



DFU User Guide

For use in updating firmware on all Quantum Devices

1. DESCRIPTION	1
2. KEY PROGRAM FEATURES	2
2.1. Supported Devices	2
2.2. Supported Operating Systems.....	3
2.3. Supported Host Bus Adapters.....	3
2.4. File Listings.....	3
2.5. Installation Description	3
3. USING THE DFU APPLICATION.....	3
3.1. Introduction Screen	3
3.2. Selection Screen.....	4
3.3. Help Screen.....	4
3.4. Device Selection Screen.....	5
3.5. Firmware Update Screen.....	5
3.6. Tape Alert Display Screen.....	6
4. ERROR CODES	6

1. Description

The Quantum Tape Drive Firmware Upgrade Utility (DFU) can be used to upgrade firmware on supported Quantum tape drives.

- If a tape cartridge is loaded, unload the cartridge before loading the firmware, otherwise an error will display.

- Be sure that there is no activity on the device before loading the firmware.
- DFU output is logged to the file DFU_Out.txt in the current directory or in SYS: on Netware.
- When entering a firmware filename, the full path must be entered.
- The level of detail printed to the output log file can be toggled between Debug and Normal. Debug will result in additional log page and error data being printed to the output log.
- When using multi-lun devices such as some autoloader libraries on Netware, make sure you load the HAM (HostAdapterModule) driver with the appropriate options for multi-lun support. I.E. 'load adpu320.ham slot=101 /luns'.

2. Key Program Features

The key features of the DFU application include, but are not limited to:

- Simple user interface – command line
- Supports all Quantum devices
- Supports multiple operating systems
- Single EXE

2.1. Supported Devices

The supported devices are:

- DLT7000 Tape Drive
- DLT8000 Tape Drive
- SDLT220 Tape Drive
- SDLT320 Tape Drive
- SDLT600 Tape Drive
- SDLT1200 Tape Drive
- DLT1 Tape Drive
- VS80 Tape Drive
- VS160 Tape Drive
- DAT24 (DDS-3) Tape Drive
- DAT40 (DDS-4) Tape Drive
- DAT 72 Tape Drive
- DAT240 Autoloader (DDS-4)
- DAT432 Autoloader (DAT 72)
- LTO-1 Ultrium Tape Drive
- LTO-2 Ultrium Tape Drive
- LTO-2 Half-Height Ultrium Tape Drive
- LTO-3 Ultrium Tape Drive
- VS80 ValueLoader
- HP LTO1 ValueLoader
- SDLT320 ValueLoader

- IBM LTO2 ValueLoader
- VS160 SuperLoader3
- LTO2L SuperLoader3
- IBM LTO3 SuperLoader3

2.2. *Supported Operating Systems*

The supported operating systems will be:

- Microsoft Windows NT, 2000, XP, 2003 x86
- Microsoft Windows 2003 x64
- Red Hat Linux AS 3.0
- Red Hat Linux ES 3.0
- Red Hat Linux AS 4.0
- Red Hat Linux ES 4.0
- SUSE Linux ES 9 EM64T
- Solaris 8 / 9
- Netware 5.1 / 6.5

2.3. *Supported Host Bus Adapters*

The supported HBA's are:

- Adaptec 29160 / 39160 / 39320 / 39320A
- Raytoc
- LSI 1030
- LSI Perc 4/Di RAID Controller

2.4. *File Listings*

- dfu.exe (DFU for Windows)
- dfu.lx (DFU for Linux)
- dfu.nlm (DFU for NetWare)
- dfu.sl (DFU for Solaris)

2.5. *Installation Description*

- No installation of the software is necessary. Simply copy the program to the desired location is all that is required. DFU is a single file executable utility that can be run from the command line from any location desired.

3. Using the DFU Application

You will be presented with a series of screens that will walk you through the firmware upgrade process. These screens are outlined below.

3.1. *Introduction Screen*

```
*****
*****
Quantum DFU - Drive Firmware Update V01.02.06 September 14, 2005
                SCSI DLL V003.031
```

DFU is a tool to enable you to update firmware on your Quantum devices.

Notes:

...If a tape cartridge is loaded, unload the cartridge before loading the firmware, otherwise an error will display.
...Be sure that there is no activity on the device before loading the firmware.

Press <enter> to continue...

3.2. Selection Screen

Select the device you are interested in upgrading the firmware for by entering the number listed with the device.

- Select R to rescan the SCSI bus.
- Select C to change the logging level.
- Select H for the Help screen.
- Select E to exit the application

```
*****
*****
Quantum DFU - Drive Firmware Update V01.02.06 September 14, 2005
              SCSI DLL V003.031
```

Scan Found: 3 devices

Dev#	: Product ID	: Bus	: Port	: ID	: Lun	: Firmware Rev	: Serial Number
001	: SDLT600	: 000	: 0002	: 01	: 000	: 1E1E	: RX0332AMC00871
002	: DLT1	: 000	: 0002	: 03	: 000	: 5538	: PHD3E10574
003	: SDLT220	: 000	: 0002	: 11	: 000	: 5050	: CXB27H2378

```
Enter your choice:
1-3 Select Device.
R   ReScan for Devices.
C   Change Logging Level (Normal/Debug) - Current = Normal
H   Help.
E   Exit DFU.
```

Selection:

3.3. Help Screen

The following Help screen is available at any time while running the application.

```
*****
*****
Quantum DFU - Drive Firmware Update V01.02.06 September 14, 2005
              SCSI DLL V003.031
```

DFU is a tool to enable you to update firmware on your Quantum devices.

Notes:

```

...If a tape cartridge is loaded, unload the cartridge before loading the
  firmware, otherwise an error will display.
...Be sure that there is no activity on the device before loading the
  firmware.
...DFU output is logged to the file DFU_Out.txt in the current directory
  or in SYS: on Netware.
...When entering a firmware filename, the full path must be entered.
...The level of detail printed to the output log file can be toggled between
  Debug and Normal. Debug will result in additional log page and error
  data being printed to the output log.
...When using multi-lun devices such as some autoloader libraries on Netware,
  make sure you load the HAM (HostAdapterModule) driver with the appropriate
  options for multi-lun support. I.E. 'load adpu320.ham slot=101 /luns'.

```

Press <enter> to continue...

3.4. **Device Selection Screen**

The following device selection screen displays a menu of tasks that can be completed on the selected device.

- Select 1 to load device firmware
- Select 2 to show tape alerts
- Select R to rescan the SCSI bus.
- Select C to change the logging level.
- Select H for the Help screen.
- Select E to exit the application

```

Device 1 is selected
      SN: RX0332AMC00871   Desc: QUANTUM SDLT600           1E1E
-----

      Enter your choice:
      1   Load Device Firmware.
      2   Show Tape Alerts.
      R   ReScan for Devices.
      C   Change Logging Level (Normal/Debug) - Current = Normal
      H   Help.
      E   Exit DFU.

```

Selection:

3.5. **Firmware Update Screen**

The following screen similar to the one show will display during the firmware update process.

```

Device 1 in progress
      SN: RX0332AMC00871   Desc: QUANTUM SDLT600           1E1E
-----

      Image File: D:\Firmware\sdl2_t40-9_u.img

      Task Started (FIRMWARE_UPDATE)
      Task Started:  Wed Sep 21 15:09:05 2005

```

```

Percent Complete = 48% - FUP Write Image
Percent Complete = 81% - FUP Commit Image
Percent Complete = 81% - FUP Device Reset
Percent Complete = 82% - FUP Device Reset
Percent Complete = 83% - FUP Device Reset
Percent Complete = 84% - FUP Device Reset
Percent Complete = 90% - FUP Relocate Device
Percent Complete = 99% - FUP Complete
Task Complete (FIRMWARE_UPDATE)

LAST SCSI ERROR
Residual: 0      ILI: 0      FileMark: 0      EOM: 0
Result: 0      SenseKey: 00      ASC: 00      iAscQ: 00
Last CDB: 12 00 00 00 38 00
Task Result: 0      No error has been encountered.
Task Err Code: 0      No error has been encountered.

Task Completed:  Wed Sep 21 15:11:23 2005

TASK PASSED      FIRMWARE_UPDATE

Device 1 finished
      SN: RX0332AMC00871      Desc: QUANTUM SDLT600      2828
-----

Press <enter> to continue...
```

3.6. *Tape Alert Display Screen*

The following screen similar to the one show will display any tape alerts that have been registered with the device.

```

Device 1 in progress
      SN: RX0332AMC00871      Desc: QUANTUM SDLT600      2828
-----

TAPE ALERTS LOG PAGE 2E

FOUND 0 TAPE ALERTS

LAST SCSI ERROR
Residual: 0      ILI: 0      FileMark: 0      EOM: 0
Result: 0      SenseKey: 00      ASC: 00      iAscQ: 00
Last CDB: 4D 00 2E 00 00 00 00 FF F0 00

Device 1 finished
      SN: RX0332AMC00871      Desc: QUANTUM SDLT600      2828
-----

Press <enter> to continue...
```

4. Error Codes

This is a list of error codes used in the DFU program.

SUBTEST_STATUS_PASSED (0x000)

No errors detected

SUBTEST_STATUS_UNUSUAL (0x003),

SUBTEST_STATUS_CANCELLED (0x004),

FUP_INCORRECT_STATE = 51

The device is not in proper state to perform Firmware Update. This will be hit for a generic sequential drive that was not in the list but said ready.

FUP_LIB_PUTAWAY = 59

Unable to put cartridge from drive to an empty slot prior to performing FUP on a drive installed in a library

FUP_UNLOAD_LIBDRIVE = 60

Error on Unload command issued to a drive installed in a library.

FUP_UNLOAD_FAILED = 61

A drive that reported a ready status - cartridge present - had a failure in attempting to perform an unload command when trying to get drive ready for FUP.

FUP_LTODRIVE_CONDITION = 62

General Drive Unload error - indicating that an LTO drive is not reporting MEDIUM NOT PRESENT or is reporting a check condition other than 0x00023A04 which is considered to be incompatible with FUP

FUP_DRIVE_CONDITION = 63

General Drive Unload error - indicating that the selected drive is not reporting MEDIUM NOT PRESENT or is reporting a check condition other than 0x00023A04 which is considered to be incompatible with FUP

FUP_CHANGER_CONDITION = 64

Changer has an operation in progress or is reporting a check condition that is incompatible with FUP

FUP_REWIND_FAILED = 65

A drive that reported a ready status - cartridge present - had a failure in attempting to perform a rewind command when trying to get drive ready for FUP.

FUP_DRIVE_READY = 66

In the final pre FUP drive check, the drive reported ready - indicating that a cartridge is present, so FUP cannot proceed.

FUP_FILE_ERROR = 52

Error reading Firmware File

This error indicates that the firmware file was corrupted or not in the correct location. The user should download the file again and submit the correct file location to the application.

FUP_WRITE_BUFFER = 53

Error during Firmware Update write buffer command

FUP_WRITE_BUFFER_COMMIT = 54

Error during Firmware Update FINAL write buffer command

These errors indicate that the device would not accept the image posted; either due to personality override settings or an invalid image file was specified for the selected device. The course of action would be to re-scan and re-select the device and retry the update with the correct image file. If the rejection was due to personality settings in the device that prevent update, then you have to change that setting in the device before being able to perform an update.

Any time there is a WRITE_BUFFER error, you can use DFU to re-scan and re-select the device and look at the Tape Alerts – log page 2E to see if an alert message is present that is related to the Firmware Update failure.

FUP_RELOCATE = 55

Error during Firmware Update relocate after update

This error is very common on LTO drives. When this error occurs, you should power cycle the device, then have DFU do a re-scan. The re-scan will then typically find the device after it has been power cycled, the firmware revision should also indicate the updated revision.

FUP_NO_FILE = 57

Error during Firmware Update - no filename given

Remarks:

FUP_INCORRECT_STATE

This return value will occur when a drive or loader cannot be put into the correct state for an update. Drives must have the tape unloaded. So if a drive has a cartridge and because of an eject error, or a setting that disables auto eject on fup, this error can occur.

The *condition* below indicates the device's current check condition. There is the following check in the code to return this error:

```

          |----- Sense Key
          | | ----- ASC
          | | | ----- ASCQ
condition == 0x00023A00          // MEDIUM NOT PRESENT
condition == 0x00023A00          // UNIT NOT READY
condition == 0x00023E00          // LTO3 with bad code gets this

```

If this condition is not met, then the FUP_INCORRECT_STATE would be returned.

For an autoloader, the software must be able to put a cartridge away – as a simple eject is not adequate and the loader must not currently be doing any type of operation, such as moving a cartridge or performing a diagnostic or inventory

```

condition != 0x00040307          // no operation in progress
condition != 0x00040307

```

```
SUBTEST_STATUS_UNUSUAL(0x003)
```

This return value would indicate that (for the FUP process) that a memory allocation failed when a buffer was being allocated for the write buffer commands

```
SUBTEST_STATUS_CANCELLED(0x004),
```

When the FUP is running, it may be trying to eject a cartridge or put a cartridge from a drive to a slot in a loader, so during this time, the sub-test could be cancelled – resulting in this check condition.

```
FUP_WRITE_BUFFER = 53
```

```
Error during Firmware Update write buffer command
```

A SCSI error / check condition was returned while trying to perform the MODE 4 write buffer, which is the command used for sending an image to a device. This type of error would sometimes indicate that the personality settings in the drive have prevented the write buffer from proceeding. A more common cause of this type of error as well as the UP_WRITE_BUFFER_COMMIT error is that the operator selected an image file that is not a valid image for the selected device, in which case the device will reject the write buffer. For example, when the user was trying to send a DLT8000 image to an SDLT320 drive would generate this error.

```
FUP_WRITE_BUFFER_COMMIT = 54
```

```
Error during Firmware Update FINAL write buffer command
```

A SCSI error / check condition was returned while trying to perform the MODE 5 write buffer, which is the command used for indicating to the device that the image upload process is complete, and that the device should not perform the update with the entire set of data received. Depending on device type, the MODE 5 write buffer command may or may not include the final bytes for the image.

```
FUP_RELOCATE = 55
```

Error during Firmware Update relocate after update

When a device has received a firmware update, it will typically disappear from the SCSI Bus during the device reset. The DFU code will try for up to 5 minutes to relocate the same device on the bus after an update. If the device is not relocated – normally by serial number gained from the original device via inquiry – then this value will be returned to indicate the error in relocating the device on the bus.

FUP_FILE_ERROR = 52

Error reading Firmware File

FUP_NO_FILE = 57

Error during Firmware Update - no filename given