FRONT

PICTURE 1

IBM Personal System/2 2.3GB Full High SCSI Tape Drive

September 25, 1990

This package contains an update to the IBM Personal System/2 *Hardware Maintenance Reference* manual (part number 15F2190, form number S15F-2190-00).

Instructions for updating the manual are on page ii.

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Part Number 84F9802
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Instructions

This package contains either supplement or replacement information. To update your manual, compare the date on the information supplied in this package, with the date on the information in your manual. Keep the information with the latest date. If the information in your manual is not dated, replace it with the dated information.

To update your manual, insert this package behind the "Options and Adapters (Micro Channel)" tab.

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1.0 General Information

The IBM (*) Personal System/2 (*) 2.3GB Full High SCSI Tape Drive can read, erase, and rewrite data on an 8mm tape cassette. The formatted capacity of an 8mm tape cassette, with data physically blocked at 1024 bytes, is approximately 2.3 billion bytes.

The drive conforms to the American National Standards Institute (ANSI) standard X3.131-1986 and X3T9.2 for the Small Computer System Interface (SCSI). The SCSI standard allows up to seven SCSI devices, such as this drive, to be connected to a single SCSI adapter. Each device connected to a SCSI adapter must be assigned a unique identification (ID) number.

The option diskette, supplied separately, contains the tape drive diagnostic programs.

Subtopics

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1.1 Option Compatibility

SCSI devices must be used only with SCSI adapters. See the *Hardware Maintenance Service* manual parts catalog for the IBM SCSI adapter.

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1.2 Setting the SCSI ID for Internal Installation

The SCSI ID for a new drive must match the ID of the drive being replaced. To set the SCSI ID switches, locate the three switches on the back of the drive in the upper left corner (the switches are already set to the SCSI ID of 1). A switch in the up position is ON. A switch in the down position is OFF. Refer to the figure below and set the SCSI ID for the drive.

PICTURE 2

SCSI ID	**Switch 1**	**Switch 2**	**Switch 3**
6	Off	On	On
5	On	Off	On
4	Off	Off	On
3	On	On	Off
2	Off	On	Off
1	On	Off	Off
0	Off	Off	Off

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2.0 Locations

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2.1 Front View
2.2 Rear View

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2.1 Front View

1 Tape tray
2 Load/Unload button
3 In-use lights

PICTURE 3

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2.2 Rear View

1 SCSI ID switch
2 SCSI cable connector
3 Power connector

PICTURE 4

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3.0 Diagnostics Information

Use the *IBM Personal System/2 2.3GB Full High SCSI Tape Drive Drive Hardware Maintenance Service* pamphlet and the *IBM Personal System/2 Tape Drive Option Diskette* to diagnose any problems with the tape drive. First, perform the general checkout procedure for the system. If the problem still exists, run the tape drive diagnostic tests. The diagnostic programs on the option diskette are stand-alone. Follow the instructions on the screen to run the tests. If an error is detected, the diagnostic tests indicate the failing FRU and indicate what action to perform.

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4.0 Repair Information

The tape drive removal and replacement is the same procedure as a full-high fixed disk drive removal and replacement. Refer to the system *Hardware Maintenance Reference* for your system for instructions.

A contaminated tape cassette causes the drive to be slow in reading and writing to the tape cassette, or it could cause a drive failure. Clean the drive with an IBM-recommended cleaning tape cassette.

If the system loses power while a tape cassette is loaded in the drive, the drive automatically ejects the tape cassette when power is restored. If the drive does not eject the tape cassette, do not attempt to remove the tape cassette from the drive because the tape is still wrapped around the read/write heads. However, if you must remove the tape cassette, refer to "Removing a Tape Cassette Manually" in topic 5.0 for instructions on removing a tape cassette.

Note: Each time power is turned on, the drive requires 60 seconds for the Power-On Self-Test (POST) and 30-120 seconds to unload the tape.

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5.0 Removing a Tape Cassette Manually

If a tape cassette cannot be removed from the drive because of a power failure or drive failure, perform the following procedure in the sequence shown, to remove the tape cassette manually.

The following tools are required to remove the tape cassette:

- 3/8-inch flat-blade screwdriver
- Pointed tweezers or small screwdriver
- Torx (**) Driver T8
- Torx Driver T10
- Cellophane tape
- 6-volt lantern battery (purchase locally).

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Subtopics

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5.1 Tape Cassette Removal Procedure No. 1

1. Remove the drive from the computer. To remove the drive, refer to the information in your system *Hardware Maintenance Reference* about removing a full high drive.

2. Remove the top cover of the drive by removing the five screws as shown.

   PICTURE 5

   If the tape is not loaded in the drive (tape wrapped around the read/write heads), the tape cassette can be removed by only using the "Tape-Tray Door release and Tape Rewind Procedures" in topic 5.4.

   Warning: Do not touch the outside edge of the exposed tape. That is the surface of the tape where data is recorded. Touching the tape could damage the data on the tape.

3. Tape the tape cassette door 1 open. The tape cassette door must be held open to prevent the door from closing on the data tape 2 before it is returned to the cassette. To hold the door open, gently position two pieces of cellophane tape 3 about 63.5 mm (2.5 in.) long, as shown.

   PICTURE 6

4. Locate the load motor 1 inside the drive unit. There is a small metal cover positioned over the load motor. Lift the cover straight up, off of the load motor, to expose the red and brown connector wires.

   PICTURE 7

   Carefully lift the insulating tape covering the load motor contacts. Do not touch the data tape.

   Warning: Care must be taken to ensure that the data tape does not get pinched in any of the rollers or guide posts of the load mechanism while moving the load mechanism to the unload position.

5. To move the load mechanism to the unload position, do the following:

   a. Position the drive so that the bottom of the drive is facing down and the right side of the drive is facing you. The red wire from the load motor is the ground, and the brown wire is the +5 vdc for the unload operation.

      Note: Read steps 5b, 5c, and 5d completely before performing them.

   b. Connect the ground lead from the 6-volt power source to the pin connector attached to the red wire on the load motor.

   c. Connect the +6-volt lead from the power source to the pin of the connector attached to the brown wire on the load motor.

      Warning: Do not leave power applied to the load motor for more that five seconds maximum. Leaving power applied for more than five seconds may damage the load motor.

   d. Apply power to the connector for about two seconds. The load rings and guide posts should move to the unload position. When the movement of the load mechanism stops, remove the power from both pins of the connector.

6. If the load mechanism moved correctly, go to "Tape-Tray Door release and Tape Rewind Procedures" in topic 5.4. If the load mechanism did not move, disconnect the power to the connector. Verify that the power source is good and that you were applying the power correctly as described in steps 5b, 5c, and 5d. If you did not apply the power as described, repeat steps 5b, 5c, and 5d. If the load mechanism still fails to move, go to "Tape Cassette Removal Procedure No. 2" in topic 5.2.

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5.2 Tape Cassette Removal Procedure No. 2

1. Perform "Tape Cassette Removal Procedure No. 1" in topic 5.1 if you have not already done so.

2. Remove the bottom cover of the drive by removing the six screws as shown.

   PICTURE 8

3. Remove the connectors to the servo board to prevent damage from occurring to it during this procedure. Note the location of all of the connectors to the servo board. Disconnect them by using a small screwdriver or similar tool and pushing the key in the center of the connector. Push the connector away from the servo board. Start by removing the connectors closest to the back of the drive.

4. Remove the servo board from the bottom of the drive by removing the two screws as shown.

   PICTURE 9

5. With the front of the drive facing you, locate gear number 4 1 in the following figure. Use this gear to return the load mechanism to the unload position.

   PICTURE 10

6. Tilt the drive so that you can see the tape, load mechanism, and gear posts. While holding the drive in this position and watching the load mechanism, use your thumb to turn gear number 4 in a counter clockwise direction. Continue to turn the gear until the load ring and all of the guide posts have returned to their unload positions. The load ring stops moving before all of the guide posts and rollers have retracted to their unload positions. Continue to turn the gear until the guide posts stop moving. To prevent damage to the tape, the gear should be rotated slowly and without jerking the tape. The load mechanism is in the unload position when all of the guides, posts, and rollers on the load ring, and all of the other guide posts are almost positioned in a straight line closest to the tape.

   PICTURE 11

7. If the load mechanism has successfully been moved, go to "Tape-Tray Door release and Tape Rewind Procedures" in topic 5.4.

If the load mechanism still failed to move, go to "Tape Cassette Removal Procedure No. 3" in topic 5.3.

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5.3 Tape Cassette Removal Procedure No. 3

1. Perform "Tape Cassette Removal Procedure No. 1" in topic 5.1 and "Tape Cassette Removal Procedure No. 2" in topic 5.2 if you have not already done so.

   Warning: The following procedure is considered to have the highest potential for damage to the data tape and the heads of the drive. Use extreme caution when attempting to remove the tape using this procedure.

2. Refer to the following figure and remove the screw 1 that secures the erase head bracket 2. Lift the erase head bracket up out of the drive.

   PICTURE 12

   Note: The connector and wires do not have to be removed from the servo board. There is sufficient slack in the wires to allow the erase head bracket to be removed.

3. Remove the tape guide 1 by lifting it straight up out of the drive.

   PICTURE 13

   Note: The heavy black line in the figure on page 5.3 represent the data tape path. Use a nonconductive tool, such as a molded potentiometer adjustment tool when removing the tape from the guide posts and rollers. Whenever this procedure describes the use of the tool, the tool must touch the side of the tape where no data is recorded. If you are unsure of which side of the tape to touch with the tool, carefully inspect the tape path before starting this procedure. The side of the tape that comes in contact with the rotating drum is the side where data is recorded. The tool must only be used to touch the opposite side.

4. Use the tool to loosen the tape at 1 as shown. While touching the side of the tape where no data is recorded, move the tool toward the rear of the drive. This action should cause the tape to pull off of the takeup reel and make a loose loop.

   PICTURE 14

5. Move the pinch roller flange 1 toward the side of the drive, and hold it in this position 2. This action releases the pinch roller.

   PICTURE 15

6. Insert the tool in the tape loop at 1.

   PICTURE 16

   Warning: Once you start to remove the tape from between the pinch roller and the capstan, **do not** release the pinch roller until the tape is completely clear of this area. If the pinch roller is released during this part of the procedure, before the tape is clear of these components, **damage will occur to the tape**.

7. Remove the tape from around the guide posts and rollers at 1 and 2, making sure to place the tool inside the tape loop (that is the

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nonrecorded side of the tape).

PICTURE 17

8. Find the **L**-shaped molded black plastic part 1. The **L** is mounted upside down and prevents the tape from riding up on the rotating drum. Care must be taken so that the tape is not creased or damaged in any way during tape removal.

9. Position the tool between points 1 and 2, inside the loop. Gently move the tape up so that it passes between the **L** and the top edge of the drum.

PICTURE 18

10. Remove the tape from around the guide posts and roller at point 1. Be sure to place the tool inside the tape loop.

PICTURE 19

11. Go to "Tape-Tray Door release and Tape Rewind Procedures" in topic 5.4.

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5.4 Tape-Tray Door release and Tape Rewind Procedures

To release the tape-tray door and rewind the tape, do the following:

1. Using a small screwdriver, move the tape-tray door release lever 1 toward the front of the drive. The tape-tray door release lever is inside and about 12.7 mm (0.5 in.) below the opening shown. You must be careful when removing the tape-tray door components with the tape cassette still in the drive. When opening the door, control the rate at which it opens by holding the door with your fingers so that it opens more slowly. This prevents the tape cassette from moving quickly and damaging the loose tape.

   PICTURE 20

   Warning: Do not bend the tabs too far or they will break.

2. Release the two tabs 1 on the tape-tray door, then remove the front and back parts of the door assembly from the door hinge.

   PICTURE 21

   Remove the inside portion of the tape-tray door first. To do this, tilt it toward the inside of the drive and remove it. Then, remove the outside portion of the tape-tray door by lifting it off of the drive.

3. Position the drive, with the tape-tray door open, so that it is resting on the back of the frame, with the door facing up and the bottom of the drive facing you.

   Warning: Do not touch the tape on the outside of the loop with your fingers, or with any metal object. Data is recorded on the outside loop portion of the tape.

4. Insert a flat-blade screwdriver into the hub of the takeup reel through the opening created by the removal of the tape-tray door. Slowly, turn the hub counter-clockwise, rewinding the tape. While turning the screwdriver, watch the tape loop to ensure that it does not get caught on any of the components. If the tape gets caught, free the tape from the obstruction before turning the hub any further.

   Warning: Make sure that all of the loose tape has been wound into the tape cassette. If all of the tape is not in the cassette, the tape will be damaged by the tape-tray door. Do not over wind the tape into the cassette. Overwinding the tape will damage the tape.

5. When all of the loose tape is in the tape cassette, remove the screwdriver.

6. Remove the cellophane-tape holding the door of the cassette open.

7. Remove the cassette from the drive.

To reassemble the tape drive, reverse the removal procedure.

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