



# StorageWorks Building Block (SBB) for Disk Drives

User's Guide

This guide describes the procedures for identifying, handling, removing, and replacing a disk drive StorageWorks Building Block (SBB).

## Overview of StorageWorks Building Blocks

This disk StorageWorks Building Block (SBB) is designed and manufactured by Digital Equipment Corporation. This device is compatible with SCSI single-ended interface standards and is ready to be used when attached to a qualified industry-standard SCSI adapter and corresponding driver software. The packaging allows you to mix and match industry-standard SCSI devices and components.

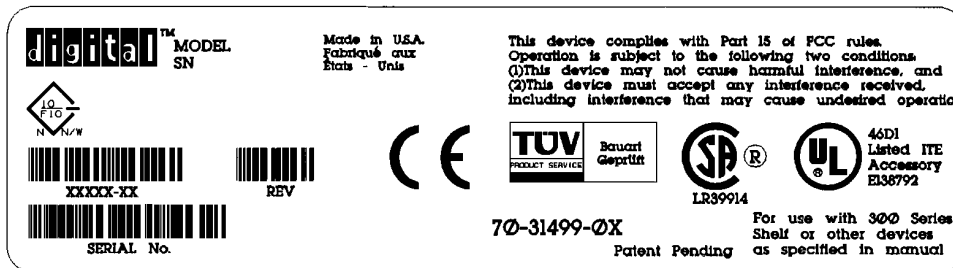
## Identifying StorageWorks Building Blocks

All StorageWorks Building Blocks have a regulatory label affixed to the side of the case that contains the device model number. In addition to the regulatory label, each disk StorageWorks Building Block has an SBB Identification label affixed to the front of the SBB. Each label is described below.

### SBB Regulatory Label

To determine the model number of a device see the regulatory label on the side of the SBB.

Figure 1 SBB Regulatory Label



CXO-5001A-PH

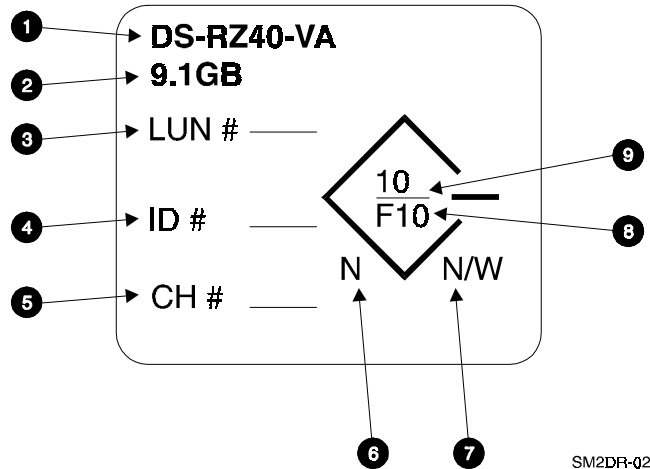
## SBB Identification Label

The SBB identification label identifies the device, the SCSI bus type, and user-assigned information. It is affixed to the front of the disk SBB.

**NOTE**

Label markings shown are for explanatory purposes only.  
The text on your specific SBB label may differ.

**Figure 2 SBB Identification Label**



The components of the device identification label are as follows:

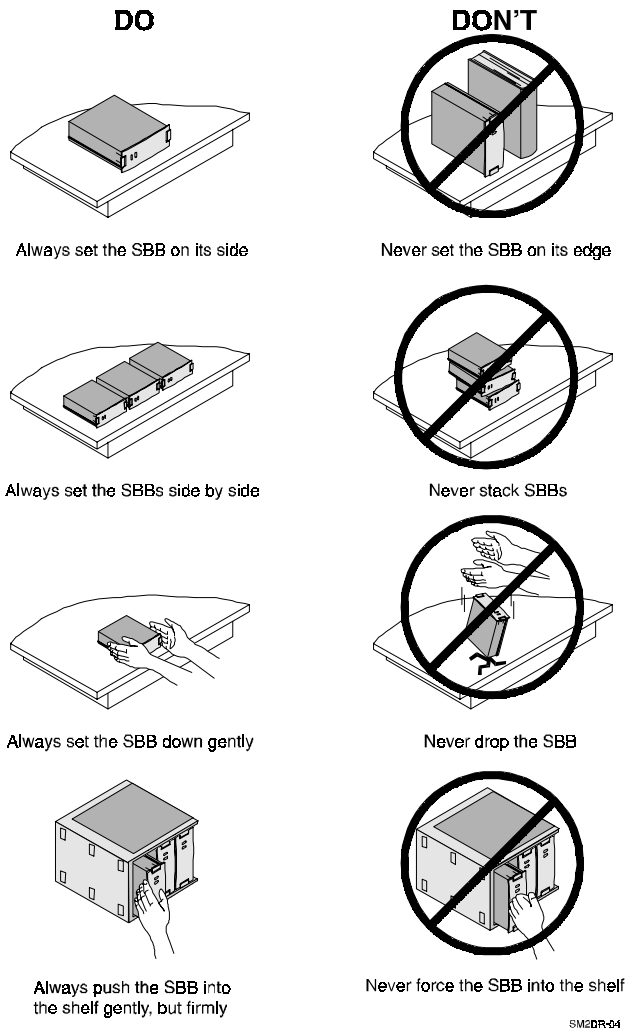
- 1) The device model number.
- 2) The total amount of data the device stores (capacity).
- 3) The user-assigned SCSI logical unit number (LUN)\*.
- 4) The user-assigned SCSI identification number (target ID)\*.
- 5) The user-assigned controller channel number, that is the controller port or SCSI bus\*.
- 6) The SCSI bus device width where:
  - N is a 8-bit device
  - W is a 16-bit device
- 7) The StorageWorks shelf type (Wide or Narrow) in which you can install the device where:
  - N - the device is 8-bit shelf compatible.
  - W - the device is 16-bit shelf compatible.
  - N/W - the device is compatible with either shelf.
- 8) The bus speed expressed in *megabits per second (Mb/s)* where:
  - S - 5 Mb/s, Slow device
  - F10 - 10 Mb/s, Fast device
  - F20 - 20 Mb/s, Ultra device
- 9) The rate at which the device can transfer data in *megabytes per second (MB/s)*.

\* These values are determined by the user.

## Handling an SBB

To prevent damaging the storage device, **ALWAYS** handle an SBB as shown. A drop as small as ¼ inch onto a bench or desktop can damage a drive.

**Figure 3 How to Handle an SBB**



SM2DR-04

### CAUTION

When you remove a higher speed disk drive (7200 RPM or more) that is still rotating the gyroscopic effect may cause you to drop the SBB. To prevent this, do not fully remove the SBB from the shelf until the drive has "spun-down." **Wait at least 30 seconds before completely removing the SBB from the enclosure to allow time for the device to spin down.**

If the drive is removed while the platters are still spinning, **DO NOT** sharply rotate the drive along **ANY** axis until the spindle has stopped.

## StorageWorks Building Block Connectors

The StorageWorks SBB connectors ensure that the SBBs will operate reliably even when replaced many times. The SBB has a 96-position DIN socket that provides positive mating with a 96 pin backplane connector. The connector design ensures that *dc power is present until after* the SCSI bus connection is broken and that *dc power is applied before the SCSI bus connection* is made. This feature protects the integrity of the SCSI data bus. This avoids introducing noise on the bus that could either distort data or cause the bus to “hang.”

The SBB connector is a simple, highly reliable mechanism that can support 200 replacement cycles. A replacement cycle consists of removing and replacing an SBB. Over the active product life of 5 years, this is the equivalent of 40 replacement cycles per year, or approximately 1 cycle every 9 days. The replacement cycle limit applies equally to shelf connectors and device connectors.

### CAUTION

If the SBB is replaced more often than the recommended cycle, the gold contact coating will wear away and destroy the integrity of the connection. Environments that require a greater number of replacement cycles are not supported by this product and are considered improper treatment or use (paragraph 9.4b of U.S. Standard Terms and Conditions). Products or connectors damaged because of a higher number of replacement cycles are not eligible for return under warranty and standard service plans. Digital Equipment Corporation markets a specific family of removable disk storage elements for higher replacement cycle environments. Contact your DIGITAL Account Representative, the DIGITAL U.S. Call Center at (800-DIGITAL/800-344-4825), or the European SRC at [31] 243529985 to request a CSS custom quote.

## Considerations When Replacing an SBB

Replacing an SBB is a relatively simple procedure, however, there are several things you must consider. The most critical factors in removing or replacing an SBB or expanding a StorageWorks subsystem are:

- The device type or model number.
- The RAID configuration.

When a controller initializes a device, it establishes the device’s physical location, the device address, and the logical unit number (LUN). Physically moving the device or changing the bus will cause the bus to become erratic and can corrupt or lose data.

Adding devices to a redundant array of independent disks (RAID) set can involve adding shelves and rerouting the SCSI buses. Rerouting a SCSI bus to a different shelf requires that the configured SBBs be located in the same logical location (the same bus and the same device address) that they had before the expansion.

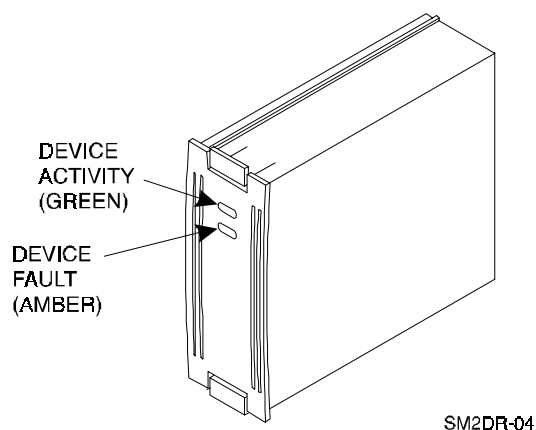
You should use the disk SBB identification label to identify the device model, logical unit number (LUN), controller bus, and other device specific characteristics.

## SBB Replacement Methods

### SBB Status LEDs

Disk drive status is displayed by two LEDs on the front of the storage device (Figure 4). Each LED has three states: ON, OFF, AND FLASHING. When the drive is powered on, both LEDs flash as a hardware/lamp test and then assume the following normal operating status activity:

**Figure 4 Storage SBB LEDs**



The lower LED (amber) is the storage SBB fault LED and indicates an error condition when it is either ON or FLASHING. Although mounted on the SBB, the Fault LED is activated by some SCSI adapters and controllers. Table 1 defines the valid states for these LEDs. If the adapter or controller does not support the fault LED, refer to the *Enclosure* manual for the correct configuration.

**Table 1 Storage SBB Status LEDs**

LED	Status	Indication
Device activity Device fault	ON OFF	SBB is operating normally.
Device activity Device fault	Flashing OFF	SBB is operating normally.
Device activity Device fault	OFF OFF	SBB is operating normally. The SBB is inactive, and there is no fault.
Device activity Device fault	ON ON	Fault status. SBB is probably not responding to control signals. DIGITAL recommends that you replace the SBB for those adapters and controllers that can control fault LEDs.
Device activity Device fault	OFF ON	Fault status. SBB is inactive and spun down. DIGITAL recommends that you replace the SBB for those adapters and controllers that can control fault LEDs.
Device activity Device fault	ON Flashing	Fault status. SBB is active and is spinning down because of the fault. SBB is inactive and spun down. DIGITAL recommends that you replace the SBB for those adapters and controllers that can control fault LEDs.
Device activity Device fault	OFF Flashing	Fault status. SBB has been identified by the controller as failed. DIGITAL recommends that you replace the SBB adapters and controllers that can control fault LEDs.

## Swap Methods

You must determine the appropriate replacement method based on the capabilities of the controller before replacing a device or power supply. There are three methods for replacing SBBs, including power supplies:

- **HOT SWAP** – power and data present
- **WARM SWAP** – power present, no data
- **COLD SWAP** – no power, no data

### Hot Swap

When you perform a hot swap, power and data are present on the SBB connector.

#### CAUTION

Not all adapters and controllers support hot swap. If you are not positive that your SCSI controller supports hot swap, DIGITAL recommends using warm swap to protect the integrity of your data.

Read your controller documentation to determine the controller-supported swap method to use.

- You can use hot swap to remove and replace SBBs from a system that is online and active.
- You can use hot swap to replace power supplies *only* when there are two power supplies on a shelf. You can remove the failed power supply while the other furnishes the power.

### Warm Swap

When you perform a warm swap, power is present on the SBB shelf connector but there is no data on the bus. *Before* you perform a warm swap you must quiesce the bus at the controller and observe the amber status LED on the SBB and ensure that *it is not* FLASHING.

#### CAUTION

You can perform a warm swap only when the green activity LED is **OFF**.

### Cold Swap

When you perform a cold swap, neither power nor data is present on the SBB shelf connector. This requires turning OFF both the shelf power and the SCSI bus controller.

## Replacing an SBB

Complete the following procedures in the specified sequence to replace an SBB.

### NOTE

Be sure the replacement device is the same model as the one being replaced.

When removing or replacing an SBB, always use both hands to support the weight of the SBB.

### CAUTION

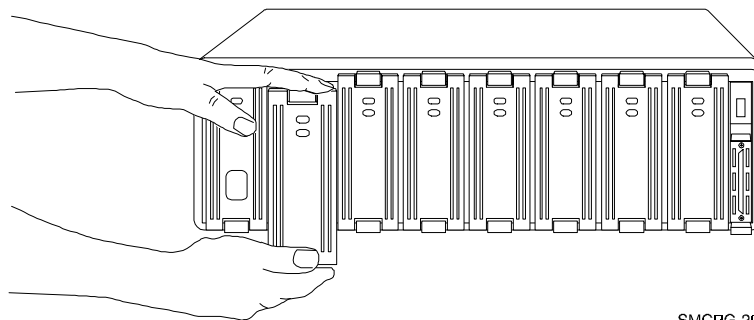
Disk Drives are delicate instruments. Improper handling such as dropping or rough handling can cause damage or reduced reliability. Touching the SBB connector can cause electrostatic discharge (ESD) damage or reduce reliability of the device.

Proper handling of the SBB is essential. When removing the SBB, partially slide the SBB out to unplug its electrical connector from the backplane. **Wait at least 30 seconds before completely removing the SBB from the enclosure to allow time for the device to spin down.**

SBBs are serviced using special equipment and are not field repairable. Opening the SBB will void the DIGITAL warranty.

1. Press the mounting tabs together to release the SBB.
2. Use both hands and pull the SBB out of the shelf.

**Figure 5 Removing an SBB from a Shelf**



SMCPG-29

3. Insert the replacement SBB into the guide slots and push it in until it seats fully and the mounting tabs engage the shelf.
4. After power is applied, observe the status LEDs for the following indications:
  - On a storage device SBB the green device activity LED is either ON, FLASHING, or OFF. The amber device fault LED should be OFF.

