EXB-8200 8mm Cartridge Tape
Subsystem

Maintenance Manual

≋Exabyte®

Revision History

Revision No.	Date	Revision Information
000	January 1989	Preliminary version.
001	May 1990	Initial release.

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Figures

Tables

1 General Information

The *EXB-8200 8mm Cartridge Tape Subsystem Maintenance Manual* describes how to repair or test an EXABYTE™ EXB-8200 8mm Cartridge Tape Subsystem (EXB-8200).

1.1 About This Manual

This manual contains 18 sections. Section 1 provides general information that you need to know before you begin testing or repairing the EXB-8200, including information about the following:

■ Static protection requirements
■ The test and repair environment
■ Required test tapes
■ Required tools and test equipment
■ Related publications
■ Performing an EXB-8200 unit test.

Sections 2 through 18 of this manual describe how to repair, maintain, and test the EXB-8200. Each section describes the preparation needed for each task and then provides step-by-step instructions for completing the task.

The instructions in each section of this manual are organized so that all figures appear on a left-hand page and the associated descriptions appear on the adjacent right-hand page. If the description associated with a figure continues beyond a single page, the figure is repeated.

1.1.1 Intended Audience

This manual is provided to assist EXABYTE Self Maintenance Contract Customers in the repair and testing of the EXB-8200.

1.1.2 Related Publications

The following manuals and user's guides are referred to in this manual. These manuals and guide books are necessary to understand and accomplish some of the tasks referred to in this manual.

■ *EXB-8200 8mm Cartridge Tape Subsystem User's Manual*, 510006

■ *EXB-8200 8mm Cartridge Tape Subsystem Product Specification*, 510005

■ *EXB-8200 8mm Cartridge Tape Subsystem Compatibility Manual*, 510002

■ *Monitor User's Guide for the EXB-8200 8mm Cartridge Tape Subsystem*, 510009

■ *EXPERT User's Guide for the EXB-8200 8mm Cartridge Tape Subsystem*, 510010.

The following books are also useful in understanding the EXB-8200, and it is recommended that they be kept with this manual:

■ *EXB-8200 8mm Cartridge Tape Subsystem Theory of Operations*, 510007

■ *EXB-8200 8mm Cartridge Tape Subsystem Illustrated Parts Catalog*, 510000.

1.1.3   Revisions

This document may be revised in whole or in part at any time. If only a single section is revised or added, only those pages will be distributed to the registered holders of this manual.

1.2   Static Protection Requirements

The test and repair environment for the EXB-8200 must be free of conditions that could cause electrostatic discharge (ESD). To ensure that the testing environment is as free from ESD as possible, follow these procedures when testing and repairing the EXB-8200:

■ Place a static protection mat on the work surface used for testing and repairing the EXB-8200. Use a 1-megohm resistor to ground the static protection mat.

■ Ensure that the power supply connected to the EXB-8200 is properly grounded.

■ Ensure that the personal computer used for EXPERT and Monitor software and for the SCSI bus is properly grounded.

■ Wear a static protection wrist band whenever you handle the EXB-8200 or EXB-8200 cards that have been removed from their antistatic bags. Connect this wrist band to the static protection mat or to other suitable ESD grounding.

■ Keep all cards in antistatic bags when not in use.

1.3 Test and Repair Environment

The environment for testing or repairing the EXB-8200 consists of the following:

■ A work area set up with static protection as described in Section 1.2 of this manual.

■ A power supply that conforms to the requirements of the *EXB-8200 8mm Cartridge Tape Subsystem Product Specification* for each EXB-8200 under test.

■ An IBM or compatible personal computer system with a color monitor and serial port.

■ An Adaptec SDS-1 family or SDS-3 family SCSI controller or an Advanced Storage Concepts ASC-88 SCSI controller installed in the computer system.

■ A SCSI bus cable properly connected to the Adaptec or ASC-88 controller and properly terminated.

■ An EXABYTE Monitor cable (727005) connected to the serial communications port on the computer system.

■ EXABYTE Monitor software (version 9.12 or later) loaded on the computer system.

■ EXABYTE EXPERT software (version 6.30 or later) loaded on the computer system.

■ Any other equipment that may be required or specified in testing specifications and procedures published by EXABYTE.

Note: There are no exceptions to the environmental requirements unless specifically agreed to in writing by the customer and EXABYTE. Such an agreement will become part of this manual as an addendum to this section.

1.4 Required Test Tapes

This section describes the tapes that are required to test the EXB-8200 and the methods to be followed in creating them. Label these tapes appropriately for easy identification.

- Test tape
- Read Interchange test tape
- Write Interchange test tape
- EXABYTE Head Sync Tapes (180223), where applicable.

Test Tape

The test tape is used for all testing with EXPERT test software. It should be an EXATAPE™ 112m tape.

Read Interchange Test Tape

The tape used for the Read Interchange test should be an EXATAPE 15m tape. This tape is written by the EXPERT Inter_chg test on a known good drive.

Write Interchange Test Tape

The tape used for the Write Interchange test should be an EXATAPE 15m tape. This tape is written by the EXPERT Inter_chg test on the drive being tested. It is read by a known good drive to verify interchangeability.

EXABYTE Head Sync Tapes

At least two head sync tapes are required to adjust the head sync any time an SV card or deck is replaced.

1.5   Required Tools and Test Equipment

This section describes the tools and test equipment required to test and repair the EXB-8200.

1.5.1   Tools

The following tools are necessary to work on the EXB-8200:

- T8 - TORX® screwdriver
- T10 - TORX screwdriver
- Torque measuring screwdriver (1.0 to 5.0 inch-pounds)
- Tweezers
- EPROM chip puller
- Small straight blade screwdriver - # 0
- Small cross blade (Phillips) screwdriver - # 1
- SCSI bus cable
- Monitor cable (727005)
- EPROM chip installation tool
- Needle nose pliers
- Nonconductive tool, such as a molded potentiometer adjustment tool.

1.5.2   Test Equipment

The following test equipment is necessary to work on EXABYTE products:

- Two channel oscilloscope (50 MHz with time delay capability) with a hood.

- Regulated +5/+12 VDC power supply.

- IBM or compatible personal computer system with a color monitor and serial port.

- Adaptec SDS-1 family or SDS-3 family SCSI controller or an Advanced Storage Concepts ASC-88 SCSI controller installed in the computer system.

1.5.3   Software

The following software is recommended to test the EXB-8200:

- EXPERT   Version 6.30 or later.

- Runtime   For Adaptec SDS-1 family SCSI controllers. The Runtime executable file is provided by Adaptec when the controller is purchased. Adaptec SDS-3 family and ASC-88 SCSI controllers do not need any special software.

- Monitor   Version 9.12 or later.

1.5.4   Supplies

The following supplies are necessary for testing, repairing, and maintaining the EXB-8200:

- Test tapes (see Section 1.4 for descriptions)

- EXABYTE 8mm Tape Subsystem Cleaning Cartridge (727113)

- Threebond screwlocking agent (item number 1401B)

- Loctite® X-NMS Cleanup Solvent (item number 76820).

1.6   EXB-8200 Unit Test

This section describes how to test an EXB-8200 to determine functionality and to evaluate its performance when troubleshooting.

1.6.1   Preparation

Read Sections 1 and 2 of this manual and the *EXPERT User's Guide for the EXB-8200 8mm Cartridge Tape Subsystem* before testing any EXB-8200.

1.6.2   Testing the EXB-8200

All the tests listed in the *EXPERT User's Guide* are useful for evaluating performance of the EXB-8200. Each test was written to evaluate performance of the EXB-8200 while doing specific types of operations. See the *EXPERT User's Guide* for details.

Each EXB-8200 under test should use a known good power supply to verify operation and to eliminate any outside influences on the test. Verify that all power to the test area is clean and free of any type of feedback or inductive

spikes. Power problems will typically cause a high percentage of ECC or extreme difficulty getting known good EXB-8200s to pass the tests consistently.

Test tapes should be closely monitored to ensure that any failures reported by EXPERT are EXB-8200 related rather than tape related. In the event of a media error, rerun the test with a known good tape to verify the failure.

To ensure accuracy and consistency when testing a string of EXB-8200s, start all EXB-8200s at the same time and run them without interruption to completion. Doing this reduces the likelihood of operator error and computer software hangs. Many hours of testing can be negated by a simple operator error.
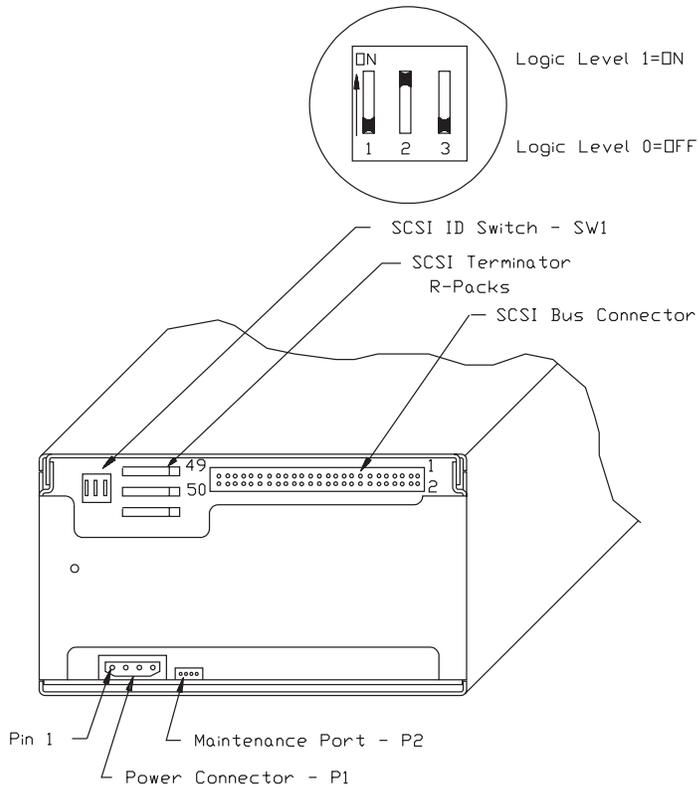
Figure 2-1
Connector and Switch Locations for the DB Card
(single-ended SCSI)
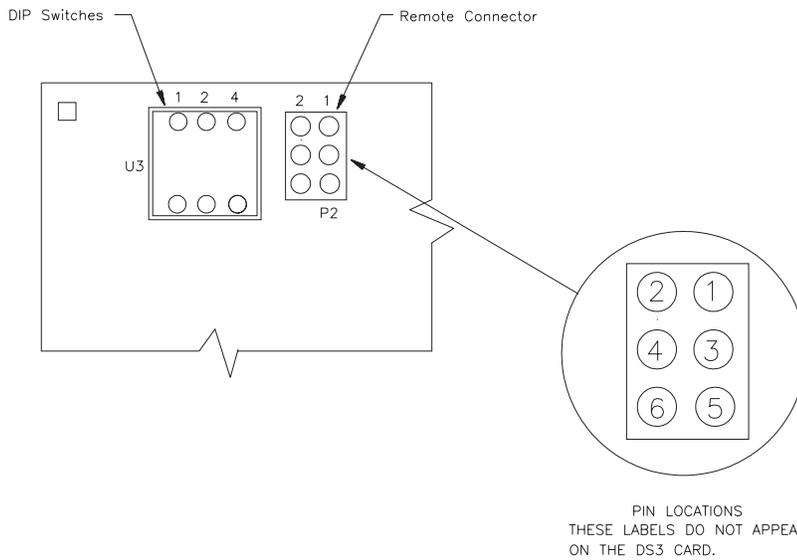
Figure 2-2
Location of DIP Switches and Remote Connector on DS Card
(implemented for embed 3)

2 Adding and Removing an EXB-8200 in the Test and Repair Environment

This section describes how to add an EXB-8200 to or remove it from the test and repair environment described in Section 1.3. Follow this procedure to prevent possible problems for the other devices being tested on the SCSI bus.

2.1 Adding an EXB-8200 to the Test Environment

When there is an available address on the SCSI bus and tests are being performed on other EXB-8200s attached to the bus, follow these steps to add a new EXB-8200 to the bus.

IMPORTANT

These steps assume that each EXB-8200 has its own power supply. If more than one EXB-8200 share the same power supply, adding an EXB-8200 to the power supply's load may momentarily drop the 5-volt power level below 4.7 volts, which will reset the SCSI bus. Using individual, switched power supplies for each EXB-8200 under test helps eliminate possible interference.

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1. Stop SCSI bus activity by pressing the function key corresponding to the SCSI ID for the available position in the EXPERT display. Refer to the *EXPERT User's Guide* for instructions.

2. If you are using a single-ended SCSI configuration, remove the resistor terminator packs (R-packs) from the EXB-8200. See Section 3.

3. If you have a DB or DS card, locate the SCSI ID DIP switches on the back of the EXB-8200 as shown in Figure 2-1. Depending on the version of the DB or DS card you have, the back of the EXB-8200 may look slightly different; however, the SCSI ID switches are in the same location. Note that some DS cards include both DIP switches and a remote connector as shown in Figure 2-2. If you have one of these cards, you can use the DIP switches, a remote switch, or jumpers to set the SCSI ID.

   If you have a DR card, locate the remote connector in the upper left-hand corner on the back of the EXB-8200. You can use either a remote switch or jumpers (shunts) to set the SCSI ID.
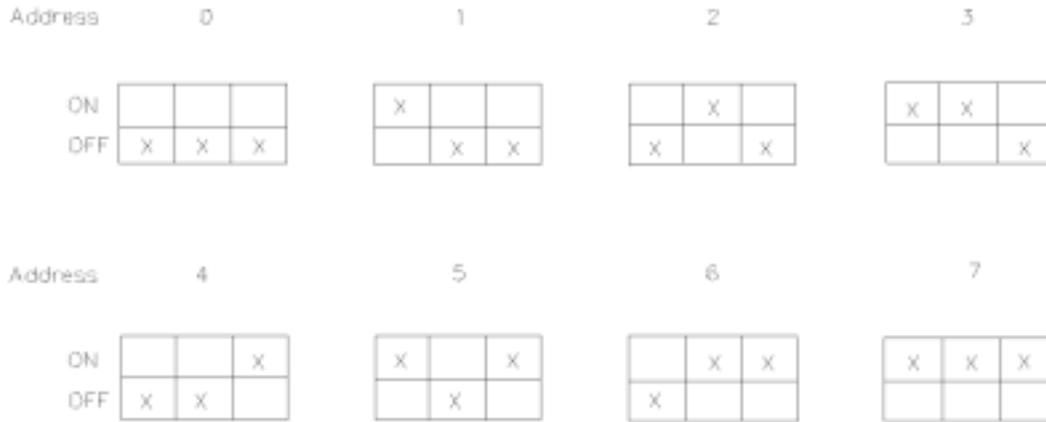
Figure 2-5
SCSI ID DIP Switch Settings for the DB and DS Cards
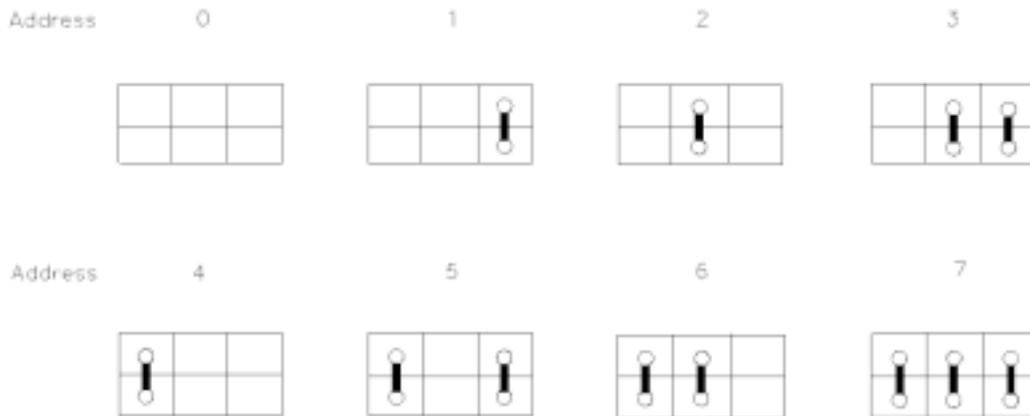
Figure 2-3
SCSI ID Jumper Connections for the DR Card
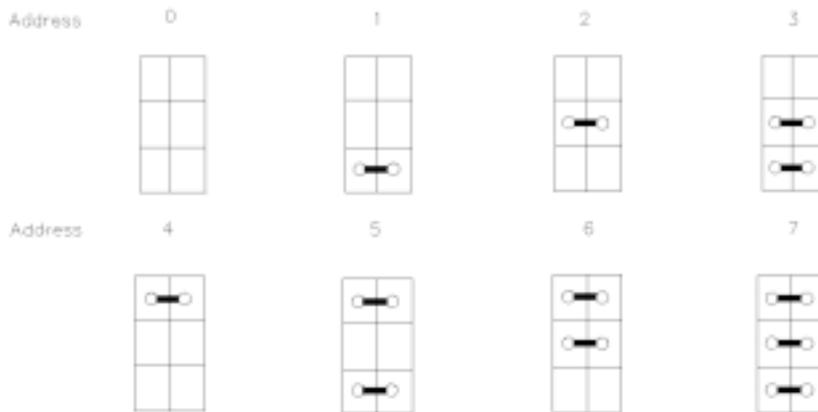
Figure 2-4
SCSI ID Jumper Connections for the DS Card
(implemented for embed 3)

4. Using the appropriate method for your configuration, set the SCSI ID to the proper address for the available position in the EXPERT display. Figure 2-3 shows the ID settings for the DIP switches on the DB or DS card. Figure 2-4 shows the jumper settings for the DR card, while Figure 2-5 shows the jumper settings for DS cards with remote connectors.

Table 2-1 shows the pin assignments for the remote connector. Note that the switch settings for the remote connector should emulate the jumper positions shown in Figure 2-4 and Figure 2-5.

Table 2-1
Pin Assignments on the Remote Connector

Pin	Signal
1	SCSI ID Bit 2 (MSB)
2	Ground
3	SCSI ID Bit 1
4	Ground
5	SCSI ID Bit 0 (LSB)
6	Ground

IMPORTANT

If you are using a remote switch or jumpers to set the SCSI ID on the DS card, make sure that the DIP switches are set to address 0. Similarly, if you are using the DIP switches to set the SCSI ID, make sure that the remote switch or jumpers are set to address 0. If you set both the DIP switches and the remote switch to a particular address, the actual SCSI ID will be the logical OR of the two settings.
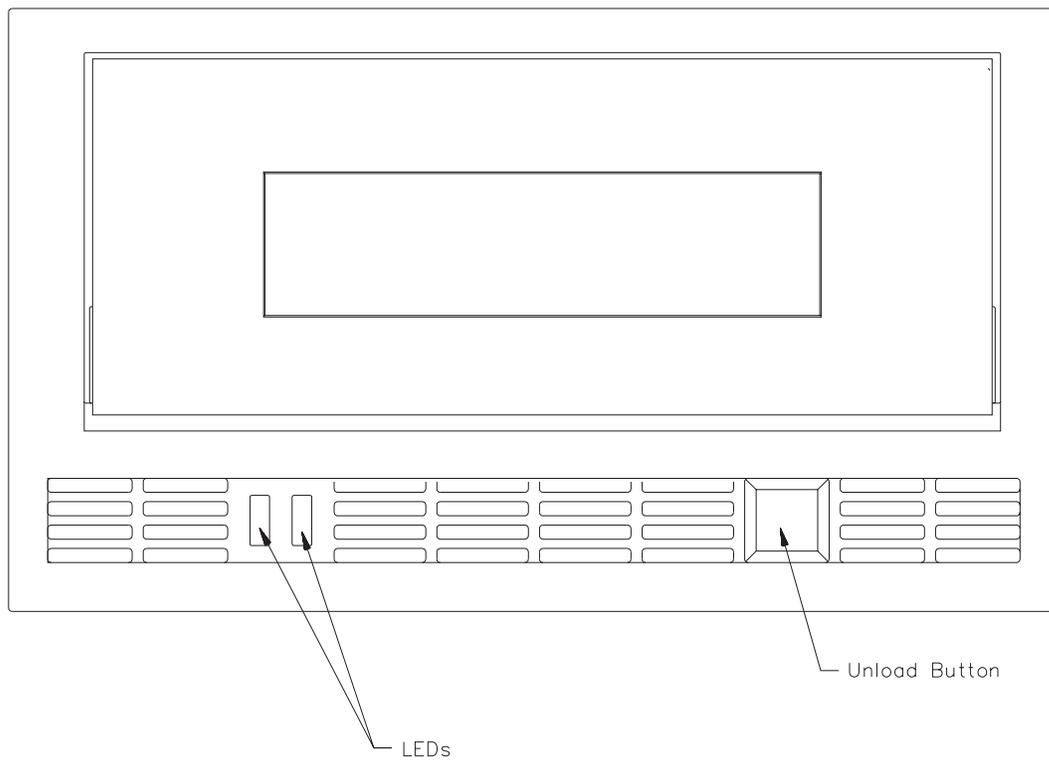
Figure 2-6
Location of the Unload Button

5. Ensure that the power is interrupted (off) so that the power cable can be connected to the EXB-8200 being tested.

6. Connect the EXB-8200 to the power supply.

7. Turn on the power supply.

Note: Do not apply power to an EXB-8200 with the SCSI bus connected, or a SCSI bus reset or error condition may result.

8. Connect the EXB-8200 to the SCSI bus cable.

9. After the power-on self-test is complete, press the unload button (shown in Figure 2-6) and insert a cartridge into the EXB-8200.

10. Activate the desired test for the new EXB-8200 added to the SCSI bus. Refer to the *EXPERT User's Guide.*

2.2 Removing an EXB-8200 from the Test Environment

When the tests being performed on an EXB-8200 attached to the bus have been completed, follow these steps to remove the EXB-8200 from the bus:

1. Stop SCSI bus activity by selecting the desired EXB-8200.

2. Press the unload button, shown in Figure 2-6, and wait for the EXB-8200 to rewind the tape and unload the cartridge.

3. Disconnect the EXB-8200 from the SCSI bus cable.

4. Turn off the power supply.

Note: Do not disconnect power to an EXB-8200 with the SCSI bus connected, or a SCSI bus reset or error condition may result.

5. Disconnect the EXB-8200 from the power supply.

6. If you are using a single-ended SCSI configuration, reinsert the resistor terminator packs (R-packs) into the EXB-8200. See Section 3.

U16 ⎫
U17 ⎭ SCSI Terminator R-Packs

SCSI ID Switch

SCSI Bus Connector

Maintenance Port

Power Connector
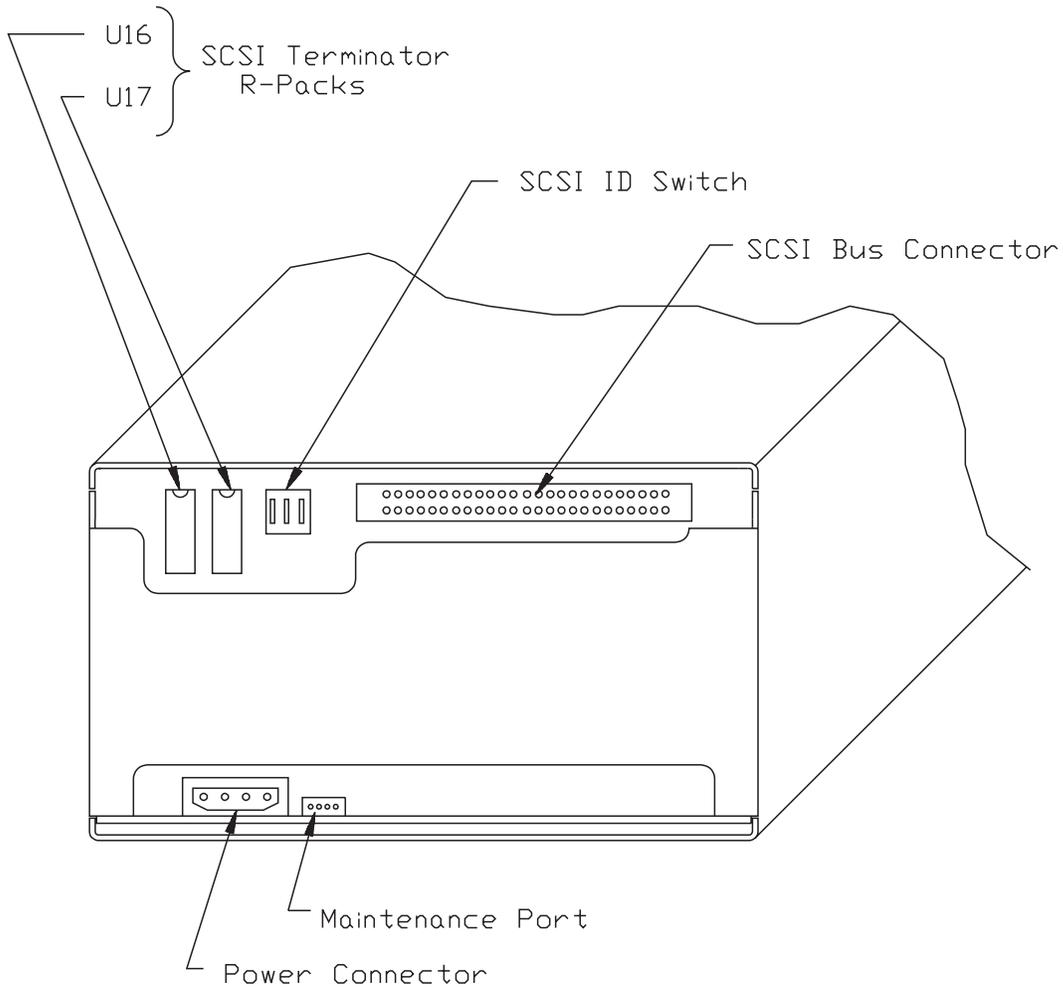
Figure 3-1
Location of DIP R-Packs on Rear of EXB-8200
(single-ended SCSI)

3 R-Pack Removal and Replacement

This section describes how to remove or replace the resistor terminators (R-packs).

3.1 R-Pack Configurations

As shown in Figures 3-1 and 3-2, there are two different R-pack configurations for the single-ended SCSI version of the EXB-8200. One configuration uses two dual in-line package (DIP) socket-mounted R-packs, and the other uses three single in-line package (SIP) socket-mounted R-packs. The differential version of the EXB-8200 does not use internal R-packs.

3.2 DIP Mounted R-Pack Removal

Figure 3-1 shows the locations of the two DIP mounted R-packs on the DB card. The R-packs can be removed with an appropriate chip removal tool designed for this size chip.

3.3 DIP Mounted R-Pack Installation

The R-packs can be installed by hand or with an appropriate chip installation tool designed for this size chip.

If you are installing the R-packs by hand, follow these steps:

1. Orient the R-pack with the notch toward the top edge of the DB card. This corresponds to the notch in the socket on the DB card.

2. Carefully position the R-pack on the socket. Check to ensure that each pin on the R-pack is aligned with a hole in the socket.

3. Press the R-pack into the socket. Be careful to provide even pressure on the top of the R-pack so that all pins are inserted at the same time. Uneven pressure can result in the R-pack being only partially inserted or in bent pins on the R-pack.

4. Visually inspect the R-pack to ensure that all of the pins have been correctly inserted in the socket. If the R-pack is not fully seated in the socket, apply additional pressure to bottom out all pins on the R-pack into the socket.

SCSI ID Switch

SCSI Terminator
R-Packs

SCSI Bus Connector

Maintenance Port

Power Connector

Figure 3-2
Location of SIP R-Packs on Rear of EXB-8200
(single-ended SCSI)

5. If any of the pins are bent, remove the R-pack. Then, straighten the pins and reinsert the R-pack. Follow the previous steps to remove, insert, and inspect the R-pack.

Note: Do not use the R-pack if any of the pins are broken.

3.4   SIP Mounted R-Pack Removal

Figure 3-2 shows the locations of the three SIP mounted R-packs on the DB card. To remove a SIP mounted R-pack, follow these steps:

1. Grasp the SIP in the center with a pair of needle nose pliers.

2. Pull the SIP straight out. Be careful not to squeeze the pliers too tightly or you may break the SIP.

3.5   SIP Mounted R-Pack Installation

To install a SIP mounted R-pack, follow these steps:

1. Orient the R-pack with pin 1 toward the SCSI connector on the DB card. Pin 1 on the R-pack is identified by the wide line over the pin.

2. Carefully position the R-pack on the socket. Check to ensure that each pin on the R-pack is aligned with a hole in the socket.

3. Press the R-pack into the socket. Be careful to provide even pressure on the top of the R-pack so that all pins are inserted at the same time. Uneven pressure can result in the R-pack being only partially inserted or in bent pins on the R-pack.

4. Visually inspect the R-pack to ensure that all of the pins have been correctly inserted. If the R-pack is not fully seated in the socket, apply additional pressure to bottom out all pins on the R-pack into the socket.

5. If any of the pins are bent, remove the R-pack. Then, straighten the pins and reinsert the R-pack. Follow the previous steps to remove, insert, and inspect the R-pack.

Note: Do not use the R-pack if any of the pins are broken.

Screw (Use T10
TORX Screwdriver)

Screw (Use T8
TORX Screwdriver)

Top Cover

Screw (Use T10
TORX Screwdriver)

Screw (Use T8
TORX Screwdriver)
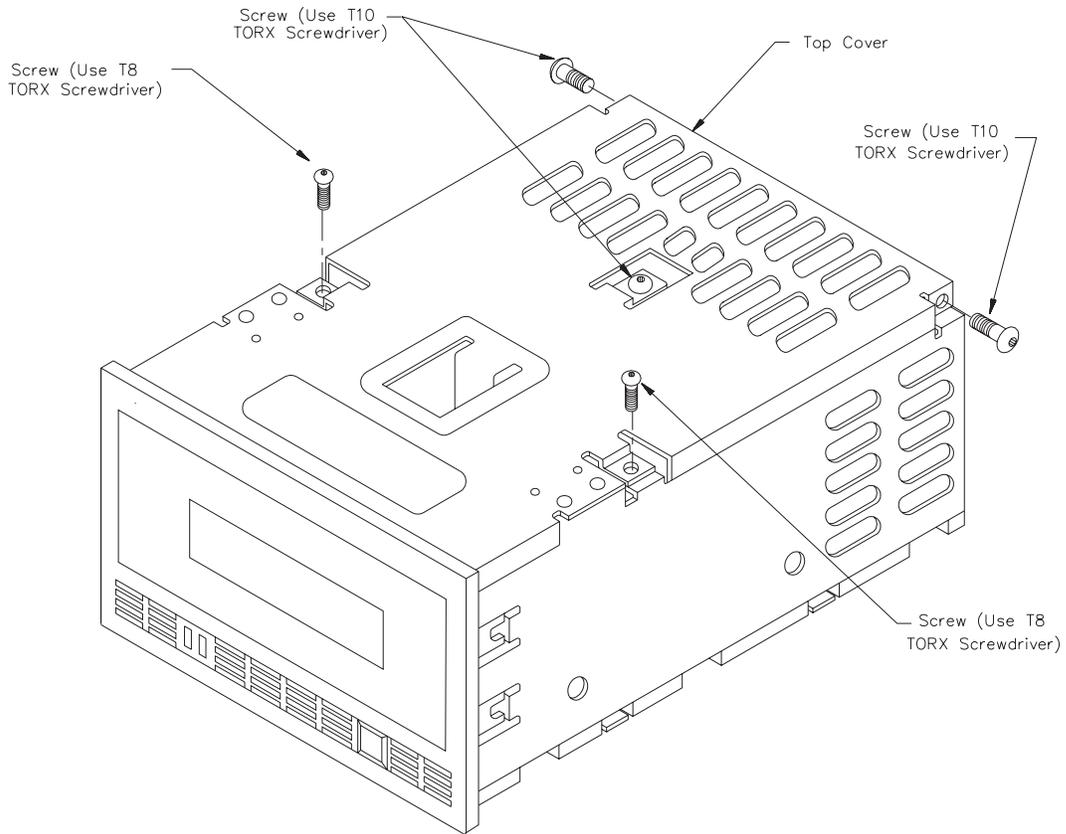
Figure 4-1
Location of Screws in Top Cover

4 Top Cover Removal and Replacement

This section describes how to remove and replace the top cover.

4.1 Top Cover Removal

To remove the top cover, follow these steps:

1. Remove the five screws that hold the top cover of the EXB-8200 in place. Figure 4-1 shows the locations of these screws. Three of the screws are located on the top of the cover, and the other two screws are located on each side of the cover at the rear of the EXB-8200. The two screws located on the top of the EXB-8200 near the edges require the use of a T8 TORX screwdriver, and the remaining three screws use a T10 TORX screwdriver.

2. Gently lift the cover at the rear of the EXB-8200 so that the tabs located at the rear and on each side of the top cover are clear of the main housing.

3. Move the cover toward the rear of the EXB-8200 to disengage the tabs on the front of the top cover from the faceplate and set the cover aside.

Screw (Use T10 TORX Screwdriver)

Top Cover

Screw (Use T8 TORX Screwdriver)

Screw (Use T10 TORX Screwdriver)

Screw (Use T8 TORX Screwdriver)
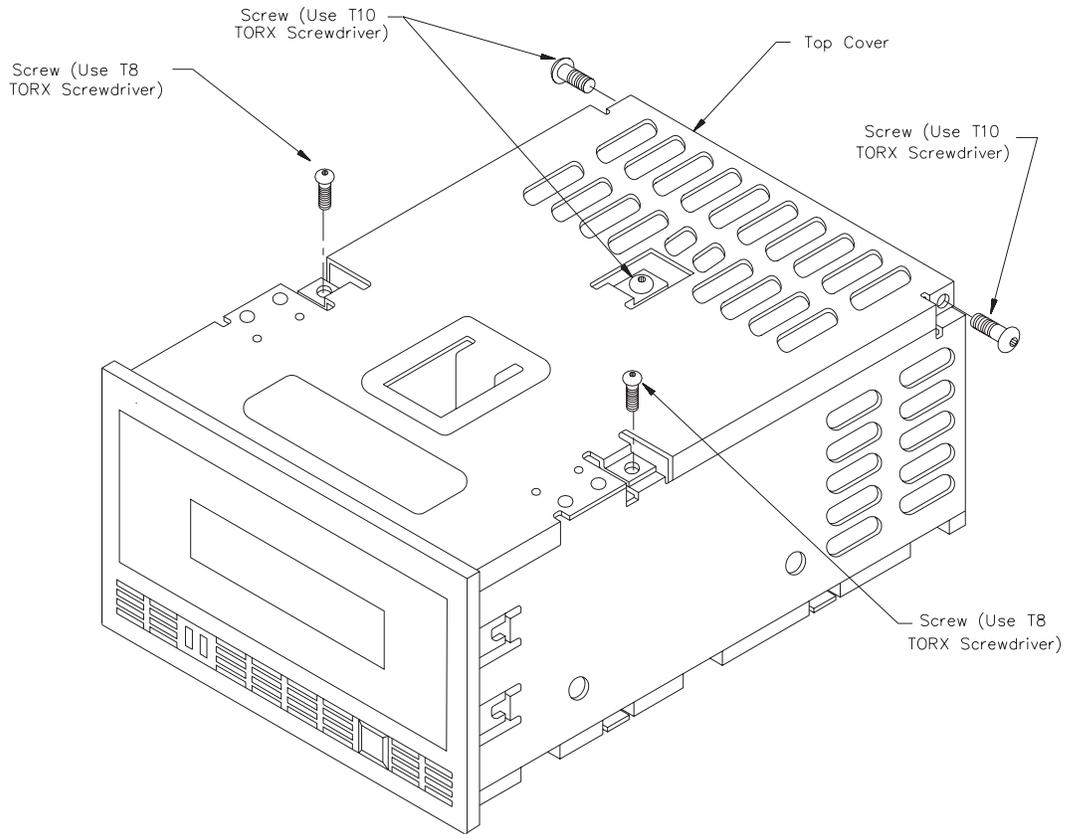
Figure 4-2
Location of Screws in Top Cover
(same as Figure 4-1)

4.2 Top Cover Replacement

To replace the top cover, follow these steps:

1. Position the cover with the flat tabs toward the front of the EXB-8200 and the two downward bent tabs toward the rear of the EXB-8200. The rear of the cover should be held up slightly.

2. Slide the cover toward the front of the EXB-8200 so that the flat tabs are inserted into the corresponding slots on the faceplate.

3. Lower the rear of the cover so that the tabs line up with the screw holes in the card retainers. You may need to apply slight pressure to seat the top cover properly.

4. Secure the rear of the cover through the card retainers and through the approximate center of the top cover to the deck hanger using the three larger screws (T10) (refer to Figure 4-2 for the locations of these screws). Tighten to 5.0 inch-pounds of torque.

5. Secure the top of the cover at the left and right edges using the two smaller screws (T8) (refer to Figure 4-2 for the locations of these screws). Tighten to 3.4 inch-pounds of torque.

CAUTION

Do not overtighten the screws. Overtightening these screws can strip the holes in the main housing, the card retainers, or the deck hanger. If any of the screw holes in the main housing become stripped, the main housing should be replaced.

Mounting Tab — Use
T8 TORX Screwdriver

Mounting Tab — Use
T8 TORX Screwdriver

SV Card Cover
(Bottom Cover)

Mounting Tab — Use
T8 TORX Screwdriver

Mounting Tab — Use
T8 TORX Screwdriver
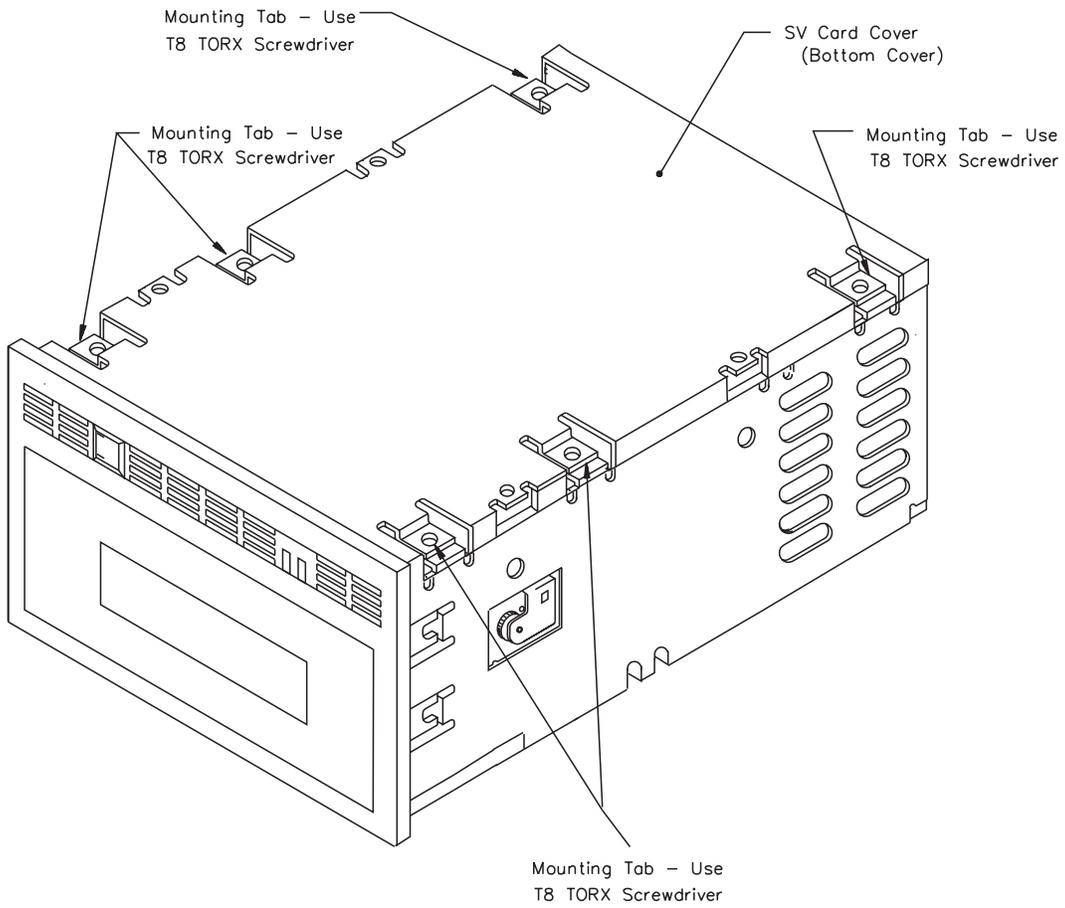
Figure 5-1
Location of Screws in the SV Card Cover

5 SV Card Cover Removal and Replacement

This section describes how to remove and replace the SV card cover.

5.1 SV Card Cover Removal

To remove the SV card cover, follow these steps:

1. Turn the EXB-8200 upside down so that the SV card cover is facing up.

2. Use a T8 TORX screwdriver to remove the six screws that hold the SV card cover to the main housing. Figure 5-1 shows the locations of these screws.

3. After the screws are removed, lift the SV card cover off of the main housing.

5.2 SV Card Cover Replacement

To replace the SV card cover, follow these steps:

1. Position the SV card cover with the tabs down and the stamped part number closest to the faceplate. All six of the mounting pads should be in contact with the SV card, and the holes should be lined up with the corresponding holes in the SV card.

2. Secure the SV card cover to the main housing using the six T8 screws that were removed previously. Since you may need to move the cover slightly to align all of the mounting holes, do not tighten any of the screws until all six have been started.

3. Tighten the mounting screws to 3.4 inch-pounds of torque.

CAUTION

Do not overtighten the screws. Overtightening these screws can damage the SV card or strip the holes in the main housing. If any of the screw holes in the main housing become stripped, the main housing should be replaced.

Card Retainer
(left hand)

Card Retainer
(right hand)
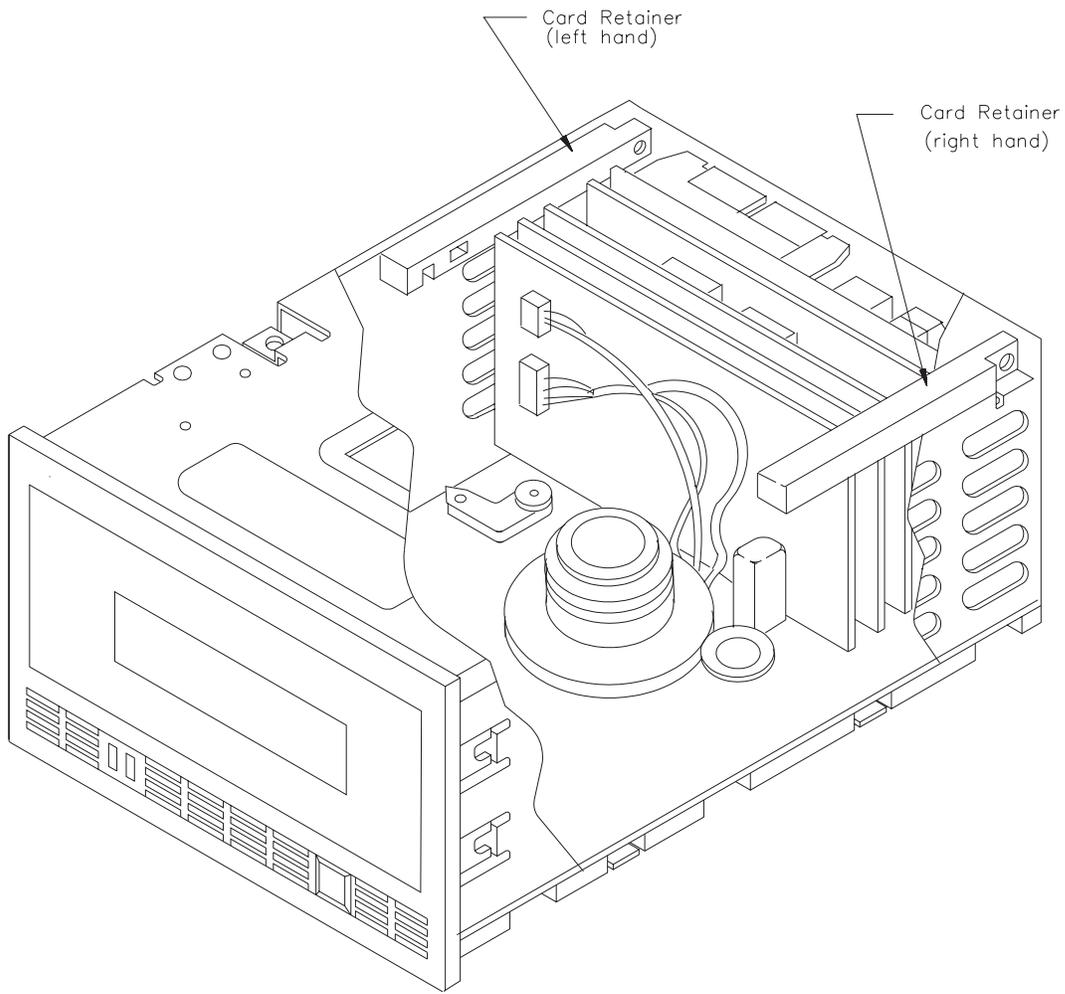
Figure 6-1
Location of Card Retainers
(deck hanger not shown)

6 Card Retainer Removal and Replacement

This section describes how to remove and replace the card retainers.

6.1 Preparation

The card retainers are accessed at the top back of the EXB-8200. Before you remove the card retainers, remove the top cover as described in Section 4.

6.2 Remove Card Retainers

Figure 6-1 shows the locations of the card retainers. Note that there is a left-hand and a right-hand card retainer.

To remove the card retainers, grasp the ends of each card retainer between your thumb and first finger and lift straight up. There should be no resistance to the removal of the two card retainers.

6.3 Replace Card Retainers

The card retainers are designed as left-hand and right-hand components and will fit correctly only one way. To replace the card retainers, follow these steps:

1. Place each card retainer so that only one card is in a slot, the deck hanger fits in the slot farthest away from the screw hole, and the screw hole is lined up with the hole on the tab at the rear of the EXB-8200. If the cards are aligned squarely in the EXB-8200, the card retainers will slide on with little or no force.

2. Adjust the card positions slightly to get all the cards into their slots in the retainer.

3. After both card retainers are in place, exert downward pressure on the top of both card retainers simultaneously. This will ensure that all cards are properly seated in the EXB-8200.

6.4 Reassemble the EXB-8200

To reassemble the EXB-8200, replace the top cover as described in Section 4.
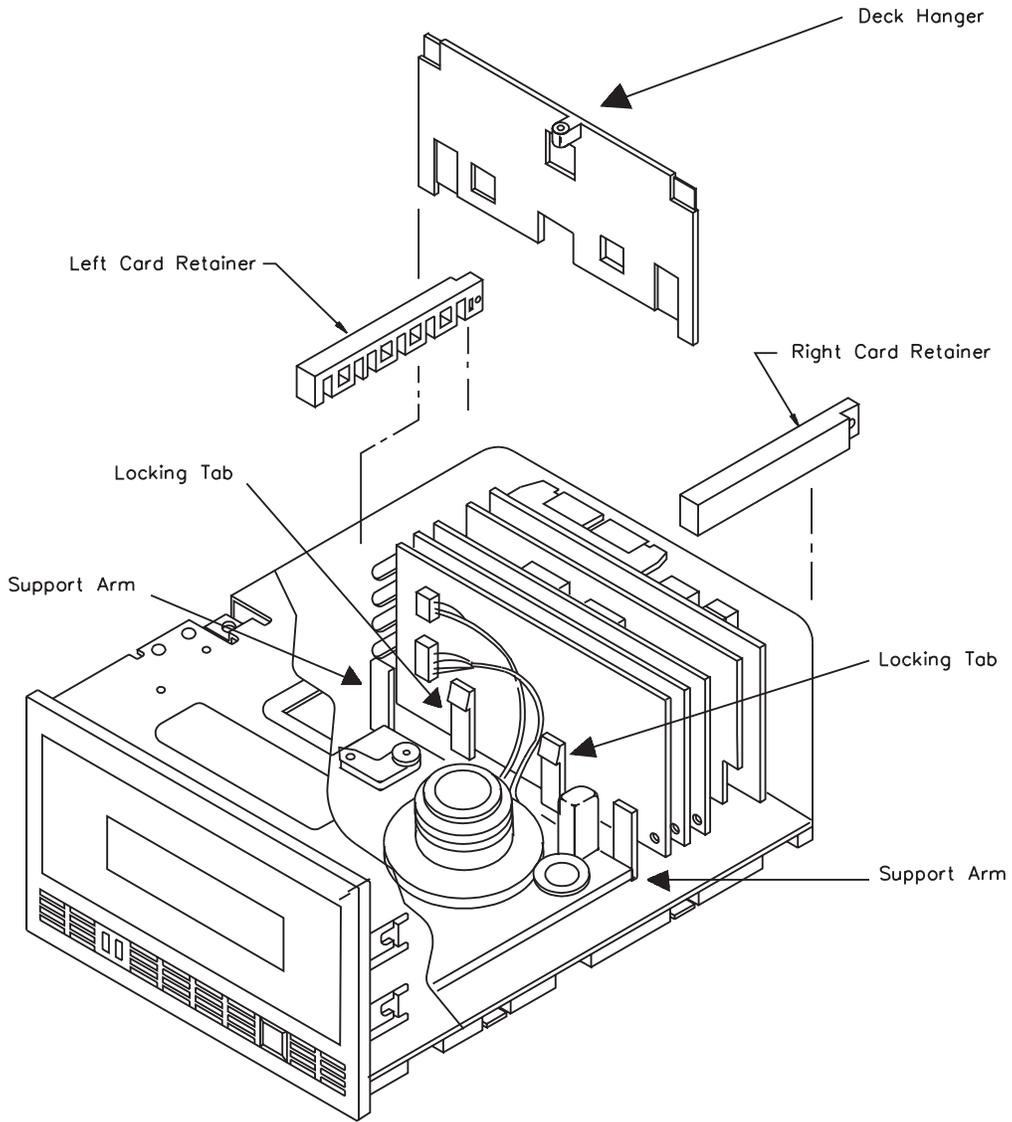
**Figure 7-1
Location of Deck Hanger**

7 Deck Hanger Removal and Replacement

This section describes how to remove and replace the deck hanger, which separates the card section of the EXB-8200 from the deck section. The deck hanger is installed into the deck hanger bracket, which is mounted along the rear edge of the deck base. It prevents the RW wire harness from getting tangled in the moving parts of the deck.

7.1 Preparation

The deck hanger is mounted to the deck hanger bracket, which is attached to the deck. To access the deck hanger, first remove these parts in the following order:

Top cover	Section 4
Card retainers	Section 6

7.2 Deck Hanger Removal

To remove the deck hanger, follow these steps:

1. Locate the locking tabs that hold the deck hanger in place, as shown in Figure 7-1 The locking tabs protrude through the deck hanger from the rear of the EXB-8200.

2. Press both tabs toward the rear of the EXB-8200 while pulling up on the deck hanger. These tabs may be released simultaneously or one at a time. If they are pressed one at a time, pull up on the deck hanger after the first tab is released and hold it in the unlocked position until the next tab is released. The deck hanger can then be removed from the EXB-8200.

7.3 Deck Hanger Replacement

To replace the deck hanger, follow these steps:

1. Line up the deck hanger with the locking tabs behind it and the support arms in front of it. The locking tabs and support arms work together to hold the deck hanger firmly in place.

2. Slide the deck hanger down between the locking tabs and support arms until it snaps into place. Very slight pressure is required.

7.4 Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

Card retainers   Section 6
Top cover   Section 4

8 Edge Connector Mounted Card Removal and Replacement

This section describes how to remove and replace the edge connector mounted cards. These cards consist of the following:

- DB/DS/DR
- MX
- DF
- CD
- RW.

8.1 MX Card Compatibility

This manual uses the term *MX* to refer to the MX card and to the MV and MS cards, which are now obsolete.

The MX card and the DB or DR card are used in the single-ended SCSI version of the EXB-8200, while the MX card and the DS card are used in the differential SCSI version of the EXB-8200. The DB card has DIP switches for setting the SCSI ID; the DR card has a remote connector for setting the SCSI ID. The embed 3 version of the DS card implemented both DIP switches and a remote connector for setting the SCSI ID; previous versions of this card have DIP switches only.

The MV card is the original version of the MX card for single-ended SCSI configurations and is now obsolete. The MS card is the original version of the MX card for differential SCSI configurations and is now obsolete.

Be sure to check the *EXB-8200 8mm Cartridge Tape Subsystem Compatibility Manual* for proper card levels.

8.2 Preparation

The edge connector socket mounted cards plug into the SV card. To access these cards, first remove these parts in the following order:

Top cover	Section 4
Card retainers	Section 6
Deck hanger	Section 7

The deck hanger needs to be removed only to disconnect the RW connectors. It does not need to be removed to remove any other card.

DF Card Assembly

MX Card Assembly

DB/DS/DR Card Assembly

CD Card Assembly

RW Card Assembly

SV Card Assembly
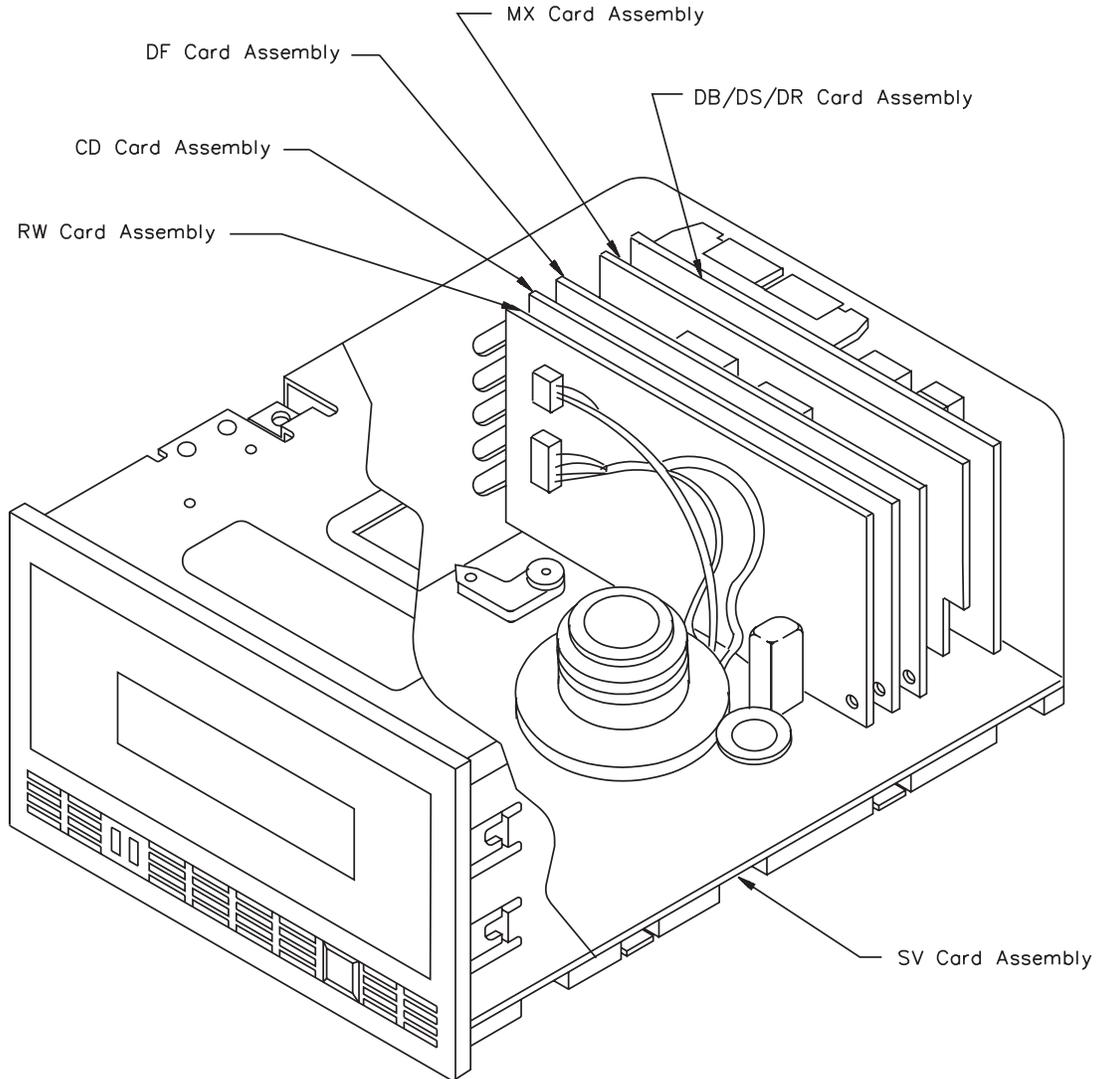
Figure 8-1
Location of Edge Connector Mounted Cards
(deck hanger and card retainers not shown)

8.3 Proper Handling of Printed Circuit Cards

When removing or inserting a card, hold the card on the PCB surface. Do not hold the components or connectors mounted on the card. Holding the components or connectors can damage the card. After removal, hold and place cards on their edges whenever possible.

8.4 Edge Connector Mounted Card Removal

Figure 8-1 shows the position of each edge connector mounted card. To remove any of these cards, follow these steps:

Note: Before removing the RW card, remove the RW card connectors as explained in Section 8.5.

1. Grasp the card between your thumb and first finger on both ends of the card.

2. Lift the card straight up. This will require a reasonable amount of force since the card fits securely into the edge connector socket.
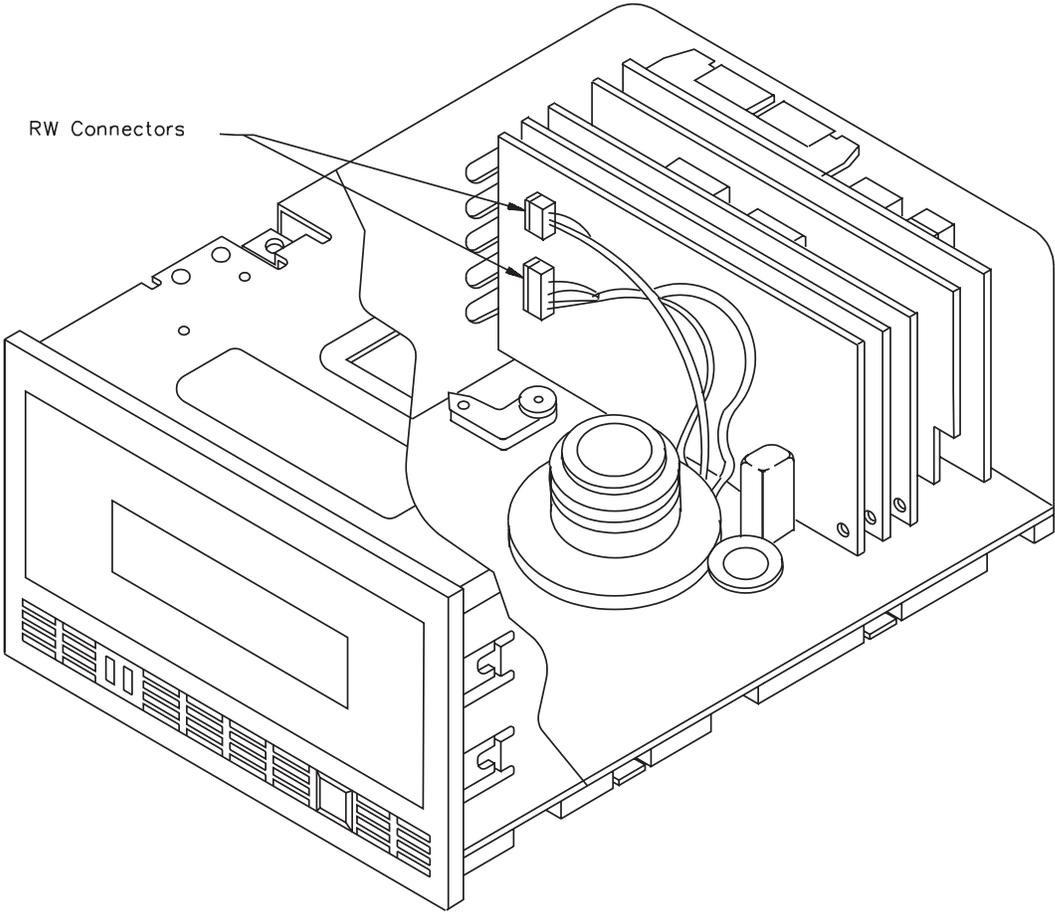
RW Connectors

Figure 8-2
Location of RW Card Wire Harness Connections
(deck hanger and card retainers not shown)

8.5 RW Card Connections

The RW card, shown in Figure 8-2, is slightly different from the other edge connector mounted cards. It has two wire harnesses connected to it, and it is the only card with the component side facing the front of the EXB-8200.

To remove the RW card connections, follow these steps:

1. Remove the deck hanger to allow access to the wire harness connectors on the RW card.

2. Carefully separate the connections by sliding the plug portion to the right using a flat tool such as the blade of a straight blade screwdriver.

Then, you can remove the RW card as described in Section 8.4.

8.6 Replace Edge Connector Mounted Cards

To replace an edge connector mounted card, follow these steps:

1. Align the edge connector with the edge connector socket. Note that the edge connectors are uniquely keyed by offsetting their position on the card. Ensure that the component side of the card is facing the rear of the EXB-8200.

Note: The components of the RW card should face the front of the EXB-8200.

2. Press on both ends of the card at the same time until the card is properly seated in the card edge connector on the SV card.

3. If necessary, reconnect the wire harness to the RW card.

8.7 Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

Deck hanger   Section 7
Card retainers   Section 6
Top cover   Section 4

SV Card
Mounting Hole

SV Card
Mounting Hole

SV Card Assembly
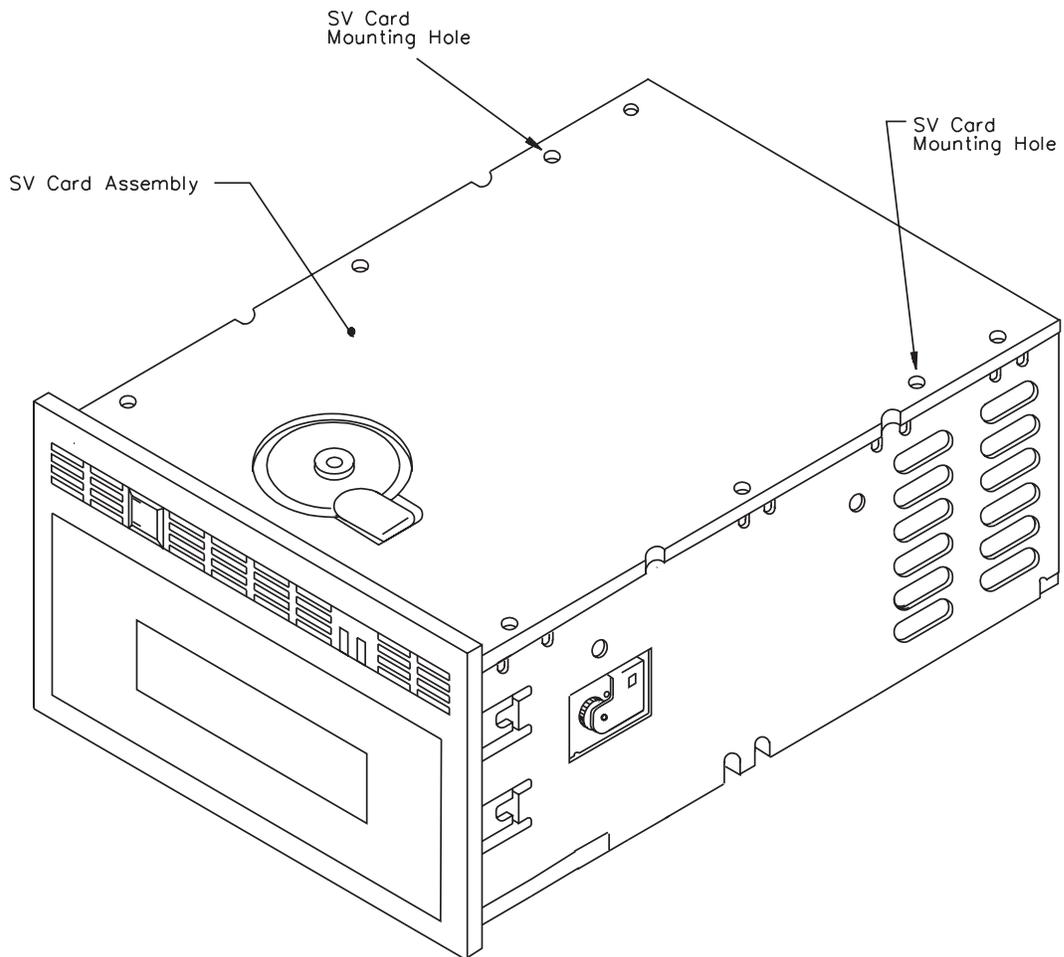
Figure 9-1
Location of SV Card Mounting Screws
(SV card cover removed)

9 SV Card Removal and Replacement

This section describes how to remove and replace the SV card.

9.1 Preparation

The SV card is the card into which the other cards (DB/DS/DR, MX, DF, CD, and RW) are inserted. The SV card performs the functions of a mother board and contains the deck control circuitry. The SV card is mounted on the bottom of the EXB-8200. Before removing the SV card, remove these parts in the following order:

Top cover	Section 4
Card retainers	Section 6
Deck hanger	Section 7
DB/DS/DR card	Section 8
MX card	Section 8
DF card	Section 8
CD card	Section 8
RW card	Section 8
SV card cover	Section 5

9.2 Proper Handling of Printed Circuit Cards

When removing or inserting a card, hold the card on the PCB surface or the card edges. Do not hold the components or connectors mounted on the card. Holding the components or connectors can damage the card. After removal, hold and place cards by their edges whenever possible.

9.3 Remove Mounting Screws

Use a T8 TORX screwdriver to remove the two screws that mount the SV card to the main housing. Figure 9-1 shows the locations of the screws. Once these screws are removed, the SV card will be loose and ready for removal of the connectors.
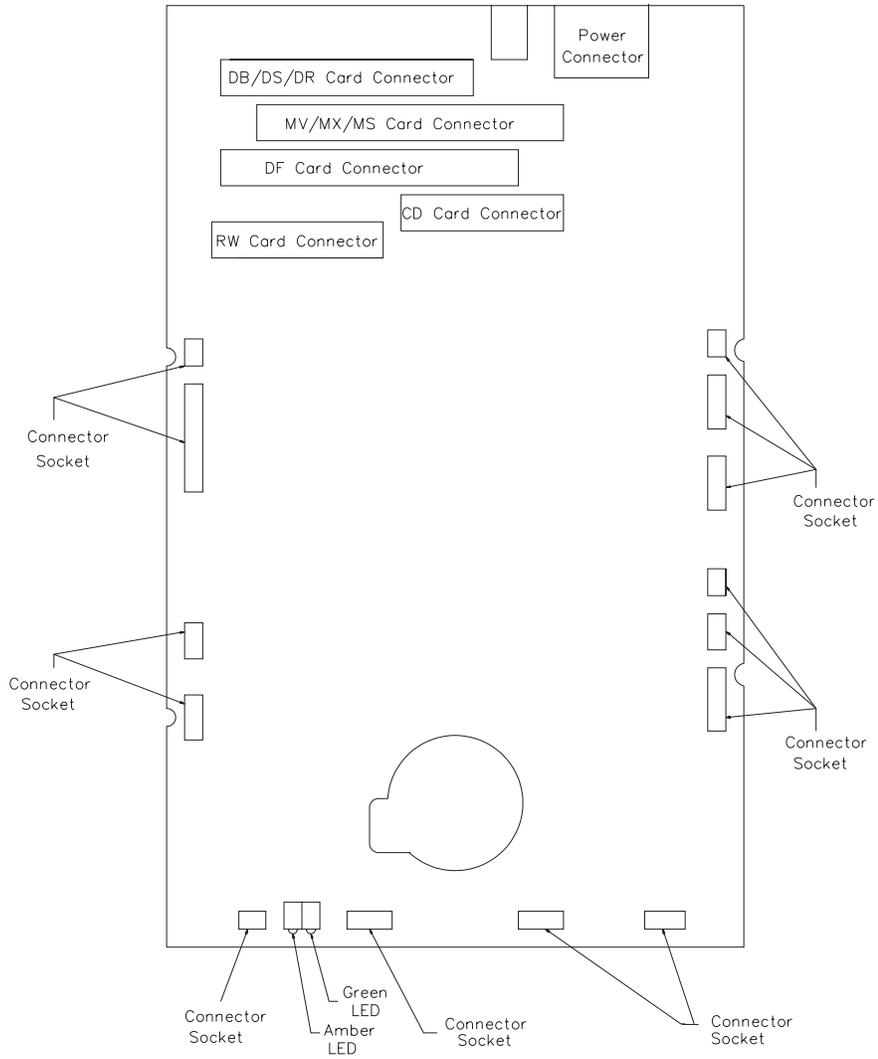
Figure 9-2
Location of SV Card Connectors

9.4 Disconnect SV Card Connectors

CAUTION

Do not pull on the wires to remove the connectors or you may damage the wires.

To disconnect the SV card connectors, follow these steps:

1. Turn the EXB-8200 so that it is resting on its side with the bottom facing toward you and the front facing to your left.

2. Pull the SV card away from the main housing so that you can access the connectors. There are 14 connectors and cables on the SV card attached to various components on the deck. Figure 9-2 shows the location of these connectors on the SV card.

Slide Plug
Out and Away
from Connector
Socket

Key Slot
Press to Release

2 Pin
Connector Socket

Slide Plug
Out and Away
from Connector
Socket

Key Slot
Press to Release

3 Pin
Connector Socket

Slide Plug
Out and Away
from Connector
Socket

Key Slot

Key Slot
Press to Release
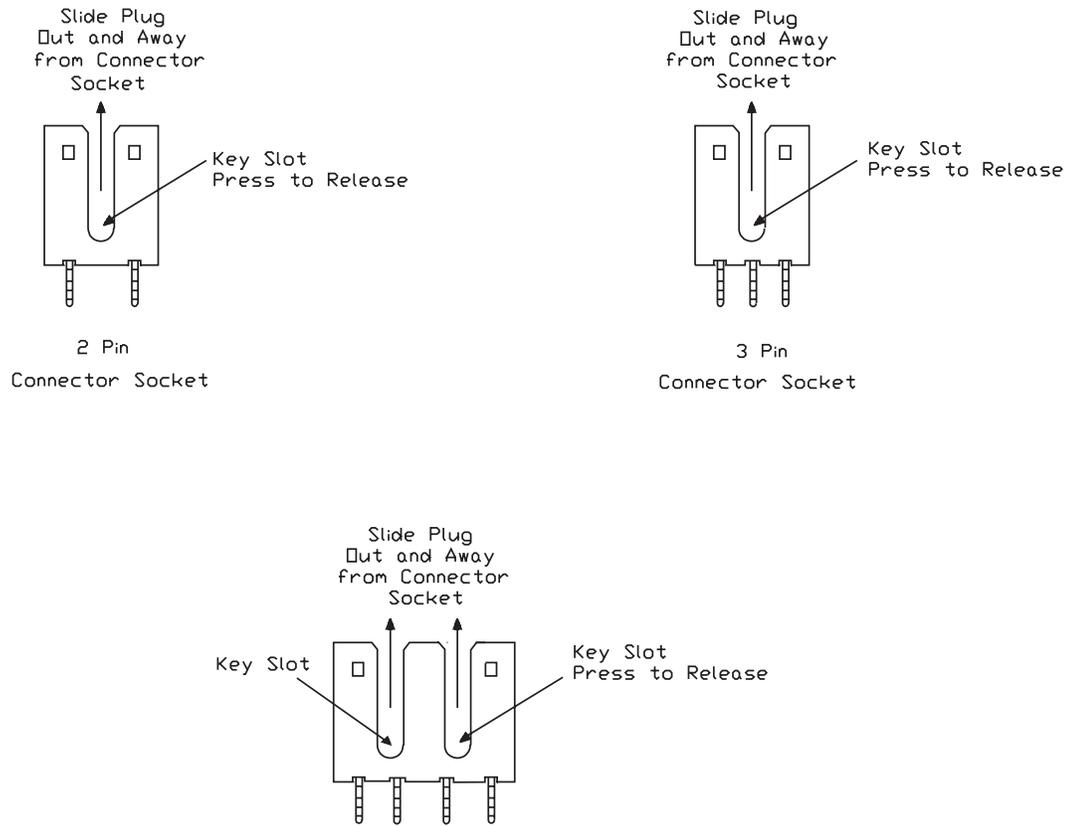
Figure 9-3
Connector Key Sockets

3. Starting with the connectors closest to the rear of the EXB-8200, remove all of the connectors along the edge facing you. Use the points on a pair of tweezers to push down on the bottom of the key portion of the connector plug, then push the plug away from the SV card mounted socket. Each connector socket has either one or two key slots. On those connectors with two keys, alternate pushing on each key so that the connector is removed evenly from the socket. See Figure 9-3.

4. Turn the EXB-8200 so that it is resting on its back with the front facing up.

5. Pull the SV card away from the main housing and disconnect the plugs along the front edge of the card.

6. Turn the EXB-8200 again so that the bottom of the EXB-8200 is still facing you and the front faces to your right.

7. Disconnect all plugs along the edge of the card.

8. Once the electrical connections are disconnected, pull the SV card away from the main housing.

9.5 Reconnect the SV Card Connections

To reconnect the SV card connections, follow the instructions for removing the SV card connections in reverse order. The connections are easiest to re-connect if you start at the rear of the EXB-8200 and work around to the front. Then, work across the front and back toward the rear, ending with the rear connector on the right-hand side. Ensure that the connectors are fully seated.

CAUTION

Be sure to plug the connectors into the correct sockets. The connectors and the sockets are color coded or sized differently to help you determine which connector goes with which socket. In the front of the EXB-8200, there are two connectors with three pins. At this location, be especially careful to insert the yellow connector into the yellow socket and the white connector into the white socket.

9.6 Reattach the SV Card to the Main Housing

To reattach the SV card to the main housing, follow these steps:

1. Turn the EXB-8200 upside down with the front of the EXB-8200 facing you.

2. Mount the SV card to the main housing using the two screws that were removed from it. Before tightening the screws, carefully inspect the edges of the SV card to ensure that no wires are caught between the SV card and the main housing. Tighten the screws to 3.4 inch-pounds of torque.

CAUTION

Do not overtighten the screws. Overtightening these screws can damage the SV card.

---

3. If the SV card was replaced with another card, check the head sync adjustment. Reset the head sync if necessary using the procedure described in Section 18.

9.7   Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

SV card cover	Section 5
RW card	Section 8
CD card	Section 8
DF card	Section 8
MX card	Section 8
DB/DS/DR card	Section 8
Deck hanger	Section 7
Card retainers	Section 6
Top cover	Section 4

DF Card Assembly

MX Card Assembly

CD Card Assembly

DB/DS/DR Card Assembly

RW Card Assembly

SV Card Assembly
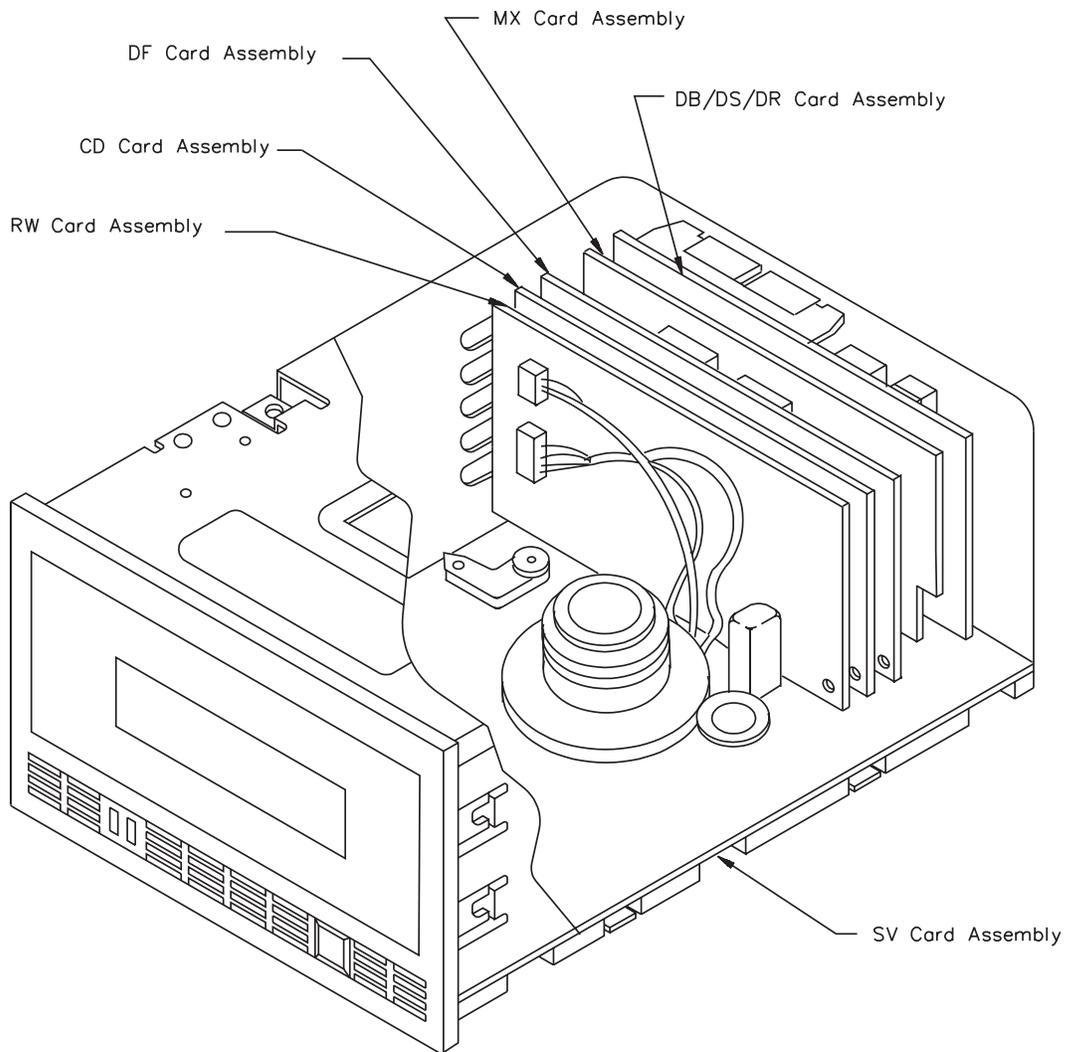
Figure 10-1
Location of Edge Connector Mounted Cards
(deck hanger and card retainers not shown)

10 MX EPROM Removal and Replacement

This section describes how to remove and replace the EPROM on the MX card. Figure 10-1 shows the location of the MX card.

Note: This manual uses the term *MX* to refer to the MX card and to the MV and MS cards, which are now obsolete. Refer to Section 8.1 for more information.

10.1 Preparation

The EPROM is socket mounted on the MX card. To access the EPROM, first remove these parts in the following order:

Top cover	Section 4
Card retainers	Section 6
MX card	Section 8

10.2 Identification Information

Before starting this procedure, ensure that you have the correct EPROM for your configuration. The MX (or MS or MV) card uses either a 128 KByte EPROM or a 256 KByte EPROM. In addition, the EPROM you need depends on the PCB part number and on the revision level of the code for your configuration. Although this manual does not provide specific information about EPROM part numbers, this section provides general guidelines for determining the PCB part number and the card type.
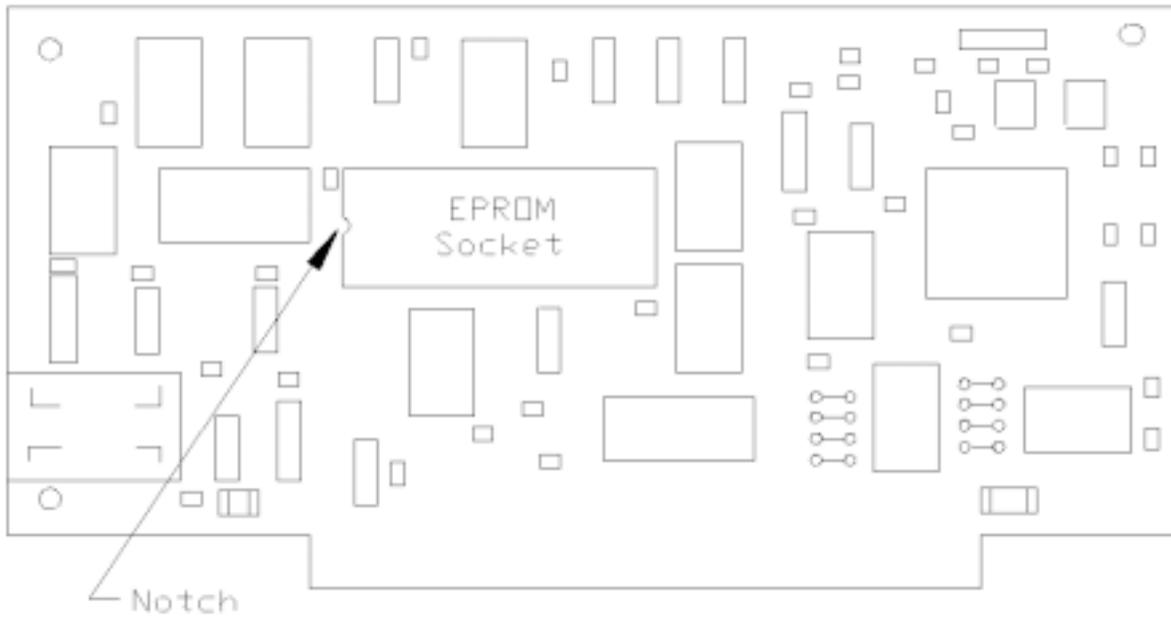
Figure 10-2
Location of EPROM for MX, MS, or MV Cards
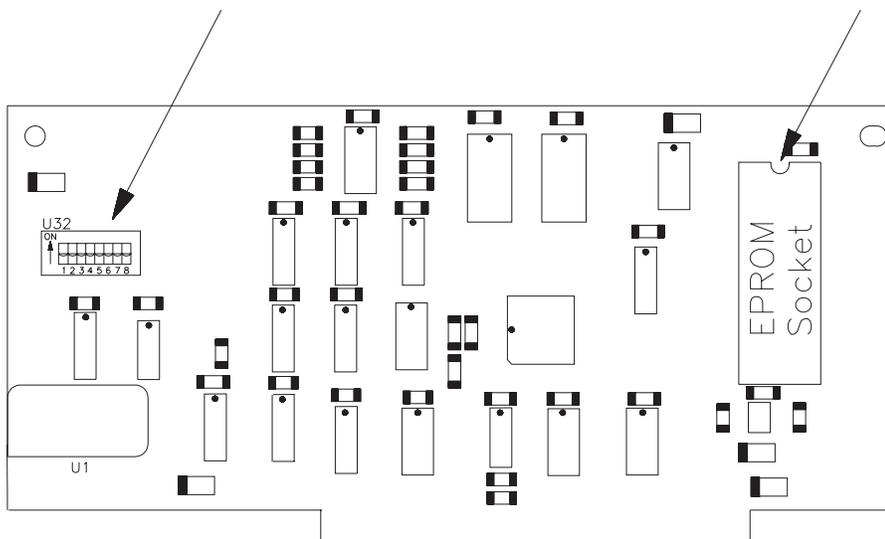
Figure 10-3
Location of EPROM for MX and MS Cards

To determine the type of EPROM you need, follow these steps:

1. Determine the card type by looking on the non-component side of the card. Near the top edge of the card are two stickers: one is a serial number sticker and the other is a revision level sticker. The serial number sticker contains the letters MX (or MV or MS), followed by the serial number.

2. Locate the PCB part number. The PCB part number is silk screened on the PCB surface and is located in the lower left-hand corner of the component side. It is located either in the lower right-hand corner or along the left edge of the non-component side.

3. Refer to Table 10-1 to determine which type of EPROM corresponds to the PCB part number for your type of card.

Table 10-1
MV/MX/MS PCB Part Numbers

Type of Card	PCB Part No.	Type of EPROM
MX	620090-*xxx* [a]	128 Kbyte
MX	620091-*xxx*	256 KByte
MX	620092-*xxx*	256 KByte
MV[b]	620080-*xxx*	128 KByte
MS[b]	620092-*xxx*	256 KByte

[a] *xxx* is the revision level for the part number.
[b] The MV and the MS cards are obsolete.

10.3 EPROM Removal

To remove the EPROM, follow these steps:

1. Place the card on the work surface with the component side up and the card edge connector pointing toward you. Figures 10-2 and 10-3 show the location of the major components on the MX (or MV or MS) card and the location of the EPROM socket.

2. Using an EPROM removal tool, extract the EPROM from the card and set it aside.
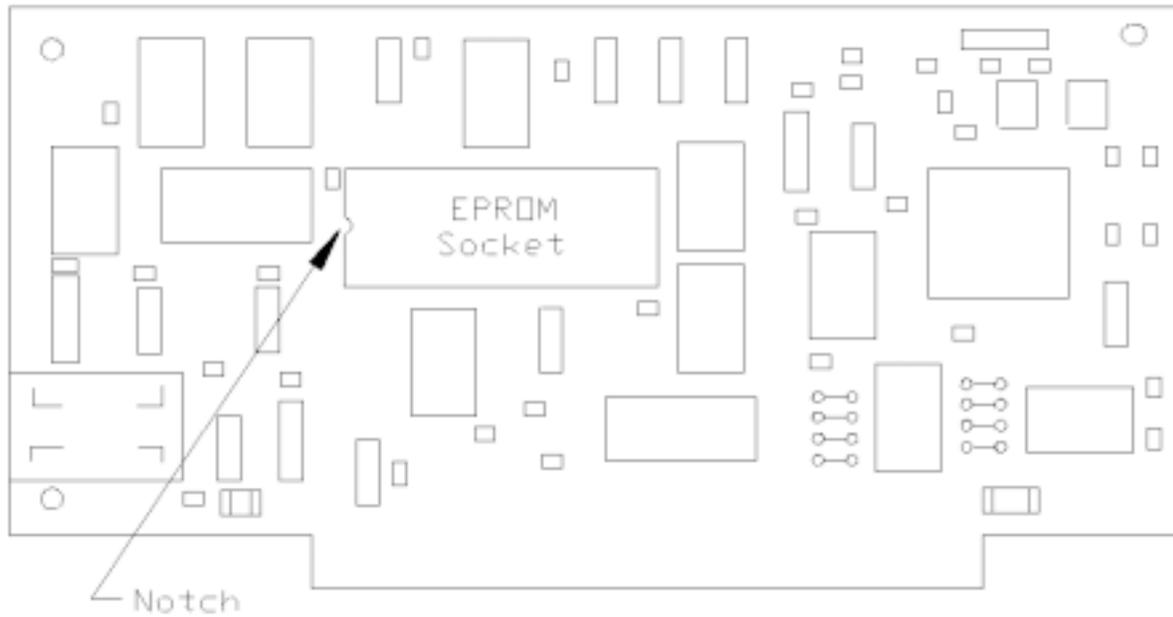
Figure 10-4
Location of EPROM for MX, MS, or MV Cards (same as Figure 10-2)
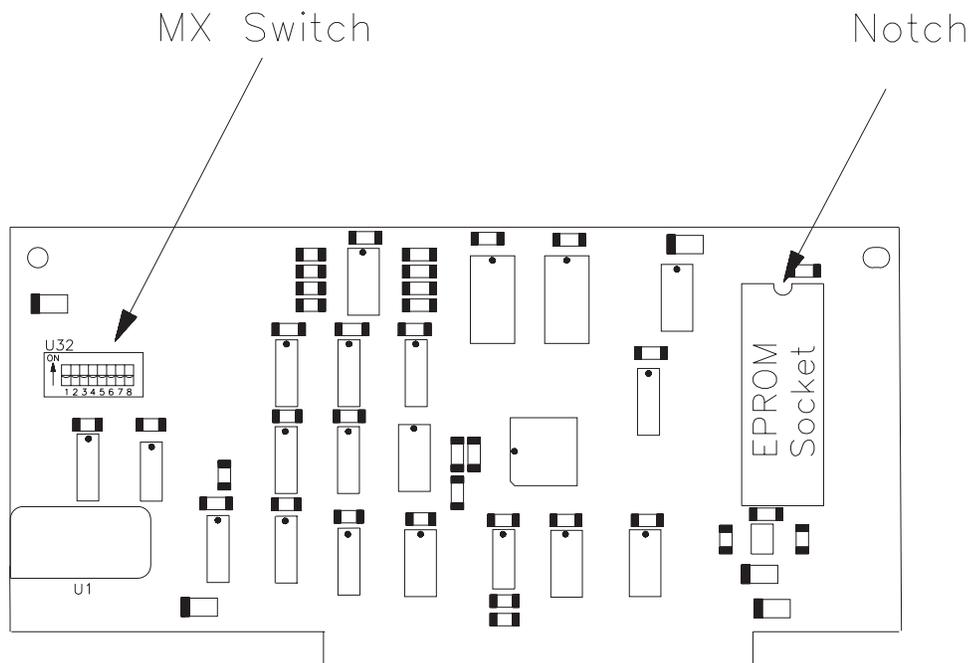
Figure 10-5
Location of EPROM for MX and MS Cards (same as Figure 10-3)

10.4 EPROM Installation

CAUTION

Be sure to install the correct EPROM on the card. Before installing the EPROM, see Section 10.2 for information about identifying EPROMs and cards correctly.

To install the EPROM if an EPROM insertion tool is available, follow these steps:

1. Select the EPROM to be installed and orient the notch in the EPROM with the notch in the EPROM socket on the card, as shown in either Figure 10-4 or Figure 10-5.

2. Use the EPROM insertion tool to insert the new EPROM.

To install the EPROM if an EPROM insertion tool is not available, follow these steps:

1. Select the EPROM to be installed and position it on the socket carefully, checking to ensure that each pin on the EPROM is aligned with a hole in the EPROM socket.

2. Place both thumbs on top of the EPROM and press it into the socket. Be careful to provide even pressure on the top of the EPROM so that all pins are inserted at the same time. Uneven pressure can result in the EPROM being only partially inserted and in bent pins on the EPROM.

3. Visually inspect the EPROM to ensure that all of the pins have been correctly inserted. If the EPROM is not fully seated in the socket, apply additional pressure to bottom out all pins on the EPROM into the socket.

4. If any of the pins are bent, remove the EPROM. Then, attempt to straighten the pins and reinsert the EPROM. Follow the previous steps to remove, insert, and inspect the EPROM.

Note: Do not use the EPROM if any of the pins are broken.

DF Card Assembly ⎯

MX Card Assembly

DB/DS/DR Card Assembly

CD Card Assembly ⎯

RW Card Assembly ⎯

SV Card Assembly
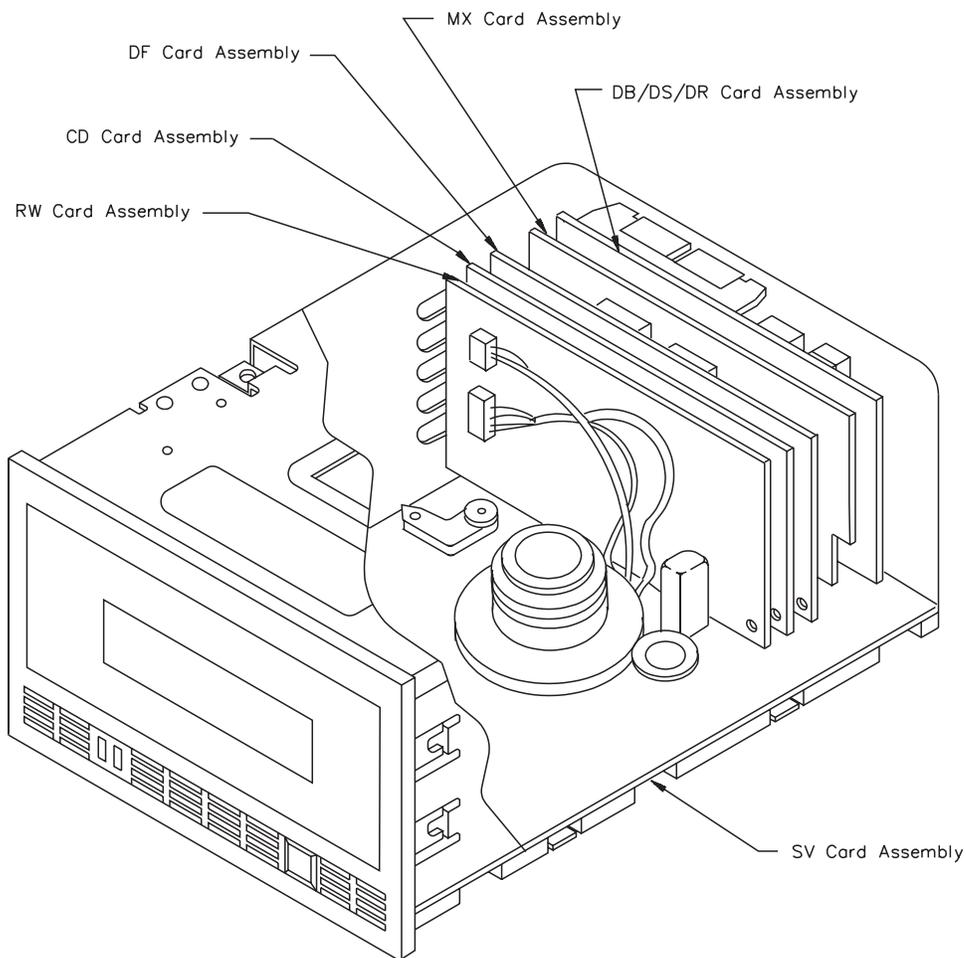
Figure 10-6
Location of Edge Connector Mounted Cards
(deck hanger and card retainers not shown)

10.5 Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

MX card   Section 8
Card retainers   Section 6
Top cover   Section 4
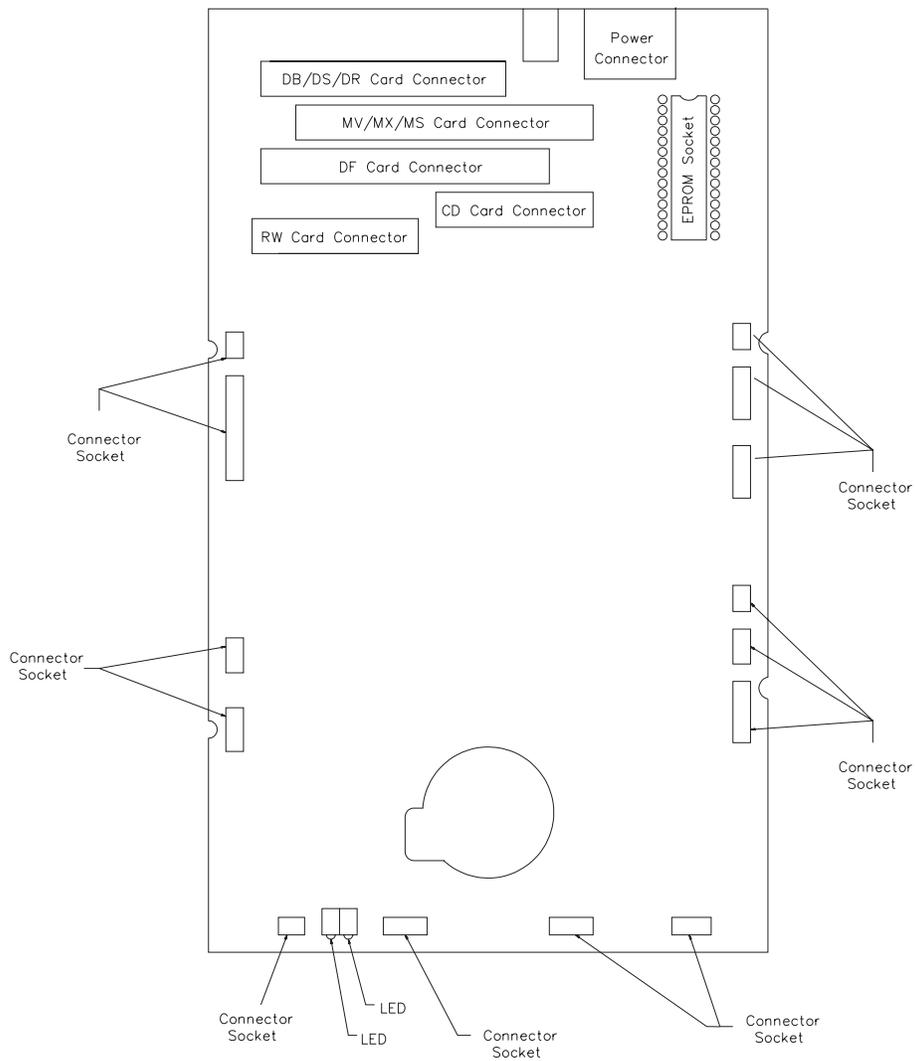
Figure 11-1
Location of SV Card EPROM for SV Card 721103-Bxx

11 SV Card EPROM Removal and Replacement

This section describes how to remove and replace the EPROM contained on the SV card. There are two different types of SV cards: 721103-B*xx* and 721102-B*xx*. The steps for replacing the EPROM on SV card 721103-B*xx* are described first, followed by the steps for replacing the EPROM on SV card 721102-B*xx*.

11.1 Proper Handling of Printed Circuit Cards

When removing or inserting a card, hold the card on the PCB surface. Do not hold the components or connectors mounted on the card. Holding the components or connectors can damage the card. After removal, hold and place cards on their edges whenever possible.

11.2 Preparation for SV Card 721103-Bxx

The SV EPROM is socket mounted on the SV card. To access the SV card EPROM, first remove these parts in the following order:

Top cover	Section 4
Card retainers	Section 6
Deck hanger	Section 7
DB/DS/DR card	Section 8
MX card	Section 8
DF card	Section 8
CD card	Section 8
RW card	Section 8

Note: Do not remove SV card 721103-B*xx* to replace the EPROM.

11.3 EPROM Removal for SV Card 721103-Bxx

To remove the EPROM, follow these steps:

1. Place the EXB-8200 on the work surface with the front facing you. Locate the EPROM (see Figure 11-1).

2. Remove the EPROM using an appropriate EPROM removal tool.
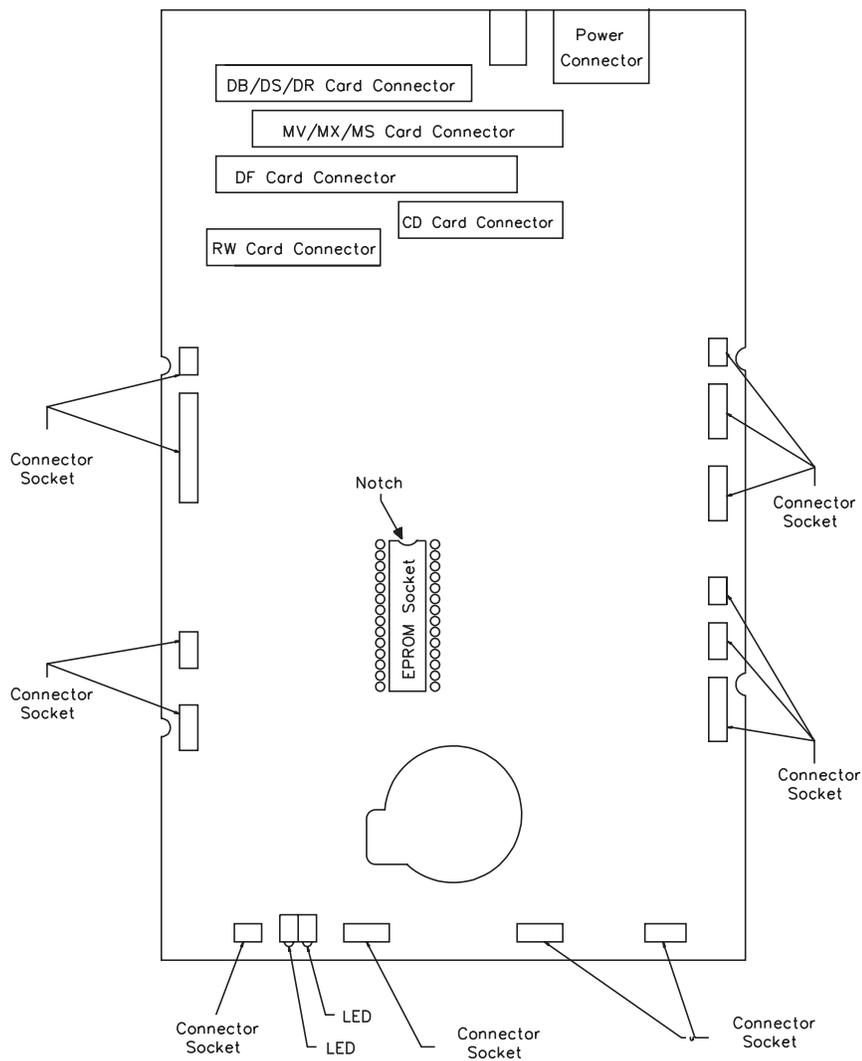
Figure 11-2
Location of SV Card EPROM for SV Card 721102-Bxx

11.4 Preparation for SV Card 721102-Bxx

To access the EPROM on the 721102-B*xx* SV card, remove all of the items mentioned in Section 11.2. Then, remove these parts in the following order:

SV card cover   Section 4
SV card   Section 8

11.5 EPROM Removal for SV Card 721102-Bxx

To remove the EPROM, follow these steps:

1. Place the SV card on the work surface with the component side up and the front edge of the card facing you. The front edge of the SV card is identified by the two LEDs and the circular cutout in the card.
   Figure 11-2 shows the location of the major components on the card and the location of the EPROM socket.

2. Using an EPROM removal tool, extract the EPROM from the SV card and set it aside.

11.6 EPROM Installation

To install the EPROM if an EPROM insertion tool is available, follow these steps:

1. Select the EPROM to be installed and orient it with the notch toward the rear edge of the SV card. This will correspond to the notch in the EPROM socket on the SV card.

2. Use the EPROM insertion tool to insert the EPROM.
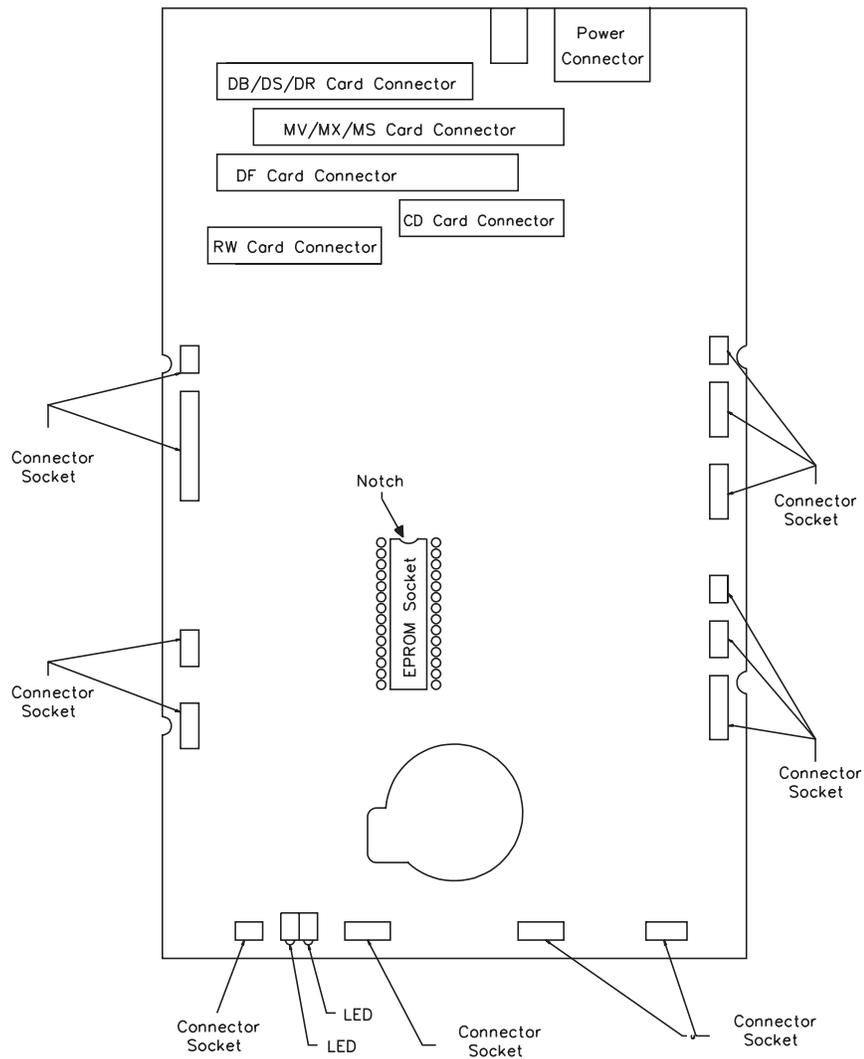
Figure 11-3
Location of SV Card EPROM for SV Card 721102-Bxx
(same as Figure 11-2)

To install the EPROM if an EPROM insertion tool is not available, follow these steps:

1. Carefully position the EPROM on the socket. Check to ensure that each pin on the EPROM is aligned with a hole in the EPROM socket on the SV card.

2. Place both thumbs on top of the EPROM and press it into the socket. Be careful to provide even pressure on the top of the EPROM so that all pins are inserted at the same time. Uneven pressure can result in the EPROM being only partially inserted and in bent pins on the EPROM.

3. Visually inspect the EPROM to ensure that all of the pins have been correctly inserted into the socket. If the EPROM is not fully seated in the socket, apply additional pressure to bottom out all pins into the socket.

4. If any of the pins are bent, remove the EPROM. Then, attempt to straighten the pins and reinsert the EPROM. Follow the previous steps to remove, insert, and inspect the EPROM.

Note: Do not use the EPROM if any of the pins are broken.

11.7 Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

SV card (for part number 721102-B*xx*)	Section 9
SV card cover (for part number 721102-B*xx*)	Section 5
RW card	Section 8
CD card	Section 8
DF card	Section 8
MX card	Section 8
DB/DS/DR card	Section 8
Deck hanger	Section 7
Card retainers	Section 6
Top cover	Section 4
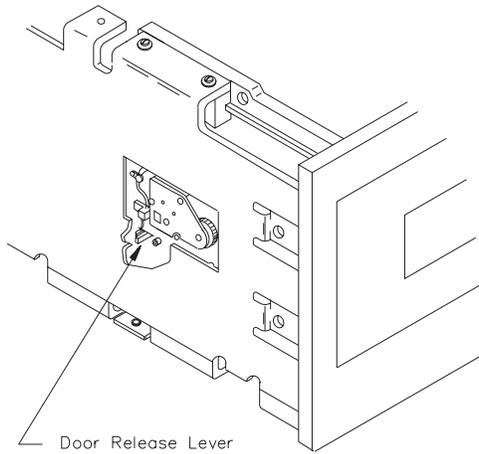
Figure 12-1
Location of Door Release Lever
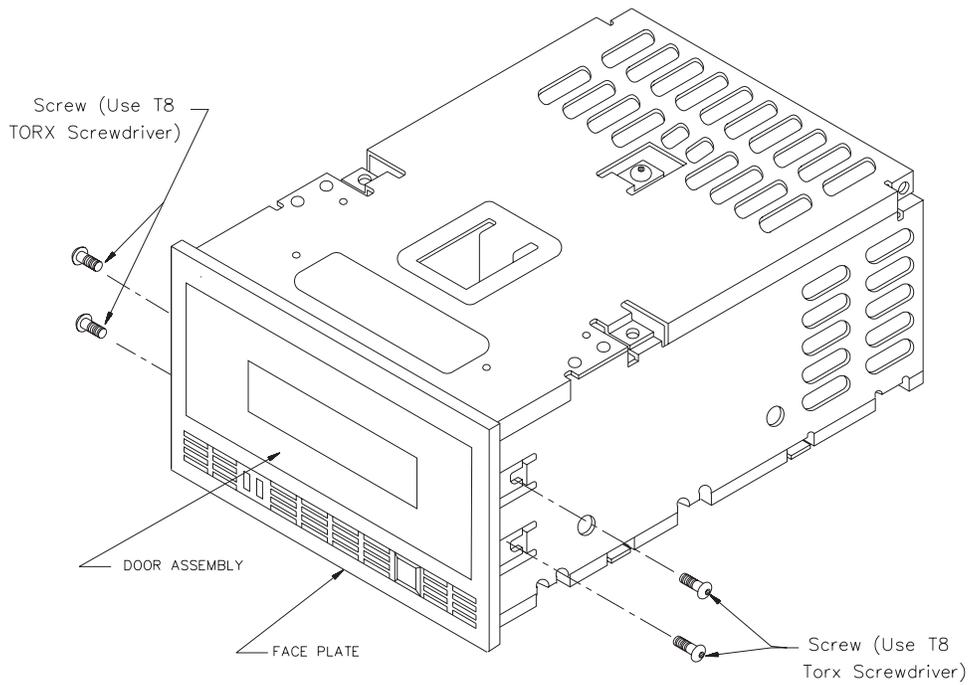
Figure 12-2
Location of Faceplate Mounting Screws

12 Faceplate Removal and Replacement

This section describes how to remove and replace the faceplate.

12.1 Faceplate Removal

To remove the faceplate, follow these steps:

1. To avoid damaging tape, ensure that there is no data cartridge in the EXB-8200.

2. Open the door on the EXB-8200 using an appropriate tool, such as a small screwdriver, to move the door release lever toward the front of the EXB-8200. Figure 12-1 shows the location of the door release lever. The amount of force required to activate the lever is slight and the movement is less than 1/8 of an inch. Be careful not to damage the small switch contacts next to the door release lever.

3. Using a T8 TORX screwdriver, loosen the four faceplate mounting screws, but do not completely remove them. Figure 12-2 shows the location of these screws.

4. Position the EXB-8200 so that it is resting on the rear of the main housing, with the front pointing up and the door open.

5. Move the faceplate away from the main housing. Close the door partially, so you can slide the faceplate off of the mounting screws and around the door.

Screw (Use T8
TORX Screwdriver)

DOOR ASSEMBLY

FACE PLATE

Screw (Use T8
Torx Screwdriver)

Figure 12-3
Location of Faceplate Mounting Screws
(same as Figure 12-2)

12.2 Faceplate Replacement

To replace the faceplate, follow these steps:

1. Position the EXB-8200 on the work surface so that it is resting on the rear of the main housing with the door open and facing up.

2. Close the door partially so that you can slide the faceplate around the door and align it with the four mounting screws (see Figure 12-3).

3. Position the faceplate so that the mounting tabs are under the four mounting screws and the faceplate is flush with the door when it is closed.

4. Tighten the mounting screws until they are snug.

CAUTION

Do not overtighten the screws. Overtightening these screws can damage the faceplate mounting tabs or strip the screw holes in the main housing.
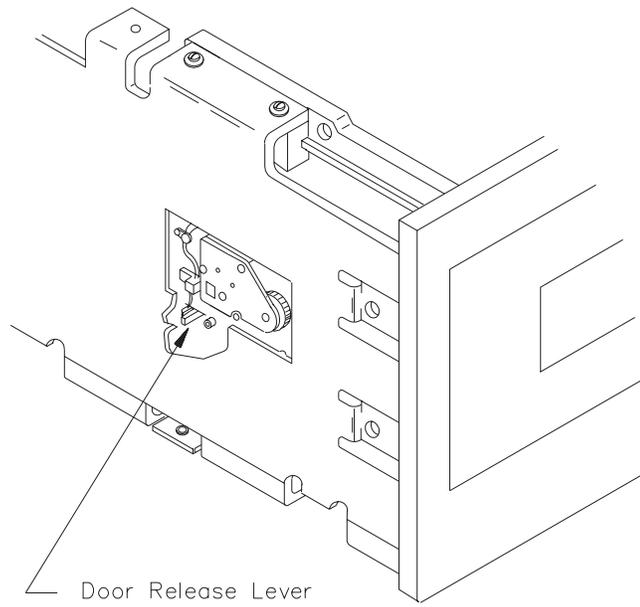
Figure 13-1
Location of Door Release Lever

Figure 13-2
Door and Door Retainer Separation

13 Door Removal and Replacement

This section describes how to remove and replace the door.

13.1 Preparation

If necessary, open the door of the EXB-8200 after checking that there is no data cartridge in the EXB-8200. To open the door, use an appropriate tool, such as a small screwdriver, to move the door release lever toward the front of the EXB-8200. Figure 13-1 shows the location of the door release lever. The amount of force required to activate the lever is slight and the movement is less than 1/8 of an inch. Be careful not to damage the small switch contacts next to the door release lever.

13.2 Door Removal

To remove the door, follow these steps:

1. Using a flat blade screwdriver, separate the door from the door retainer. The locking tabs that hold the two together are near the top edge of the door. Figure 13-2 shows where to position the screwdriver to separate the door and the door retainer.

    Start with either side of the door and position the screwdriver so that the prying force will separate the two components. Apply the force so that it pushes the door retainer tab toward the outside edge of the door as well as away from the door.

2. Unlatch the remaining locking tab using the same method.

3. Separate the two components so that the bottom locking tabs are also released and both parts can be removed and set aside.

Door Retainer

Door Bracket

Door

View A

Upper Locking Tab

Front

Door   Lower
        Locking
        Tab

Door Retainer
Door Bracket

View B
Side View
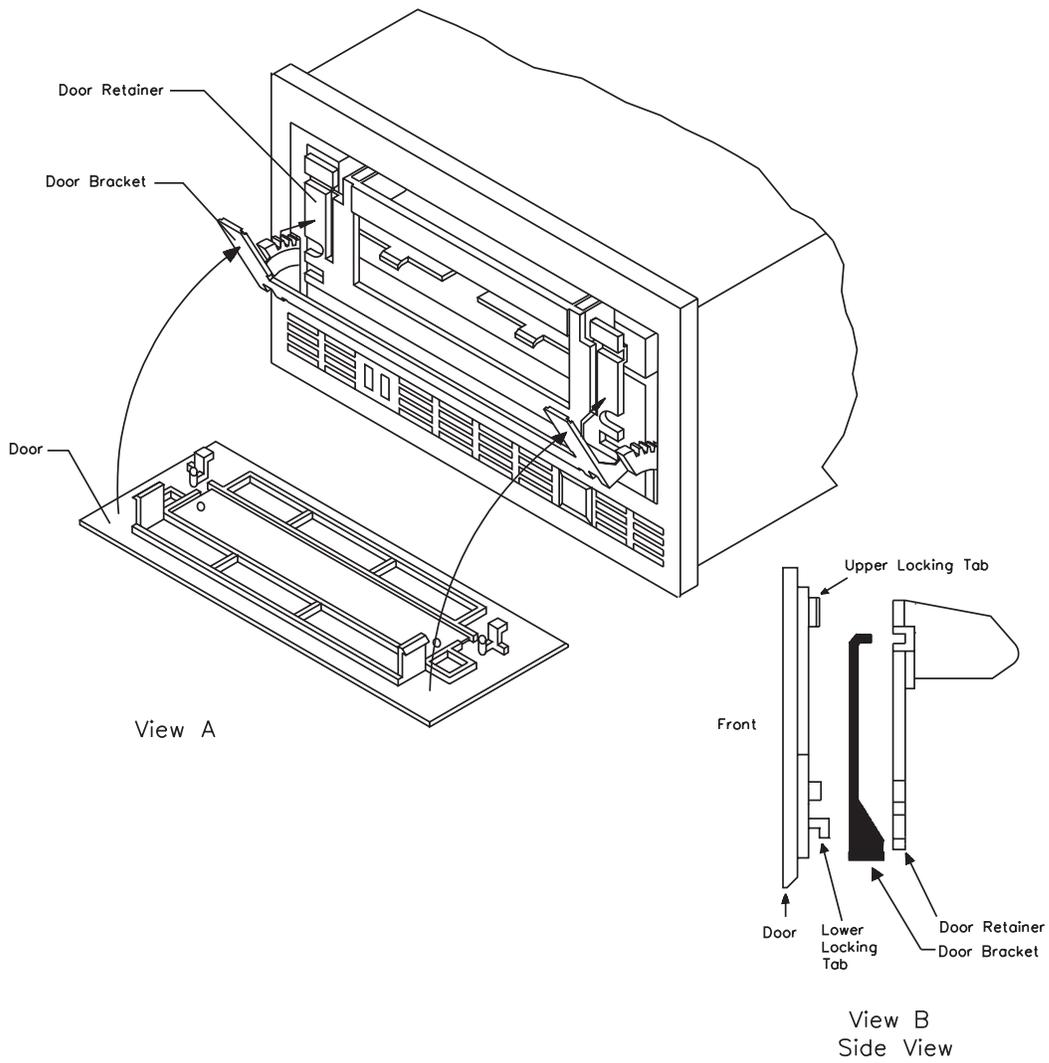
Figure 13-3
Relationship among the Door, Door Retainer, and Door Bracket

13.3 Door Replacement

Practice assembling the door and the door retainer independently of the EXB-8200 several times before attempting to put them on the EXB-8200. Be sure to observe the final relationship of all of the locking tabs so that it is clear how they should look when they are placed on the door mechanism. View A in Figure 13-3 shows how the door, the door retainer, and the door bracket are positioned on the EXB-8200. View B shows a side view of the door, the door bracket, and the door retainer.

To replace the door, follow these steps:

1. If necessary, open the door mechanism on the EXB-8200 after checking that there is no data cartridge in the EXB-8200.

2. Position the door on the arms of the door bracket so that the bottom locking tabs on the door are in the notches on the bottom of the door bracket.

3. Hold the door in position on the door bracket with the thumb and first finger of one hand and position the door retainer so that the locking tab notches on the bottom of the door retainer are by the locking tabs on the door.

4. Squeeze the door and door retainer together using the thumb and first finger of each hand so that the bottom notches snap together with the locking tabs. Apply the pressure so that the door retainer moves in and up under the locking tabs.

5. Squeeze the door and door retainer together at the top edge to engage the top locking tabs.

6. Inspect the door to make sure all tabs are in the correct position. If one of the bottom tabs is not in its correct position, separate the door and the door retainer and restart the replacement procedure.
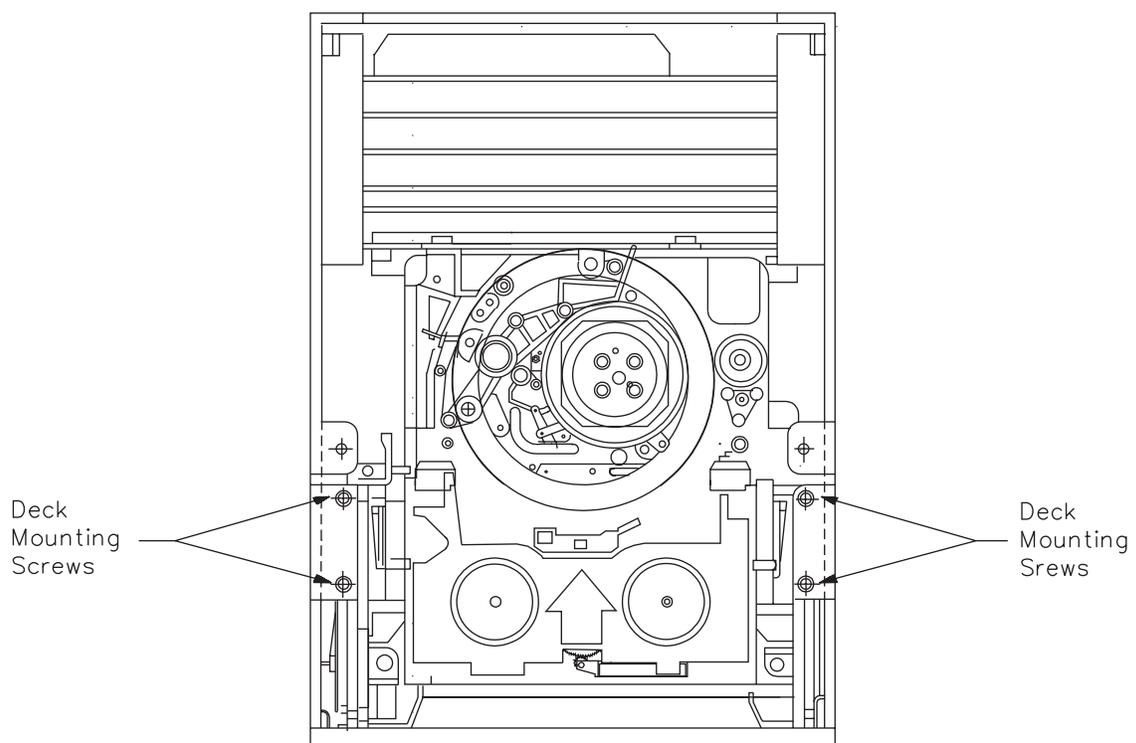
Figure 14-1
Location of Deck Mounting Screws

14 Deck Assembly Removal and Replacement

This section describes how to remove and replace the deck assembly.

14.1 Preparation

To replace the deck, first remove these parts in the following order:

Top cover	Section 4
Card retainers	Section 6
Deck hanger	Section 7
Faceplate	Section 12
RW card	Section 8
CD card	Section 8
DF card	Section 8
MX card	Section 8
DB/DS/DR card	Section 8
SV card cover	Section 5
SV card	Section 9

14.2 Deck Removal

To remove the deck, follow these steps:

1. Remove the four Phillips screws that mount the deck to the main housing, as shown in Figure 14-1.

2. Move the deck out the front of the EXB-8200 and away from the main housing.

Deck
Mounting
Screws

Deck
Mounting
Srews

Figure 14-2
Location of Deck Mounting Screws (same as Figure 14-1)

14.3 Deck Replacement

To replace the deck, follow these steps:

1. Set the new deck in place and start the four mounting screws to hold the deck in place while reassembling the EXB-8200. Do not tighten these screws at this time.

2. Mount the door assembly from the old deck on the new deck (see Section 13).

3. Install the faceplate on the main housing (see Section 12).

4. Close the door to the deck and position the deck so that the door is flush with the faceplate.

5. Tighten the deck mounting screws to 1.7 inch-pounds of torque.

+--+
| **CAUTION** |
| |
| **Do not overtighten the screws.** Overtightening these |
| screws can strip the screw holes in the new deck. |
+--+

14.4 Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

SV card	Section 9
SV card cover	Section 5
DB/DS/DR card	Section 8
MX card	Section 8
DF card	Section 8
CD card	Section 8
RW card	Section 8
Deck hanger	Section 7
Card retainers	Section 6
Top cover	Section 4
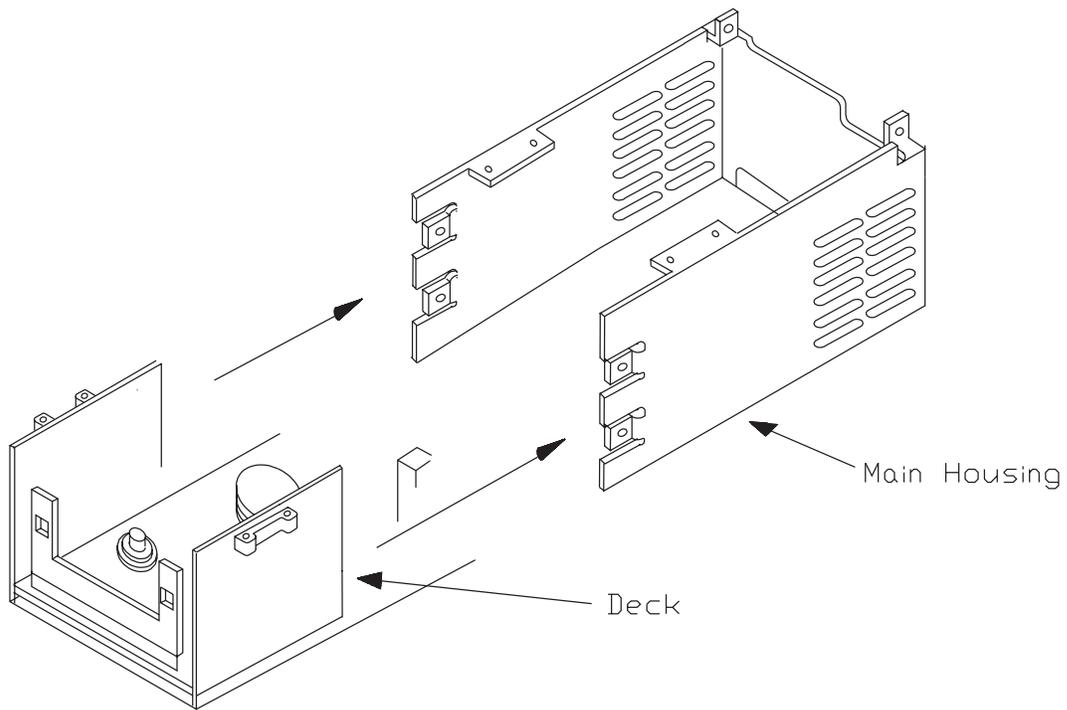
Figure 15-1
Main Housing Removal

15 Main Housing Removal and Replacement

This section describes how to remove and replace the main housing.

15.1 Preparation

To replace the main housing, first remove these parts in the following order:

Top cover	Section 4
Card retainers	Section 6
Faceplate	Section 12
SV card cover	Section 5

Note: You must remove the SV card mounting screws (see Section 9.3), but the SV card can remain in place. You should also remove the deck mounting screws (see Section 14.2), but there is no need to remove the deck.

15.2 Main Housing Removal

After the main housing has been separated from all other assemblies and components, the main housing is ready for removal. To remove the main housing, follow these steps:

1. Grasp the main housing by the sides toward the front.

2. Spread the sides of the main housing apart.

3. Push the main housing away from the rest of the EXB-8200 until it is completely separate from the deck and cards, as shown in Figure 15-1.

15.3 Main Housing Replacement

To replace the main housing, follow these steps:

1. Grasp the main housing by the sides at the front.

2. Spread the sides of the main housing apart.

3. Pull the main housing around the deck and cards until it is in place.

4. Inspect the mounting tabs for the SV card cover to ensure that they are positioned so that the SV card and SV card cover can be mounted to the main housing properly. The screws for the SV card cover should go through the SV card cover and SV card before they go into the main housing.

15.4 Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

Deck assembly   Section 14
SV card   Section 9
SV card cover   Section 5
Card retainers   Section 6
Faceplate   Section 12
Top cover   Section 4

16 Cleaning Procedure

This section describes how to clean an EXB-8200.

16.1 Accepted Procedures and Products

The only cleaning material authorized for use with the EXB-8200 is the EX-ABYTE 8mm Tape Subsystem Cleaning Cartridge 727113 (3 cleanings).

Cloth swabs, cotton swabs, and cleaning agents are not accepted for use and will void the warranty on the EXB-8200.

16.2 Cleaning Intervals

The EXABYTE Cleaning Cartridge is designed as a preventive maintenance product. Use it at regular intervals based on tape drive use. Under normal environmental conditions, use the cleaning cartridge once a month or after approximately 30 gigabytes of data transfer or 30 tape motion hours, whichever occurs first. If the EXB-8200 is experiencing read/write performance problems, perform one or two cleaning passes at that time.

Note: For planning purposes, one gigabyte of data is transferred for every hour of continuous streaming operation.

16.3 Minimum Firmware Level Required

The EXABYTE Cleaning Cartridge will work properly with all EXB-8200s that have MX processor firmware of at least 4$22 and SV processor firmware of at least B016. Inserting a cleaning tape into EXB-8200s below these firmware levels causes the EXB-8200 to identify the cleaning tape as a data tape. If this occurs, the EXB-8200 will load the cleaning tape and show Ready status (green LED lit). Press the unload button to unload the cleaning cartridge.

16.4 Cleaning Action Performed by Cartridge

When a cleaning cartridge is inserted into an EXB-8200 with the proper firmware levels, the cleaning tape is loaded into the tape path and moved forward for approximately 15 seconds. At the end of this time, the cleaning tape is drawn back into the cartridge and the cartridge is ejected. The EXB-8200 is ready for use at this point.

16.5 Usage and Reusage

The EXB-8200 8mm Tape Subsystem Cleaning Cartridge is designed for three uses and then disposal. The cleaning tape should never be rewound or reused since the chances of reintroducing contaminants are very high. Firmware 4$22 and above are designed to prevent the EXB-8200 from rewinding cleaning tapes.

16.6 Cleaning Instructions

To clean an EXB-8200, follow these steps:

1. Apply power to the EXB-8200. When the power-on cycle is complete, open the door and remove any data cartridge from the EXB-8200. Leave the door open.

2. Place the cleaning cartridge into the EXB-8200 and close the door.

   The remainder of the cleaning process is automatically performed by the EXB-8200. When the cleaning process is complete, the cleaning cartridge is automatically unloaded and ejected from the EXB-8200. The average cleaning cycle is 15 seconds.

3. Record the date on the cartridge label.

4. Store the cleaning cartridge for future use.

Note: To prevent contamination of the EXB-8200, do not rewind the cleaning cartridge or use it more than three times.

17 Tape Removal Procedure

This section describes how to remove a data cartridge that is loaded in the tape path around the rotating head assembly of a nonfunctioning EXB-8200. Use this procedure only as a last option when it is necessary to preserve the data on the tape.

Before using this procedure and if there are any questions about this procedure, contact EXABYTE Technical Support. Technical Support will attempt to provide alternate methods for recovering the data cartridge.

IMPORTANT

EXABYTE Corporation does not assume responsibility for any damage to the EXB-8200, the data cartridge, or media or for the loss of any data resulting from this procedure. Any damage to the EXB-8200 caused by this procedure will be repaired as a nonwarranty repair and may void the existing warranty for the EXB-8200.

17.1 Preparation

Before attempting this procedure, remove and reapply power to the EXB-8200 in an attempt to clear a possible hang condition. If the green LED is lit, indicating Ready status, push the unload button or issue a SCSI UNLOAD command. If the green LED is not lit, continue with the instructions in this section.

17.2 Definitions

Non-functioning EXB-8200. For the purposes of this procedure, a non-functioning EXB-8200 is an EXB-8200 that fails to execute the rewind/unload operation on power up.

Rewind/Unload Operation. The rewind/unload operation is the operation in which the tape is returned to the supply reel of the data cartridge and then unloaded from the tape path around the rotating head assembly and tape guides.

Eject Operation. The eject operation is the operation that is executed after the rewind/unload operation. This operation opens the door on the EXB-8200, removing the tape cartridge from inside the drive.

Note: The eject operation can be disabled with the PREVENT MEDIA REMOVAL SCSI command.

Adhesive Tape
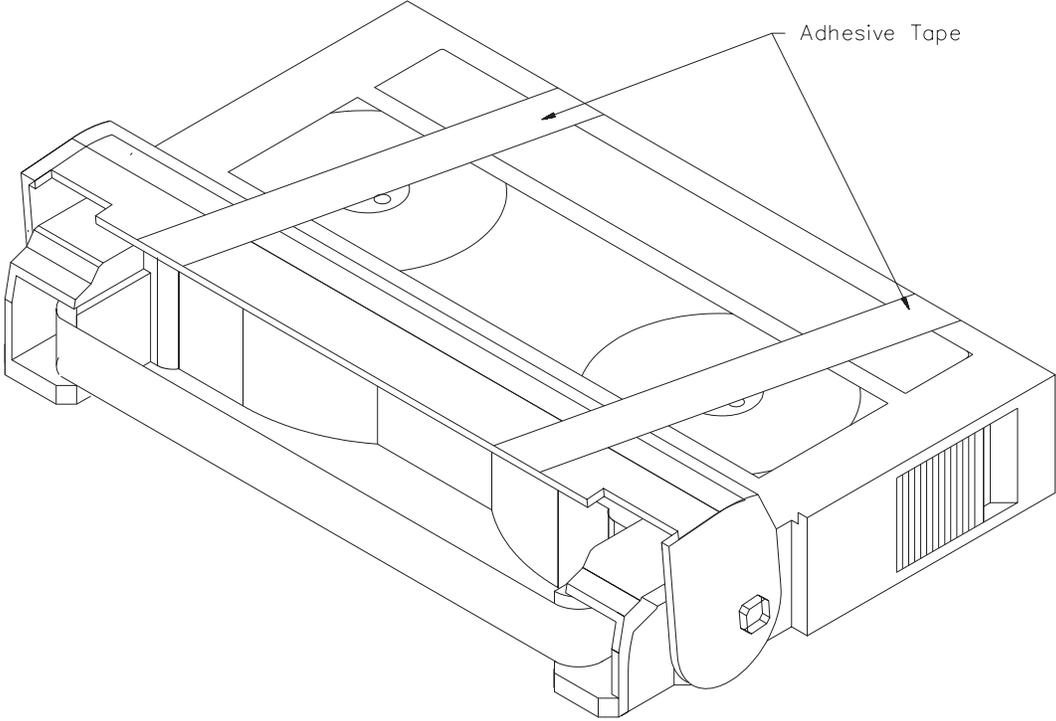
Figure 17-1
Data Cartridge with Door Taped Open

17.3 Required Tools

The following tools are required:

- 3/8-inch straight blade screwdriver
- Pointed tweezers
- #0 Phillips screwdriver
- T8 TORX screwdriver
- T10 TORX screwdriver
- Torque measuring screwdriver (1.0 to 5.0 inch-pounds)
- Adhesive tape
- Nonconductive tool, such as a molded potentiometer adjustment tool.

17.4 Disconnect the EXB-8200

Following all procedures appropriate to the system in which the EXB-8200 is installed, disconnect the EXB-8200 from the power supply and the SCSI bus. Remove the EXB-8200 from the system and transport it to the work area.

17.5 Preparation of the EXB-8200

Remove the top cover, as described in Section 4.

17.6 Cartridge Preparation

To prevent possible damage to the tape by the data cartridge door during this procedure, the door must be taped open. Taping the door open prevents the cartridge door from closing on the tape and damaging it before the tape is re-wound into the data cartridge. Figure 17-1 shows a data cartridge with the door taped open.

To tape the door open, follow these steps:

1. Obtain two pieces of adhesive tape, each approximately two inches long.

2. Position the two pieces of tape as shown in Figure 17-1, and press them gently to the data cartridge.

Erase Head Bracket

Erase Head
Bracket
Mounting Screw

Tape Guide
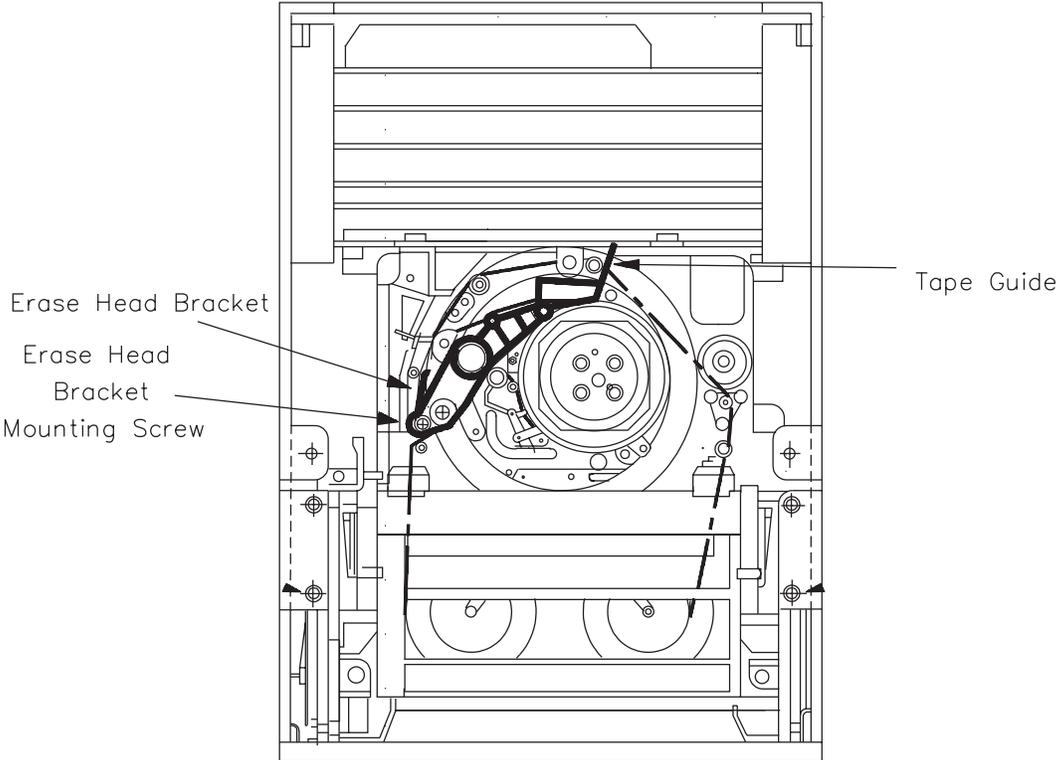
Figure 17-2
EXB-8200 with Tape Loaded

17.7 Erase Head Bracket Removal

The erase head bracket is a molded black plastic part, as shown in Figure 17-2. It is mounted onto two posts. The erase head is attached to the bracket where the wires emerge and lead to the connector on the SV card.

To remove the erase head bracket, follow these steps:

1. Remove the small Phillips head screw that holds the erase head bracket in place (see Figure 17-2).

Note: Early models of the EXB-8200 do not have the mounting screw. In EXB-8200s without the mounting screw, go to step 2.

2. Lift the erase head bracket straight up at the base. The connector and wires do not have to be removed from the SV card since there is sufficient slack in the connector wires to allow the erase head bracket to be removed.

3. Position the erase head bracket so that it is hanging over the side of the EXB-8200 and away from the tape path.

17.8 Tape Guide Removal

The tape guide is a molded black plastic part, as shown in Figure 17-2. It looks like the boom on a crane and is mounted on three posts as shown. The largest post is the primary mounting post, and the other two posts are guides for correct positioning of the tape guide.

To remove the tape guide, follow these steps:

1. Gently lift the tape guide straight up at the primary mounting post, so that it is removed from all three posts at the same time.

2. Set the tape guide aside, so it can be replaced later.

Point 2

Pinch Roller Flange

Point 1

Pinch Roller

Point 4

Point 5

Point 3

Point 6
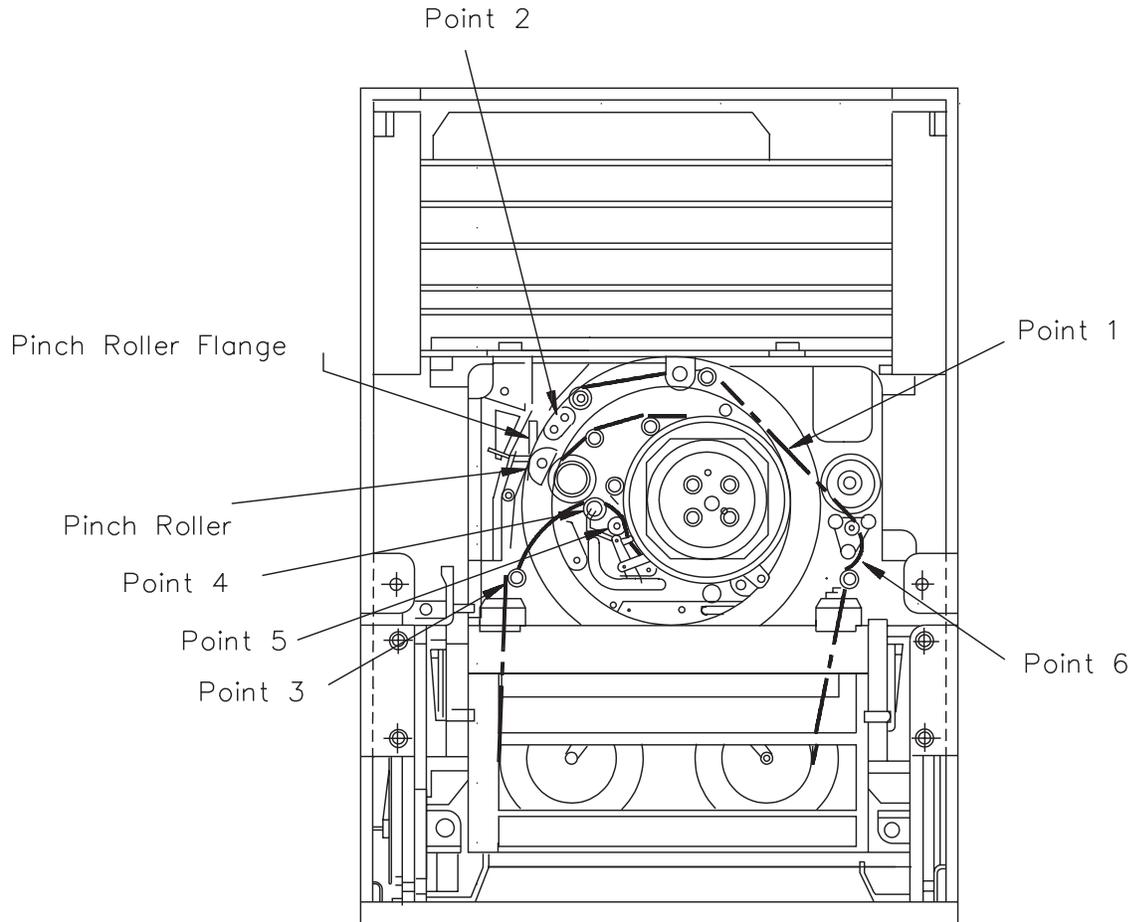
Figure 17-3
EXB-8200 with Tape Loaded
Tape Guide and Erase Head Bracket Removed

17.9 Tape Removal

CAUTION

EXABYTE considers this procedure to have a high potential for damage to the media and the heads on the EXB-8200. **Use extreme caution when attempting to remove the tape using this procedure.**

When removing the tape from the guide posts and rollers, use a nonconductive tool, such as a molded potentiometer adjustment tool. Avoid touching the side of the tape where 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 direct contact with the rotating head assembly is the side where data is recorded. It is duller in color than is the back of the tape.

To remove the tape, follow these steps:

1. Using the nonconductive tool, loosen the tape at point 1, shown in Figure 17-3, by positioning the tool between the tape and the rotating head and moving the tool toward the rear of the EXB-8200. This action pulls the tape off of the takeup reel and makes a loose loop in the tape.

2. Using your finger, move the pinch roller flange toward the left side of the EXB-8200 and hold it in this position. This will release the pinch roller from the capstan and provide a gap between the pinch roller and the pinch roller flange.

3. Insert the tool in the tape loop at point 2 and gently lift the tape up from around the pinch roller and capstan.

CAUTION

After starting to remove the tape, do not release the pinch roller until the tape is completely removed from around the pinch roller and capstan. If the pinch roller is released before the tape is clear of these components, the tape will be damaged.

---

4. After the tape is completely clear of the pinch roller and the capstan, release the pinch roller flange.

Point 2

Point 1

Pinch Roller Flange

Pinch Roller

Point 4

Point 5
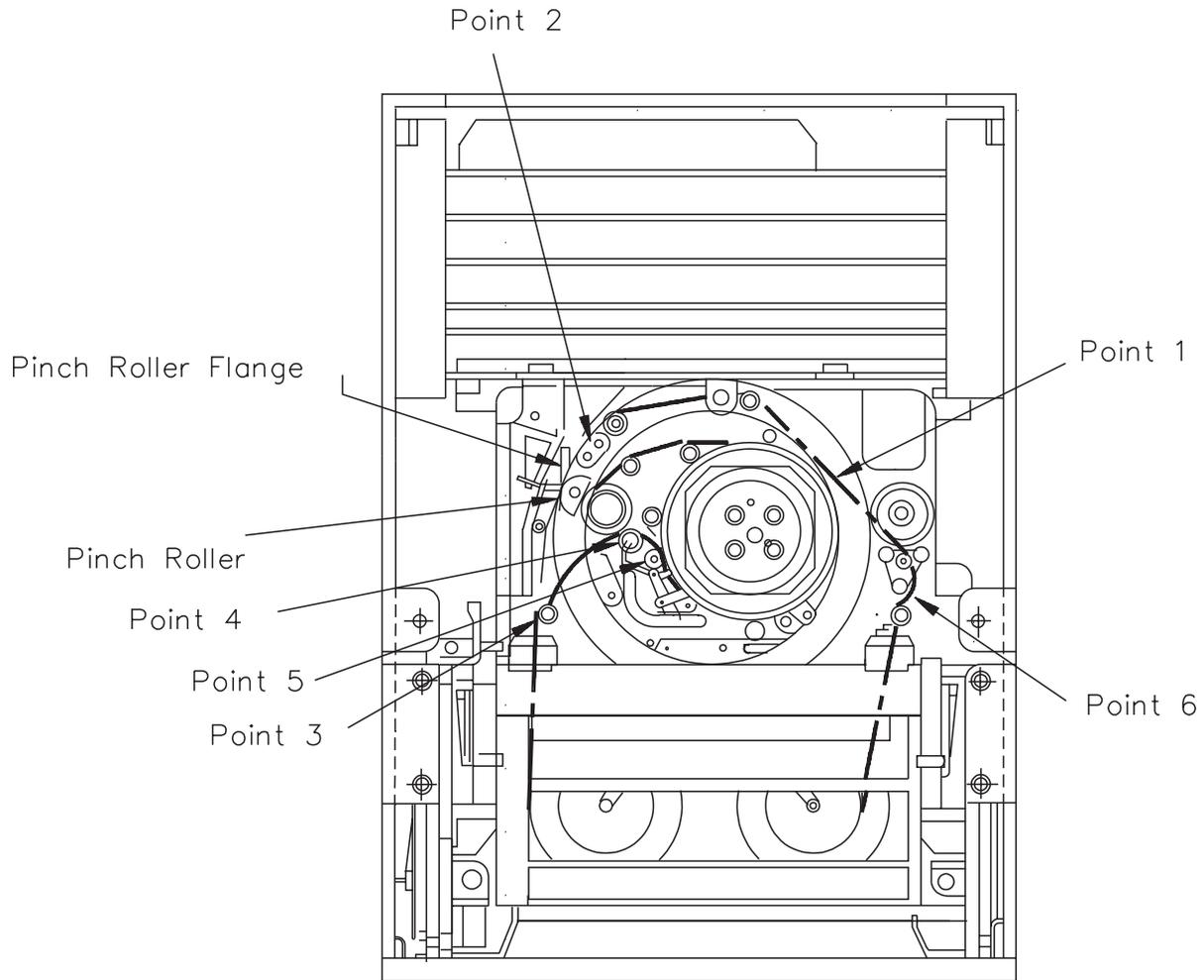
Point 3

Point 6

Figure 17-4
EXB-8200 with Tape Loaded
Tape Guide and Erase Head Bracket Removed
(same as Figure 17-3)

5. Remove the tape from around the guide posts and rollers at points 3 and 4, shown in Figure 17-4. Be sure to place the tool inside the tape loop to avoid touching the tape recording surface or the rotating head assembly.

6. Position the tool between points 4 and 5 inside the tape loop. Point 5, shown in Figure 17-4, is an "L" shaped molded black plastic part. The "L" is mounted upside-down and prevents the tape from riding up over the rotating drum. Gently move the tape up so that it passes between the "L" and the edge of the rotating head assembly.

Note: Be careful that the tape is not creased or damaged in any way when re-moving it from this point.

7. Lift the tape from around the guide posts and roller at point 6, shown in Figure 17-4. Be sure to place the tool inside the tape loop.

17.10 Remove Faceplate and Open Door

To remove the faceplate, refer to the instructions in Section 12. Be especially careful when removing the faceplate with a data cartridge in the EXB-8200. When opening the door as described in Section 13, hold the door so that the door opens more slowly than normal. This will prevent the data cartridge from being moved quickly and damaging the media.

17.11 Wind Loose Tape and Eject Data Cartridge

With the faceplate removed and the door open, you can rewind the tape. To wind the loose tape and eject the data cartridge, follow these steps:

1. Position the EXB-8200 so that it is resting on the left side of the main housing with the door facing to your left.

2. Insert the 3/8-inch straight blade screwdriver between the bottom edge of the door and the edge of the EXB-8200.

3. Insert the blade of the screwdriver into the hub of the takeup reel (the top hub with the EXB-8200 in the current position).

4. Slowly turn the screwdriver counterclockwise to wind any loose tape onto the data cartridge.

Note: As you are rewinding the tape manually, you may hear a ratcheting sound. This sound is normal and does not indicate that the tape is be-ing damaged.

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 it and continue turning the screwdriver.

CAUTION

Make sure that all of the loose tape in the tape loop has been wound into the data cartridge. If all of the tape is not wound in the data cartridge, the tape will be damaged by the cartridge door. In addition, once the loose tape has been wound onto the takeup reel, do not overwind the tape into the cartridge. Overwinding will damage the tape.

---

5. When all of the loose tape has been wound into the data cartridge, remove the screwdriver.

6. Remove the adhesive tape that is holding the door of the data cartridge open.

7. Carefully close the door on the data cartridge, checking to ensure that the door does not contact the exposed tape. Then, remove the data cartridge.

8. Replace the tape guide. Ensure that it fits onto all three guide posts starting with the primary post.

9. Replace the erase head bracket. Replace the mounting screw if the bracket had one. Tighten the screw to 1.7 inch-pounds of torque.

17.12 Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

Faceplate   Section 12
Top cover   Section 4

18 Head Sync Adjustment Procedure

This section describes how to adjust the head sync timing on an EXB-8200 to ensure interchangeability of data. The head sync timing needs to be adjusted whenever an SV card or a deck is replaced. The head sync adjustment procedure entails checking the head sync timing, adjusting it if necessary, and verifying the adjustment.

18.1 Requirements

Before you set the head sync timing, ensure that you have ready access to the following tools, test equipment, software, and user's manuals.

18.1.1 Tools

- T8 TORX screwdriver
- T10 TORX screwdriver
- Torque measuring screwdriver (1.0 to 5.0 inch-pounds)
- Tweezers
- Straight blade screwdriver - # 1
- Head sync tape
- Threebond screwlocking agent
- Loctite X-NMS Cleanup Solvent
- Potentiometer adjustment tool.

IMPORTANT

To ensure accurate results, replace the head sync tape after rewinding it 150 times. Continuing to use the tape after 150 rewinds may cause the head sync signal to become degraded, which can make adjusting the head sync timing more difficult.

18.1.2 Test Equipment

- IBM or compatible personal computer system with a color monitor and a serial port

- Adaptec SDS-1 family or SDS-3 family SCSI controller or an Advanced Storage Concepts ASC-88 SCSI controller installed in the computer system

- SCSI bus cable properly connected to the Adaptec or ASC-88 controller and properly terminated
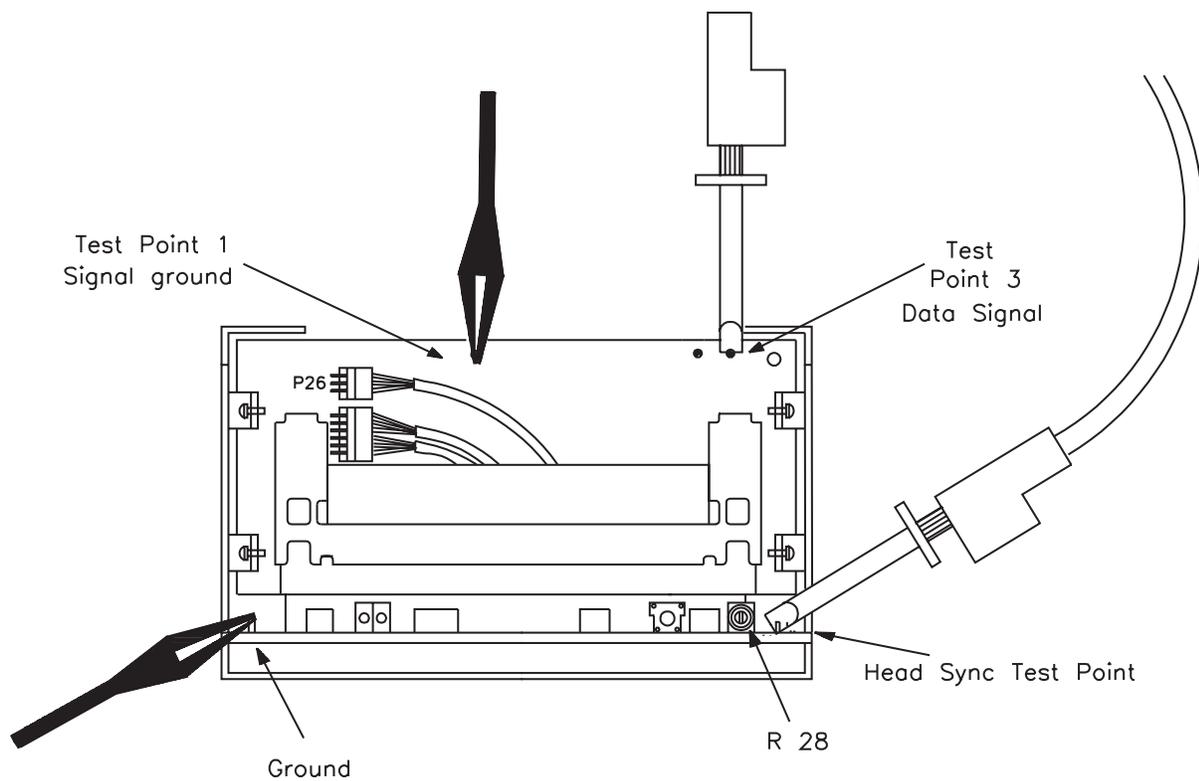
Figure 18-1
Oscilloscope Connections for the Head Sync Timing Procedure
(deck hanger not shown)

■ Monitor cable properly connected to the serial port on the computer system

■ Two-channel oscilloscope (50 Mhz with time delay capability) with a hood

■ Known good EXB-8200

■ Read Interchange test tape, written with a known good EXB-8200 (see Section 1.4)

■ Blank EXATAPE 8mm data cartridge.

18.1.3   Software and User's Manuals

■ EXABYTE Monitor software (version 9.12 or later) installed on the computer system

■ EXABYTE EXPERT software (version 6.30 or later) installed on the computer system

■ *Monitor User's Guide for the EXB-8200 8mm Cartridge Tape Subsystem*

■ *EXPERT User's Guide for the EXB-8200 8mm Cartridge Tape Subsystem.*

18.2   Preparation

1. Remove the top cover. See Section 4.

2. If necessary, install R-packs in the DB or DR card (or install an external SCSI terminator on the DS card). See Section 3.

3. Remove the faceplate. See Section 12.

4. Connect the Monitor cable to the Monitor port on the SV card. The Monitor port is the connector to the right of the power connector.

5. Connect oscilloscope test probe channel 1 to test point 3 (TP3) on the RW card. Connect the ground for the probe to test point 1 (TP1) on the RW card, as shown in Figure 18-1.

6. Connect oscilloscope test probe channel 2 to the head sync test point, which is the second test point from the right on the front edge of the SV card. Connect the ground for the probe to the ground point, which is the left-most test point on the front edge of the SV card, as shown in Figure 18-1.

7. Connect the power cable to the EXB-8200 and apply power.

8. Start the Monitor program on the personal computer as described in the *Monitor User's Guide for the EXB-8200 8mm Cartridge Tape Subsystem.*

Correct
Waveform
Timing

10 μsec
Maximum

Negative
transition
of Head
Sync Pulse

After negative
transition

A

Maximum allowable
signal delay

after transition

B

Signal stopping

before transition

C

Signal stopping

after transition

D
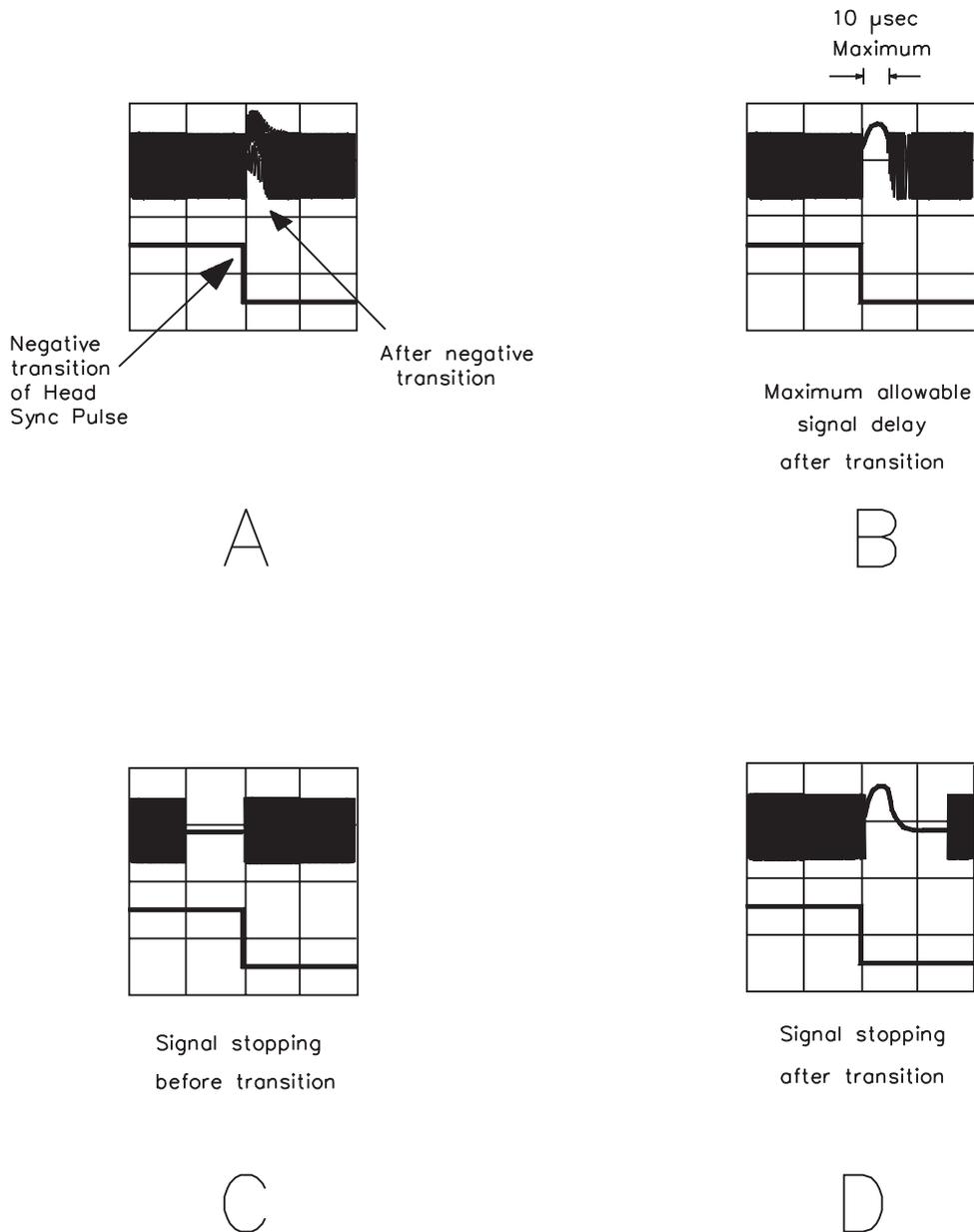
**Figure 18-2
Waveforms**

18.3   Scope Settings

- ■ Channel 1   500 mv/div
- ■ Channel 2   5 v/div
- ■ Time scale   20 µs/div
- ■ Trigger delay   16.47 msec.
- ■ Trigger slope   +
- ■ Trigger channel 2   Autolevel
- ■ Trigger coupling   DC
- ■ Set the display to chop channels 1 and 2.

18.4   Check the Head Sync Timing

Determine whether to adjust the head sync timing by comparing the data signal from the head sync tape to the head sync signal. Channel 1 on the oscilloscope is the data signal read from the head sync tape by the write/read head and the read-back-check head. Channel 2 on the oscilloscope is the head sync signal.

1. Turn on power to the EXB-8200. Wait for the EXB-8200 to complete the power-on self-test.

2. Press the unload button on the EXB-8200 and wait for the door to open.

3. Ensure that the head sync tape is write protected. If the red write protect switch is visible, the tape is write protected.

4. Enter **T** on the personal computer.   The display in the upper right corner of the screen changes from green *Running* to red *Stopped*, and the screen border turns red.

5. Insert the head sync tape into the EXB-8200.

6. Enter **M880001** to load the tape.

Correct
Waveform
Timing

10 µsec
Maximum

Negative
transition
of Head
Sync Pulse

After negative
transition

Maximum allowable
signal delay

after transition

A

B

Signal stopping

before transition

Signal stopping

after transition

C

D
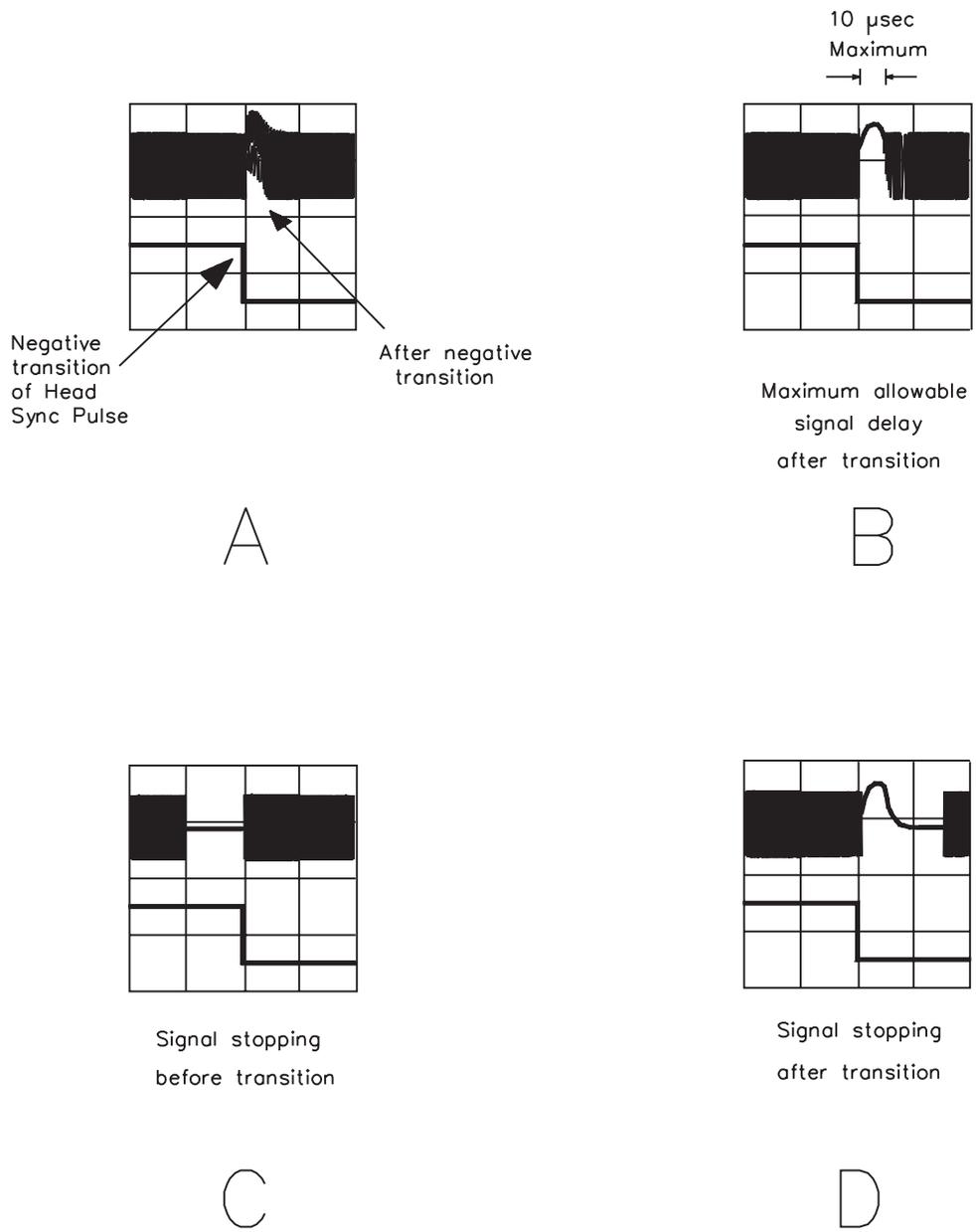
Figure 18-3
Waveforms (same as Figure 18-2)

7. Enter **M880004** to move the tape forward.

Note: Other useful commands for controlling tape movement include:

M880001	Load tape
M880002	Unload and eject tape
M880003	Space forward to LBOT
M880004	Go track
M880007	Rewind to physical beginning of tape (PBOT)
M88000C	Stop tape

8. Adjust the trigger delay on the oscilloscope so that the negative transition of the head sync signal (channel 2) is centered on the oscilloscope screen.

9. Wait at least 20 seconds before proceeding to the next step to allow the signals to become stable.

10. Compare the data signal from the head sync tape (channel 1) to the head sync signal to determine whether you need to adjust the head sync timing. Figure 18-3 shows correct and incorrect waveforms.

    ■ If the two data signals on channel 1 are within 10 μsec. of meeting each other after the negative transition point of the head sync signal, no adjustment is necessary. See Figure 18-3B.

    ■ If the two data signals approach each other before the negative transition of the head sync signal, adjustment is necessary. See Figure 18-3C.

    ■ If the separation between the two signals is more than 10 μsec., adjustment is also necessary. See Figure 18-3D.

11. Enter **M88000C** to stop the tape.

12. If you need to adjust the head sync timing, go to Section 18.5.

    or

    If you do not need to adjust the head sync timing, enter **M880002** to unload and eject the tape. Then, exit the Monitor program.

Correct
Waveform
Timing

10 μsec
Maximum

Negative
transition
of Head
Sync Pulse

After negative
transition

A

Maximum allowable
signal delay

after transition

B

Signal stopping

before transition

C

Signal stopping

after transition

D
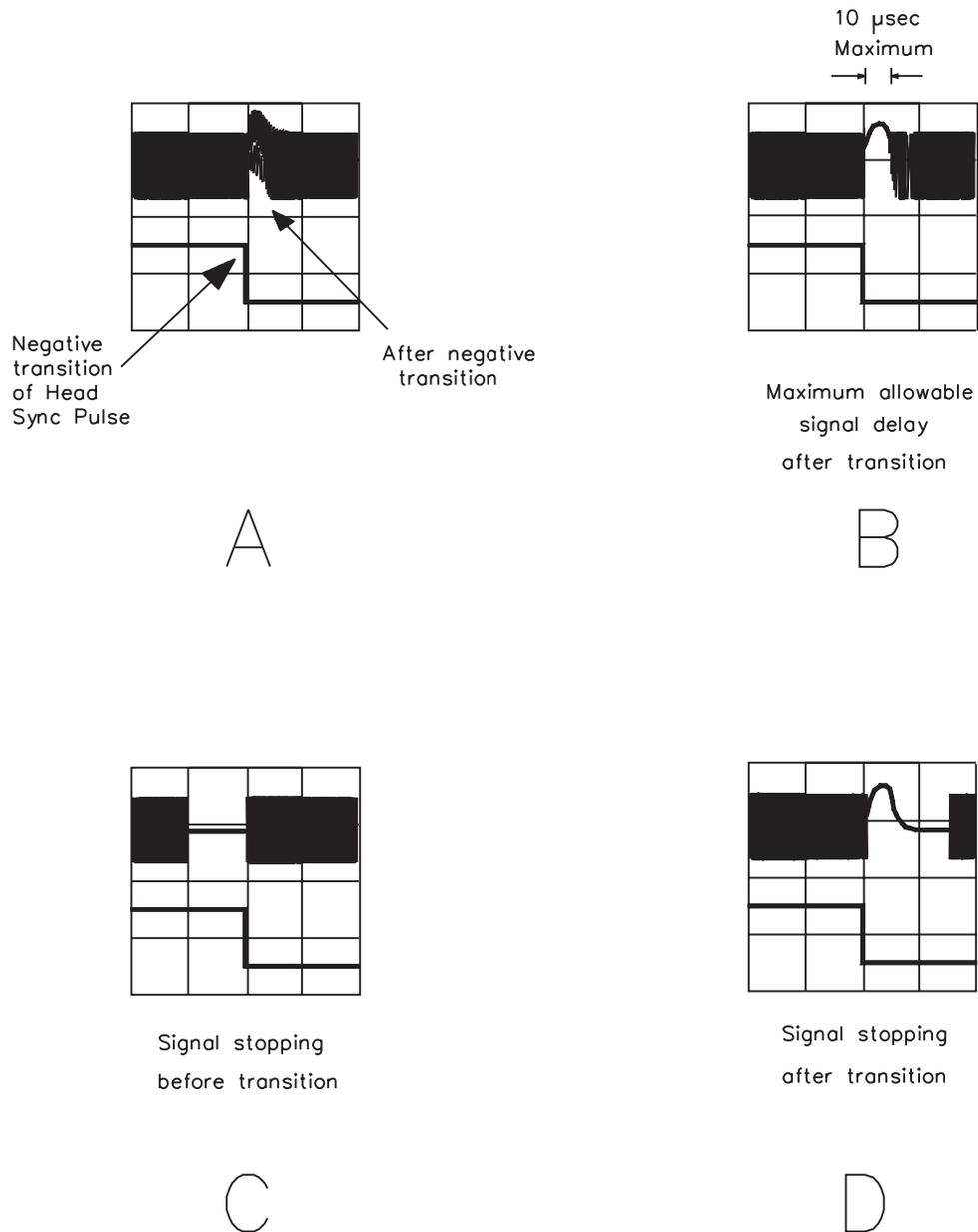
Figure 18-4
Waveforms (same as Figure 18-2)

18.5   Adjust the Head Sync Timing

The head sync adjustment potentiometer is labeled R28 on the SV card. It is just to the left of the head sync test point on the front edge of the SV card.

To adjust the head sync timing, follow these steps:

1. Carefully remove the Threebond screwlocking agent from the head sync adjustment potentiometer. Hold the potentiometer with one finger while removing the Threebond with a sharp instrument such as a pair of tweezers. If this method does not remove enough of the Threebond to adjust the potentiometer, use Loctite X-NMS Cleanup Solvent to dissolve the Threebond. Be careful not to break the potentiometer by forcing it while there is still Threebond holding it secure.

2. Enter **M880004** to move the tape forward

3. Using a straight blade screwdriver or potentiometer adjustment tool, turn the head sync adjustment potentiometer clockwise until the data signal stops at the negative-going transition of the head sync signal, becomes a straight line, and starts up again to the right of the transition point. See Figure 18-4D.

4. Turn the head sync adjustment potentiometer counterclockwise until the data signals meet. See Figure 18-4A.

Note: If the data signal is unstable and varies in amplitude making this procedure difficult to perform, follow these steps:

    a. Enter **M88000C** to stop the tape motion.
    b. Enter **M880007** to rewind the tape to PBOT.
    c. Enter **M880003** to advance the tape to LBOT.
    d. Restart the head sync adjustment from step 2.

5. Enter **M88000C** to stop tape movement.

6. Enter **M880002** to unload and eject the tape.

18.6 Verify the Adjustment

After adjusting the head sync timing, verify that it is adjusted correctly. To verify the adjustment, follow these steps:

1. Connect the SCSI cable to the personal computer and to the EXB-8200.

2. Start EXPERT software on the personal computer (refer to the *EXPERT User's Guide*).

3. Load the Read Interchange tape that was written on a known good EXB-8200.

4. Perform a read only Inter_chg test.

   If the EXB-8200 fails this test, reset the head sync timing. If the EXB-8200 passes this test, go to step 5.

5. Unload the tape and insert a blank EXATAPE.

6. Perform a write Inter_chg test.

7. Unload the tape, insert it into the known good EXB-8200, and perform a read only Inter_chg test.

8. If the EXB-8200 passes both of the Inter_chg tests, the head sync timing adjustment is complete. Apply one drop of Threebond to the head sync potentiometer to secure the adjustment.

   or

   If the EXB-8200 fails either of the Inter_chg tests, recheck the head sync timing and, if necessary, reset the head sync timing.

Note: If the head sync timing is adjusted correctly and the EXB-8200 fails the Inter_chg tests, look for other causes for the failure.

18.7 Reassemble the EXB-8200

To reassemble the EXB-8200, replace these parts in the following order:

Faceplate	Section 12
Top cover	Section 4

Index

B

bezel
    See faceplate
bottom
    See SV card cover

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