



# BackBox<sup>®</sup> E4.13 VTC Server Installation

## Abstract

This VTC Server Installation document is for BackBox<sup>®</sup> E4.13

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# INTRODUCTION

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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 :

AttoCelerityFC-YYYYMMDD

BackBox-E4.13 - date

Guardian-E4.13-date

UI-E4.13.build

VTC-E4.13.build

VTCserverScripts-date

## 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
```

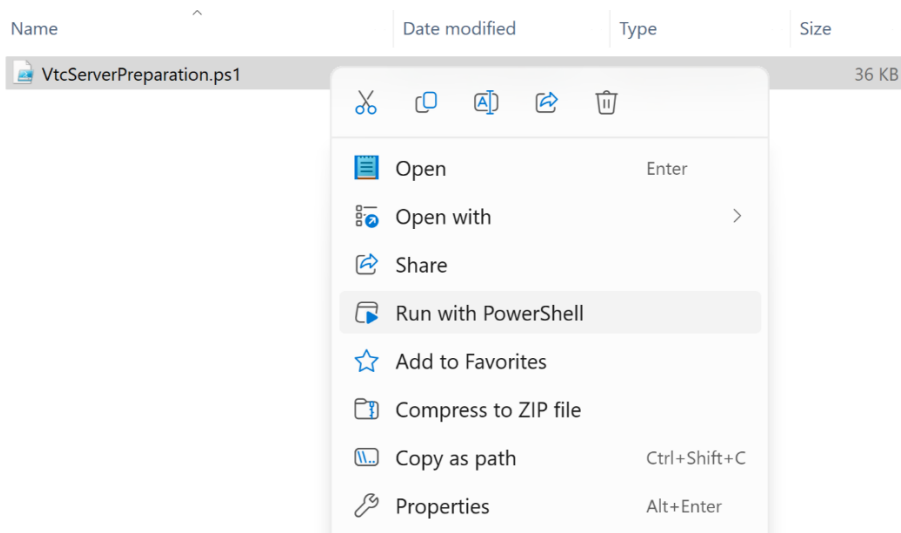
- Ensure the policy is in force:

```
Get-ExecutionPolicy -List
```

```
Scope ExecutionPolicy
```

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

Once this is 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.ps1 and click on the Run with PowerShell (or launch the script from the opened PowerShell command line).



```
Administrator: Windows PowerShell
[Y] Yes [A] Yes to All [N] No [L] No to All [S] Suspend [?] Help (default is "N"): y
Transcript started, output file is C:\Users\Administrator\Desktop\T0954V04\AAAW\VTCserverScripts-20210420\ServerPreparati
on.log

Preparing Microsoft windows Server 2022 Standard
VTC Server MS Schannel TLS configuration

Enable TLS 1.2
TLS 1.2 has been enabled (Server reboot required)
Configure .NET applications to use TLS 1.2
TLS 1.2 has been enabled for .NET applications (Server reboot required)
Disable weak TLS protocols
TLS 1.0 has been disabled (Server reboot required)
TLS 1.1 has been disabled (Server reboot required)
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 has been disabled (Server reboot required)
Protocol TLS_RSA_WITH_AES_128_GCM_SHA256 has been disabled (Server reboot required)
Protocol TLS_RSA_WITH_AES_256_CBC_SHA256 has been disabled (Server reboot required)
Protocol TLS_RSA_WITH_AES_128_CBC_SHA256 has been disabled (Server reboot required)
Protocol TLS_RSA_WITH_AES_256_CBC_SHA has been disabled (Server reboot required)
Protocol TLS_RSA_WITH_AES_128_CBC_SHA has been disabled (Server reboot required)
Protocol TLS_RSA_WITH_3DES_EDE_CBC_SHA has been disabled (Server reboot required)
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 has been disabled (Server reboot required)
Protocol TLS_RSA_WITH_NULL_SHA has been disabled (Server reboot required)
Protocol TLS_PSK_WITH_AES_256_GCM_SHA384 has been disabled (Server reboot required)
Protocol TLS_PSK_WITH_AES_128_GCM_SHA256 has been disabled (Server reboot required)
Protocol TLS_PSK_WITH_AES_256_CBC_SHA384 has been disabled (Server reboot required)
Protocol TLS_PSK_WITH_AES_128_CBC_SHA256 has been disabled (Server reboot required)
Protocol TLS_PSK_WITH_NULL_SHA384 has been disabled (Server reboot required)
Protocol TLS_PSK_WITH_NULL_SHA256 has been disabled (Server reboot required)
TLS/SSL Server supports the use of Static key Ciphers has been disabled (Server reboot required)
TLS/SSL Server supports the use of longer Diffie-Hellman ephemeral (DHE) key shares for TLS servers as been configured (S
erver reboot required)

Install MSNMQ-Server Feature
Message Queuing Server already installed

System restart required to apply settings. Restart computer now?

Confirm
Are you sure you want to perform this action?
Performing the operation "Enable the Local shutdown access rights and restart the computer." on target "localhost
(TECHWRITER)".
[Y] Yes [A] Yes to All [N] No [L] No to All [S] Suspend [?] Help (default is "Y"): _
```



Some features will require rebooting the server. Re-execute this script until it shows there is no more feature needed to be installed.

# 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.

## Prerequisites

ATTO Celerity FC-82EN or FC-84EN adapter  
ATTO Celerity FC-162P or FC-164P adapter  
Administrator account under Windows



This procedure is illustrated with a 2-U rack-mount ProLiant DL380 and a PCI-X FC42XS card. While specific hardware orientations and assembly steps may vary from one server model to another, the general procedure will be the same. See the ATTO Technology “Installation and Operation Manual Celerity FC host adapters” for details about other adapters listed above.

If the server is running, shut it down from the Windows Start menu. Disconnect both AC power cords from the rear of the chassis.

Disconnect any cables connecting to any cards that may already be installed in the PCI riser Cage. Slide the server chassis fully out of the rack on its rails.

Remove the top cover, opening it using its latch. Unscrew the plastic knobs that secure the PCI riser cage to the chassis and lift the riser cage out of the chassis.

Place the riser cage upright on a clean flat surface.



Example of a HP ProLiant PCI riser cage, removed from server chassis

Remove the Fiber Channel PCI card from its antistatic bag and insert it into one of slot, marked as “64-bit/133MHz” (for FC-41XS or FC-42XS models only.) Snap the plastic clip in place to hold the top of the card bracket.

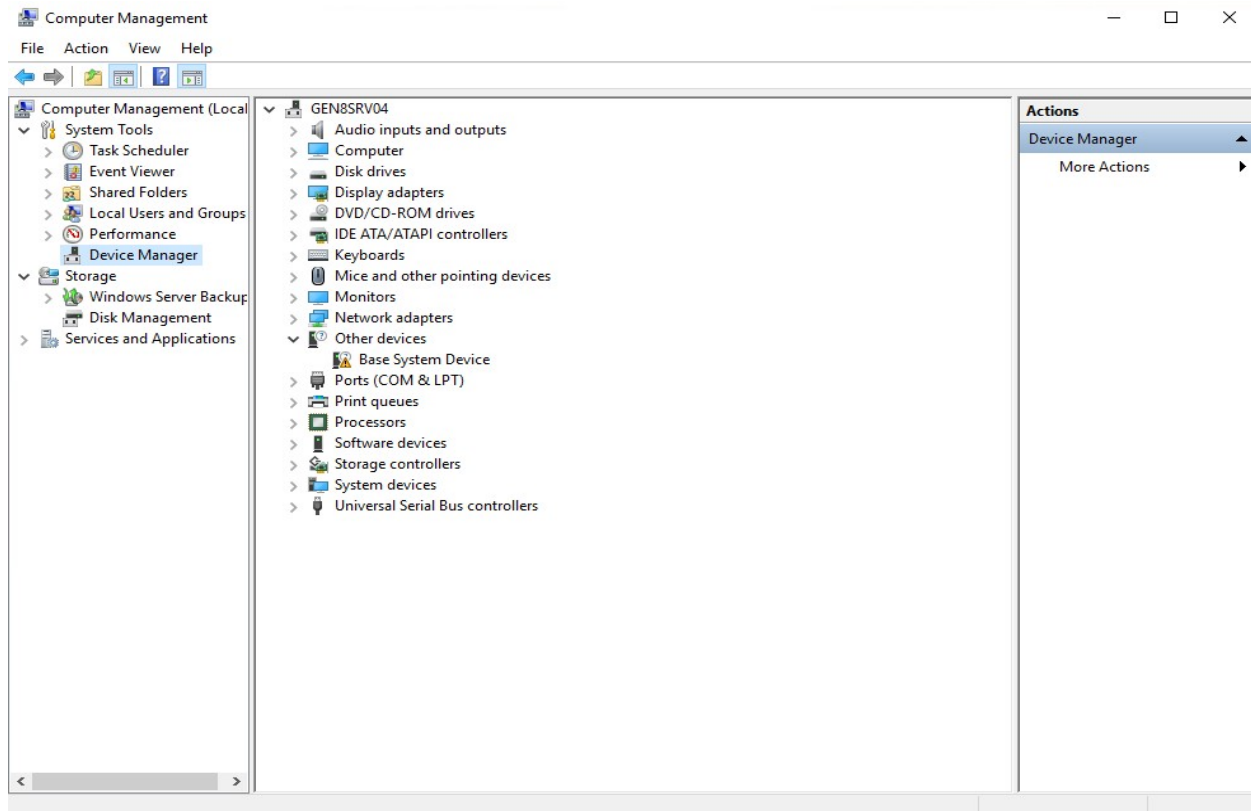


## Celerity FC-42XS 4 Gbps dual-port PCI-X Card

Re-install the PCI riser cage in the Proliant chassis, tightening it securely to the back panel using the attached plastic knobs.

Replace the server cover, securing it in place with the latch in its center. Slowly push the server back into the rack. Reconnect any cables that were disconnected in step c. Re-insert the two power cords in the rear of the server. Power up the server and log on to it using the local administrator account. After logon, the Windows Plug & Play wizard could prompt for "New Hardware found" and ask to search and install corresponding driver. Select the "Cancel" button for all pop-up windows that occur (one per channel installed). FC adapter drivers will be installed in a subsequent step.

Go to Administrative Tools > Computer Management and check if you can see the Fiber Channel Controller(s) in the Device Manager.



In the example above you can see the new FC ports and are ready to install the Celerity driver.

## Install FC Drivers in Windows

### Prerequisites

ATTO configuration tool, driver and firmware of the FC card. You will find all installer in the installation package location `AttoCelerityFC-YYYYMMDD`.

Administrator account under Windows on the server acting as the Virtual Tape Controller.



During the initial installation you will need to install the driver before updating the firmware with the latest flash bundle. For an upgrade of firmware and driver after initial installation, it is recommended to upgrade the ATTO configuration tool to the latest version, upgrade the firmware to the latest flash bundle and finally update the driver version.

### BackBox Software Requirements

Components	Version	Location
ATTO Configuration Tool	4.38	Tools\win_app_configtool_438



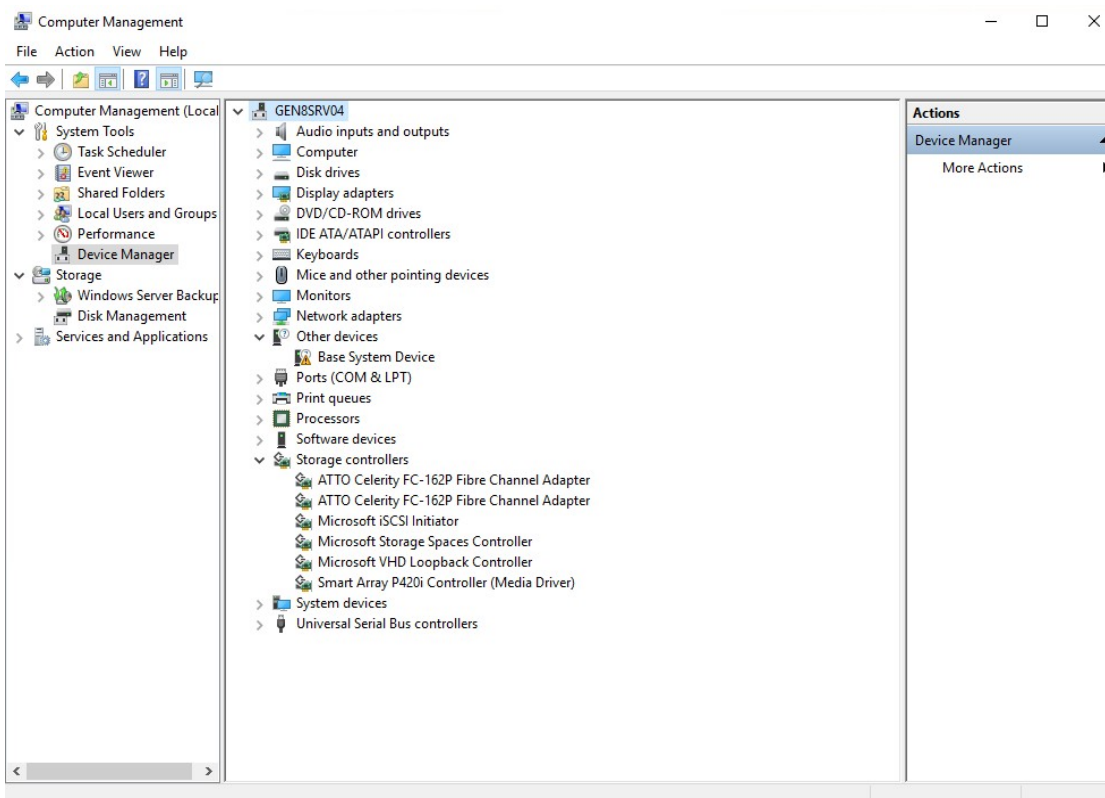
ATTO Celerity driver FC-162P HBA	1.62.0f1	\AttoCelerityFC-20191101\FC16 \win_drv_celerity16\1.62.0f1\x64\Win10
ATTO Celerity flash FC-16	01 November, 2018	FC16\win_fls_celerity16-32_181101
ATTO Celerity driver FC-81EN, FC-82EN or FC-84EN HBA	2.07.0f1	\FC8\win_drv_celerity8\2.07.0f1\x64
ATTO Celerity flash FC-81EN, FC-82EN or FC-84EN HBA	06 April, 2018	\FC8\win_fls_celerity8_180406

## 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 release. If you absolutely require signed driver, 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 were installed correctly.



## Install the FC Configuration Tool

Perform this sub-task only if there is no ATTO Configuration Tool already installed or the currently installed version is an older one.

Access the repository folder and navigate to the AttoCelerityFC-20191101 directory, sub directory Tools\win\_app\_configtool\_438.

Double-click on ConfigTool\_438.exe and follow the installer's instructions. You should accept all default and choose a Full installation. If a previous version of the ATTO configuration tool is already installed, you may be prompted to uninstall the old version first.

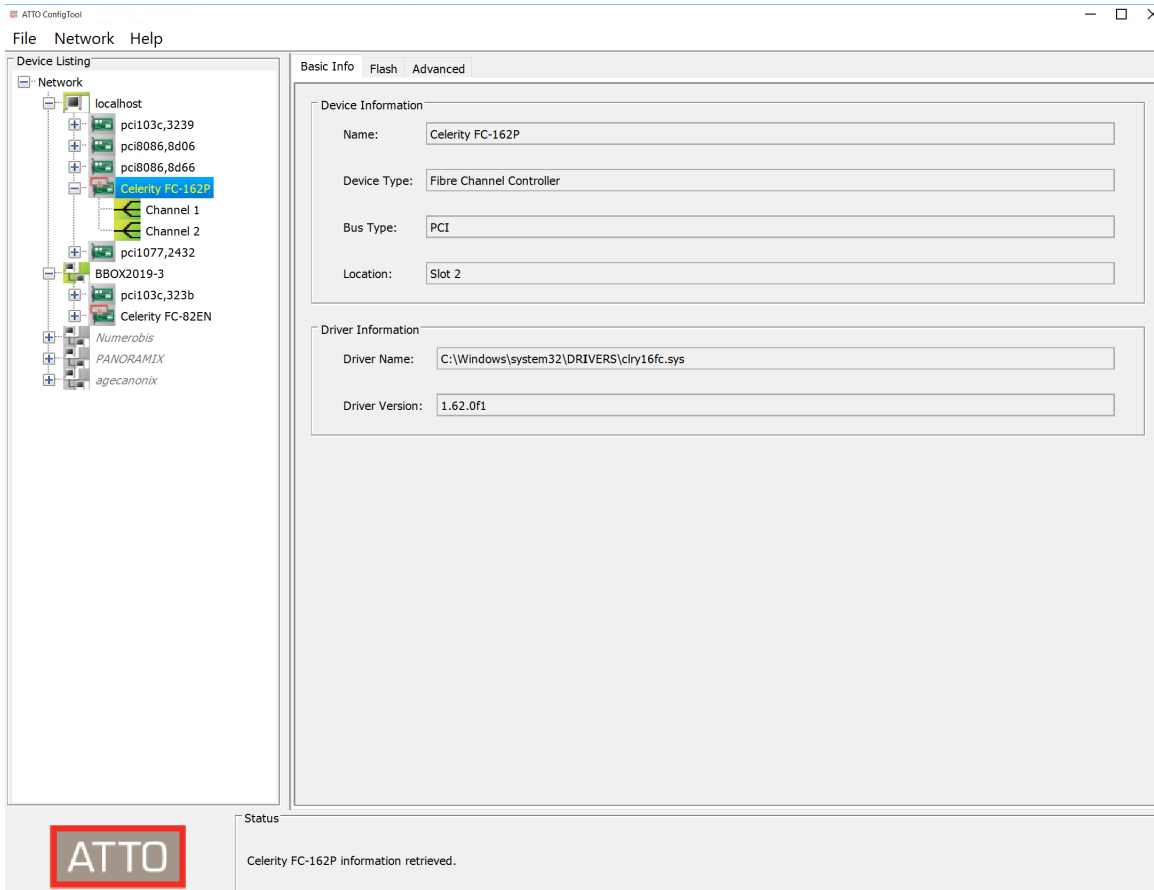
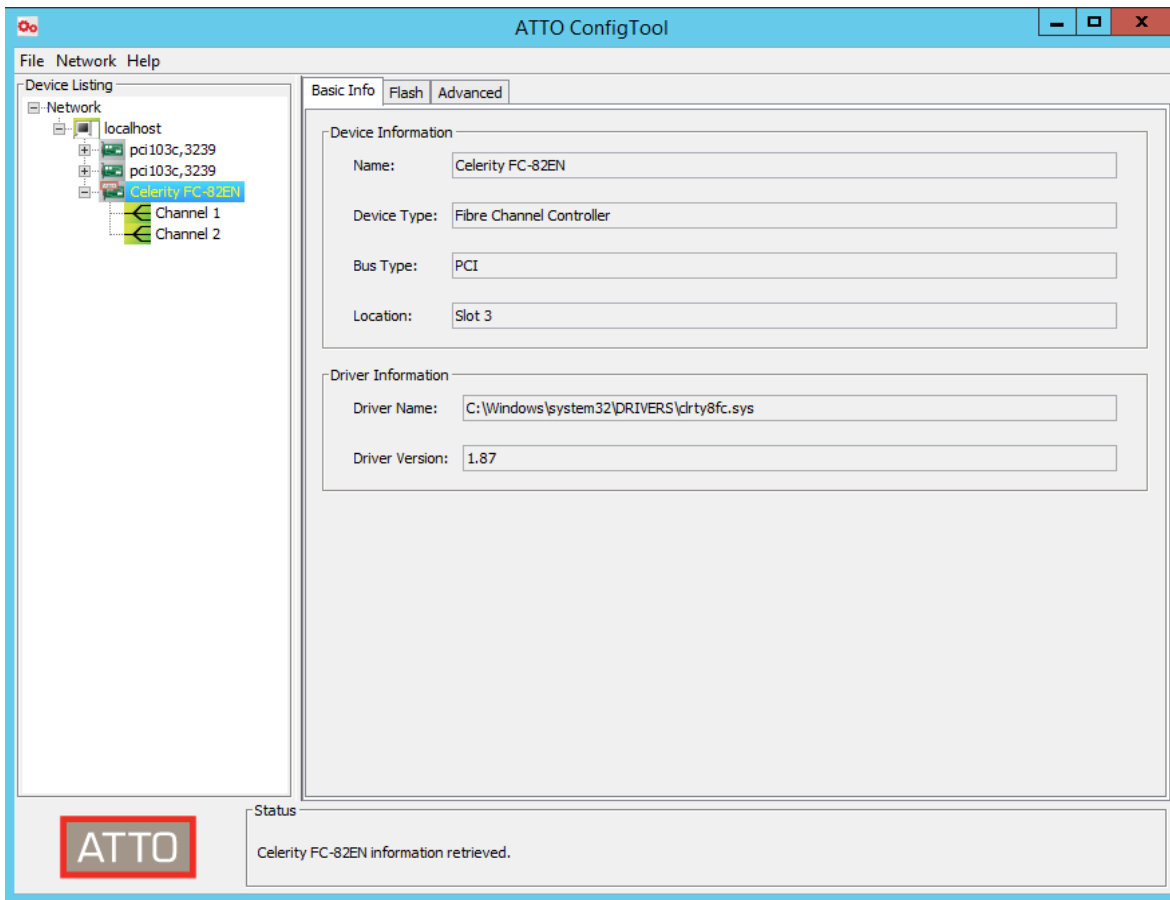
## FC Card Channel Parameters

Start the ATTO ConfigTool (from the Windows Start menu > All Programs > ATTO ConfigTool.) After it opens, you will need to login with a user with the local administrator privilege. To log in, expand the loc- almost node in the left

panel.

Once logged in, you will be able to expand the localhost node in the left pane. For each Celerity Device listed perform the following:

In the Basic info tab, check the Driver version id is matching the driver version that you just installed. If not, you will need to re-install the Celerity driver.



Expand the current Celerity Device node in the left panel.

For each Channel listed, verify that default values match the ones shown in the NVRAM figure. If not, update all mismatched fields. In particular, one parameter that may require changing is the Connection Mode. It must be set to “Point-to-Point”.

When done with the changes for each port, press the Commit Button. Wait for the Commit confirmation status message before continuing (see Commit confirmation figure). You must press the Commit button for each Channel being updated.



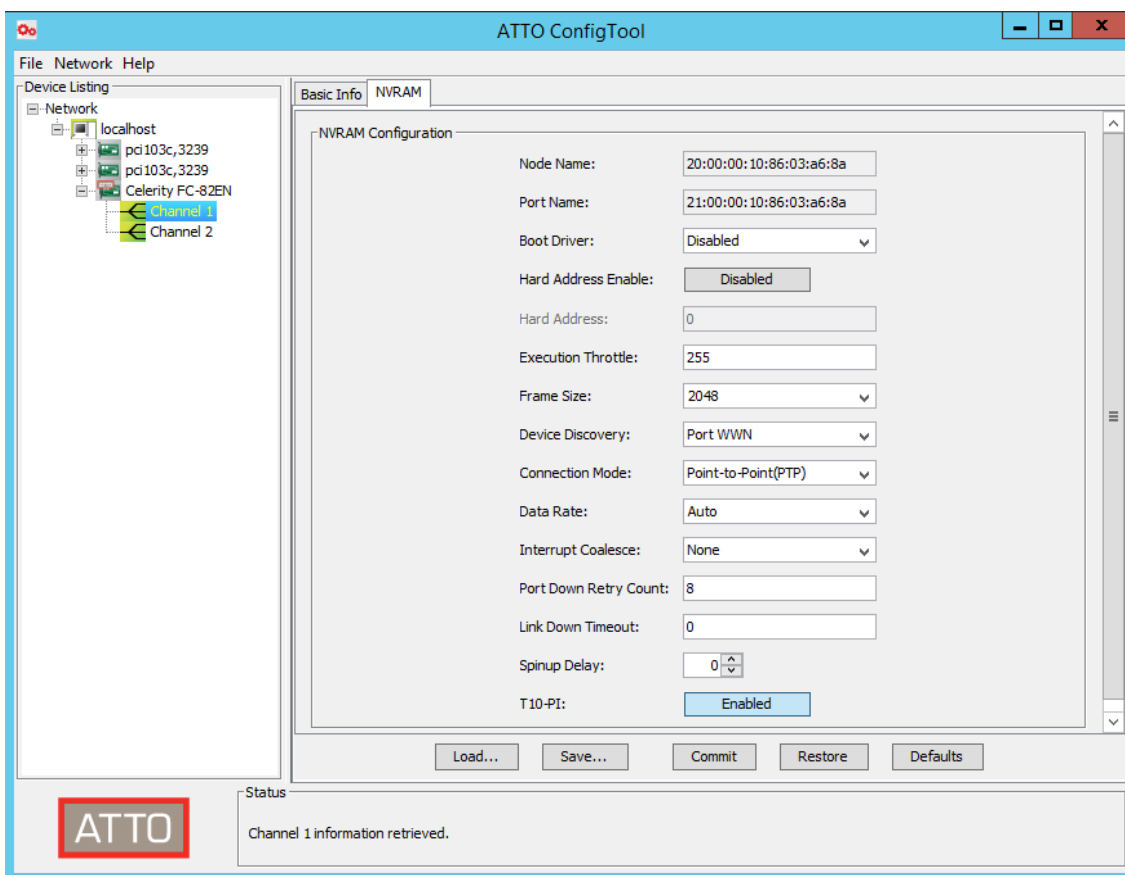
You can complete all parameters and Flash updates before restarting the server.



If a FC switch is to be used to share use of a single NonStop FCport with multiple VTFC ports, the following additional settings may be required:

Configure a FC switch zone and customize switch setting

Each switch and environment may require different settings. Contact your [ETI-NET Support](#) representative for assistance.



ATTO ConfigTool

File Network Help

Device Listing

- Network
  - localhost
    - pci103c,3239
    - pci8086,8d06
    - pci8086,8d66
    - Celerity FC-162P
      - Channel 1
      - Channel 2
    - pci1077,2432
    - BBOX2019-3
      - pci103c,323b
      - Celerity FC-82EN
        - Channel 1
        - Channel 2
    - Numerobis
    - PANORAMIX
    - agecanonix

Basic Info NVRAM

NVRAM Configuration

Node Name: 20:00:00:10:86:04:af:67

Port Name: 10:00:00:10:86:04:af:67

Boot Driver: Disabled

Execution Throttle: 255

Frame Size: 2048

Tape Mode: Enabled

Data Rate: Auto

Interrupt Coalesce: None

Port Down Retry Count: 8

Link Down Timeout: 0

Spinup Delay: 0

T10-PI: Enabled

Load... Save... Commit Restore Defaults

Status

ATTO


NVRAM settings loaded.

Status

ATTO

NVRAM settings committed. A system reboot is required for the changes to take effect.

## Update FC Adapter Flash Version

 This step is required only if the Flash version is older than 4/6/2018 (FC-8xEN and FC-16xP models).

ATTO ConfigTool

File Network Help

Device Listing

- Network
  - localhost
    - pd9005,28f
    - Celerity FC-162P
    - pd9005,28f
    - pd1077,2261
    - Celerity FC-164P
    - BBL01W1E1D
    - BBSMLG3P
    - VTRSGH749XXPH
    - VTRgen10

Basic Info Flash Advanced

Flash Information

Flash Version: 11/1/2018

Flash Update File Information

File Name:

File Version:


Update Browse


Status

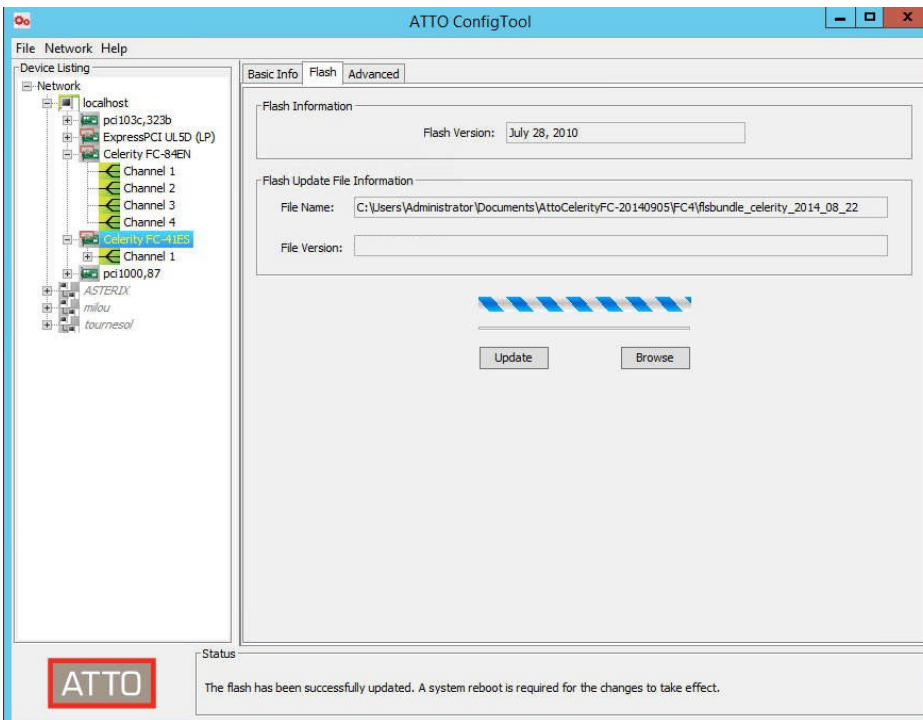
ATTO

Celerity FC-162P information retrieved.

To update the Flash version, first press the **Browse** button. Then navigate up to the repository folder, `AttoCelerityFC-20191101 \FC8` or `\FC16` directory, and select the Flash Bundle file proposed by the Configuration Tool. To complete the selection, press the **Open** button. You will then be allowed to review the selected Flash Bundle file information and then start the process by pressing the **Update** button. Wait for the Flash completion status message before proceeding to any other activities. Complete all others Celerity device Flash update.

 Do not power off or otherwise interrupt server operation until the Flash update reports completion. Doing so could damage the FC card being updated.

 You can complete changes to all parameters and Flash updates, as well as setting Target mode (as described in the following section) before restarting the server. It is not necessary to restart multiple times.

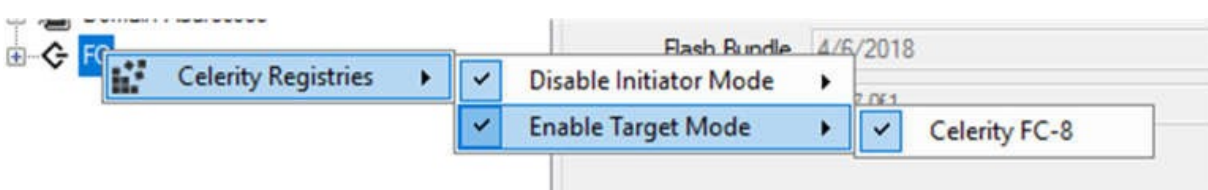


## Enable Target Mode

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 Target 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 and FC-16. 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

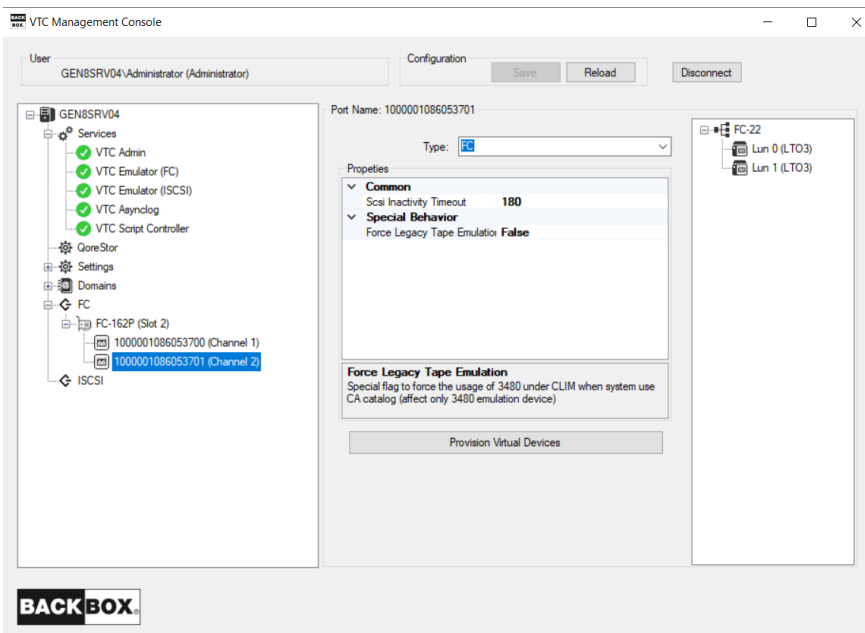
Once the card and the software are installed, you can start the VTC configuration. Perform the following steps:

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

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

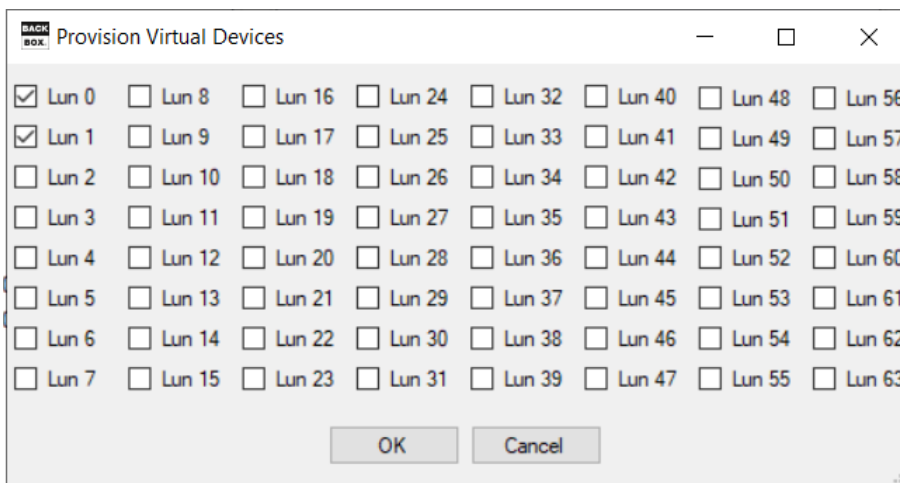
## Virtual Tape Device Configuration

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 VTCservices 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.)



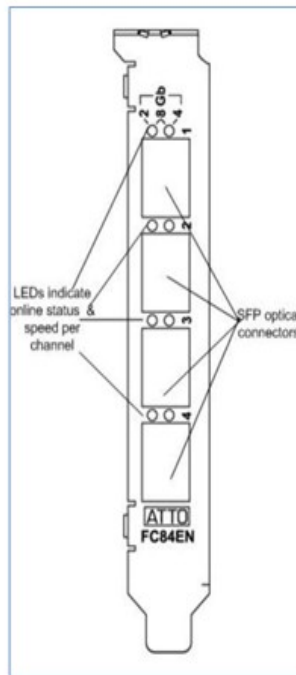
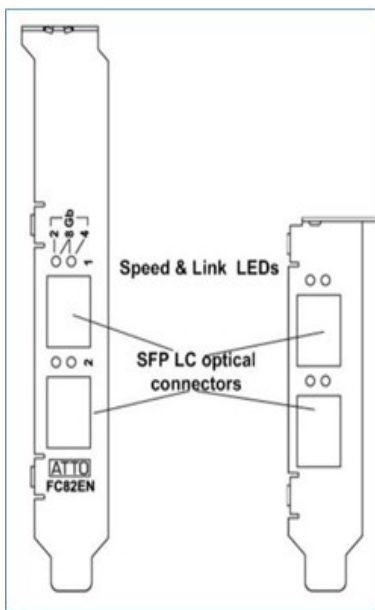
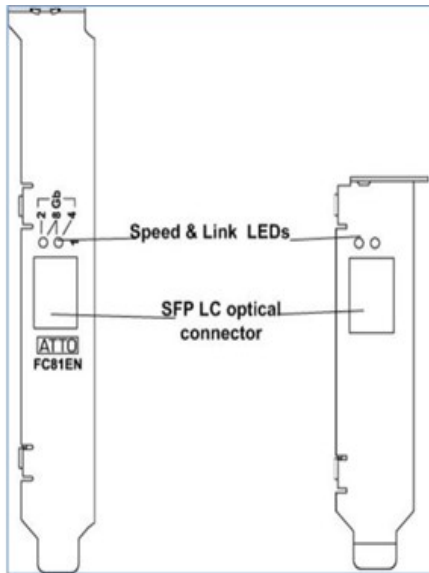
When an FC link-level connection is established between the NonStop FC port and the BackBox FC card, the Link LED should be illuminated solid at both ends. If the Link LED is off on the BackBox card, or flashing on the NonStop port, then link level communications has not been established. This could 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.

Refer to the above FC Card Bracket details be able to locate a physical Fiber Channel port according to your card model and bracket size.





## 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...")

```
$DATA15 ETIH411 4> climcmd s100231 lunmgr -e
```

```
-- Enclosure table --
```

lun	type	stable address
1	3	tape HP Ultrium4-SCSI #3432980001
2	3	tape HP Ultrium4-SCSI #3432980002
3	3	tape HP UltriumM8801A #BB01B02E00
4	3	tape HP M8505 #BB02FAE400
5	3	tape HP M8505 #BB03962A00
6	3	tape HP UltriumM8801A #BB01B02E01

```

7          3          tape HP M8505 #BB03962A01
8          3          tape HP M8505 #BB02FAE401
9          3          tape HP UltriumM8801A #BB023B7C00
10         3          tape HP M8505 #BB03B99F00
11         3          tape HP M8505 #BB03B99F01
12         3          tape HP M8505 #BB02FAE403
13         3          tape HP Ultrium5-SCSI #VG00000000
14         3          tape HP M8505 #BB030EA001
15         3          tape HP M8505 #BB03B98C00
16         3          tape HP M8505 #BB03B98C01
17         3          tape HP M8505 #BB023B7C00
18         3          tape HP M8505 #BB02FAE402
19         3          tape HP M8505 #BB030EA000
20         3          tape CPQNSD 5257 #0974061831
21         3          tape HP M8505 #BB023B7C01
22         3          tape HP M8505 #BB023B7C02
23         3          tape HP M8505 #BB023B7C03
24         3          tape HP Ultrium1-SCSI #0974062087
25         3          tape IBM ULT3580-TD4 #0974061575
26         3          tape HP M8505 #BB03962E00
27         3          tape HP M8505 #BB03962E01
28         3          tape HP UltriumM8801A #BB03B98C00
29         3          tape HP UltriumM8801A #BB03B98C01
30         3          tape HP M8505 #BB023B7C04
31         3          tape HP UltriumM8801A #BB023B7C01
51         6          changer STK L180 #3432980000

```

```

100 1 enclosure 5001438028b91880
200 1 enclosure 5001438025601dc0

```

In this example multiple virtual tape devices emulating LTO-3, LTO-4 and LTO-6 tape drives have been recognized on the CLIM. BackBox VTC virtual tape drive always shows 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`

```
$SAS22 BPAK 8> climcmd s1002531 lunmgr --print
```

```
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_ 0083
```

lun	type	stable address	volatile address
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
etc...			

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 console (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 s1002531):

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
```

```
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_0083 Termination Info: 0
```

d. `climcmd <clim-name> lsscsi -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.

```
$$SAS22 BPAK 32> climcmd s1002531 lunmgr --approve
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_0083 OK to assign lun 1 to tape HP M8505 #BBF0FE2000? y
Termination Info: 0
$$SAS22 BPAK 33> climcmd s1002531 lunmgr --approve
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_0083 OK to assign lun 2 to tape HP M8505 #BBF0FE2001? y
Termination Info: 0
$$SAS22 BPAK 34> climcmd s1002531 lunmgr --approve
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_0083 OK to assign lun 3 to tape HP M8505 #BBF0FE2002? y
Termination Info: 0
$$SAS22 BPAK 35> climcmd s1002531 lunmgr --approve
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_0083 OK to assign lun 4 to tape HP M8505 #BBF0FE2003? y
Termination Info: 0
$$SAS22 BPAK 36> climcmd s1002531 lunmgr --approve
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_0083 OK to assign lun 5 to tape HP M8505 #BBF0FE2004? y
Termination Info: 0
$$SAS22 BPAK 37> climcmd s1002531 lunmgr --approve
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_0083 OK to assign lun 6 to tape HP Ultrium 4- SCSI #BB010FE205? y Termination Info: 0
```

In the above example the `--approve` command was used 6 times, once for each of the previously discovered virtual tape devices. Before responding “y” to each confirmation request, the device information should be checked.

In this example the first 5 devices were identified as “tape HP M8505” as in the Linux device discovery, with serial numbers “BBF0FE2000” through “BBF0FE2004” (the # prefix character is not part of the serial number). The 6th device was identified as “tape

HP Ultrium 4-SCSI” with the serial number “BB010FE205”.

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 OF 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 s1002531 lunmgr --print
$SAS22 BPAK 39..
comForte SSH client version T9999H06_18Dec2008_comForte_SSH_ 0083
```

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-SCSI	#BB010FE205		4:0:0:5
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 $VTxxxxxx, 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:

```
T0021G05^02SEP05^ABM^05SEP05
```

In this particular instance, the Tape IOP version is “ABM”, from Sept 2005.

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.

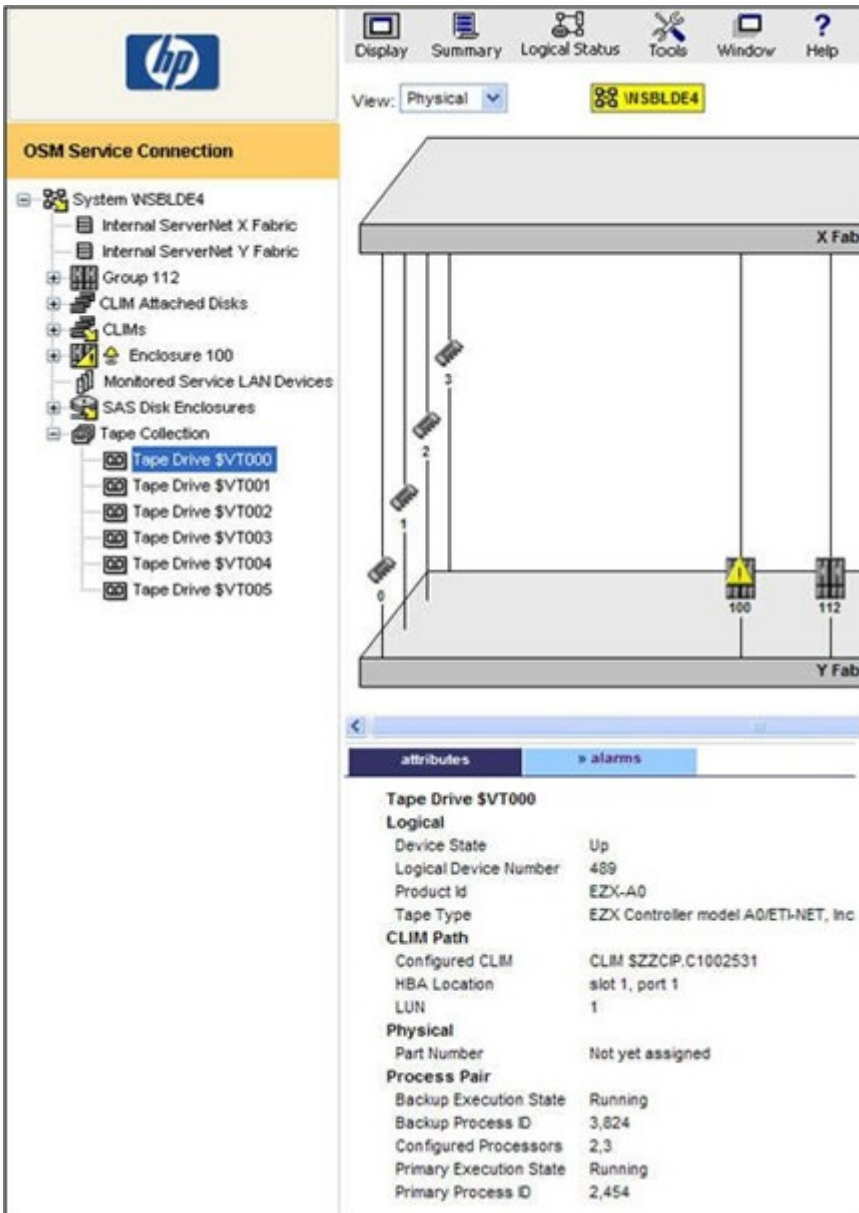
The following SCF ADD command example corresponds to that example, with the FC cable connected to FC port 0 on Storage CLIM S1002531.

```
ADD tape $VTA1401, & SENDTO STORAGE, & PRIMARYCPU 2, &  
BACKUPCPU 3, & CLIM S1002531, & 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 $zzsto.S1002531,detail
STORAGE - Detailed Info CLIM \BLDESYS.$ZZSTO.#S1002531
```

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 ..... S1002531

*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

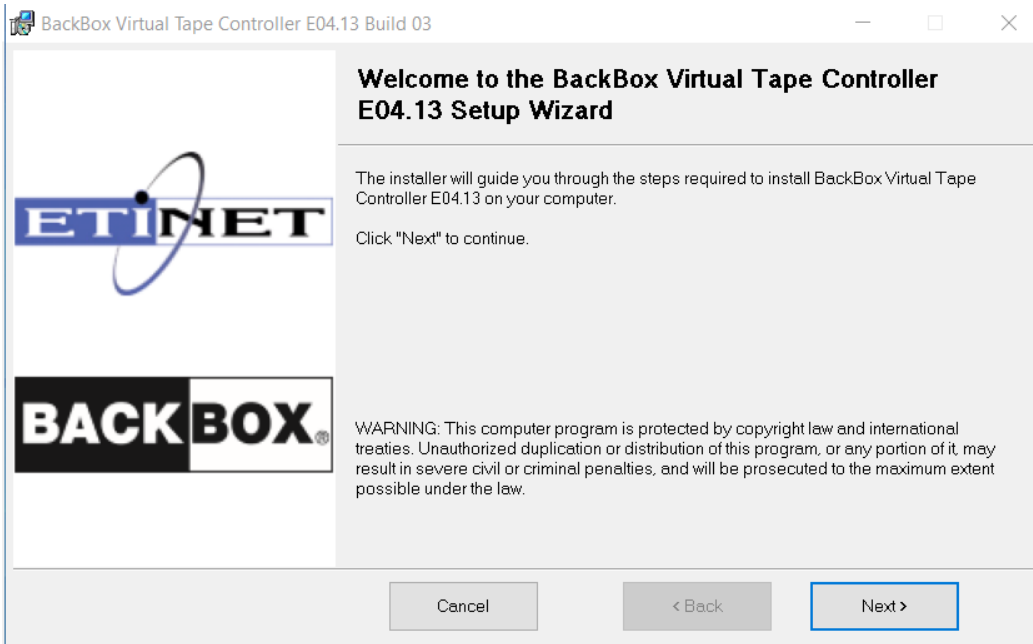
The following command displays the relation between the virtual LUN assigned to the device by the CLIM and the serial number of that specific device:

```
climcmd <clim-name> lunmgr --enclosures
$SAS22 BPAK 18> climcmd S1002533 lunmgr --enclosures
comForte SSH client version T9999H06_07Jan2022_comForte_SSH_0087
-- Enclosure table --
  lun      type
  1         3         tape      HP      M8505      #BBF0FE2000
  2         3         tape      HP      M8505      #BBF0FE2001
  3         3         tape      HP      M8505      #BBF0FE2002
  4         3         tape      HP      M8505      #BBF0FE2003
  5         3         tape      HP      M8505      #BBF0FE2004
  6         3         tape      HP Ultrium 4-SCSI    #BB010FE205
 100        1         enclosure
 200        1         enclosure
                    500143800041b180
                    5001438000406d00

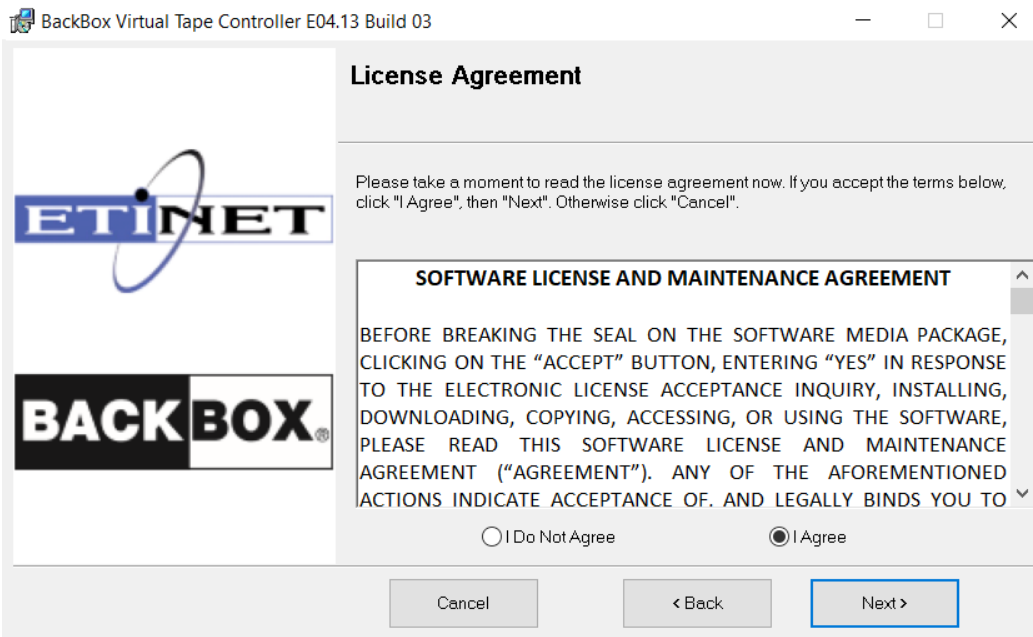
-- Enclosures present --
dev      lun      type      stable address      controller
|
| serial #      revision
sg41      3         tape      HP M8505 #BBF0FE2000      slot 1, port 2
|          BBF0FE2000      VE03
sg42      3         tape      HP M8505 #BBF0FE2001      slot 1, port 2
|          BBF0FE2001      VE03
sg43      3         tape      HP M8505 #BBF0FE2002      slot 1, port 2
|          BBF0FE2002      VE03
sg44      3         tape      HP M8505 #BBF0FE2003      slot 1, port 2
|          BBF0FE2003      VE03
sg45      3         tape      HP M8505 #BBF0FE2004      slot 1, port 2
|          BBF0FE2004      VE03
sg46      3         tape      HP Ultrium 4-SCSI #BB010FE205      slot 1, port 2
|          BB010FE205      VE03
sg40      200        1         enclosure 5001438000406d00      slot 4, port 1,
expander 1      SGA750006E      2.16
sg20      100        1         enclosure 500143800041b180      slot 5, port 1,
expander 1      SGA750006B      2.16
Termination Info: 0
```

## VTC SOFTWARE INSTALLATION

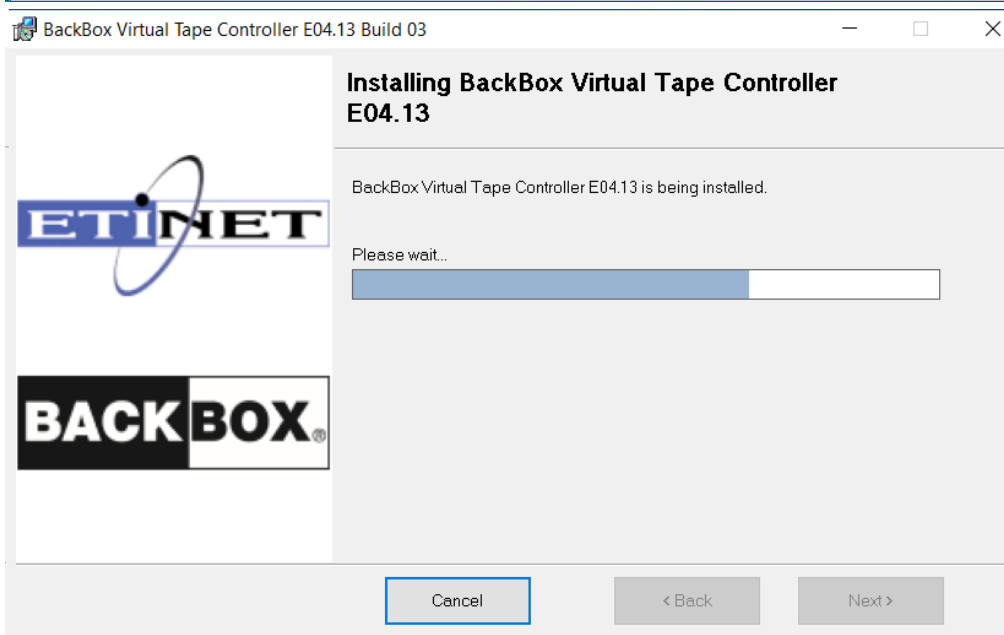
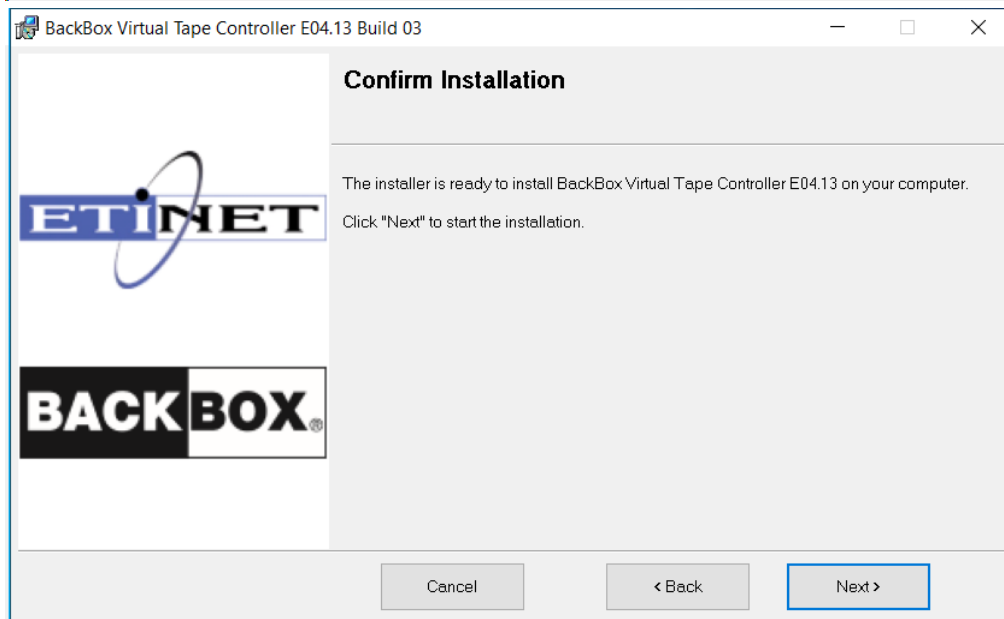
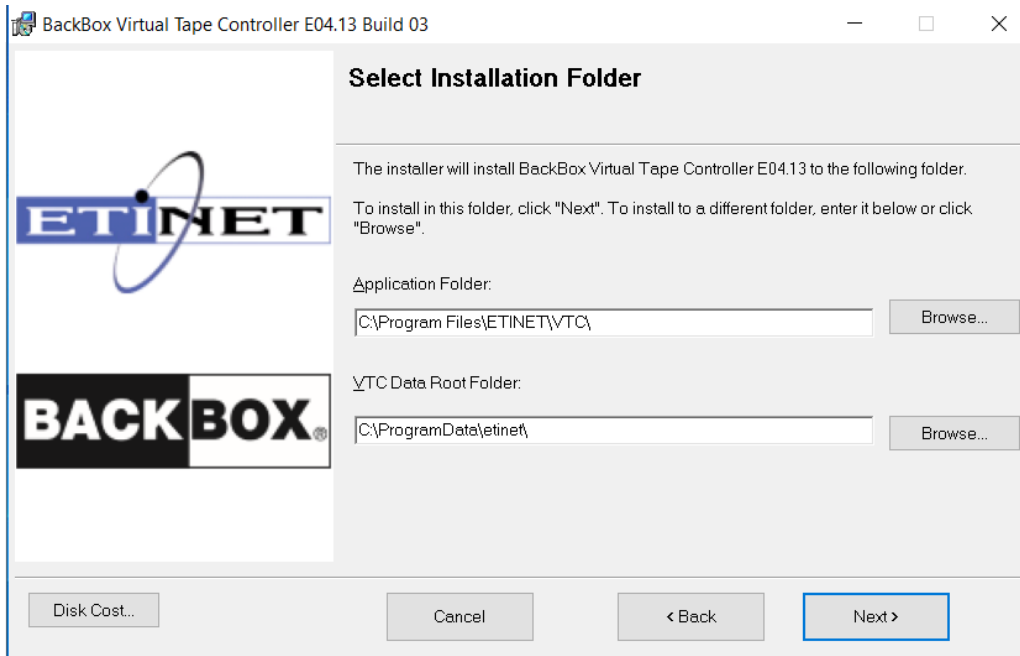
To proceed with the BackBox VTC software installation locate VTC software: \\VTC-E4.XX.XX  
To start the installation double click on the setup.exe program, click Next.

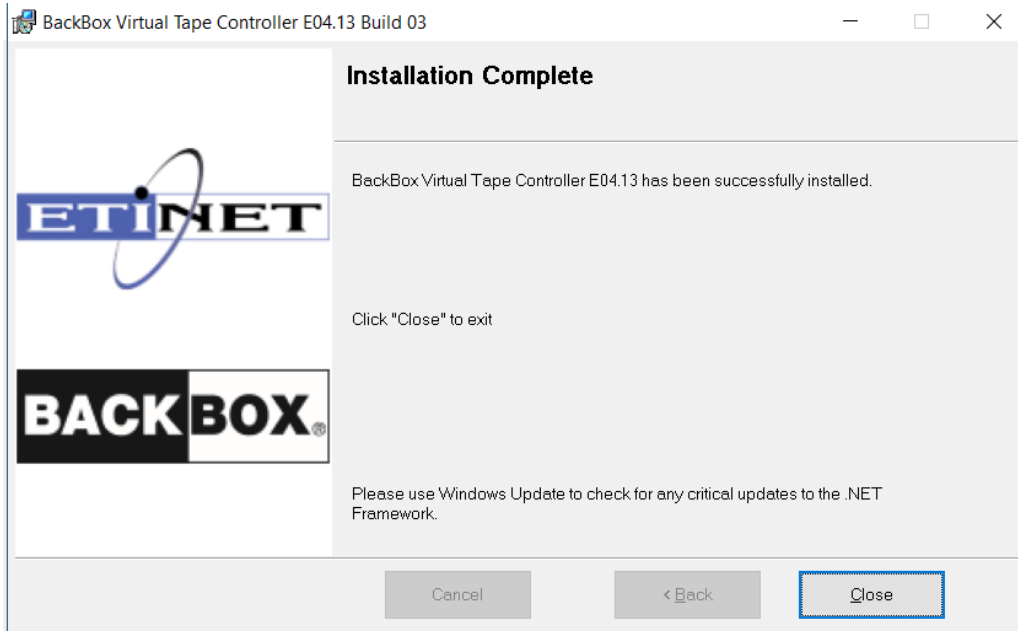


You will then be prompted to read and accept the license agreement. Click **I Agree** to proceed with the installation, a complete copy of the license agreement is available at the end of the present document.



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





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.