# StorageWorks™ Solutions

SBB User's Guide

This guide describes the procedures for handling, removing, and replacing StorageWorks building blocks (SBBs), including disk drive, tape drives, optical disk drives, CD–ROMs, solid state disks, power supplies, SCSI bus converters (DWZZ-series), and so forth. Identifying devices, compatible bus widths, and setting device addresses are also discussed.
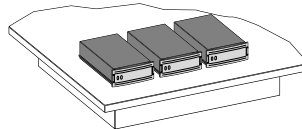
How To Handle an SBB

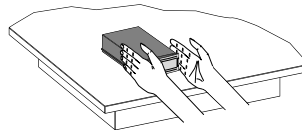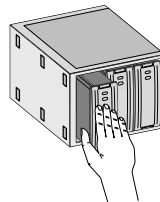*To prevent damaging the storage device, **ALWAYS** handle an SBB as shown.*

DO
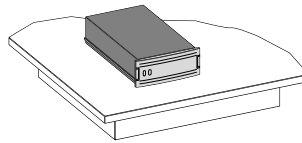
DON'T

Always set the SBB on its side

Never set the SBB on its edge
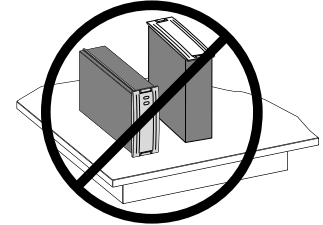
Always set the SBBs side by side

Never stack SBBs

Always set the SBB down gently

Never drop the SBB

Always push the SBB into the shelf gently, but firmly
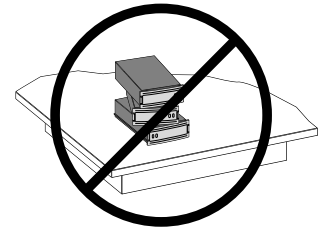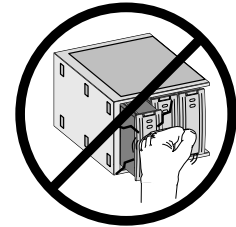
Never force the SBB into the shelf

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Replacing SBBs

Replacing an SBB is a relatively simple procedure. However, there are several things you must consider.

The most critical factors in removing or replacing SBBs or expanding a StorageWorks system are:

- The device type or model number.
- The SCSI bus device address.

Once a device has been initialized on a SCSI bus, moving the device to another bus or changing the device address can cause the bus to become erratic.

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 prior to the expansion.

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

Identifying SBBs

The SBB identification label identifies the device, the SCSI bus type, and user-assigned information.

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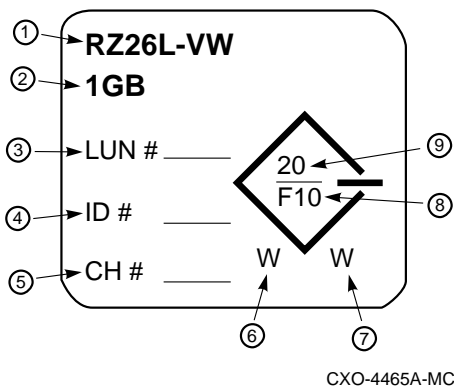
The components of the device identification label are as follows:

① The device model number.

② **T**he 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* (Mbits) per second where—
   S - Slow device
   F - Fast device

⑨ The rate at which the device can transfer data in *megabytes* (MB) per second.

To determine the model number of a 3.5-inch tape drive see the regulatory label on the side of the SBB.
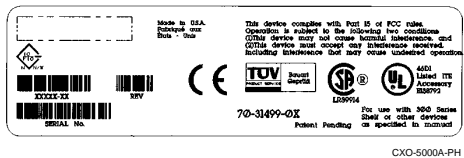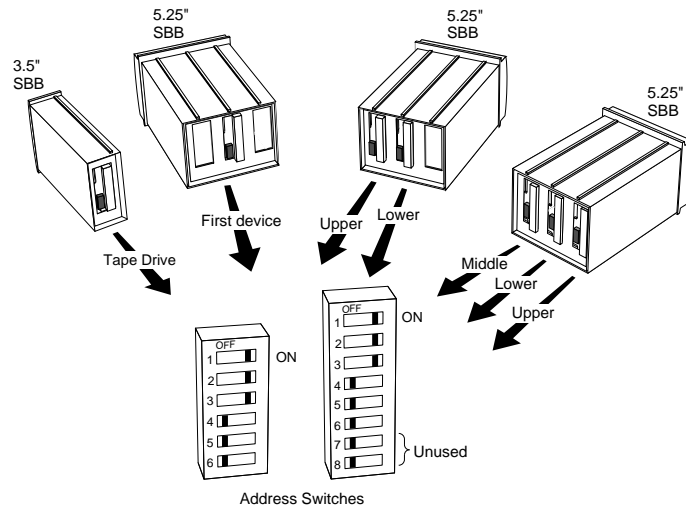
Assigning Device Addresses

3.5-inch 8-bit tape drive SBBs and all 5.25-inch 8-bit SBBs have device addresses switches. These switches allow you either use the device address determined by the backplane connector or to assign your own.

NOTE

None of the 16-bit SBBs have a device address switch. Either the 16-bit shelf or 16-bit shelf and the personality module bus address switch *automatically* set the default device address.

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Device Addressing Rules

*You must assign device addresses to **ALL** 8-bit 5.25-inch SBBs and 3.5-inch tape drive SBBs before installing them. Use the following rules to assign device addresses.*

1. 8-bit devices *can only* use addresses 0 through 6 even when installed in a 16-bit shelf. Address 7 is normally reserved for the host.

    Each device address is used only once on a SCSI bus even when the bus extends across more than one shelf. unless both of the following condition exist.
    - The shelf has multiple buses.
    - The SBBs have device address switches.

2. The SBB can have either a 6- or an 8-position device address switch.
    - Switch positions 1, 2, and 3 set the device SCSI address (0 through 6).
    - Switch positions 4, 5, and 6 enable the device address switch and disable the SCSI backplane SCSI address setting.
    - Switch positions 7 and 8 are not used.

3. A 5.25-inch SBB can contain one full-height, two half-height, or three third-height devices. The guidelines for setting device addresses when multiple devices are installed in an SBB are:
    - The right switch sets the upper device address.
    - The middle switch sets the lower device address.
    - The left switch sets the middle device address.

Device Addresses

Before you install the SBB in the shelf, you must set the device address switches to a valid address.
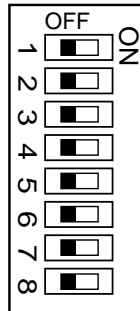
To use the default shelf device address set
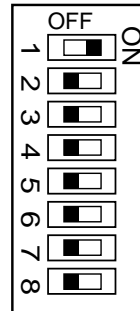- Switches 1, 2, and 3 to OFF
- Switches 4, 5 and 6 to ON.

The shelf backplane connector and the personality module switch settings now determine the SCSI device address. For example, in a single shelf configuration:
- If the SBB is in slot 5, the device address is 5.
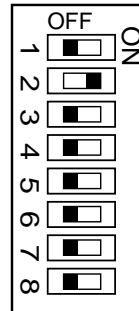- If the SBB is in slot 3, the device address is 3.
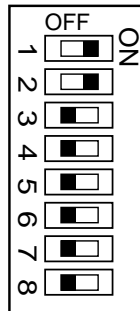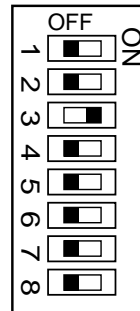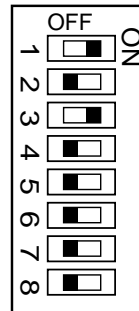
Address 0	Address 1	Address 2
Address 3	Address 4	Address 5
	Address 7 (Reserved for host)	Automatic (Use slot address)
Address 6		
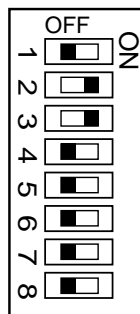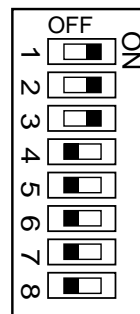
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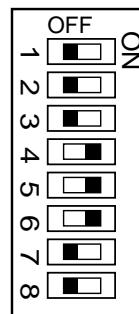
SBB Replacement Methods

*There are three methods for replacing SBBs, including power supplies—**HOT SWAP** (power and data present), **WARM SWAP** (power present, no data**), and **COLD SWAP** (no power, no data). You must determine the appropriate replacement method based on the capabilities of the controller before replacing a device or power supply.*

The light emitting diodes (LEDs) on the front of the SBB indicate the SBB status. The three SBB replacement methods are listed as follows:

CAUTION

Not all controllers support hot swap.

If you are not sure that your SCSI controller supports hot swap, Digital recommends using warm swap to protect the integrity of your data.

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

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

CAUTION

Use warm swap only when the device activity LED is OFF.

2. Use warm swap *only after* you stop all signal activity on the bus.

3. Use cold swap during initial installation or when adding shelves.

Replacing an SBB

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

CAUTION

Be sure that 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

Do not touch the SBB connector unless you are properly grounded. Unless you are grounded when touching the SBB connector you can cause electrostatic discharge (ESD) damage to the device.

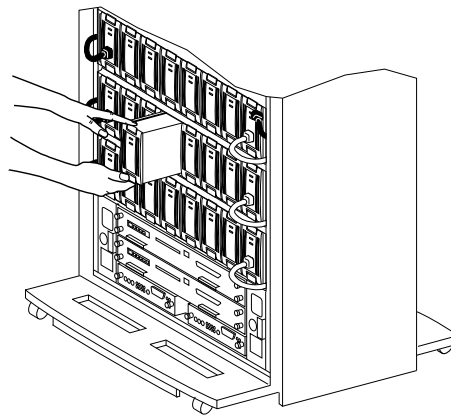1. Press the two mounting tabs together to release the SBB.

    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."

2. Use both hands and pull the SBB out of the shelf.

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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 power supply SBB both green status LEDs should be ON.
    - On a storage device SBB the green device activity LED is either ON, FLASHING, or OFF. The amber device fault LED is OFF.
    - On a battery backup unit SBB the amber charge status LED is ON.

An Overview of the SBB Connector

The StorageWorks SBB connectors ensure that the SBBs will operate reliably even when replaced many times.

The SBB has 96-pin female DIN connectors that provide positive mating with the SBB shelf male connectors. 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 SBB 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.

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 storage elements for higher replacement cycle environments. Contact your Digital Account Representative for more information.