IBM

ValuePoint
Hardware Maintenance
Manual Supplement

April 1994

Types 6472, 6482, 6484, 6492, and 6494

This package contains a supplement to the IBM
PS/ValuePoint *Hardware Maintenance Manual* (part
number 71G5388, form number S61G-1423-01).

**Insert this package in the back of the manual. (Align
the pages in the manual, then press the pages into
place with your fingers.)**

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Model 64XX Service Information

This supplement contains a general checkout and diagnostic test procedure, a Symptom-to-FRU Index, procedures for isolating problems to a FRU, a parts catalog, system specifications, a system board layout, exploded views, and a 64XX computer features table for the IBM* ValuePoint* Models 6472, 6482, 6484, 6492, and 6494.

The diagnostic tests in this manual are intended to test *only* 64XX ValuePoint products. Other products, prototype cards, or modified options can give false errors and invalid computer responses.

> **Important**
> - Use the ValuePoint Advanced Diagnostics Diskette Type 5 for all models in this supplement.
> - For systems preloaded with Windows**, QAPlus/WIN** for ValuePoint is available in the Windows environment as an additional diagnostic aid.
> - Call 1-800-772-2227 for the latest BIOS level for the system you are servicing.

Before Replacing 64XX System Boards

For all 64XX models, the processor is a separate FRU from the system board; the processor is not included with the system board FRU.

If you are instructed to replace the system board, do the following:

1. Install the processor from the old system board on the new system board.
2. If any of the following options are on the old system board, install them on the new system board.
   - external cache memory and cache tag RAM
   - memory modules
   - extended video memory
3. Ensure that all the new system board jumper settings match the old system board jumper settings.

If the new system board does not correct the problem, reinstall the options on the old system board, reinstall the old system board, then replace the processor.

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How to Install 64XX Processors

Install all model 64XX processors with the bevelled corner located at the front-left corner of the processor socket.

Important

If the processor is not installed correctly, the system board and the processor will be damaged.

How to Diagnose 64XX system boards with 486DX4 Processors

The 486DX4 processor FRU consists of the processor and a voltage regulator. If you are instructed to replace the system board, first check for 3.5 V dc between pin 1 and pin 19 on the regulator board.
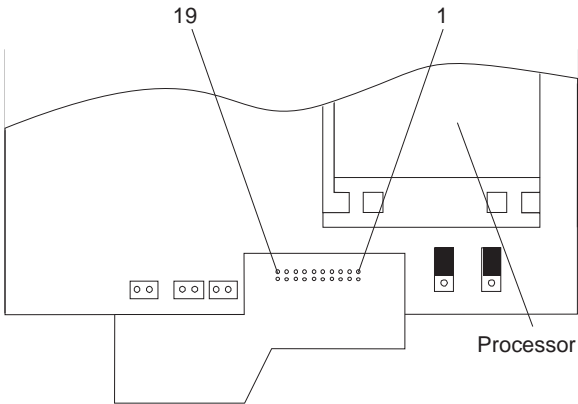
1. If the voltage is correct (approximately 3.5 V dc) replace the system board.
2. If the voltage is incorrect, replace the processor FRU.

The general checkout procedure starts on the next page.

General Checkout

001

– Power-off the computer and all external devices.
– Check all cables and power cords.
– Make sure there are no diskettes in the drives.
– Power-on all external devices.
– Power-on the computer.

   Note: You can press **Esc** to speed through the memory count when the system is first powered on.

– Watch the screen for a POST error message.

DID YOU RECEIVE A POST ERROR MESSAGE?

Yes No

> **002**
>
> Go to Step 008.

003

IS THE ERROR 162?

Yes No

> **004**
>
> If you remove or install memory, a 164 error is displayed. Follow the instructions on the screen. Otherwise, go to "Symptom-to-FRU Index" on page 12 in this supplement. If that does not solve the problem, go to Step 008.

005

HAS THE CONFIGURATION BEEN INTENTIONALLY CHANGED?

Yes No

> **006**
>
> Go to Step 008.

007

Press **Enter** to run the Configuration Utility program and verify that the error is no longer present. If you return to this point again, go to Step 008.

008

– Insert your diagnostics diskette.
– Press **Ctrl+Alt+Del**.
(Step **008** continues)

008 (continued)
**DID THE COMPUTER BOOT FROM THE DIAGNOSTIC
DISKETTE AND DID THE IBM HARDWARE
DIAGNOSTIC LOGO SCREEN APPEAR?**
Yes No

  009

  Go to "Symptom-to-FRU Index" on page 12 in this
  supplement.

010

– Select Test the System.
– Press **Enter**.
– If you need to create a formatted test diskette for this
  test, press **Y**, press **Enter**, then follow the instructions
  on the screen.
  Otherwise, press **N**, press **Enter**, then go to Step 011.

011

IS THE INSTALLED DEVICES LIST CORRECT?
Yes No

  012

  Press **N**, then press **Enter**. Go to "Installed Devices
  List" on page 8 in this supplement. If that does not
  resolve the problem, continue with Step 016 on
  page 5.

013

– Press **Y**, then press **Enter**
DID THE "SYSTEM CHECKOUT" MENU APPEAR?
Yes No

  014

  Go to "Symptom-to-FRU Index" on page 12 in this
  supplement.

015

– Run the diagnostics tests.

  • If the test stops and you cannot continue, replace
    the last device tested.
  • If the computer has incorrect keyboard responses,
    go to "Keyboard" on page 9 in the PS/ValuePoint
    Hardware Maintenance Manual.
  • If the printer has incorrect responses, go to
    "Printer" on page 9 in the PS/ValuePoint Hardware
    Maintenance Manual.
  • If the display has problems such as jittering, rolling,
    shifting, or being out-of-focus, go to "Display" on
    page 7 in this supplement.

DID THE TESTS IDENTIFY A FAILURE?

Note: If the test stops and you cannot continue, replace the last device tested.

Yes No

> **016**
>
> Check the "Symptom-to-FRU Index" on page 12 in this supplement for any POST error or other error symptom you might have. If your error symptom is not listed, go to "Undetermined Problem" on page 6 in this supplement. If you cannot find a problem, it might be intermittent:
>
> - Check for damaged cables and connectors.
> - Reseat all adapters, drives, and modules.
> - Check the system unit fan for proper operation.
> - Start an error log and run the tests multiple times (see "Error Log" on page 42 in this supplement).

017

Follow the instructions on the display. If that does not correct the problem, go to "Symptom-to-FRU Index" on page 12 in this supplement.

Undetermined Problem

Check the power supply voltages (see "Power Supply" on page 6 in the PS/ValuePoint *Hardware Maintenance Manual*). If the voltages are correct, return here and continue with the following steps:

1. Power-off the computer.
2. Remove or disconnect the following, one at a time:
   a. Non-IBM devices
   b. External devices (modem, printer, or mouse)
   c. Math coprocessor
   d. Any adapters
   e. Riser card
   f. Memory modules (see "Computer Memory" on page 11 in this supplement).
   g. Extended video memory
   h. External Cache
   i. External Cache tag RAM
   j. Hard disk drive
   k. Diskette drive
3. Power-on the computer to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the system board (see "Before Replacing 64XX System Boards" on page 1 in this supplement).

Display

If the screen is rolling, replace the display assembly. If that does not correct the problem, replace the system board.

If the screen is not rolling, do the following to run the display self-test:

Note: The following test does not work on all ValuePoint displays. If the test does not work, but you suspect the display, replace it. If that does not solve the problem, reinstall the original display, then replace the system board.

1. Power-off the computer and display.
2. Disconnect the display signal cable.
3. Power-on the display.
4. Turn the brightness and contrast controls to their maximum setting.
5. Check for the following conditions:
   - You should be able to vary the screen intensity by adjusting the contrast and brightness controls.
   - The screen should be white or light gray, with a black margin (test margin) on the screen.

     Note: The location of the test margin varies with the type of display. The test margin might be on the top, bottom, or one or both sides.

   If you do not see any test margin on the screen, replace the display. If there is a test margin on the screen, replace the system board.

   Note: During the first two or three seconds after the display is powered on, the following might occur while the display synchronizes with the computer.
   - Unusual patterns or characters
   - Static, crackling, or clicking sounds
   - A "power-on hum" on larger displays

   A noticeable odor might occur on new displays or displays recently removed from storage.

   These sounds, display patterns, and odors are normal; do not replace any parts.

If you are unable to correct the problem, go to "Undetermined Problem" on page 6 in this supplement.

Installed Devices List

Follow the instructions on the screen for the installed devices list.

Warning: A customized setup configuration (other than default settings) might exist on the computer you are servicing. Running the Configuration Utility program might alter those settings. Note the current configuration settings and verify that the settings are in place when service is complete.

If the number of diskette drives shown in the installed devices list is not correct, do the following:

1. Restart the computer.
2. Run the Configuration Utility program to correct the drive information (see "Diagnostics and Test Information" on page 32 in this supplement).
3. Run the diagnostic tests.

If you cannot correct the drive information, replace FRUs, in the following order, until the problem goes away:

- Diskette drive
- Diskette-drive cable
- System board

If the number of hard disk drives shown in the installed devices list is not correct, do the following:

1. Check the hard disk drive jumper settings (see "Hard Disk Drive Jumper Settings" on page 44 in this supplement).
2. Check the voltages to the hard disk drives (see "Power Supply" on page 6 in the PS/ValuePoint *Hardware Maintenance Manual*).
3. Restart the computer and check the configuration.
   - If the first drive is missing, replace the primary drive.
   - If any other drive is missing, replace that drive.
   - If all drives are missing, replace the primary drive.

   If the problem remains, replace the drive cable. If that does not fix the problem, replace the system board.

If any other adapter or device is missing from the installed devices list, run the Configuration Utility program (see "Diagnostics and Test Information" on page 32 in this supplement). Check to see if any adapter or device is set to a conflicting address with any other adapter or device. Also be sure that any adapter or device missing from the list is not set to "disabled."

Note: If the device is still missing from the list, run the diagnostics provided with that device. Devices missing from a model 64XX installed devices list cannot be added to the list.

Memory

001

– Power-off the computer.
– Insert the diagnostics diskette into drive A.
– Power-on the computer.
– Make a note of any POST errors you receive. Disregard 164 errors (memory size).

DID YOU RECEIVE A 2XX POST ERROR?
Yes No

> **002**
>
> **DID THE COMPUTER BOOT FROM THE DIAGNOSTIC DISKETTE AND DID THE IBM HARDWARE DIAGNOSTIC LOGO SCREEN APPEAR?**
> **Yes No**
>
> > **003**
> >
> > You might have to press **Esc** to continue.
> > – Select "Test the System." Run the memory tests. (Use the **RUN TESTS ONE TIME** option.)
> > – Continue with the question in Step 004.
> > – or –
> > If the computer did not boot from the diagnostic diskette with the IBM hardware diagnostic logo screen displayed, go to "Symptom-to-FRU Index" on page 12 in this supplement.
>
> **004**
>
> – Select "Test the System." Run the memory tests. (Use the **RUN TESTS ONE TIME** option.)
> **DID THE MEMORY TESTS FINISH WITHOUT AN ERROR?**
> **Yes No**
>
> > **005**
> >
> > Follow the instructions on the display. If there are no instructions on the display, go to Step 007 on page 10 in this supplement.
>
> **006**
>
> Your computer memory is now functioning correctly. If you suspect an intermittent problem, start an error log (see "Error Log" on page 42 in this supplement).

(CONTINUED)

007

Press **Esc** to continue.
– Select "Test the System." Run the memory tests. (Use
the **RUN TESTS ONE TIME** option.) If you cannot run
the memory test or the test does not find a problem,
replace the memory modules, one at a time, until the
problem goes away. Refer to "Computer Memory" on
page 11 in this supplement. When the problem goes
away, replace the last memory module removed. If that
does not fix the problem, replace the system board.

Computer Memory

Four 72-pin connectors are available to add memory modules. Memory modules supported are 4MB, 8MB, 16MB, and 32MB with a maximum of 128MB. Memory module speed supported is 70 ns.

Notes:

1. QAPlus/WIN for ValuePoint and most applications do not recognize more than 64MB of memory.

2. A memory module must be installed in memory module connector 1 at all times. Additional memory modules must be installed in connector 2, then in connector 3, then in connector 4.

3. Smaller size memory modules must be installed into lower numbered memory module connectors. For example, to install two 4MB memory modules with two 8MB memory modules, the 4MB memory modules must be installed in memory module connectors 1 and 2 and the 8MB memory modules in memory module connectors 3 and 4.

ValuePoint Memory Module Chart

FRU Number	Size and Speed	6 3 8 1 S	6 3 8 2 S	6 3 8 4	6 3 8 4 D	P 6 0	6 3 8 7	6 4 X X
60G2950	16-70ns	X	X		X	X	X	X
64F3606	8-70ns		X	X	X		X	
64F3607	8-80ns		X	X	X		X	
73G3233	4-70ns	X				X		X
73G3234	8-70ns					X		X
73G3235	32-70ns					X		
92F0102	2-70ns		X	X	X		X	
92F0103	2-80ns		X	X	X		X	
92F0104	2-85ns		X	X	X		X	
92F0105	4-70ns		X	X	X		X	
92F3337	4-80ns		X	X	X		X	
93F0058	1-80ns			X				
96F9289	4-80ns			X				
71G0801	32-70ns							X

Symptom-to-FRU Index

The Symptom-to-FRU Index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with "General Checkout" on page 3 in this supplement. This index can also be used to help you decide which FRUs to have available when servicing a computer. If you are unable to correct the problem using this index, go to "Undetermined Problem" on page 5 in this supplement.

Notes:

1. If you have both an error message and an incorrect audio response, diagnose the error message first.
2. If you cannot run the diagnostic tests, but did receive a POST error message, diagnose the POST error message.
3. If you did not receive any error message, look for a description of your error symptoms in the first part of this index.
4. Check all power supply voltages before you replace the system board. (See "Power Supply" on page 6 in the PS/ValuePoint *Hardware Maintenance Manual*.)
5. Check the hard disk drive jumper settings before you replace a hard disk drive. (See "Hard Disk Drive Jumper Settings" on page 44 in this supplement.)

Important

1. For all 64XX models, some errors are indicated with a series of beep codes (see "Model 64XX Beep Code Index" on page 13 in this supplement).
2. For all 64XX models, the processor is a separate FRU from the system board; the processor is not included with the system board FRU (see "Before Replacing 64XX System Boards" on page 1 in this supplement).
3. The 486DX4 processor FRU consists of the processor and a voltage regulator. See "How to Diagnose 64XX system boards with 486DX4 Processors" on page 2 in this supplement before replacing the system board on models with this processor installed.

Model 64XX Beep Code Index

> **Important**
>
> In the following Beep Code Index, the numbers indicate the sequence and number of beeps. For example, a "2-3-2" error symptom (a burst of two beeps, three beeps, then a burst of two beeps) indicates a memory module problem. (Continue with the Symptom-to-FRU index below for other beep/no-beep symptoms.)

Beep Code	FRU/Action
1-3-1, 1-3-2	**Memory Module** System Board
1-4-4	**Keyboard** System Board
2-1-1, 2-1-2	**Run Setup** System Board
2-2-2	**Video Card** System Board
2-3-2	**Memory Module** System Board
2-4-3, 2-4-4	**Run Setup** Memory Module System Board
All other beep code sequences	**System Board**

In the following index, an "X" in an error message can represent any number.

Symptom/Error	FRU/Action
No power, or fan not running	**See "Power Supply" on page 6 in the PS/ValuePoint** *Hardware Maintenance Manual*.
No beep during POST but computer works correctly	**System Board**
No beep during POST	**See "Undetermined Problem" on page 6 in this supplement.** System Board Memory Module Any Adapter or Device Riser Card Power Cord Power Supply
One long and two short beeps during POST	**System Board**

| Symptom/Error	FRU/Action
Three short beeps during POST	**See "Computer Memory" on page 11 in this supplement.** System Board
Continuous beep	**System Board**
Repeating short beeps	**Keyboard (stuck key?)** Keyboard Cable System Board
Changing colors	**Display**
Intensity or color varies from left to right of characters and color bars	**Display** System Board
Flashing cursor with an otherwise blank display	**System Board** Primary Hard Disk Drive Hard Disk Drive Cable
Other display symptoms not listed above (including blank or illegible display)	**See "Display" on page 7 in this supplement.** System Board Display
Power-on indicator or hard disk drive in-use light not on, but computer works correctly	**Power Supply** System Board LED Cables
Diskette drive in-use light remains on or does not light when drive is active	**Diskette Drive** System Board Diskette Drive Cable
The "Insert a Diskette" icon appears with a known-good diagnostics diskette in the first 3.5-inch diskette drive	**Diskette Drive** System Board Diskette Drive Cable Network Adapter
Program loads from the hard disk with a known-good diagnostics diskette in the first 3.5-inch diskette drive	**Check Configuration Utility** Diskette Drive Diskette Drive Cable System Board Power Supply
A nonsystem disk or disk error-type message with a known-good diagnostic diskette	**Diskette Drive** System Board Diskette Drive Cable
Cannot read a 5.25-inch diskette	**The button on the PS/VP 5.25-inch diskette drive bezel must be pressed after inserting a diskette.**
Incorrect memory size during POST	**See "Memory" on page 9 in this supplement.** Memory Module System Board
Printer problems	**See "Printer" on page 9 in the PS/ValuePoint** *Hardware Maintenance Manual*.

| Symptom/Error	FRU/Action
Serial or parallel port device failure (system board port)	**External Device Self-Test OK?** External Device Cable System Board
Serial or parallel port device failure (adapter port)	**External Device Self-Test OK?** External Device Cable Alternate Adapter System Board Riser Card
Some or all keys on the keyboard do not work	**Keyboard** Keyboard Cable System Board
Clock Battery inaccurate	**Clock Battery** System Board
110	**Follow screen instructions** Memory Module System Board
161	**Run Configuration Utility** Clock Battery System Board
162 (and unable to run diagnostics)	**Diskette Drive** System Board Diskette Drive Cable
162	**Run Configuration Utility** Clock Battery System Board
163	**Time and Date Set?** Clock Battery System Board
164	**Run Configuration Utility** See "Memory" on page 9 in this supplement. System Board
199	**See "Installed Devices List" on page 8 in this supplement.**
1XX (not listed above)	**System Board**
225	**Unsupported Memory**
2XX	**See "Memory" on page 9 in this supplement.** Memory Module System Board
303 (with an 8603 error)	**Mouse** Keyboard Keyboard Cable System Board

Symptom/Error	FRU/Action
303 (with no 8603 error)	**Keyboard** Keyboard Cable System Board
305	**System Board** Keyboard Keyboard Cable Mouse
3XX (not listed above)	**Keyboard** Keyboard Cable System Board
604 (and unable to run diagnostics)	**Diskette Drive A** Diskette Drive Cable System Board
604 (and able to run diagnostics)	**Diskette Drive B** Diskette Drive Cable System Board
662	**Wrong diskette drive type**
663	**Wrong media type**
6XX (not listed above)	**Diskette Drive** System Board External Drive Adapter Diskette Drive Cable Power Supply
7XX	**Math Coprocessor** System Board
9XX	**System Board**
1047	**16-bit AT Fast SCSI Adapter**
10XX (not listed above)	**Alternate Parallel Adapter** Riser Card
11XX	**System Board**
12XX	**Alternate Serial Adapter** Riser Card
13XX (A properly functioning joystick or paddle must be attached)	**Game Control Adapter** Riser Card
14XX	**See "Printer" on page 9 in the PS/ValuePoint** *Hardware Maintenance Manual*.
15XX	**SDLC Communications Adapter** Riser Card

| Symptom/Error	FRU/Action
17X0 (1st Disk Drive) **17X1** (2nd Disk Drive) **17X2** (3rd Disk Drive) **17X3** (4th Disk Drive)	**See "Power Supply" on page 6 in the PS/ValuePoint** *Hardware Maintenance Manual***.** Hard Disk Drive System Board Hard Disk Cable Power Supply
209X	**Diskette Drive** Diskette Cable 16-bit AT Fast SCSI Adapter
20XX (not listed above)	**BSC Adapter** Riser Card
21XX	**SCSI Device** 16-bit AT Fast SCSI Adapter Alternate BSC Adapter Riser Card
2401, **2402**	**System Board** Display
2409	**Display**
2410	**System Board**
30XX	**PC Network Adapter** LF Translator Cable Problem? Riser Card
31XX	**Alternate PC Network Adapter** LF Translator Cable Problem? Riser Card
86XX	**Mouse** System Board
12902	**Run Diagnostics** System Board
12904	**Run Diagnostics** L2 Cache Adapter
I**99903**01 (Hard disk reset failure)	**Possible hard disk drive problem**
I**99903**05 (No startable device found)	**Restart computer from diskette or check for valid startup sequence** System Board
I**999XX**XX (not listed above) (There is an optional SCSI adapter installed)	**SCSI Hard Disk Drive** SCSI Adapter SCSI Cable

Type 6472 Parts
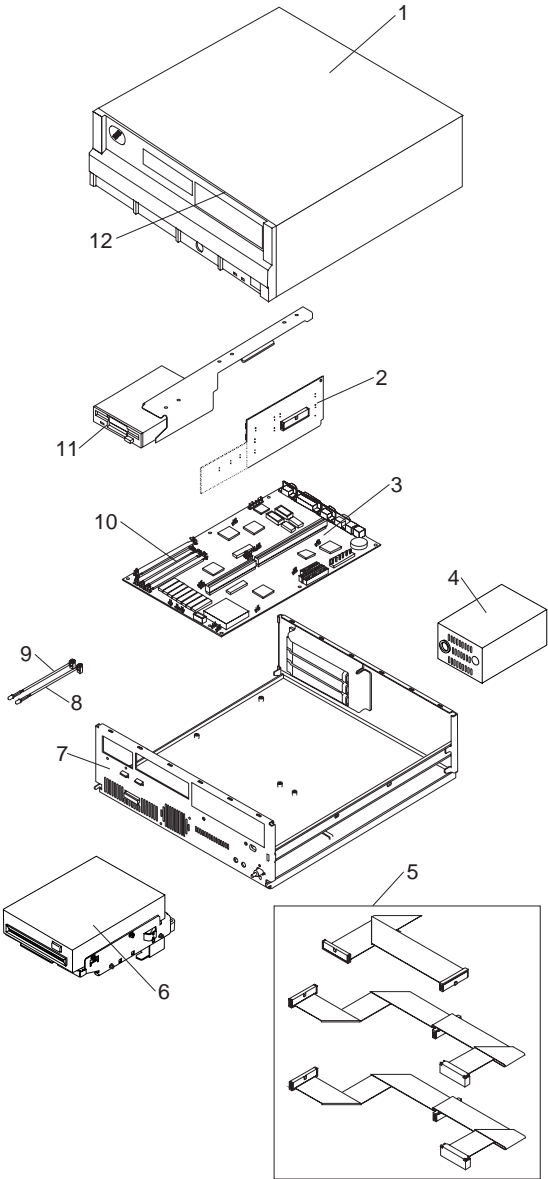
Type 6482, 6484 Parts
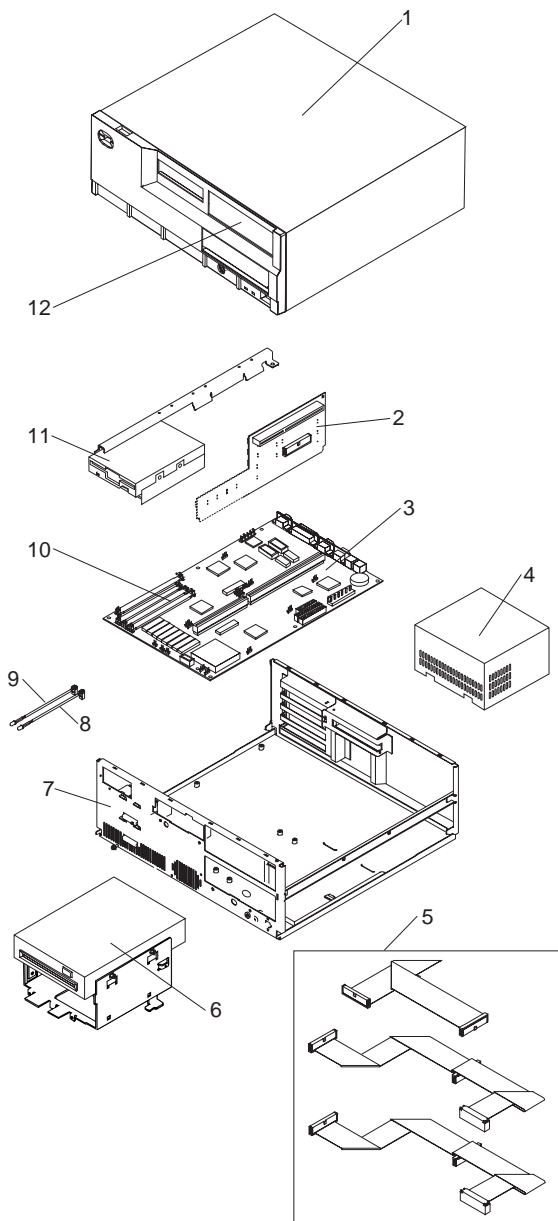
Type 6492, 6494 Parts
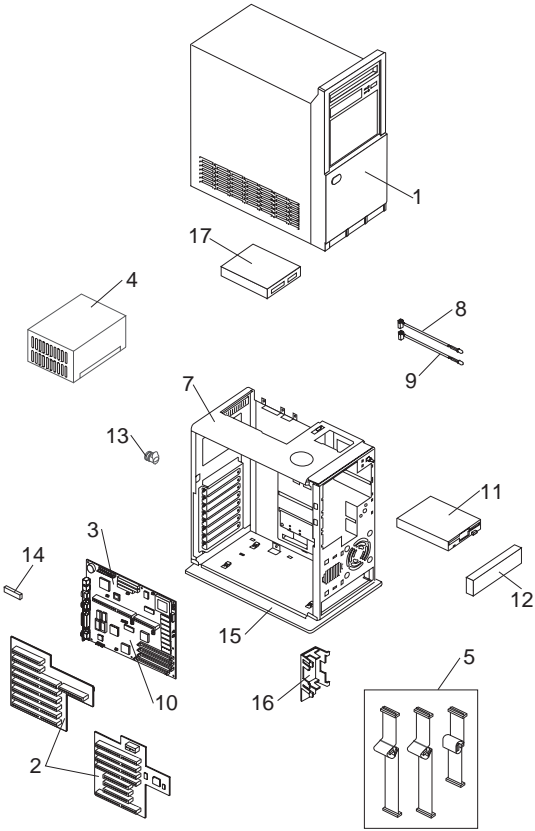
64XX Parts Listing

Note: Not all parts in this listing apply to all countries.
(R) indicates restricted parts.

Index	*System Unit*	
1	Top Cover Assembly (6472)	92F0414
1	Top Cover Assembly (6482, 6484)	92F0410
1	Top Cover Assembly (6492, 6494)	61G2169
	Logo (R)	06H3159
	Power Button (6472, 6482, 6484)	61G3204
	Power Button (6492, 6494)	61G3205
	Front Bezel w/ labels (6472)	06H3196
	Front Bezel w/ labels (6482, 6484)	06H3197
	Front Bezel w/ labels (6492, 6494)	06H3198
	Foot (4)	93F2386
2	Riser Card (6472)	06H3095
2	Riser Card (6482)	06H3096
2	Riser Card PCI (6484)	82G3555
2	Riser Card (6492)	06H3097
2	Riser Card PCI (6494)	82G3563
3	System Board (no memory or processor)	82G2397
	Processors	
	486SX 25Mhz	71G0790
	486SX 33Mhz	71G0791
	486SX2 25/50Mhz	71G0792
	486DX 33Mhz	71G0793
	486DX2 25/50Mhz	71G0794
	486DX2 33/66Mhz	71G0795
	486DX4 50/100Mhz	71G0796
	Lithium Battery - CR2032	33F8354
	L2 Cache 128KB	92G7430
	L2 Cache 256KB	92G7431
	Video DRAM, 1MB 16ns	92G7432
	Jumper, 2 position - 4 pack	93F0067
	EMC Clips - 7 pack	92F0420
	EMC Clips - 3 pack (6492, 6494)	61G3206
4	100 W Power Supply (6472)	92F0415
4	200 W Power Supply (6482, 6484)	92F0411
4	250 W Power Supply (6492, 6494)	82G5874
5	Diskette Drive Cable	92F0423
5	Hard Disk Drive Cable	92F0424
7	Base Frame Assembly (6472) (R)	92F0416
7	Base Frame Assembly (6482, 6484) (R)	92F0412
7	Base Frame Assembly (6492, 6494) (R)	92F0422
	Adapter Card Guides (2) (6472, 6482, 6484)	52G8746
	Speaker	92F0421
8	LED and Cable, Power	93F2389
9	LED and Cable, Hard Disk Drive	93F2388
10	72-Pin Memory Module, 4MB (70 ns)	73G3233
	72-Pin Memory Module, 8MB (70 ns)	73G3234
	72-Pin Memory Module, 16MB (70 ns)	60G2950
	72-Pin Memory Module, 32MB (70 ns)	73G3135
	Cover Lock w/ pawl (6472, 6482, 6484)	52G8744
13	Cover Lock w/ pawl (6492, 6494)	61G2177
14	Riser Card Support Clip (6492, 6494)	61G2365
15	Base Stand (6492, 6494)	61G2174
16	Adapter Card Guide (2) (6492, 6494)	61G2173
	Miscellaneous Parts Kit	53G0387
	Hardware Kit (Type 2 system board)	82G5894

Communication Adapters

Ethernet Adapter (twisted pair)	92F0386
Ethernet Adapter (coaxial)	92F0387
Token Ring Adapter	03F0212

Keyboard Cable and Mouse

Keyboard Cable Assembly 0.9 m (3 ft.)	61X8898
Keyboard Parts Kit	33F8174
Mouse	33G5420
Mouse (6381, 6384 P60/D, 64XX)	96F9258
— Mouse Ball and Pop-Off Retainer	33F8461
— Mouse Ball and Twist-Off Retainer	33F8462
— Mouse Ball and Clip (6381, 6384 P60/D)	96F9279

Keyboards

Arabic	1391490
Belgian	1391414
Belgian/French	1391526
Brazil (6381, 6384 P60/D, 64XX)	61G3976
Bulgarian	1399583
Canadian French	1392022
Canadian French (attached cable)	92F0334
Czechoslovakian	1399570
Cyrillic	1393866
Danish	1391407
Dutch	1391511
Finnish/Swedish	1391411
French	1391402
German	1391403
Greek	1399046
Hebrew	1391408
Hungarian	1399581
Italian	1393395
Latin-American Spanish	1392025
Latin-American Spanish (attached cable)	92F0333
Latin-American Spanish (6381, 6384 P60/D)	61G3976
Norwegian	1391409
Polish	1399580
Portuguese	1391410
Portuguese (6381, 6384 P60/D, 64XX)	61G3976
Romanian	1399582
Russian/Cyrillic	1399579
Serbian/Cyrillic	1399578
Slovakian	1399571
Spanish	1391405
Swedish/Finnish	1391411
Swiss	1391412
Swiss/French	1395881
Swiss/German	1395882
Turkish	1393286
U.K. English	1391406
U.S. English	1392090
U.S. English (attached cable)	92F0332
U.S. English (E/ME/A only)	1396790
Yugoslavian	1393669

Displays

6312 Color Display

90/137 V ac (U.S. and Canada)	39G3321
180/264 V ac (Northern Hemisphere)	39G3322
180/264 V ac (Equatorial)	39G3323
180/264 V ac (Southern Hemisphere)	39G3494
Tilt/Swivel Stand	39G3496

6314 Color Display

98/264 V ac (U.S. and Canada)	39G3352
98/264 V ac (Northern Hemisphere)	39G3353
98/264 V ac (Equatorial)	39G3454
98/264 V ac (Southern Hemisphere)	39G3498
Tilt/Swivel Stand	39G3502
Signal Cable	39G3331

6317 Color Display

98/264 V ac (U.S. and Canada)	39G3359
98/264 V ac (Northern Hemisphere)	39G3360
98/264 V ac (Southern Hemisphere)	39G3361

6319 Color Display

98/264 V ac (U.S. and Canada)	39G3385
98/264 V ac (Northern Hemisphere)	39G3386
98/264 V ac (Equatorial)	39G3387
98/264 V ac (Southern Hemisphere)	39G3500
Tilt/Swivel Stand	39G3503
Signal Cable	39G3331

6321 Color Display

98/264 V ac (U.S. and Canada)	72G8785
ITC Assembly for 72G8785	72G8784
Card Assembly for 72G8785	72G8783
Card Tray for 72G8785	68G3011

6324 Color Display

98/264 V ac (U.S. and Canada)	68G1356
ITC Assembly for 68G1356	68G1419
Card Tray Assembly for 68G1356	39G6257

6325 Color Display

98/264 V ac (U.S. and Canada)	68G1443
ITC Assembly for 68G1443	39G6292
Card Tray Assembly for 68G1443	68G1321

6327 Color Display

98/264 V ac (U.S. and Canada)	39G3362
ITC Assembly for 39G3362	72G8486
Card Tray Assembly for 39G3362	72G8489

Power Cords

Arabic Countries	14F0033
Australia	93F2365
Belgium	13F9979
Bulgaria	13F9979
Canada	93F2364
Czechoslovakia	13F9979
Denmark	13F9997
Finland	13F9979
France	13F9979
Germany	13F9979
Hungary	13F9979
Israel	14F0087
Italy	14F0069
Latin-America	93F2366
Netherlands	13F9979
New Zealand	93F2365
Norway	13F9979
Poland	13F9979
Portugal	13F9979
Serbia	13F9979
Slovakia	13F9979
South Africa	14F0015
Spain	13F9979
Switzerland	13F9979
Switzerland (French, German)	14F0051
U.S.	93F2364
UK, Ireland	14F0033
Yugoslavia	13F9979

Display Power Cord 38F3908

Special Tools

The following special tools are required to service these computers:

- A meter similar to the Triplett** Model 310 (IBM P/N 9900167)
- Wrap Plug, IBM P/N 72X8546

** Trademark of the Triplett Corporation

Product Description

Type 6472 computers contain three drive bays and three I/O adapter card slots. Type 6482 computers contain five drive bays and five I/O adapter card slots. Type 6484 computers contain five drive bays and four I/O adapter card slots. Type 6492 computers contain six drive bays and eight I/O adapter card slots. Type 6494 computers contain six drive bays and seven I/O adapter card slots.

- **Security**
  - Administrator password
  - Cover lock
  - Hard Disk password
  - Power-on password
  - U-bolt and cable
- **System Board (All Type 64XX)**

  Model 6472, 6482, 6484, 6492, and 6494
  - 64XX models using the 486SX processor have no math coprocessor. All other 64XX models have a built-in math coprocessor.
  - Supports at least 8KB internal cache and up to 256KB external cache.
  - RAM is installed directly onto the system board using industry standard, 72-pin, 70 ns parity memory modules. There are four sockets to allow a maximum of 128 MB (4MB, 8MB, 16MB, and 32MB memory modules are supported). Refer to "Computer Memory" on page 11.
  - 1 MB of Video memory (DRAM) is soldered on the system board. Two video DRAM sockets allow a maximum of 2MB of video DRAM.
  - Ports include: two serial, one parallel, one keyboard, one mouse, and one video.
  - Connectors for AT* riser card (120-pin), VESA** / PCI (116-pin), input power (12-pin), AT diskette drives (34-pin), Two AT hard disk drive connectors (40-pin each), power LED (2-pin), hard disk LED (2-pin), speaker (2-pin), and video feature (26-pin).
  - Lithium battery
- **Power Supplies** (with CPU power switch)
  - Type 64XX computers have either a 100W, 200W, or a 250W universal voltage power supply with a fan and a connector for a detachable grounded 3-wire power cord. The power cable has five DASD connectors (one 3.5-inch diskette drive minipower connector, and four standard 4-pin power connectors).

---

* Trademark of the IBM Corporation.
** Trademark of the Video Electronics Standards Association.

The 250W power supply has an additional PCI riser connector.

When the computer is powered off for 15 seconds or more and then powered on, the power supply generates a "power good" signal that resets the computer logic.

- **Cables**
  - Two signal cables for hard disk drives and one signal cable for diskette drives
- **Diskette Drives**
  - 3.5-inch 1.44MB Slimline diskette drive
  - 3.5-inch 2.88MB Slimline diskette drive (optional)
  - 5.25-inch 1.2MB diskette drive (optional)
- **IDE Hard Disk Drives**
    Hard disks are 3.5-inch Slimline AT drives
    - 170MB with 96/128KB read/write buffer
    - 270MB with 96KB read/write buffer
    - 340MB with 96/128KB read/write buffer
    - 364MB with 96KB read/write buffer
    - 527MB with 256KB read/write buffer
    - 540MB with 96KB read/write buffer
    - 728MB with 96KB read/write buffer
- **Keyboard**
  - Enhanced 101- or 102-key keyboard
  - 84-key keyboard (optional)
  - 122 Host-Connected keyboard (optional)
  - TrackPointII (optional)
    with 1.8 m (6 ft.) cable
- **Mouse** 2-button PS/2 with 1.8 m (6 ft.) cable

Power-On Password

A power-on password denies access to the computer by an unauthorized user when the computer is powered on. When a power-on password is active, the password prompt appears on the screen each time the computer is powered on. The computer starts after the proper password is entered.

Removing a Power-on Password: To service a 64XX computer with an active and unknown power-on password, power-off the computer and do the following:

1. Remove the battery for 15 minutes.
2. Reinstall the battery.
3. Power-on the computer. The password is erased from memory.

Note: Remind the user to enter a new password when service is complete.

Specifications (6472)

(Minimum configuration)

System Unit Size:

- Width: 360 mm (14.2 in.)
- Depth: 420 mm (16.5 in.)
- Height: 122 mm (4.8 in.)

System Unit Weight:

- 8.1 kg (17.8 lb)

Environment:

- Temperature (System Unit and Display)
    - Power on: 10 to 32 degrees C (50 to 90 degrees F)
    - Power off: 10 to 43 degrees C (50 to 110 degrees F)
- Humidity (System Unit and Display)
    - Power on: 8% to 80%
    - Power off: 8% to 80%
- Maximum altitude: 2134 m (7000 ft.)

Heat output:

- 120 BTU/hr

Electrical:

- Input voltage (sinewave input is required)
    - Low Range
        - Minimum: 90 V ac
        - Maximum: 137 V ac
    - High Range
        - Minimum: 180 V ac
        - Maximum: 265 V ac

Specifications (6482, 6484)

(Minimum configuration)

System Unit Size:

- Width: 404 mm (15.9 in.)
- Depth: 420 mm (16.5 in.)
- Height: 147 mm (5.8 in.)

System Unit Weight:

- 9.7 kg (21.4 lb)

Environment:

- Temperature (System Unit and Display)
  – Power on: 10 to 32 degrees C (50 to 90 degrees F)
  – Power off: 10 to 43 degrees C (50 to 110 degrees F)
- Humidity (System Unit and Display)
  – Power on: 8% to 80%
  – Power off: 8% to 80%
- Maximum altitude: 2134 m (7000 ft.)

Heat output:

- 120 BTU/hr

Electrical:

- Input voltage (sinewave input is required)
  – Low Range
    - Minimum: 90 V ac
    - Maximum: 137 V ac
  – High Range
    - Minimum: 180 V ac
    - Maximum: 265 V ac

Specifications (6492, 6494)

(Minimum configuration)

System Unit Size:

- Width: 187 mm (7.4 in.)
- Depth: 429 mm (16.9 in.)
- Height: 413 mm (16.3 in.)

System Unit Weight:

- 11.4 kg (25 lb)

Environment:

- Temperature, System Unit and Display
    – Power on: 10 to 32 degrees C (50 to 90 degrees F)
    – Power off: 10 to 43 degrees C (50 to 110 degrees F)
- Humidity, System Unit and Display
    – Power on: 8% to 80%
    – Power off: 8% to 80%
- Maximum altitude: 2134 m (7000 ft.)

Heat output:

- 934 Btu/hr (maximum configuration)

Electrical:

- Input voltage (sinewave input is required)
    – Low Range
        - Minimum: 90 V ac
        - Maximum: 137 V ac
    – High Range
        - Minimum: 180 V ac
        - Maximum: 265 V ac

Hard Disk Drive Specifications

Size (MB)	**170**	**270**	**270**	**340**	**364**
Bytes/Sector	512	512	512	512	512
Sectors/Track	34	40	40	55/48	48
Cylinders	984	944	944	1010/ 872	929
Heads	10	14	14	6/16	16
Rotate Speed (RPM)	3600/ 3551	4500	4500	3322/ 3600	4500
Transfer Rate (Mb/sec)	13.3/ 9.0	30-44/ 24-46	66/48	17-30/ 19-26	30-44/ 66
Seek Time (ms):					
Track-to-Track	5.0	12	12	4.5	12
Average	18.5	2/4	2/4	14.0	2
Maximum	32.5	25/23	25/23	29.0	25
Interleave Factor	1:1	1:1	1:1	1:1	1:1
Recording Method	1,7 RLL	PRML RLL	1,7 RLL	1,7 RLL	1,7 RLL
dc Power:					
+5 V Tolerance	±5%	±5%	±5%	±5%	±5%
+12 V Tolerance	±8%	±8%	±8%	±8%	±8%
Power (W):					
Idle (typical)	3.2/3.7	2.6/3.2	2.6/3.2	2.0	2.6
Seek (typical)	3.5/3.9	5.3/6.7	5.3/6.7	3.0	5.3
Startup (typical)	8.3/10.0	15.9/13	15.9/13	12.0	15.9

Size (MB)	**527**	**540**	**540**	**728**
Bytes/Sector	512	512	512	512
Sectors/Track	63	63	63	63
Cylinders	1024	1049	1049	1416
Heads	16	16	16	16
Rotate Speed (RPM)	6300	4500	4500	4500
Transfer Rate (Mb/sec)	22-44	30-44/ 24-46	66/48	30-44/ 66
Seek Time (ms):				
Track-to-Track	2.0	12	12	12
Average	9.0	2/4	2/4	2
Maximum	20.0	25/23	25/23	25
Interleave Factor	1:1	1:1	1:1	1:1
Recording Method	1, 7 RLL	1, 7 RLL	PRML RLL	1, 7 RLL
dc Power:				
+5 V Tolerance	±5%	±5%	±5%	±5%
+12 V Tolerance	±8%	±8%	±8%	±8%
Power (W):				
Idle (typical)	7.0	2.7/3.8	2.7/3.8	2.7
Seek, R/W (typical)	11.0	5.4/7.4	5.4/7.4	5.4
Startup (typical)	30.5	15.9/13.3	15.9/13.3	15.9

Diagnostics and Test Information

The following information is helpful when diagnosing computer problems on types 6472, 6482, 6484, 6492, and 6494.

Power-On Self Test

Each time you power-on the computer, the power-on self test (POST) is initiated. The POST takes up to 90 seconds to complete, depending on the options installed.

The POST checks the following:

- System board
- Memory
- Video
- Hard disk drive(s)
- Diskette drive(s)
- Keyboard
- Mouse
- Parallel port
- Serial port(s)

To start the POST, power-on the display and the computer. The following happens:

1. The following icon

   ```
   ~~~~ ~~
   ~~~~ ~~
   ~~~~ ~~
   ```

   appears at the upper-right corner of the display. Pressing F1 at this time causes the Configuration Utility menu to appear after the POST has completed.

2. A count of the computer memory appears at the upper-left corner of the display.

   Note: You can press **Esc** to speed through the memory count during POST.

3. If an error is detected, an error code appears under the computer memory count.

   Note: Memory errors appear as 2XX in the upper-left corner of the display (X can be a number or letter).

4. Successful completion of POST is attained when there are no errors detected in the computer.

5. The computer attempts to load the operating system. If an operating system is not found, a graphic message (icon) is displayed requesting the user to insert a diskette into drive A and press the F1 key to resume operation.

6. If a critical error is encountered, the POST is halted.

Diagnostics Diskette

> **Important**
>
> - Use the ValuePoint Advanced Diagnostics Diskette Type 5 for all models in this supplement.
> - For systems preloaded with Windows, QAPlus/WIN for ValuePoint is available in the Windows environment as an additional diagnostic aid.

The diagnostics program is intended to test only ValuePoint Models 6472, 6482, 6484, 6492, and 6494. Other products, prototype cards, or modified options can give false errors and invalid computer responses.

To load the diagnostics diskette:

1. Power-off the computer.
2. Install the diagnostics diskette in Drive A.
3. Power-on the computer.
4. Do not press **F1** when the icon appears.
5. If any POST error(s) appear after POST, make a note of the error(s) and press the **Esc** key.
6. An IBM hardware diagnostics logo screen appears, followed by the Diagnostic Diskette Main Menu.
7. Select "Test the System."
8. If you want to test diskette drives, you will need a formatted test diskette for each diskette drive in your system. Press **Y** or **N**, then press **Enter**.

Note: Press **F1** for repair action and help whenever "F1=?" appears in the upper right corner of the screen.

64XX Diagnostic Menus
The following menus are available in the advanced diagnostics tests.

Diagnostic Diskette Main Menu: This menu appears each time the diskette is loaded.

```
Diagnostic Diskette Main Menu

 1 - Test the System
 2 - Create Test Diskette
 3 - Backup Hardware Diagnostic Diskette
 4 - Display Error Log
 5 - Access the Editor
 6 - Display System Information

Press Esc to exit or
select a number and press Enter.
```

1 - Test the System: Starts the computer checkout procedure. Follow the instructions on the screen run the tests.

2 - Create Test Diskette: Formats a scratch diskette for diagnostic use only.

3 - Backup Hardware Diagnostic Diskette: Copies the ValuePoint Diagnostic Diskette to another diskette.

4 - Display Error Log: Displays information in the error log.

5 - Access the Editor: Starts a text editor for DOS based text files.

6 - Display System Information: Displays memory map, device drivers, hardware configuration, and the DOS environment.

System Checkout: This menu appears if the computer options are correctly set.

```
System Checkout

 1 - Run tests ONE time
 2 - Run tests MULTIPLE times
 3 - Start Error Log
 4 - End Error Log

Press Esc to exit or
select a number and press Enter.
```

1 - Run tests ONE time: Takes you to the Diagnostic Test Selection Menu. Follow the instructions on the menu to select the test(s) to run, then press **Enter** to run the tests. Follow the instructions on the screen to proceed through the tests.

2 - Run tests MULTIPLE times: Takes you to the Diagnostic Test Selection Menu. Follow the instructions on the menu to select the test(s) to run, then press **Enter** to run the tests. Enter the number of times to run tests or press **Enter** to run continuously. Follow the instructions on the screen to proceed through the tests.

3 - Start Error Log: Starts a log of errors found during testing.

4 - End Error Log: Stops logging entries into the error log.

Diagnostic Test Select Menu: This menu allows
you to select the hardware components to test.

```
Diagnostic Test Select Menu

Instructions: - To select (*) or bypass ( ) a test,
                type the test number and press Enter.
              - To run selected (*) tests, press Enter.

(*)  1 Processor Unit
(*)  2 System Board
(*)  3 Keyboard
(*)  4 Pointing Device
(*)  5 X  MB Memory
(*)  6 XXXX Kbytes External Cache Module
(*)  7 Super VGA Display
(*)  8 System Board Parallel Port
(*)  9 2 System Board Serial Port(s)
(*) 10 X Diskette Drive(s)
(*) 11 X Hard Disk(s)

 98 Select (*) all tests.
 99 Bypass ( ) all tests.

Selection:
```

Follow the instructions on the menu to select or bypass
any test.

Note: The numbers for the options on the Diagnostic Test
Select Menu above can change depending on the
options installed in the system you are servicing.

Diskette Test Select Menu: This menu allows you to test the diskette drives and the control logic on the system board.

```
Diskette Test Select Menu

 1 - Seek Test
 2 - Write, Read, Compare Test
 3 - Verify Diskette Test
 4 - Speed Test
 5 - Diskette Change Test

Press Esc to exit or
select a number and press Enter.
```

1 - Seek Test: Tests the basic diskette seek operations, including sequential and random diskette drive head positioning.

2 - Write, Read, Compare Test: Tests the basic diskette operations, including a series of random seeks. Each seek is followed by a write, read, and comparison of data.

3 - Verify Diskette Test: Verifies data accessing and each sector.

4 - Speed Test: Measures the time required for one revolution of the diskette.

5 - Diskette Change Test: Tests the diskette change signal and write-protect feature as you remove and insert a diskette.

Hard Disk Drive Test Select Menu: This menu allows you to test the hard disk drive and the integrated controller.

```
Hard Disk Drive 0

Hard Disk Drive Test Select Menu

 1 - Self-Diagnostics
 2 - Seek Test
 3 - Write, Read, Compare (on test cylinder)
 4 - Error Detection and Correction
 5 - Run Tests 1 through 4
 6 - Read Verify
 7 - Format Hard Disk

Press Esc to exit or
select a number and press Enter.
```

1 - Self-Diagnostics: Runs self tests on the hard disk drive.

2 - Seek Test: Sequentially moves the hard disk heads inward one cylinder at a time until the last cylinder is reached. The heads then reset to the first cylinder and a random seek test is performed.

3 - Write, Read, Compare (on test cylinder): Data is written to the test cylinder by each hard disk head; the data is then read and checked for any errors.

4 - Error Detection and Correction: Tests the hard disk error checking and correction circuits by reading data, altering the data, and writing the data on the test cylinder. A comparison test is made to detect any errors.

5 - Run Tests 1 through 4: Runs tests 1, 2, 3, and 4; also reads track 0.

6 - Read Verify: A read operation is performed on the entire hard disk drive; any tracks that cannot be read are reported with existing defects.

7 - Format Hard Disk: Selects the Format Selection menu for the hard disk drives.

Formatting a Hard Disk Drive: Hard disk drives normally contain tracks in excess of their stated capacity to allow for defective tracks. The user is notified by a diagnostic message when the defect limit has been reached and service is recommended.

The Diagnostics Format program is different from the operating system format program. Before the customer can transfer information from the backup diskettes to the hard disk drive, the hard disk drive must be formatted using the operating system format program. Have the customer refer to the operating system manual for a description of the hard disk preparation commands.

Note: The Diagnostics Format program on this diskette might damage non-IBM hard disk drives. Refer to the documentation that came with the drive for low-level formatting information.

Warning: All data on the selected hard disk drive is destroyed during a format operation or surface analysis.

Warning: Formatting results in a complete loss of data on the hard disk drive, including system programs. If you are directed to or elect to format the hard disk drive, prior to formatting you must have the customer back up all information, if possible.

Formatting Procedure: Before replacing a failing hard disk drive, try to format it as follows:

1. Power-off the computer. Check that the hard disk drive cable is tightly connected.
2. Insert the diagnostics diskette into drive A.
3. Power-on the computer.
4. Press **1 (Test the System),** then press **Enter**.
5. Depending on the options installed in the computer, questions about attached devices appears on the screen. Answer as required, then press **Enter**.
6. If the list is incorrect, run the Configuration Utility program (see "Diagnostics and Test Information" on page 32 in this supplement). Check to see if any adapter or device is set to a conflicting address with any other adapter or device. Also be sure that any adapter or device missing from the list is not set to "disabled."
   Press **Y (Is this list correct? (Y/N))**, then press **Enter**.
7. Press **1 (Run tests ONE time)**, then press **Enter**.
8. Press **99 (Bypass ( ) all tests)**, then press **Enter**.
9. Select **Hard Disk Drive**, then press **Enter**. The Hard Disk Drive test begins.
10. At the Hard Disk Drive Test Select Menu, press **7**, then press **Enter**.
11. Press **Y (Do you want to continue? (Y/N))**, then press **Enter**.
12. Press **Y (This is your last chance to cancel! Do you want to continue? (Y/N))**, then press **Enter**.

    Formatting progress is displayed on the screen.

Video Test Select Menu: This menu allows you to test the SVGA displays and control logic on the system board.

```
Video Test Select Menu

 1 - SVGA/Video Memory Test
 2 - Text Mode Tests
 3 - Screen Paging Test
 4 - Run Tests 1 through 3
 5 - VGA Graphics Mode Test Menu
 6 - SVGA Graphics Mode Test Menu
 7 - Full Screen Raster
 8 - Focus

Press Esc to exit or
select a number and press Enter.
```

1 - SVGA/Video Memory Test: Verifies the video portion of the system board.

2 - Text Mode Tests: Shows the following character attributes: normal and high intensity, reverse video, blinking, non-display, and (for color displays) 15 EGA color attributes.

3 - Screen Paging Test: Preloads 8 pages of video memory with appropriate page numbers, then displays each page for verification.

4 - Run Tests 1 through 3: Performs tests 1 through 3 on an SVGA or ValuePoint display.

5 - VGA Graphics Mode Test Menu: Displays a menu to select the display VGA graphics modes.

6 - SVGA Graphics Mode Test Menu: Displays a menu to select the display SVGA graphics modes.

7 - Full Screen Raster: Cycles through a full raster of white, pure blue, green, and red. Press any key to cycle.

8 - Focus: Displays a screen of black/white and white/black 'M's. Press any key to toggle from one to the other.

Error Log

Use the following steps to create an error log, run the diagnostic tests, and automatically record any error messages in an error log. This procedure is normally used to diagnose an intermittent problem.

Notes:

1. The errors can be logged to a diskette drive, to a hard disk drive, or to a printer.
   (You cannot run any diskette test when logging to a diskette drive.)
2. OS/2 systems must be logged to a diskette drive.

Creating the Error Log

1. Load the diagnostics diskette from drive A.
2. Press **1 (Test the System)**, then press **Enter**.
3. Press **N** to answer the test diskette question, then press **Enter**.
4. Press **Y** or **N (Is this list correct?)**, then press **Enter**.
5. Press **3 (Start Error Log)**, then press **Enter**.
6. Press **1** to log to a diskette or hard disk, or press **2** to log to a printer, then press **Enter**.
7. If you are logging to a hard disk drive, press **C, D, E, or F (Enter the error log drive ID)**, then press **Enter**. Go to "Starting the Test" below.
8. If you are logging to a diskette, press **A** or **B (Enter the error log drive ID)**, then press **Enter**.
9. Verify that the diagnostic diskette is installed in the error log drive, A or B, and that it is not write-protected, then press **Enter**.

Starting the Test

1. Press **2 (Run tests MULTIPLE times)**, then press **Enter**.
2. Press **Enter** at the Diagnostic Test Select Menu to run all tests.
3. Select the number of times to run the tests, then press **Enter**.
4. Press **N (Wait each time an error occurs? (Y/N))**, then press **Enter**.
5. Follow any instructions on the screen and select any requested tests.

   Note: Do not press any keys during the keyboard test.

6. To end a continuous test, press **Ctrl+C**. The computer completes testing, then returns to the System Checkout menu.

Displaying the Error Log

1. Depending on the options installed in the computer, questions about attached devices appear on the screen. Answer as required, then press **Enter**.
2. From the System Checkout menu, Press **Esc**.
3. Press **4 (Display Error Log)**, then press **Enter**.
4. Press **A, B, C, D, E, or F (Enter the error log drive ID)**, then press **Enter**. (If logging to a diskette drive, the ValuePoint diagnostic diskette must be in the error log drive selected.) The error log is displayed.
5. Press **F3** to leave the error log. If errors are displayed, go to "Model 64XX Service Information" on page 1 in this supplement.

Hard Disk Drive Jumper Settings

Hard disk drives for ValuePoint computers use jumpers or tabs to set the drives as primary or secondary. Match your hard disk drive to one of the following figures. Set the first drive as the primary (master) drive **1**. If a second drive is installed, set it as the secondary (slave) drive **2**.
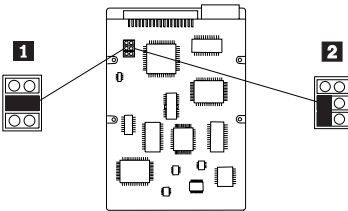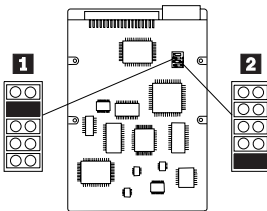
170MB and 340MB AT Drives with Tabs
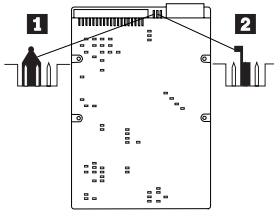
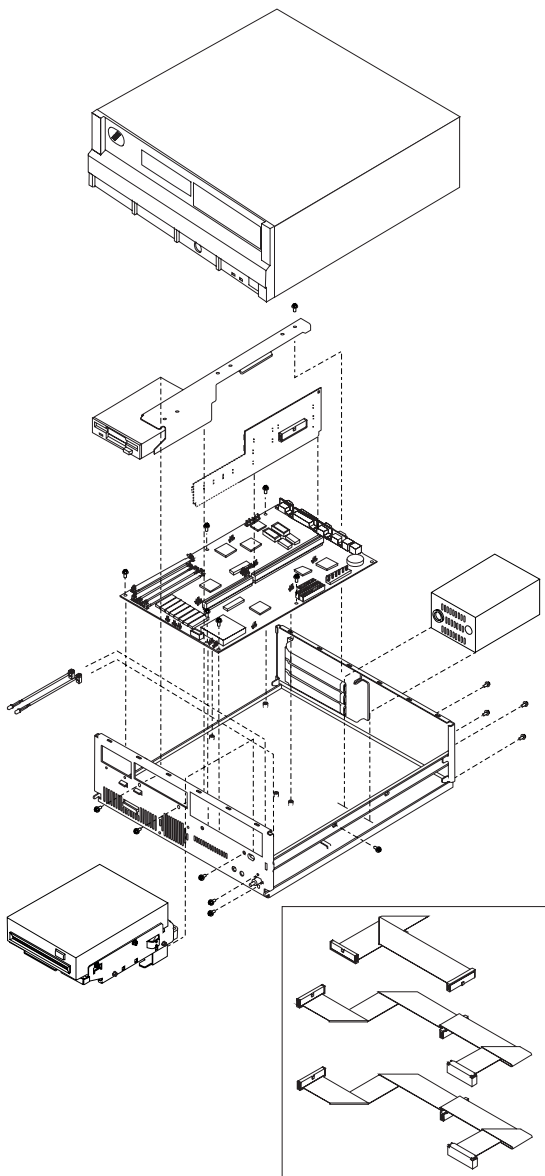**270MB, 364MB, 540MB, and 728MB AT Drives with Tabs**
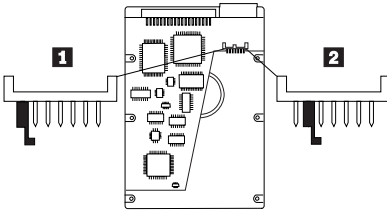
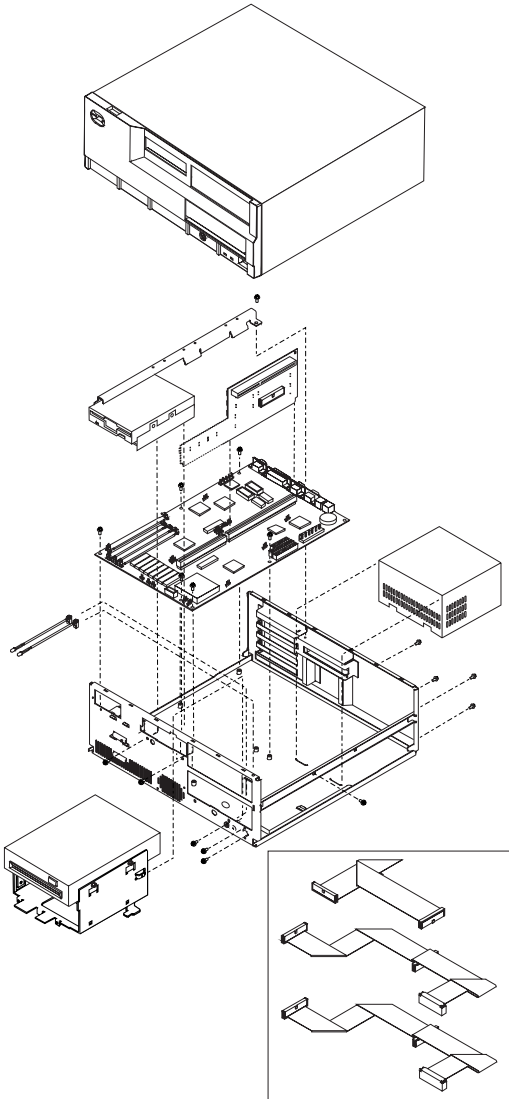**270MB and 540MB AT Drive with Jumpers**

527MB AT Drive with Jumpers
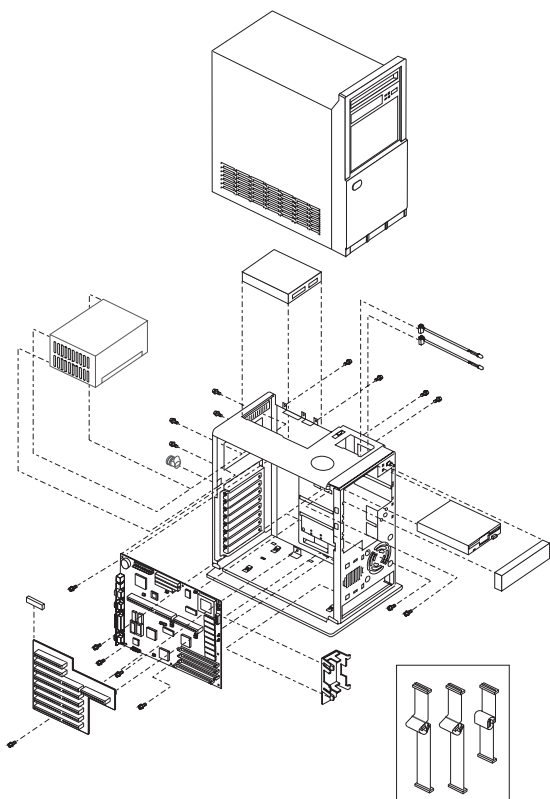
Computer Exploded View (6472)

Computer Exploded View (6482, 6484)

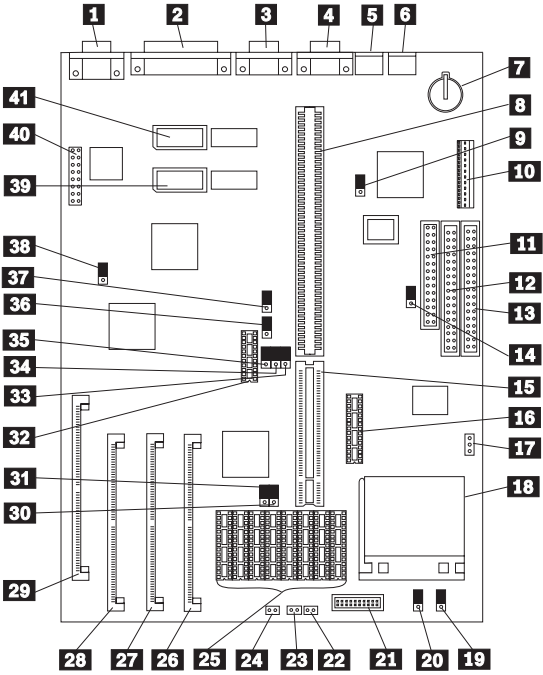## Computer Exploded View (6492, 6494)

64XX System Board

Figure 1. 64XX

64XX System Board

1 Video Port
2 Parallel Port
3 Serial Port (Comm B)
4 Serial Port (Comm A)
5 Mouse Port
6 Keyboard Port
7 Battery
8 Riser Connector
9 IRQ1 & IRQ2
10 Power Supply Connector
11 Diskette Drive Cable Connector
12 Hard Disk Drive Cable Connector
13 Hard Disk Drive Cable Connector
14 Write-Protect Jumper
15 Riser Connector Extension
16 Cache Tag RAM
17 Fan Power Connector
18 Processor Socket
19 SL to non-SL Processor Jumper
20 Overdrive / DX Jumper
21 DX4 Voltage Regulator Connector
22 Power-on LED
23 Hard Disk LED
24 Speaker
25 128/256KB External Cache Connectors
26 Memory Module Connector, Bank 1
27 Memory Module Connector, Bank 2
28 Memory Module Connector, Bank 3
29 Memory Module Connector, Bank 4
30 128K Cache Jumper (to rear)
31 128K Cache Jumper (to rear)
32 Cache Tag RAM
33 VESA / PCI Jumper (VESA to rear)
34 VESA / PCI Jumper (VESA to rear)
35 VESA / PCI Jumper (VESA to rear)
36 Frequency Synthesizer
37 Frequency Synthesizer
38 Video Enable/Disable
39 Extended Video Memory Connector
40 Video Feature Connector
41 Extended Video Memory Connector

64XX Memory Module—72 Pin

Pin	Signal Name	I/O
1	Ground	
2	SIMMD0	I/O
3	SIMMD16	I/O
4	SIMMD1	I/O
5	SIMMD17	I/O
6	SIMMD2	I/O
7	SIMMD18	I/O
8	SIMMD3	I/O
9	SIMMD19	I/O
10	+5 V dc	I
11	CASP	I
12	MA0	I
13	MA1	I
14	MA2	I
15	MA3	I
16	MA4	I
17	MA5	I
18	MA6	I
19	MA10	I
20	SIMMD4	I/O
21	SIMMD20	I/O
22	SIMMD5	I/O
23	SIMMD21	I/O
24	SIMMD6	I/O
25	SIMMD22	I/O
26	SIMMD7	I/O
27	SIMMD23	I/O
28	MA7	I
29	BS0	I
30	+5 V dc	I
31	MA8	I
32	MA9	I
33	RAS3	I
34	RAS2	I
35	MP2	I
36	MP0	I

Figure 2 (Part 1 of 2). 64XX Memory Module—72 Pin

64XX Memory Module—72 Pin

Pin	Signal Name	I/O
37	MP1	I
38	MP3	I
39	Ground	I
40	BCAS0	I
41	BCAS2	I
42	BCAS3	I
43	BCAS1	I
44	RAS0	I
45	RAS1	I
46	BS1	I
47	AWE	I
48	Open	
49	SIMMD8	I/O
50	SIMMD24	I/O
51	SIMMD9	I/O
52	SIMMD25	I/O
53	SIMMD10	I/O
54	SIMMD26	I/O
55	SIMMD11	I/O
56	SIMMD27	I/O
57	SIMMD12	I/O
58	SIMMD28	I/O
59	+5 V dc	I
60	SIMMD29	I/O
61	SIMMD13	I/O
62	SIMMD30	I/O
63	SIMMD14	I/O
64	SIMMD31	I/O
65	SIMMD15	I/O
66	BS2	I
67	PD1	O
68	PD2	O
69	PD3	O
70	PD4	I
71	BS3	I
72	Ground	

Figure 2 (Part 2 of 2). 64XX Memory Module—72 Pin

Model 64XX Computer Features

Notes:

1. In the following table, DD refers to Diagnostic Diskette type, S/B refers to Slots and Bays.

2. Multi-media models are designated with "MM" in the far-right column.

3. OS/2* models are designated with "OS/2" in the far-right column. All other models (with a hard disk drive) have DOS and Windows installed.

4. Models 6484 and 6494 have a PCI bus riser card.

Type	Processor	DD	S/B	Memory	Hrd Dsk
6472-C0D	486SX-33	5	3/3	4M/128M	None
6472-C2B	486SX-33	5	3/3	4M/128M	170M
6472-C3B	486SX-33	5	3/3	4M/128M	270M
6472-H0D	486DX-33	5	3/3	4M/128M	None
6472-H2B	486DX-33	5	3/3	4M/128M	170M
6472-H3B	486DX-33	5	3/3	4M/128M	270M
6472-H4F	486DX-33	5	3/3	8M/128M	364M
6472-L0D	486DX2-33/66	5	3/3	4M/128M	None
6472-L4F	486DX2-33/66	5	3/3	8M/128M	364M
6472-L4G	486DX2-33/66	5	3/3	8M/128M	364M OS/2
6482-C0D	486SX-33	5	5/5	4M/128M	None
6482-C2B	486SX-33	5	5/5	4M/128M	170M
6482-C3B	486SX-33	5	5/5	4M/128M	270M
6482-CNB	486SX-33	5	5/5	4M/128M	270M MM
6482-H0D	486DX-33	5	5/5	4M/128M	None
6482-H3B	486DX-33	5	5/5	4M/128M	270M
6482-H3G	486DX-33	5	5/5	8M/128M	270M OS/2
6482-H4F	486DX-33	5	5/5	8M/128M	364M
6482-K3B	486DX2-25/50	5	5/5	4M/128M	270M
6482-L0D	486DX2-33/66	5	5/5	4M/128M	None
6482-L4F	486DX2-33/66	5	5/5	8M/128M	364M
6482-LNF	486DX2-33/66	5	5/5	8M/128M	364M MM
6482-L5F	486DX2-33/66	5	5/5	8M/128M	527M
6482-X0D	486DX4-50/100	5	5/5	4M/128M	None
6482-X4F	486DX4-50/100	5	5/5	8M/128M	364M
6482-X4G	486DX4-50/100	5	5/5	8M/128M	364M OS/2
6484-H3B	486DX-33	5	4/5	4M/128M	270M
6484-H4G	486DX-33	5	4/5	8M/128M	364M OS/2
6484-L4F	486DX2-33/66	5	4/5	8M/128M	364M
6484-L4G	486DX2-33/66	5	4/5	8M/128M	364M OS/2
6484-X5F	486DX4-50/100	5	4/5	8M/128M	527M
6484-X5G	486DX4-50/100	5	4/5	8M/128M	527M OS/2
6492-H3F	486DX-33	5	8/6	8M/128M	270M
6492-L4F	486DX2-33/66	5	8/6	8M/128M	364M
6492-L4G	486DX2-33/66	5	8/6	8M/128M	364M OS/2
6492 L5F	486DX2-33/66	5	8/6	8M/128M	527M
6492 X4F	486DX4-50/100	5	8/6	8M/128M	364M
6492 X5F	486DX4-50/100	5	8/6	8M/128M	527M
6494-L5F	486DX2-33/66	5	7/6	8M/128M	527M
6494-X5G	486DX4-50/100	5	7/6	8M/128M	527M OS/2

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