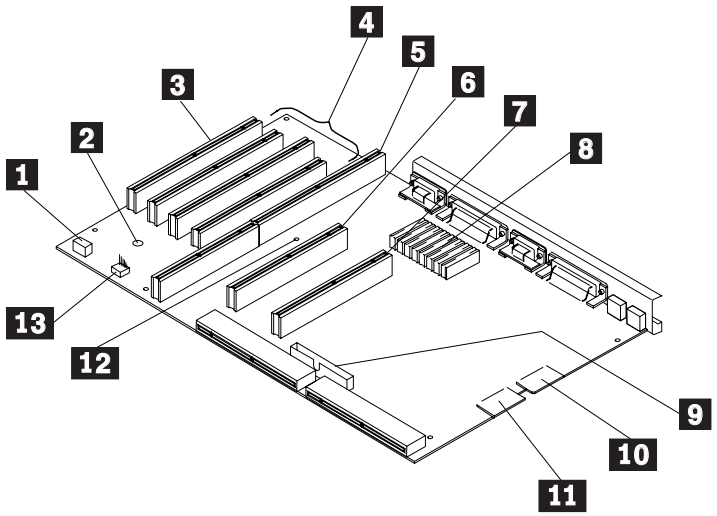
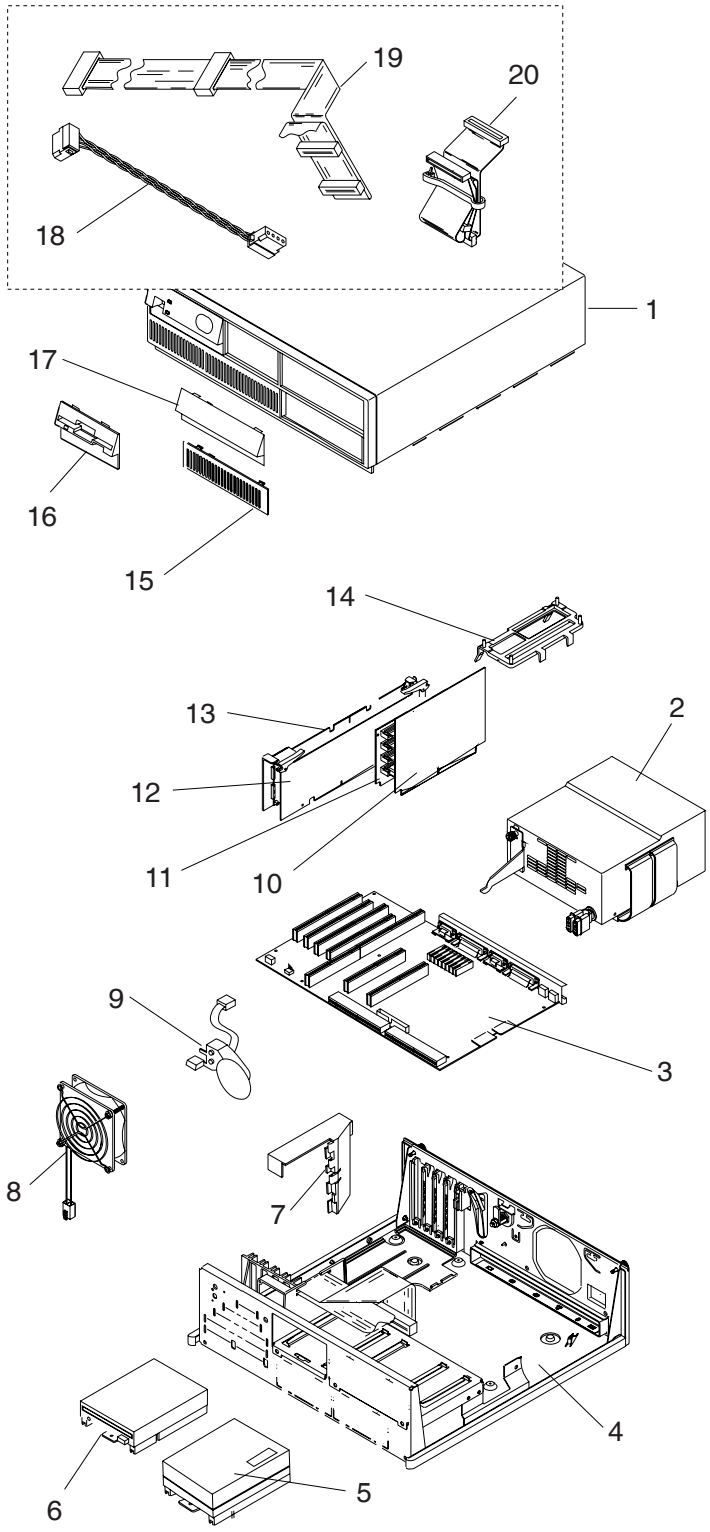
Model 90 XP 486 System Board

1 Power switch/speaker assembly (J2)
2 Battery (BT1)
3 SCSI adapter slot (J1)
4 Adapter slots (J1, J3, J4, and J6)
5 Processor-board slot (J8)
6 Memory-riser-card slot (J11)
7 Memory-riser-card slot (J14)
8 Video-memory connectors
9 Diskette-drive-cable connector (J15)
1 Power-supply connector (J25)
11 Power-supply connector (J26)
12 Power-on password override connector (J10)
13 Fan connector (J5)



Model 90 (8590) Parts



Index	*System Unit (90)*	
1	Top Cover	33F8350
	Logo	33F8367
2	Power Supply	92F0088
	Power Supply Bracket	64F4131
3	System Board (no memory)	64F3287
	System-Board Memory-Module Kits:	
	Parity Memory-Module Kits:	
	1MB (85ns) (Type 1 & 3 Boards only)	90X8624
	2MB (85ns) (Type 1 & 3 Boards only)	92F0104
	2MB (70ns)	92F0102
	2MB (80ns)	92F0103
	4MB High-Reliability Parity SIMM (70ns)	71G6203
	4MB (80ns)	92F3337
	8MB High-Reliability Parity SIMM (70ns)	71G6204
	8MB (80ns)	64F3607
	ECC Memory-Module Kits:	
	4MB (70ns) (Type 3 Boards only)	92F0097
	8MB (70ns) (Type 3 Boards only)	92F0098
4	Base Frame (R)	64F4116
	Keylock Assembly	33F8353
5	(see DASD)	
6	(see DASD)	
7	Air Baffle (for 57F1597)	92F0134
	Air Baffle (for all others)	64G4130
	Adapter Card-Guide Assembly	33F8363
8	Base Fan	64F4128
9	Power Switch/Speaker assembly	33F8352
10,11	Memory-Riser Card	81F8823
12	***Processor Board (With cache option connector)***	
	80486 (25 MHz)	64F0201
	80486 (33 MHz)	64F0198
	80486DX2 (33/66 MHz)	92F0145
	(runs internally at 66MHz)	
	256KB Cache 17ns	64F0199
	(for 64F0201, 64F0198, 92F0145)	
	80486 (50 MHz)	92F0048
	256KB Cache 12ns (for 92F0048)	92F0050
12	***Processor Board (Without cache option connector)***	
	80486SX 20 MHz	92F0049
	80487SX 20 MHz	92F0065
	80486SX 25 MHz	92F0079
	(With Dual Processor Sockets)	

Note:

See “20 and 25 Mhz Processor Boards” on page 284.

	80487SX Microprocessor (Extended Math Capability for 92F0079)	92F0100
	80486 25/50 MHz Overdrive Processor (runs internally at 50 MHz) (for 92F0079)	92F0147
	80486DX2 25/50 MHz (runs internally at 50 MHz)	92F0161
	80486 50 MHz (single socket, both boards are one single FRU)	57F1597
13	SCSI Adapter (with cache)	85F0063
13	SCSI Adapter (without cache)	85F0002
	Terminator, External (for 85F0063)	33F8464
	Terminator, Internal (for 85F0063)	34F0025
	Terminator, Internal (for 85F0002)	57F2870
	Terminator in-line (for 320/400MB)	92F0142
14	Memory-Riser-Card Support Bracket	57F3029
	Video-Memory Module	75X5894
	Battery	33F8354
	Label Kit	33F8367
	Miscellaneous Parts Kit (see page 301)	33F8370
	Shipping Carton	74F3583

Index	*DASD (90)*	
6	1.44MB 3.5-Inch Diskette Drive	64F0162
	Drive Slide (for 64F0162)	64F0156
6	2.88MB Drive (with slide) (not supported on all early type 1 systems)	64F0204
	Drive Slide (for 64F0204)	64F0156
	5.25-Inch Diskette-Drive Bezel	33F8459
	5.25-Inch Hard Disk Drive Bezel	64F4104
15	Bezel for Hard Disk Drive	33F8361
16	3.5-Inch Diskette Drive Bezel	33F8360
	3.5-Inch Device Filler Bezel	64F4149
17	Blank Bezel for 5.25-inch Drive Bay	33F8362
18	Device Power Cable	33F8431
18	Device Power Cable (supports two devices)	34F0014
19	SCSI Internal Cable	64F4127
20	Diskette Drive Signal Cable	57F3030
5	60MB Hard Disk Drive (SCSI)	6128296
5	80MB Hard Disk Drive (SCSI)	56F8854
5	104MB Hard Disk Drive (SCSI)	95F4748
5	120MB Hard Disk Drive (SCSI)	6128298
5	160MB Hard Disk Drive (SCSI)	56F8851
5	212MB Hard Disk Drive (SCSI)	95F4749
5	320MB Hard Disk Drive (SCSI)	85F0011
5	400MB Hard Disk Drive (SCSI)	85F0012
5	540MB Hard Disk Drive (SCSI)	92F0406
5	540MB Hard Disk Drive (SCSI)	61G3788
5	1GB Hard Disk Drive (SCSI)	92F0428
5	2GB Hard Disk Drive (SCSI) (8-bit 50-pin)	92F0440
5	2GB Hard Disk Drive (SCSI) (16-bit 68-pin)	92F0407
	EMC Bezel and Spring Shield (for 92F0089)	92F0407
	Drive Slide (Model 90)	85F0035
	Drive Power Cable	33F8431
	Drive Power Cable (Two connector)	34F0014
	127MB Rewritable Optical Drive	92F0167
	Rewritable Optical Cartridge	38F8645
	Drive Mounting Slide (for 92F0167)	85F0022
	Tray with Bezel (for 92F0167)	85F0021
	CD-ROM I Drive Bezel	64F4122
	CD-ROM II Drive Bezel	92F0081
	Rewritable Optical Drive Bezel (B Bay)	92F0157
	Rewritable Optical Drive Bezel (D Bay)	92F0158
	Rewritable Optical Drive Bezel (Filler)	64F4149
	Large Ground Shield (Upper Bay)	85F0006
	Small Ground Shield (Upper Bay)	85F0005
	Ground Shield (Lower Bay)	85F0034

Screw Kit: 2mm 5 x 4 black screw (10) 2mm 5 x 12 screw (10) 1mm 6 x 4 screw (10) Tapping 2 x 4 screw (10) 2mm 5 x 8 black screw (10) 2mm 5 x 3 black screw (10) Screw (10) 4-40 x 5 stud (20) 4-40 x 4.8 stud (10) 2mm 5 x 6 screw w/ washer (10) 2mm 5 x 5 screw (100) Special screw (1) 2mm 0 x 5 (10) 3 x 4 screw (10)	07G1835
Miscellaneous Parts Kit: Nut (2) Cover screw (2) I/O panel screw (2) 3.5mm captive screw (2) Fingerstock shield (3) Fingerstock base shield (3) Slide (1) Standoff shaft (2) 3mm screw (5) Ground power special bracket (1)	27F4171
Miscellaneous Parts Kit: Rubber foot (4) 8mm captive screw (4) Captive screw (2) 3.5mm hex head screw (4) 3mm Plastite screw (4)	33F8370
Miscellaneous Parts Kit: Screw (2) Cable Cable clamp (1) 4mm screw (2) Breakaway washer (1) Pawl bracket (1) Cable clamp (1) Ground base spring (1) I/O bracket (1) PC board standoff (1) Wing nut (1) Ground spring (1)	33F8435

Rewritable Optical Drives

3.5-Inch Rewritable Optical Drive	92F0167
Rewritable Optical Cartridge	38F8647
Drive Mounting Slide (for 92F0167)	85F0022
Tray with Bezel (for 92F0167)	85F0021
Objective Lens Cleaner (for 92F0167)	38F8681
Prism Lens Cleaner (for 92F0167)	38F8682
3.5-Inch Enhanced Rewritable Optical Drive	92F0167
Mounting Tray	92F0269
Mounting Tray/Bezel (Model 3510)	92F0268
Drive Bezel Assembly:	
Model 8535, 8540, 8556, 8557, Bays 2, 3	92F0159
Model 9556, 9576	92F0159
Model 9557, 9577, Bays 2, 3	92F0159
Model 8560, 8565, 8580	92F0156
Model 8590, 9590 B-Bay	92F0157
Model 8590, 9590 D-Bay	92F0158
Model 8590, 9590 Filler	64F4149
Model 3511, 8595, 9595	92F0155

System-Unit Power Supplies

When the computer is powered-off for 8 seconds or more and then powered-on, the power supply generates a “power good” signal that resets system logic. The presence of the “power good” signal turns on the green power-on light on the front of the system indicating that the power supply is functioning correctly.

Power-Supply Features

Most PS/2 power supplies support the following features.

Operating Voltage Range: PS/2 power supplies can be operated continuously over the following ranges: 100V Range (90 to 137 VAC) and 200V Range (180 to 265 VAC) with a sine wave input with maximum 5% total harmonic distortion.

On some models, the power supply automatically switches to the required voltage, and on others, there is a manual switch.

No-Load Operation: All PS/2 power supplies are designed to operate at No Output Load.

Over-Current Protection: All PS/2 power supplies have output over-current protection. If more than a safe current is pulled from any output on the power supply, the power supply shuts down until the on/off switch is recycled.

Short-Circuit Protection: All PS/2 power supplies have protection from shorts being placed between an output and ground, or between two outputs. This prevents damage to the power supply if a fault occurs in the system. The power supply shuts down until the on/off switch is recycled.

Over-Voltage Protection: All PS/2 power supplies have protection from output over-voltage. Before any voltage exceeds 130% of its nominal value, the power supply automatically shuts down until the on/off switch is recycled.

Under-Voltage Protection: If any voltage drops below its regulation range, the “power good” signal drops, preventing any further processing in the system.

Automatic Restart: Most PS/2 power supplies have an automatic restart feature. This allows the power supply to restart after an AC voltage power outage. Beginning with products announced in October 1990, a 3 to 6 second delay was added to enable all subsystems and peripherals ample time to reset, prior to sequencing power back to the system.

Power-Line Disturbances: All PS/2 power supplies have been tested for power-line disturbances. Power supplies will stay in specification if any of the following conditions occur:

A 20% below nominal voltage for 2 seconds repeated 10X with a 10% duty cycle (80V in 100V Range and 160V in 200V Range).
A 30% below nominal voltage for .5 seconds repeated 10X with a 10% duty cycle (70V in 100V Range and 140V in 200V Range).
A 15% above nominal voltage for 1 second repeated 10X with a 10% duty cycle (143V in 100V Range and 276V in 200V Range).
A 400Hz oscillatory, exponentially decaying disturbance at the peak of the input line voltage. The initial impulse of the disturbance will increase the input voltage by an amount equal to the nominal line voltage. This is performed 100 times at 3 second intervals.
A pulse of 1.5X the peak input voltage superimposed at the peak of the input voltage applied 100 times at 3 second intervals.

Power supplies will not be damaged if any of the following occurs:

A 100% power outage of any duration
A brownout
A 2.5kV spike is applied to the AC input (for example, a lightning strike, or a lightning simulation test).

Surge Protection: External surge suppressors are not required on PS/2 systems. The systems are designed to resist typical power surges. More severe surge levels are possible, but the probability is quite low. A defective external surge suppression device can cause intermittent system failures. No design or performance standards have been established for these devices and there is no easy way to test them. If the system has undetectable intermittent failures and there is a surge suppressor installed, try operating the system without the surge suppressor.

Safety: All PS/2 power supplies are designed to world safety requirements, such as UL, CSA, IEC, and Nordic.

Current Leakage: All PS/2 power supplies have an extremely low leakage-to-ground rating of 500 microamps. This is especially important if you are using an outlet that has a defective or missing ground line.

Reliability: PS/2 power supplies have demonstrated field failures approaching 500 000 hours before failure.

Uninterruptible Power Devices: Uninterruptible power devices are designed to supply continuous power to the system in the case of a power outage. They are usually used only when the potential loss of data or use is unacceptable.

Numerous devices of this type are available, but not all of them produce an AC sine wave voltage. U.S. PS/2 systems require sine wave. If the uninterruptible power device is defective or the wrong type, you might experience a failure that is extremely difficult to diagnose.

Power Supply Voltage Check

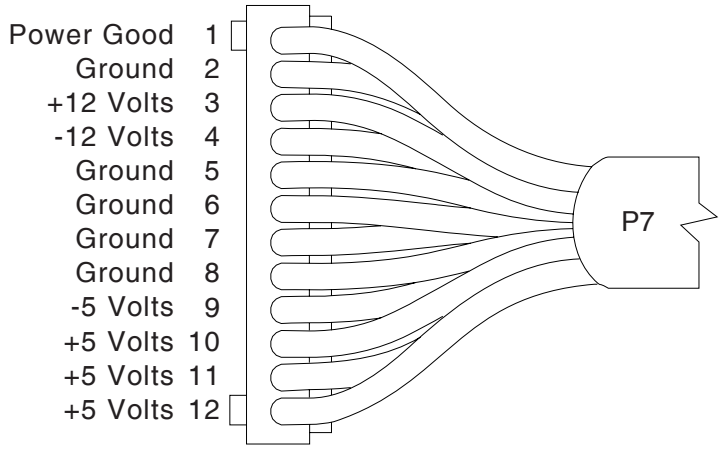
If the power-on indicator is not on, and if the power-supply fan is not running, check the power cord for proper installation and continuity.

Note: Verify that the voltage-select switch (if applicable) is set for the correct voltage.

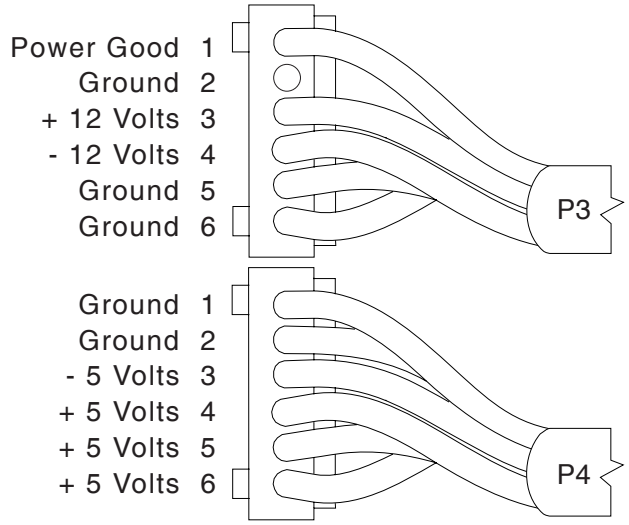
If the power cord is OK, either the power supply is defective or a defective device is causing the power supply to shut off. Check the power supply voltages.

If the voltages are incorrect, replace the power supply. If the voltages are correct, and the Symptom-to-FRU index does not solve the problem, go to "Undetermined Problems" on page 183.

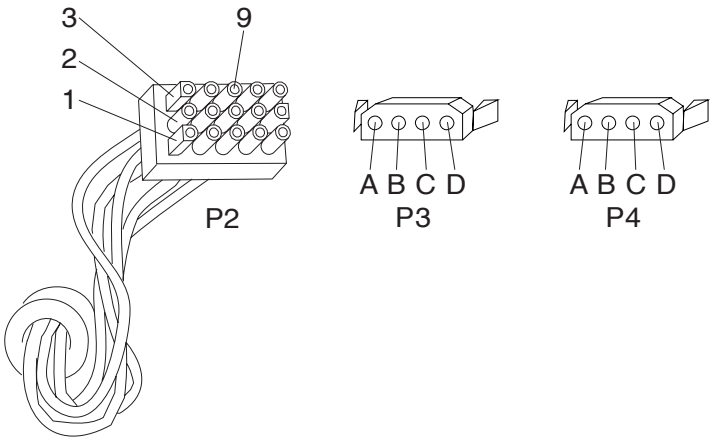
Models 25, 25 SX, 25-286



Models 30, 30-286



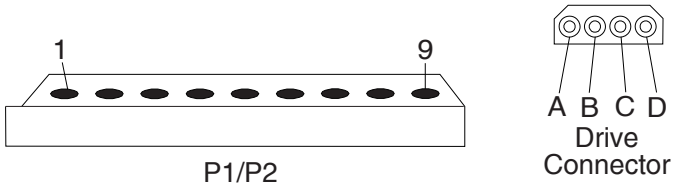
Models 60, 65, 80



–Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
2	9	–9.0	–15.0
2	3	+9.0	+15.0
2	1	+3.7	+ 6.2
B	D	+3.7	+ 6.2
C	A	+9.0	+15.0

Model 90

Check the voltages with connectors P1 and P2 plugged into the system board.



–Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
1 (P1)	2-7 (P1)	+ 4.8	+ 5.25
1 (P1)	8,9 (P1)	+11.5	+12.6
2 (P2)	1 (P2)	–11.5	–12.6
B	D	+ 4.8	+ 5.25
B	A	+11.5	+12.6

There are two systems fans: one in the power supply, and a second fan on the base. If the power supply fan does not work, replace the power supply. If the second fan does not work, replace it.

Passwords

Any combination of up to 7 alphanumeric characters (A–Z, a–z, and 0–9) is supported.

Note: If the wrong password is typed three times, the system logs an error in the system error log and you cannot continue without restarting the system.

Removing a Power-On Password: The method used to erase a power-on password varies, and so does the location of the password jumper (known as the *override* jumper.) Make sure you either backup, or make note of, the current configuration before you erase the password. After service, follow the instructions on the screen, and reset the date, time, and any customized configuration data. (You can use Backup/Restore to save it, or Automatic Configuration after service.)

To erase the power-on password, do the following:

Models 25, 30, 33, 35, 40, 56, 57, 76, 77, 85, 90, 95 Override Jumper

The override jumper is located on the system board.

System	Jumper Location
Model 25 SX	J2
Models 25, 30 (286)	J13
Models 8535, 8540	J14
Models 9533, 9535, 9540	J20
Models 8556, 8557	J18
Models 9556, 9557, 9576, 9577, 9595	JMP1
Model 90	J10
Server 85, Model 95	J16

1. Power-off the computer and unplug the power cord.
2. Remove the system-unit cover.
3. Move the password jumper to connect the center pin and the pin on the opposite end of the connector.
4. Power-on the computer. The system senses the change in the jumper position and erases the password. There is no need to move the jumper back to the previous position.

Additional Override Jumper Functions

The override jumper is most often used to erase a power-on password. However, on IML systems, moving the jumper also has the following effects on the system.

Unattended Start Mode (Server Mode)

If the Unattended Start Mode is activated, power-off the computer, move the jumper; then power-on the computer. The unattended start mode is deactivated. You must reset the Unattended Start Mode. (Power-on password is required to run in the Unattended Start Mode).

Override Jumpers on IML Systems

The Server 95A has no System Partition. It loads the IML and POST from the EEPROM on the system board or on the processor board. If a power-on password is set and the Reference Diskette is in the diskette drive, move the password override jumper; then power-on the computer. The system default is bypassed and the system loads the IML image from the Reference Diskette. The next time you power-on the computer, the IML and the POST load from the EEPROM.

The Server 85 and Server 95 load the IML from the EEPROM, but the POST is in the System Partition. If a power-on password is set and the Reference Diskette is in the diskette drive, move the password override jumper; then power-on the computer. The system default is bypassed and the system loads the IML image from the Reference Diskette. The next time you power-on the computer, the IML loads from the EEPROM and the POST loads from the System Partition.

All other IML systems system load the IML and the POST from the System Partition. If a power-on password is set and the Reference Diskette is in the diskette drive, move the password override jumper; then power-on the computer. The system default is bypassed and the system loads the IML image from the Reference Diskette. The next time you power-on the computer, the IML loads from the System Partition.

Privileged-Access Password

Note: The privileged-access password jumper is always JMP2.

This is used with other security features to make the system inoperative after a forced entry, until the password is typed. It also overrides the power-on password, if installed, and restricts access to the system programs.

You cannot erase or override the privileged-access password. The user or the technical support person at the

Memory Problems

Models 50, 55, 60, 65, 70, and 80

Note: For other Models, see the following information.

Finding the Failing Memory

Note: Running customer diagnostic tests will deallocate defective memory. After you replace defective memory, run the memory diagnostic test to enable the replacement memory. Then, restart the computer and rerun the same test to validate the installed memory-module kits.

Use the following procedure when you suspect a problem with the system memory.

1. Run the advanced-memory diagnostic test. If the test does not indicate which memory-module kit failed, or if the system hangs, try running the test from the System Diskettes. If you still cannot identify which memory-module kit failed, return here and continue with the next step.

   Note: If a screen message appears, asking if you have replaced a specific memory-module kit, suspect that *it* is the failing kit.

2. Using a known-good kit, exchange each kit, one at a time, and repeat the memory diagnostic test until you find the defective kit. Replace *only* the defective kit. If the kits are not the problem, suspect:
   Riser Card (if used)
   Memory Expansion Adapter (if used)
   System Board

Models 53 (9553-xBx) 56, 57, 76, 77, 85, 90, and 95

On these systems, the "X" digit of the POST error (for example, 00020x**X**x), indicates the socket location.

Determining Failing Memory Location

"X" digit equals	56, 57 Socket	76, 77 Socket	90 Socket	85, 95 Socket
X=1	Mem 1	Mem 1	J1 (J11)	A1
X=2	Mem 3	Mem 3	J3	B1
X=3	Mem 2	Mem 2	J2	A2
X=4	Mem 4	Mem 4	J4	B2
X=5			J1 (J14)	A3
X=6			J2	B3
X=7			J3	A4
X=8			J4	B4
X=U	Unknown			

When a mixture of 4MB, 8MB, and 16MB (or larger) memory-module kits are installed in the 9585-xKx, and

9585-xNx computers, the smaller kits must be installed in the higher-numbered connectors (A4/B4 is the highest), and the larger kits in the lower-numbered connectors (A1/B1 is the lowest).

Determining Memory Type, Size and Speed

The "Y" digit of the POST error (for example, 00020xx**Y**), indicates the type, size, and speed.

"Y" digit equals	**Type**	**Size**	**Speed**
Y=0	Parity	4MB	80ns
Y=1	Parity	2MB	100ns
Y=2	Parity	1MB	100ns
Y=4	Parity	4MB	70ns
Y=5	Parity	2MB	85ns
Y=6	Parity	1MB	85ns
Y=8	Parity	8MB	80ns
Y=9	Parity	2MB	80ns
Y=B	Parity	8MB	70ns
Y=C	Parity	2MB	70ns
Y=D	Parity	2MB	120ns
Y=E	Parity	1MB	120ns
Y=K	ECC	16MB	70ns
Y=Q	ECC	4MB	70ns
Y=R	ECC	32MB	70ns
Y=S	ECC	8MB	70ns
Y=T	ECC	2MB	70ns
Y=Z	Unknown		

If you are still unable to determine which memory-module kit failed, follow the isolation procedure under "Finding the Failing Memory" on page 125.

Determining Models 90/95 Processor Type

On these models, memory operation differs with each type of processor board (type 1, 2, or 3). Use any of the three methods in the "Processor Board Matrix (90, 95)" to determine which one it is, then continue with the appropriate memory section.

Processor Board Matrix (90, 95)

1. Go to the Diagnostic Main Menu and select **Display revision levels** (you might have to select **More utilities** first). Note the submodel code displayed on the screen. (The customer can use this screen to tell you the submodel code.)
2. Read the FRU number printed near the card-edge of the processor board.
3. Look for a second label (marked P1 - PC) to the right of the front serial number of the system. The second label indicates that the processor board has been upgraded.

The following table converts the model code, submodel code, FRU number, reference diskette type, or the second label to the processor type.

Mod	Sub Mod 90	Sub Mod 95	Processor Board FRU Number and Description	2nd Lab.	Ref Disk Type
0GX	2D	2C	92F0049 486SX 20	- -	1
0JX	11	14	64F0201 486 25	P1	1
0KX	13	16	64F0198 486 33	P2	1
0MX	2B	2A	92F0048 486 50	P3	1
0GX	2F	2E	92F0065 487SX 20	P4	1
0HX	57	58	92F0079 486SX 25	P5	2
0HX	59[1]	5A[1]	92F0079 486 SX25[1]	P6	2
0LX	3F	40	92F0161 486DX2 25/50	P7	2
0HX	5B[2]	5C[2]	92F0079 486 25/50[2]	P8	2
0MX	29	28	57F1597 486 50	PA	3
0NX	43	42	61G2343 486DX2 33/66[3]	PB	4
0PX	45	46	92F0120 586DX2 66	PE	4
0NX[4]	N/A	44	61G2343 486DX2 33/66[3]	PB	4
0PX[4]	N/A	47	92F0120 586DX2 66	PE	4

[1] Also has a 487SX processor (FRU 92F0100).

[2] Also has a 486 processor (FRU 92F0147).

[3] Has built-in Level 2 cache.

[4] Model 9095A

Memory (Type 1 Processor Boards)

Only interleaved memory configurations are supported. The system memory-module kits operate in pairs. Each pair must be the same memory size, speed, and type.
On the Model 90, the pairs are J1 & J3, J2 & J4, on each riser card.
On the Model 95 the pairs are A1 & B1, A2 & B2, A3 & B3, A4 & B4, on the system board.
Only *parity* (70ns, 80ns and 85ns) kits are supported. Minimum operating requirement is one *pair* of 1MB kits. Total system memory capacity is 64MB.

Memory (Type 2 Processor Boards)

Interleaved and noninterleaved memory configurations are supported. If the kits are installed in pairs of the same memory size, speed, and type, the kits will run in interleaved mode. Any other configuration is supported, but will run in noninterleaved mode.
On the Model 90, the pairs are J1 & J3, J2 & J4, on each riser card.
On the Model 95, the pairs are A1 & B1, A2 & B2, A3 & B3, A4 & B4, on the system board.
Only *parity* (70ns and 80ns) kits are supported. Minimum operating requirement is one 2MB kit. Total system memory capacity is 64MB.

Memory (Type 3 Processor Boards)

Only interleaved memory configurations are supported. The system memory-module kits operate in pairs. Each pair must be the same memory size, speed, and type.
On the Model 90, the pairs are J1 & J3, J2 & J4, on each riser card.
On the Model 95, the pairs are A1 & B1, A2 & B2, A3 & B3, A4 & B4, on the system board.
Parity (70ns, 80ns, and 85ns) or Error Correcting Code (ECC) (70ns) kits are supported (but not a combination of both). Minimum operating requirement is one *pair* of 4MB *ECC* kits or one *pair* of 1MB *parity* kits. Total system memory capacity is 64MB.

If the advanced diagnostic tests (with the wrap plug installed) do not detect a failure, replace the printer cable. If that does not correct the problem, do one of the following:

If the printer is attached to the parallel port on the system board, replace the system board.

If the printer is attached to the parallel port on an adapter, replace FRUs, in the following order, until the problem goes away:

1. Adapter
2. System board
3. Bus adapter (if installed)

Processor Board Installation (90, 95)

Improper installation can cause hard to diagnose failures, and simulate various error conditions. If the processor board fails, you might want to try reseating it.

Note: Never use the blue levers (on the board), to initially seat the board. The levers are intended to help you remove the board.

To install a processor board correctly:

1. Align the board with the *designated* slot (not an expansion slot).
2. Move the blue levers to the up (unlocked) position.
3. Firmly press the board into the slot until it snaps into place.
4. Simultaneously, move the blue levers to the down (locked) position.

Processor Boards with Diagnostic LEDs:

The 50-MHz Type 3 processor board in a 90/95 (submodel code 28 and 29), has two LEDs; one in position CR1, and one in CR2. During POST, CR1 should come on momentarily and CR2 should stay off. If the LEDs work any other way, suspect that the processor board is defective. Use the LEDs to help differentiate between a processor board or a system board failure. If you are instructed to replace one of the boards, and the problem still exists, replace the other board (also reinstall the first board).

Processor Boards without Diagnostic LEDs:

If the processor board does not have LEDs, you might not always be able to differentiate between processor board and system board failures. If you are instructed to replace one of the boards, and the problem still exists, replace the other board (also reinstall the first board).

a thickness of 3.3 mm, 5.0 mm, or 10.5 mm. Available PC Cards include Ethernet, Token Ring, modems, 3270 emulator, FAX, memory, solid state hardfiles, and hard disk drives.

Two key elements of PCMCIA technology are Socket Services and Card Services. Socket Services identifies how many option slots are in the computer and detects the insertion or removal of a PC card while the computer is powered on. When a PC Card is inserted and detected, Card Services immediately reconfigures the computer to give the new PC Card access to the system memory, interrupts, and other computer functions.

Video

The video subsystem is either on the system board or the display adapter. The video subsystem operates in two video modes:

VGA compatibility mode
XGA compatibility mode

Most display adapters support up to 1MB of video memory. When the computer is powered-on, the graphics array is in the VGA mode. In this mode, all alphanumeric text, and the VGA all-points-addressable (APA) graphics modes are supported. The maximum resolution in VGA compatibility mode is 720 x 400 picture elements (PELS) in the text mode, and 640 x 480 PELS in the graphics mode. A maximum of 256 colors or 64 shades of gray are supported in VGA mode. Composite video is not supported.

The graphics array is in the XGA mode only when enabled by the DOS Adapter Interface or other video device drivers (example: Microsoft** Windows**, OS/2*, and Presentation Manager* device drivers).

The XGA and XGA-2 works with monochrome and color, analog, and direct-drive displays.

The following table shows how the amount of video memory available affects the maximum color and resolution.

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* Trademark of the IBM Corporation.
** Trademark of the Microsoft Corporation.

ASCII Terminals

The terminal attaches to the system board serial connector. There are physical differences among the ASCII terminals that affect the system setup.

Notes:

1. Not all systems support an ASCII terminal. (See “PS/2 System Specifications” on page 435 for more information.)
2. Not all operating systems will support an ASCII terminal.
3. Beginners All-Purpose Symbolic Instruction Code (BASIC) language is not supported when using an ASCII terminal.
4. High-resolution graphics are not available when using an ASCII terminal.

ASCII Terminal Setup and Menu Selection

Use the setup instructions supplied with the ASCII terminal. As you are using those instructions, you will need to know the following information:

Use a null-modem cable or a null-modem connector with the communication cable when attaching the ASCII terminal to the serial connector on the computer.

If the ASCII terminal has a test switch next to the keyboard connector, make sure it is in the normal position.

When you use the system programs to define the setup values on the ASCII terminal, be sure the machine mode matches the actual terminal you are installing. For example, if you are installing a 3151 ASCII Display Station, the Machine Mode on the Setup Menu must be set to IBM3151. When the setup values correctly match the terminal type, the machine is considered to be in the *native machine mode*.

Set the Communication values on the terminal as follows:

```
Line Speed (bps)            96
Word Length (bits)             8
Parity                      No
Stop Bit                     1
```

Notes:

1. When using the system programs, do not install an emulation cartridge unless it will support native machine mode.
2. The terminals designed for countries where English is not the native language must support the ISO 8859/1.2 code page. Some of the terminals require a cartridge to support this code page. Check the documentation supplied with the terminal to see if the terminal requires a cartridge.

ASCII Terminal Configuration

When using an ASCII terminal, you must define the setup values so that the terminal can correctly communicate with the system.

Console Selection: The system has a Set Console utility program that lets you tell the system you are using an ASCII terminal.

Without the Set Console utility program, the system will use the default values shown. The ASCII terminal values must match these values. Complete the following steps to use an ASCII terminal.

Before you make these selections in the Set Console utility program, make sure that you have an ASCII terminal *attached* to the system.

1. Start the system programs.

   Note: If you start the system programs from an ASCII terminal, power-on the terminal then the system. Press and hold **Ctrl**. Then press and release **C+A+D**. When the cursor moves to the top-right corner of the screen, press **Ctrl+**`I`.
2. Select **Set features** on the system programs Main Menu.
3. Select **Set console** on the Set Features Menu.
4. Select **ASCII terminal** on the Set Console Menu.

The values must be:

```
Baud rate                  96
Bits per character             8
Parity                     None
Stop bits                     1
```

Note: These instructions assume that you have already set the terminal to the same values described in “ASCII Terminal Setup and Menu Selection” on page 430.

Any time you change the ASCII terminal values, you also must update the system values to match it. The baud rate should always be 9600 or above. If you set the baud rate below 9600, system performance will be slow.

Operation: Some of the ASCII terminal operations are listed below.

Communication When using an ASCII terminal, the communication parameters will appear on the information panel (for example `96-8N1`). This information is not an error message.

Configuration When you run the system programs or diagnostic programs from the ASCII terminal, the terminal values might change. Check the terminal values. If they have changed, reset them.

Utilities To start the system programs when using an ASCII terminal, follow the instructions supplied with the operating system. When the cursor moves to the top-right corner of the screen, press **Ctrl+I**.

Diagnostics When an ASCII terminal is selected as the system console, the following will not appear on the diagnostic installed device list:

Keyboard
Mouse
System board async port
Video displays

Error Messages: If you get a 161 or 173 error during POST, the selection you made in the Set Console utility program is no longer valid. When this happens, the system will look for a video adapter. If it finds one, the keyboard and display will be used as a console. If it does not find one, the ASCII terminal will be used as a console.

96 8N1 Error Message: This is not an error message. An 96 8N1 message on the Model 95 console indicates that the system is set to ASCII terminal mode. If no ASCII terminal is attached, remove the battery, then wait five minutes. Replace the battery and restart the system.