
303 Informational Help File - Main Menu

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Intel Product Update Bulletin (iPUB)

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- [BIOS History Menu](#)
- [Compatibility List](#)
- [Orderable Spare Parts](#)
- [Quick Product Reference](#)
- [Memory Qualifications](#)

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- [CMOS Setup Usage](#)
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iPUB 303 General Section Menu

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Invalid Configuration Information

July, 1990

PBA: 459699

502557

Product Information:

This issue is resolved with BIOS 19.H0. The condition listed below is the product of a residual from an older BIOS being in System CMOS.

When upgrading from BIOS V1.10 16.H0 to BIOS V1.10 19.H0 or later, the following message MAY appear every time the system is powered up until corrective action is taken:

"Invalid configuration information - please run SETUP program"

Upon entering SETUP, the following message will be seen:

"Incorrect configuration data in CMOS,
memory size in CMOS invalid"

The message is displayed as a result of how the Model 303 handles the extended BIOS data area. The above stated issue occurs when a system is upgraded to V1.10 19.H0 BIOS.

Changing from V1.10 19.H0 to an earlier BIOS version will again create the invalid configuration.

Recommendation:

To alleviate the error message, it is necessary to go into SETUP, <Page Up> through all the pages (back to page 1) and exit via <Esc>. From this point on, the system will come up without the invalid configuration message.

See Also:

[CMOS - Setup Usage](#)

Manual Corrections Menu

- [Serial Port Options](#)
- [Memory Options](#)
- [Math Coprocessor Options](#)
- [Keyboard Lock Information](#)

Serial Port Options

January, 1990

MANUAL P/N: 459945-001

Below is TABLE H-7 on Page H-8 as it should appear in the above named manual:

J10C Pin No.	DB25 Pin No.	Signal/Function
15	8	DCD
11	6	DSR
5	3	RXD
7	4	RTS
3	2	TXD
9	5	CTS
14	20	DTR
18	22	RI
13	7	GND
24	25	MGTEST
1	--	Key (no pin)

See Also:

[System Features: I/O Ports](#)

Memory Options

January, 1990

MANUAL P/N: 459945-001

Below is TABLE C-1 on Page C-3 as it should appear.

DRAM Type

Type	Jumper Pin Setting
RAS/CAS	none
Fast-paged*	E2 to E4, E3 to E5
Static Column	E3 to E5
Total Onboard RAM	

Amount	Jumper Pin Setting
1 MB	none
2 MB	E7 to E9
4 MB*	E6 to E8
8 MB	E6 to E8, E7 to E9
RAM Size	

Amount	Jumper Pin Setting
256 KB	E16 to E18, E17 to E19
1 MB*	E18 to E20, E19 to E21

* - Factory Default

These jumpers are located between slot J10 and the SIMM sockets on the motherboard. Numbering sequence is left to right, from the rear of the board forward. There are no stake pins present at E10-E15, however, the numbering sequence continues through E21.

There is no jumper E11-E13 as stated on page C-2 of this manual.

See Also:

[Memory Qualifications](#)

Math Coprocessor Options

March, 1990

MANUAL P/N: 459945-001

PBA: 459699

Below is TABLE C-9 as it should have appeared on Page C-6

Math Coprocessor	Jumper Pin Setting
Installed	E43 to E44
Not Installed	E44 to E45

See Also:

[CPU Features](#)

[Additional Coprocessor Information](#)

Keyboard Lock Information

March, 1990

MANUAL P/N 45994-001

Below is Section 2.3.8 as it should have appeared on Page 2-10.

2.3.8 Keyboard Lock

The keyboard lock is located in the center of the system module front panel. The lock disables the keyboard so that commands cannot be entered into the system. Two identical keys are shipped with the system. Be sure to record the key number and store the extra key in a safe place.

Jumper Settings

- [Video Jumper](#)
- [Printer Jumpers](#)
- [Serial Port Jumpers](#)
- [Memory Jumpers](#)
- [Keyboard Reset Jumper](#)
- [Math Coprocessor Jumper](#)
- [Manufacturing Test Jumper](#)

The jumper tables listed are for the 8 & 10 Slot 303

PBA numbers: 500704 & 502557

See Also:

[Additional Jumper Information](#)

Video Display Jumper

Monitor Type	JUMPER PIN SETTING
Color	E38 to E39*
Monochrome	E37 to E38
*Factory Default	

Printer Jumper Settings

Printer Acknowledge

Condition	JUMPER PIN SETTING
Leading Edge	E46 to E47
Trailing Edge	E47 to E48*
*Factory Default	

Parallel Printer Port Selection

Condition	JUMPER PIN SETTING
LPT1 Enabled	E25 to E26*
LPT1 Disabled	E26 to E27
LPT2 Enabled	E28 to E29
LPT2 Disabled	E29 to E30*
*Factory Default	

Serial Port Jumper Settings

Condition	JUMPER PIN SETTING
COM1 enabled	E31 to E32*
COM1 disabled	E32 to E33
COM2 enabled	E34 to E35*
COM2 disabled	E35 to E36
*Factory Default	

Memory Jumper Settings

EPROM Size

Condition	JUMPER PIN SETTING
64 kb*	E49 to E50
128 kb	E50 to E51
Total Onboard RAM	

Amount	JUMPER PIN SETTING
1MB	NONE
2MB	E7 to E9
4MB*	E6 to E8
8MB	E6 to E8,E7 to E9
RAM Size	

Amount	JUMPER PIN SETTING
256 kb	E16 to E18,E17 to E19
1 mb*	E18 to E20,E19 to E21
*Factory Default	

RAM Access Type

Type	JUMPER PIN SETTING
RAS/CAS	NONE
Fast-paged*	E2 to E4,E3 to E5
Staic-column	E3 to E5
*Factory Default	

Keyboard Reset Jumper Setting

Type	JUMPER PIN SETTING
Enabled*	E40 to E41
Disabled	E41 to E42

Math Coprocessor Jumper Setting

8 SLOT BOARD ONLY

Condition	JUMPER PIN SETTING
MathCoprocessor installed	E43 to E44
MathCoprocessor not installed	E44 to E45

Manufacturing Test Jumper

Clock Test **E52 to E53***
*** For Manufactor Use ONLY**

Board Product History Menu

10 Slot Board PBA: 459699
10 Slot Board PBA: 502557
8 Slot Board PBA: 500704

10 Slot Board PBA: 459699

December, 1991

Version -002 effective October 2, 1989

Production Release

Baseboard and system product introduced operating at 33 MHz. Ability to limit system memory to 512K on board, freeing 128K from 80000H to A0000H allowing use of memory address space for ISA add-in cards. Extended DMA addressability (address memory above 16 MB). Supports PS/2 style mouse in conjunction with the AT style keyboard controller.

8742 Phoenix Keyboard Controller V1.00 03K at U85 P/N 501903-001

Phoenix BIOS Version 1.10 16.H0.

BIOS PROM at U109 P/N 503612-001
BIOS PROM at U147 P/N 503613-001

Schematic No. 540321

Version -003 effective February 9, 1990

Corrected a MEM_ACC setup time violation which caused the baseboard to lockup when executing accesses to non-memory resources. The Processor Ready Control PAL at location U169 has been replaced and associated wires modifies the generation of the MEM_ACC* signal to correct the timing violation. Cache corruption occurred during accesses by secondary bus masters on the ISA bus. GAL at location U115 replaced by a PAL device to correct the corruption. Excessive ground bounce in a GAL device located at U160 caused the system board to lockup when three outputs are switching. Ten 24-pin GAL devices were replaced with Bipolar PAL devices at locations U165, U53, U166, U84, U160, U178, U148, U17, U29, and U115 on the Model 303 baseboard.

8742 Phoenix Keyboard Controller V1.00 03K at U85 P/N 501903-001

Phoenix BIOS Version 1.10 16.H0.

BIOS PROM at U109 P/N 503612-001

BIOS PROM at U147 P/N 503613-001

Schematic No. 506379

Version -004 effective June 6, 1990

New 80386DX step change from HCMOS-IV D0 to HCMOS-IV D1. This new stepping of the 80386 fixes two errata; 1) I/O protection for 32 I/O addresses, and 2) code queue overflow. Neither of these errata impacts the Model 303. Improved signal quality to a cache control PAL which caused overshoot on one of the PAL input lines. One blue wire was added to the baseboard to reduce the length of the signal trace to the PAL. With heavy activity across the AT32 bus a glitch was found on the reset line.

Although one system was found to exhibit this problem, two blue wires and a PAL change to reroute the reset signal were incorporated to improve the overall reliability of the Model 303.

80386 HCMOS-IV D1 33 MHz = SX219 at U77, P/N 108407-318

8742 Phoenix Keyboard Controller V1.00 03K at U85 P/N 501903-001

Phoenix BIOS Version 1.10 16.H0.

BIOS PROM at U109 P/N 503612-001

BIOS PROM at U147 P/N 503613-001

Schematic No. 506379

Version -005 effective June 26, 1990

A new Phoenix BIOS was incorporated to fix a POST problem which caused a stack underflow condition. A new Phoenix keyboard controller was also incorporated to fix several keyboard failure messages. The upper DMA page register has been fixed with a PAL code change and one blue wire added to the Model 303 baseboard. This change affects customers who use their own BIOS or perform DMA above 16MB. There are no known peripheral cards which utilize memory above 16 MB for DMA operations.

8742 Phoenix Keyboard Controller V1.00 03.K4 at U85 P/N 507720-001

Phoenix BIOS version 1.10 19.H0.

BIOS PROM at U109 P/N 509666-001

BIOS PROM at U147 P/N 509667-001

Schematic No. 509443

10 Slot Board PBA: 502557

Version -001 effective April 4, 1990

New revision of the Model 303 baseboard to bury blue wires.

8742 Phoenix Keyboard Controller V1.00 03K at U85 P/N 501903-001

Phoenix BIOS version 1.10 16.H0.

BIOS PROM at U109 P/N 503612-001

BIOS PROM at U147 P/N 503613-001

Schematic No. 506379

Version -002 effective June 26, 1990

Improved signal quality to a cache control PAL which caused overshoot on one of the PAL input lines. One blue wire was added to the baseboard to reduce the length of the signal trace to the PAL. With heavy activity across the AT32 bus a glitch was found on the reset line. Although one system was found to exhibit this problem, two blue wires and a PAL change to reroute the reset signal were incorporated to improve the overall reliability of the Model 303.

8742 Phoenix Keyboard Controller V1.00 03K at U85 P/N 501903-001

Phoenix Technologies BIOS version 1.10 16.H0.

BIOS PROM at U109 P/N 503612-001

BIOS PROM at U147 P/N 503613-001

Schematic No. 506379

Version -003 effective June 26, 1990

A new Phoenix BIOS was incorporated to fix a POST problem which caused a stack underflow condition. A new Phoenix keyboard controller was also incorporated to fix several keyboard failure messages. The upper DMA page register has been fixed with a PAL code change and one blue wire added to the Model 303 baseboard. This change affects customers who use their own BIOS or perform DMA above 16MB. There are no known peripheral cards which utilize memory above 16 MB for DMA operations.

8742 Phoenix Keyboard Controller V1.00 03.K4 at U85 P/N 507720-001

Phoenix BIOS version 1.10 19.H0.

BIOS PROM at U109 P/N 509666-001

BIOS PROM at U147 P/N 509667-001

Schematic No. 509443

Version -004 effective March, 1991

Replaced plastic SIMM sockets with metal SIMM sockets at J14, 15, 16, and 17 if found to be defective upon upgrade or repair.

Metal SIMM sockets at J14, 15, 16, and 17 P/N 108940-002

8742 Phoenix Keyboard Controller V1.00 03.K4 at U85 P/N 507720-001

Phoenix BIOS version 1.10 16.H0

BIOS PROM at U109 P/N 503612-001

BIOS PROM at U147 P/N 503613-001

Schematic No. 509443

8 Slot Board PBA: 500704

Version -002 effective October 2, 1989

Production Release 8-slot baseboard introduced operating at 33 MHz.

Ability to limit system memory to 512K on board, freeing 128K from 80000H to A0000H allowing use of memory address space or ISA add-in cards. Extended DMA addressability (address memory above 16 MB). Supports PS/2 style mouse in conjunction with the AT style keyboard controller.

8742 Phoenix Keyboard Controller V1.00 03K at U85 P/N 501903-001

Phoenix BIOS Version 1.10 16.H0.

BIOS PROM at U109 P/N 503612-001

BIOS PROM at U147 P/N 503613-001

Schematic No. 505619

Version -003 effective February 9, 1990

Corrected a MEM_ACC setup time violation which caused the baseboard to lockup when executing accesses to non-memory resources. The Processor Ready Control PAL at location U169 has been replaced and associated wires modifies the generation of the MEM_ACC* signal to correct the timing violation. Cache corruption occurred during accesses by secondary master on the ISA bus. GAL at location U115 replaced by a PAL device to correct the corruption. Excessive ground bounce in a GAL device located at U160 caused the system board to lockup when 3 outputs are switching. Ten 24-pin GAL devices were replaced with Bipolar PAL devices at locations U165, U53, U166, U84, U160, U178, U148, U17, U29, and U115 on the Model 303 baseboard.

8742 Phoenix Keyboard Controller V1.00 03K at U85 P/N 501903-001

Phoenix BIOS Version 1.10 16.H0.

BIOS PROM at U109 P/N 503612-001

BIOS PROM at U147 P/N 503613-001

Schematic No. 505619

Version -004 effective June 15, 1990

A fix for HIT0* Overshoot was implemented to eliminate a cache corruption problem which was caused by overdriving input to a PAL. A glitch on the RSTDRV signal line was eliminated. New 80386DX step change from HCMOS-IV D0 to HCMOS-IV D1. This new stepping of the 80386 fixes two errata; 1) I/O protection for 32 I/O addresses, and 2) code queue overflow. Neither of these errata impacts the Model DB303.

80386 HCMOS-IV D1 33 MHz = SX219 at U77, P/N 108407-318

8742 Phoenix Keyboard Controller V1.00 03K at U85 P/N 501903-001

Phoenix BIOS version 1.10 16.H0.

BIOS PROM at U109 P/N 503612-001

BIOS PROM at U147 P/N 503613-001

Schematic No. 505619

Version -005 effective June 26, 1990

A new Phoenix BIOS was incorporated to fix a POST problem which caused a stack underflow condition. A new Phoenix keyboard controller was also incorporated to fix several keyboard failure messages. The upper DMA page register has been fixed with a PAL code change and one blue wire added to the Model 303 baseboard. This change affects customers who use their own BIOS or perform DMA above 16MB. There are no known peripheral cards which utilize memory above 16 MB for DMA operations.

8742 Phoenix Keyboard Controller V1.00 03.K4 at U85 P/N 507720-001

Phoenix BIOS version 1.10 19.H0.

BIOS PROM at U109 P/N 509666-001

BIOS PROM at U147 P/N 509667-001

Schematic No. 509443

Version-006 effective February, 1991

Replaced plastic SIMM sockets with metal SIMM sockets at J14, 15, 16, and 17 if found to be defective upon upgrade or repair.

Metal SIMM sockets at J14, 15, 16, and 17 P/N 108940-002

8742 Phoenix Keyboard Controller V1.00 03.K4 at U85 P/N 507720-001

Phoenix BIOS version 1.10 19.H0

BIOS PROM at U109 P/N 509666-001

BIOS PROM at U147 P/N 509667-001

Schematic No. 509443

System Product History

October, 1991

System 303

33MHz System, 8MB on-board

PBA	AA	Product Code
459699-004	--	Standalone Board
459967-004	501837-003	S3030B0
459969-004	501839-003	S3034B0
459969-004	501839-003	S3034BI
502557-003	--	Standalone Board
502557-003	502845-003	S3030B0
502557-003	502847-003	S3034B0
502557-003	502847-003	S3034BI

BIOS V1.10 19.H0

Chassis:

- o Teapo 303.5W Power Supply Model No. TP447B, P/N 200903-002.
- o Plastic packaging modification implemented to allow side panels to fit properly into rear and front bezels.

Controller Change:

- o The Adaptec 1542A SCSI controller is being discontinued by the manufacturer and affects all integrated system configurations offered by Intel. The Adaptec 1542A is replaced by the Adaptec 1542B.

August, 1990

Air Deflector:

- o The air deflector tray has been removed from the chassis. This tray is the 16 inch sheet metal pan that fits directly over the 80386DX(TM) processor. Intel has removed this tray and increase the cooling fan size to improve overall air flow. This modification permits better access to the system baseboard without compromising on the air flow.

I/O Port Cover:

- o The metal can covering the serial and parallel I/O port cables has been removed. After significant VDE and FCC testing, the EMI shield was proven to show a negligible difference in the actual emissions.

BIOS History Menu

BIOS Version 1.10 16.H0

BIOS Version 1.10 16.H0

November, 1990

PBA: 459699 **P/N:** 503612-001 U109
502557 503613 U147

Effective October 1, 1989

o Major Enhancements:

- o An option in setup allows access to memory above 16 MB.
- o Setup option allows capability to enable/disable UNIX.
- o Setup option allows disabling of the AT32 bus I/O address decoding. Disabling the AT32 bus I/O allows I/O access to 16-Bit expansion cards above 8000H.
- o Setup optional allows deselection of system memory above 512K to allow add-in cards to use address space from 80000H to A0000H.
- o Fast A20 gating logic incorporated as a specific bit in a reserved onboard I/O port increases system performance when switching in or out of protected mode.

o Minor Enhancements:

- o Setup option allows capability to enable/disable speaker.
- o Fully supports AT style keyboard and PS/2 style mouse.
- o Extended DMA addressability allows DMA access to memory above 16 MB.
- o Fully supports Weitek numeric coprocessor.

See Also:

[Additional BIOS Information](#)

BIOS Version 1.10 19.H0

Effective October 22, 1990

P/N: 509666-001 U109
509667-001 U147

o Major Enhancements:

- o New Phoenix hard disk driver which addresses the high speed/volume file transfer problems encountered under Windows and IDE powerup issues.
- o User definable hard drives can now be either 48 and 49 or 2 and 3 to accommodate software which directly accesses the drive table.
- o Memory deallocation affects the BIOS data area only and not CMOS. This allows a device to allocate memory without affecting BIOS memory sizing during powerup resulting in a "Memory Configuration Error" when rebooting.

o Minor Enhancements:

- o Data Set Ready/Receive Transmit Status support added to serial initialization.
- o Increased the wait for completion of the keyboard interface test.
- o Allows booting without a keyboard attached. "Invalid Configuration" message will be displayed during boot process if keyboard is set to "Not Installed" and a keyboard is present. The keyboard will function properly.

See Also:

[Additional BIOS Information](#)

BIOS Version 1.10 20.H0

December, 1991

Effective December, 1991

P/N: 518274-001 U109,
518275-001 U147

O Major Enhancements

- o Weitek coprocessor not being recognized and configured into the system.
- o DOS 5.0 "Ctrl-Alt-Del" had a problem when a program was loaded high. Would cause system to hang or put out erroneous invalid configuration message.
- o ESDI Adaptec had a problem due to the way time outs were handled. The disk would hang because it wasn't ready for the next command.
- o Puts out erroneous configuration error message with Irwin Tape drives.
- o Prologue Operating System would hang doing a disk access. There was a problem in the way they handled timer interrupts.
- o First Choice software would hang the serial port. There was a conflict with the status bits.
- o Quantum drives added to the drive table.

See Also:

[Additional BIOS Information](#)

Compatibility Lists

[Hardware Compatibility List](#)

[Software Compatibility List](#)

Hardware Compatibilty List

January, 1991

<u>CLASS</u>	<u>VENDOR</u>	<u>MODEL</u>
Communications	Logitech	Serial Mouse
	Microsoft	Bus Mouse
	Microsoft	PS/2 Mouse
	Microsoft	Serial Mouse II
	Mouse Systems	Serial Mouse

GammaLink	GammaFax
Intel	Connection CoProcessor
Hayes	Smartmodem 2400 (internal)
Hayes	V-Series 9600 (external)
3COM	EtherLink II 3C503
3COM	3C505
Digital Comm Assoc.	IRMA II 1.1.0c
IBM	PC3274 Adapter
IBM	Token Ring
Intel	PCLINK II
Novell	Novell KeyCard
AST	5251/11 Emulation Adapter
DCA	IRMA II 3278 Emulation Bd
IBM	3278/79 Emulation Adapter

IBM 5251/11 Emulation Adapter

Controllers	Adaptec	AHA 1540/1542 (SCSI)
	Adaptec	AHA 2322 (ESDI)
	Western Digital	WD1003-WA2 (ST506)
	Western Digital	WD1003V-MM2 (ST506)
	Western Digital	WD1006V-MM2
	Western Digital	WD1007-WA2 (ESDI)
	Western Digital	WD240 AT (IDE)
	Western Digital	WD7000F-ASST (SCSI)

Memory	AST Research	RAMpage AT
	Cheetah Int'l	Cheetah Combo
	Intel	AboveBoard AT
	Intel	AboveBoard PS AT
	Intel	SBCATMEM04
	Intel	SBCATMEM08
	Intel	SBCATMEM16
Talltree Systems	JRAM AT4	

Peripherals	IBM	3.5" 1.2MB
	Panasonic	3.5" 1.44MB
	Teac	FD-235HF (3.5" 1.44MB)
	Teac	FD-55GFR (5.25" 1.2MB)

Maxtor	XT-1140
Maxtor	XT-4380E, S
Maxtor	XT-4175E, S
Quantum	ProDrive 40AT
Quantum	ProDrive 80AT, 120AT
Quantum	Q540
Seagate	ST-251
Seagate	ST-225
Archive	125/150MB (SCSI) Tape

Hitachi CD-ROM Drive

Printers Apple LaserWriter II

Epson	RX80	
	Hewlett-Packard	7475A Plotter
	Hewlett-Packard	HP LaserJet II
	Hewlett-Packard	HP Paint Jet
	IBM	Proprinter

Video	ATI	VGA Wonder
	Compaq	Compaq VGA
	Control Systems	Artist XJ12
	Genoa	Super EGA
	Hercules	GB112 Graphics Plus
	IBM	8514 Graphics Adapter
	IBM	VGA
	Paradise	VGA Plus
	Paradise	AutoSwitch 480
	STB	EGA MultiRes
	STB	VGA Extra EM
	Video Seven	Vega EGA Deluxe
	Video Seven	Vega Video-7 EGA
	Video Seven	Vega VGA
Video Seven	VRAM VGA	

Software Compatilby List

January, 1991

PBA: 459699
502557

<u>CLASS</u>	<u>VENDOR</u>	<u>PACKAGE</u>	<u>VERSION</u>
Accounting	DAC	DAC Easy Accounting	3.0
	Intuit	Quicken	2.0
	Peachtree Software	Complete Acc. Sys.	4.21
Benchmarks	DataBase Group	Power Meter	1.5
	Diagsoft	QAPlus	3.12
	PC Magazine	PC Labs Benchmarks	5.00
	Windsor Tech	PC Technician	2.12
CAD\Graphics	Autodesk	AutoCAD	10.0
	Amer. Small Business	Design CAD	3.0
	Evolution Computer	Versacad Deluxe	5.2
	Foresight Research	Drafix	5v1.01
	Generic Software	Generic CADD	1.1
	New England Soft.	Graph-in-the-Box	2.0
	Software Publishing	Harvard Graphics	2.12
	Spinnaker	Splash	1.0
	Visionics	EE Designer	1.12
Communication	DCA	Crosstalk XVI	3.76
	DCA	Crosstalk Mark IV	1.1
	D.C.Hayes	Smartcom III	1.0
	Datastorm	Procomm Plus	1.1B
	Hilgraeve	Hyperaccess	3.3
	Meridian Tech	Carbon Copy Plus	5.0
	Norton-Lambert	Close Up	3.00a
	VM Personal Comp.	Delay Gold	3.0
	White Crane Sys.	Brooklyn Bridge	Parallel
DataBase	Ashton-Tate	DBASE II	2.43
	Ashton-Tate	DBASE III+	1.1
	Ashton-Tate	Framework III	1.0
	Borland	Paradox	3.0
	Borland	Reflex	2.0
	Dataease Int.	Dataease	2.5r3
	Fox Data Systems	Foxbase + 386	2.1
	Microrim	R:Base for DOS	2.1
	DAC	Lucid 3D	2.0
Development	Borland	Turbo Assembler	1.0
	Borland	Turbo BASIC	
	Borland	Turbo Pascal	5.5
	Borland	Turbo C	2.0
	Microsoft	Microsoft Pascal	
	Microsoft	Microsoft Quick C	1.01
	Microsoft	Quick Pascal	1.0
	Microsoft	Macro Assembler	5.1
	Microsoft	Microsoft C	5.1
Microsoft	Quick BASIC	4.0	
Games	Electronic Arts	Chessmaster	N/A
	Microsoft	Flight Simulator	3.0/4.0
	Silicon Beach S/W	Falcon	N/A
	XOR	NFL Challenge	N/A
Network	3COM	3PLUS	
	3COM	Ethernet II	
	3COM	3 Share	
	IBM	Token Ring Diag	1.0
	Intel	PCLink II	3.0
	Novell	Advanced Netware	2.12, 2.15
	UB	OpenNET Adapter	
<u>Certification Information:</u>			
Intel Certification			
Novell Certification			
Operating Env	AT & T Unix	System V 3.2	2.1
	Disital Res.	Concurrent DOS	
	Microsoft	Microsoft Windows/386	2.1
	Microsoft	Microsoft Windows	3.0
	Microsoft	MS-DOS	3.3,
	Microsoft	MS-DOS	4.01
	Microsoft	MS-OS/2	1.1
	Microsoft	MS-OS/2	1.21
	Qualitas	386MAX	4.00
	Quarterdeck	Desqview 386	2.25
	Quarterdeck	QEMM 386	5.1
	SCO	Xenix	2.3.2
	SCO	Unix	3.2.2
	Spread Sheets	Borland	Quattro
Computer Assoc.		Supercalc 5	5.0
Lotus		Symphony	2.0

	Lotus	1-2-3	3.0
	Lotus	1-2-3 3.5" Protected	2.01
	Microsoft	Excel	2.1
Utilities	Borland	Sidekick Plus	1.00a
	Peter Norton Comp.	Norton Utilities Adv.	4.5
	Mathworks	MATLAB-387	4.00
	Mathworks	MATLAB-Weitek	4.00
	Microsoft	MS-SMARTDRIVE	2.1
Word Processing	IBM	Displaywrite 4	1.0
	Intel	Aedit	2.13
	Microsoft	Microsoft Word	5.0
	Wordtech Systems	DBXL	2.0
	WordPerfect	WordPerfect	5.1

Orderable Spare Parts

December, 1991

PART NUMBER	DESCRIPTION
508972-003	Base, chassis assembly
109889-010	SIMM (1Mx9), 100ns
455959-001	SIMM (1Mx9), 100ns, FP
109889-180	3piece SIMM (1MBx9), 80 ns
458412-001	5.25" 1.2MB Floppy, HH 96TPI
200903-002	PwrSupply, 300 watt
451221-001	Speaker
453848-008	Tape, 125MB Archive viper SCSI
455113-001	3.5" 1.44MB Floppy
455441-003	170M Wini, FH SCSI (Maxtor 4170S)
455624-002	Bezel, Front 303
455626-002	Bezel, Rear 303
455625-002	Top, molded, 401
455627-001	Foot molded
455621-002	Panel, left side
455622-002	Panel, right side
459447-003	Panel, Peripheral
512409-001	Cable,Floppy 303
505222-001,002	Fan Assembly, 303
508109-001	Cable, SCSIInterface (6 conn)
509273-001	SCSI Host Adaptor, Adaptec 1542B
503022-003	PBA, Power Distributor
512170-001	Cable, Parallel
512174-001	Cable, Serial Dual 9p
501730-xxx	SBC386AT33, 0MB
501735-xxx	SBC386AT33, 4MB
502557-004	SBC386AT33, 8MB
455629-001	Board Card Guide
108265-052	Top Cover Screw
508918-001	Accessory kit, 303
501331-001	Mnl, 303 User's guide
108520-003	CDSET, SJT, 125V, 5-15P

Accessory Kit Contains: 1 Model 303 User's Guide and User's Guide Errata, 1 Intel386tm Logo Kit, 1 Cord Set.

11/18/91 JP

iPUB 303 Quick Product Reference Menu

<u>Current 10 slot PBA revision:</u>	502557-004
<u>Current BIOS revision:</u>	1.10 16.H0
<u>Current Keyboard controller:</u>	V1.00 03.K4
<u>Current 8 slot PBA revision:</u>	500704-006
<u>Current BIOS revision:</u>	1.10 19.H0
<u>Current Keyboard controller:</u>	V1.00 03.K4

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See Also:

[Board Product History Menu](#)
[BIOS History Menu](#)

Certification Letters Menu

[Intel Certification](#)
[Novell Certification](#)

August, 1991

Listed below is the Intel/Banyan certification testing results for Intel Platforms.

PRODUCT	Intel Testing		Banyan Certification	
	<u>Completed</u>		<u>Completed</u>	
	4.0	4.1	4.0	4.1
Model 303	XX	XX	XX	XX

Certified Platform Configuration: 303

- * Up to 16MB Memory, if applicable
- * 1.2MB, 5.25" Floppy Drive
- * SCSI Controller, Adaptec 1542B
- * Ethernet Controller, Racal Interlan NI5210-8
- * SCSI Hard disk (variable Mfg/Sizes):
 - 170MB, Maxtor XT4170S
 - 380MB, Maxtor XT4380S
 - 410MB, Maxtor XT8380S
 - 760MB, Maxtor XT8760S
 - 1.2GB, Seagate ST41200N
- * 150MB Tape Drive, Archive VP150E

**NOTE: Banyan DOES NOT assign certification numbers as seen with our other network vendors.

Novell Certification

March, 1990

Certification #S-241

Configuration:

CPU: 80386
Tested Clock Speed: 33MHZ
Fixed Disk Type: SCSI (170MB) Maxtor XT-41705
Disk Driver: ASWNOVL.OBJ
Disk Controller: Adaptec AHA-1542A
Floppy Disk(s): 1.44MB, 1.2MB
Bus Type: ISA
ROM BIOS: V 1.10 16.H0
CPU Memory: Base 640 Extended 7168
Monitor: VGA
Video Adapter: VGA

TESTED and APPROVED NetWare Compatible with the following products:

Advanced NetWare (v2.15 rev.c)	NetWare for Macintosh (v1.0)
SFT NetWare (2.15 rev.c)	NetWare SNA Gateway (v1.0)
NetWare for SQL (v2.10b)	MS DOS (3.30)

Test Results:

- * Passed dedicated server tests with limitation #1.
- * Passed nondedicated server tests with limitation #1.
- * Passed bridge tests with limitation #2.
- * Passed DOS workstation tests.

Limitations:

- 1) Does not support the following LAN Adapter:
Novell NE2000 with AppleTalk
- 2) Does not support the following SNA Gateway Adapter:
Synchronous/HS

NOTES:

- * The Adaptec AHA1542A controller must be configured at option 2 to function properly with Novell Disk Co-processor Boards.
- * The Novell NE2000 (without AppleTalk) driver does function properly. A patch for this workaround is available by contacting Novell.
- * ELS NetWare Level I and ELS NetWare Level II do not support SCSI drives.

Introduction to the Intel386 Microcomputer Model 303

The Intel386 MicroComputer Model 303 is here! Powered by a 33 MHz 386 MicroProcessor, the Model 303 opens up new computing vistas and opportunities. With the additional processing power of a 33 MHz CPU, the Model 303 provides an excellent fileserver solution for network environments. Running stand-alone, the Model 303 can serve as a high powered CAD workstation, outperforming many of SUN, Apollo and DEC's entry level workstation products. In addition, the Model 303 provides the necessary processing muscle and memory configurations required to support a large multi-user and multi-tasking operating system, such as UNIX, while maintaining complete compatibility with DOS and OS/2. Providing eight half-height peripheral bays in conjunction with a ten-slot ISA solution, the Model 303 allows for optimal flexibility in configuration and expansion capabilities.

Building off the proven 25 MHz Model 302 design, the Model 303 adds additional functionality while improving upon Intel's commitment to achieving complete ISA compatibility. The Model 303 resolves all known incompatibilities with Intel's previous ISA platforms. Initially supporting up to 40 MB of 32-bit extended memory accessible at zero wait states, the Model 303 improves upon Intel's previous platforms by allowing DMA addressability up to 256 MB. While maintaining the reliable CPU core design of the Model 302, the Model 303 design has been carefully tuned and engineered to provide reliable, consistent and blazingly fast 33 MHz performance. Supporting both the 387TM and Weitek coprocessors running at 33 MHz, this microcomputer supplies all the floating point and math functionality required by high-end CAD/CAE and fileserver applications.

A solid chassis design and 303.5 watt power supply rounds out the Model 303. Carefully designed to minimize ElectroMagnetic Interference (EMI) and Radio Frequency Interference (RFI), the Model 303 compartmentalizes each section of the microcomputer. The power supply, motherboard and each peripheral is enclosed in its own separate individual container, effectively minimizing the radiation noise and emissions generated. With these precautions in place, the Model 303 passes the stringent FCC and VDE emissions requirements with ease.

The Model 303's upright tower construction allows the user to place the system under a table or in a corner. The narrow facade, modest height and deep length keeps the office environment uncluttered by minimizing the impact on space. In addition, the power on/off switch, reset switch, keylock and hard disk indicator lights are all located on the front panel, within convenient view and reach. The Model 303 design team's great attention to detail even allows the microcomputer to fit under Japanese table tops. Recessing all the front panel switches to prevent accidental activation again highlights Intel's superior attention to detail.

The Intel386 MicroComputer Model 303 provides the networking, fileserver and workstation solutions for today's burgeoning computer market. The combination of expandability, reliability and above all high speed 32-bit performance ensures the Model 303 a leadership position in the high-end OEM marketplace.

403E Known Issues Menu

For a list of known issues and a detailed problem/solution connect to iPAN.
iPAN's modem number is (503)-693-1493

Model 303 System Features Menu

The following is a detailed component and feature level description of the Intel386TM MicroComputer Model 303. This section includes high level information regarding system design, which provides a good general understanding and background of the workings, functionality and features of the Model 303.

Memory	Phoenix Technologies BIOS
Extended Memory	Phoenix Technologies Keyboard Controller
Cache	Programmable Interrupt Controller (PIC)
CPU	Programmable Interval Timer (PIT)
Battery Real Time Clock	8 Peripheral Bays
I/O Ports	Front Panel
Power Supply	Chassis
Expansion Slots	Direct Memory Access Controllers
Cover	System Fan

Memory Features

1. AMOUNT

The system baseboard supports 1, 2, 4 or 8 MB of SIMMs ONLY. No other memory configurations on the system board are supported. Like the Model 302, the Model 303 splits memory into two banks, Bank 0 and Bank 1. Four SIMMs make up each bank. A functional bank **MUST** contain four SIMMs.

2. TYPE

The system board supports RAS/CAS, Fast Page Mode and Static Column SIMMs. Static Column DRAMs produce the optimum system performance, but are more expensive and difficult to obtain on the DRAM market. The Model 303 ships from Intel with Fast Page Mode SIMMs. Fast Page Mode DRAMs are faster than RAS/CAS, but slower than Static Column DRAMs. Static Column DRAMs perform approximately 7 percent faster than Fast Page DRAMs. Likewise, Fast Page DRAMs perform about 7 percent faster than RAS/CAS. Keep in mind that the Model 303 has a 90 percent cache hit rate. Therefore, only 10 percent of all memory accesses will be made on average to the slower main memory. Users must weigh the advantages of using expensive Static Column DRAMs for only 10 percent of all memory accesses. SIMM types may be combined on the system board, however the jumper configuration must reflect the slowest SIMM type installed.

3. SPEED

The system board supports either 85 or 100 nanosecond (ns) DRAMs. The Model 303 ships by default with 100 ns DRAMs. The 85 ns DRAMs improve system performance by one wait state ONLY on memory reads following a cache miss.

4. SIZE

The system board currently supports 256 KB and 1 MB SIMM sizes. The Model 303 system board will not support 4 MB SIMMs. However, the ATMEM16 board will support 4 MB SIMMs when available.

5. SIMM MODULE MAKEUP

Each SIMM module represents one byte (8 bits) of a 32-bit word. Therefore, the Model 303 requires four SIMM modules to construct the entire 32-bit 386 MicroProcessor word. Each SIMM module contains nine individual DRAMs, corresponding to eight memory bits and one parity bit. The eight memory bits on each SIMM module forms one byte. Therefore, each SIMM module corresponds to one byte of a 32-bit 386 MicroProcessor word. The four SIMM modules correspond to one bank of memory on the baseboard, either Bank 0 or Bank 1. The necessity of creating full 32-bit words explains why SIMM upgrades to the baseboard occur in multiples of four.

* **NOTE:** The Model 303 does not support Error Correction Checking (ECC).

32 BIT Extended Memory Features

1. MEMORY BOARD PRODUCTS

The Model 303 supports the ATMEM4, ATMEM8 and ATMEM16 32-bit extended memory boards. The ATMEM4 is a 4 MB memory board expandable to 8 MB. The ATMEM8 is an 8 MB memory board. The ATMEM16 comes configured with 16 MB of memory. The ATMEM16 also supports 4 MB and 8 MB, although currently Intel does not sell these configurations. The ATMEM4 and ATMEM8 use standard DIP DRAMs, while the ATMEM16 uses SIMMs. SIMMs permits denser and higher capacity memory boards.

2. AMOUNT

Using two 16 MB ATMEM16 memory boards in conjunction with 8 MB of memory on the system board, the Model 303 can support up to 40 MB of 32-bit extended memory.

3. TYPE

The ATMEM4 and ATMEM8 support only Fast Page Mode DRAMs. The ATMEM16 supports RAS/CAS, Fast Page Mode and Static Column DRAMs. The add-in board DRAM type does not need to match the on-board SIMM type.

4. SIZE

The ATMEM4, ATMEM8 and ATMEM16 all run at 100 ns. The boards support no other speeds.

5. TYPE

The ATMEM4 and ATMEM8 support only 1 Mbit X 1 DRAMs. The ATMEM16 supports 1 Mbit X 1 and 4 Mbit X 1 DRAMs. The boards support no other size DRAMs.

6. MEMORY BOARD MAKEUP

Like the baseboard memory, each 32-bit extended memory board uses nine individual DRAMs to form one byte. The nine bits correspond to eight memory bits and one parity bit. To form a 32-bit word, the memory boards use four bytes (36 total DRAMs; 32 memory bits and 4 parity bits).

* **NOTE:** Like the baseboard memory, the extended memory boards do not support ECC.

7. EXPANDED MEMORY

The Model 303 can use extended memory to emulate expanded memory. The Model 303 does not support expanded memory functionality via hardware, but instead Intel suggests using a software emulation package. CTRL386, 386MAXX and QEMM are all high quality expanded memory emulation packages available on the software market.

Cache Features

1. SIZE

Like the Model 302, the Model 303 uses a 64 KB cache to provide zero wait state performance.

2. IMPLEMENTATION

The system does not use the Intel 82385 cache controller, choosing instead to implement the cache with discrete logic. Using discrete logic instead of the 82385 does not imply slower performance or an inferior cache design. Both caches perform equally well and there are no significant performance discrepancies. The direct mapped with posted write through cache design is an Intel386 MicroComputer standard which provides an impressive 90 percent hit ratio with 100 percent cache coherency.

3. COMPONENT SPEED

The cache uses three 15 ns Tag SRAMs to locate addresses within the cache. Eight 25 ns 16 Kbit X 4 data SRAMs provide 16 KB of data addresses and make up the 64 KB data cache.

4. WAIT STATES

Locating data within the cache produces zero wait state performance. However, during a cache miss, slower main memory must be accessed. Depending on the speed and type of the DRAMs installed, as well as the memory address location, a cache miss will result in various numbers of wait states. The absolute worst case scenario results in a maximum of eight wait states. Keep in mind that a wait state at 33 MHz is just 30 ns. Competitors' cache designs are not immune to the realities of memory design and wait states of high speed processors. All computers running at 33 MHz will have cache miss wait state performance not significantly different than the Model 303.

5. SNOOPING

The cache algorithm implements a snooping feature to ensure cache coherency when the CPU is put into a hold state. When a bus master device puts the CPU into a hold state, the Model 303's main memory may be accessed or modified. When the bus master releases control, the snooping feature checks the data cache with main memory data to ensure cache coherency. This feature allows intelligent PC/AT add-in boards performing DMA to modify main memory without destroying the integrity of the cache.

Central Processing Unit(CPU) Features

1. SPEED

The Model 303 uses an official 32-bit 33 MHz 386 MicroProcessor. Some competitors may run a 25 MHz 386 CPU at 33 MHz, raising the serious question of reliability and longevity. Intel's MicroComponents Group does not sanction 25 MHz 386 CPUs running faster than 25 MHz. The Model 303 does not require a heat sink.

2. ADDRESS PIPELINING

The Model 303 does not use the address pipelining capabilities of the 386 MicroProcessor. Extensive study of the 386 CPU pipelining feature determined that for the CPU sections of the Model 302 and Model 303, pipelining did not provide any additional wait state reductions.

3. MATH COPROCESSOR

The Model 303 supports both the Intel 387 coprocessor and the Weitek 3167 and the 3167BRD coprocessor products. All the coprocessors run synchronously with the 386 CPU at 33 MHz.

Battery and Real Time Clock Features

Like the Model 302, the Model 303 uses the Dallas Semiconductor 1287 CMOS Real Time clock. The real time clock contains 64 bytes of RAM locations, 14 bytes used for clock and control registers and 50 bytes of general purpose RAM. A self-contained lithium battery provides ten years of data integrity in the absence of power. The 1287 is directly pin-compatible with the MC146818A clock chip used on the original IBM PC/AT. Therefore, using the 1287 introduces no incompatibilities with the IBM PC/AT standard and only enhances the Model 303 by increasing the real time clock reliability and functionality.

I/O Ports Features

1. SERIAL PORTS

The Model 303 supports two DB9 RS232 serial ports configured as COM1 and COM2. In addition, COM2 may be configured as a 25-pin serial connector. Both ports may be enabled or disabled via easily accessible jumper locations on the system board. Using two Intel 82510 serial drivers, the Model 303 supports baud rates of 300, 1200, 2400, 9600, 19,200 and 38,400. In accordance with the RS232 standard, Intel discourages the use of cables longer than 50 feet in length connected to the serial ports.

2. PARALLEL PORT

The Model 303 provides one Centronix parallel port configurable as either LPT1 or LPT2. The port may be enabled or disabled for LPT1 or LPT2 via easily accessible jumper locations on the system board. The parallel port may also be configured to use the leading or trailing edge of the printer acknowledge signal.

3. MOUSE PORT

Integrated onto the system board, the Model 303 provides a PS/2 style mouse connector supporting full mouse functionality. The mouse circuitry implemented via the keyboard controller is completely PS/2 compatible. Per IBM specifications, the mouse port uses interrupt 12. No jumper exists on the baseboard to disable the mouse port. However, since the mouse port is driven by an open collector circuit, other devices can use IRQ 12 when the user disconnects the mouse.

4. KEYBOARD CONNECTOR

The Model 303 supports a wide variety of 84 and 101 key AT compatible keyboards. The microcomputer does not support XT or PCjr style keyboards.

5. SPEAKER PORT

The Model 303 provides a programmable speaker. The speaker provides error beep code information and may be programmed via port 61H per the IBM PC/AT specification.

Direct Memory Access Controllers

Using two Intel 8237A DMA controllers running at 4 MHz, the Model 303 supplies DMA addressability up to 256 MB. The IBM PC/AT only supports DMA up to 16 MB and most competitors have followed this. By adding an additional 74ALS612 page register with four address lines, the Model 303 increases DMA addressability to an impressive 256 MB. The increase in addressability presents an engineering enhancement and does not introduce any type of incompatibility with the IBM standard. Both floppy and hard disks use DMA to transfer data from disk to system memory.

Programmable Interrupt Controller (PIC)

The Model 303 uses two Intel 8259 Programmable Interrupt Controllers providing 16 hardware interrupts in full compatibility with IBM specifications. The two PICs as well as the Programmable Interval Timer are surface mounted on a small hybrid board to free up system board space.

Programmable Interval Timer (PIT)

The Model 303 follows IBM specifications by using an Intel 8254 Programmable Interval Timer to supply three system timers. Producing 100 percent compatibility, the system uses Timer 0 as the system clock tick. Timer 1 is used to trigger DRAM refresh cycles, while Timer 2, accessible via port 61H, provides programming frequencies for the speaker.

Phoenix Technologies BIOS Features

Phoenix Technologies BIOS duplicates the IBM BIOS functionality including some Intel specific additional features.

1. SETUP

The system setup is included within the BIOS. Menu driven, the setup routine allows for easy system configuration and supports the following features:

- A) 24-hour Time of Day Clock and Month/Day/Year.
 - B) Two 360 KB, 720 KB, 1.2 MB or 1.44 MB floppy disk drives.
 - C) Two hard disks of ANY size. 47 specific drive types with two additional user configurable drive types. Types 48 and 49 allow the user to specify the number of heads and cylinders, sectors per track, landing zone and the precomposition for any type of hard disk. Types 48 and 49 allow for easy ESDI, RLL and large capacity ST506 disk integration.
 - D) Baseboard conventional memory supports a full 640 KB of useable base memory.
 - E) Extended memory support. Detects and configures all memory above one MB (extended memory) available for use.
 - F) Keyboard configuration supports all 84 and 101 key IBM compatible keyboards. Also, allows for no keyboard installed to support diskless network server applications.
 - G) VGA/EGA/CGA/MDA video support. Also, allows for 40 and 80 column modes and no video card installed to support dedicated network server applications.
 - H) Turbo/deturbo switch allows the user to slow the CPU down to a simulated 8 MHz for installation of copy protected software sensitive to processor speeds. The Model 303 by default runs at 33 MHz. The processor speed may also be adjusted via the keyboard controller using CTRL-ALT-1 (deturbo) and CTRL-ALT-2 (turbo).
 - I) 387 coprocessor detection.
 - J) System BIOS ROM and video BIOS ROM shadowing. Copies slow 8-bit system and video ROM to fast 32-bit system memory. Produces a phenomenal increase in video throughput. At 33 MHz shadowing video ROM improves screen performance by over 1000 percent compared to an unshadowed 8-bit VGA card.
 - K) Cache enable/disable. The user may enable or disable the 64 KB cache.
 - L) Above 16 MB. The Model 303 BIOS can make a duplicate copy of itself in system memory from location FE0000 to FFFFFFFF (16 MB). The BIOS normally enables this switch to allow for a contiguous memory block for UNIX and other memory intensive applications.
-

Phoenix Technologies Keyboard Controller Features

In conjunction with the BIOS the Model 303 uses an Intel 8742 keyboard controller programmed by Phoenix Technologies. The keyboard controller supports the following features:

1. CTRL-ALT-DEL: SYSTEM RESET

CTRL-ALT-DEL resets the system by jumping to the beginning of the BIOS and running the POST.

2. CTRL-ALT-INS: SYSTEM SETUP

CTRL-ALT-INS (CTRL-ALT-0 on the calculator keypad for 101 keyboards) will pull up the BIOS setup screen. This feature allows for convenient system modification without the use of floppies.

3. CTRL-ALT-1: DETURBO

CTRL-ALT-1 on the calculator keypad slows the system down to a simulated 8 MHz operating rate. By inserting wait states into the CPU, the system allows for the installation of copy protected software sensitive to processor speeds. CTRL-ALT-1 emanates a low speaker tone when invoked. The 8 MHz speed remains active until the user either turns the system off and on or types CTRL-ALT-2 to return to turbo speed. The CPU processor speed may also be configured via the BIOS setup menu.

Expansion Slot Features

The Model 303 has an impressive ten I/O expansion slots. The expansion slots all maintain full ISA compatibility running at 8 MHz exactly as specified by the IBM PC/AT standard.

1. 8-BIT

Supports one 8-bit IBM PC/XT slot pin for pin compatible with the IBM standard. Offers complete functionality of all signals included within the IBM standard.

2. 16-BIT

Supports seven 16-bit IBM PC/AT slots pin for pin compatible with the IBM standard. Offers complete functionality of all signals included within the IBM standard.

3. AT32

Supports two Intel AT32 32-bit memory and I/O slots. The AT32 provides complete functionality with the ISA bus. Therefore 8-bit and 16-bit ISA cards may also be used in the AT32 slots. In addition the AT32 supports the 32-bit ATMEM4, ATMEM8 and ATMEM16 extended memory boards and provides 32-bit I/O support. The AT32 supports the 8 MHz bus speed for 8-bit and 16-bit ISA cards. More significantly, the AT32 bus speed runs synchronously with the CPU at 33 MHz when AT32 I/O cards are installed. Running at 33 MHz the AT32 expansion slots can currently support 32 MB of add-in 32-bit extended memory. Coupled with the on-board SIMMs, the Model 303 can support up to 40 MB of 32-bit memory. With the cache enabled, all 40 MB is accessible with zero wait states. More information regarding the proprietary AT32 bus design may be obtained by signing a non-disclosure agreement.

Invalid Configuration Information

M. POWER SUPPLY

1. WATTS

The Model 303 uses a 303.5 watt switching power supply from Teapo. Please see the Appendix for specific voltage and current ratings for the supply.

2. POWER DISTRIBUTION AND SEQUENCER

The power supply plugs two of its connectors into a power distribution board that supports four peripheral connections. The power sequencing board more effectively controls the current flow. Two of the four connectors on the power sequencing board stagger their initial current flow. Sequencing allows large current hungry disk drives to spin up individually one at a time. This prevents several hard disks from competing for current resources during power-up. Hard disks require their greatest current flow during initial power-up. More importantly, however, the sequencing board allows the two primary drives to complete their initialization before allowing third disk drives to initialize. Both ESDI and SCSI drives must allow the two primary drives to initialize completely before allowing additional drives to boot. The 303.5 watt power supply provides enough current to support three full-height hard drives in the system. One additional power connector runs the system cooling fan.

Eight Peripheral Bays

The Model 303 stacks vertically eight half-height peripheral bays into the chassis. Four peripheral bays are accessible from the front of the system to be used for floppy and tape drives. An additional four bays are hidden from sight and may be used for hard disks and optical disks. The integrator must remove the Model 303 cover to install any peripheral. Each peripheral is moored in a three-sided metal seat that effectively reduces EMI and RFI emissions.

Front Panel

Many government contracts require the use of front panel switches so handicapped individuals may easily use the system. With this in mind the Model 303 provides a front panel with the following features.

1. RESET

The Model 303 supports and fully implements a front panel hardware reset switch. This switch allows the user to perform a hardware reset to the system baseboard at any time. The switch simply completes the connection to a Dallas Semiconductor 1232 MicroMonitor chip on the baseboard, which contains the debounce and reset circuitry. This is a well understood component, having been used successfully on the Model 302. The switch is deeply recessed into the front panel to prevent accidental invocation. This is a non-trivial feature, considering the potential loss of data and file corruption that can occur when a UNIX or XENIX system is improperly shutdown.

2. KEYLOCK

The keylock feature disables the keyboard. With the keylock activated the keyboard becomes locked out and transmits no keystrokes to the system.

3. POWER ON/OFF SWITCH

Recessing the power on/off switch into the bottom front of the chassis prevents an individual from accidentally turning the system off.

4. INDICATOR LIGHTS

The front panel also provides two LED indicator light tubes providing disk access information. The tubes are visible from a sitting or standing position.

Chassis Features

1. SILVER CHROMATE

The Model 303 chassis is constructed out of sheet metal dipped in silver chromate to prevent corrosion and reduce EMI and RFI emissions.

2. COMPARTMENTALIZED

The chassis effectively compartmentalizes each section of the computer. The system board is contained within its own compartment. The power supply is completely enclosed in a metal case and the peripheral section is isolated as well. In addition, the serial and parallel cable connectors to the system board are enclosed in an EMI can as well. By enclosing each section in a separate cage, the Model 303 reduces an enormous amount of emissions producing a very reliable and quiet system design. The Model 303 passed the stringent FCC class B emissions tests with flying colors, receiving official government certification.

3. STABILITY

The sturdy construction of the chassis and two stabilizing legs help to protect the system from shock and vibration. In addition, the system has plastic back bumpers which permit the system to sit flush with a wall without disturbing any of the power cabling. The Model 303's I/O ports are all accessible from the top and can be hidden from view with a flip top lid.

Model 303 Cover Design

Durable molded plastic covers the system chassis. The plastic provides protection from dirt, dust and corrosion.

Model 303 System Fan

The Model 303 provides a system fan to maintain a consistent operating temperature within the case. The system fan exchanges internal and external air at the rate of 90 Cubic Feet per Minute (CFM).

Differentiators Menu

[Design Experience](#)
[ISA Compatibility](#)
[Expandibility](#)
[Power Supply](#)

Design Experience - Model 303

The Model 303 bases much of its system board design on the proven Model 302 system board. While the Model 302 encountered several initial compatibility issues, these have all been resolved. The resolutions to these issues and further performance and feature enhancements have all been included in the 33 MHz system board. The experience gained with the Model 302 design provided valuable insights for the 33 MHz design team. The CPU and memory sections have remained virtually intact with the exception of faster logic parts. The faster logic is necessary, of course, to provide proper signal timing margins to accommodate the high speed 386 MicroProcessor. The incorporation of the Model 302's proven and tested design methodology in the Model 303 provides firm ground for Intel to base its thrust into the 33 MHz microcomputer world.

Listed below are important and significant features to consider in a 33 MHz design.

1. MEMORY ARCHITECTURE

The Model 303 uses the high performance AT32 memory scheme tuned for high speed memory transactions. The inclusion of a 64 KB direct mapped posted write through cache provides zero wait state operation. Cache thrashing and coherency problems do not occur with this design. This design has been used on Intel MULTIBUS designs, as well as the Model 302, and is extremely well understood. The Model 303 memory architecture is powerful, well tested in several products and up to the 33 MHz challenge.

As processor speeds increase, the memory bottleneck will continue to grow. The Model 302 and 303 memory architecture very effectively minimizes the slowdown in throughput to the CPU.

2. EMISSIONS

The 386 MicroProcessor requires a 2X clock input. Running at 33 MHz the Model 303 uses a 66 MHz clock crystal to supply the 386 CPU. Signals on the system board running at these high frequencies cause severe and sometimes dangerous interference with other electronic devices. Strict FCC regulations require effective containment of all EMI and RFI emissions. The Model 303's compartmentalized cell design effectively isolates the various system components from each other and contains the emissions within the Model 303 chassis. Any signal trace or component known to generate high levels of emissions have been carefully placed on the system board. The trace and component layout has been designed to optimally minimize their impact on emissions and the operation of other components. The board design minimizes all the trace lengths and avoids sharp 90 degree turns to prevent the signals from acting like antennas. One example of this is the layout of the CPU and memory sections. The CPU, coprocessor, cache and memory are located together. This increases system performance while reducing the noise generated by this critical section. In addition, all the serial, parallel, keyboard and mouse ports use Resistor-Capacitor networks and ferrite beads to absorb as much spurious noise as possible.

ISA Compatibility

The Model 303 incorporates all the design and compatibility experience developed on Intel's MicroComputer Models 300SX, 301, 301Z, 302 and 303. The ISA logic section of the Model 303 includes a well established and tested implementation. The system board supports all signals and functionality of the ISA bus. Intel maintains a large group of compatibility partners who conduct continual functionality testing of their hardware and software on the Intel MicroComputer platforms. In addition, Intel uses a well staffed compatibility department and two outside testing companies to fully evaluate each Intel MicroComputer product. The combination of four years of design and compatibility experience, coupled with an extensive network of compatibility relationships with leading industry vendors, gives the Model 303 a powerful edge.

Expandability

The Model 303 offers the user a plethora of options for expandability and configurations. With ten I/O expansion slots and eight half-height peripheral bays, the Model 303 stands out as a unique fileserver solution in the marketplace. For example, the user may install two 16-channel serial cards, two 9600 BAUD modems, two 380 MB SCSI hard disks, a streaming tape, a VGA card and a LAN card, and still have three slots left to play with. This is just one of many possible configurations available and supported by the Model 303.

Power Supply

The Model 303 uses a 303.5 watt power supply. Other fileserver competitors use much weaker power supplies, some as low as 200 watts. The Model 303's ability to support large current requirements of multiple peripherals gives it a decided edge in fileserver and network markets.

Model 303 Benchmarks

This section contains a brief list of benchmarks run on the Model 303.

<u>Power Meter v1.5</u>	<u>IBM AT</u>	<u>Model 302</u>	<u>Model 303</u>
Dhrystone	2.13 K	7.02 K	9.875 K
Whetstone	156 K	1026 K	1563 K
MIPS	1.26	5.808	7.703
Disk thrupt	165 KB	280 KB	512 KB
 <u>QAPLUS 3.10</u>			
Video CPS	1,503	10,619	37,869 (Compaq VGA)
Dhrystone		7586	11,379
 <u>Norton v4.5 SI (System Index)</u>			
CI (Compute)	7.7	28.2	40.0
DI (Disk)	3.2	3.5	3.8
PI (Perform)	6.2	19.9	27.9
 <u>Dhrystones</u>			
v 1.0		9671	13,192.6
v 2.0		9174	12,532.4
v 1.0 with registers		9689	13,369
v 2.0 with registers		9104	12,811.9
 <u>Whetstone</u>			
Single Precision		1470	2222
Double Precision		1298	1923
QAPLUS 3.10		1414	2574.2
 <u>Coretest</u>			
Data transferred		244.3 KB	977.5 KB
Performance index		3.672	8.109
 <u>Landmark v1.10</u>			
		37.4	50.8
 <u>HLBENCH (using 8-bit Paradise EGA)</u>			
Text scrolling			23.46
Window scrolling			4.01
Graphics			12.96
CPU/Sort			4.72
Floating point			3.46

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Formatting SCSI Drives

Standard Configuration

Floppy: One TEAC 1.44 MB & one TEAC 1.2 MB
Hard disk: One Maxtor XT-4170S 179.41 MB SCSI
Disk controller: Adaptec 1542A SCSI floppy/hard disk controller
Tape drive: Archive Viper 150 MB SCSI streaming
Tape controller: Uses the above 1542A SCSI controller
Memory: 4 MB of Fast Page SIMMs
Serial: 2 DB9 RS232 connectors (COM1 & COM2)
COM2 also configurable as 25 pin connector
300,1200,2400,9600,19200,38400 baud rates
Parallel: 1 Centronix connector (LPT1 or LPT2)
Mouse: 1 PS/2 style mouse connector
Keyboard: 1 AT style keyboard connector
10 I/O slots: 1 8-bit XT slot
7 16-bit AT slots
2 32-bit AT32 slots
(AT32 slots may be used as 8 or 16-bit as well)
Bays: 8 half-height peripheral bays
Power supply: 303.5 watt

Dimensions

SYSTEM

Height =	24.50"	(62.23 cm)
Width =	6.85"	(17.40 cm)
Length =	27.75"	(70.49 cm)
Weight =	80 lbs	(36.36 k) (standard configuration)

SYSTEM BOARD

Width =	13.0"	(33.00 cm)
Length =	13.6"	(34.54 cm)

Regulatory Standards

SAFETY

USA	UL 478, Edition 5
Canada	CSA C22.2 No. 220
Europe	IEC 950 & VDE 0806

EMI/RFI

USA	FCC; CFR 47 Part 15 Subpart J, Class B
Canada	DOC; CRC c.1374, Class B
Europe	VDE 0871 Level B

Coprocessors

- 1) 33 MHz 387 coprocessor
- 2) 33 MHz Weitek 3167 Abacus
- 3) The Model 303 does not support the Weitek 3167 BRD
(Weitek 3167 & 387 coprocessor on single board)

System Board Memory

- 1) Supports 256 KB or 1 MB SIMMs
- 2) 1 MB, 2 MB, 4 MB or 8 MB SIMM configurations

	<u># OF SIMMS</u>		
	4	8	
<u>SIMM</u>	<u>256 KB</u>	<u>1 MB</u>	<u>2 MB</u>
<u>SIZE</u>	<u>1 MB</u>	<u>4 MB</u>	<u>8 MB</u>

- 3) RAS/CAS, Fast Page Mode & Static Column DRAMs

32 BIT Extended Memory Boards

ATMEM4 --> 4 MB 32-bit extended (expandable to 8 MB)
ATMEM8 --> 8 MB 32-bit extended
ATMEM16 --> 16 MB 32-bit extended (configurable for 4, 8, or 16 MB)

The Model 303 provides two AT32 expansion slots, Slot 0 and Slot 1. Each slot accepts XT, ISA or AT32 add-in boards. The table below provides the memory configurations possible using various combinations of the ATMEM4, ATMEM8 and ATMEM16 memory boards in Slots 0 and 1.

SLOT 0

 | NONE | ATMEM4 | ATMEM8 | ATMEM16 |

SLOT 1

NONE | 0 MB | 4 MB | 8 MB | 16 MB |

ATMEM4 | 4 MB | 8 MB | 12 MB | 20 MB |

ATMEM8 | 8 MB | 12 MB | 16 MB | 24 MB |

ATMEM16 | 16 MB | 20 MB | 24 MB | 32 MB |

* NOTE:
 RAS/CAS, Fast Page Mode DRAMs on ATMEM4 and ATMEM8
 RAS/CAS, Fast Page Mode & Static Column DRAMs on ATMEM16 only

Cache

64 KB Direct Mapped Posted Write Through (Discrete)
 15 ns Tag SRAM (3)
 25 ns 16 Kbit X 4 Data SRAM (8) --> 16 KB cache data addresses
 90% hit ratio

Power Supply

303.5 watt
 Manufacturer --> Teapo from Taiwan
 AC voltage --> 115/230 Nominal
 AC frequency --> 50/60 Hz
 Maximum continuous current:
 +5V --> 35A
 +12V --> 10A
 -12V --> .5A
 -5V --> .5A
 Peak current --> +12 V --> 14A for 15 seconds
 Minimum current:
 +5V --> 7A
 +12V --> 2.5A
 -12V --> 0A
 -5V --> 0A
 Switching power supply
 Four power connectors off of power supply
 Standard configuration

* NOTE: 303.5 watt power supply supports three hard disks with a minimum system configuration consisting of a video board and disk controller card.

Baseboard Environmentals

Ambient temperature
 On: 0 55 degrees C
 Off: 40 to +70 C

Relative humidity
 On: to 85% at 55 C
 Off: to 95% at 55 C

Altitude
 Operating: ambient air temp, to 10,000 Ft.

Model 303 System Environmentals

Ambient temperature
 On: 15.6 - 40 degrees C
 Off: -34 - 60 C

Relative humidity
 On: to 85% at 55 C
 Off: to 95% at 55 C

Altitude
 Operating: ambient air temp, to 10,000 Ft.

Static discharge: 7.5 KV maximum

Ambient air noise level
 47-50 dB (depending upon position)

Jumpers Settings

* = Default configuration

OPTION	ENABLE	DISABLE
PTR1	E25-26*	E26-27

PTR2	E28-29	E29-30*
COM1	E31-32*	E32-33
COM2	E34-35*	E35-36
80387	E43-44	E44-45*
KBRST	E40-41	E41-42*
PRT EDGE	E46-47 (lead)	E47-48* (trailing)
BW/CLR	E37-38 (mono)	E38-39* (color)
EPROM	E49-50* (27256)	E50-51 (27512)
66 MHz CLK	E52-53* (removed on Revision B boards)	
<u>DRAM SIZE</u>	E16-18 (256K)	E18-20* (1 MB)
	E17-19 (256K)	E19-21* (1 MB)
<u>DRAM QUANTITY</u>	<u>E6-8</u>	<u>E7-9</u>
	8 MB	IN
	4 MB	IN*
	2 MB	OUT
	1 MB	OUT
<u>DRAM TYPE</u>	<u>E2-4</u>	<u>E3-5</u>
Fast Page Mode	IN*	IN*
Static Column Mode	OUT	IN
RAS/CAS Mode	OUT	OUT

Formatting SCSI Drives

SCSI hard disks must be low level formatted before installing any operating system. Using the Adaptec 1542A SCSI controller board, the process is very straight forward. Please follow the steps below to properly prepare your SCSI drives for use.

1. Boot the system with a bootable DOS diskette.
2. Invoke the DOS debug.com program.
3. At the debug "dash" prompt type:
-g=dc00:6
4. At address dc00:6 the Adaptec firmware contains a SCSI formatting and identification program.
Running the program brings up a menu screen with several user options. Note that the address dc00 is jumper configurable and may be changed on the Adaptec 1542A controller board.
5. Select the SCSI device to be formatted using option 1.
6. Low level format the drive using option 2.
7. Once low level formatting has completed the user may now begin the installation of an operating system.

Support Information

The Intel Microcomputer Platforms Operation has an extensive support service available. The support includes a monthly update bulletin (iPUB) which includes information concerning compatibility lists, board revisions and other sundries on the Intel ISA product line. An on-line phone support system (iPALS) is also in place to assist the distributor, the OEM and the field. Finally an on-line bulletin board service exists, which contains valuable product, demo and general ISA information all accessible via a modem. Call iPALS for further information regarding iPUB and iPAN.

iPUB (Intel Product Update Bulletin) Monthly Bulletin
iPALS (Intel Phone Action Line Support) 503-696-PALS
iPAN (Intel Product Assistance Network) 503-693-1493

Product Order Codes

The Intel MicroComputer Model 303 has been discontinued.
This is a list of the old product codes

Systems

S3030B0 System, no memory
S3034B0 System with 4 MB RAM
S3034I System with 4 MB RAM, 5.25" and 3.5" diskette drives
170 MB SCSI disk, and 150 MB SCSI tape

Motherboards

B3030 10-slot board, no memory
B3034 10-slot board, 4 MB RAM
DB3030 8-slot board, no memory
DB3034 8-slot board, 4 MB RAM

Memory Expansion

SBCATMEM04 4 MB 32-BIT board, expandable to 8, 12 or 16 MB
SBCATMEM08 8 MB 32-BIT board, expandable to 12 or 16 MB
SBCATMEM16 16 MB 32-BIT board
SIMM49 4 MB SIMM (4 each, 1 MB X 9 SIMM, 80ns) for
expansion of 303 baseboard memory and for
SBCATMEM04/08

CMOS - Setup Usage

Setup Screen 1

Phoenix Technologies Ltd. Version
System Configuration Setup x.xx yy

Time: 08:56:05
Date: Fri Jul 10, 1992
Diskette A: 3.5 Inch, 1.4 MB
Diskette B: 5.25 Inch, 1.2 MB Cyl Hd Pre Lz Sec Size
Hard Disk 1: Type 44 820 6 -1 820 17 40
Hard Disk 2: Not Installed
Base Memory: 640 KB
Extended Memory: 3072 KB
Display: VGA/EGA
Keyboard: Installed
CPU Speed: Turbo

Coprocessor: Not Installed

PgUp for advanced options. Up/Down Arrow to select. Left/Right Arrow to change.

F1 for help. F10 to exit and save changes.
Esc to reboot for changes to take effect.

See Also:
[Advanced Options - Setup Screen 2](#)
[Invalid Configuration Information](#)

Advanced Options - Setup Screen 2

Phoenix Technologies Ltd. Version
System Configuration Setup x.xx yy

Time: 08:56:05
Date: Fri Jul 10, 1992

Shadow BIOS ROM: System and Video BIOS
Cache Memory: Enabled
AT32 I/O: Disabled
Above 16 Meg: Enabled
Speaker: Enabled
512-640 KB: Enabled
Enter Setup: Always

PgUp for main menu. Up/Down Arrow to select. Left/Right Arrow to change.
F1 for help. F10 to exit and save changes.
Esc to reboot for changes to take effect.

See Also:
[Invalid Configuration Information](#)

Memory Qualifications Menu

[Memory Board iSBCATMEM16](#)
[Memory Board iSBCATMEM04](#)
[Memory Board iSBCATMEM08](#)
[SIMM Vendor List](#)

See Also:
[System Memory Features](#)
[Extended Memory Features](#)
[System Board Memory Appendix](#)
[32 BIT Extended Memory Boards](#)
[Memory Jumper Information](#)

Memory Board iSBCATMEM16

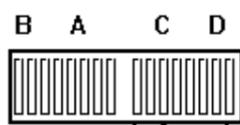
August, 1990

PBA: 459718

Version -001 effective September 1989

SBCATMEM16 Production Release. This 32-bit board is compatible with the INTEL386(TM) Microcomputer Model 303. The Intel SBCAT386MEM16 memory board is sold with the 16MB (1MB/100ns) SIMMs onboard. The bank order on this board is Bank B, A, C, D. No jumper settings are required on the motherboard, but you must run set-up to verify that the correct amount of extended memory is installed. The default mode setting is for Fast Page, which is the only mode available on this board. The memory board may be populated with 4MB, 8MB, or 16MB of memory with the following jumper changes required on the memory board (located on the center of the board):

4MB E15-E16, E21-E22 (must populate Bank A)
8MB E17-E18, E19-E20 (must populate Banks A,B)
16MB E15-E16, E17-E18 (must populate Banks A,B,C,D)
Schematic No. 459723



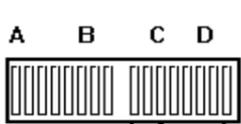
PBA: 503601

Version -002 effective September 1990

New changes to the MEM16 board that include changing the board layers from eight to six, added support of 4MB x 9 SIMM modules, and changed the order of the banks to A,B, C, D. New jumper settings are also required on this revision of the MEM16 board and are located at the top of the board.

4MB E4-E5, E13-E14, E15-E16 (must populate Bank A)

8MB E6-E7, E13-E14, E17-E18 (must populate Bank A,B)
 16MB E8-E9, E15-E16, E17-E18 (must populate Bank A,B,C,D)
 Schematic No. 503606



Type FAST PAGE E10-E11 **SIMM Size** 1MB E1-E2, E20-E21
 RAS/CAS E11-E12 4MB E2-E3, E19-E20
 Schematic No. 503606

Memory Board iSBCATMEM04

August, 1990

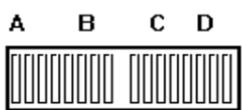
PBA: 507164

Version -002 effective September 1990

SBCATMEM04 Production Release. Memory board used with the Model 303. The board is fully expandable up to 16MB by populating the board with SIMMs. No jumper settings are required on the motherboard, but you must run set-up to verify the correct amount of extended memory installed. In addition, you must set the correct jumper settings on the memory board (located at the top of the board), and they are as follows:

Jumper Settings:

4MB E4-E5, E13-E14, E15-E16 (Bank A)
 8MB E6-E7, E13-E14, E17-E18 (Bank A,B)
 16MB E8-E9, E15-E16, E17-E18 (Bank A,B,C,D)
 Schematic No. 503606



Memory Board iSBCATMEM04

August, 1990

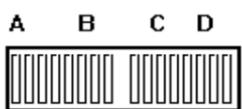
PBA: 507170

Version -002 effective September 1990

SBCATMEM08 Production Release. Memory board used with the Model 303. The board is fully expandable up to 16MB by populating the board with SIMMs. No jumper setting changes are required on the motherboard, but you must run set-up to verify the correct amount of extended memory installed. In addition, you must set the correct jumper settings on the memory board (located at the top of the board), and they are as follows:

Jumper Settings:

4MB E4-E5, E13-E14, E15-E16 (Bank A)
 8MB E6-E7, E13-E14, E17-E18 (Bank A,B)
 16MB E8-E9, E15-E16, E17-E18 (Bank A,B,C,D)
 Schematic No. 503606



SIMM Vendor List

June 1992

Listed below are the Onboard SIMM configurations for Intel platforms. Listed after the tables are the qualified vendors for Single In-Line Memory Modules (SIMMS) that are qualified by Intel and are to be used in the Intel platforms..

"n" x 9 SIMMS

<u>MODEL</u>	<u>SLOTS POPULATED</u>	<u>SIMM SIZE</u>	<u>SIMM SPEED</u>	<u>TOTAL MEMORY</u>	<u>EXPANSION MEMORY</u>
303	4	256K	100ns	1MB	SBCMEM04
	8	256K		2MB	SBCMEM08
	4	1MB		4MB	SBCATMEM16
	8	1MB		8MB	

256K X 9 SIMM QUALIFIED VENDORS 100ns

<u>Manufacturer</u>	<u>Part Number</u>	<u>Type</u>
Micron Technology	MT9259M-10	FP
NMB Corporation	MM2801J9S07	FP
NMB Corporation	MM2801J9S08	FP
NMB Corporation	MM2801J9S06	FP
NMB Corporation	MM2801J9S10	FP
Toshiba	THM92500AS-10	FP
Toshiba	TMM92500AS-80	FP

1M X 9 SIMM QUALIFIED VENDORS 100ns

Matsushita	MN4A091MOS80	FP
Matsushita	MN4A091MOS80A	FP
NEC	MC421000A9B-10	FP*
NEC	MC421000A9B-70	FP*
NEC	MC421000A9B-80	FP*

Texas Instruments	TM024EAD9-10L	FP
Texas Instruments	TM024EAD9-80L	FP
Toshiba America	THM91000AS-10	FP*
Toshiba America	THM91000AS-80	FP*

(* NOTE: Not available in the United States or U.S. Territories.)

(NOTE: Panasonic are Matsushita product and are qualified should you obtain Panasonic SIMMS in your platforms.)

NOTE: FP = Fast Page

Shipping Contents

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Related Products

The following are products that are related to the use of the Intel Microcomputer model 303. **The model 303 and its related products have been discontinued.**

Adaptec 1542 SCSI controller-

This product allows the 303 to be configured with a tape drive as well as additional hard drives.

Utilities 1.0 Package-

This product creates an interface with the 303 and a tape drive using the SY-TOS tape operating system.

Utilities 1.1 Package-

An upgrade to the Utilities 1.0 package. Includes SY-TOS PLUS software