BackBox© E5.00 VTC Server Installation

Abstract

This VTC Server Installation document is for BackBox© E5.00

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INTRODUCTION

This manual documents the installation and configuration of a BackBox Virtual Tape Controller (VTC) on a Windows Server 2016, 2019 and 2022 Standard Edition.

This VTC Installation Guide is organized in four sections

- Server preparation
- Fiber Channel Card installation
- VTC Software installation
- VTC Initial configuration

Refer to BackBox Troubleshooting and Messages Manual for some details and some activity descriptions.

SERVER PREPARATION

This section documents the preparation of a Windows server who will act as a Virtual Tape Controller (VTC) for BackBox environment.
Current BackBox version has been certified to run on Windows Server 2016, 2019 and 2022 Standard Edition.

Upload VTC Package

Upload the current VTC software package on the server. The package is delivered directly by ETI-NET. Contact your ETINET representative for credentials and version delivery.

ZIP File	Content
BackBox-Ev.vv-yyyymmdd.zip	ETI-NET Release Software

Once uploaded, unzip the BackBox software. The zip file consists of :

Folder Installation Package Latest Released Version	Content
Guardian-500-yyyymmdd	Latest BackBox Guardian Software
UI-nn	Installer for the BackBox UI Client
VTC-nn	Installer for the VTC application
VTCserverScripts-yyyymmdd	PowerShell installation scripts required for upgrade or new installation
AttoCelerityFC-yyyymmdd	Latest (required) AttoCelerity version, if necessary

Install Additional Roles and Features

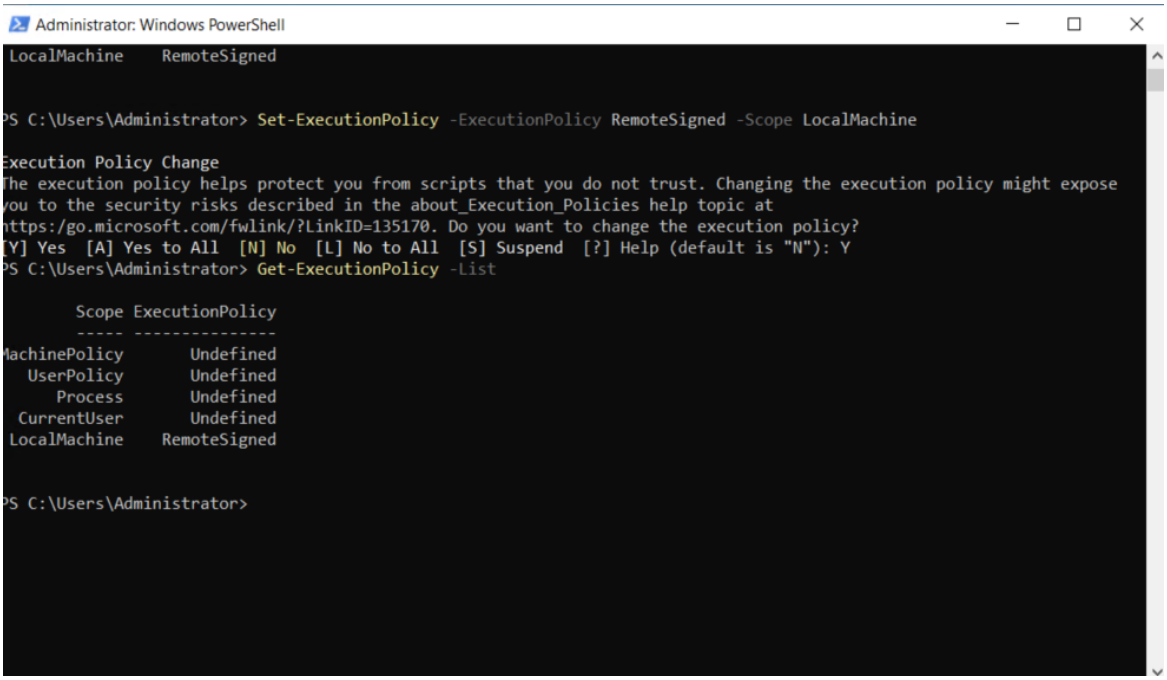
The next step of the preparation is to make sure all needed roles and features have been installed on the server. To do so we provide a PowerShell script that will automatically check and add any missing component to the Windows installation.
Before doing so PowerShell execution policy must be set up properly to do the following action:

- While logged as local administrator, start a PowerShell command window, type the following command to allow script execution:

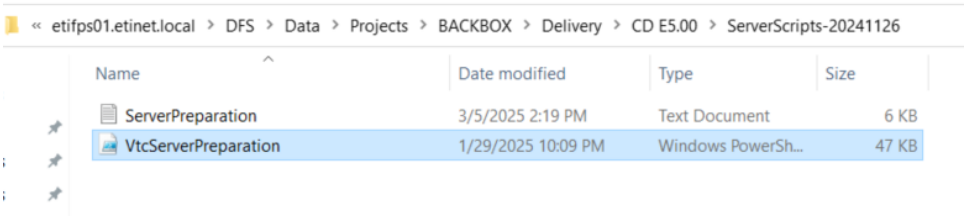
```
Set-ExecutionPolicy -ExecutionPolicy RemoteSigned -Scope LocalMachine
```

- Ensure the policy is in force:

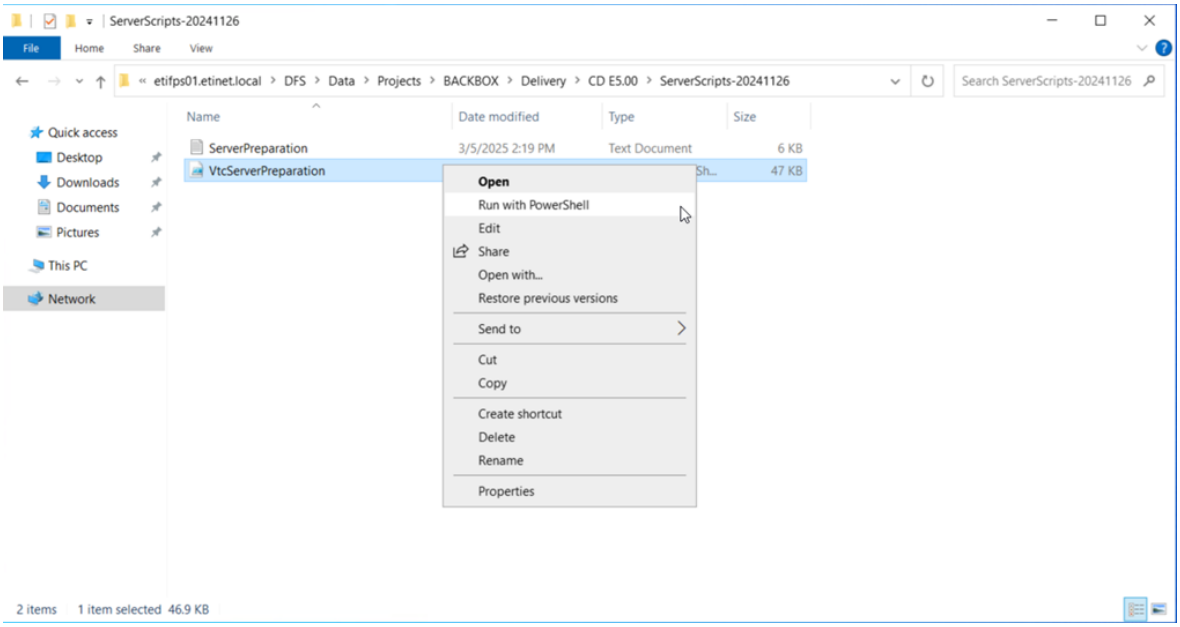
```
Get-ExecutionPolicy –List

Scope  ExecutionPolicy
--------        --------------
MachinePolicy   Undefined
UserPolicy      Undefined
Process         Undefined
CurrentUser     Undefined
        LocalMachineRemoteSigned
```

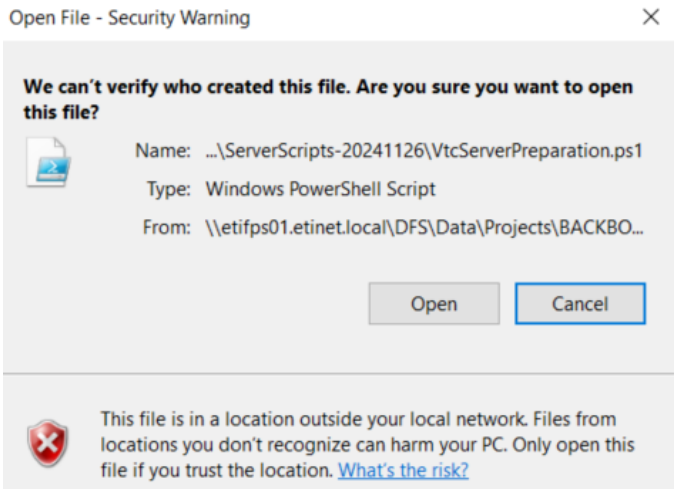


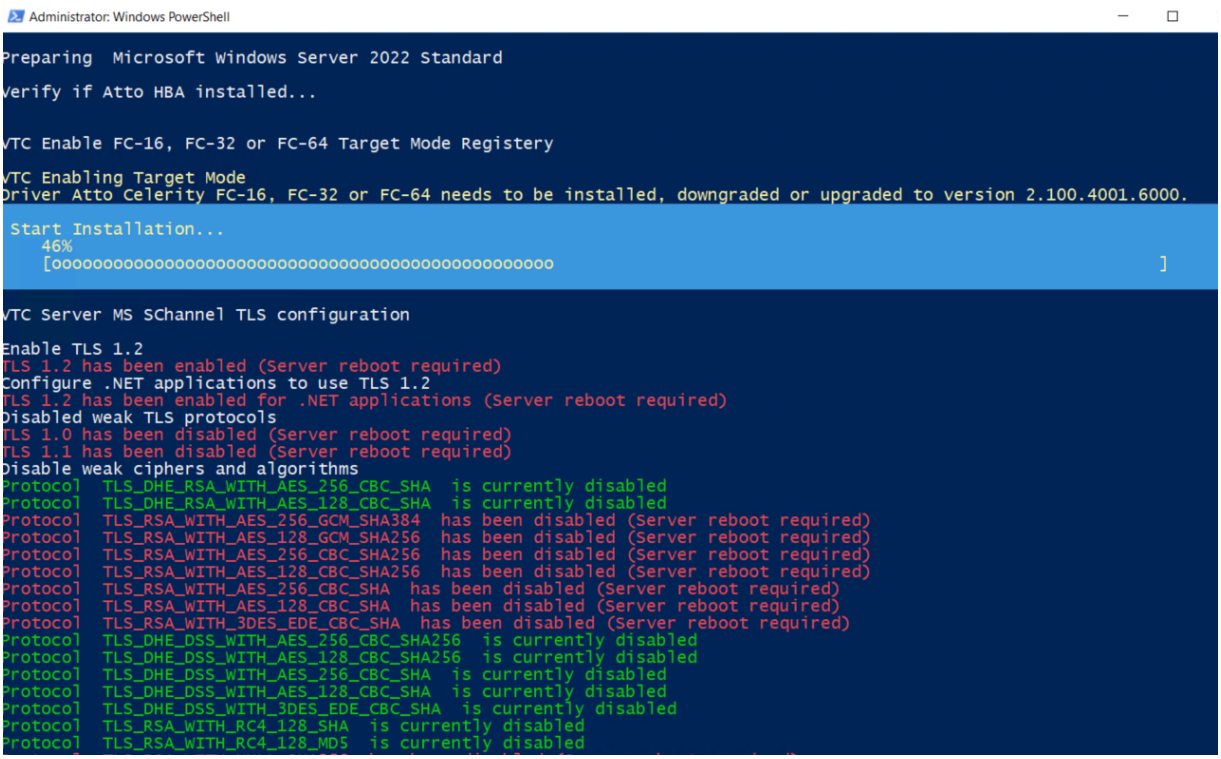
Once done, proceed with the execution of the ETINET script for roles and features. From the location where the BackBox package was unzipped, go to the VtcServerScripts-YYYYMMDD folder.

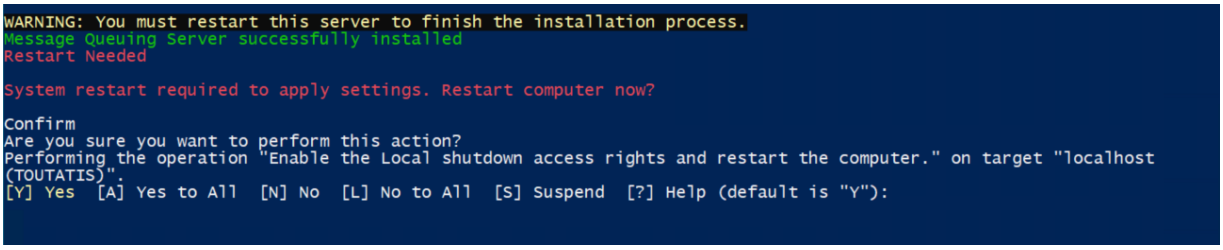


Right- click on the file VtcServerPreparation and Run with PowerShell (or launch the script from the opened PowerShell command line).





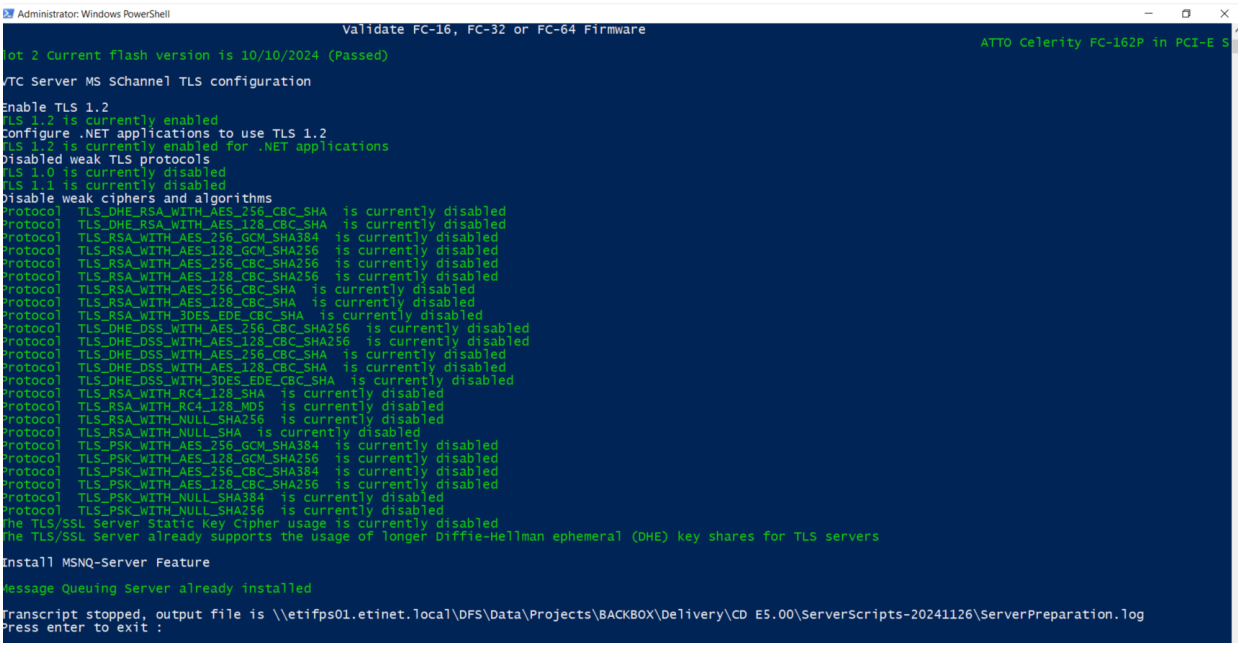




Click Y in the PowerShell to restart the server.

Reboot the server.

⚠	Some features will require rebooting the server. Re-execute this script until it shows there is no more feature needed to be installed (no red message in the PowerShell).


Administrator: Windows PowerShell
Validate FC-16, FC-32 or FC-64 Firmware
ATTO Celerity FC-162P in PCI-E S
lot 2 Current flash version is 10/10/2024 (Passed)
VTC Server MS SChannel TLS configuration
Enable TLS 1.2
TLS 1.2 is currently enabled
Configure .NET applications to use TLS 1.2
TLS 1.2 is currently enabled for .NET applications
Disabled weak TLS protocols
TLS 1.0 is currently disabled
TLS 1.1 is currently disabled
Disable weak ciphers and algorithms
Protocol TLS_DHE_RSA_WITH_AES_256_CBC_SHA is currently disabled
Protocol TLS_DHE_RSA_WITH_AES_128_CBC_SHA is currently disabled
Protocol TLS_RSA_WITH_AES_256_GCM_SHA384 is currently disabled
Protocol TLS_RSA_WITH_AES_128_GCM_SHA256 is currently disabled
Protocol TLS_RSA_WITH_AES_256_CBC_SHA256 is currently disabled
Protocol TLS_RSA_WITH_AES_128_CBC_SHA256 is currently disabled
Protocol TLS_RSA_WITH_AES_256_CBC_SHA is currently disabled
Protocol TLS_RSA_WITH_AES_128_CBC_SHA is currently disabled
Protocol TLS_RSA_WITH_3DES_EDE_CBC_SHA is currently disabled
Protocol TLS_DHE_DSS_WITH_AES_256_CBC_SHA256 is currently disabled
Protocol TLS_DHE_DSS_WITH_AES_128_CBC_SHA256 is currently disabled
Protocol TLS_DHE_DSS_WITH_AES_256_CBC_SHA is currently disabled
Protocol TLS_DHE_DSS_WITH_AES_128_CBC_SHA is currently disabled
Protocol TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA is currently disabled
Protocol TLS_RSA_WITH_RC4_128_SHA is currently disabled
Protocol TLS_RSA_WITH_RC4_128_MD5 is currently disabled
Protocol TLS_RSA_WITH_NULL_SHA256 is currently disabled
Protocol TLS_RSA_WITH_NULL_SHA is currently disabled
Protocol TLS_PSK_WITH_AES_256_GCM_SHA384 is currently disabled
Protocol TLS_PSK_WITH_AES_128_GCM_SHA256 is currently disabled
Protocol TLS_PSK_WITH_AES_256_CBC_SHA384 is currently disabled
Protocol TLS_PSK_WITH_AES_128_CBC_SHA256 is currently disabled
Protocol TLS_PSK_WITH_NULL_SHA384 is currently disabled
Protocol TLS_PSK_WITH_NULL_SHA256 is currently disabled
The TLS/SSL Server Static Key Cipher usage is currently disabled
The TLS/SSL Server already supports the usage of longer Diffie-Hellman ephemeral (DHE) key shares for TLS servers
Install MSNQ-Server Feature
Message Queuing Server already installed
Transcript stopped, output file is \\etifps01.etinet.local\DFS\Data\Projects\BACKBOX\Delivery\CD E5.00\ServerScripts-20241126\ServerPreparation.log
Press enter to exit :

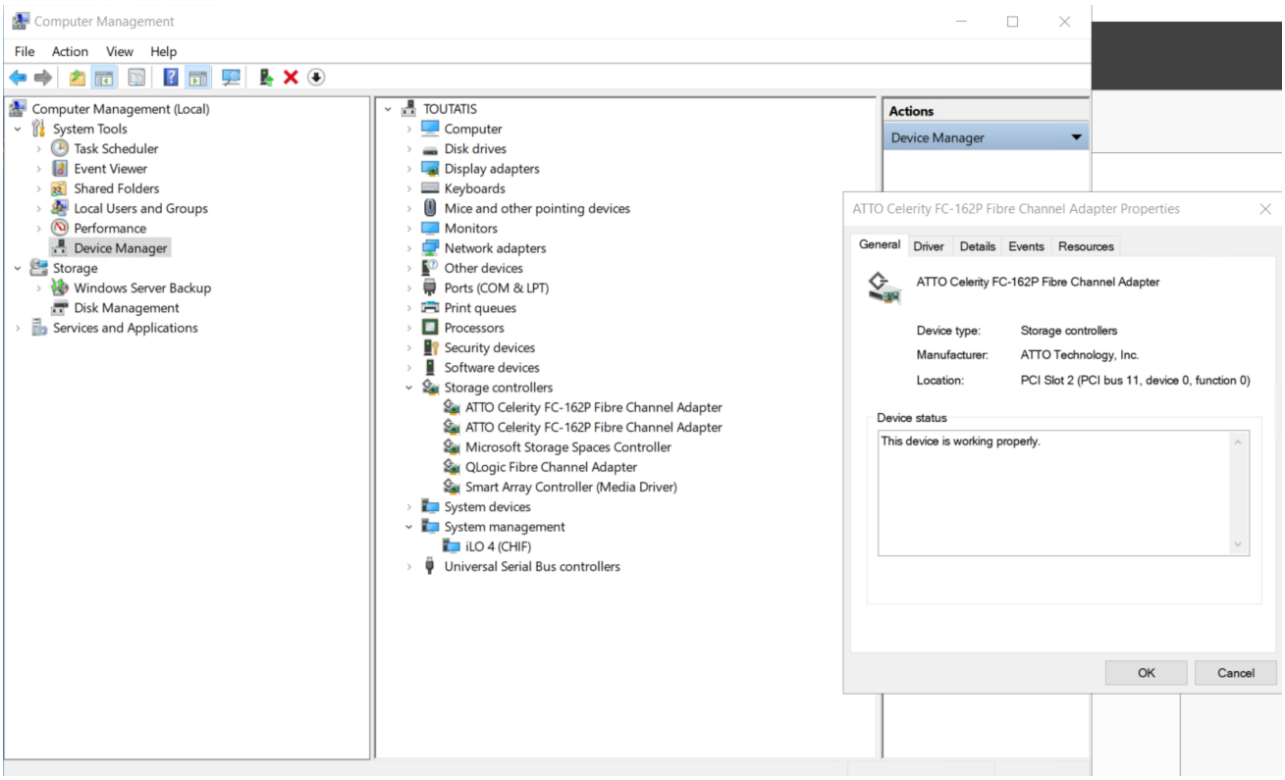
INSTALL FC CARDS IN VTC

> The PCI boards, as well as the server components, are easily damaged by static electricity that can be discharged when you touch them. You must use anti-static procedures, such as grounded wristbands, when handling the cards outside of their anti-static bags and during the installation procedure.

Install FC Drivers in Windows

Install the FC Adapter Driver

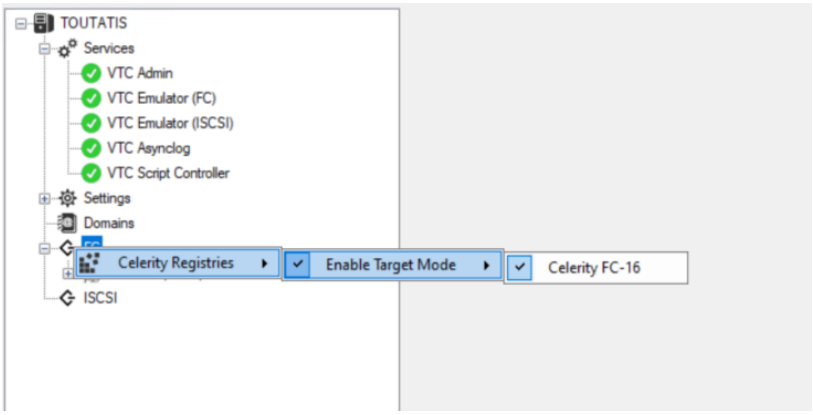
Reach the appropriate installer at the location indicated in the software requirement table and double-click on Setup.exe and follow the installer's instructions.
Although we recommend using the latest release of driver available, ATTO does not usually sign all their releases. If a signed drivers are required, they are provided in the package inside folder marked has **signed** (ex: FC8\win_drv_celerity8\1.95-Signed).
In **Device Manager**, verify that all FC adapters are installed and working properly.



Enable Target Mode

Upon initial installation the ATTO Celerity driver only supports Initiator mode usage. To be able to emulate tape devices the ATTO Celerity driver must be configured to support Target mode. This is done by running the **VTCServerPreparation** script from the PowerShell. For more details, refer to the section Install Additional Roles and Features in this guide.
The procedure needs to be done only once, but it may be required again if Target mode has been disabled during subsequent installations.

If the VTC software is already installed, you can use the VTC Management Console to enable target mode.
Right-clicking on the FC node lets you configure ATTO registry entries, to enable/disable Initiator and Tar- get mode Celerity HBA features. Those features are based on family model and are applied to all ATTO Celerity HBA installed on the server. ATTO Celerity family models supported are FC-8, FC-16 and FC-32. Family model will be shown only if one or more Celerity HBA is installed on the server.



When enabled, the feature will be checked . A diamond indicates that the feature is enabled only for part of the HBAs on the server . To enable or disable a feature, simply check or uncheck the feature on the model and Save the modification.

Restart VTC Server

To complete Target mode activation, you must restart the server. When the server has restarted, log in to it using the local administrator account.

VTC INITIAL CONFIGURATION

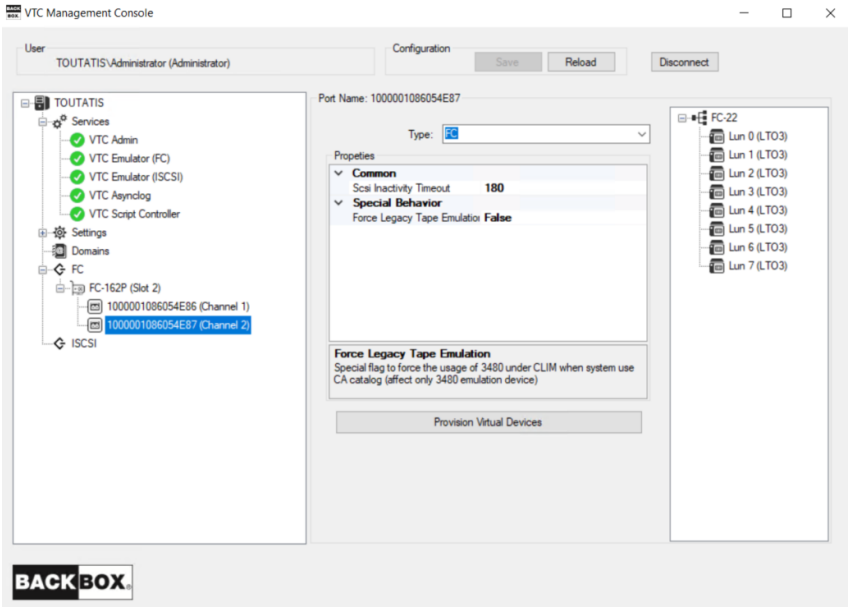
Once the card and the software are installed, you can start the VTC configuration. Perform the following steps:

- verify and adjust the VTC tape devices
- connect to the NonStop
- verify the connectivity

After this section you VTC server will be ready for to use by the actual BackBox system.

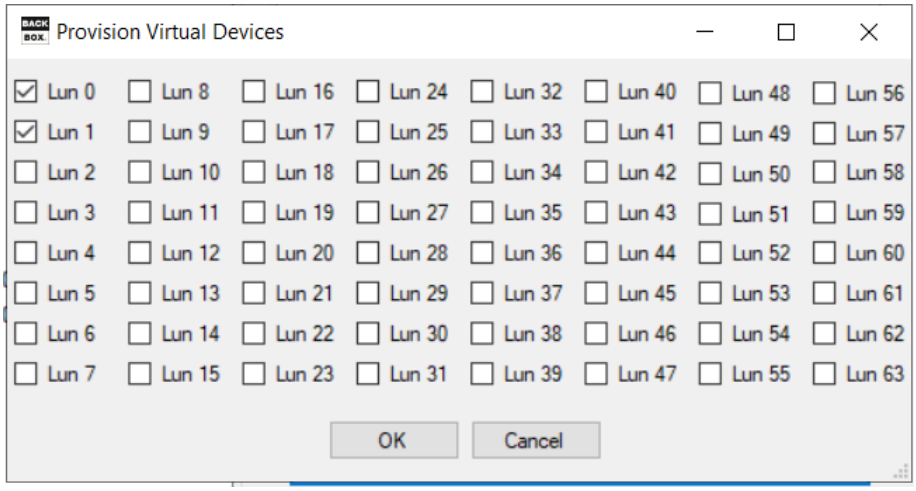
Virtual Tape Device Configuration

To view the VTC virtual tape device entries you must use the VTC Management Console. There under the FC node (1), you will have listed all FC cards available for use by the VTC. If you select a card, you will see listed the port by their WWN. When you select a port you will see in the right window the devices currently provisioned for this port and the type of device this port is (in the picture LTO3) (2). By default, the number of ports configured is 8.



Add/Remove Devices

To add or remove device attached to a port, click the Provision Virtual Devices button (3). See the following dialog box:



Each selected box represents a Virtual Tape Device that will be available on the NonStop. Click ok when satisfied with the provisioning. Restart VTC services by right clicking on the service node and then select the restart option.

Ports Configuration Automatic Update Rules

When the VTC (FC) Emulator service start, it will manage the file according following rules:

- When a new ATTO fiber channel is discovered and not listed in the port configuration, it will be automatically added into a Fiber Card element. For each channel of the card, a Fiber Port element of type FC will be added to the Card element. Each Fiber Port element will have 8 Device elements using lun 0 to 7 with LTO3 as default emulation.
- If an ATTO fiber channel HBA is replaced by a new HBA, information of Fiber Card and Fiber Port elements related to the replaced HBA are updated with the new one. All Device element and Option previously configure under the old HBA are kept as is. If the new HBA contains more channels than the previous one, new Fiber Port elements are added with 8 Device elements each (lun 0 to 7, LTO3 emulation). If the HBA contains less channels than the previous one, extra Fiber Port elements are deleted.
- If an ATTO fiber channel HBA is removed from the server, Fiber Card and Fiber Port elements related to it are deleted.
- If an ATTO fiber channel HBA is moved into a different PCI slot, Fiber Card and Fiber Port elements related to the Fiber Card are updated. All previous Device and Option elements of the Fiber Card are lost. For each Fiber Port of the Fiber Card element, 8 new Device elements (lun 0 to 7, LTO3 emulation) are set. Moving a HBA from one slot to another is considered to have been deleted from the previous slot (with all his devices) and added has a new one with default devices assigned.

When hardware change occurs on the server, start the VTC Management Console and validate wwn information and slot number shown under the FC category node. If not valid, restart the VTC (FC) Emulator service to force the update and click on the Reload button to refresh the port configuration. Sometime a race condition appends between the time the service is started and the time the new hardware is discovered and initialized.

Connect FC Cables to NonStop FC Ports

FC links for NonStop systems are implemented using multi-mode optical cables (50/125µm or 62/125 µm) with LC connectors. For cable specifications, refer to “Cabling Requirements” section in the Product Requirements manual.

Optical cables are easily damaged. They must never be bent at a sharp angle, coiled with a tight radius or crushed. Excess cable should be coiled with at least a 4” diameter.

The tips of the connectors should be protected from dust or dirt (keep them capped while running the cables), and never touched directly.

You should ensure that the LC connector on each end of the FC cable is fully seated (plastic tab should snap back up and the SFP optical transceiver module must be firmly seated in its PCI card receptacle.)

When an FC link-level connection is established between the NonStop FC port and the BackBox FC card, the Link LED should be illuminated solid at both ends. If the Link LED is off on the BackBox card, or flashing on the NonStop port, then link level communications has not been established. This could be for any of the following reasons (listed in order of likelihood):

- FC cable is not plugged into the correct NonStop SAC port;
- FC cable is defective, or one of its LC connectors is not fully seated;
- CLIM port is defective;
- The BackBox FC card is defective.

Once the FC link lights are both on solid, indicating low-level connectivity, proceed on to check the high-level connectivity by issuing commands described in the section on testing FC connectivity.

Test FC connectivity to the NonStop System

Test FC Connections to CLIM Ports

At a TACL prompt, perform the following command for the CLIM name to which the FC cables have been connected:

`climcmd <clim-name> lsscsi –e`
This command lists all of the devices attached to the CLIM, as seen by its Linux O/S. Note the results for future reference. (The two lists of HP SAS disks attached to the particular Storage CLIM used in the example have been abbreviated with “etc…”)
`climcmd s100231 lunmgr -e`

```
Current volume is $DATA06.SUPOPER
$DATA06 SUPOPER 1> climcmd s100231 lunmgr -e
-- Enclosure table --
lun      type    stable address
1        3       tape HP M8505 #BB04AF6A00
2        3       tape HP M8505 #BB04FB6E00
3        3       tape HP M8505 #BB05370000
4        3       tape HP M8505 #BB04FB6E01
5        3       tape HP M8505 #BB054E8800
6        3       tape HP M8505 #BB04AF6A01
7        3       tape HP Ultrium4-SCSI #BB05370001
8        3       tape HP M8505 #BB03B98C00
9        3       tape HP M8505 #BB030EA001
10       3       tape HP M8505 #BB030EA000
11       3       tape HP Ultrium4-SCSI #BB04FB7A03
12       3       tape HP M8505 #BB054E8601
13       3       tape HP Ultrium4-SCSI #BB04FB7A04
14       3       tape HP Ultrium3-SCSI #BB04AF6A01
15       3       tape HP Ultrium3-SCSI #BB04AF6A00
16       3       tape HP M8505 #BB02FAE600
17       3       tape HP M8505 #BB04FB6C01
18       3       tape HP M8505 #BB051FC900
19       3       tape HP M8505 #BB051FC702
20       3       tape HP M8505 #BB051FC701
21       3       tape HP M8505 #BB054E8801
22       3       tape HP M8505 #BB04FB7A00
23       3       tape HP M8505 #BB04FB7A01
24       3       tape HP M8505 #BB054E8600
25       3       tape HP Ultrium4-SCSI #BB04FB6C02
28       3       tape HP UltriumM8801A #BB04FB7A02
29       3       tape HP M8505 #BB051FC700
30       3       tape HP M8505 #BB03B98C01
32       3       tape HP M8505 #BB04FB6C00
100      1       enclosure 5001438028b91880
200      1       enclosure 5001438025601dc0
```

In this example multiple virtual tape devices emulating LTO-3. LTO-4and LTO-6 tape drives have been recognized on the CLIM. BackBox VTC virtual tape drive always +show a serial number starting with #BB combine with the last 6 digits of the WWN of the port used and a sequential number (starting at 0).

CLIM Device Configuration

HPE Storage CLIM uses Debian Linux on a standard Proliant server platform with standard FC HBAs to provide FC ports for the NS system it is connected to via ServerNet. The HP CLIM applications software provides a layer of indirection in SCSI (FC) device addressing that must be taken into account. Unlike all other NonStop systems, at the SCF level there is no awareness of the actual FC addressing (WWN) or device LUNs presented by the VTC. Instead SCF deals with CLIM names and virtual LUN numbers assigned within each CLIM.
The virtual LUN numbers are assigned by a lunmgr process within each CLIM. More information about the CLIM and its management can be found:
HPE NonStop Cluster I/O Protocols (CIP) Configuration and Management Manual The list of available CLIMs in a system

is displayed by the SCF command :

```
SCF INFO CLIM $ZZSTO.*, detail
```

CLIMCMD commands use a different CLIM naming syntax.
When SCF reports \CGNAC2.$ZZSTO.#SCLIM001, CLIMCMD commands require the name:
SCLIM001

Since Storage CLIMs also implement the paths from the NS Blade host to attached SAS disks, you should consult your HP NonStop system support engineer before attempting the CLIM re- configuration procedure described below.

Follow the procedure for connecting a BackBox VTC FC port to a Storage CLIM port:

1. Determine the name of the Storage CLIM to which the FC cable from the BackBox VTC will be connected. NonStop systems typically ship with two Storage CLIMs. Each Storage CLIM can house up to two dual-port FC HBAs.

2. Before connecting anything new to the CLIM, check what currently attached devices are seen by its Linux I/O system. At a TACL prompt on the NonStop system, type the following commands (note that in the following examples the value of <clim-name> is s1002531):

   a. `climcmd <clim-name> lsscsi –e`

      This will list all of the SCSI devices attached to the CLIM, as seen by Linux.

   b. `climcmd <clim-name> lunmgr --print`
      `climcmd s100231 lunmgr --print`

```
lun     type   stable address                      volatile address   device
partitions
2       3      tape HP M8505 #BB04FB6E00           5:0:2:0            sg37
0
3       3      tape HP M8505 #BB05370000           1:0:3:0            sg23
0
4       3      tape HP M8505 #BB04FB6E01           5:0:2:1            sg39
0
7       3      tape HP Ultrium4-SCSI #BB05370001   1:0:3:1            sg25
0
9       3      tape HP M8505 #BB030EA001           1:0:2:1            sg38
0
10      3      tape HP M8505 #BB030EA000           1:0:2:0            sg24
0
11      3      tape HP Ultrium4-SCSI #BB04FB7A03   5:0:6:3            sg28
.....
```

      This displays the currently attached devices that are already mapped by the CLIM's lunmgr. The devices listed in this example are all SAS disks for use by the NonStop system.

   a. Configure virtual tape devices on the BackBox VTC and cable it to a CLIM FC port.
   b. Ensure that the configuration for the FC port is rightly done in the VTC Management consol (number and type of devices).

   c. Ensure that the VTC Emulator (FC) service is started in Windows on the VTC. If you have modified the configuration since the VTC was re-booted, you will need to stop and restart this service to ensure that the devices are correctly presented to the NonStop system.

   d. Connect the FC cable between the VTC's FC adapter port and a free FC port on the Storage CLIM.

e. For the purposes of CLIM & SCF configuration it is not necessary to know the physical port number on the CLIM, but this information may be useful for later OSM fault diagnosis.

3. Verify that the newly attached virtual tape devices are recognized correctly by the CLIM and then initiate their mapping by lunmgr. At a TACL prompt on the NonStop system, type the following commands (note that in these examples the value of <clim-name> is s100231):

   c. `climcmd <clim-name> lunmgr -s`

      This command causes lunmgr and Linux on the CLIM to re-scan the attached devices so that it will see the new BackBox virtual tape devices.

      ```
      $SAS22 BPAK 30> climcmd s1002531 lunmgr --scan
      ```

   d. `climcmd <clim-name> lunmgr –e`

      This command lists all of the devices now attached to the CLIM, as seen by its Linux O/S. Note the results for future reference.

   e. `climcmd <clim-name> lunmgr --approve`

      This command tells the CLIM's lunmgr to add each of the newly Linux-recognized devices to its LUN mapping table and assign them virtual LUN numbers. (This command implicitly performs a lunmgr --update command.)

The virtual tape devices should be mapped one at a time as illustrated below. DO NOT use the "`yesall`" option for the `--approve` command. It has the potential to disturb the configurations of other devices attached to the CLIM.

```
$SAS22 BPAK 32> climcmd s100231 lunmgr --approve
#BBF0FE2000? y Termination Info: 0
$SAS22 BPAK 33> climcmd s1002531 lunmgr --approve
```

In the above example the `--approve` command was used 2 times, once for each of the previously discovered virtual tape devices. Before responding " `y`" to each confirmation request, the device information should be checked.

The BackBox device serial number structure is based on fiber channel port name and the device LUN enabled in the VTC local configuration. See the examples below:

Devices serial numbers are structured as:

`BB`	BackBox virtual tape device
`010FE2`	Attached to VTCFC port with WWN ending with "01 0F E2"
`05`	LUN number of each device define in the VTC local configuration (0- 63)

This is only valid for BackBox virtual tape devices. If the device in the confirmation request line does not confirm to this model and serial number format, simply reply "n" to cancel the mapping.

   f. `climcmd <clim-name> lunmgr --print`

      Lists the LUNs mapped by the lunmgr and now available for use by SCF.

```
$SAS22 BPAK 39> climcmd s100231 lunmgr --print
$SAS22 BPAK 39..


lun    type           stable address              volatile address
1      3     tape HP M8505       #BBF0FE2000              4:0:0:0
2      3     tape HP M8505       #BBF0FE2001              4:0:0:1
3      3     tape HP M8505       #BBF0FE2002              4:0:0:2
4      3     tape HP M8505       #BBF0FE2003              4:0:0:3
6      6     tape HP Ultrium 4-  #BB010FE205              4:0:0:5
                    SCSI
101    1      enclosure   500143800041b180,     bay  1           0:0:1:0
102    1      enclosure   500143800041b180,     bay  2           0:0:2:0
103    1      enclosure   500143800041b180,     bay  3           0:0:3:0
etc..
.
201    1      enclosure   5001438000406d00,     bay  1           1:0:0:0


202     1    enclosure 5001438000406d00,    bay    2             1:0:1:0
203     1    enclosure 5001438000406d00,    bay    3             1:0:2:0
204     1    enclosure 5001438000406d00,    bay    4             1:0:3:0
etc...

    Termination Info: 0
```

In this example the assigned CLIM virtual LUNs for the new tape devices are shown in the left column as LUNs 1-6. The right column shows their corresponding "physical" addressing, with the right-hand digit representing the VTC's virtual tape device LUN (as defined in the VTC local configuration). So, you can see the correspondence.

The default VTC device LUN numbering starts at 0, while the lunmgr virtual LUN numbering for tape devices starts at 1. This can be a source of confusion, as the LUN numbers used by SCF must be the lunmgr virtual LUN numbers.

4. Using the CLIM name and the virtual LUN numbers for virtual tape devices from the `lunmgr PRINT` command, create an obey file for SCF to ADD those devices (see below).
5. In SCF, execute the obey file to add the new devices, and then START them. For the first instance of starting devices after their configuration it is recommended that they be started one at a time, with the results observed in the EMS log entries.

Add Tape Drive in SCF

NSK Tape I/O Processes

Input/Output operations from NonStop applications to BackBox virtual tape devices use the same Guardian I/O process (IOP) as for physical tape drives. The program file for the default Tape IOP is $SYSTEM.SYSTEM.OTPPROCP, and its version depends on the SYSnn currently in use.

Helpful hints for Tape IOP utilization:

1. Definition of virtual tape devices (as for physical tape devices):
    - Best done via an SCF Obey file.
    - Typing definitions directly into SCF can lead to errors.
2. CPU allocation for the TAPE IOP's:
    - Allocate TAPE IOPs in different CPUs for CPU load balancing
    - Depending on how many NS CPUs the system has, relative to the number of virtual tape drives to be configured, avoid CPU 0 and 1 if possible.

Over the years, HPE has reported a few instances where the Tape IOP connected to a physical tape drive caused CPU to crash. These are very infrequent cases and fixes are provided in the regular HPE maintenance. But to minimize the risks, if the system contains more than 2 CPUs, avoid using CPUs 0 and 1, since if either of these CPUs (which manage ServerNet) crashes, it could have consequences for the entire system.

No issue or limitation specific to BackBox, but rather a warning about rare, but possible behavior of HPE Tape IOP.

3. Tape IOP version:
    - Check the version of the Tape IOP and use the latest version wherever possible to avoid potential conflicts.

The version of the Tape IOP in use can be found as follows:

```
SCF INFO TAPE $VTxxxxx, DETAIL
```

Note the full path of the filename and use it in the following command:

```
VPROC $SYSTEM.SYSnn.OTPPROCP
```

The result will be a number of lines, of which one be similar to:

```
T0021G05^02SEP24^ABM^05SEP24
```

In this particular instance, the Tape IOP version is "ABM", from Sept 2024.

4. Tape device reconfiguration:

Once a device has been STARTED, the tape IOP continues to run, even after the device has been STOPPED. Sometimes, it can present an issue in determining whether a problem has been solved or not, since the results of initial SCSI operations may have been retained by the Tape IOP.

For instance, if FC speed negotiation was performed at initial device connection, but then the BackBox was shut down, SCSI cables/ports changed, and then the devices STARTED in SCF, correct speed negotiation may not be performed.

To avoid such conflicts, ALWAYS issue SCF RESET <device>, FORCE commands for all virtual tape devices in a BackBox VTC, if they are to be shut down and/or re-cabled. Once re-cabling is completed and the BackBox VTC re- booted (causing the VTC SCSI Emulator Service to be restarted), then SCF START commands can be issued.

Add CLIM-attached Tape devices in SCF

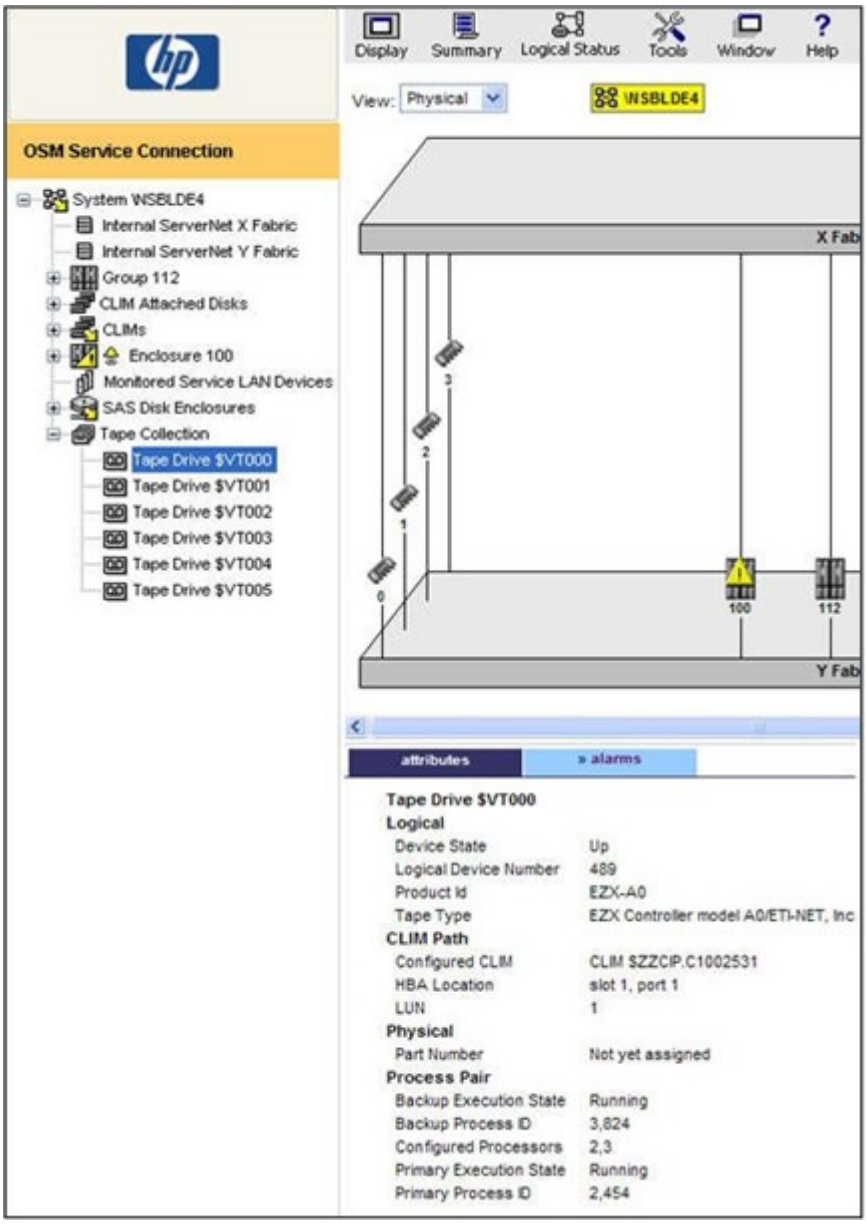
Virtual tape devices can be freely named. The following naming terminology is suggested only to simplify recognition of virtual tape devices in the actual subsystem configuration, such as in OSM displays:
`$VTanxyy`, where:
a is a code to identify a specific VTC Server (arbitrarily "A" in this example);

n is the last digit of the CLIM name ("1" in this example);
x is the CLIM FC port number ("4" in this example);
yy is the virtual LUN number assigned by the `lunmgr`.
For the configuration example above, the virtual tape devices would be named `$VTA1401` through `$VTA1401`.
The following SCF ADD command example corresponds to that example, with the FC cable connected to FC port 0 on Storage CLIM S100231.

```
ADD tape $VTA1401, & SENDTO STORAGE, & PRIMARYCPU 2, &
BACKUPCPU 3, & CLIM S100231, & LUN 1
```

OSM Display of CLIM-Attached Virtual Tape Devices

Information about virtual tape devices and their status can be obtained graphically in OSM. The virtual tape devices are listed, along with any physical tape devices connected to the system, in a group called “Tape Collection”. By expanding this group and clicking on an individual device, as shown in the illustration below, the state and configuration of the device can be displayed.
In the example, the device $VT000 is connected to CLIM S1002531 as LUN 1, and has a status of UP. If the device is not responding, its icon would be flagged in OSM in yellow or red.



SCF INFO and STATUS for CLIM-Attached Devices

As with FCSA or VIO-attached virtual tape devices, information about the configuration and status of CLIM-attached virtual tape devices can be obtained via SCF.

Display CLIM Configuration Information:

```
info clim $zzsto.<clim-name>, detail 9-> info     clim     $zzsto.S100231,detail
     STORAGE - Detailed Info CLIM \BLDESYS.$ZZSTO.#S100231

     Configured Devices:
```

```
Type        Name          Primary CPU        Backup      CPU    Lun
TAPE        $VTA1401      2                  3                  1
TAPE        $VTA1402      3                  2                  2
TAPE        $VTA1403      0                  1                  3
TAPE        $VTA1404      1                  0                  4
TAPE        $VTA1405      2                  3                  5
TAPE        $VTA1406      3                  2                  6
DISK        $SYSTEM-P     0                  1                  101
DISK        $DSMSCM-P     1                  0                  102
DISK        $SAS32-P      0                  1                  103
DISK        $SAS03-P      0                  1                  104
Etc...
```

Display CLIM status:

```
Name            State       Substate Primary      PID   Backup      PID
$VTA1401        STARTED              2,454            3,824
$VTA1402        STARTED              3,825            2,453
$VTA1403        STARTED              0,683            1,559
$VTA1404        STARTED              1,566            0,684
$VTA1405        STARTED              2,455            3,826
$VTA1406        STARTED              3,829            2,456
$SYSTEM-P       *STARTED             0,257            1,257
$DSMSCM-P       STARTED              1,296            0,323
$SAS32-P        *STARTED             0,315            1,312
$SAS03-P        *STARTED             0,319            1,304
Etc...
```

Display Tape Device Information:

```
info tape <device-name>,
detail 4-> info   tape
$VTA1401,detail
STORAGE - Detailed Info TAPE configuration \BLDESYS.$VTA1401
*BackupCpu ..... 3
*CLIM ..... S100231

*Compression. ..... ON
*Density. ..... 6250
*HighPin. ..... ON
*LUN. ..... 1
*MaxOpens. ..... 4
*PrimaryCpu. ..... 2
*Program. ..... $SYSTEM.SYSTEM.OTPPROCP
*RecSize. ..... 2048
*StartState. ..... STARTED
```

The LUN value reported is the CLIM virtual LUN number, not the VTC's FC LUN number.

Display Tape Device Status:

```
status tape <device-name>, detail 5-> status    tape    $VTA1401,detail

STORAGE - Detailed Status TAPE \BLDESY.$VTA1401 Tape process Information:

     LDev State        Primary          backup       Device Status
                       PID              PID
     464 STARTED       2,445            3,818        NOT READY

Tape I/O Process Information:

Library File.......

Program File.............. $SYSTEM.SYS00.OTPPROCP

Current Settings:

ACL.............. NOT INSTALLED   Buffer Level      RECORD
Checksum Mode..... NORMAL I/O*Compression      ON
*Density.....  38000    Media Type.......Not applicable
Opens.............. 0  *RecSize     2048
Short Write Mode..... ALLOWED, PADDED SubType    15
Volume Switching ..... TRANSPARENT
```

Display device information to help locate CLIM-attached devices

The following command displays the relation between the virtual LUN assigned to the device by the CLIM and the serial number of that specific device:

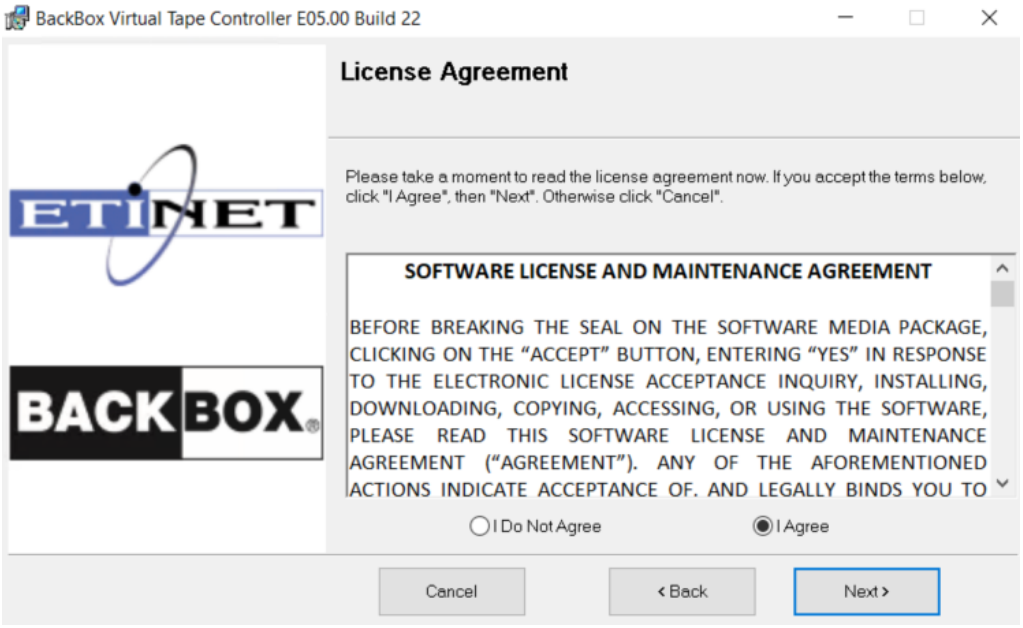
```
climcmd <clim-name> lunmgr –-enclosures
climcmd s100231 lunmgr --enclosures
-- Enclosures present --
lun     type   stable address                      device
controller
          serial #       revision
200     1      enclosure 5001438025601dc0          sg7      slot 2,
port 2, exp
ander 1   7CE347P13Y     0200
100     1      enclosure 5001438028b91880          sg13     slot 2,
port 1, exp
ander 1   7CE347P0ZU     0200
        3      tape HP M8505 #BB02FAE600           sg18     slot 3,
port 2
          BB02FAE600     VE03
        3      tape HP M8505 #BB030EA000           sg24     slot 3,
port 1
          BB030EA000     VE04
        3      tape HP M8505 #BB030EA001           sg38     slot 3,
port 1
          BB030EA001     VE04
        3      tape HP M8505 #BB04FB6C00           sg35     slot 3,
port 2
          BB04FB6C00     VE04
        3      tape HP M8505 #BB04FB6C01           sg36     slot 3,
port 2
          BB04FB6C01     VE04
        3      tape HP M8505 #BB04FB6E00           sg37     slot 3,
port 2
          BB04FB6E00     VE04
        3      tape HP M8505 #BB04FB6E01           sg39     slot 3,
```

```
port 2
          BB04FB6E01     VE04
        3      tape HP M8505 #BB04FB7A00            sg14     slot 3,
port 2
          BB04FB7A00     VE04
        3      tape HP M8505 #BB04FB7A01            sg15     slot 3,
port 2
          BB04FB7A01     VE04
```

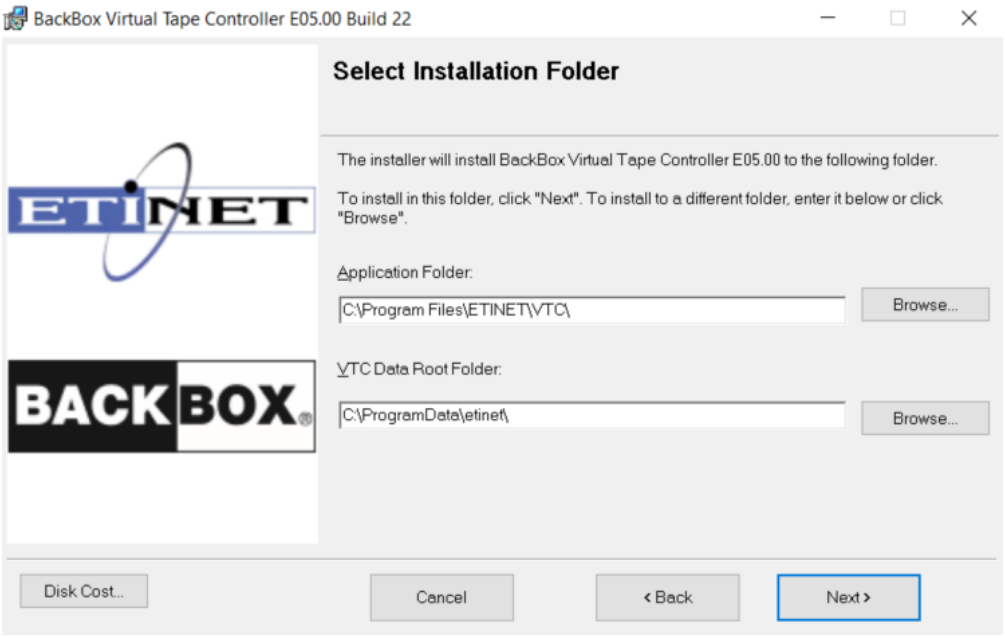
VTC SOFTWARE INSTALLATION

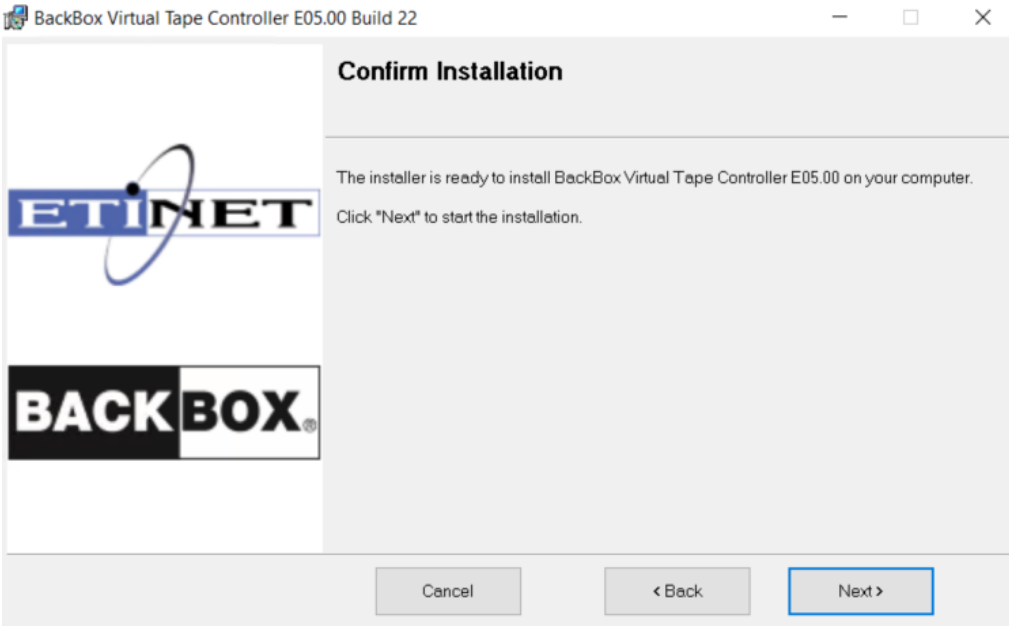
To proceed with the BackBox VTC software installation locate VTC software: **\VTC-E4.XX.XX**
To start the installation double click on the setup.exe program, click **Next**.

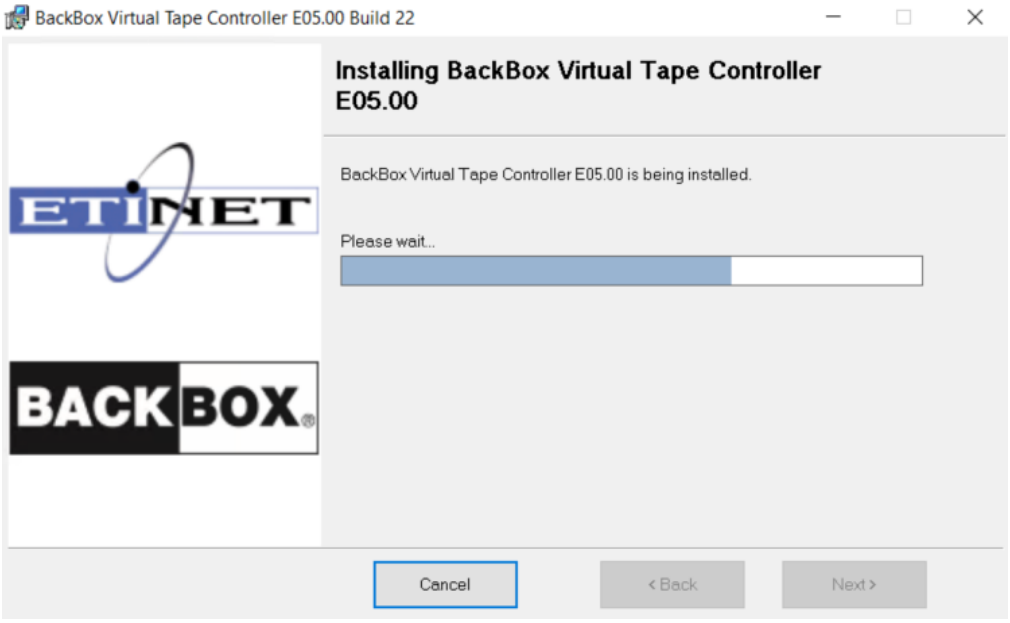
You will then be prompted to read and accept the license agreement. Click I Agree to proceed with the installation, a complete copy of the license agreement is available at the end of the present document.

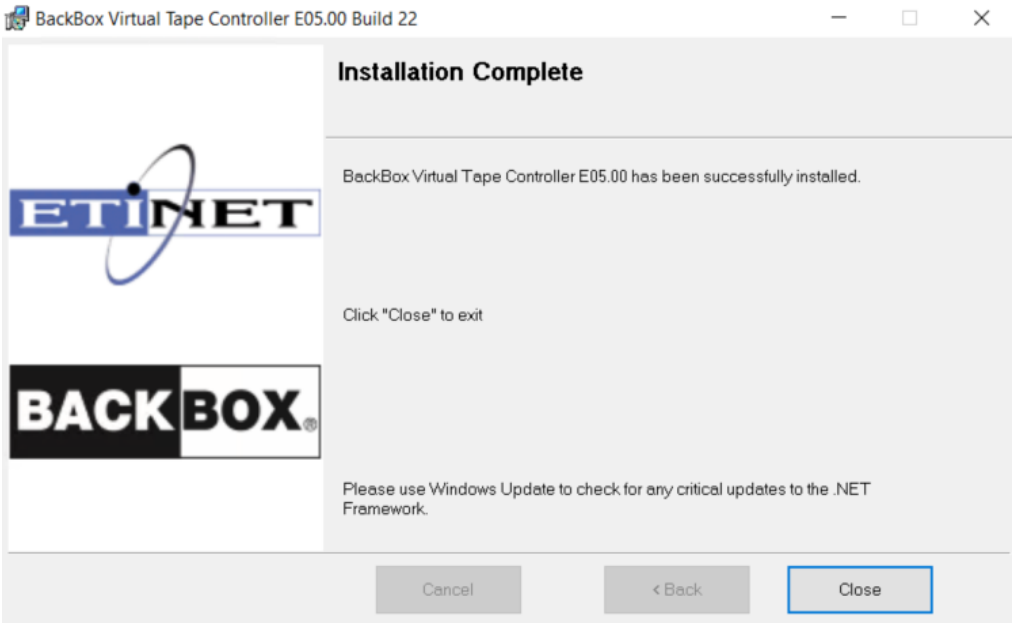


Installation is now ready to start. Click **Next** button to initiate the process.


BackBox Virtual Tape Controller E05.00 Build 22
Select Installation Folder
The installer will install BackBox Virtual Tape Controller E05.00 to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Application Folder:
C:\Program Files\ETINET\VTC\
Browse...
VTC Data Root Folder:
C:\ProgramData\etinet\
Browse...
Disk Cost...
Cancel
< Back
Next >


BackBox Virtual Tape Controller E05.00 Build 22
Confirm Installation
The installer is ready to install BackBox Virtual Tape Controller E05.00 on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >


BackBox Virtual Tape Controller E05.00 Build 22
Installing BackBox Virtual Tape Controller E05.00
BackBox Virtual Tape Controller E05.00 is being installed.
Please wait...
Cancel
< Back
Next >



Once the installation process is over, click the **Close** button.
BackBox VTC software installation is now over, you are ready to start basic configuration of the VTC.

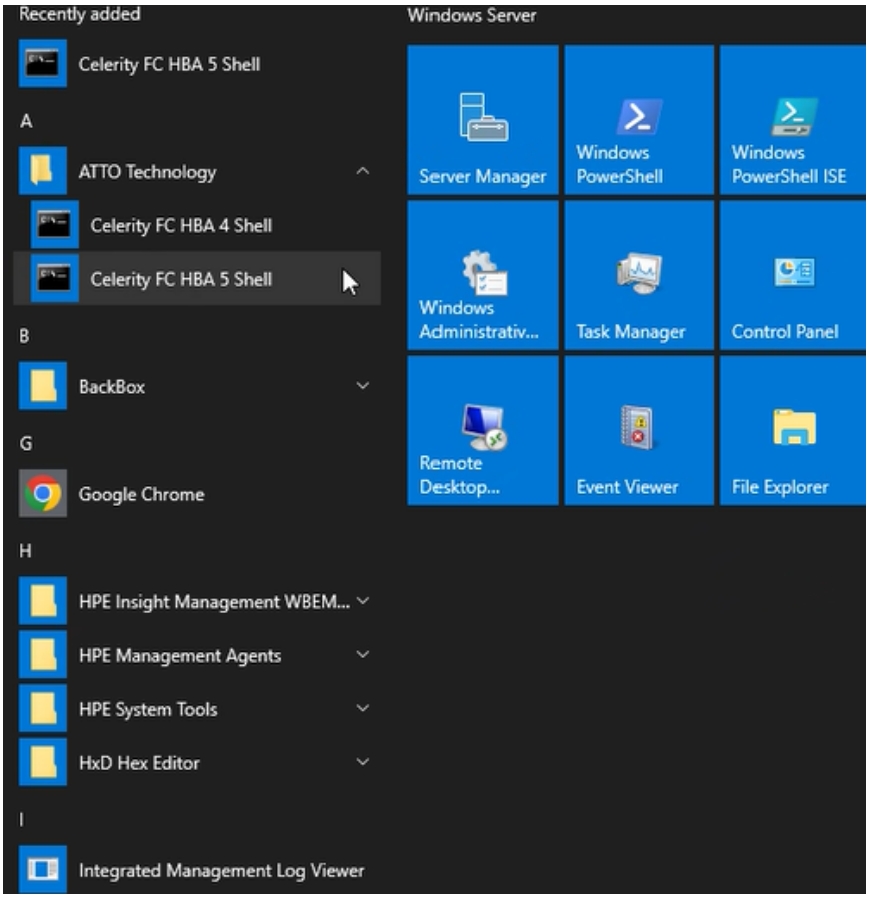
⚠	In case the VTC version comes with a patch, the patch is being installed along with the controller and is being mentioned between brackets.

Appendix - ATTO CLI Commands

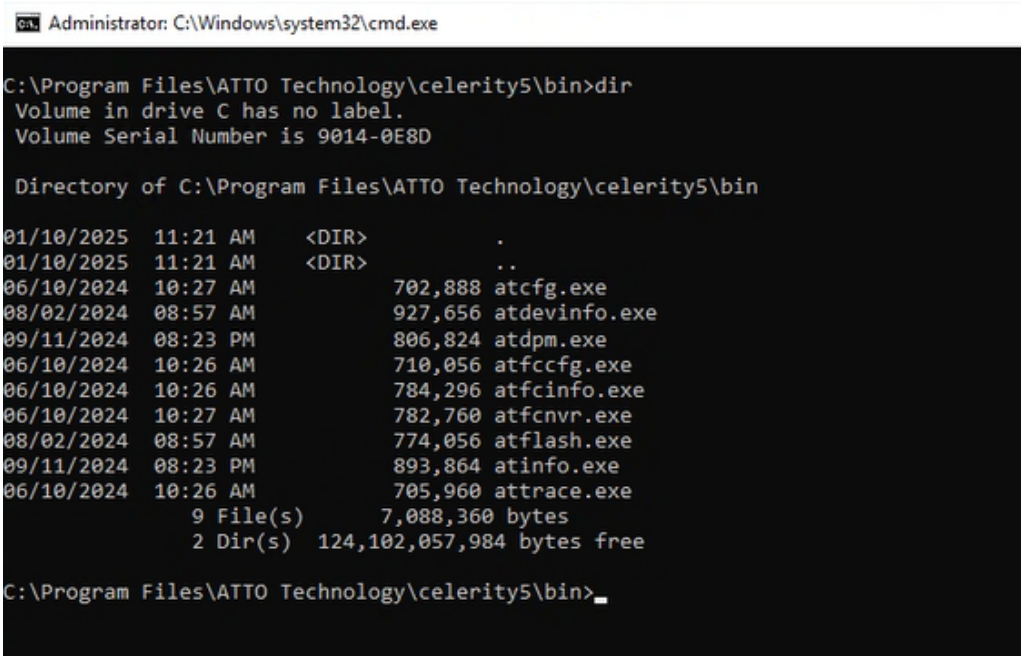
ATTO ConfigurationTool is not distributed anymore, as all divers/flash configurations and CLI tools are included in the **VTCServerPreparation** script, delivered with the BackBox software package.

In order to access CLI tools and the associated applications, follow the steps below:

1. Install ATTO Celerity from **Software Downloads – ATTO Technology, Inc.**
2. Start Windows menu and open ATTO CLI shell.
3. Select Celerity FC HBA 4 Shell for ATTO Celerity FC-8 HBA or Celerity FC HBA 5 Shell for ATTO Celerity FC-16, FC-32 or FC-64 HBA.



4. Run **dir** command in the Shell to list and display all CLI applications.



attrace.exe

attrace.exe -h

Driver Tracing Tool 1.63.0f1

This tool saves controller driver trace data to a file.

Options:

-c {channel} Selects a specific controller channel for the operation,
starts at 1, all channels are selected by default.
-d [feature] Disable driver tracing feature.
-e [feature] Enable driver tracing feature.
[feature] values:
wrap Trace buffer wrapping.
all All tracing, overrides trace mask (-e only).
<blank> All tracing, maintain current trace mask.
-g Generate the trace data (Warning: may disrupt I/O).
-h Display extended help.
-l List the controllers in the system.
-r Reset tracing and clear trace data.
-s {filename} Save the trace to a file.
-t {type} Specify the trace type. {type} values:
driver Driver trace (default).
fwcoredump Firmware core dump.
fwdriver Firmware backend driver trace.
fwlog Firmware trace log.
-v Display non-error messages.

Note that multiple trace functions may be specified at a time. Options may be specified in any order, but are processed in the following order: -d, -s, -r, -e. When -s is specified, -d and -e are implied if tracing is currently enabled.

Usage Examples:

1. Save the current driver trace to a file named trace.trc:
   attrace -s trace.trc
2. Clear the firmware backend driver trace for channel 2:
   attrace -r -t fwdriver -c 2

atflash.exe

atflash.exe -h

Controller Flash Update Tool 1.63.0f1

This tool updates controller flash from a flash bundle.

Options:

-c {channel} Selects a specific controller channel for the operation, starts at 1, all channels are selected by default.
-f {filename} Specifies the flash bundle file name.
-h Display extended help.
-l List the controllers in the system.
-p Print the flash version.
-v Display non-error messages.

Usage examples:

1. Display all controllers:
   atflash -l
2. Display the current flash version for all controllers:
   atflash -p
3. Display the flash bundle version for {filename}:
   atflash -p -f {filename}
4. Update the flash on channel 1:
   atflash -c 1 -f {filename}

atfcnvr.exe

atfcnvr.exe -h

Fibre Channel NVRAM Tool 1.63.0f1

This tool modifies NVRAM settings for Fibre Channel controllers. Settings can also be saved to or restored from a file.

Options:

```
-b {boot}       Set the boot driver setting.  {boot} values are:
                enable    Enable the boot driver
                disable   Disable the boot driver
-c {channel}    Selects a specific controller channel for the operation,
                starts at 1, all channels are selected by default.
-d {feature}    Disable an NVRAM feature.
-e {feature}    Enable an NVRAM feature.
                {feature} values:
                t10-pi  Support for T10-PI (T10-DIF).
-g {disctype}   Set the device discovery type.  {disctype} values are
                port    Discover devices by port WWN
                node    Discover devices by node WWN
-h              Display extended help.
-i {coalescing} Set the interrupt coalescing. {coalescing} values are
                'low', 'medium', 'high', and 'disable'.
-j {mode}       Set the connection mode.  {mode} values are
                alonly   Arbitrated loop connections only
                alpref   Arbitrated loop connections preferred
                ptponly  Point-to-point connections only
                ptppref  Point-to-point connections preferred
-k {speed}      Set the connection speed.  {speed} values are:
                auto    Auto speed negotiation
                 64      64 Gb/s
                 32      32 Gb/s
                 16      16 Gb/s
                 8       8 Gb/s
                 4       4 Gb/s
                 2       2 Gb/s
                 1       1 Gb/s (4Gb controllers only)
-l              List the controllers in the system.
-m {seconds}    Set the spinup delay (0-255)
-n {hardaddr}   Set the hard address.  {hardaddr} values are 0-125 or
                'disable'.
-o {framesize}  Set the frame size in bytes.  {framesize} values are
                '512', '1024', and '2048'.
-p              Print the contents of NVRAM.
-q {throttle}   Set the execution throttle (1-255).
-r {filename}   Restore the NVRAM from a file.
-s {filename}   Save the NVRAM to a file.
-t              Restore the NVRAM to default settings.
-u {VF count}   Set SR-IOV VF count (1-16), 0 to disable SR-IOV (default).
-v              Display non-error messages.
```

-w {seconds} Set the link down timeout (0-255). 0 selects the driver default.

-x {count} Set the port down retry count (0-255).

-X [xmlfile] Output the information in XML - to a file if specified or to the console.

By default, the current adapter NVRAM is modified and written back to the adapter. Alternatively, the input NVRAM may be the defaults (-t) or a previously saved file (-r). The output may be printing NVRAM (-p) or saving the NVRAM to a file (-s).

Usage examples:

1. Display all controllers:
   atfcnvr -l
2. Display the NVRAM settings for all controllers:
   atfcnvr -p
3. Set the NVRAM for all controllers to the defaults:
   atfcnvr -t
4. Save the NVRAM for channel 1 to a file:
   atfcnvr -c 1 -s {filename}
5. Set the execution throttle to 8 for all controllers and set all other settings from a file:
   atfcnvr -r {filename} -q 8
6. Set the spinup delay to 20 seconds for all controllers and set all other settings to defaults:
   atfcnvr -t -m 20

atfcinfo.exe

atfcinfo.exe -h

Fibre Channel Information Display Tool 1.63.0f1

Display information about a Fibre Channel topology.

Options:

-c {channel} Filter the display to a controller channel, starts at 1, defaults to all channels.

-h Display extended help.

-i [infotype] Display information for the FC topology. Information types are:
  all Display detailed information.
  dump Display raw hex dumps.

-l List the controllers in the system.

-v Display non-error messages.

-X [xmlfile] Output the information in XML - to a file if specified or to the console.

Usage examples:

1. Display details for the FC topology:
   atfcinfo -i all
2. Display hex dumps of FC protocol data on channel 1:
   atfcinfo -i dump -c 1