y7	P6	Z7	Not Used
Y8	P7	Z8	GND
Y9	DOT CLK	Z9	GND
Y10	BLANK*	Z10	GND
Y11	HSYNC	Z11	GND
Y12	VSYNC	Z12	MCLK
Y13	GND	Z13	OVW*

* Active low signal

11 SETTING POWER MANAGEMENT MODES

11.01 Power Management Modes.....	11-2
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11.01 POWER MANAGEMENT MODES

The TEK-AT4LVG supports a very flexible and powerful power management scheme. The System Controller provides progressively higher levels of power conservation whenever the system is idle through the following special power saving modes: Stand-by and Suspend. These modes are fully programmable through the AWARD Setup Program. In general, each progressive level of power management is entered when inactivity is detected by the System Controller which monitors activity from the Keyboard, Video, Serial and Parallel I/O. The timeouts which are used to enter into Stand-by Mode and Suspend Mode are set via the AWARD Power Management Setup screen.

While in full speed operation, your system will monitor all Stand-by events (most data activity). When any monitored event occurs, such as any keyboard or serial port activity, the Stand-by timer will be reset.

If no events occur within the specified period, the system will enter the Stand-by state where the CPU is slowed down and the display becomes inactive. At this time, the system will start monitoring the Suspend events. Again, if no events occur in the period specified by the Suspend timer, the CPU will be stopped and the system will be powered down. As always, when any monitored event occurs, the system will be fully powered-on, the CPU returned to its default speed and the standby timer reset.

The various options in the POWER MANAGEMENT SETUP are described below.

POWER MANAGEMENT

There are three selections for Power Management: Disable (default, no power management), Enable (power management with fixed default values), and User Define (allows the user to set each option individually).

VIDEO ON/OFF CONTROL

When enabled, this option will make the Video Display become inactive after the period of inactivity set in the System Stand-by Timer option.

HDD STAND-BY TIMER

This option enables the Hard Disk to be powered off separately from other peripheral devices without necessarily interfering with the operation of the rest of the system. The Hard Disk will be powered back on at the next hard disk access operation. The settings are Disable, 1 MIN, 2 MIN, 3 MIN, 4 MIN, 5 MIN, 6 MIN, 7 MIN, 8 MIN, 9 MIN, 10 MIN, 11 MIN, 12 MIN, 13 MIN, 14 MIN and 15 MIN.

SYSTEM STAND-BY TIMER

This option sets the inactivity timer for the enabled Wake Up Event Detection system devices listed on the next page. When this timer expires, the system will enter the Stand-by state. The settings are Disable, 7 SEC, 30 SEC, 3.8 MIN, 7 MIN, 14.5 MIN, 58 MIN and 240 MIN.

SYSTEM SUSPEND TIMER

This option sets the interval of inactivity between Stand-by mode and Suspend Mode. The timer starts when the system enters Stand-by and, when it reaches this setup value, will enter the Suspend state. The settings are Disable, 14 SEC, 56 SEC, 3.8 MIN, 7 MIN, 58 MIN and 240 MIN.

WAKE UP EVENT DETECTION

Power Management events are I/O events whose occurrence can prevent the system from entering a Power saving mode or can awaken the system from such a mode.

KEYBOARD DETECTION

This option enables access to the keyboard as a Power Management event.

SERIAL PORT DETECTION

This option enables access to the COM ports (COM1, COM2, etc.) as a Power Management event.

PARALLEL PORT DETECTION

This option enables access to the printer port(s) as a Power Management event.

HARD DISK I/O DETECTION

This option enables access to the hard drive(s) as a Power Management event.

DMA/ISA MASTER DETECTION

When Enabled, the system will monitor system requests to move memory as Power Management events.

NON MOTHERBOARD MEMORY

This option enables access to non Motherboard memory as a Power Management event.

VIDEO MEMORY (BLOCK A,B)

This option is always enabled and permits the monitoring of video refresh events as Power Management events.

I/O ADDRESS DETECTION

This option enables access to a specific I/O address range as a Power Management event. The settings are Disable, 300H, 310H, 320H, 330H, 340H, 350H, 360H, 370H, 380H, 390H, 3A0H, 3B0H, 3C0H, 3D0H and 3E0H.

VESA MASTER DETECTION

This option enables access to the VESA Bus as a Power Management event.

PART FOUR
SPECIAL SOFTWARE AND ONBOARD UTILITIES

12 VFLASH SOFTWARE

13 FLASH FILE SYSTEM II

14 UPDATING BIOS WITH UBIOS

15 VT100 MODE

16 DOWNLOAD MODE

12 VFLASH SOFTWARE

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12.01 INTRODUCTION

VFLASH is TEKNOR's Flash EPROM transfer utility program for single board computers. Its main function is to download DOS files to the 2 or 4 MB Flash EPROM disk U37, 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 the VFLASH Transfer Utility.

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 13).

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

12.01.1 VFLASH SOFTWARE OVERVIEW

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

1. If your TEK-AT4LVG is equipped with hard or floppy drives, then VFLASH downloads data directly on the board's Flash EPROM disk.
2. If your TEK-AT4LVG does not have floppy or hard drives, then VFLASH must be run from a remote computer which downloads data to the TEK-AT4LVG 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 W19 (1-2) on the TEK-AT4LVG; in this mode, the TEK-AT4LVG 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 next screen is where the address and size of the Flash partition to create are determined.(the screens are explained in section 12.03 - OUTPUT SELECTION).

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 12.04 - FILE SELECTION).

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 (also explained in section 12.04 - FILE SELECTION).

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 12.05 - FILE TRANSFER).

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 12.06 - BATCH MODE).

12.01.2 TYPES OF FLASH EPROM DISKS

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

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 four conditions must be met:

- You must have the optional 2 MB or 4 MB Flash EPROM installed at U37.
- The bootable Flash EPROM partition must start from the first block.
- The VIP-UP option “BIOS Interrupt 13h Configuration” must be set to Enabled.
- The Flash disk must be configured in the VIP-UP Setup as “Installed Bootable”. To do so, you must change the value of the Flash Disk Support option on VIP-UP’s second screen from Disabled to Installed Bootable.

NON-BOOTABLE FLASH DISK: Unlike bootable Flash disks which must begin at the first Flash block, non-bootable disks can begin anywhere. When installed as a non-bootable Flash disk, the disk will be assigned a drive letter after your last physical hard drive installed.

To use Flash EPROM as a non-bootable Flash disk, three conditions must be met:

- The bootable Flash EPROM partition must start from the first block.
- The VIP-UP option “BIOS Interrupt 13h Configuration” must be set to Enabled.
- The Flash disk must be configured in the VIP-UP Setup as “Installed”. To do so, set the value of the Flash Disk Support option on VIP-UP’s second screen to Installed.

12.01.3 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 TEK-AT4LVG, VFLASH must be running on board.

If you need a remote computer to program Flash device on the TEK-AT4LVG (host), then the board must be in Download Mode and VFLASH must be running on the remote computer. A serial cable must be connected between the remote computer and either the COM1 or COM2 port, as it would be in VT100 mode (the remote computer is cabled like a VT100 terminal, see Section 15 - VT100 MODE).

☞ **To run VFLASH properly, you need at least one floppy drive, 1 MB of DRAM, MS-DOS® or PC-DOS (version 2 or higher) or DR-DOS (version 3.41 or higher).**

12.02 RUNNING VFLASH

To run VFLASH, simply type "VFLASH" at the DOS prompt and press ENTER. The first OUTPUT SELECTION FOR THE TRANSFER screen appears.

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 board 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 TEK-AT4LVG has no floppy or hard disks, or simply because the data to transfer is on a different computer than the TEK-AT4LVG and Flash EPROM disk. The transfer takes place via a serial link on COM1 (3F8H) or COM2 (2F8H) from the remote computer to the TEK-AT4LVG.

12.03 OUTPUT SELECTION

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

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.

Directly below the bar is a BEGIN pointer. It shows where the Flash partition will begin. The next line shows physical parameters such as the starting block ADDRESS and the DISK SIZE of selected blocks. It also shows the minimal partition size you have available. The minimal disk size can be altered by the /G:x option (for details on this option, please refer to Section 12.05 - BATCH MODE).

Moving the BEGIN pointer with the left and right arrow keys allows you to select the desired starting block (i.e., address) of the disk.

To set the size of the disk, type "E" and move the END pointer to the desired location for the end of the disk by using the left and right arrow keys.

OUTPUT SELECTION FOR THE TRANSFER

Output selected: On board FLASH devices.

Type "B" to choose where the disk begins,
"E" to set where it ends.

Legend: selected block = , unselected block =

↑ Begin

ORDER:#2, ADDRESS: 20000h, DISK SIZE: 640 Kbytes (min: 128K-b)

Disk will start from the 2nd block (address : 20000 hex).
The size of the disk is: 640 K-bytes.

Strike any key to continue.

↑ ↓ → ← **Enter** to select option **Special disk**

12.04 FILE SELECTION

Once you have selected the output, a file selection screen appears.

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 current directory and ". ." to the parent directory. Thus, if you enter 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:

Selected files (max 240):0;		Free Space to copy: 522240 bytes	
DRIVE A: COMPLETE COPY DRIVE B: COMPLETE COPY DRIVE C: DRIVE E: DOS <DIR> QAPLUS <DIR> TEMP <DIR> TP <DIR> VENTURA <DIR> ATTR2 PAS 569 1-04-91 9:32 AUTOEXEC BAT 74 2-14-91 16:12 BOOTDIR PAS 6508 3-03-91 13:31 COMMAND COM 25308 2-02-91 12:25 CONFIG SYS 128 1-01-91 14:42		DRIVE A: TO CHOOSE FILES DRIVE B: TO CHOOSE FILES DRIVE D: BIOS 700 <DIR> PCAD <DIR> SKEY <DIR> TEST <DIR> TYPESET <DIR> WIN <DIR> AUTOEXEC BAK 59 2-14-91 16:11 BOOT_DIR PAS 158 1-25-91 16:58 CHOIXMED PAS 19797 3-06-91 1:11 COMMANDE PAS 6110 2-21-91 15:57 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			

12.04.1 MENU COMMANDS

- TAG** Use this function to select a file from the above file list. Simply move the cursor over the desired field and press T on your keyboard. The file will then be highlighted - indicating it was selected. If you press 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 press 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 press on the B key (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 press 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 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 press 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 "Newdir". When the cursor is on a file, pressing ENTER will tag/untag it.
DONE	Use this function when the file selection is terminated. Press 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 press V on your keyboard to bring the message into the following format: Volume is xxxxxxxxxxxx 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.

12.04.2 LIST OF SELECTED FILES

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

LIST OF SELECTED FILES			
Disk volume label: xxxxxxxxxxxx			
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
Program Change Selection ↑ ↓ PgUp PgDn Home		Esc to quit	

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 pressing C.

PROGRAM Press 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 This allows you to abort VFLASH and exit to DOS without modifying the contents of the Flash devices.

12.04.3 DUPLICATE FILES MENU

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: xxxxxxxxxxxx			
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		Select 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.

12.05 FILE TRANSFER

12.05.1 TRANSFER STATUS OF ONBOARD FLASH PROGRAMMING SCREEN

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.

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

12.05.2 TRANSFER STATUS OF EXTERNAL FLASH PROGRAMMING SCREEN

When a serial link is used, this screen is displayed. It displays 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.

☞ **The transfer 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 1 and 2 on jumper W19. This forces Download Mode at boot up.
2. Download Mode is automatically enabled when VT100 Mode is activated by shorting Pins 3 and 4 on jumper W19. 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 W19 (1-2) jumper. If Download Mode was entered by recognition of the code sequence, you can simply exit Download Mode and continue processing.**

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

12.06 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.

12.06.1 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 12.04 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.

12.06.2 BATCH MODE COMMAND LINE OPTIONS

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.

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 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.

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 TEK-AT4LVG 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.

12.06.3 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 source files
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

ERROR (HEX)	NUMBER (DECIMAL)	DESCRIPTION
1C	28	Flash content does not verify with source
1D	29	No device found in specified starting socket
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

13 FLASH FILE SYSTEM II

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13.01 INTRODUCTION

With FLASH FILE SYSTEM II, a read/write MS-Flash partition can be created in the 2MB or 4MB Flash EPROM device (located at U37). Such a partition can be accessed via the DOS commands.

Section 12 - 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 2MB or 4MB 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 12 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 "Installed Bootable" (C:), other physical hard disks as D: and E:, while the MS-Flash disk, in this case, would automatically be set up as the next drive letter, that is F:. Another example could be only one hard disk, with the following setup: hard disk (C:), VFLASH disk "Installed" (D:) and MS-Flash disk (E:).
- The fourth possible configuration is similar to the previous one except that space (one or more memory blocks) 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.

FLASH FILE SYSTEM II can be purchased from TEKNOR and is not part of the standard TEK-AT4LVG package and utilities.

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.

13.02 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, the user may have already 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.

13.03 CREATING & FORMATTING AN MS-FLASH PARTITION

FLASH FILE SYSTEM II on the TEK-AT4LVG 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; either:

- Run the program interactively and make selections in the menus, or
 - Execute 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.**

13.03.1 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 follows:

```
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	2048K

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 "N" and then press ENTER.

4. This step is only required 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.

13.03.2 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= <i>drive</i> : [/V= <i>label</i>] MEMCARD /CHK= <i>drive</i> : [/F]
Parameters	<i>drive</i> : Specifies the drive you want to format. <i>label</i> 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.

Example 1:

To assign an entire memory card to drive D and specify the volume label CARD1, type the following at the command prompt:

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

Example 2:

To check partition E for errors, fix any errors that are found, and display the status of the partition, type the following at the command prompt:

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

14 UPDATING BIOS WITH UBIOS

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14.01 INTRODUCTION

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:

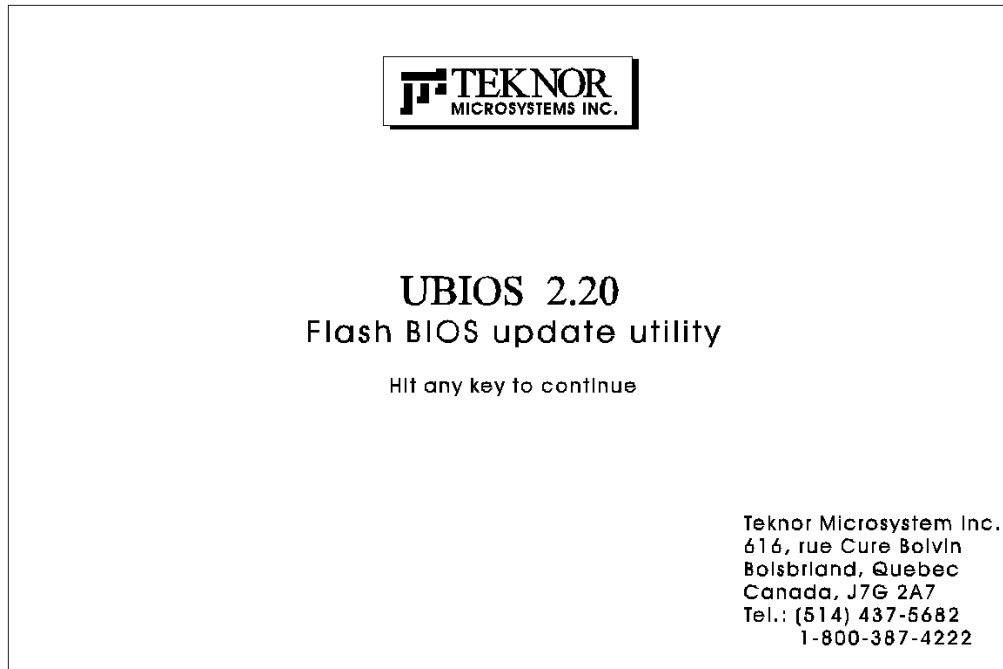
- **Interactive Mode:** In this mode the program is menu-driven. This mode is explained in section 14.01.
- **Batch Mode:** It is also possible to run the program without menus by a command which specifies the selected options and files with parameters. This mode is explained in section 14.02.

Both the Interactive Mode and the Batch Mode are available in VT100 mode (Section 15). The small differences will be explained in the sections noted above.

Note: 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.

14.02 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.

14.02.1 MAIN MENU

An example of the main menu appears below:

```

                                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

    5-Update main BIOS          0-Copy main BIOS
```

The main menu displays two groups of options: Write Flash BIOS device (options 1 to 3 and 5) and Retrieve a BIOS to a file (options 6 to 8 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.
- 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), or
- Use the ↓ or ↑ keys to highlight the desired option and press ENTER.

14.03.2 UPDATE MENU

If you select from the first group of options in the Main Menu (1 to 3 and 5), a screen similar to the following appears:

```

                                UPDATE
You are currently using :VGA version AAB
                        :Teknor's extension version 0.60
                        :main BIOS version 0.60
Directory:F:\LOGICIEL\UBIOS\UBIOS210.NOT
      FILES                                DOCUMENTATION
                                No documentation available
      <DIR>
B800_060.BIN
B800_987.BIN
B801_612.BIN
```

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. At 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 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, .BFP, .EXT 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 browse 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 navigate 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 you that you will have to reboot if you want the new configuration to become operational. The program then exits to the operating system prompt.

14.03.3 FLASH BIOS COPY MENU

If you select from the second group of options in the Main Menu (6 to 8 and 0), a screen similar to the one below 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 or .ROM.
- Type in the name of the BIOS file to create and press ENTER to proceed.

Once you complete this step, the program will exit to the operating system prompt.

14.03 UBIOS - BATCH MODE

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

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,
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 "FLAT.BFP".

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

/C This option will no clear the CMOS Setup when updating main BIOS (AMIBIOS), however this is not recommended since the CMOS Setup should be updated when the main BIOS is changed.

/R Instructs UBIOS to reset the 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.

15 VT100 MODE

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15.01 VT100 REQUIREMENTS

To use VT100 Mode, the board must be supplied with ± 12 volts. This is the voltage required by the RS-232 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.

All disk drives, Flash and SRAM disks, operate identically in both Normal and VT100 Modes; all drives assignment remain the same.

Downloading software to Flash devices is done through VFLASH, TEKNOR's transfer utility software.

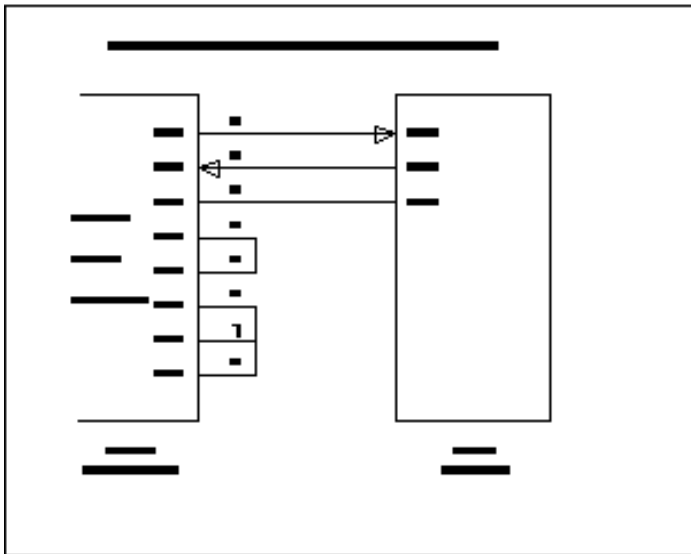
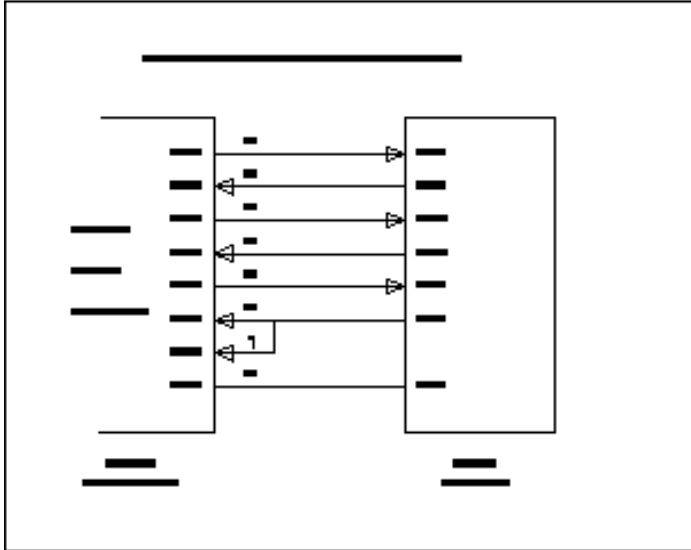
15.02 VT100 SETUP & CONFIGURATION

Follow these steps for setting up VT100 Mode:

- Power off your TEK-AT4LVG and install jumper W19 (3-4) to enable VT100 Mode. Note: VT100 Mode runs on UART1 and UART2.
- Connect the communications cable as shown in Diagram 15-1. 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 15-2.
- Power on your TEK-AT4LVG and run VIP-UP 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 VIP-UP 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.

DIAGRAM 15-1: VT100 Full Setup
DIAGRAM 15-2: VT100 Partial Setup



15.03 RUNNING WITHOUT A TERMINAL

The TEK-AT4LVG 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 15-2 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 by simply not enabling VT100 Mode and by not installing a video card.

16 DOWNLOAD MODE

Information can be downloaded to the Flash EPROM disk on the TEK-AT4LVG 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 W19(1-2).

Refer to Section 12 for more information on running VFLASH in Download Mode.

17 TROUBLESHOOTING

Following is a list of the most frequently Questions/Answers we meet at our Technical Support Department.

If any trouble appears while using the TEK-AT4LVG, please check this list first.
If the trouble still persists, contact TEKNOR's Technical Support Department.

Q1. *My computer does not retain the information entered in the AWARD BIOS setup (CMOS). What is the problem ?*

A1. The battery jumper is not installed. When TEKNOR ships a Single Board Computer (SBC), the battery is disconnected (no jumper). Refer to Section 4.01 - "Connecting the Battery", to connect the battery jumper.

Q2. *My SCSI devices are not working or are intermittent. Is there something I should look for ?*

A2. Make sure that the termination resistors are found only on both ends of the SCSI bus. The TEK735 SCSI interface is terminated ; it has to be at one end of the SCSI bus and not in the middle.

Q3. *My SBC boots up, but when the hard or floppy disk is accessed, it reboots. What is wrong with my board ?*

A3. All TEKNOR boards come with a power monitoring circuit. This circuit keeps the board in a reset state while the +5V power input is under 4.75V.
In your case, your power supply tries to give the current needed by your computer system but by doing so, drops the voltage below 4.75V. Make sure that your power supply is able to provide the maximum current asked by your system.

- Q4. *My TEK-AT4LVG is used in a RS-485 party line network. The network is flaky (intermittent). Any reasons ?*
- A4. In party line operation, 120 ohms termination resistors are used on both ends of the network. All TEKNOR SBCs are shipped with default 120 ohms resistors on both TX(+/-) and RX(+/-) lines. For the nodes in the middle of the transmission line, those resistors (R110 and R112) should be removed.
- Q5. *I connected serial cables that I already had (10 pin header to DB9) but I cannot get any of the serial port to work. What's wrong ?*
- A5. Cables provided with typical serial cards will not work because of the different pinout. A direct pin to pin cable (from DB9 to 10 pin header) must be used or order TEKNOR's cable #150-019 from your distributor.
- Q6. *The PS/2 mouse is not working. What's wrong with it ?*
- A6. Make sure that the mouse driver provided by the mouse manufacturer is installed.

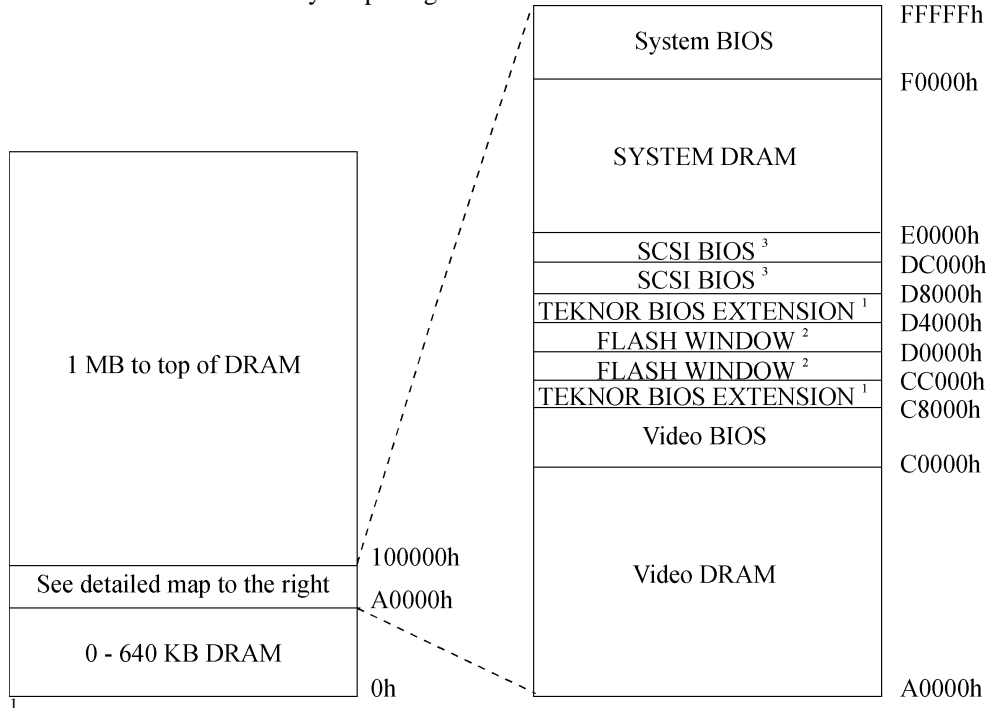
18. APPENDICES

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18.01 MEMORY & I/O MAPS

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

DIAGRAM 18-1: Memory Map Diagram



For TEKNOR BIOS EXTENSION, choose one of the following two options in the VIP-UP's first screen:
C8000h-CBFFFh or D4000h-D7FFFh.

² For Flash Window, choose one of the following two options in the VIP-UP's first screen:
CC000h-CFFFFh or D0000h-D3FFFh.

³ For SCSI BIOS, choose one of the following two options in the VIP-UP's first screen:
D8000h-DBFFFh or DC000h-DFFFFh.

TABLE 18-1: Memory Map

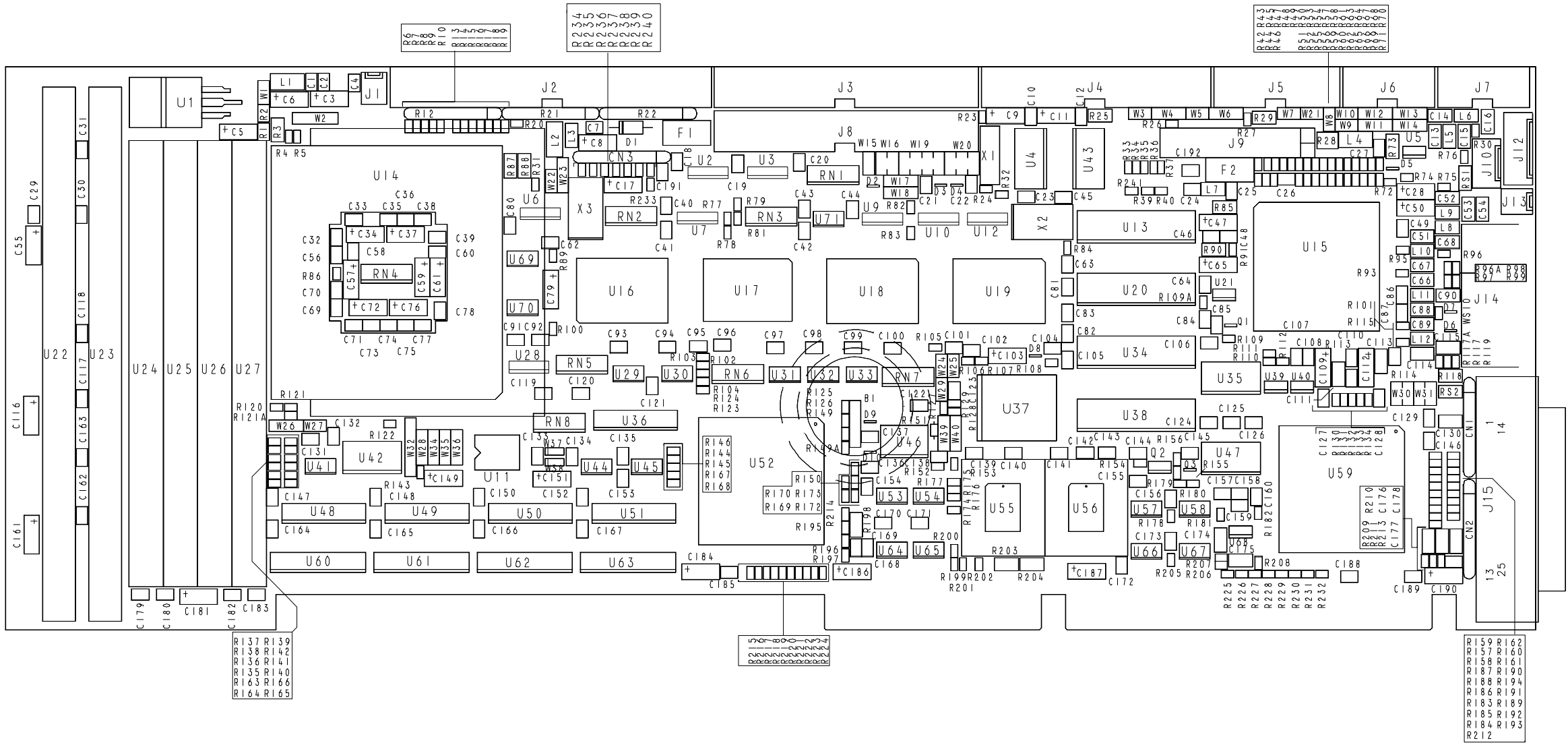
ADDRESS	OPTIONAL ADDRESS	FUNCTION
00000-0FFFF		0-640 KB DRAM
A0000-BFFFF		Video DRAM
C0000-C7FFF		Video BIOS
C8000-CBFFF	D4000-D7FFF	TEKNOR BIOS Extension
CC000-CFFFF	D0000-D3FFF	Flash BIOS Window
D8000-DBFFF	DC000-DFFFF	SCSI BIOS
E0000-EFFFF		System DRAM
F0000-FFFFFF		System BIOS
100000-Top of DRAM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

TABLE 18-2: I/O Map

ADDRESS	OPTIONAL ADDRESS	OPTIONAL ADDRESS	FUNCTION
000-00F			DMA Controller 1
020-03F			Interrupt Controller 1
040-05F			Timer
060-06F			Keyboard (8742)
070-07F			Real-time clock, NMI mask
080-09F			DMA Page Register
0A0-0BF			Interrupt Controller 2
0C0-0DF			DMA Controller 2
0F0-0FF			Math Coprocessor / Configuration Registers
190-193	290-293	390-393	Teknor Control Port
1F0-1F7, 3F6, 3F7	170-177, 376, 377		IDE Hard Disk
3F0-3F7	370-377		Floppy Disk
340-35F	140-15F		SCSI Controller
378-37A, 778-77A (ECP mode)	3BC-3BE, 7BC-7BE (ECP mode)	278-27A, 678-67A (ECP mode)	Parallel Port (LPT1 by default)
3F8-3FF (COM1)	3E8-3EF (COM3)	2F8-2FF (COM2)	UART1 (COM1 by default)
2F8-2FF (COM2)	2E8-2EF (COM4)	3F8-3FF (COM1)	UART2 (COM2 by default)
3C0-3CF, 3D0-3DF, 3B0-3BB, 46E8			Graphics Controller

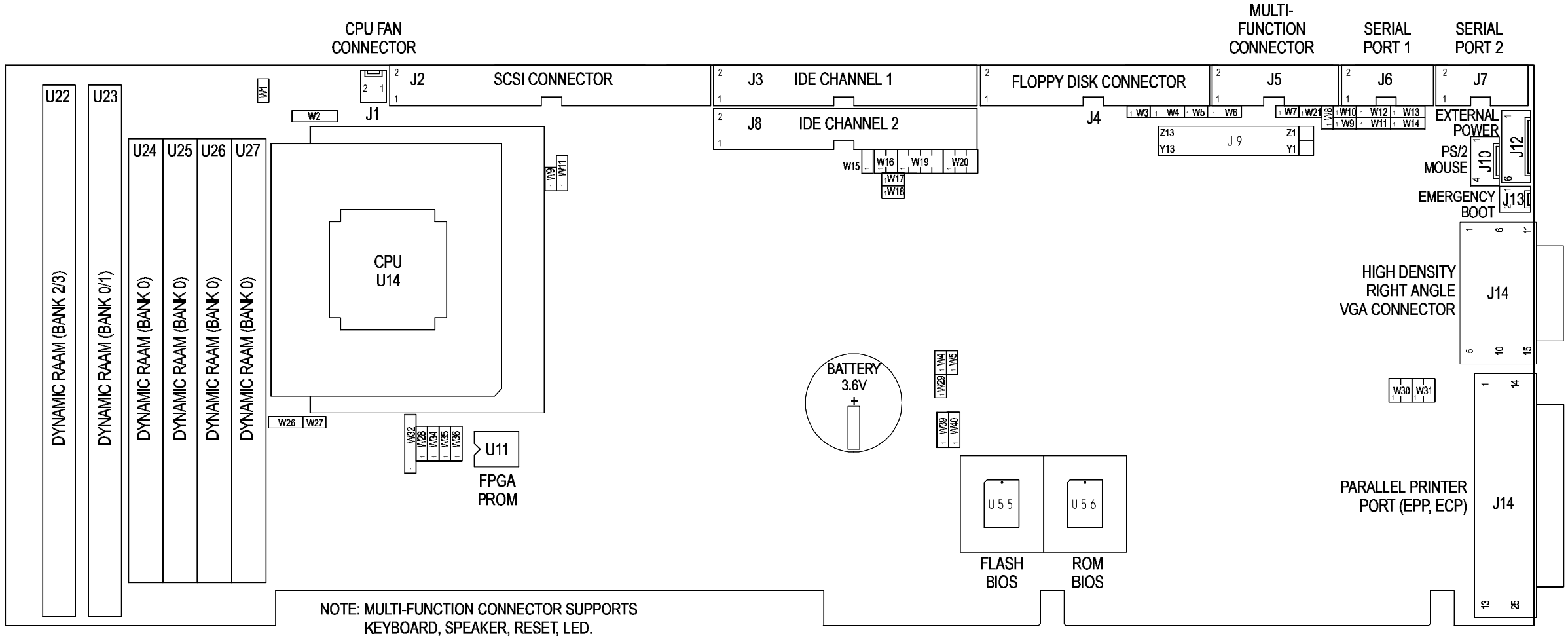
18.02 ASSEMBLY DIAGRAM

DIAGRAM 18-2: TEK-AT4LVG Assembly



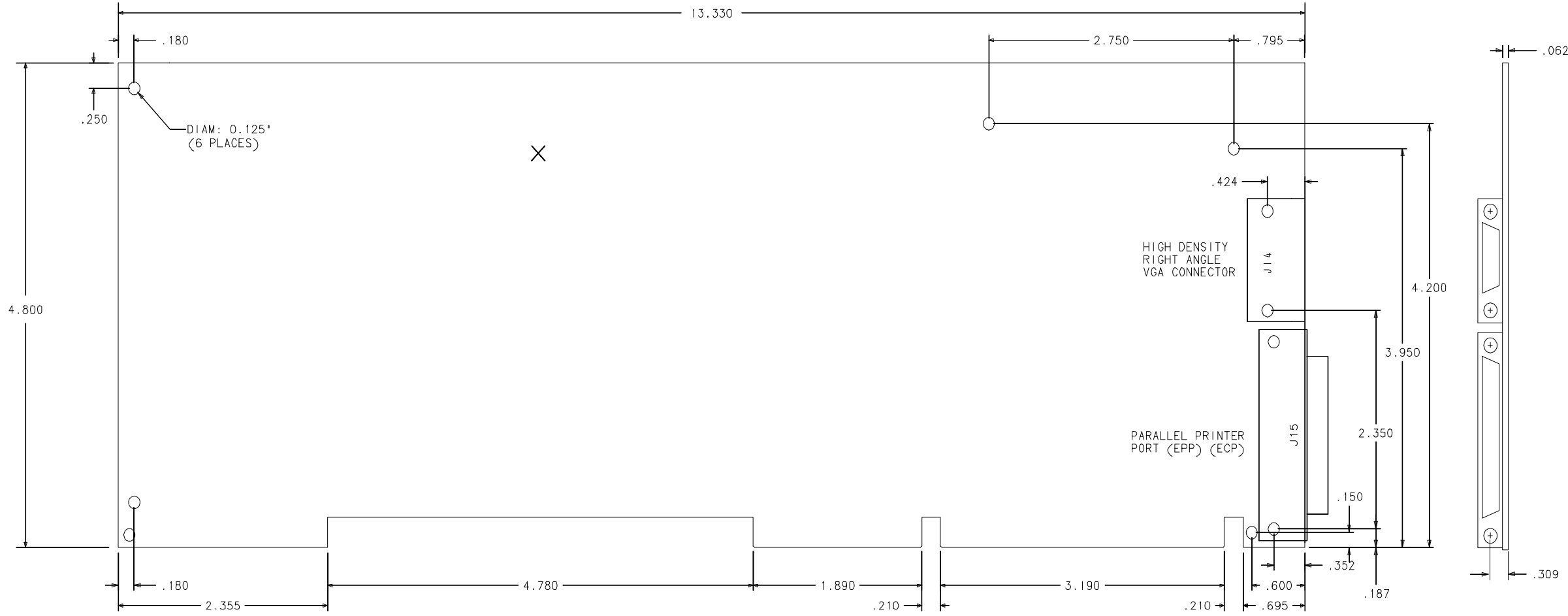
18.03 CONFIGURATION DIAGRAM

DIAGRAM 18-3: TEK-AT4LVG Configuration



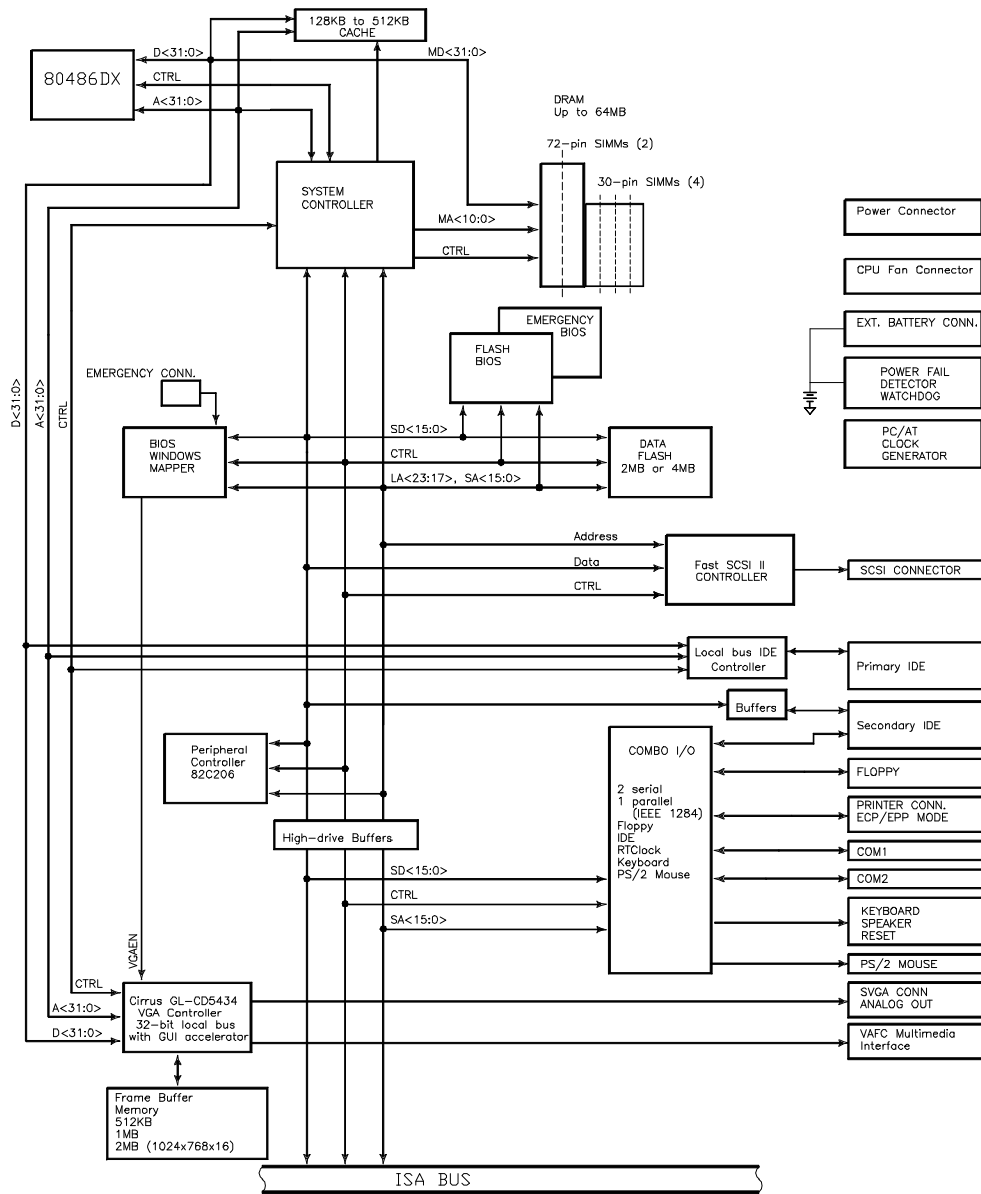
18.04 MECHANICAL SPECIFICATIONS

DIAGRAM 18-4: TEK-AT4LVG Mechanical Specifications



18.05 BLOCK DIAGRAM

DIAGRAM 18-5: TEK-AT4LVG Block Diagram



18.06 LIST OF APPROVED VENDORS

The following is list of recommended devices and connectors for use on the TEK-AT4LVG. Many other modes are available and function equally well. Users are encouraged to check with their local distributors for comparable substitutes.

DRAM (two 72-pin sockets located at U22 and U23)

DRAM devices with parity bit and page mode at 70ns maximum access time are recommended. Consult the following list to see examples of recommended DRAM devices on the TEK-AT4LVG.

256K*36	MICRON NEC SAMSUNG	MT10D25636M-7 MC-42256A36B-70 KMM536256C-7	2M*36	MICRON SAMSUNG TOSHIBA	MT18D236M-7 KMM5362000B-7 THM362040AS-70
512K*36	MICRON	MT18D51236M-7	4M*36	NEC SAMSUNG TOSHIBA	MC-424000A36BH-70 KMM5364100-7 THM3640205-70
1M*36	MICRON NEC SAMSUNG TOSHIBA	MT9D136M-7 MC-4210000A36B-70 KMM5361000B-7 THM361020AS-70	8M*36	HITACHI TOSHIBA	HB56D836BR-70A THM368020SG-70

DRAM (four 30-pin sockets located at U24, U25, U26 and U27)

DRAM devices with parity bit and fast-page mode at 70ns maximum access time are recommended. Consult the following list to see examples of recommended DRAM devices on the TEK-AT4LVG.

256K*9	MOZEL OKI	V104BJ9S-70 MSC2331A-70YS3-R
1M*9	MOTOROLA NEC OKI SAMSUNG	MCM91430S70 MC-421000A9BA-70 MSC23109B-70DS3B KMM591000AN-70
4M*9	HITACHI OKI TI TI	HB56A49BR7B MSC23409-70DS9 TM4100EAD9-70 TM497EU9-70

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.

<u>Connector</u>	<u>Recommended Mating Part</u>
Fan Connector (J1)	Leoco 2530 S020013 (housing), Leoco 2533 TCB00A0 (crimp); Molex 22-01-3027 (housing), Molex 08-50-0114 (crimp).
SCSI (J2)	Robinson Nugent IDS-C50PK-TG, Amp 1-746285-0 [499252-4*], Thomas & Betts 622-5030 [622-5041*]. (50-pin flat cable connector).
Hard Disks (J3 & J8)	Amp 746285-9 [499252-1*], Robinson Nugent IDS-C40PK-TG, Thomas & Betts 622-4030 [622-4041*]. (40-pin flat cable connector).
Floppy Disk (J4)	Amp 746285-8 [499252-6*], Robinson Nugent IDS-C34PK-TG, Thomas & Betts 622-3430 [622-3441*]. (34-pin flat cable connector).
Multi-Function (J5)	Amp 746285-3 [499252-8*], Robinson Nugent IDS-C16PK-TG, Thomas & Betts 622-1630 [622-1641*]. (16-pin flat cable connector).
Serial Ports 1 & 2 (J6 & J7)	Amp 746285-1 [499252-5*], Robinson Nugent IDS-C10PK-TG, Thomas & Betts 622-1030 [622-1041*]. (10-pin flat cable connector).

* optional strain relief part number shown in square brackets

<u>Connector</u>	<u>Recommended Mating Part</u>
Feature Connector (J9)	Robinson Nugent IDS-C26PK-TG, Amp 746285-6 [499252-3*], Thomas & Betts 622-2630 [622-2641*]. (26-pin flat cable connector).
PS/2 Mouse Connector (J10)	Molex 22-01-3047 (connector), Molex 08-50-0114 (crimp).
Power Connector (J12)	Leoco 2530 S060013 (housing), Leoco 2533 TCB00A0 (pins); Molex 22-01-2065 (housing), Molex 08-50-114 (pins).
Parallel Port (J15) IDD*],	Robinson Nugent IDD-C25PM-440-TG30 [SR-25M- IDD*], Amp 747321-2 [747275-2*], Thomas & Betts 609-25P, Amphenol 841-18-DBFR-B25P. (25-pin flat cable connector).

* optional strain relief part number shown in square brackets

18.07 BIOS SETUP ERROR CODES

18.07.1 POST Messages

During the Power On Self Test (POST), if the BIOS detects an error requiring you to do something to fix, it will either sound a beep code or display a message.

If a message is displayed, it will be accompanied by:
“PRESS F1 TO CONTINUE, DEL TO ENTER SETUP”.

18.07.2 POST Beep

Currently there is only one beep code in BIOS. This code indicates that a video error has occurred and BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps.

18.07.3 Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and EISA BIOS.

CMOS BATTERY HAS FAILED

CMOS battery is no longer functional. It should be replaced.

CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. This could mean either a boot drive was not detected or the drive does not contain proper system boot files. Insert a system disk into Drive A and press Enter. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Then reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

Type of diskette drive installed in the system is different from CMOS definition. Run Setup to reconfigure the drive type correctly.

DISPLAY SWITCH IS SET INCORRECTLY

Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE

Hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

ERROR INITIALIZING HARD DRIVE DISK CONTROLLER

Cannot initialize controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly on the hard drive.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause BIOS to ignore the missing keyboard and continue the boot.

MEMORY ADDRESS ERROR AT ...

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

MEMORY PARITY ERROR AT ...

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

MEMORY SIZE HAS CHANGED SINCE LAST BOOT

Memory has been added or removed since the last boot. In EISA mode use Configuration Utility to reconfigure the memory configuration. In ISA mode enter Setup and enter the new memory size in the memory fields.

MEMORY VERIFY ERROR AT ...

Indicates an error verifying a value already written to memory. Use the location along with your system's memory size in the memory map to locate the bad chip.

OFFENDING SEGMENT

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.
PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

18.07.4 POST Codes

Note: EISA POST codes are typically output to port address 300h.
ISA POST codes are output to port address 80h.

POST (hex)	Name	Description
CO	Turn Off Chipset Cache	OEM Specific-Cache control
1	Processor Test 1	Processor Status (IFLAGS) Verification. Tests the following processor status flags: Carry, zero, sign, overflow. The BIOS will set each of these flags, verify they are set, then turn each flag off and verify it is off.
2	Processor Test 2	Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FF and 00.
3	Initialize Chips	Disable NMI, PIE, AIE, UEI, SQWV. Disable video, parity checking, DMA. Reset math coprocessor. Clear all page registers, CMOS shutdown byte. Initialize timer 0, 1, and 2, including set EISA timer to a known state. Initialize DMA controllers 0 and 1. Initialize interrupt controllers 0 and 1. Initialize EISA extended registers.
4	Test Memory Refresh Toggle	RAM must be periodically refreshed in order to keep the memory from decaying. This function assures that the memory refresh function is working properly.
5	Blank video, Initialize keyboard	Keyboard controller initialization.
6	Reserved	
7	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly, detects bad battery.
BE	Chipset Default Initialization	Program chipset registers with power on BIOS defaults.
C1	Memory presence test	OEM Specific-Test to size on-board memory.
C5	Early Shadow	OEM Specific-Early Shadow enable for fast boot.
C6	Cache presence test	External cache size detection.

8	Setup low memory	Early chip set initialization. Memory presence test. OEM chip set routines. Clear low 64K of memory. Test first 64K memory.
9	Early Cache Initialization	Cyrix CPU initialization. Cache initialization.
A	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL.
B	Test CMOS RAM Checksum	Test CMOS RAM Checksum, if bad, or insert key pressed, load defaults.
C	Initialize keyboard	Detect type of keyboard controller (optional). Set NUM LOCK status.
D	Initialize Video Interface	Detect CPU clock. Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
E	Test Video Memory	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
F	Test DMA Controller 0	BIOS checksum test. Keyboard detect and initialization.
10	Test DMA Controller 1	
11	Test DMA Page Registers	Test DMA Page Registers.
12-13	Reserved	
14	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
15	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
17	Test Stuck 8259's Interrupts Bits	Turn off interrupts then verify no interrupt mask register is on.
18	Test 8259 Interrupt Functionality	Force an interrupt and verify the interrupt occurred.
19	Test Stuck NMI Bits (Parity/IO Check)	Verify NMI can be cleared.

1A		Display CPU clock
1B-1E	Reserved	
1F	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests and clear EISA mode flag. Test EISA Configuration Memory Integrity (checksum & communication interface).
20	Enable Slot 0	Initialize slot 0 (System Board).
21-2F	Enable Slots 1-15	Initialize slots 1 through 15.
30	Size Base and Extended Memory	Size base memory from 256KB to 640KB and extended memory above 1 MB.
31	Test Base and Extended Memory	Test base memory from 256KB to 640KB and extended memory above 1 MB using various patterns. NOTE: This will be skipped in ISA mode and can be « skipped » with ESC key in EISA mode.
32	Test EISA Extended Memory	If EISA Mode flag is set then test EISA memory found in slots initialization. NOTE: This will be skipped in ISA mode and can be « skipped » with ESC key in EISA mode.
33-3B	Reserved	
3C	Setup Enabled	
3D	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
3E	Setup Cache Controller	Initialize Cache controller.
3F	Reserved	
BF	Chipset Initialization	Program chipset registers with Setup values.
40		Display virus protect disable or enable
41	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.
42	Initialize Hard Drive & Controller	Initialize hard drive controller and any drives.
43	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
44	Reserved	
45	Detect & Initialize Math Coprocessor	Initialize math coprocessor
46	Reserved	
47	Reserved	
48-4D	Reserved	

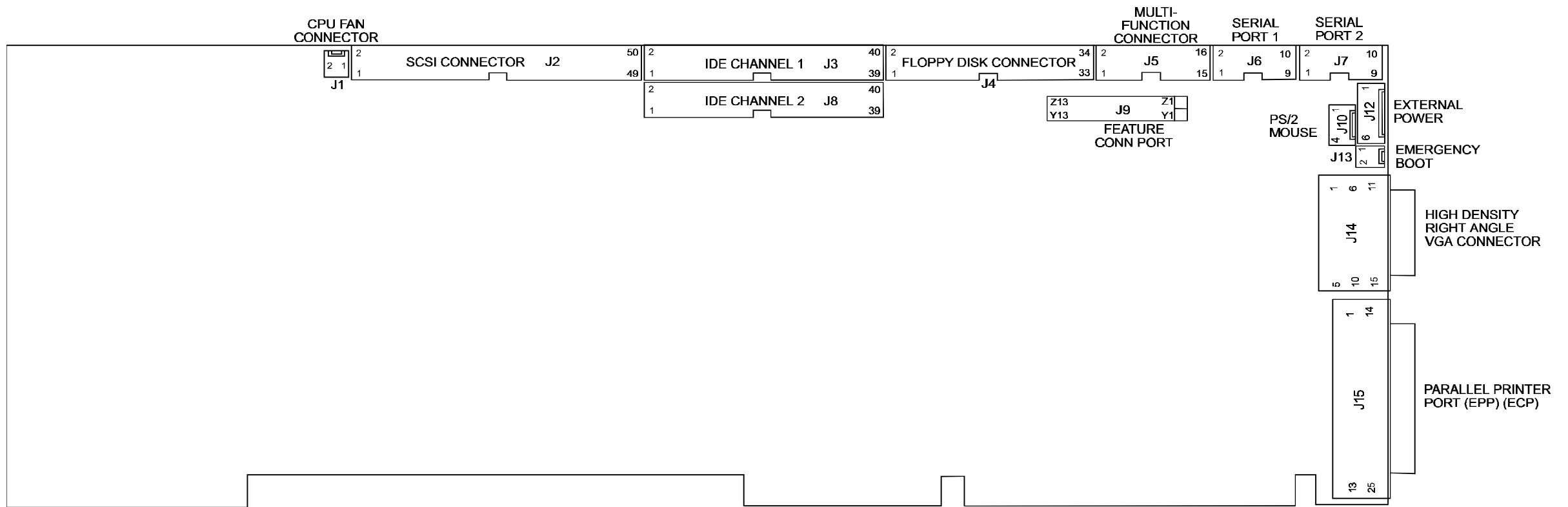
4E	Manufacturing POST Loop or Display Messages	Reboot if Manufacturing POST Loop pin is set. Otherwise display any messages (i.e., any non-fatal errors that were detected during POST) and enter Setup.
4F	Security Check	Ask password security (optional).
50	Write CMOS	Write all CMOS values back to RAM and clear screen.
51	Pre-boot Enable	Enable parity checker. Enable NMI, Enable Cache before boot.
52	Initialize Option ROMs	Initialize any option ROMs present from C8000h to EFFFFh. Note: When FSCAN option is enabled, will initialize from C8000h to F7FFFh.
53	Initialize Time Value	Initialize time value in 40h: BIOS area.
60	Setup Virus Protect	Setup virus protect according to Setup.
61	Set Boot Speed	Set system speed for boot.
62	Setup NumLock	Setup NumLock status according to Setup.
63	Boot Attempt	Set low stack. Boot via INT 19h.
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display: Press F1 to disable NMI, F2 reboot.
E1-EF	Setup Pages	E1 - Page 1, E2 - Page 2, etc.
FF	Boot	

18.08 CONNECTOR LOCATIONS & PINOUTS

18.08.1 LOCATION OF CONNECTORS ON THE BOARD

Diagram 18-6 on the next page shows the connector locations on the board.

DIAGRAM 18-6: Connector Locations



18.08.2 CONNECTOR PINOUTS

Fan Connector (J1) - Pinout

Pin Number	Signal
1	+12V
2	GND

SCSI Interface Connector (J2) - Pinout

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

Hard Disk Connector #1 (J3) - Pinout

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	O	REQ A	22	-	GND
23	I	IOW*	24	-	GND
25	I	IOR*	26	-	GND
27	O	IOCHRDY*	28	-	Not Used
29	O	DACK A*	30	-	GND
31	O	IRQ14	32	O	IOCS16*
33	I	SA1	34	-	Not Used
35	I	SA0	36	I	SA2
37	I	CS0 A*	38	I	CS1 A*
39	O	ACTIVE*	40	-	GND

* Active low signal

Floppy Disk Connector (J4) - Pinout

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 W30 and W31 jumpers, these configurations are possible:

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

Multi-Function Connector - Keyboard, Speaker, Reset, LED - (J5) - Pinout

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

* Active low signal

Serial Port 1 - (J6) RS-232 - Pinout

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

Serial Port 2 - (J7) RS-232 - Pinout

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

Serial Port 2 - (J7) RS-485 - Pinout

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	10	-	Not Used

Hard Disk Connector #2 (J8) - Pinout

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	O	REQ B	22	-	GND
23	I	IOW*	24	-	GND
25	I	IOR*	26	-	GND
27	O	IOCHRDY*	28	-	Not Used
29	O	DACK B*	30	-	GND
31	O	IRQ15	32	O	IOCS16*
33	I	SA1	34	-	Not Used
35	I	SA0	36	I	SA2
37	I	CS0 B*	38	O	CS1 B*
39	O	ACTIVE*	40	-	GND

* Active low signal

Video Feature Connector (J9) - Pinout

I/O Pin	Signal Name	I/O Pin	Signal Name
Y1	P0	Z1	GND
Y2	P1	Z2	GND
Y3	P2	Z3	GND
Y4	P3	Z4	EVIDEO*
Y5	P4	Z5	ESYNC*
Y6	P5	Z6	EDCLK*
Y7	P6	Z7	Not Used
Y8	P7	Z8	GND
Y9	DOT CLK	Z9	GND
Y10	BLANK*	Z10	GND
Y11	HSYNC	Z11	GND
Y12	VSYNC	Z12	MCLK
Y13	GND	Z13	OVW*

* Active low signal

PS/2 Mouse Connector (J10) - Pinout

Pin Number	Signal
1	MCLK
2	GND
3	MDATA
4	VCC (+5V)

External Power Connector (J12) - Pinout

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

Emergency BIOS Boot (J13) - Pin- Out

Pin Number	Signal
1	EMER*
2	GND

* Active low signal

VGA Connector (J14) - Pinout

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

Parallel Port Connector (J15) - Standard 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	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

Parallel Port Connector (J15) - 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

Parallel Port Connector (J15) - 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.

19 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.
Zeppelin 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 (514) 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**



**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 (514) 437-8053 or in Germany at +49 811 / 600 15-33**