

# **SWXD3-WB**

## **2.10 GB 3.5-Inch**

### **16-bit Disk Drive SBB**



## **Product Notes**

EK-SM2DJ-PN. C01

Thank you for purchasing our SWXD3-WB StorageWorks Building Block (SBB), designed and manufactured by Digital Equipment Corporation. This 2.10 GB, 3.5-inch disk drive is compatible with SCSI-2 single-ended 16-bit interface standards. This drive has been Novell and Microsoft™ Windows™ certified and is supported on all Intel compatible Windows, Windows NT™ and Novell Systems. It is also supported for use with IBM RS/6000, Sun SPARC systems, and HP9000 700/800 Series platforms. It comes labeled for the Sun operating system.

### **Overview of the SWXD3-WB Drive:**

This 3.5-inch drive has a formatted capacity of 2.10 GB. It features an average seek time of 9.5 ms and an average latency of 5.6 ms, giving an average data-access time of 15.1 ms. The drive uses a banded recording technique to keep the bit density constant regardless of track radius, obtaining media transfer rates as high as 5.5 MB/s. This drive has a 1.0 MB segmented cache buffer to maximize the cache hit rate for sequential reads.

The SWXD3-WB drive also offers unsurpassed data integrity, featuring a 264-bit ECC that can correct up

to 11 non-contiguous bytes per block. The drive layout ensures proper addressing by providing four separate copies of the header for each sector, along with embedded servo data for fine-tuning the head position. In addition, the drive electronics add end-to-end checksum error detection code (EDC) to the data to ensure the integrity of the data returning to the system bus.

Other special features of note include:

- Fast Wide SCSI-2 single-ended interface (8-bit & 16-bit).
- Automatic sector reallocation.
- Tagged command queuing.
- Banded recording.
- Zero-latency read and messages.
- Self diagnostics.
- 500,000-hour MTBF.
- UL, CSA, and VDE standards.

This drive is not supported for use in narrow (8-bit) Expansion Storage Pedestals. It can co-exist with narrow (8-bit) devices when configured in the StorageWorks Wide (16-bit) Expansion Storage Pedestal.

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### **SWXD3-WB Application Notes:**

1. The SWXD3-WB 3.5-inch disk drive has been designed to be compatible with many data-storage applications. The StorageWorks Building Block (SBB) is ready to be used when attached to qualified Industry-standard SCSI Adapters and corresponding driver software.
2. The generic model number of the internal 3.5-inch disk drive is RZ28W. The drive will identify itself as "DEC RZ28" when interrogated by the SCSI driver software.
3. Standard SWXD3-WB units do not automatically supply voltage to the spindle motor when installed in a computer system, but instead must be switched on by the host computer. The SWXD3-WB has a modified turn-on circuit that automatically spins up the drive after a delay period which is a multiple of the applicable SCSI address for that drive, each eight seconds longer than the preceding one. This arrangement is required for operating systems that do not have a facility for motor spin-up; it lets successive drives in an array automatically spin up following a staggered delay. This se-

quence avoids excessive loading of the power supply. If your specific operating system is not compatible with this automatic "spin up" feature, please contact your supplier for instructions. (Similarly, please contact your supplier if you wish to reprogram the generic RZ28W drive for automatic spin-up operation.)

4. Some SCSI adapters provide options in the adapter set-up menu to allow automatic spin-up of the disk drive motor. Although the SWXD3-WB disk drive does not require it, this feature may be enabled, if other disk drive devices sharing the same SCSI adapter require it. SCSI adapters that have jumper or switch options to simultaneously spin up disk drive motors should not have that function enabled. The staggered spin-up feature within the SWXD3-WB sequences power to the disk drive motors one at a time. This sequencing avoids out-of-specification surges of power supply current, which under extreme conditions could cause the supply to turn off.

# SWXD3-WB Specifications:

Physical Configuration	
Number of discs (platters)	8
Number of read/write heads	16
Servo	Embedded
Unformatted capacity	2,521 MB
Formatted capacity	2,105 MB
Number of cylinders	3,045
Tracks per surface	3,045
Track capacity	30,720 to 61,440 bytes
Bytes/sector	512
Sectors/track	59-119
Sectors/drive	4,110,480

Power Requirements	
Seeking current:	
+5 Vdc +/-5% (typical)	0.72 A
+12 Vdc +/-5% (typical)	0.90 A
Power consumption:	
Active (100% seeking)	13.2 W
Active (40% seeking)	11.2 W
Idle	9.8 W

Performance	
Interface transfer rate:	
Synchronous (8-bit)	10 MB/s
Synchronous (16-bit)	20 MB/s
Asynchronous (8-bit)	5 MB/s
Asynchronous (16-bit)	10 MB/s
Track-to-track seek:	1 ms
Rotational Speed	5,400 rpm

Performance (continued)	
Media transfer rate	2.7–5.5 MB/s
Cache buffer	1.0 MB

Recording	
Track density	3,256 tpi
Bit density	64,000 bpi
Areal density	206 MB/in <sup>2</sup>
Recording method	RLL (1,7)

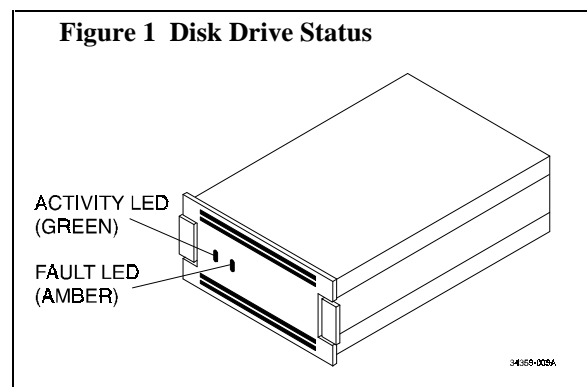
Physical	
Height	41.4 mm/1.63 inches
Width	101 mm/4.0 inches
Length	146 mm/5.75 inches
Weight	0.82 Kg/1.8 lbs

Environmental	
Non-Operating:	
Temperature	-40° C to 66° C
Humidity (RH)	8% to 95%, noncondensing
Operating:	
Temperature	5° C to 55° C
Humidity (RH)	10% to 90%, noncondensing
Shock	10 G peak half sine 10 ms duration
Vibration	22–500 Hz @ 0.5 G peak
Acoustics:	
Seeking	36 dBA @ 1.0 meter
Idle	32 dBA @ 1.0 meters

## Power-On Test

Disk drive status is displayed by LEDs on the front of the storage device (Figure 1). Each LED has three states: *on*, *off*, and *flashing*. When the drive is powered on, verify the following normal operating LED status activity.

- The left LED (green) is a device-controlled activity LED and is on or flashing when the drive is active.
- The right LED (amber) is the drive fault LED and indicates an error condition when either on or flashing.



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## Notes for HP-UX Users

### Model HP 9000 Series 700 */etc/disktab* Information:

This disk has been formatted and is ready for a file system. For the convenience of HP 9000 Series 700 users, we have provided a few suggested disktab entries, as listed below, that you can use with the *newfs* command. We recommend that you enter this information into your */etc/disktab* file at your earliest convenience so that the data will be readily available for future use.

```
DEC_RZ28|DEC_RZ28_noswap:\
      :ty=direct access:ns#84:nt#16:nc#1529:\
      :s0#2054976:b0#8192:f0#1024:\
      :se#512:rm#5400:
DEC_RZ28|DEC_RZ28_100MB:\
      :100 MB reserved for swap & root:ns#84:nt#16:nc#1453:\
      :s0#1952832:b0#8192:f0#1024:\
      :se#512:rm#5400:
DEC_RZ28|DEC_RZ28_200MB:\
      :200 MB reserved for swap & root:ns#84:nt#16:nc#1376:\
      :s0#1849344:b0#8192:f0#1024:\
      :se#512:rm#5400:
DEC_RZ28|DEC_RZ28_300MB:\
      :300 MB reserved for swap & root:ns#84:nt#16:nc#1300:\
      :s0#1747200:b0#8192:f0#1024:\
      :se#512:rm#5400:
```

### Model HP 9000 Series 800 */etc/disktab* and LVM Information:

We recommend that HP 9000 Series 800 users use the *disksecn* command to create a disktab entry. This must be done before creating partitions or logical volumes. To do this, issue the following HP-UX command (you must be a superuser):

```
disksecn -dn RZ28 >> /etc/disktab
```

and supply the following values as answers for the questions asked by the program during the process:

```
Disk type:           Winchester
Sector size:        1024
Number of sectors/track: 84
Number of tracks/cylinder: 16
Number of cylinders: 1529
Revolutions per minute: 5400
```

If you wish to use partitions, only segment 2 can work with this drive under the HP-UX operating system. We therefore suggest that you use the Logical Volume Manager (LVM) to allocate disk space in accordance with the sizes of your filesystems or raw data instead of a single partition. You can do this from the command line or by using the System Administration Manager (SAM) utility. For more information on LVM, refer to *How HP-UX Works: Concepts for the System Administrator* (B2355-90029), Chapter 9. After creating logical volumes and filesystems, you will have more control over the disk than you would have with traditional partitions.

## Notes for IBM AIX RS-6000 Users

After you have appropriately connected the drive to the SCSI bus, you can install the SWXD3-WB drive from the root account either by using **SMIT**, as follows:

1. Enter **# smit dev** choose "Configure Devices Added After IPL" from the menu and then exit.
2. Execute either of the following selections, as applicable:
  - a: If you want to add the disk to a new volume group, enter **# smit vg**, choose "Add a Volume Group" from the menu, and follow normal procedures.
  - b: If you want to add the disk to an already existing volume group, enter **# smit lv**, choose "Add a Logical Volume" from the menu, and follow normal procedures.

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As an alternative to using **SMIT**, you can use the following commands while logged into the root account:

1. # **cfgmgr**
2. # **lsdev -Cc disk**

*Example:*

```
# lsdev -Cc disk
      :           :
hdisk1 Available 00-03-00-20 Other SCSI Disk Drive
```

3. Depending on whether :
  - a. A new volume group is to be added:
    - i. # **mkvg -f -y<newvg> -s<size> <new\_disk>**
    - ii. # **varyonvg <newvg>**

*or*

- b. The drive is added to an existing volume group.  
**#extendvg -f <oldvg> <new\_disk>**

where the angle-bracketed options are:

<newvg> is the volume group name to be added.

<oldvg> is an existing volume group.

<size> is the physical partition size (normally 4).

<new\_disk> is the disk added, as identified by the `lsdev` command.

## Notes for SunOS and Solaris Users

### **/etc/format.dat Information:**

For your convenience, we have labeled this drive with a format utility, giving the drive traditional partitions, so that you can install this unit and get it up and running quickly. To do this, we used the following settings. Note that we designated a fixed *nsect* value, even though this banded drive allows a different number of sectors/track, depending on the radius of a given track. We determined this value by dividing the total number of blocks by the total number of heads, dividing that result by the total number of cylinders, and then rounding down the result to the next lower whole number. Some partition sizes also were selected to be consistent with the *newfs* command. (For example, the "g" partition was reduced to avoid truncation of the last cylinder group.) We recommend that you enter the applicable information into your */etc/format.dat* file at your earliest convenience so that the data will be readily available for any possible future use:

```
disk_type = "DEC_RZ28" \
: ctlr = SCSI : fmt_time = 5 \
: ncyl = 3043 : acyl = 2 : pcyl = 3045 : nhead = 16 : nsect = 84 \
: rpm = 5400 : bpt = 43008
```

For SunOS systems, the partition data is as follows:

```
partition = "DEC_RZ28" \
: disk = "DEC_RZ28" : ctlr = SCSI \
: a = 0, 64512 : b = 48, 196224 : c = 0, 4089792 : g = 194, 3827712
```

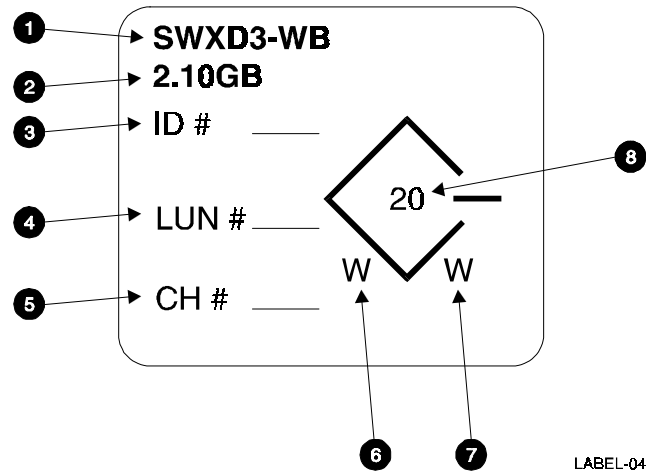
For Solaris systems, the partition data is as follows:

```
partition = "DEC_RZ28" \
: disk = "DEC_RZ28" : ctlr = SCSI \
: 0 = 0, 64512 : 1 = 48, 196224 : 2 = 0, 4089792 : 6 = 194, 3827712
```

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## StorageWorks Building Block Identification Labels

Each StorageWorks Building Block (SBB) contains an identification label that shows the SBB device, the shelf bus type (8- or 16-bit), and user specific information. The 16-bit label that appears on the front of the SWXD3-WB is shown below.



- ❶ The type of device.
- ❷ The total amount of data that the device can store.
- ❸ The SCSI Logical Unit Number assigned to the device<sup>1</sup>.
- ❹ The SCSI ID assigned to the the device<sup>1</sup>.
- ❺ The RAID Controller Number assigned to the device<sup>1</sup>.
- ❻ The device bus width. For the SWXD3-WB this value is W.
- ❼ Indicates the type of shelf in which the drive can function:
  - 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.
- ❽ The data transfer rate in MB per second.

<sup>1</sup> These values are assigned by the user. The others are assigned when the device is assembled.

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Digital Equipment Corporation does not warrant that the predicted values represent any particular unit installed for customer use. The actual values will vary from unit to unit. These specifications are subject to change without notice. Digital is not responsible for inadvertent errors.

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