



# *Excellerator*<sup>™</sup>

## Troubleshooting and Repair Guide

Version 1.2

Excellerator Troubleshooting and Repair Guide ver. 1.2

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# Preface

This manual explains how to troubleshoot a Solid Data Excellerator™ and is intended to serve as an addendum to the *Excellerator Installation and Support Manual*. For information on installation and operation, please refer to the *Excellerator Installation and Support Manual*.

Whereas every effort has been made to ensure the accuracy of the information presented in this manual, engineering and manufacturing changes may occur which alter the actual configuration of the hardware. Please contact Solid Data Systems' Technical Support Group, should there be doubt as to how to perform any function described in this manual.

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**CAUTION:** This manual is intended for qualified engineers who are familiar with the safety requirements appropriate for working on equipment of this nature. **DO NOT ATTEMPT TO UPGRADE OR REPAIR AN EXCELLERATOR™ IF YOU ARE NOT SO QUALIFIED.** Failure to follow proper upgrade and/or repair procedures could result in substantial property damage and serious or fatal personal injury. Please contact Solid Data Systems' Technical Support Group if you have any questions concerning proper upgrade and/or repair procedures. Solid Data Systems' Technical Support Group is available to provide upgrade and/or repair service and/or consultation for its products. Accordingly, **IN NO EVENT SHALL SOLID DATA SYSTEMS BE LIABLE IN ANY WAY FOR LOSS, DAMAGE, COST OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH PROPERTY DAMAGE, PERSONAL INJURY OR DEATH RESULTING FROM FAILURE OF OTHERS TO PERFORM PROPER UPGRADE AND/OR REPAIR OF SOLID DATA SYSTEMS' PRODUCTS.**

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## Audience

The *Excellerator Troubleshooting and Repair Guide* is for service engineers engaged in repairing the Excellerator.

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# Chapter 1 Troubleshooting

## 1.1 Power

When the power cord is plugged into the Excellerator, the fans should turn on immediately. If so, the Excellerator is receiving power. If the fans do not turn on when the power cord is plugged in, check that the cable is properly seated and that the outlet it is attached to has power. If power is available, but the fans still do not turn on, try another cable.

If power is available, the cable has been shown to be good, and the fans do not turn on, check the fuse, located near the key switch on the back of the unit.

If the fans still do not come on, replace the chassis.

## 1.2 Startup

Turn the key switch on the back of the Excellerator to the “on” position.

The Start Up In Progress light should come on.

The Activity light should also come on at this time.

After a few minutes, the System Ready light will come on, and the Start Up in Progress and Activity lights will turn off.

If all of these things do not happen, replace the chassis.

## 1.3 Initialization and Use by the Host

When the Excellerator is connected to the host, check to ensure the host computer can recognize the unit. If not, be sure the Excellerator has completed its startup cycle and the System Ready light has come on.

Check that the host’s controller interface is the same type as the Excellerator. Ie. High Voltage Differential, Low Voltage Differential, etc.

Check that each SCSI bus on the Excellerator is properly terminated, and that cable length limitations are not being exceeded. For dual port units, the unused port must also be terminated for the Excellerator to function properly.

Check the connections on the SCSI or Fiber cables to be sure they are seated correctly.

Check the SCSI ID on the Excellerator to be certain it does not conflict with the ID of the host’s SCSI controller. For SUN and HP systems, it must be set to something OTHER than 7.

Ensure the host has been rebooted to enable it to recognize new devices. (see Appendix B for detailed information)

If the host is still not able to recognize the Excellerator, try using a different cable that is known to be good when used with other devices.

Try attaching a different device to the same controller on the host where the Excellerator was connected.

If the cable is known to be good, the ID is correct, and the host is able to see other devices through its controller, the Excellerator chassis should be replaced.

## 1.4 Memory Array

If the host is able to see and communicate with the Excellerator, but a memory problem is suspected, run IOTest from the host. If IOTest returns an error, compare the value to the Drive Geometry table in Appendix A. This will allow you to determine which memory board is experiencing the problem. There are some instances when IOTest may hang. If this is the case, remove the front panel of the unit to see which memory board was being accessed when the program hung. The blue LED on the extreme right of the board will be lit when it is in use. Run IOTest again to see if it behaves the same way, and if the same board is in use when it hangs. If so, that board will need to be replaced.

Be aware that memory boards in the Excellerator are ordered from top to bottom. The first being directly under the controller board, which is in the very top slot of the Excellerator.

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**NOTE: Troubleshooting and repair of any Excellerator unit must include running IOTest on the unit both before and after any parts are replaced. This should consist of both read and write test from within IOTest.**

**IOtest must be run through a complete cycle for the memory array boards after a board is added, removed, or changed. As stated before, both read and write tests are required. It is recommended that the front panel of the unit be removed while running the tests. In this way the activity light on each board can be seen as IOTest is run. To run the test for a complete cycle of the memory, choose the Random Read Test, or Random Write Test, and accept the defaults. Notice that you will be able to write to block 0 of the drive, should you choose to do so. This is not recommended, as this will overwrite the disk label.**

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# Chapter 2 Parts Replacement

**Before removing or replacing any parts in the Excellerator, shut down and power down the unit!**

## 2.1 SHUTDOWN Procedure

The following steps should be performed when it is necessary to shutdown the Excellerator (actual order to be determined by individual operating system/backup utility being used):

- Backup all data on the Excellerator to the operating system. This may take the form of database dumps or UNIX backup utilities such as dump or tar.
- Stop all database servers or other jobs using the Excellerator.
- Dismount the Excellerator from the operating system, if it is mounted. This is done to force the buffer cache to flush.
- Unlock the front panel and press the SHUTDOWN switch. The SYSTEM READY lamp will extinguish, the SHUT DOWN IN PROGRESS and ACTIVITY lamps will illuminate, and the Excellerator will start a backup of the memory array(s) to the internal backup drive.

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**CAUTION:** While the Excellerator is backing up to the internal backup drive, it is off-line to the operating system.

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- When the backup has completed, the SHUTDOWN COMPLETE lamp will illuminate. The DC POWER key switch on the rear panel can then be turned off to remove power to the unit.

## 2.2 Chassis Replacement

Each model of Excellerator will have its own chassis. Replace it with the same model of chassis.

The chassis will have a controller card already installed. It will be set to use 1GB memory boards by default. In order to use 2GB memory boards, the config block will need to be replaced.

### 2.2.1 Controller Board Config Block Replacement

The front panel assembly must be removed to gain access to the controller card. To remove the front panel, grasp and pull it towards you being careful not to put any strain on the still-connected front panel connector cable.

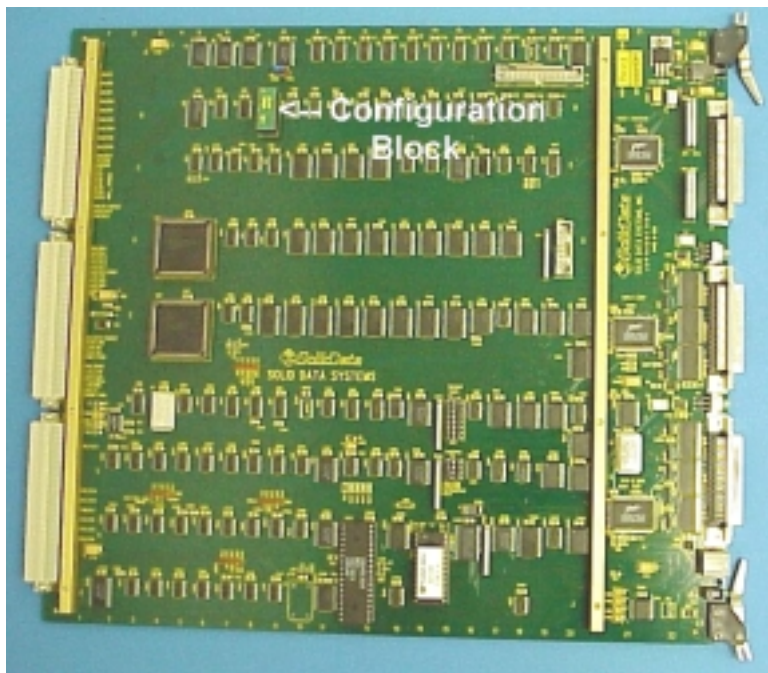
To allow the use of 2GB memory boards in the replacement chassis, the config block on the controller board must be replaced.

To remove the controller card from the Excellerator, disconnect the SCSI and RJ-11 cables from the front of the controller board, noting their positions for ease in reinstallation. Cut the tie wraps on the controller card handles (if

installed) and simultaneously pull forward on both handles to unseat the card allowing it slide forward out of the chassis.

To insert a controller card, configure the controller to use the appropriate size memory boards and slide the card into the card cage, component side toward the open side of the chassis, ensuring the control card handles engage the slots on the card cage. Seat the card by simultaneously pushing in on both handles. Reconnect any removed cables.

Gently remove the config block from the controller board using a chip puller, or other appropriate tool. See picture below for location of the Config block on the controller board.



Controller Card

Part Numbers for Configuration Blocks:

79062 For 1GB memory boards.

79093 For 2GB memory boards.



## 2.3 Canister Hard Drive

Canister systems allow easy plug-in replacement of hard drives and come in one or two hard drive versions. The front panel must be removed to facilitate replacement of a canister type hard drive system. To remove the front panel, grasp and pull it towards you being careful not to put any strain on the still-connected front panel connector cable.

Unlock the canister using the key provided. Grasp the canister handle and pull it towards you to remove the drive(s). Refer to Figure 3-1. To reinstall the hard drive(s), position the canister with the key switch at the bottom and reinsert.



## 2.4 Memory Boards

Memory arrays can be found in card cage slots two through six on a model 800, and in slots two through seventeen on a Model 1000, the number of cards being dependent upon the total amount of memory in the Excellerator. The unit must be populated from the slot closest to the controller first, without vacancy, through the last card. Empty slots must be at the high end. Slots may not be skipped!

### Memory Array Card Removal and Insertion

To remove a memory array card, cut the tie wraps on the memory array card handles (if installed) and simultaneously pull forward on both handles to unseat the card allowing it slide forward out of the chassis.

To insert a memory array card, slide the card into the card cage, component side toward slot #1 (the control card slot), ensuring the memory array card handles engage the slots on the card cage. Seat the card by simultaneously pushing in on both handles

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# Appendix A Drive Geometry

# 134's	# 268's	# 536's	# 1GB's	# 2GB's	# Sectors	# Tracks	# Cylinders	Blocks	MB's
1					128	8	255	261120	134
2	1				128	8	511	523264	268
3					128	8	767	785408	402
4	2	1			128	8	1023	1047552	536
5					128	8	1279	1309696	671
6	3				128	8	1535	1571840	805
7					128	8	1791	1833984	939
8	4	2	1		128	8	2047	2096128	1073
9					128	8	2303	2358272	1207
10	5				128	8	2559	2620416	1342
11					128	8	2815	2882560	1476
12	6	3			128	8	3071	3144704	1610
13					128	8	3327	3406848	1744
14	7				128	8	3583	3668992	1879
15					128	8	3839	3931136	2013
16	8	4	2	1	128	8	4095	4193280	2147
	9				128	8	4607	4717568	2415
	10	5			128	8	5119	5241856	2684
	11				128	8	5631	5766144	2952
	12	6	3		128	8	6143	6290432	3221
	13				128	8	6655	6814720	3489
	14	7			128	8	7167	7339008	3758
	15				128	8	7679	7863296	4026
	16	8	4	2	128	8	8191	8387584	4294
		9			128	8	9215	9436160	4831
		10	5		128	8	10239	10484736	5368
		11			128	8	11263	11533312	5905
		12	6	3	128	8	12287	12581888	6442
		13			128	8	13311	13630464	6979
		14	7		128	8	14335	14679040	7516
		15			128	8	15359	15727616	8053
		16	8	4	128	8	16383	16776192	8589
			9		128	8	18431	18873344	9663
			10	5	128	8	20479	20970496	10737
			11		128	8	22527	23067648	11811
			12	6	128	8	24575	25164800	12884
			13		128	8	26623	27261952	13958
			14	7	128	8	28671	29359104	15032
			15		128	8	30719	31456256	16106
			16	8	128	8	32767	33553408	17179
				9	128	8	36863	37747712	19327
				10	128	8	40959	41942016	21474
				11	128	8	45055	46136320	23622
				12	128	8	49151	50330624	25769
				13	128	8	53247	54524928	27917
				14	128	8	57343	58719232	30064
				15	128	8	61439	62913536	32212
				16	128	8	65535	67107840	34359

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# Appendix B

## Host Computer Installation

This appendix explains how to install an Excellerator on host computer systems operating under:

- HP UNIX (HPUX)
- Solaris

### B.1 HP UNIX (HPUX) Installation

#### B.1.1 HP UNIX (HPUX) Hardware Installation

##### Differential Mode

The Excellerator with the Ultra/Wide differential controller works on the 28696A PB Host Adapter and 2969A HSC HP controller. The 28696A is a double high card that supports 15 peripherals and a 20 Mb/second burst speed. The differential SCSI configuration has a maximum cable length of 25 meters.

Follow the steps below to install the hardware:

1. Set the SCSI ID # on the Ultra/Wide controller card using rotary switch S2 next to the "B" port connector on the controller card. Each device must have its own distinct ID. SCSI ID "7" is reserved for the controller.
2. Connect a 68-pin P cable between the controller and the back of the Excellerator. The second back panel connector must be terminated with a differential terminator.

## B.1.2 Software Installation (HPUX Versions 10.X/11.X)

### Boot HPUX

Boot HPUX and use `/etc/ioscan` to make sure the system sees the drive. Device special files should be created automatically.

```
ISL>HPUX
      :disc3(52.6.0;0)/hp-ux
      .....
      .....

      :/>/etc/ioscan -fn
```

Class	I	H/W Path	Driver	S/W State	H/W Type	Description
bc	0		root	CLAIMED	BUS_NEXUS	
ba	0	0	epic	CLAIMED	BUS_NEXUS	PCI Bus Bridge -
epic						
ext_bus	0	0/0/0	c720	CLAIMED	INTERFACE	Ultra SCSI
target	0	0/0/0.0	tgt	CLAIMED	DEVICE	
disk	0	0/0/0.0.0	sdisk	CLAIMED	DEVICE	DES 800
FAST/WIDE						
			/dev/dsk/c0t0d0		/dev/rdisk/c0t0d0	
target	1	0/0/0.7	tgt	CLAIMED	DEVICE	
ctl	0	0/0/0.7.0	sctl	CLAIMED	DEVICE	Initiator
			/dev/rscsi/c0t7d0			
lan	0	0/1/0	btlan6	CLAIMED	INTERFACE	PCI(10110019)
			/dev/diag/lan0		/dev/ether0	/dev/lan0
ba	1	1	epic	CLAIMED	BUS_NEXUS	PCI Bus Bridge -
epic						
ext_bus	1	1/0/0	c720	CLAIMED	INTERFACE	Ultra SCSI
target	2	1/0/0.1	tgt	CLAIMED	DEVICE	
disk	1	1/0/0.1.0	sdisk	CLAIMED	DEVICE	DES 800
FAST/WIDE						
			/dev/dsk/clt1d0		/dev/rdisk/clt1d0	
target	3	1/0/0.7	tgt	CLAIMED	DEVICE	
ctl	1	1/0/0.7.0	sctl	CLAIMED	DEVICE	Initiator
			/dev/rscsi/clt7d0			
.						
.						
.						
.						
#						

If necessary, create the device special files as follows:

```
:/>insf -e
:/>
```

### Read Drive Description

Use `/etc/diskinfo` to read back basic drive description:

```
:/>/etc/diskinfo /dev/rdisk/c22t0d0
      SCSI describe of /dev/rdisk/cl2t0d0

      vendor:  DES INC
      product id: 800 ULTRA/WIDE
      type:    direct access
      size:    523776 Kbytes
      bytes per sector: 512
```

## Initialize the Drive

Initialize the drive using `/etc/mediainit`:

```
:/>mediainit -v /dev/rdisk/c22t0d0

mediainit: Initialization process started
mediainit: Locking disk3 device
mediainit: Initializing media
:/>
```

---

**NOTE:** `/etc/mediainit` should take about 2 seconds to complete.

---

## Create Physical Volume

Initialize the Solid State Disk for LVM

```
:/>pvcreate /dev/rdisk/c22t0d0
```

## Create File System

Create the file system using `/etc/newfs`:

```
:/>/etc/newfs -v /dev/rdisk/c22t0d0
/etc/mkfs -L /dev/rdisk/c22t0d0 2096640 64 8 8192 1024 16 10 60 2048
/dev/rdisk/c22t0d0: 2096640 sectors in 4095 cylinders of 8 tracks,
64 sectors
2147.0Mb in 256 cyl` groups (16 c/g, 8.39Mb/g, 2048 i/g)
super-block backups (for fsck -b#) at:
16, 8272, 16528, 24784, 33040,
.....
.....
2048144, 2056400, 2064656, 2072912, 2081168, 2089424,
```

## Create Mount Point and Mount Excellerator

```
:/>mkdir /RAMDSK
:/>mount /dev/dsk/c22t0d0 /RAMDSK
```

## Check Mounted File Systems

```
:/>bdf

Filesystem      Kbytes    used  avail  capacity  mounted on
/dev/dsk/c4t0d0  506344      9  455200      0%      /RAMDSK

:/>df
/RAMDSK(/dev/dsk/c4t0d0) : 911400 Blocks 131068 i-nodes
```

## B.2 Solaris Installation

This appendix explains how to install an Excellerator on a Solaris host computer system.

### Hardware Installation

1. Connect the SCSI cable between the controller on the SUN host and the back of the Excellerator. Check the setting of the AC VOLTAGE SELECT switch on the rear panel of the Excellerator. Apply AC power to the Excellerator, and turn on the MASTER DC POWER Switch on the rear panel. After the unit has completed its restore cycle, power on the SUN host. Do a "probe-scsi" or "probe-scsi-all" at the "OK" prompt to verify SCSI ID and cable connections. The "probe-scsi" will not report the Excellerator when it is in a "restore" or "save".

```
<#1> ok probe-scsi
/io-unit@f,e0200000/sbi@0,0/QLGC,isp@2,10000
Target 2
Unit 0 Disk    DES   800 ULTRA\WIDE SD02408332909345098092353
        00022255 825   844860   55f5965   844834
ok
```

### Boot Solaris

2. Boot Solaris by typing "boot -r" at the "ok" prompt. This will cause Solaris to re-configure the device special files for the new configuration.

### Configuration Information

3. Configuration information is placed in /var/adm/messages as the system boots. Sample entries from messages.0 file...

```
Nov 11 10:42:03 DES unix: sd2 at esp0: target 2 lun 0
Nov 11 10:42:03 DES unix: sd2 is
/io-unit@f,e0200000/sbi@0,0/dma@0,81000/esp@0,80000/sd@2,0
Nov 11 10:42:03 DES unix: WARNING:
/io-unit@f,e0200000/sbi@0,0/dma@0,81000/esp@0,80000/sd@2,0 (sd2):
Nov 11 10:42:03 DES unix: corrupt label - wrong magic number
Nov 11 10:42:03 DES unix: Vendor 'DES', product '800', 261121 512 byte
        blocks
```

This is normal output for an un-formatted Excellerator.

### Format Drive

4. Format the Excellerator. Log in as "root" and run "format" from the "#" prompt.

```
#
# format
```



Searching for disks...done

AVAILABLE DISK SELECTIONS:

- 0. c0t0d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 72>  
/io-unit@f,e0200000/sbi@0,0/dma@0,81000/esp@0,80000/sd@0,0
- 1. c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 72>  
/io-unit@f,e0200000/sbi@0,0/dma@0,81000/esp@0,80000/sd@1,0
- 2. c0t2d0 <DES800-536MB cyl 254 alt 2 hd 8 sec 128>  
/io-unit@f,e0200000/sbi@0,0/dma@0,81000/esp@0,80000/sd@2,0

Specify disk (enter its number): 2

selecting c0t2d0

[disk formatted]

FORMAT MENU:

- disk - select a disk
- type - select (define) a disk type
- partition - select (define) a partition table
- current - describe the current disk
- format - format and analyze the disk
- repair - repair a defective sector
- label - write label to the disk
- analyze - surface analysis
- defect - defect list management
- backup - search for backup labels
- verify - read and display labels
- save - save new disk/partition definitions
- inquiry - show vendor, product and revision
- volname - set 8-character volume name
- quit

format> inquiry

Vendor: DES

Product: 800 ULTRA/WIDE

Revision: SD43A

format> format

Ready to format. Formatting cannot be interrupted.

Continue? yes

Beginning format. The current time is Mon Sept 20 16:55:29 1999

Formatting...

done

Verifying media...

pass 0 - pattern = 0xc6dec6de  
253/7/96

pass 1 - pattern = 0x6db6db6d  
253/7/96

Total of 0 defective blocks repaired.

format> partition

PARTITION MENU:

- 0 - change `0' partition
- 1 - change `1' partition

```
2 - change `2' partition
3 - change `3' partition
4 - change `4' partition
5 - change `5' partition
6 - change `6' partition
7 - change `7' partition
select - select a predefined table
modify - modify a predefined partition table
name - name the current table
print - display the current table
label - write partition map and label to the disk
quit
partition> print
Current partition table (original):
Part  Tag  Flag  Cylinders    Size    Blocks
0 unassigned  wm    0          0    (0/0/0)
1 unassigned  wm    0          0    (0/0/0)
2 unassigned  wm   0 - 253    536.00MB (254/0/0)
3 unassigned  wm    0          0    (0/0/0)
4 unassigned  wm    0          0    (0/0/0)
5 unassigned  wm    0          0    (0/0/0)
6 unassigned  wm    0          0    (0/0/0)
7 unassigned  wm    0          0    (0/0/0)

partition> label
Ready to label disk, continue? yes

partition> quit
```

**FORMAT MENU:**

```
disk - select a disk
type - select (define) a disk type
partition - select (define) a partition table
current - describe the current disk
format - format and analyze the disk
repair - repair a defective sector
label - write label to the disk
analyze - surface analysis
defect - defect list management
backup - search for backup labels
verify - read and display labels
save - save new disk/partition definitions
inquiry - show vendor, product and revision
volname - set 8-character volume name
quit
format> label
Ready to label disk, continue? y

format> quit
#
```

**View Volume Table**

5. To view the volume table on the Excellerator:

```
# prtvtoc /dev/rdisk/c0t2d0s2
* /dev/rdisk/c0t2d0s2 partition map
*
* Dimensions:
*   512 bytes/sector
*   128 sectors/track
*    8 tracks/cylinder
*  1024 sectors/cylinder
*   255 cylinders
*   253 accessible cylinders
*
* Flags:
*   1: unmountable
*  10: read-only
*
*
* Partition Tag  First  Sector  Last
* Partition Tag  Flags  Sector  Count  Sector  Mount Directory
0   2   00      0  32768  32767
1   3   01  32768  32768  65535
2   5   01      0 259072 259071
6   4   00  65536 193536 259071
```