StorageWorks Solutions

TZ8x7-Series Tape Drive SCSI Bus Configuration and Installation Guide

Order Number: EK–TZ8X7–IG. A01

This document contains instructions for planning and installing SCSI buses for TZ8x7-series tape drives in StorageWorks cabinets.

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1

TZ8x7-Series Tape Drive SCSI Buses

This chapter presents general information on the arrangement and cabling of TZ8x7-series tape drive Small Computer System Interface (SCSI) buses in StorageWorks™ cabinets.

1.1 TZ8x7-Series Tape Drive SCSI Buses

TZ8x7-series tape drives are used in either storage-only or controller/storage cabinet configurations.
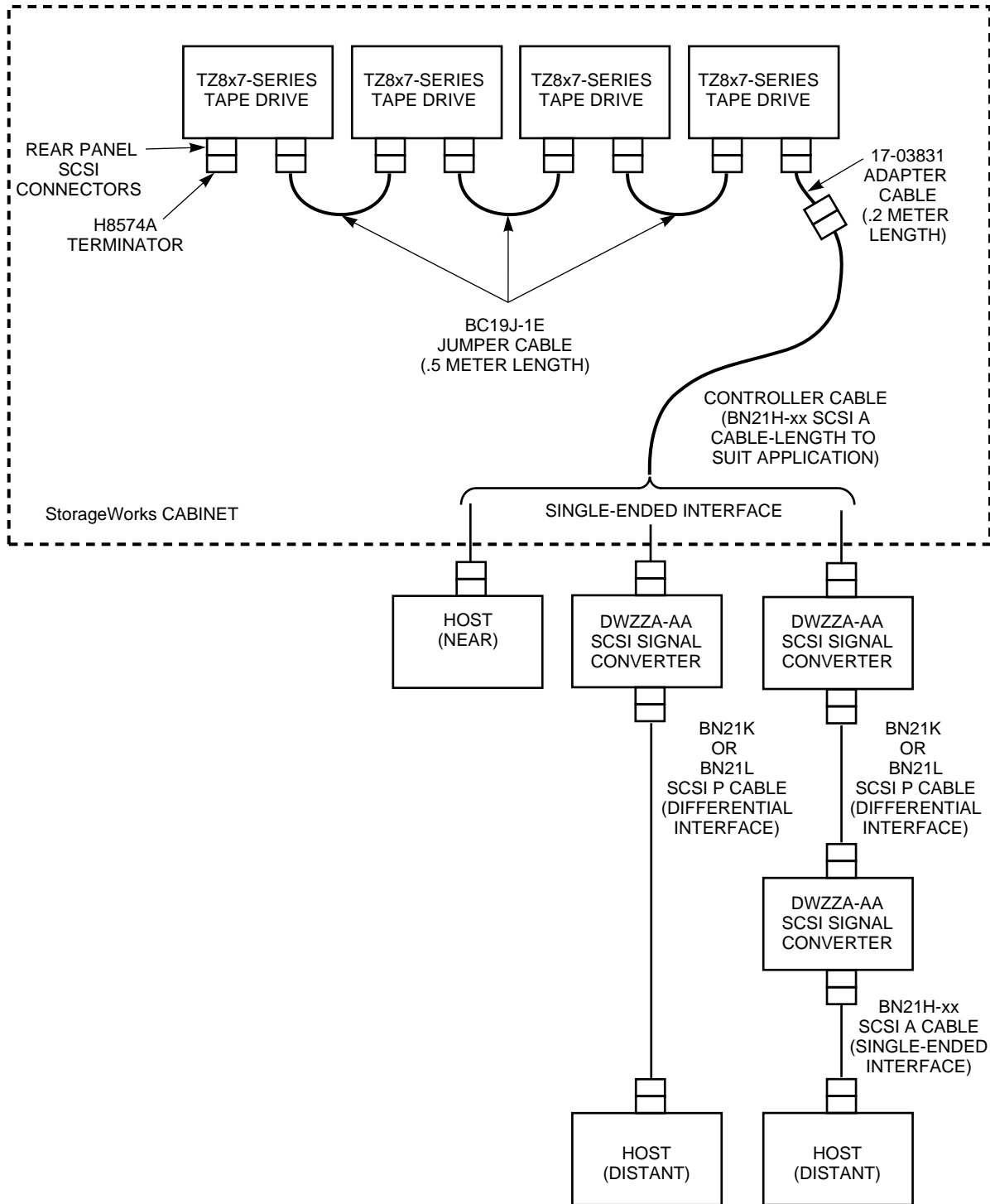
1.1.1 Storage-Only Cabinet Configurations

In a storage-only cabinet configuration, the controller for devices in the cabinet is located outside the cabinet. Typical SCSI bus arrangements for TZ8x7-series tape drives in StorageWorks storage-only cabinets are shown in Figure 1–1.

From one to four TZ8x7-series tape drives may be installed in a storage-only cabinet. The tape drives may be configured on one or more SCSI buses. The units are serially connected using an adapter cable and one or more jumper cables, and a host cable connects the tape drive bus structure within the cabinet to an external host. A terminator is installed on the last tape drive on the bus.

There are three host SCSI bus configurations normally used with StorageWorks storage-only cabinets:

- If the host uses a single-ended interface and is near enough to the storage-only cabinet not to violate SCSI bus length restrictions, it may be connected directly to the tape drive bus within the cabinet.

- If the host uses a differential interface and is distant (relative to the maximum allowable SCSI bus length) from the storage-only cabinet, it must be connected to the tape drive bus using a DWZZA–AA SCSI signal converter. The signal converter must be mounted next to or inside the storage-only cabinet. The differential bus allows the host to be farther away than does the single-ended one. The signal converter translates the differential bus into a single-ended bus acceptable by the tape drives. In this configuration, the host must operate in the 8-bit differential mode to function properly with the signal converter.

- If the host uses a single-ended interface and is distant (relative to the maximum allowable SCSI bus length) from the storage-only cabinet, it must be connected to the tape drive bus using two DWZZA–AA SCSI signal converters. One signal converter must be mounted next to or inside the storage-only cabinet, and the other near the host. The two back-to-back signal converters act as a bus extender, to allow a greater distance between the host and the storage-only cabinet.

Figure 1–1 Storage-Only Cabinet SCSI Bus Arrangements


CXO-4049A-MC

For more detailed information on the use of DWZZA–AA SCSI signal converters, see the *StorageWorks Family User's Guide*.

Section 2.2 presents further information on the planning and installation of TZ8x7-series tape drive buses in StorageWorks storage-only cabinets.

1.1.2 Controller/Storage Cabinet Configurations

In a controller/storage cabinet configuration, the controller for devices in the cabinet is located within the cabinet. The SCSI bus arrangement for TZ8x7-series tape drives in StorageWorks controller/storage cabinets is shown in Figure 1–2.

Figure 1–2   Controller/Storage Cabinet SCSI Bus Arrangement
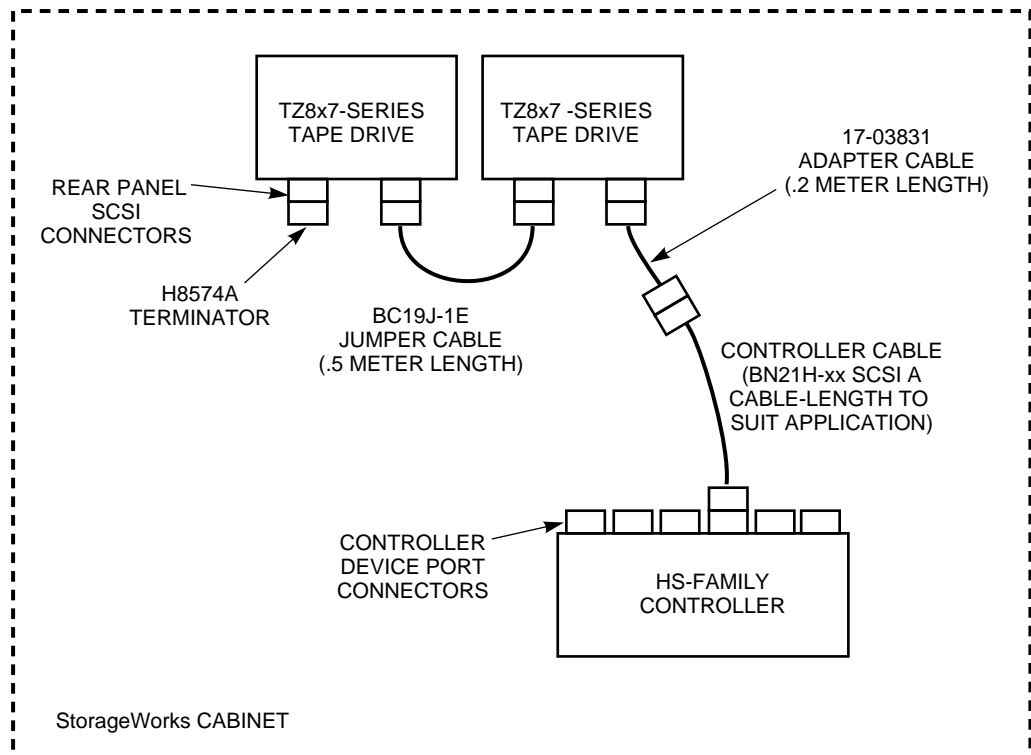
CXO-4050A-MC

One or two TZ8x7-series tape drives may be installed in a controller/storage cabinet. The tape drives may be configured on one or two SCSI buses. The units are serially connected using an adapter cable and one jumper cable, and a controller cable connects the tape drive bus to the controller within the cabinet. A terminator is installed on the last tape drive on the bus.

Section 2.3 presents further information on the planning and installation of TZ8x7-series tape drive SCSI buses in StorageWorks controller/storage cabinets.

1.2 TZ8x7-Series Tape Drive Bus Connections

The TZ8x7-series tape drive connects to its host system or controller using a single-ended, narrow, SCSI bus. The approximate transfer rate for the tape drive is 3 MB per second, allowing a SCSI bus length of up to 6 meters (19.7 feet).

Two connectors on the rear panel of the TZ8x7-series tape drive are provided to connect the unit to its SCSI bus. Figure 1–3 shows the location of the SCSI connectors.

Figure 1–3 TZ8x7-Series Tape Drive Bus Connections
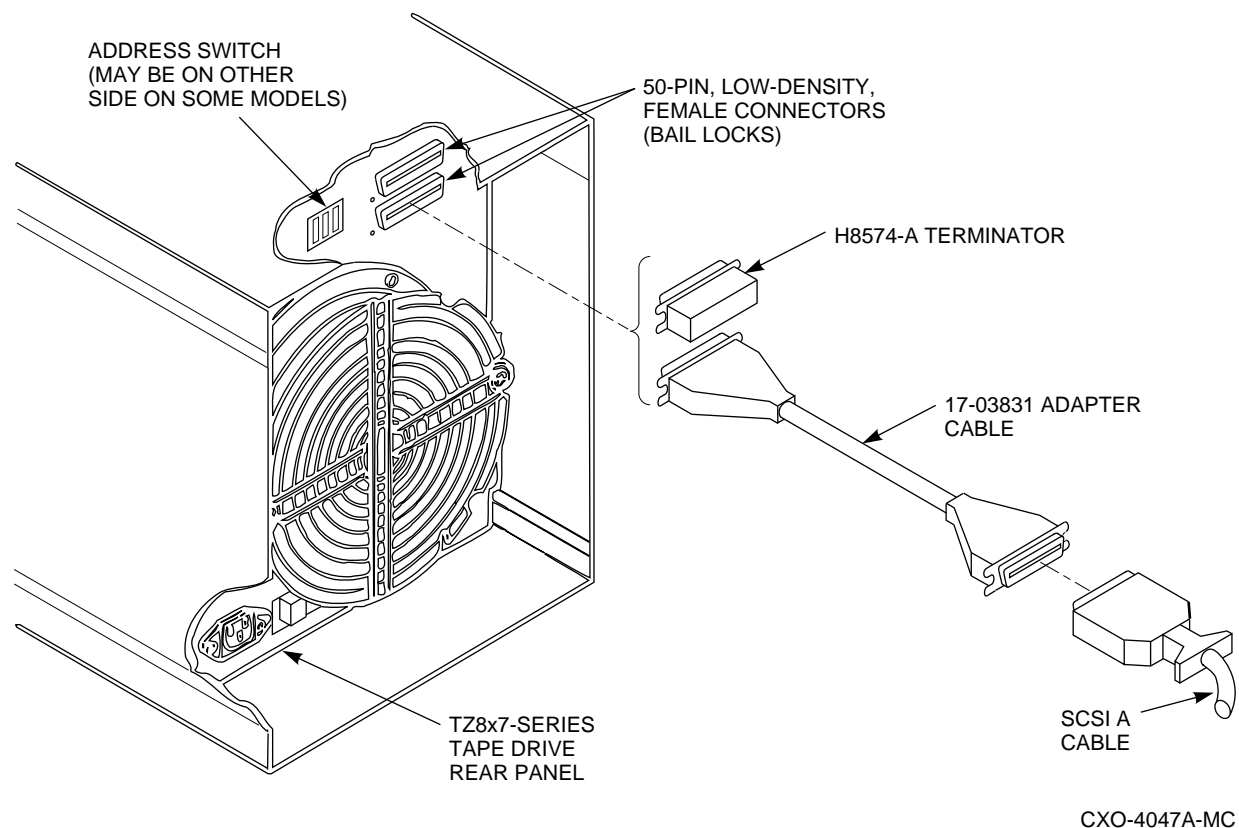
CXO-4047A-MC

CAUTION

Failure to use the 17–03831 adapter cable to connect TZ8x7-series tape drives to StorageWorks SCSI buses may result in improper system operation and equipment damage. StorageWorks SCSI buses contain fault detection signals that could be rendered inoperable if any other cable arrangement is used. The adapter cable must be installed at the first tape drive on the bus to prevent improper system operation and equipment damage.

The rear panel connectors are 50-pin, low-density, SCSI connectors that do not mate with standard StorageWorks SCSI A cables. To connect the TZ8x7-series tape drive to a StorageWorks SCSI bus, you must use an adapter cable (Digital part number 17–03831). The adapter cable and its installation are shown in Figures 1–3 and 1–4.

Figure 1–4 TZ8x7-Series Tape Drive Adapter Cable and Terminator

H8574-A TERMINATOR
(50-PIN, LOW-DENSITY,
MALE CONNECTOR [BAIL LOCKS])

17-03831 ADAPTER CABLE

5O-PIN, HIGH-DENSITY,
FEMALE CONNECTOR
(THUMB LATCHES)

50-PIN, LOW-DENSITY,
MALE CONNECTOR
(BAIL LOCKS)

CXO-4048A-MC
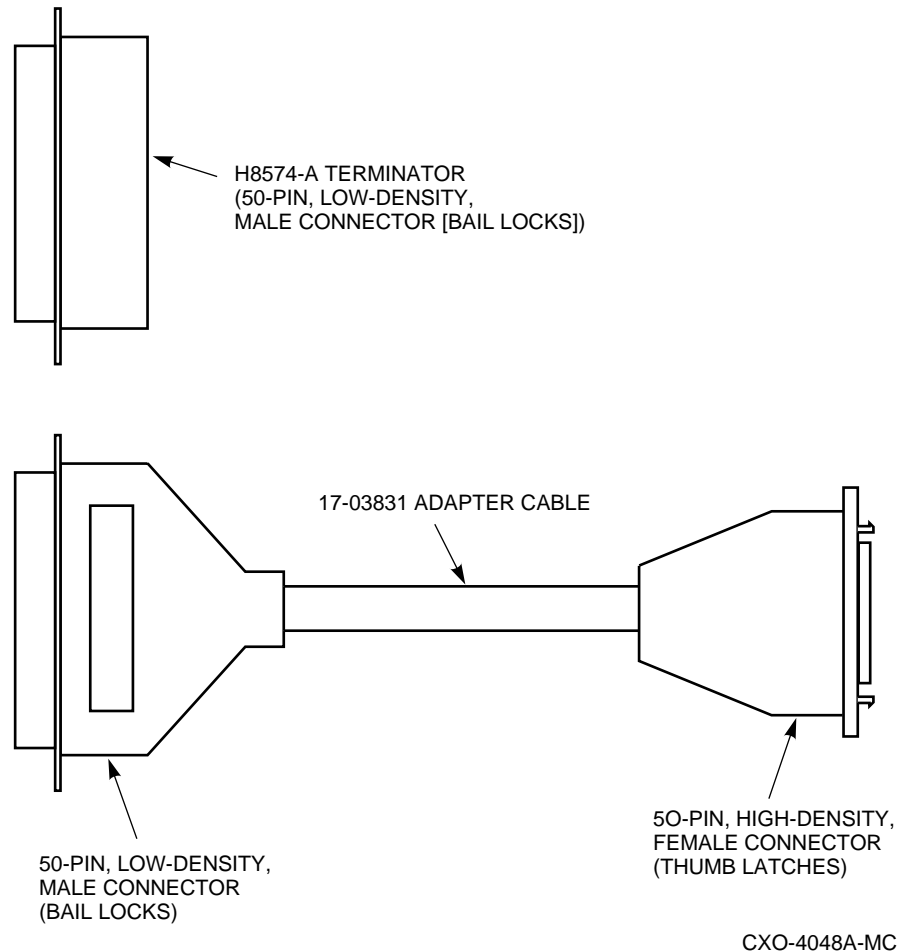
Use Digital BC19J–1E cables as jumper cables among TZ8x7-series tape drives within the same cabinet. These cables are .5 meters (1.6 feet) in length. Standard StorageWorks SCSI A cables are used for the host and controller cables, and their length is determined as part of the bus planning process. See the *StorageWorks Family Configuration Guide* for further information on SCSI A cables. See Sections 2, 2.2 and 2.3 for detailed TZ8x7-series tape drive bus planning information.

The H8574–A terminator is used to terminate the tape drive bus. The H8574–A terminator is shown in Figures 1–3 and 1–4.

2

Planning and Installing a TZ8x7-Series Tape Drive SCSI Bus

This chapter presents detailed procedures for planning and installing SCSI buses for TZ8x7-series tape drives in StorageWorks cabinets.

2.1 General Planning Steps

Following are the general steps required to configure a TZ8x7-series tape drive bus in a StorageWorks cabinet.

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For maximum performance, tape drive buses should contain only tape drives. Do not mix tape drives and disk drives on the same bus.

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1. Determine the number of tape drives to be installed on the bus. This number is normally limited by the maximum number of tape drives that can be installed in a specific cabinet.

2. Determine the quantity of jumper cables to be used to connect the tape drives to each other within the cabinet.

3. Determine the maximum host or controller cable length using the maximum allowed total bus length and the lengths of the adapter and jumper cables. (If the cable length available is insufficient to reach the host, two DWZZA-AA SCSI signal converters must be used to extend the bus.)

4. Choose the appropriate host or controller cable length, from the available standard SCSI A cable lengths.

5. Install the tape drives and bus cabling.

6. Set each tape drive's address switch.

Section 2.2 presents detailed procedures for planning and installing SCSI buses for TZ8x7-series tape drives in storage-only cabinets. Section 2.3 presents detailed procedures for planning and installing SCSI buses for TZ8x7-series tape drives in controller/storage cabinets.

2.2 Planning and Installing Tape Drive Buses In Storage-Only Cabinets

The following sections describe the steps necessary to plan and install a TZ8x7-series tape drive bus in a StorageWorks storage-only cabinet.

2.2.1 Determining the Number of Tape Drives On the Bus

You can install from one to four TZ8x7-series tape drives in a StorageWorks storage-only cabinet, depending upon the model of the cabinet. See the installation and user's guide for your specific cabinet for instructions on the number and location of tape drives in the cabinet. The tape drives may be configured on one or more buses, but each tape drive bus should contain only tape drives. For maximum performance, do not mix tape drives and disk drives on the same bus.

2.2.2 Determining the Quantities of Adapter and Jumper Cables

_____ CAUTION _____

Failure to use the 17–03831 adapter cable to connect TZ8x7-series tape drives to StorageWorks SCSI buses may result in improper system operation and equipment damage. StorageWorks SCSI buses contain fault detection signals that could be rendered inoperable if any other cable arrangement is used. The adapter cable must be installed at the first tape drive on the bus to prevent improper system operation and equipment damage.

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The number of jumper cables required is one less than the number of tape drives on the bus. One adapter cable must be used on the first tape drive on the bus to connect it to the host cable.

2.2.3 Determining the Maximum Host Cable Length

To determine the host cable length, add up the lengths of the adapter cable and all of the jumper cables and subtract it from the maximum total bus length of 6 meters (19.7 feet). The result is the maximum length of the host cable.

Example 2–1 shows the tape drive SCSI bus length calculation for the bus with four tape drives shown in Figure 1–1.

Example 2–1 Storage-Only Cabinet Tape Drive SCSI Bus Length Calculation

```
total number of adapter cables = 1
total adapter cable length = 1 x .2 meters = .2 meters

total number of jumper cables = 3
total jumper cable length = 3 x .5 meters = 1.5 meters

   total adapter and jumper cable length = 1.7 meters

Maximum SCSI bus length = 6 meters

Maximum length of SCSI A cable from adapter cable to host
     (or DWZZA-AA SCSI Signal Converter) = 6 - 1.7 = 4.3 meters
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2.2.4 Choosing the Host Cable

Using the *StorageWorks Family Configuration Guide*, choose the SCSI A cable that is nearest in length but less than the length you calculated in Section 2.2.3. In Example 2–1, for instance, you would choose a BN21H–03, 3-meter cable as the nearest standard cable.

Note that TZ8x7-series tape drives are always physically installed in the upper portion of the StorageWorks cabinet. Some host cable length is consumed by the cable run from the first tape drive on the bus to the bottom of the cabinet. This distance is approximately 2 meters for SW800 cabinets, and 1 meter for SW500 cabinets. If your chosen host cable cannot reach from the tape drives to the host taking the internal cable run into account, two DWZZA–AA SCSI signal converters must be used to extend the bus. See the *StorageWorks Family User's Guide* for further information on using DWZZA–AA SCSI signal converters to extend single-ended SCSI buses.

In the case where the host uses a differential SCSI bus, a DWZZA–AA SCSI signal converter must be used to convert the differential bus to a single-ended bus for use by the tape drives (refer to Figure 1–1). The signal converter should be placed in or near the base of the StorageWorks cabinet to minimize the single-ended bus length. The host cable must be long enough to reach from the first tape drive on the bus to the signal converter at the base of the cabinet. (Note that the host must operate in the 8-bit differential mode to function properly with the DWZZA–AA SCSI signal converter.)

2.2.5 Installing the Tape Drives and Cabling

See the installation and user's guide for your specific StorageWorks cabinet model for detailed tape drive mechanical installation information. Using Figure 1–1 as a guide, install adapter and jumper cables to interconnect the tape drives within the cabinet. Install the terminator on the last tape drive on the bus.

You may use either connector on the rear panel to connect the tape drive to a SCSI bus. The remaining connector may be used either to extend the bus to additional devices or to terminate the bus with a H8574–A terminator.

Route the host cable from the bus's first tape drive adapter cable to the base of the cabinet using the guidelines in the cabinet's installation and user guide. Connect the cable to either the host or the signal converter, as appropriate.

2.2.6 Setting the Address Switch

Each tape drive has a SCSI bus address switch located on the rear panel next to its bus connectors (refer to Figure 1–3). The address switch may be located on either side of the connectors. The address switch on each tape drive must be set to a different value to avoid bus conflicts.

Normally, TZ8x7-series tape drives are addressed in sequence, starting from address 0 to address 3. Addresses 4 and 5 may also be used if desired, but addresses 6 and 7 should be reserved for bus initiator use.

Using a pen or other small stylus, set the address switch on each tape drive. See the installation and user's guide for your specific TZ8x7-series tape drive for detailed instructions on setting the address switch.

2.3 Planning and Installing Tape Drive Buses In Controller/Storage Cabinets

The following sections describe the steps necessary to plan and install a TZ8x7-series tape drive bus in a StorageWorks controller/storage cabinet.

2.3.1 Determining the Number of Tape Drives On the Bus

You can install one or two TZ8x7-series tape drives in a StorageWorks controller/storage cabinet. See the installation and user's guide for your specific cabinet for instructions on the number and location of tape drives in the cabinet. The tape drives may be configured on one or two buses, but each tape drive bus should contain only tape drives. For maximum performance, do not mix tape drives and disk drives on the same bus.

2.3.2 Determining the Quantities of Adapter and Jumper Cables

_____ CAUTION _____

Failure to use the 17–03831 adapter cable to connect TZ8x7-series tape drives to StorageWorks SCSI buses may result in improper system operation and equipment damage. StorageWorks SCSI buses contain fault detection signals that could be rendered inoperable if any other cable arrangement is used. The adapter cable must be installed at the first tape drive on the bus to prevent improper system operation and equipment damage.

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One jumper cable is required if two tape drives are being installed on the bus. One adapter cable must be used on the first tape drive on the bus to connect it to the host cable.

2.3.3 Determining the Maximum Controller Cable Length

To determine the controller cable length, add up the lengths of the adapter and jumper cables and subtract it from the maximum total bus length of 6 meters (19.7 feet). The result is the maximum length of the controller cable.

Example 2–2 shows the tape drive SCSI bus length calculation for the bus with two tape drives shown in Figure 1–2.

Example 2–2 Controller/Storage Cabinet Tape Drive SCSI Bus Length Calculation

```
total number of adapter cables = 1
total adapter cable length = 1 x .2 meters = .2 meters

total number of jumper cables = 1
total jumper cable length = 1 x .5 meters = .5 meters

    total adapter and jumper cable length = .7 meters

Maximum SCSI bus length = 6 meters

Maximum length of SCSI A cable from adapter cable
 to controller = 6 - .7 = 5.3 meters
```

2.3.4 Choosing the Controller Cable

Using the *StorageWorks Family Configuration Guide*, choose a SCSI A cable that is less than the length you calculated in Section 2.3.3. Because the tape drives and controller in this case are in the same cabinet and are likely less than 1 or 2 meters from each other, choose the shortest cable that will reach between the units. In Example 2–2, for instance, you might choose a BN21H–01, 1-meter cable. See the installation and user's guide for your specific cabinet for guidelines on the locations of tape drives and controllers in the cabinet.

2.3.5 Installing the Tape Drives and Cabling

See the installation and user's guide for your specific StorageWorks cabinet model for detailed tape drive mechanical installation information. Using Figure 1–2 as a guide, install adapter and jumper cables to interconnect the tape drives within the cabinet. Install the terminator on the last tape drive on the bus.

You may use either connector on the rear panel to connect the tape drive to a SCSI bus. The remaining connector may be used either to extend the bus to additional devices or to terminate the bus with a H8574–A terminator.

Route the controller cable from the bus's first tape drive adapter cable to the appropriate controller port using the guidelines in the cabinet's installation and user guide. Connect the cable to the controller shelf. See the *StorageWorks Array Controller HS Family of Array Controller User's Guide* for further information on the connection of SCSI buses to HS-family controllers.

2.3.6 Setting the Address Switch

Each tape drive has a SCSI bus address switch located on the rear panel next to its bus connectors (refer to Figure 1–3). The address switch may be located on either side of the connectors. The address switch on each tape drive must be set to a different value to avoid bus conflicts.

Normally, TZ8x7-series tape drives are addressed in sequence, starting from address 0 to address 3. Addresses 4 and 5 may also be used if desired, but addresses 6 and 7 should be reserved for controller use.

Using a pen or other small stylus, set the address switch on each tape drive. See the installation and user's guide specific to your TZ8x7-series tape drive for detailed instructions on setting the address switch.