

**TEK-AT4L
486SX/DX/DX2 SINGLE-BOARD COMPUTER
HARDWARE REFERENCE MANUAL
VERSION 1.1, JULY 1993**

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NOTE

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FOREWORD

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

For information on IBM standard features, please refer to the following books available at your local book stores:

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

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

If you require information not covered in this manual or in our Application Notes releases, contact our Technical Support/Services Department at (514) 437-5682.

TABLE OF CONTENTS

SECTION 1: INTRODUCTION	1
Introduction	1
Unpacking	3
Basic Modes of Operation	3
Passive Backplane	3
User Interface	4
Stand-Alone Operation	4
Diskless Operation	5
SECTION 2: CONFIGURATION	7
Jumpers	7
BIOS Setup	14
SETUP Utility	14
User's Setup Configuration Information	15
SECTION 3: MEMORY & I/O MAP	17
Memory Mapping	17
Expanded And Extended Memory	17
Expanded Memory	18
Extended Memory	18
TEK-AT4L Memory Mode	18
Shadow RAM	19
Configuring The TEK-AT4L	19
I/O Map	21

SECTION 4: ONBOARD UTILITIES	23
DMA Controllers (8237)	23
Interrupt Controllers (8259)	23
Timer (8254)	24
Keyboard & PS/2 Mouse Controller	24
Keyboard, PS/2 Mouse, Speaker, Reset, Keylock Interface	25
Math Coprocessor	27
Supervisor Utilities	
Special Note on Register 201 (hex)	28
Watchdog Timer	29
Power Failure Detector	30
Low Battery Detection	33
Real-Time Clock	33
Parallel Port (LPT1)	34
Changing Direction on LPT1	35
Serial Communications Ports	35
COM1 (J6) Hardware Configuration	35
COM2 (J4) Hardware Configuration	36
COM2 (J4) as RS232	36
COM2 (J4) as RS485	37
Full Duplex Operation	37
Party Line Operation	37
Power Management	38
Using Sleep Mode	39
Floppy Disk Controller	39
Mechanical Floppy Disk Installation	40
Hard Disk Controller	41

Hard Disk Installation	41	
Solid State Disks	43	
Flash EPROM Disk	44	
Writing To Flash Disks	45	
Using EPROMs	46	
SRAM Disk	47	
Battery Backup Circuit	48	
Bus CLK Speed	50	
Power Connector (J5)	51	
SECTION 5: OPERATION		53
Configuration Jumpers (SW1)	53	
Logical Disk Configuration	53	
VT100 Operation (SW(5-6))	56	
Requirements	56	
Hardware Setup And Configuration	56	
Running Without A Terminal	57	
Disk Drives And Semi Conductor Disks	60	
Baud Rate Restrictions	60	
Graphics/Stand-Alone (SW1(5-6))	60	
SECTION 6: TEK-AT4L BIOS		61
Overview And Features	61	
Error Handling	61	

SECTION 7: SPECIFICATIONS	63
TEK-AT4L DC Characteristics	63
Supply Voltage	63
Supply Current	63
TEK-AT4L Environmental Specifications	63
Mechanical Specifications	64
Assembly	65
Block Diagram	66
Connector Overview	67
J1 Hard Disk Connector Pin Out	67
J3A Mouse Connector	68
J2 Floppy Disk Connector Pin Out	69
J3 Keyboard Connector	70
J4 COM2 Connector RS232	70
J4 COM2 Connector RS485	71
J5 Power Connector	72
J6 COM1 Connector	72
J7 Printer Connector	73
J8 Mezzanine Card Connector	74
J9 Piggyback Connector	75
J10 CPU Fan Connector	76
GF8-GF9 PC Bus Connector	77
SECTION 8: LIMITED WARRANTY	79
Returning Defective Merchandise	79
SECTION 9: GETTING HELP	81
Need More Help?	81

APPENDICES

Appendix A	
Meeting Standards Organization's Specifications	i
Appendix B	
Recommended Devices And Connectors	iii
Appendix C	
Interface Connectors	v
INDEX	viii

LIST OF TABLES

2-1 Configuration Jumpers	13
3-1 TEK-AT4L Memory Mapping	20
3-2 Onboard Decoded I/O	21
4-1 8237 Controller Table	23
4-2 8259 Controller Table	24
4-3 Keyboard Controller	25
4-4 J3 Keyboard Header	26
4-5 Register 201 (hex)	28
4-6 Watchdog Timer Register	30
4-7 Power Monitoring	31
4-8 LPT1 (J7)	34
4-9 COM1 (J6)	36
4-10 COM2 (J4) RS232	36
4-11 COM2 (J4) RS485	38
4-12 Floppy Disk Connector Pin Out (J2)	40
4-13 Hard Disk Connector Pin Out (J1)	43
4-14 Static RAM Disk	48
4-15 Battery Backup Circuit	49
4-16 Power Connector	53
5-1 SW1 Jumper Settings	53

5-2 Physical Devices Table	55
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LIST OF DIAGRAMS

2-1 Jumper Locations	12
4-1 Floppy Disk Cable	41
5-1 VT100 Full Cable Setup	58
5-2 VT100 Partial Cable Setup	59
7-1 Mechanical Specifications	64
7-2 Assembly	7-2
7-3 Block Diagram	65
	66

INTRODUCTION

SECTION 1

The TEK-AT4L is a high performance PC/AT type computer on a single-slot card format (13.3" x 4.7"). It integrates all the basic functions available on standard IBM AT computers like a hard disk interface and floppy disk controller.

Best of all, the TEK-AT4L is designed to operate in environments where a sturdy and compact system is essential. So elements such as a watchdog timer, solid state disks, and a power failure detector were added to make the TEK-AT4L perform even in the most extreme industrial applications.

Built using CMOS technology, the TEK-AT4L consumes very little power. For example, the 33Mhz TEK-AT4L typically consumes less than 7.5 watts.

And the TEK-AT4L is versatile, too. It can be installed in a PC passive backplane or, because of its small size, it can be used as a stand-alone controller by utilizing the four standard mounting holes and separate power connector.

To top it off, a 93-pin, AT expansion header accommodates TEKNOR's series of mezzanine display controllers or other optional expansion cards. Here are more exciting features found on the TEK-AT4L single board computer:

- PC/AT bus or stand alone
- AT keyboard and speaker port

2 *TEK-AT4L REFERENCE MANUAL*

operation

- 486SX @ 25Mhz
- 486DX @ 33Mhz
- 486DX2 @ 66Mhz

• 1, 4, 8, 16, or 32MB of system memory with mixed DRAM support

- 4MB of user EPROM or Flash EPROM
- Up to 2MB user SRAM with battery backup
- Supports Shadow RAM BIOS for fast execution
- Flash EPROM boot
- Real-time clock with battery backup

• One parallel printer port (LPT1)

• Two serial ports with COM2 as RS232 or RS485

- Watchdog Timer
- Power Fail Detector
- Low Battery Circuit Detector
- Onboard floppy controller: drives two floppies
- Onboard IDE hard disk interface
- Sleep Mode support
- CMOS technology for low power
- Two year warranty

UNPACKING

If the TEK-AT4L appears to be damaged, please notify Teknor immediately. Save the box and packing material in case you need to ship the card back in the future.

The TEK-AT4L package is comprised of the card itself, a keyboard cable, a 3.5" floppy disk containing the utilities, this hardware reference manual, and a software utility manual. The TEK-AT4L is preconfigured at the factory to operate as a standard IBM AT processor card.

BASIC MODES OF OPERATION

The TEK-AT4L single board computer is an exceptionally versatile board that will function either on a passive backplane or as a stand-alone controller. In fact, it is a real performer in true industrial applications functioning without disks, keyboard and monitor.

Following is a brief description of the operating modes available on the TEK-AT4L.

Passive Backplane

The TEK-AT4L can be used in a PC/AT Passive Backplane in conjunction with any PC/AT and XT compatible cards. Power is drawn directly from the PC Bus. Video cards may be used but are not a prerequisite for operation.

4 TEK-AT4L REFERENCE MANUAL

☞ **To avoid damage, make certain the power is off before inserting or retrieving a card from the passive backplane.**

User Interface

The TEK-AT4L operates with any PC Bus compatible display card. Or, if stand-alone mode is desired, a TEKNOR Mezzanine SVGA card may be used.

A VT100 terminal (or a PC emulating VT100) may be used as an inexpensive alternative to a display and keyboard. Refer to Section 5, *Using VT100 Mode* for more details on this procedure.

Stand-Alone Operation

An alternate power connector is available for supplying the necessary voltages to the TEK-AT4L board. This is useful in situations where a Passive Backplane system is not appropriate.

In fact, by utilizing a TEKNOR Mezzanine card, you can assemble a complete computer in a 13.3x4.7x1.25" area - without ever using a passive backplane system at all.

And when your applications call for it, the TEK-AT4L is fully operational without any user interfaces at all - able to run without disks, keyboard, and video.

Diskless Operation

The TEK-AT4L can operate without mechanical drives in any basic mode of operation. A Flash disk can be configured as a bootable disk and temporary data may be securely stored on SRAM disks.

In essence, the TEK-AT4L is an ideal industrial controller withstanding shock, vibration, and temperature variations - all major concerns in industrial environments.

6 TEK-AT4L REFERENCE MANUAL

CONFIGURATION

SECTION 2

JUMPERS

The TEK-AT4L is designed to allow for minimal hardware configuration. The following is a list of the basic configuration jumpers available on the TEK-AT4L.

Jumper	State ¹	Function
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COM2 Configuration

	<u>RS232</u>	<u>RS485</u>
W1	(1-2)*	(2-3)
W2	(1-2)*	(2-3)
W3	Open*	Closed
W4	Open*	Closed
W5	(1-2)*	(2-3)
W6	(1-2)*	(2-3)

Power Detection Circuitry

W7	(1-2)*	Power Fail Detection
W7	(2-3)	Low Battery Detection

SRAM Memory Type

W8(1-2)*	32Kx8, 128Kx8 Devices
W8(2-3)	256Kx8, 512Kx8 Devices

¹ * as shipped

8 TEK-AT4L REFERENCE MANUAL

Flash EPROM Type

W9(1-2)* 28F010, 28F020 Devices Only

W9(2-3) 29F040 Devices Only²

SRAM Battery Backup

W10 Open* No Batt

Closed Vbatt

Hard Disk Interface

W11 Open* Enable

Closed Disable

Watchdog Timer

W12 Open Disable

Closed* Enable

Power Monitoring

W13 Open* Disable

Closed Enable

Flash EPROM

W14 Open No Flash

Closed* Flash Installed

BIOS Boot Flash³

W15 Open* EPROM BIOS

Closed Flash BIOS

Teknor BIOS Extension

² Devices expected to be available 4Q93

³ Not yet supported.

W16 *Open* Enable*
 Closed Disable

CPU Type⁴

	<u>486SX</u>	<u>486DX/DX2</u>	<u>OPR486</u>
W17	<i>Open</i>	<i>Closed</i>	<i>Closed</i>
W18	<i>(1-2)</i>	<i>(2-3)</i>	<i>(2-3)</i>
W19	<i>Open</i>	<i>(1-2)</i>	<i>(2-3)</i>

PS/2 MOUSE

W19A *Open* Disable*
 Closed Enable

BUSCLK⁵

W20	<i>CPUCLK</i>	<i>ASYNC</i>	<i>CPUCLK</i>
	<u><i>25Mhz</i></u>	<u><i>16Mhz</i></u>	<u><i>33Mhz</i></u>
	<i>1-2</i>	<i>2-3</i>	<i>Open</i>

⁴ **Factory configured.**

⁵ **SYCLK can be setup to boot 25Mhz or 33Mhz boards (Synchronous mode) or either (Asynchronous mode). However, when set to Asynchronous mode the boot process is much slower. Moreover, regardless of the CPU speed setting, the SYCLK will always be at 8Mhz after the boot up process.**

10 TEK-AT4L REFERENCE MANUAL

CPU Speed⁴

	<u>25Mhz</u>	<u>33Mhz</u>	<u>50/66Mhz</u>
W21(1-2) S0	Closed	Open	Clos/Open
W21(3-4) S1	Closed	Closed	Closed
W21(5-6) S2	Closed	Closed	Closed

Graphics

W22	Open*	Mono, EGA, VGA
	Closed	Color CGA Only

Boot From Flash EPROM

SW1(1-2)	Open*	Boot From Drives
	Closed	Boot From Flash

COM1/COM2 Select for VT100 or Remote Download

SW1(3-4)	Open	Use COM1*
	Closed	Use COM2

Console is VT100

SW1(5-6)	Open*	Standard Display Mode
	Closed	VT100 Mode

Remote Download

SW1(7-8)	Open*	Normal
	Closed	Remote Download