StorageTek Virtual Operator Panel

User's Guide
(Customer Version)

Part Number: E20750-02
September 2011

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Preface

This publication is for customers who are installing and using Oracle's StorageTek Virtual Operator Panel (VOP) with a T-series tape drive not being monitored by a Service Delivery Platform (SDP) or an encryption-capable LTO4/5 tape drive.

> **Note –** When an SDP is installed on site and monitoring T-series drives connected to the Ethernet private network, the drive Ethernet port is 100% dedicated to the SDP. Therefore, the drive Ethernet port is unavailable for the customer connection that is required for VOP to interface with the drive.

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/support/contact.html or visit http://www.oracle.com/accessibility/support.html if you are hearing impaired.

What's New

The changes to the VOP application since the previous edition of this guide are detailed below:

Version Number	Description of Changes
1.0.16	• Oracle rebranding • HP encrypting LTO-5 support • Capability to save the ID file • Delete all files in the FTP Temp directory on startup • Added Collect Support Logs shortcut (the S character)
1.0.17	• Updated information to include support for the T10000C tape drive • Revised the download instructions for the Oracle E-Delivery site • Moved the JRE installation instructions to Appendix C
1.0.18	• Added the Identify commands to the Drive Operations menu • Removed Zero Drive command from the Drive Operations menu • Encryption of the ID file • Windows 7 support • Unified password support T10000A/B drives running code level 1.48.xxx and a T10000C drive running 1.53.xxx *require* VOP version 1.0.18, or higher. **Note –** VOP 1.0.18 does work with code levels before 1.48.xxx (T10000A/B) and 1.53.xxx (T10000C). The password change resulted in instruction modifications for Chapter 3.

1

Virtual Operator Panel Overview

Introduction

The Virtual Operator Panel (VOP) facilitates user communication with a T10000 tape drive, a T9840D tape drive, or supported Linear Tape Open (LTO) Ultrium tape drives. Use the VOP Graphical User Interface (GUI) to display drive information, to configure the drive, or to perform various drive operations and functions. There are two versions of the application: VOP (supports T10000A, T10000B, T10000C, and T9840D tape drives) and LTOVOP (supports generation 4 and 5 drives).

FIGURE 1-1 shows the T-series VOP (Windows OS) after connection to a drive. When connected to a T10000C tape drive, the Active or Hibernate indicator is also present.

FIGURE 1-1 T-series VOP Application Window

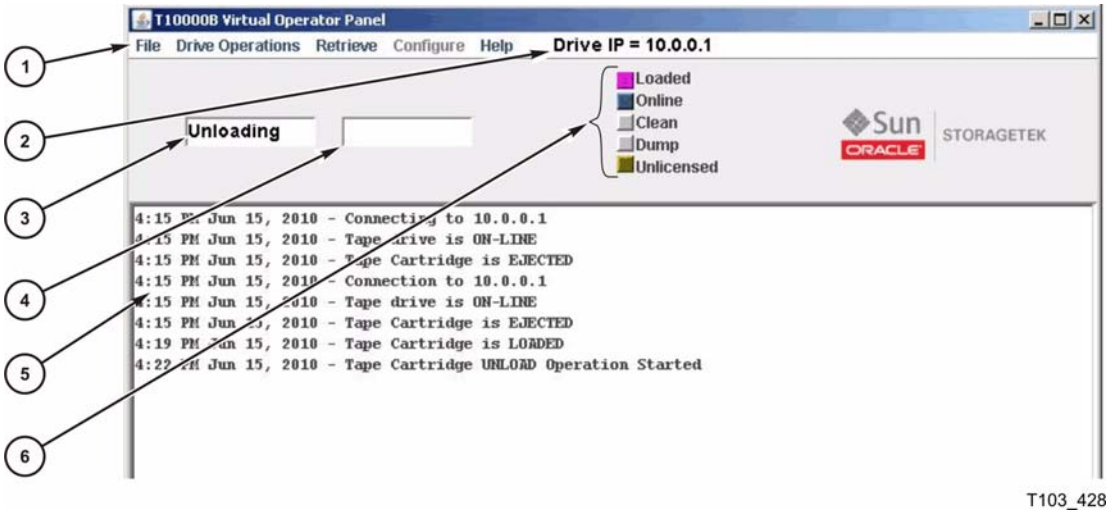


Illustration call-outs (6):
1. Menu bar
2. Drive IP/name
3. Primary drive message window
4. Secondary drive message window
5. VOP message pane
6. Drive status indicators

Note – VOP on the Linux or UNIX OS is similar but with a Linux/UNIX look and feel.

T-series VOP Application Window

The application window in FIGURE 1-1 on page 15 contains the following sections:

- The menu bar contains the names of the menus. The File and Help menus are the only available menus before you complete a drive connection. The Drive Operations, Retrieve, and Configure menus have sub-menus and commands that are available after VOP connects to a drive. Note that you must place the drive offline to access certain functions in the Drive Operations and Configure submenus.
- The drive name area displays the drive name or IP address (10.0.0.1 in this example).
- The primary and secondary drive message windows show drive status, host-generated messages, error messages, and so on.
- The VOP text message pane displays the VOP transcript.
- The drive status indicators show drive conditions (see TABLE 1-1).

TABLE 1-1 Drive Status Indicators

Indicator	Color	Meaning
All	Black	Indicates no connection to a tape drive.
Loaded or Unload	Blue	Indicates that a cartridge is loaded in the drive.
	Grey	Indicates that a cartridge is present in the loading slot, but NOT loaded in the drive.
	Magenta	Indicates cartridge loading/unloading is in transition.
Empty	Grey	Indicates that a cartridge is NOT present in the loading slot.
Online or Offline	Blue	Indicates that the drive is online (label reads Online).
	Grey	Indicates that the drive is offline (label reads Offline).
	Magenta	Indicates online/offline is in transition.
Clean	Orange	Indicates that the drive needs to be cleaned.
Dump	Orange	Indicates that there is a dump present for retrieval.
Encryption[1]	Red	Indicates that the drive is encryption-enabled and has all keys (label is Enabled).
	Orange	Indicates the drive is either missing an encryption key (label indicates Media for KMS 2.0) or has not been enrolled (label indicates Unlicensed for KMS 2.0).
Active or Hibernate	Blue	Automatic hibernation has been activated.
	Grey	The drive is in the hibernate state.

1. The encryption status indicator is present only with an encryption-capable drive.

Note – See Chapter 4, "VOP Operation—T-series Tape Drives" for additional information.

LTOVOP Application Window

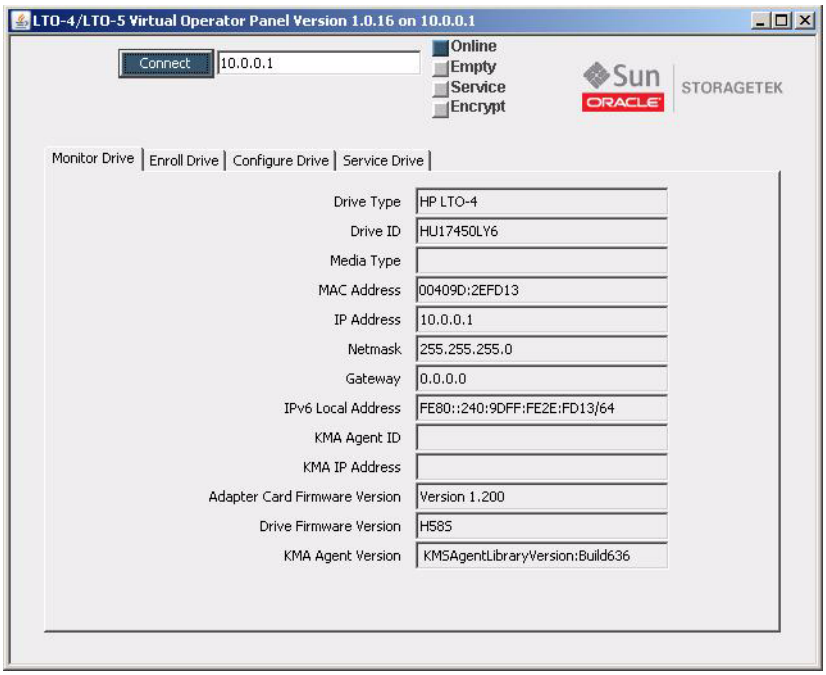
The LTOVOP (Windows OS) is shown in FIGURE 1-2 after connection to a drive. The main parts of the window are:

- Title bar
- Connect button
- Four drive status indicators: Online, Empty, Service, and Encrypt

  Note – The Online and Empty indicators are in a different order than those of the T-series VOP.

- Four tabs: Monitor Drive, Enroll Drive, Configure Drive, and Service Drive.

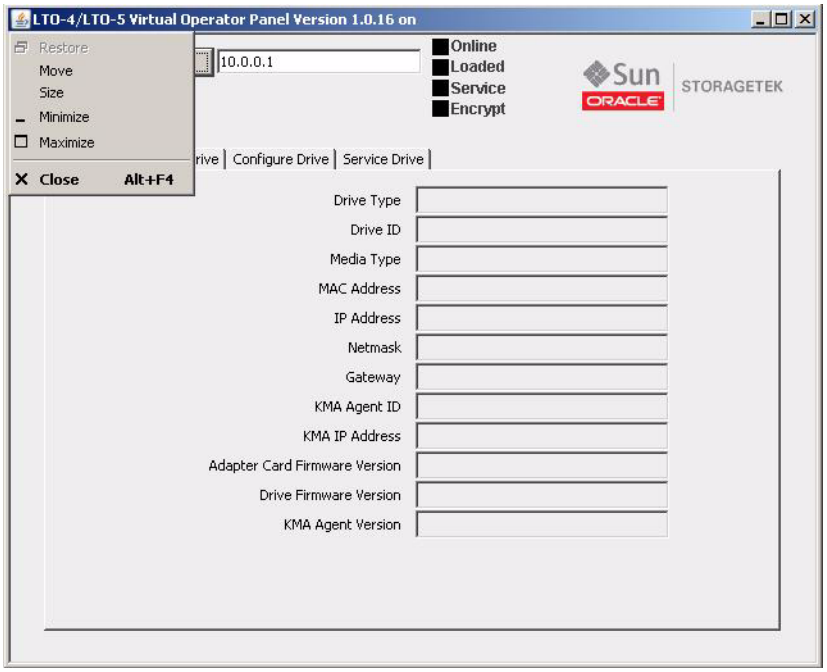
FIGURE 1-2 LTO-4/LTO-5 VOP Application Window



Note – LTOVOP on the Linux or UNIX OS is similar but with a Linux/UNIX look and feel.

Whereas VOP for the T-series drives has several menus, the only true menu in the LTOVOP appears when you click on the logo in the upper left corner of the title bar (see the figure below). Use the property sheets in the main body of the window to complete various enrollment, configuration, and drive service tasks or to monitor the drive (see Chapter 5, "VOP Operation—LTO").

FIGURE 1-3 Window Control Menu - LTOVOP



Prerequisites

Before you can install and operate the VOP application, your system must meet certain prerequisites.

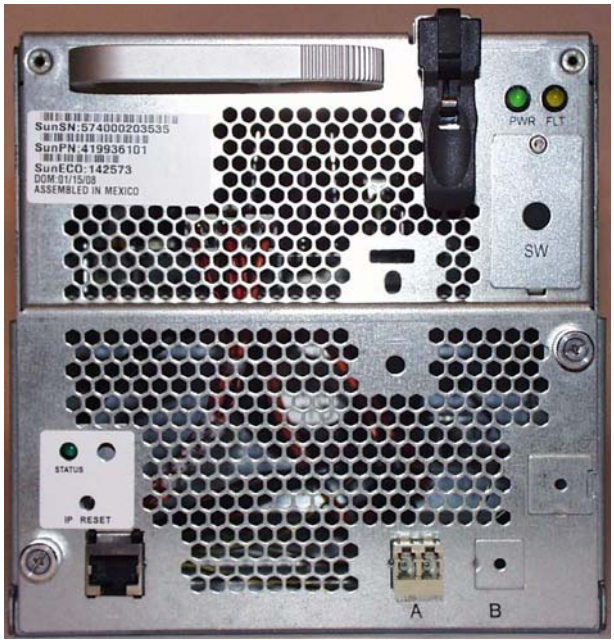
Computer Hardware Requirements

- 512 MB memory
- 1.0 GHz processor
- Monitor screen resolution 1024 x 768 (minimum)
- Ethernet port available for static IP addressing
- RJ45-RJ45 Ethernet cross-over cable (direct connection to a drive or drive tray)
- RJ45-RJ45 Ethernet cables (connection through an Ethernet switch)

> **Note –** See Appendix B, "VOP to Drives on Private Networks" for guidelines regarding an indirect Ethernet connection.

The picture below shows an SL3000 modular library system drive tray (LTO4 drive). Notice the Ethernet port in the lower left corner of the LTO encryption-capable drive tray. Above the Ethernet port is the STATUS indicator and an IP RESET switch. The T9840D and T10000 tape drives have similar items but they might be located differently on the drive tray.

FIGURE 1-4 Drive Tray Ethernet Port



Your computer must be configured with a static IP address that is compatible with the target drive.

> **Note –** See Appendix A, "Changing the Computer IPv4 Address" for guidelines.

When you have Ethernet connection to a drive and a compatible static IP on your computer, you are ready to operate VOP.

Secure Configuration

The VOP is designed to operate on a service network configured as a private LAN. VOP, tape drives, the Crypto Key Management Appliance (if drives are encrypted), and Ethernet switches are potential components of the private LAN. The private LAN best practice recommendation ensures security from unauthorized access. See the *Oracle Key Manager, Systems Assurance Guide* for details regarding the service network.

Operating System Requirement

The VOP works on the following operating system levels:

- Linux–Redhat 9.0, ES
- Solaris–SunOS 5.8, SunOS 5.9, and SunOS 5.10

- Windows 2000, XP, or 7

> **Note –** It is unlikely that platforms with older operating systems meet the minimum hardware requirements (see "Computer Hardware Requirements" on page 18).

Java® Runtime Environment Requirement

The VOP software application is a Java-based program. Therefore, you need a compatible version of Java Runtime Environment (JRE™) installed on your computer.

> **Note –** Your computer must have version JRE 1.5, or higher, to properly install and run VOP release 1.0.10, or higher. See "Java Software Installation" on page 119 for additional information.

Before attempting to install and run VOP, verify the presence, and release level of JRE.

- On a Windows OS, open the *Control Panel*, and double-click *Add and Remove Programs*.
- On a Linux/UNIX OS, see your system administrator.

2

Software Installation

This chapter provides instructions to install/update the *customer (system administrator)* version of the Virtual Operator Panel (VOP).

VOP Application Software

The VOP application software installation process consists of four parts:

- Downloading the latest VOP version (zip file)
- Extracting (unpacking) the zipped (compressed) contents
- Installing and launching VOP
- Performing post-installation options

▼ To Download a VOP Zip File

Begin the VOP installation process by downloading the latest VOP version release level zip file from the designated download resource.

1. **Create a local sub-folder for the VOP download.**

   Create the folder as a direct subordinate to the root (home folder in Linux/UNIX) and name it *VOP_download* or another name of your choice.

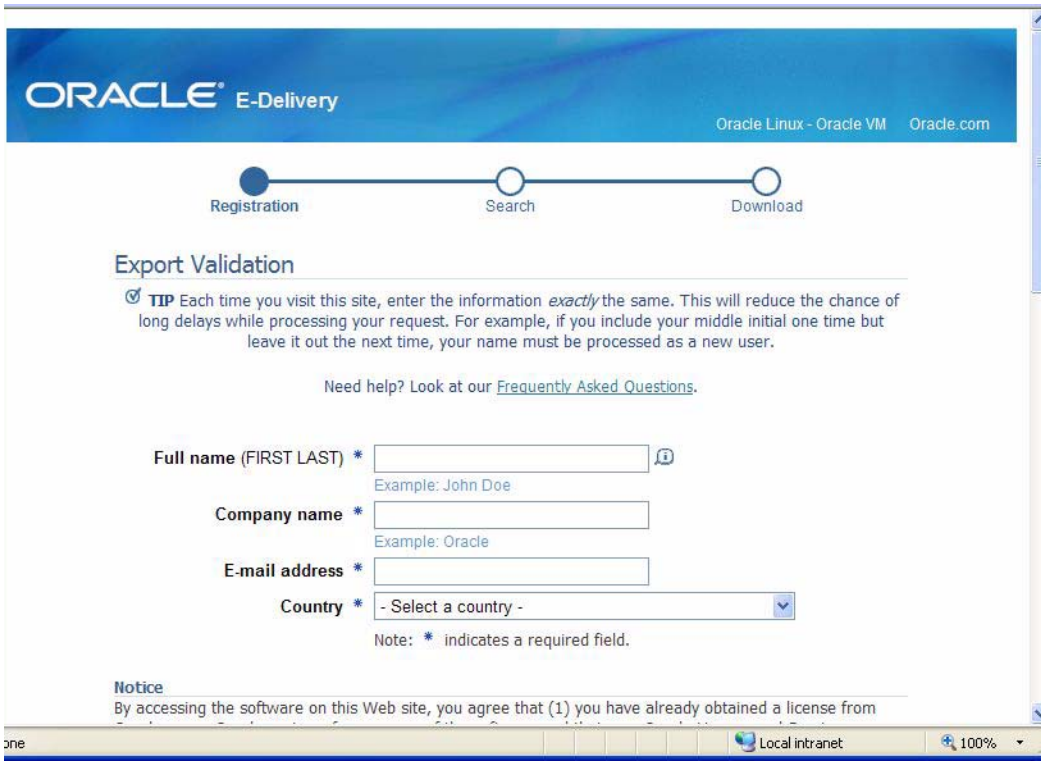
2. **Download the latest version of the program from Oracle's E-Delivery web site.**

   Note – Use the following URL: http://edelivery.oracle.com/

a. Choose your language and click Continue.

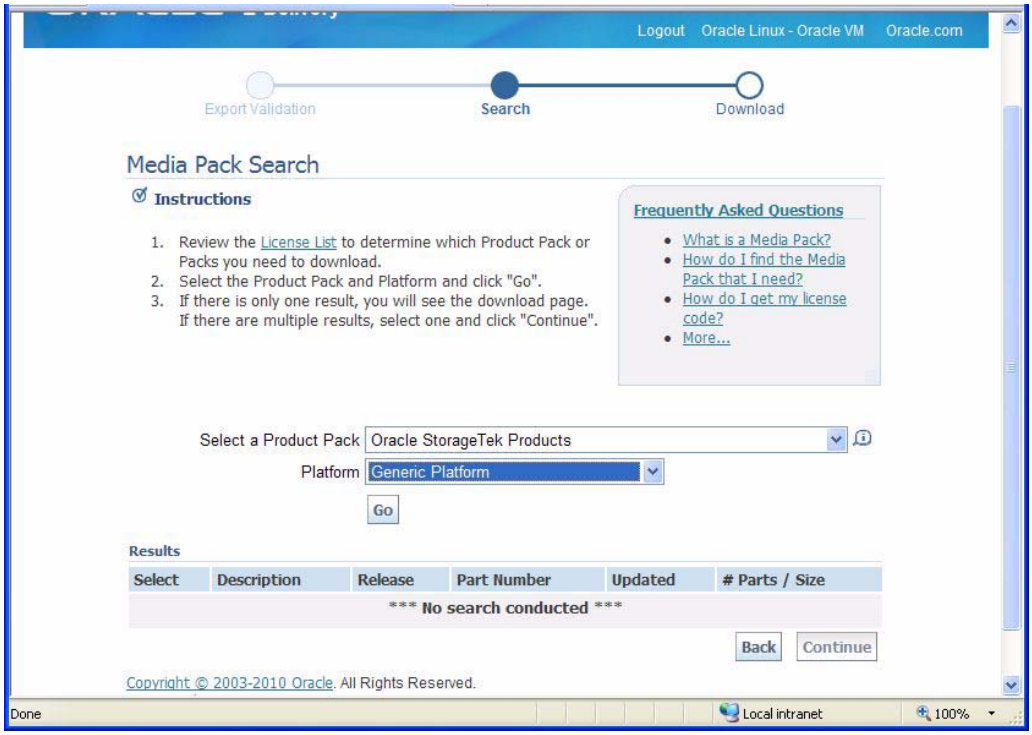
Note – The images for the E_Delivery site are for illustration purposes only. The actual presentation might be different than shown.

b. Enter your personal information on the Export Validation screen.



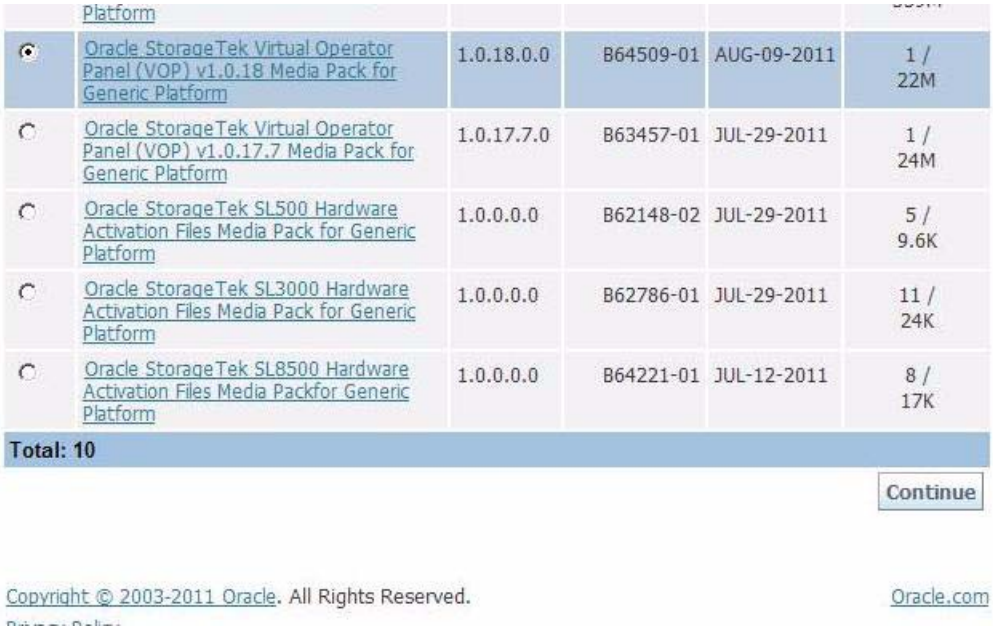
c. Scroll down the page and agree to the terms and conditions.

d. Choose Oracle StorageTek Products and Generic Platform on the Media Pack Search page.



e. Click GO.

f. Select VOP from the list of available products, and click Continue.



3. **Click Download to save the VOP zip file to the folder created in Step 1.**

When the download to your local disk completes, you can exit from the web page.

▼ To Extract VOP Files

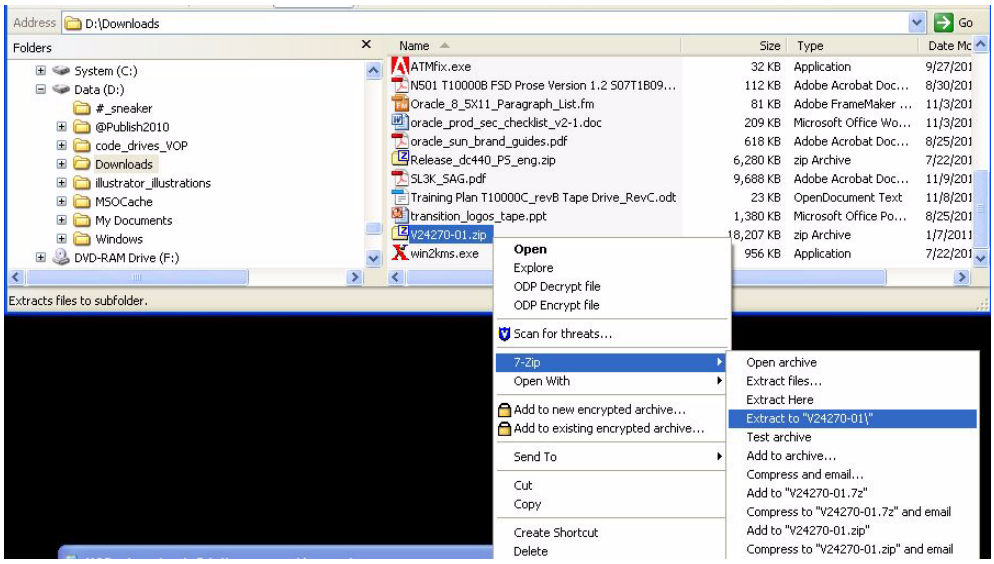
> **Note –** The example procedure uses the Windows OS as a representative example and might not be completely accurate for other OS types.

There are several methods of extracting the VOP folders/files from the zip file. The following example is modeled on the Windows XP operating system and the IZArc utility. The following procedure uses the most direct method to extract the VOP files within the download folder.

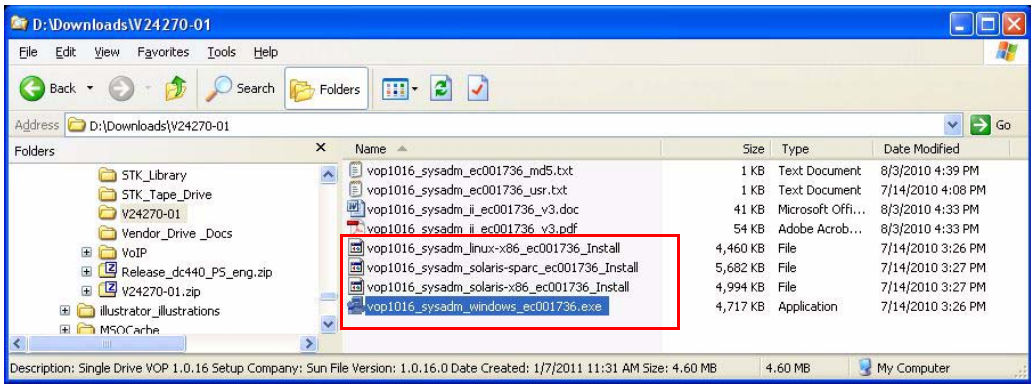
1. **Open the sub-folder that you created in Step 1 of "To Download a VOP Zip File" on page 21.**
2. **Right click on the zip file.**

3. **Point to *7zip and click Extract to VOPfilename.***

The VOP files are extracted into the folder.



Note – The zip file contents will vary relative to the specific VOP version.



The example above shows four install files, each one for a different host (Linux-x86, Solaris-SPARC, Solaris-x86, and Windows). Each file is executable.

VOP Installation

Note – The example procedure uses the Windows OS as a representative example and might not be completely accurate for other OS types.

VOP software installation consists of the following activities:

- Installing the software
- Launching each VOP program
- Performing post-installation options

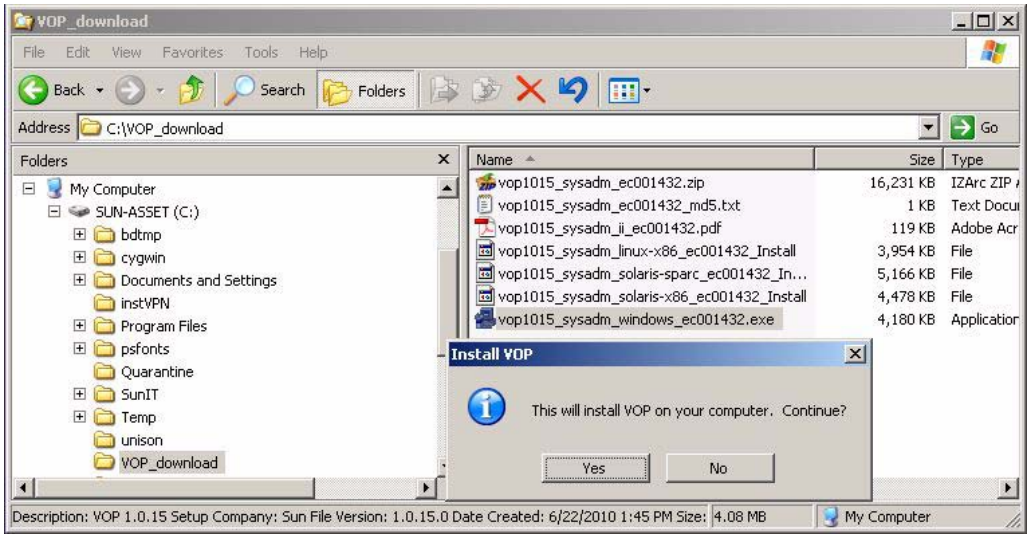
Note – VOP version 1.0.15 is used as a representative example of the installation process. The primary installation differences between VOP versions are filenames, the actual installation program, and the quickstart links and desktop shortcuts created by the installation program.

▼ To Perform an Installation for the Windows OS

The automatic setup process installs VOP program files within the Windows Program Files structure and creates a Start Menu path for launching the program.

1. **Double-click the executable (*.exe*) Windows file.**

   An information dialog box appears.



2. **Click Yes to continue.**

   The installation wizard window appears.

3. **Click Next, accept the license agreement, and click Yes.**

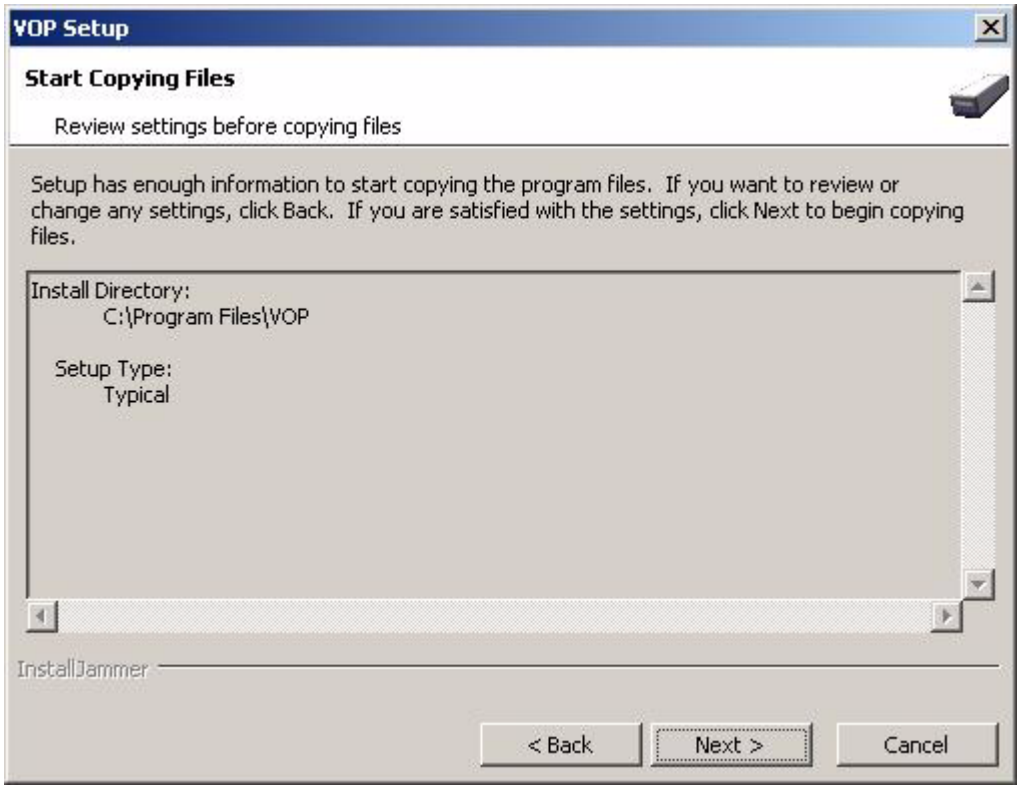
   Note – The installation wizard for some VOP releases provides a dialog box offering to remove the previous version of VOP.

4. **Specify the directory for the wizard to install the VOP files.**

5. **Click Next to continue.**

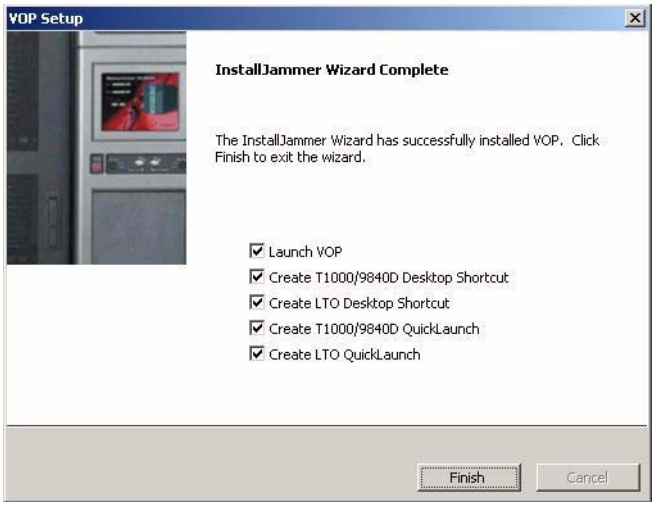
   The copy files screen appears.

6. **Click Next to continue.**



Installation progress information appears on the screen.

7. **Click Finish on the Wizard Complete screen.**

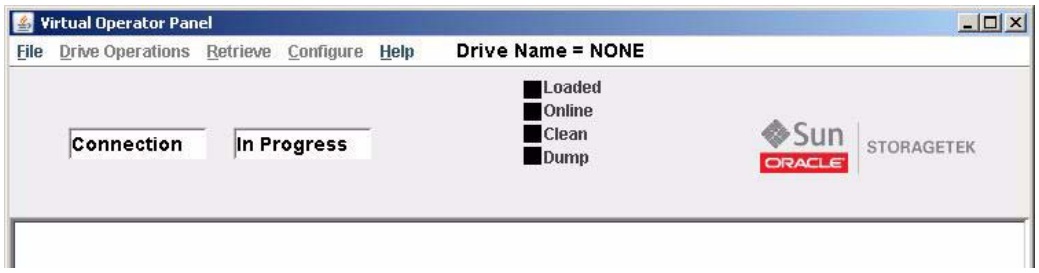


Note – The number of desktop and Quickstart shortcuts can vary from one VOP release to the next.

The VOP program (versions prior to 1.0.18) launches.

Note – VOP 1.0.18 presents the Authentication dialog box. Because you are not able to connect to a drive at this time, click the Cancel button to move forward.

Note – There is a noticeable delay when you open the VOP application for the first time of every PC power-on session due to the anti-virus scan.

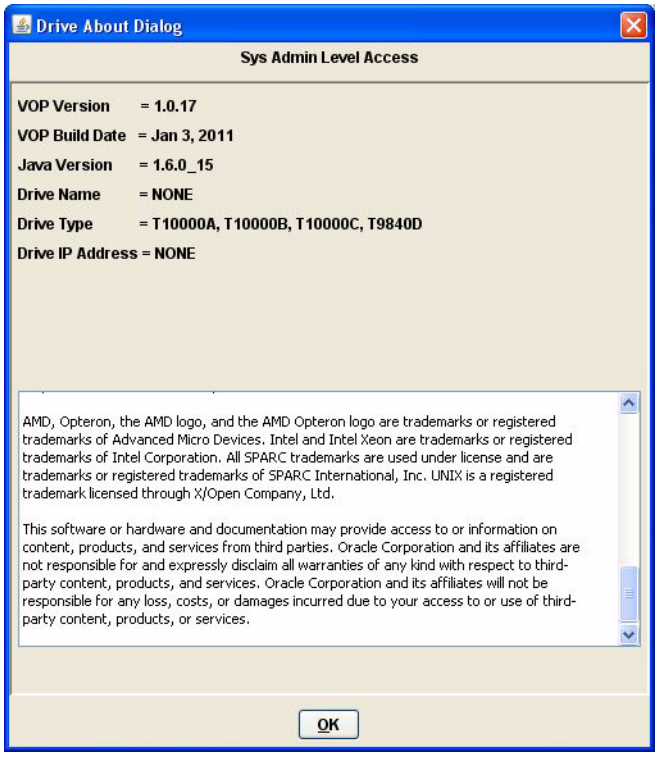


Note – Connection In Progress appears in the two drive message windows, but the application is open without actually initiating a drive connection. Notice that the Drive Name is NONE and all status indicators are black.

8. **Determine the Java version.**

   a. **Open the *Help menu* and click *About*.**

      The Drive About Dialog box opens.



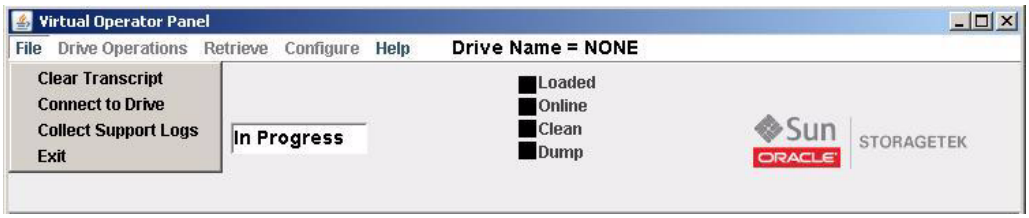
   b. **Confirm the release level in the Java Version field.**

      If the release level is not correct, replace it with the proper level.

9. **Click OK or use the ALT+O keyboard shortcut to close the About dialog box.**

10. **Exit the program.**

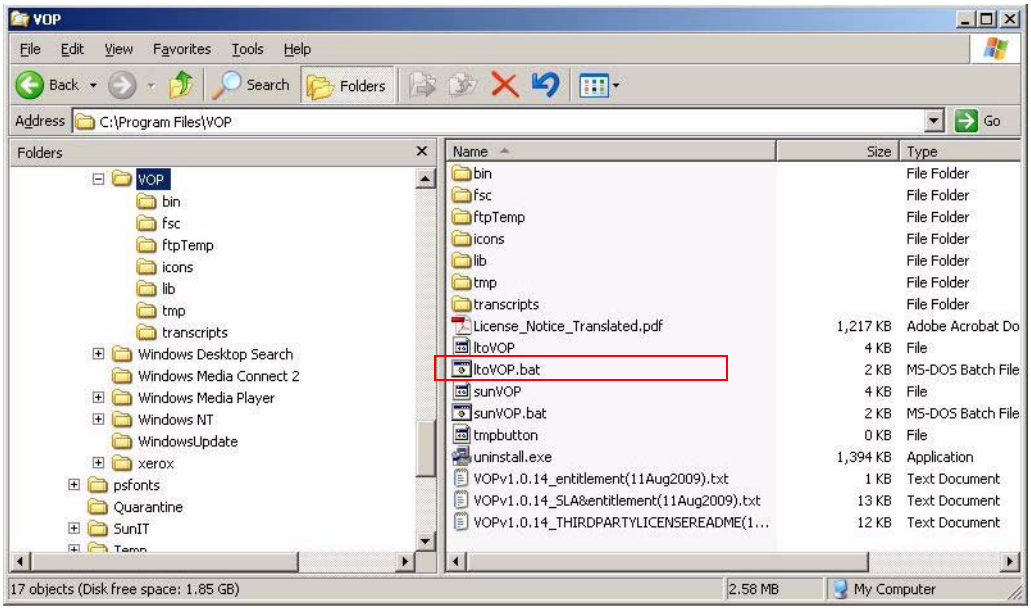
Note – Click the "*X*" in the upper right corner, use the *Exit* command in the File menu, or use the keyboard shortcuts (ALT+F to open the file menu and SHIFT+E to exit).



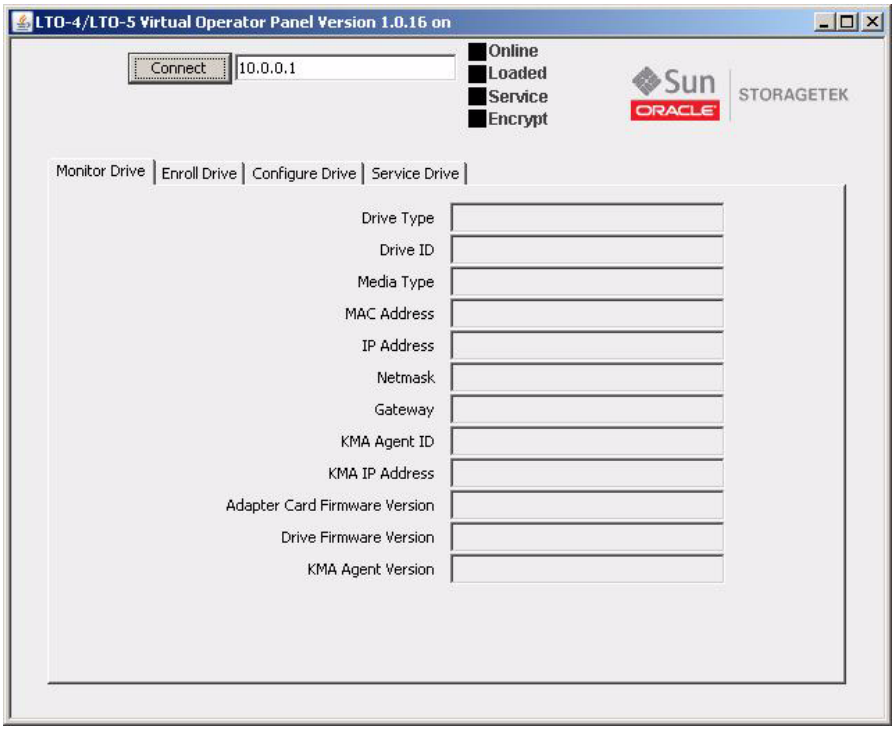
▼ To Test Launch the ltoVOP Program, Windows

The ltoVOP program is available in VOP 1.0.12 or higher. The following example uses the ltoVOP.bat file to launch the program for the Windows operating system. Other methods are usually available to launch the program.

1. **Open the VOP folder.**
2. **Double-click the *ltoVOP.bat* file.**



The LTO Virtual Operator Panel window opens.



Note – The VOP version number appears near the center of the GUI title bar.

3. **Exit from the ltoVOP program.**

VOP Post-Installation Options, Windows

When you have confirmed the VOP programs open, you can optionally delete down-unneeded VOP files.

▼ (Optional) To Delete Unneeded Windows Files

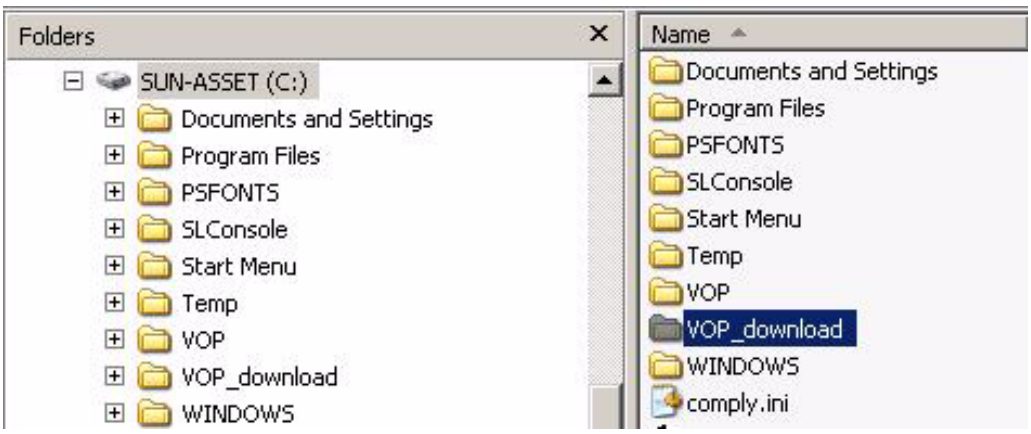
Note – After you have confirmed the newest version of the VOP programs are fully functional, it is considered best practice to remove/delete unneeded VOP folders.

The following procedure removes/deletes unneeded VOP program files:

1. **Delete the VOP_download folder:**

   a. **Open the root folder.**

   The VOP_download folder you created to hold and extract (unzip) the VOP program folders and files is listed.



   b. **Right-click the VOP_download folder and choose Delete.**

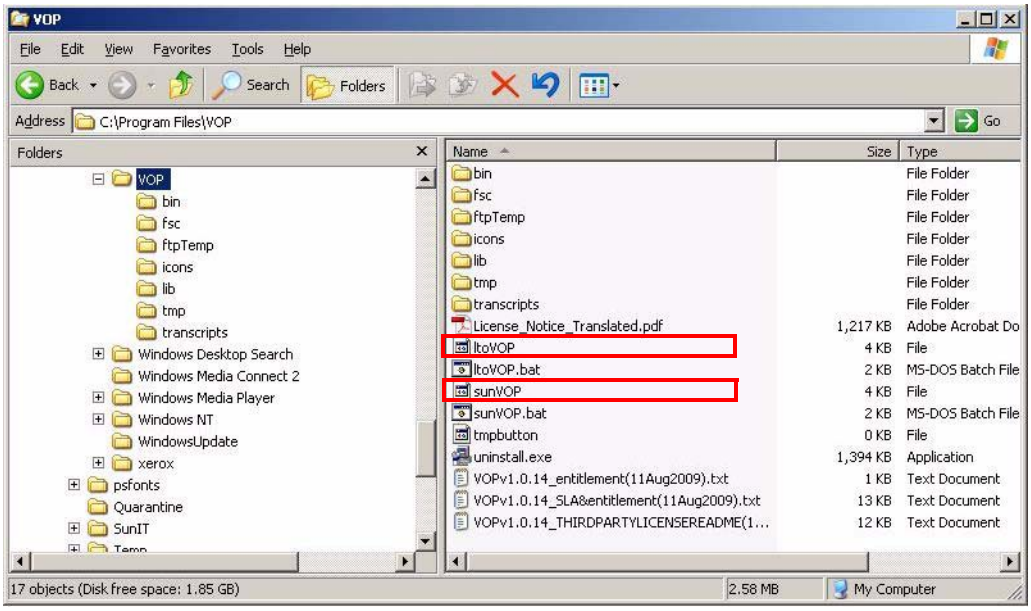
   The Confirm Folder Delete dialog box appears.

   c. **Click Yes to confirm or No to cancel.**

   After the VOP_download folder is deleted, it no longer appears in the folder tree.

2. **Delete VOP executable files for the operating system that is not in use.**
   - ltoVOP.bat and sunVOP.bat are used with the Windows operating systems.
   - ltoVOP and sunVOP are used with Solaris or Unix operating systems.

     The figure below has the ltoVOP and sunVOP files identified. You might want to delete these files when VOP is installed on a Windows system.



3

Starting VOP Programs

This chapter assumes that the Virtual Operator Panel (VOP) operates with an Ethernet connection to a single tape drive. See Appendix B, "VOP to Drives on Private Networks" for additional guidelines when operating VOP within a multiple-drive private network.

For basic hardware requirements and a description of the drive connection, see "Computer Hardware Requirements" on page 18.

Early versions of the VOP application provided an operator panel for only the T10000A tape drive. Now it provides an operator panel for other T-series tape drives (T10000A, T10000B, and T9840D) and also enables encryption enrollment of various tape drives.

Overview

This chapter contains instructions for starting the VOP applications on a Windows platform. Because the operating systems provide multiple means to start (launch) the VOP applications, you can choose any one of those listed: There are two versions:

- T-series VOP
- VOP Application for LTO Tape Drives

> **Note –** Specific instructions are not provided for other operating systems.

T-series VOP

You can start the VOP application in the following ways:

- "To Use the Windows Start Menu, Programs List" on page 36
- "To Use the Desktop Shortcut" on page 37
- "To Use Windows Explorer" on page 38.
- "To Use the Run Dialog Box" on page 38

See Chapter 4, "VOP Operation—T-series Tape Drives" for detailed information on using the application.

T10000A/B drives running code level 1.48.xxx and a T10000C drive running 1.53.xxx require VOP 1.0.18, or higher.

Note – VOP 1.0.18 does work with code levels before 1.48.xxx (T10000A/B) and 1.53.xxx (T10000C).

▼ To Use the Windows Start Menu, Programs List

During VOP installation, the installation wizard created a pointer in the start menu program list to the executable VOP files.

1. **Click *Start*, point to All *Programs*, and the Single Drive *VOP* folder.**

   Note – Older versions of VOP listed the folder name as VOP.

   Other selections appear for LTO VOP, VOP, and to uninstall VOP.

   Note – The installation process for certain versions of VOP provides a quick start for LTOVOP.

2. **Click the pointer name (Single Drive VOP).**

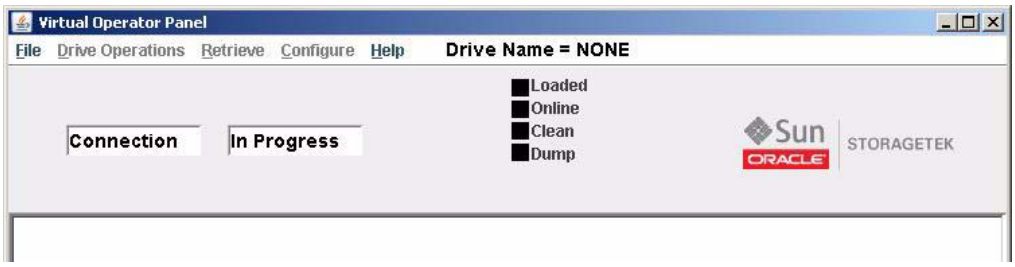
   Make sure to select the VOP option if multiple options are present.

   With VOP releases prior to 1.0.17, a window opens (FIGURE 3-1) while release 1.0.18 presents the Authentication dialog box (FIGURE 3-2 on page 37).

   Note – There is a noticeable delay for the VOP application window to open for the first time of every PC power-on session while your anti-virus scans. Subsequent VOP launches, in the same powered session, are quicker.

   The application appears in a separate window as shown in the following figure. However, a drive connection has not been established. The key indications that VOP is not connected to the drive are that only two menu names are blue, the Drive Name = NONE, and all status indicators are black.

FIGURE 3-1 VOP, Not Connected (Windows Version)



3. **Enter the IP address of the drive and click** Connect.

FIGURE 3-2 Authentication Dialog

Note – For VOP releases prior to 1.0.18; select Connect to Drive from the File menu, enter the IP address, and click OK.

The application window updates to show a drive connection (FIGURE 4-2 on page 44).

▼ To Use the Desktop Shortcut

1. **Double-click the shortcut icon.**

With VOP releases prior to 1.0.17, a window opens (FIGURE 3-1 on page 36) while release 1.0.18 presents the Authentication dialog box.

Note – The installation wizard generally creates a desktop shortcut. The icon might vary from one VOP release to another.

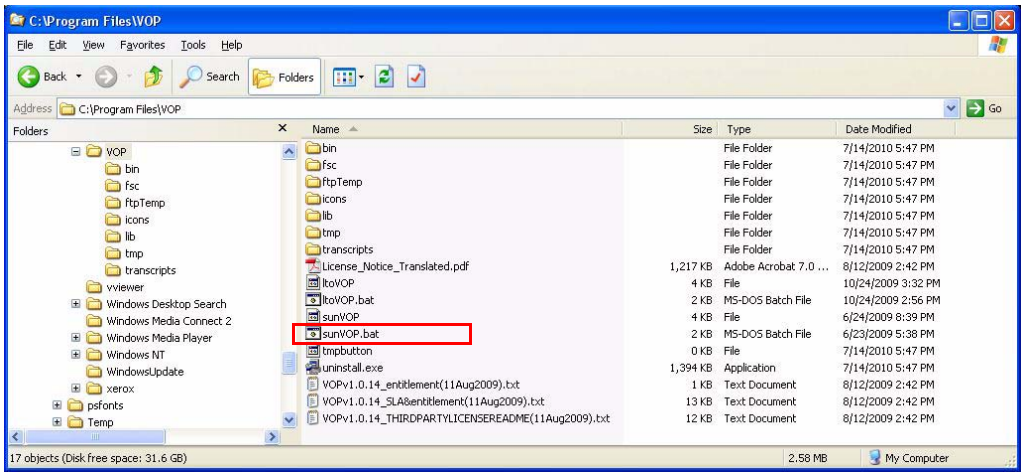
2. **Enter the IP address of the drive and click** OK **or** Connect**, as applicable.**

Note – For VOP releases prior to 1.0.18; select Connect to Drive from the File menu, enter the IP address, and click OK.

▼ To Use Windows Explorer

You can start VOP from Windows Explorer:

1. **Navigate to the VOP folder, then double-click the sun*VOP.bat* file.**



With VOP releases prior to 1.0.17, a window opens (FIGURE 3-1 on page 36) while release 1.0.18 presents the Authentication dialog box (FIGURE 3-2 on page 37).

2. **Enter the IP address of the drive and click** OK **or** Connect**, as applicable.**

> **Note –** For VOP releases prior to 1.0.18; select Connect to Drive from the File menu, enter the IP address, and click OK.

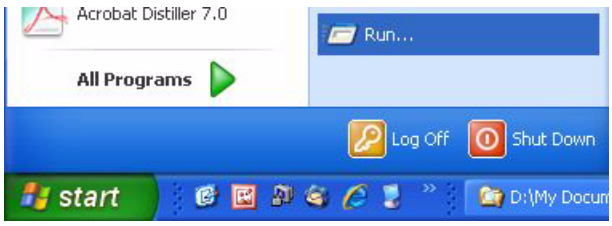
▼ To Use the Run Dialog Box

Use the following guidelines to launch VOP from the Run dialog box:

1. **Click** Start**.**

   The Start menu opens.

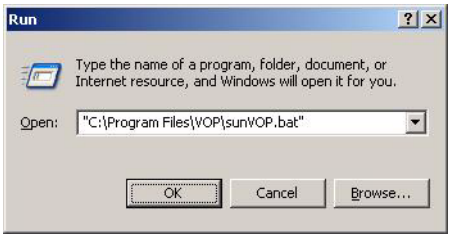
2. **Click** Run**.**



The Run dialog box opens.

3. **Do one of the following:**

   - Enter the path to the VOP executable file.
   - In the Open list, click a previous entry.
   - Click Browse to locate the desired VOP executable file.



4. **Click** OK**.**

   With VOP releases prior to 1.0.17, a window opens (FIGURE 3-1 on page 36) while release 1.0.18 presents the Authentication dialog box (FIGURE 3-2 on page 37).

5. **Enter the IP address of the drive and click** OK **or** Connect**, as applicable.**

   Note – For VOP releases prior to 1.0.18; select Connect to Drive from the File menu, enter the IP address, and click OK.

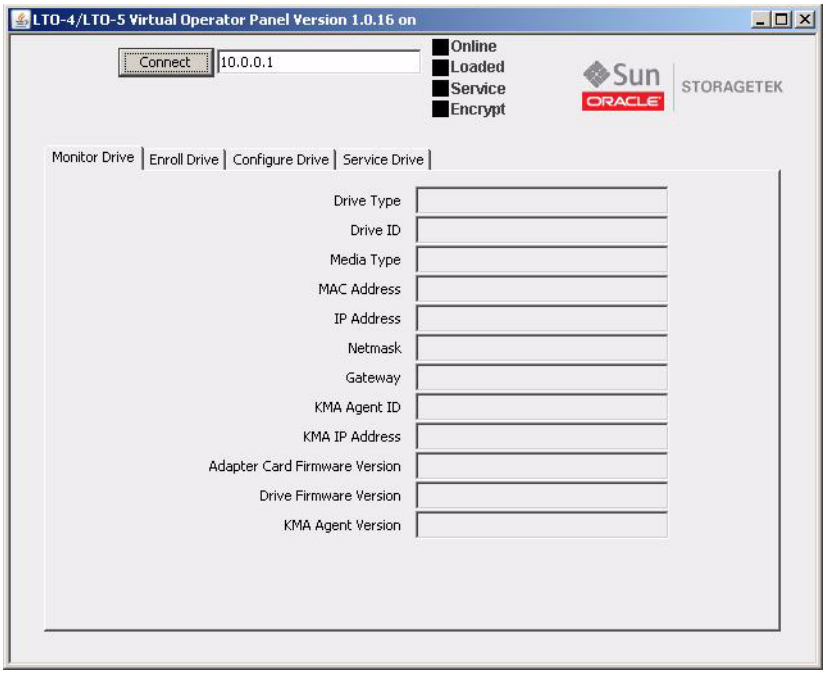
VOP Application for LTO Tape Drives

You can start the ltoVOP application in the following ways:

- "To Use Windows Explorer" on page 41
- "To Use the Windows Desktop Shortcut Icon" on page 41
- "To Use the Windows Run Dialog Box" on page 41
- "To Use the Windows Start Menu, Programs List" on page 42

The application appears in a separate window as shown in the following figure.

FIGURE 3-3 LTO-4/LTO-5 Virtual Operator Panel (Windows Version)



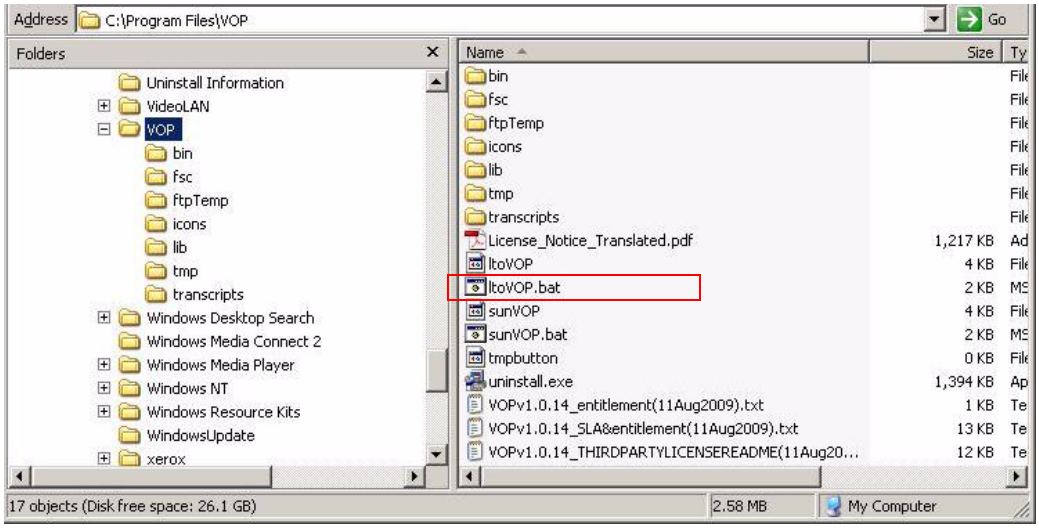
Note – At this point, the application is open, but a drive connection has not been completed. The key indications that VOP is not connected to the drive are the lack of an IP address in the title bar, the grey color of the Connect button, and all status indicators are black.

See Chapter 5, "VOP Operation—LTO" for detailed information on the ltoVOP application.

▼ To Use Windows Explorer

You can start ltoVOP from Windows Explorer

- **Navigate to the VOP folder, then double-click the lto*VOP.bat* file.**



The ltoVOP opens (FIGURE 3-3 on page 40).

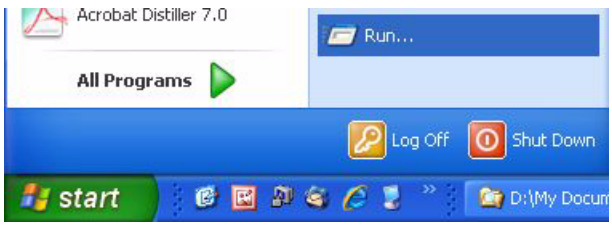
▼ To Use the Windows Desktop Shortcut Icon

- **Double-click the shortcut icon.**

The ltoVOP window opens (FIGURE 3-3 on page 40).

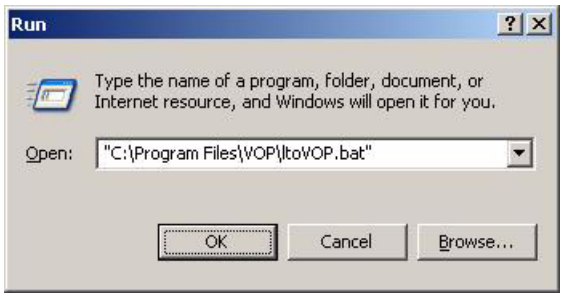
▼ To Use the Windows Run Dialog Box

1. **Click** Start.
2. **Click** Run.



The Run dialog box opens.

3. **Do one of the following:**
   - Enter the path to the desired VOP executable file.
   - In the Open list, click a previous entry.
   - Click Browse to locate the desired VOP executable file.



4. **Click OK.**

   The ltoVOP window opens (FIGURE 3-3 on page 40).

▼ To Use the Windows Start Menu, Programs List

During VOP installation, the installation wizard created a pointer in the start menu program list to the LTOVOP executable file.

1. **Click *Start*, point to All *Programs*, and the Single Drive *VOP* folder.**

   Note – Older versions of VOP listed the folder name as VOP.

   Note – The installation process for certain versions of VOP provides a quick start for LTOVOP. Make sure to select the VOP option if multiple options are present.

2. **Click the pointer name (Single Drive LTO VOP).**

   The LTO VOP window opens (FIGURE 3-3 on page 40).

   Note – There is a noticeable delay for the LTO VOP application window to open for the first time of every PC power-on session while your anti-virus scans. Subsequent VOP launches, in the same powered session, are quicker.

4

VOP Operation—T-series Tape Drives

This chapter describes operation of the Virtual Operator Panel (VOP) over a direct connection to the Ethernet port of a T9840D or T10000 tape drive (see FIGURE 4-1). See Appendix B for additional guidelines when operating VOP within a multiple-drive private network. The VOP does not interact with the host data input/output interface.

The VOP has three basic operational functions:

- Monitor drive status
- View or change drive configuration settings
- Use drive operation utilities

FIGURE 4-1 SL8500 Drive Tray Ethernet Port (T-series drive)

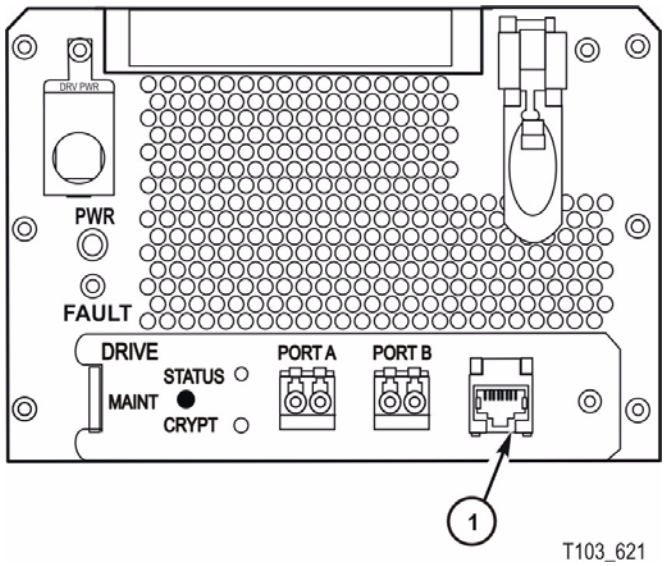


Illustration call-out:

1. Ethernet port

When a Service Delivery Platform (SDP) site unit is installed and monitoring tape drives over an Ethernet private network, the drive Ethernet port is 100% dedicated to the service network. Therefore, the drive Ethernet port is *not* available for connection to the customer VOP.

Note – Many of the sunVOP application window illustrations in this section were captured on a Windows XP platform. While the Solaris/Linux platform VOP application window has a slightly different look, the guidelines apply equally.

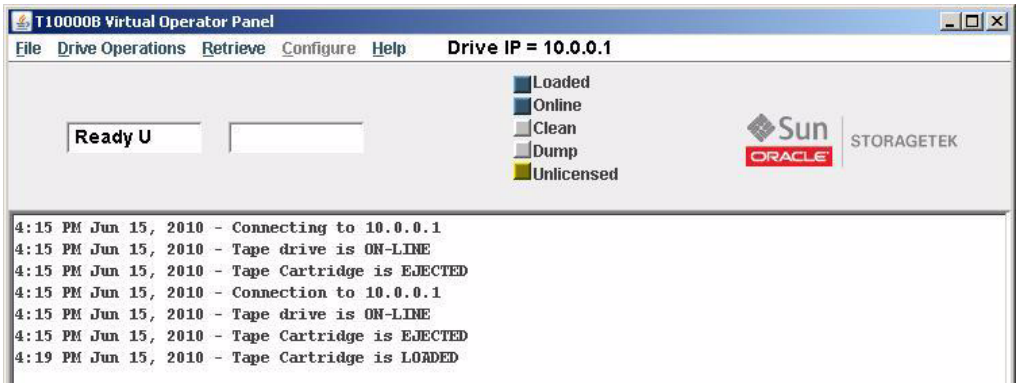
Note – Differences might exist between any illustration in this guide and the GUI you are viewing. The VOP version, the tape drive model, or the drive code level might produce alternate results such as: the number of commands in a given main menu, labeling of the encryption status LED, or parameter values for a configuration attribute.

Use sunVOP Menus and Controls

The VOP application window provides several menus (see FIGURE 4-2), several status indicators, and a text message pane presenting a transcript of the VOP actions or a prompt for additional input or actions.

Note – For VOP versions prior to 1.0.17, when the drive is online the label for the Configure menu is dimmed to indicate it is unavailable.

FIGURE 4-2 VOP Window, Main Menu, and Indicators/Controls (Version 1.0.16)



Some status indicators function as an active link to permit you to toggle the state of the monitored drive item.

Note – The following sections provide more detailed guidelines.

▼ To Use Menu Bar Selections

In general, the following steps are basic for all menus:

1. **Identify whether the menu you want to access is available.**

   Available menu items are blue.

   TIP – For VOP versions before 1.0.17, you must set the drive offline to access the Configure menu.

2. **Open an active menu.**

   A drop-down list of available commands appears. The drive must be offline to execute some commands.

3. **Click a command or sub-menu.**

   The drive message text windows, drive status indicators, and the transcript pane provide informational feedback.

   TIP – The drive must be offline to perform functions such as Format Tape.

4. **Make sure the drive is in the online state before ending a VOP session.**

File Menu

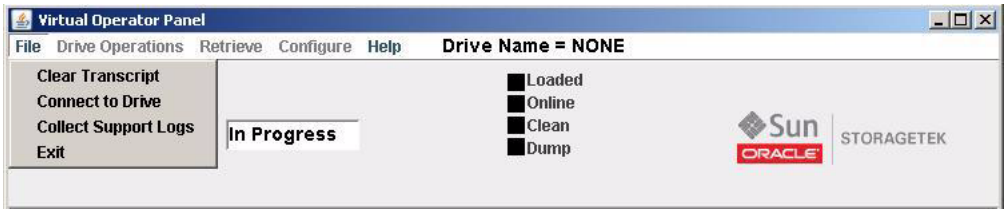
Note – Commands in the File and Help menu are available whether VOP is connected to a drive or not, and if connected when the drive is either online or offline.

The File menu (FIGURE 4-3) has four commands. A description of each command is provided in the following table.

TABLE 4-1 File Menu Commands

Command	Description
Clear Transcript	Clears the entire VOP transcript pane and closes the file menu.
Connect to Drive	Connects VOP to the tape drive. **Note** - You must be connected to the drive before you can use the Drive Operations, Retrieve, or Configure menus.
Collect Support Logs	Collects drive log files that you can forward to product support for analysis.
Exit	Disconnects VOP from the tape drive and closes the VOP window.

FIGURE 4-3 File Menu Commands



▼ To Use the Clear Transcript Command

Use the Clear Transcript command to empty the transcript pane.

1. **Open the File menu.**

   TIP – Choose File from the menu bar or use the ALT+F keyboard shortcut.

2. **Click Clear Transcript.**

   The entire VOP transcript pane clears and the file menu closes.

▼ To Use the Connect to Drive Command

Use the following guidelines to connect VOP to a designated drive:

1. **Open the File menu.**

   TIP – Choose File in the menu bar or use the ALT+F keyboard shortcut.

2. **Click Connect to Drive or use the SHIFT+C keyboard shortcut.**

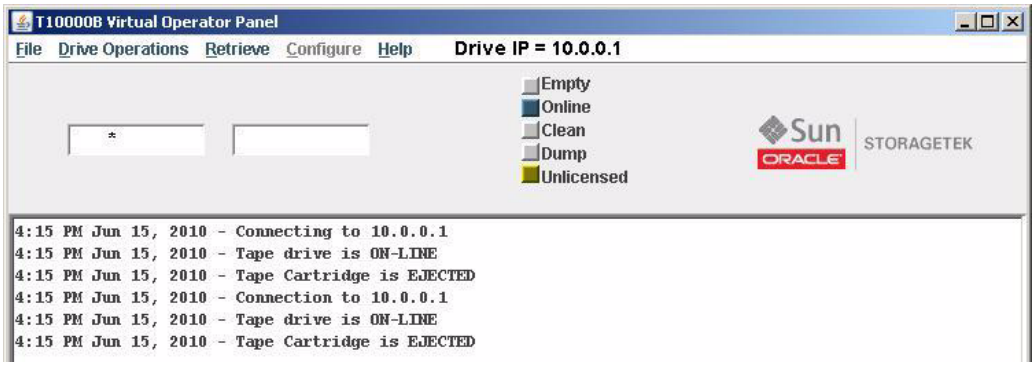
   The Connect to Drive (VOP 1.0.17 and prior) or Authentication (VOP 1.0.18) dialog box opens. See FIGURE 3-2 on page 37 for an example of the Authentication dialog.

FIGURE 4-4 Connect to Drive Dialog Box

3. **(Optional) Enter the drive password, if prompted (see "Security" on page 95).**

4. **Enter the IP address of the drive in the dialog box and click the OK or Connect button, as applicable.**

   After the VOP establishes connection with the designated drive, the VOP window changes to the connected stage.



In the connected stage, the menu bar contains the drive IP address or alias, additional menus are accessible, the status indicators are a color other than black, and the text pane/transcript contains message text.

> **Note –** When you connect to a T10000C tape drive, a hibernation status indicator is present to the right of the Dump indicator.

5. **(Optional) To connect VOP to a different drive, perform the appropriate action:**

   a. **Determine if you are using a crossover cable connection to a single drive:**

      If no, go to Step b. If yes, perform the following actions:

      i. Disconnect the crossover cable from the tape drive.

      ii. Reconnect the cable to a different drive.

      > **Note –** If the drive uses a different IP address, perform Step 2 through Step 4 to designate the IP address of the new drive.

   b. Leave the Ethernet cable connected to the PC private-network switch, and designate the new drive IP address (see Step 2 through Step 4).

      > **Note –** The text pane shows that VOP disconnects from the old drive and connects to the new Drive IP address.

▼ To Use the Collect Support Logs Command

1. **Open the File menu.**

   > **TIP –** Choose File from the menu bar or use the ALT+F keyboard shortcut.

2. **Click Collect Support Logs.**

   > **TIP –** With VOP 1.0.16 and higher, you can use the SHIFT+S keyboard shortcut.

   A text pane message appears after each log is collected, and a final message indicates the location of the archive (.zip) message file. Note that an information message appears if WinZip is not installed on your PC.

▼ To Use the Exit Command

1. **Open the File menu.**

   > **TIP –** Choose File from the menu bar or use the ALT+F keyboard shortcut.

2. **Click Exit or use the SHIFT+E keyboard shortcut.**

   The VOP application window closes. If the VOP was connected to a drive, the Ethernet connection terminates.

Drive Operations Menu

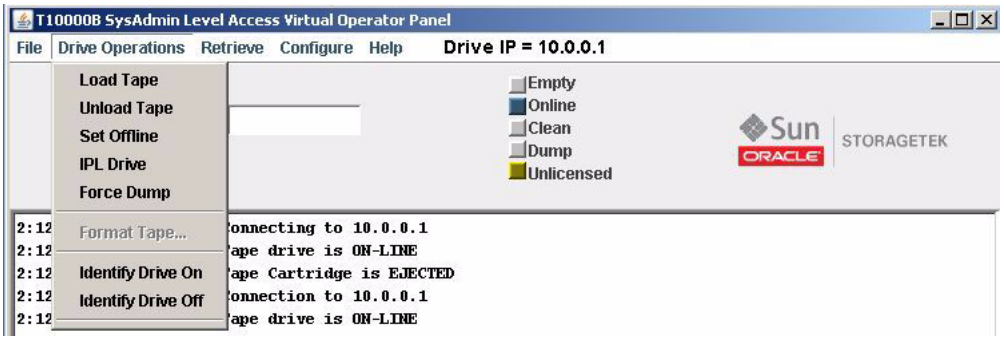
Note – You should consult either the *T10000 Tape Drive Operator's Guide* or the *T9840 Tape Drive User's Reference Manual* for additional information regarding the tape drive, use of a cartridge tape, and general operating procedures.

You access the Drive Operations commands (FIGURE 4-5 on page 49) from the main menu or by using the ALT + D shortcut keys. A description of the commands is provided in the following table. The drive must be encryption-enabled for some commands to appear.

TABLE 4-2 Drive Operations Menu Commands

Command	Description
Load Tape	This command loads a cartridge that is presently in the cartridge loading slot.
Unload Tape	This command causes a loaded cartridge to rewind and unload.
Set Offline or Set Online	This command changes the tape drive state. The command name is opposite of the current drive state (for instance, Set Offline when the drive is online).
IPL Drive	This command starts a tape drive initial program load (IPL).
Force Dump	This command dumps the current contents of various drive registers to a file.
Format Tape	This command calls a dialog box to reformat a data cartridge as a code tape, data tape, or dump tape. It also rebuilds the contents of the tape Media Information Region (MIR). The drive must be offline to use this command.
Identify Drive On	This command causes the Drive Status indicator to flash (on a T10000A/B drive the indicator uses a fast flash rate while the T10000C drive indicator changes color between green and blue). The indicator stops flashing after five minutes. It was added to version 1.0.18.
Identify Drive Off	This command stops the Identify Drive On command, and the Drive Status indication returns to the previous state.
Reset Drive	This command is used on an encryption-enabled drive to remove all media keys and device keys from the drive. The drive is inoperable until both are reloaded. **Note –** The drive must be in the reset state to turn encryption off.
Zero Drive	This command meets the FIPS requirement to destroy the encryption-enabled drive. All keys, including the internal enabling key, are deleted and render the drive useless. **Note –** This command was removed from version 1.0.18.
Set Power Hibernate	This command forces the T10000C tape drive into the hibernation state. The status indicator label shows Hibernate and the color is grey.
Set Power Active	This command forces the T10000C tape drive out of the hibernation state. The status indicator label shows Active and the color is blue. It takes approximately 20 seconds for the drive to wake up from the hibernation state.

FIGURE 4-5 Drive Operations Menu (VOP Version 1.0.18 and T10000B)



▼ To Use the Load Tape Command

Use this command to reload a cartridge that was previously unloaded but that was not removed from the tape drive loading slot.

1. **Open the Drive Operations menu.**

   TIP – Click Drive Operations in the menu bar or use the ALT+D keyboard shortcut.

2. **Click Load Tape or use the SHIFT+L keyboard shortcut.**

   The drive loads the cartridge that is present in the tape drive loading slot. A *ready* message appears in the primary drive message window after the tape advances to the beginning of tape (FIGURE 4-2 on page 44). A message also appears in the text pane to identify that the cartridge is loaded.

▼ To Use the Unload Tape Command

1. **Open the Drive Operations menu.**

   TIP – Click Drive Operations in the menu bar or use the ALT+D keyboard shortcut.

2. **Click Unload Tape or use the SHIFT+U keyboard shortcut.**

   A loaded cartridge rewinds and unloads. The text pane shows the unload message and a message appears in the primary drive message window.

3. **Remove the tape cartridge from the drive load slot.**

   Note – You must physically remove an unloaded cartridge from the drive by library robotics or manually from the rack mount configuration. Otherwise, the cartridge remains in the loading slot, but *not* loaded into the drive.

▼ To Use the Set Offline/Online Command

- When the tape drive is online, this command reads Set Offline.
- When the tape drive is offline, this command reads Set Online.

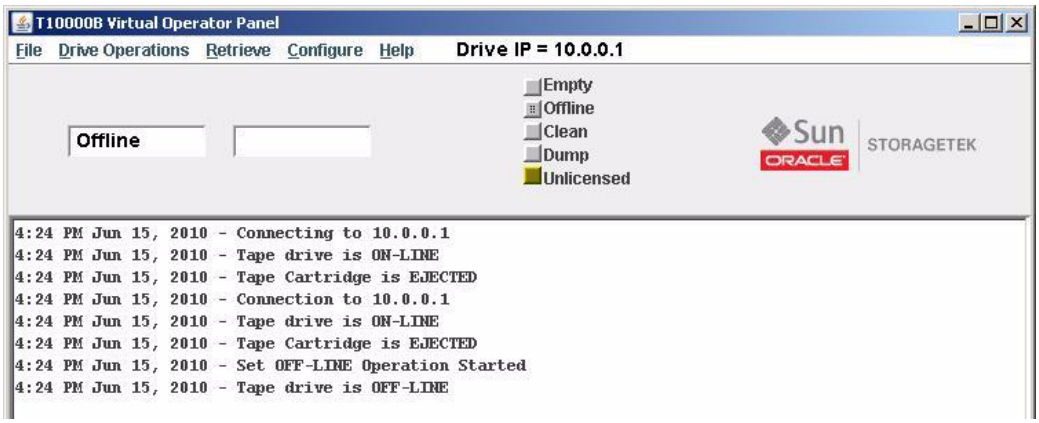
1. **Open the Drive Operations menu.**

   TIP – Click Drive Operations in the menu bar or use the ALT+D keyboard shortcut.

2. **Click Set... or use the SHIFT+O keyboard shortcut.**

   Note – If the drive is in the online state, a dialog box appears and you must confirm for the IPL action to continue.

   The message pane example below shows when the Set OFF-LINE operation starts and when the tape drive is OFF-LINE. As the drive goes offline, the status indicator turns gray, the label changes to Offline, and the Offline message appears in the primary drive message window.



   In addition, the label for the Configure menu turns blue.

   Note – You can also click the Online/Offline status indicator to change the drive state.

▼ To Use the IPL Drive Command

1. **Open the Drive Operations menu.**

   TIP – Click Drive Operations in the menu bar or use the ALT+D keyboard shortcut.

2. **Click IPL Drive.**

   If the drive is online, a dialog box appears. Confirm that you want to proceed with the IPL.

   The tape drive performs an initial program load (IPL).

   Note – VOP loses communications with the drive during the IPL. Once the drive IPL is successfully completed, VOP automatically reconnects with the drive.

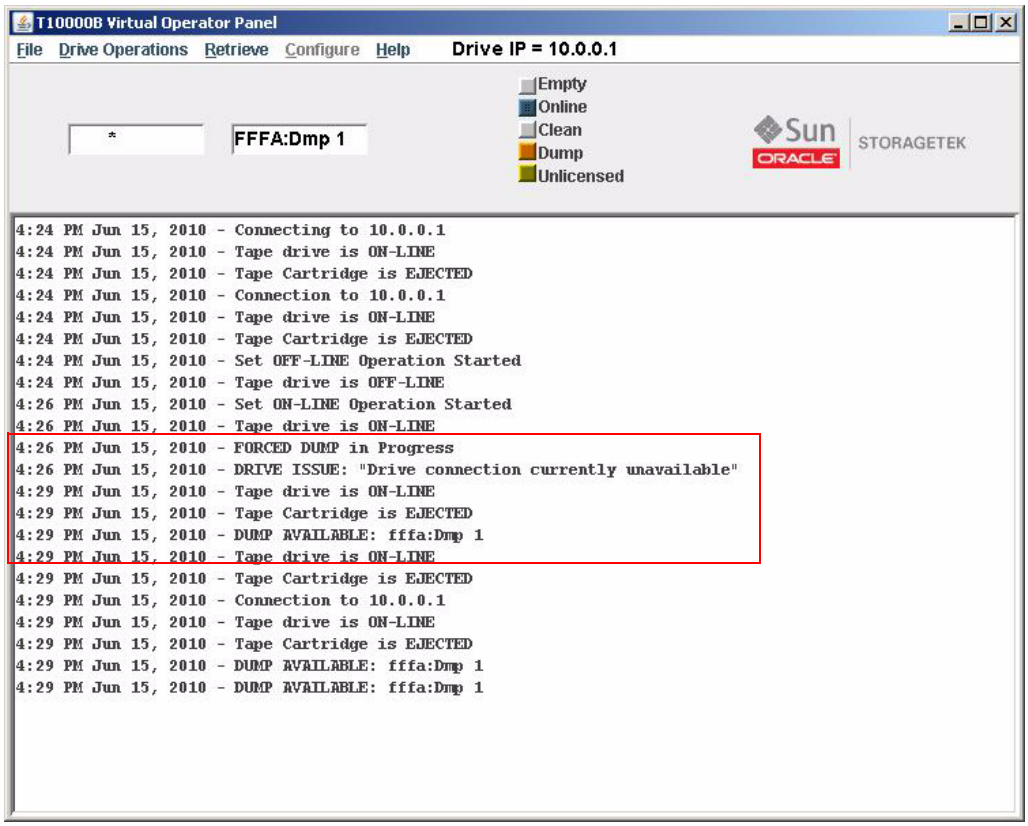
▼ To Use the Force Dump Command

1. **Open the Drive Operations menu.**

   TIP – Click Drive Operations in the menu bar or use the ALT+D keyboard shortcut.

2. **Click Force Dump.**

   The drive stores the dump to internal memory, and the dump status indicator changes to orange in approximately three minutes. The forced dump operation causes a drive IPL, and the VOP loses connection with the drive during the IPL. After the drive successfully completes the IPL, FFFA appears in the secondary drive message window. See the following figure.



Format Tape Command

Note – You must load (mount) and unload (dismount) a cartridge when you use any of the Format Tape functions. This might require you to use a library control path command or utility.

The offline Format Tape command launches a dialog box that provides four utilities that are described in the following table.

TABLE 4-3 Format Tape Utilities

Function	Description
Make data tape	The Make Data Tape utility reformats a tape cartridge for reuse as a *data* tape cartridge. Existing headers are removed and the Media Information Region (MIR) is rewritten to identify the cartridge as empty and therefore ready for write operations.
Make code tape	The Make Code Tape utility reformats a tape cartridge with a special format, and downloads the drive firmware from the drive memory to the tape cartridge. The MIR is then written to identify the cartridge as a *code* tape. You can use the code tape to upload drive firmware to other tape drives. The T9840D requires a configuration setting (see FIGURE 4-28 on page 84) followed by the loading of a full code image.
Make dump tape	The Make Dump Tape utility reformats a tape cartridge with a special format. The MIR is written to identify the cartridge as a *dump* tape. You can use a formatted dump tape to download diagnostic *dump* data from drive memory.
Rebuild MIR	You can use the Rebuild MIR utility to repair a data tape cartridge that has an invalid or corrupted MIR. The utility reads the file headers all the way to the End of Data mark. Then, the MIR is rewritten to correctly reflect the tape contents. This utility could take well over one hour to rebuild the MIR on a full or nearly full data tape cartridge. See "Media Information Region" in the *T10000 Tape Drive Operator's Guide*, PN 96174 for additional MIR information.

The dialog box also contains three command buttons:

- Make - Initiates the selected utility.
- Abort - You can select this option before you load a cartridge in the drive to terminate the utility.
- Done - Closes the dialog box.

Caution – Possible data loss. Do not use a customer data tape to make a code tape or a dump tape.

▼ To Format a Tape Cartridge (*Offline*)

Use the following general guidelines to perform any of the utilities:

1. **Make sure the drive is offline.**

   If not offline, perform one of the following actions:

   a. **Click the Online status indicator.**

   b. **Open the Drive Operations menu and click Set Offline (see FIGURE 4-5 on page 49 and "To Use the Set Offline/Online Command" on page 50).**

   c. **Use keyboard shortcut (ALT+D to open the Drive Operations menu followed by SHIFT+O to set the drive offline).**

2. **Click Format Tape.**

   The Format Tape Cartridge dialog box appears.

3. **Click the appropriate utility.**

4. **Click the *MAKE* button or use the ALT+M keyboard shortcut to start the selected utility.**

   A prompt appears in the transcript directing you to insert a cartridge.

   Note – If there is a cartridge in the drive, it unloads. You must physically remove the unloaded cartridge.

   TIP – Before inserting the cartridge, you can cancel a selected utility by clicking the **ABORT button or use the ALT + A keyboard shortcut**. After you insert the cartridge, the utility runs to completion.

   Caution – Do not use the Make Code Tape or Make Dump Tape functions with a customer data tape.

5. **Insert a write-enabled cartridge.**

   TIP – See FIGURE 4-6 on page 54 for the location of the write-protect switch. Make sure the switch is in the write-enabled position as indicated by the open padlock icon.

FIGURE 4-6 Tape Cartridge Write-Protect Switch

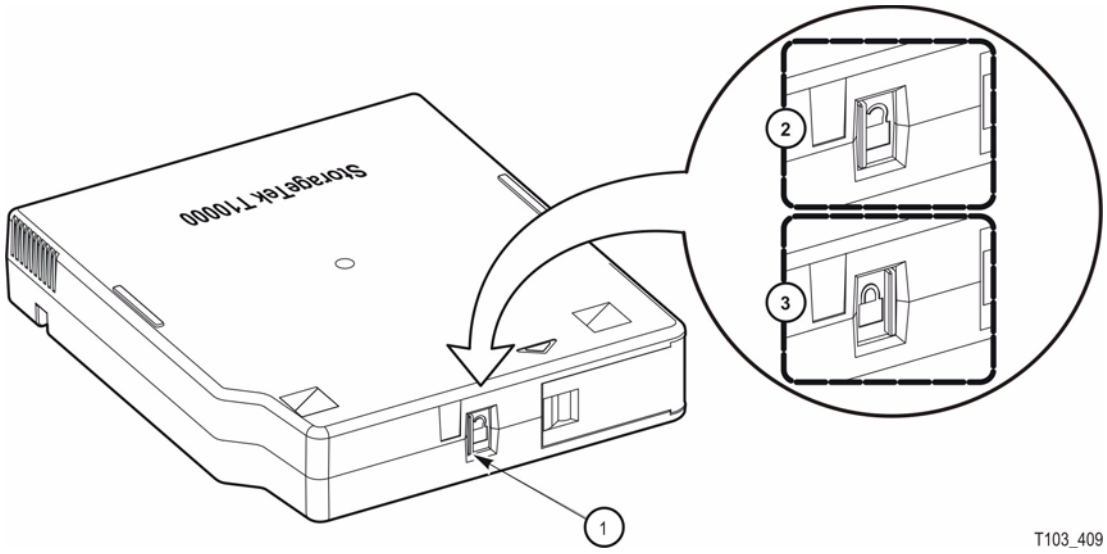


Illustration call-outs (3)
1. Write-protect switch
2. Unlocked position
3. Locked position

The drive performs the selected utility, displays related information in the VOP transcript pane, then unloads the cartridge.

6. **Remove the unloaded cartridge.**

   You now have the following options:

   - Repeat the current selected format tape command (go to Step 4 on page 53).
   - Select a different format tape command (go to Step 3 on page 53).
   - Exit the format tape submenu (continue with Step 7).

7. **Click the *DONE* button or use the ALT+D keyboard shortcut to exit the format tape submenu.**

   The Format Tape Cartridge dialog box closes.

▼ To Use the Identify Drive On Command

1. **Open the Drive Operations menu.**

   TIP – Click Drive Operations in the menu bar or use the ALT+D keyboard shortcut.

2. **Click Identify Drive On.**

   The drive status indicator on the rear panel of the drive starts to flash. The drive must have the appropriate firmware installed to provide this capability.

▼ To Use the Identify Drive Off Command

1. **Open the Drive Operations menu.**

   TIP – Click Drive Operations in the menu bar or use the ALT+D keyboard shortcut.

2. **Click Identify Drive Off.**

   The drive status indicator on the rear panel of the drive stops flashing.

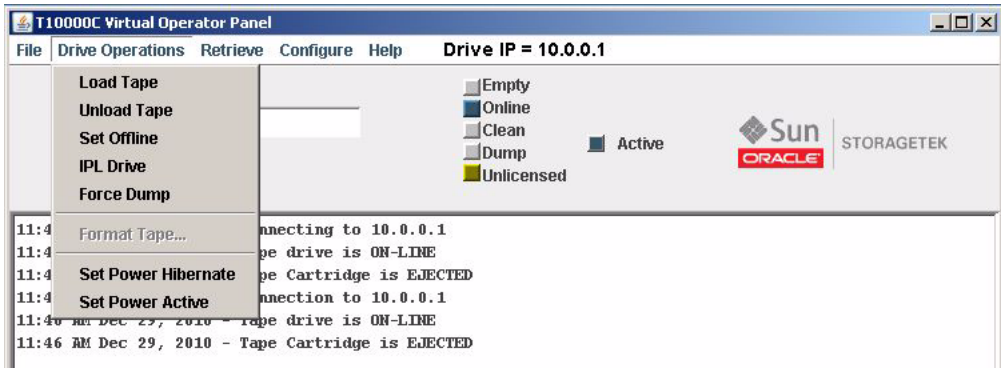
T10000C Commands

The Drive Operations menu has additional commands for the T10000C tape drive:

- Set Power Hibernate
- Set Power Active

An indicator for the hibernation function is present to the right of the Dump indicator (see FIGURE 4-7). The label for the indicator reflects the current state (Active or Hibernate) and is shown in the figure.

FIGURE 4-7 Drive Operations Menu Showing T10000C Tape Drive Differences



If the hibernation indicator shows Active, you can force the drive into the hibernation state by selecting the Set Power Hibernate command. The indicator color changes from blue to grey and the label changes to Hibernate.

If the hibernation indicator shows Hibernate, you can force the drive to wake up from the low power state by selecting the Set Power Active command. It takes approximately 20 seconds for the indicator to change color to blue and the label to show Active.

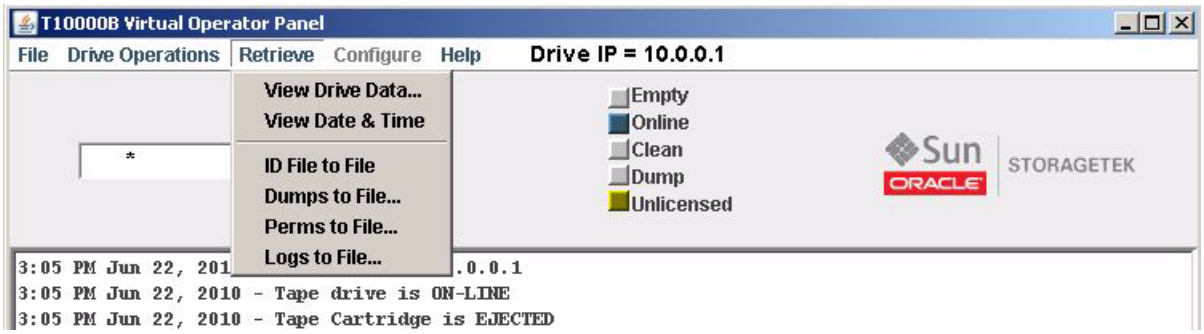
Retrieve Menu

The Retrieve menu (FIGURE 4-8) has six commands. You can access the menu by choosing Retrieve in the menu bar or by using the ALT+R keyboard shortcut. A description of each command is provided in the following table.

TABLE 4-4 Retrieve Menu Commands

Command	Description
View Drive Data	This command uses selectable property sheets (tabs) to show the current drive configuration settings and other drive data.
View Date & Time	This command shows the setting of the internal timer in the drive.
ID File to File	This command retrieves and saves the ID file to the ID folder in the VOP directory.
Dumps to File	This command retrieves and saves diagnostic dumps that are currently stored in the drive memory.
Perms to File	This command retrieves and saves all the permanent errors that are currently stored in the drive memory.
Logs to File	This command retrieves and saves event logs that are currently stored in the drive memory.

FIGURE 4-8 Retrieve Menu



Note – The Retrieve menu is available when the drive is online or offline.

Additional information is available in the following sections:

- "View Drive Data Command" on page 57
- "To Use the View Date & Time Command" on page 71
- "To Use the ID File to File Command" on page 71
- "To Use the Save Dumps to a File Command" on page 71
- "To Use the Perms to File Command" on page 73
- "To Use the Logs to File Command" on page 73

View Drive Data Command

The View Drive Data command uses dialog box pages to show the current drive configuration settings and other drive data. The page names for an encryption-capable drive are:

- Encrypt (encryption-capable drive)
- Fibre - shows either Fibre Channel or FICON properties based upon the interface
- Keyid (encryption-capable drive)
- Maintenance (was added to VOP 1.0.18)
- Manufacturing
- Missing (encryption-capable drive)
- Network
- Power settings to support the T10000C automatic hibernation function
- Rfid (a cartridge must be loaded in the drive) - not available on a T9840D drive
- Version

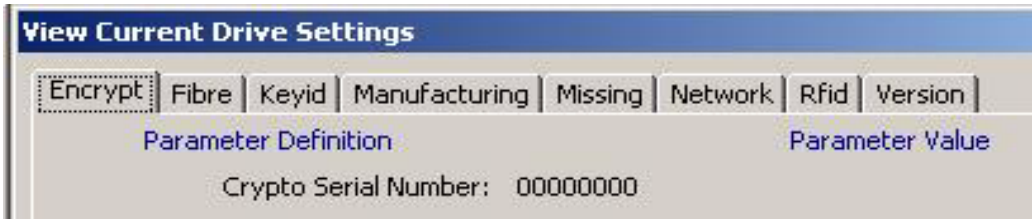
The View Current Settings window of an encryption-capable drive shows the Encrypt page (FIGURE 4-9 on page 58) while a drive that is not encryption-capable shows the Fibre page (FIGURE 4-11 on page 60).

Note – Many of the following pages contain example screens.

▼ To Use the View Drive Data Command

1. **Open the Retrieve menu or use the ALT+R keyboard shortcut.**
2. **Click View Drive Data or use the SHIFT+V keyboard shortcut.**

   The View Current Drive Settings dialog box appears.



Note – The View Current Drive Settings pages are for viewing purposes only. See "Configure Menu" on page 74 for detailed descriptions and guidelines regarding the changing of any configuration setting.

3. **Click the tab for the page that you want to view.**

   The page shows the current drive settings for that property.

4. **(Optional) Click a different page tab.**

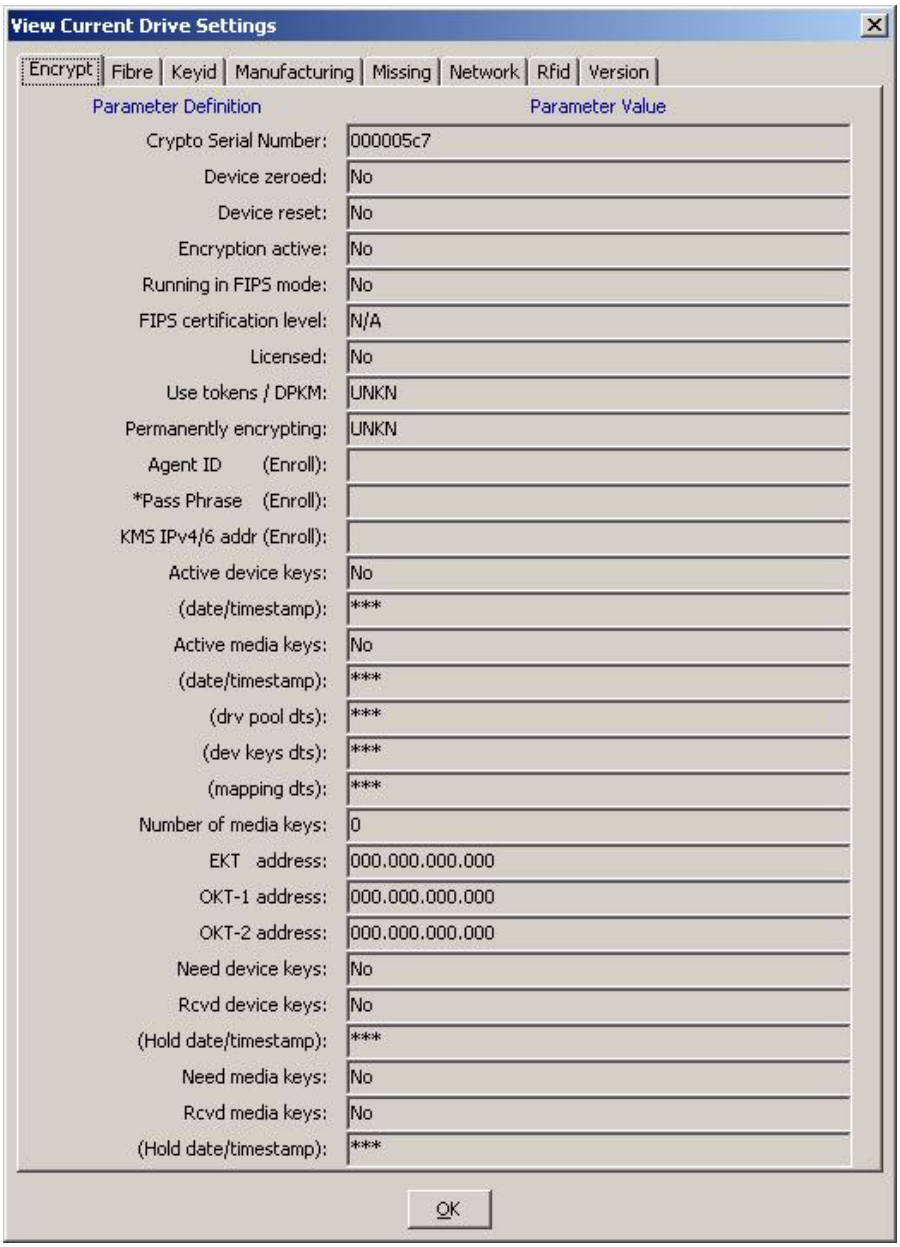
   Note – Repeat as applicable to gather all required information.

5. **Click the OK button or use the ALT+O keyboard shortcut to close the window.**

Encrypt Page

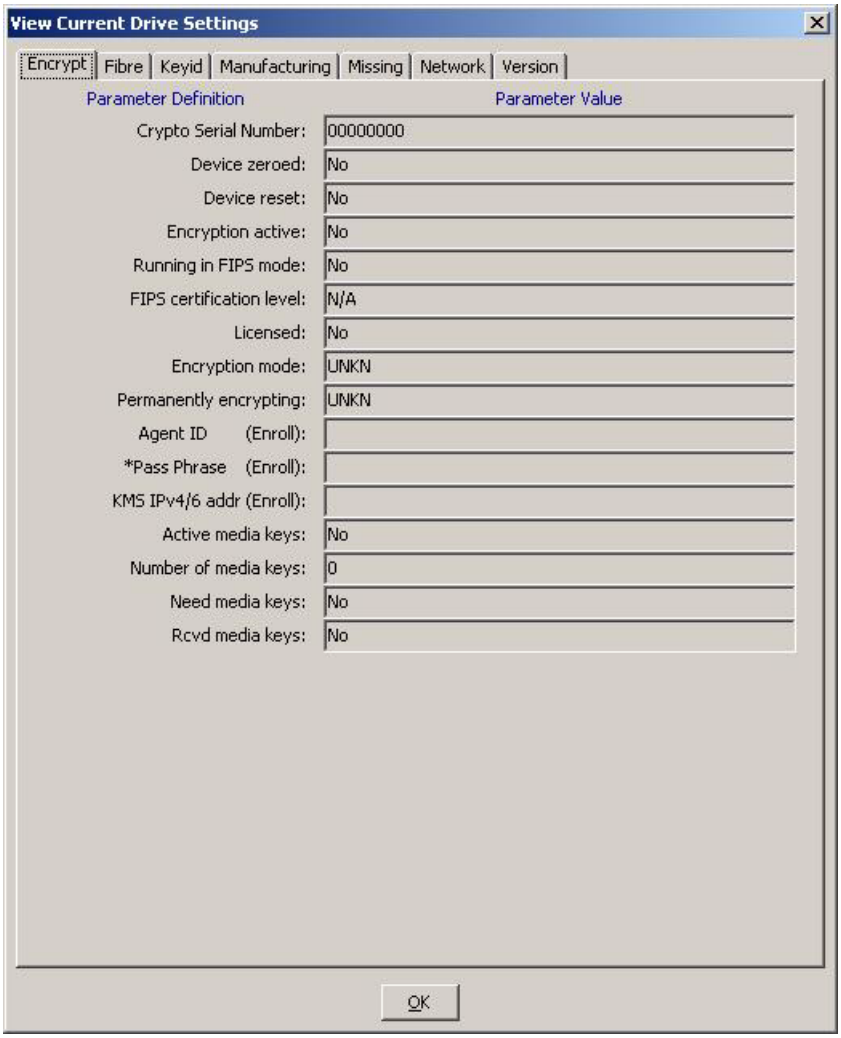
The Encrypt page shows encryption-related data: see FIGURE 4-9 for a T10000 drive or see FIGURE 4-10 on page 59 for a T9840D drive.

FIGURE 4-9 View Current Drive Settings, Encrypt Page (T10000 Drive)



If you want additional information on FIPS aspects of the drive, see the document titled *T10000A Encrypting Tape Drive Security Policy, T10000B Encrypting Tape Drive Security Policy,* or *T10000C Encrypting Tape Drive Security Policy.*

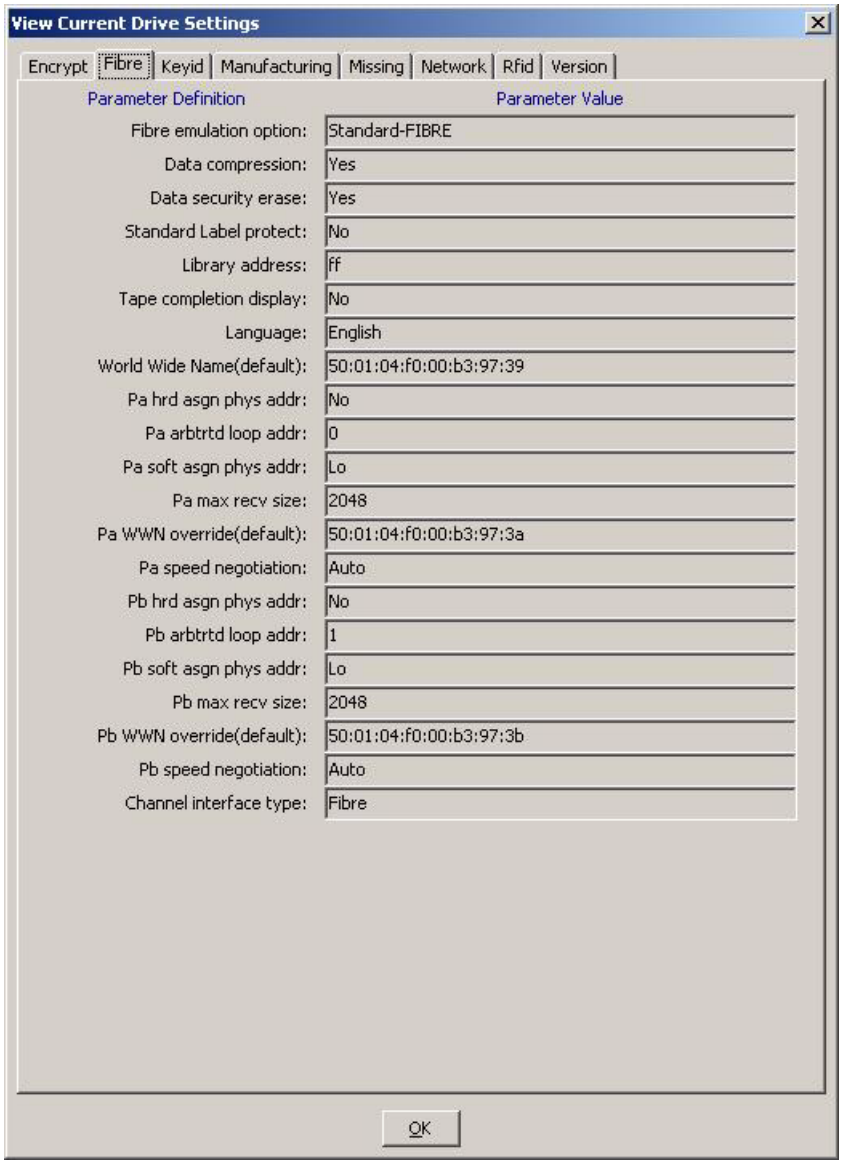
FIGURE 4-10 View Current Drive Settings, Encrypt Page (T9840D Drive)



Fibre Page

The data shown on the Fibre page is specific to the type of drive interface. The Fibre Channel Protocol (FCP), shown in FIGURE 4-11, has FCP specific data. The Fibre Interface Connection (FICON), shown in FIGURE 4-13 on page 62 has FICON specific data. There is a similar list of parameters for a T9840D drive.

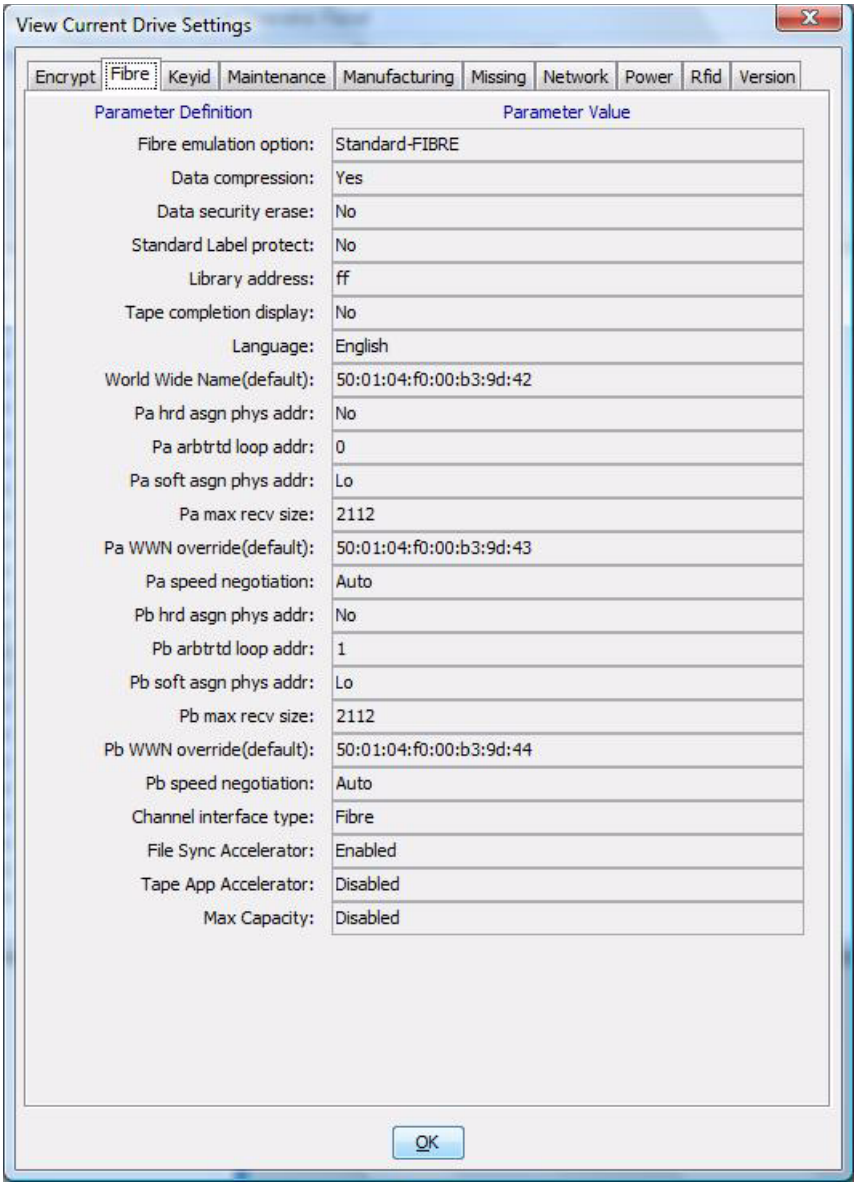
FIGURE 4-11 View Current Drive Settings, Fibre Page (FCP Interface)



Note – The T10000C tape drive has additional parameters (see FIGURE 4-12 on page 61).

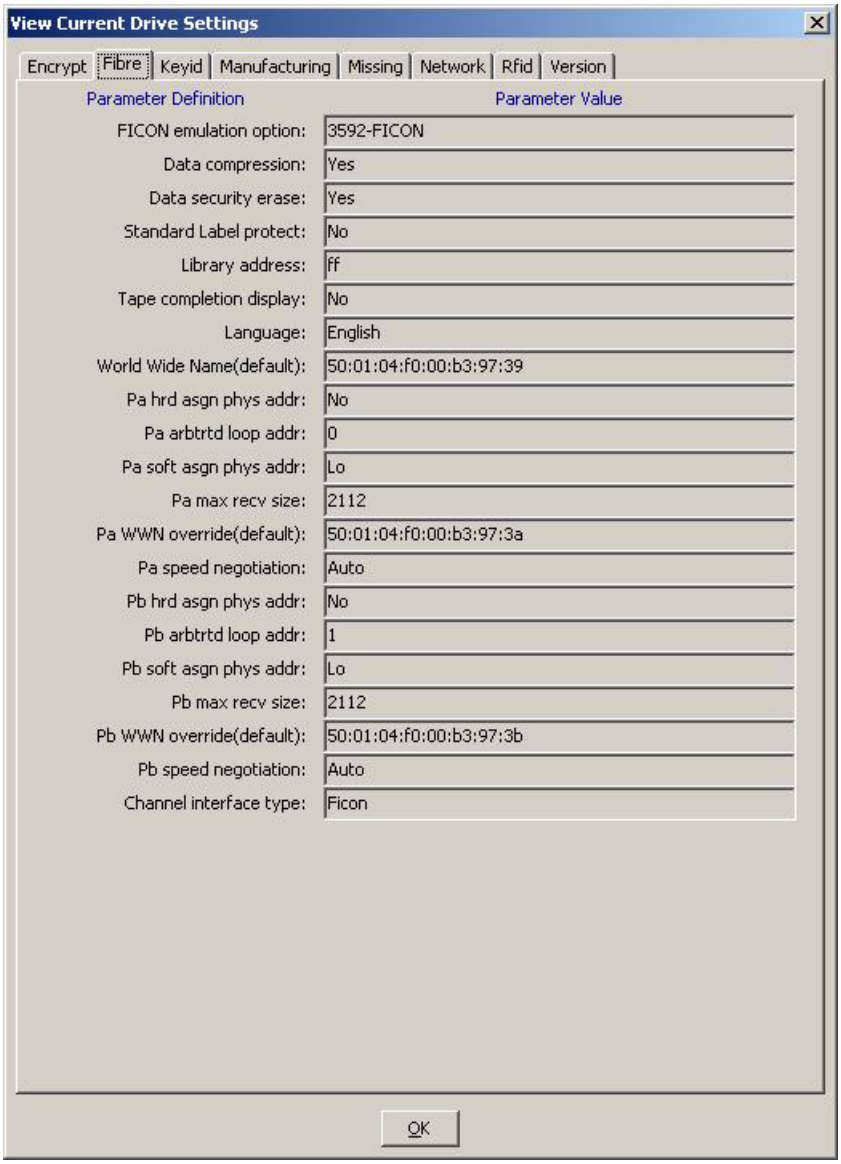
The Fibre page for the T10000C tape drive has the File Sync Accelerator, Tape App Accelerator, and Max Capacity parameters at the end of the parameter list.

FIGURE 4-12 View Current Drive Settings, Fibre Page (FCP - T10000C)



The Fibre page for the FICON interface (FIGURE 4-13) is very similar to the FCP interface (FIGURE 4-11 on page 60), with the exception of the FICON-specific emulation setting.

FIGURE 4-13 View Current Drive Settings, Fibre Page (FICON Interface)

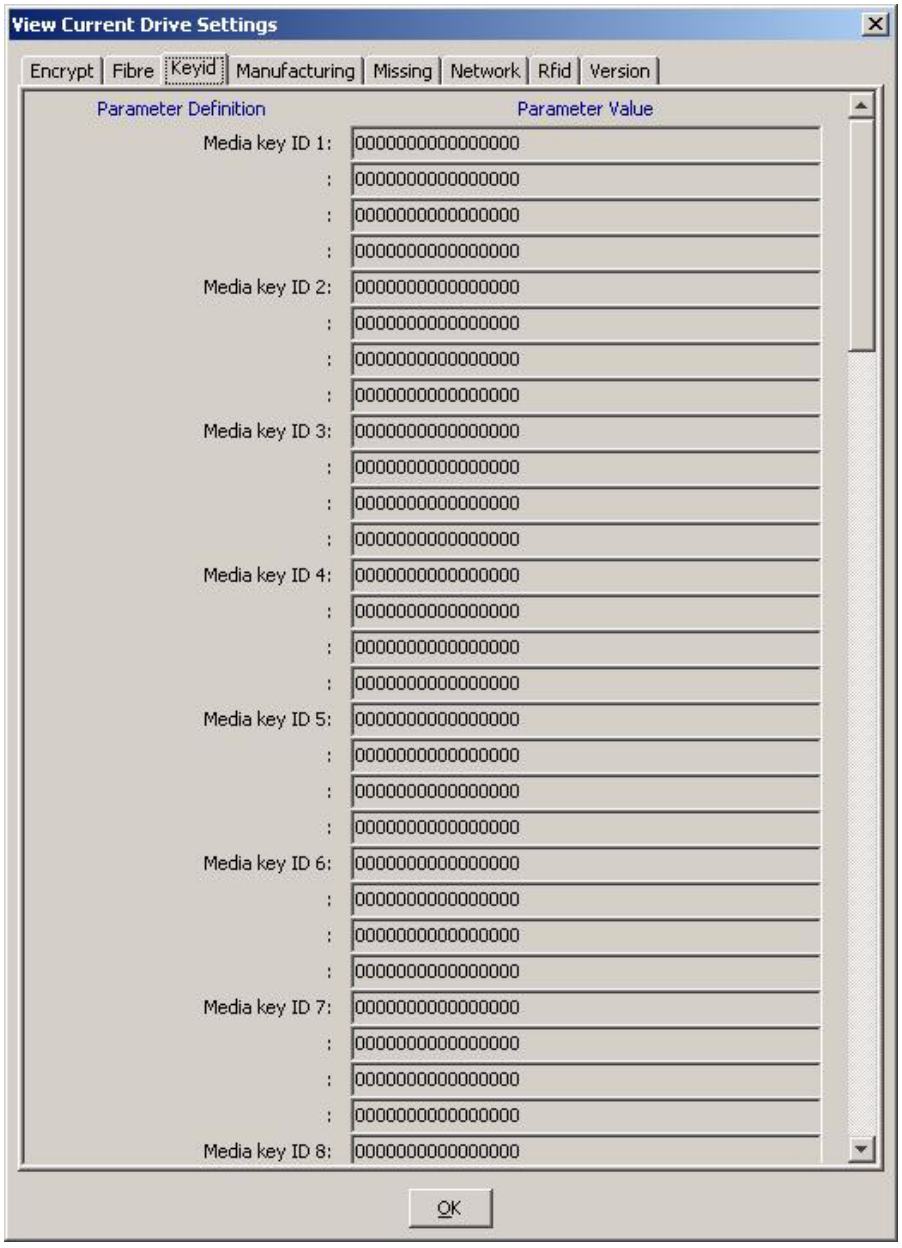


Note – The FICON page for the T10000C drive has additional parameters at the end of the list like the FCP property sheet (see FIGURE 4-12 on page 61).

Keyid Page

The Keyid page (FIGURE 4-14) shows a list of key identifiers.

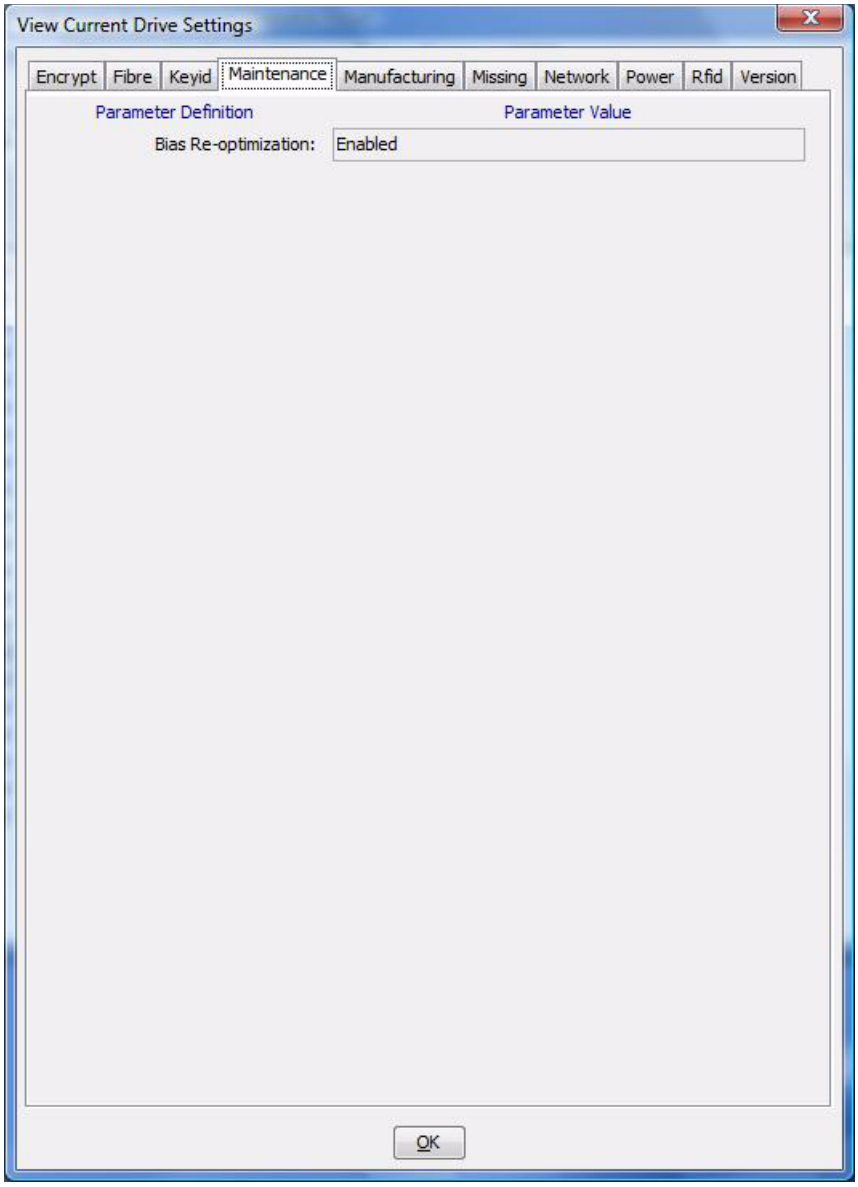
FIGURE 4-14 View Current Drive Settings, Keyid Page



Maintenance

The maintenance page shows whether a particular setting is enabled or disabled.

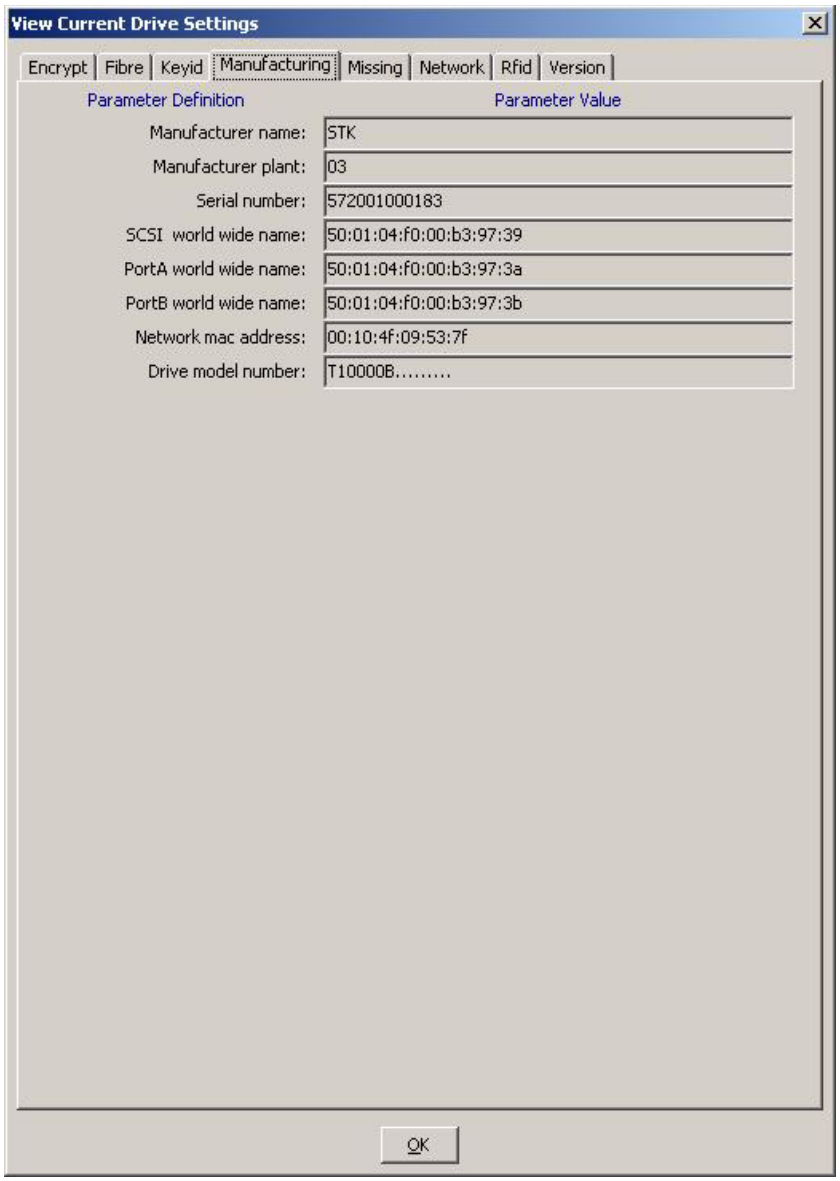
FIGURE 4-15 View Current Drive Settings, Maintenance Page



Manufacturing Page

The Manufacturing page (FIGURE 4-16) shows factory preset settings, such as drive serial number, and default world wide names.

FIGURE 4-16 View Current Drive Settings, Manufacturing Page

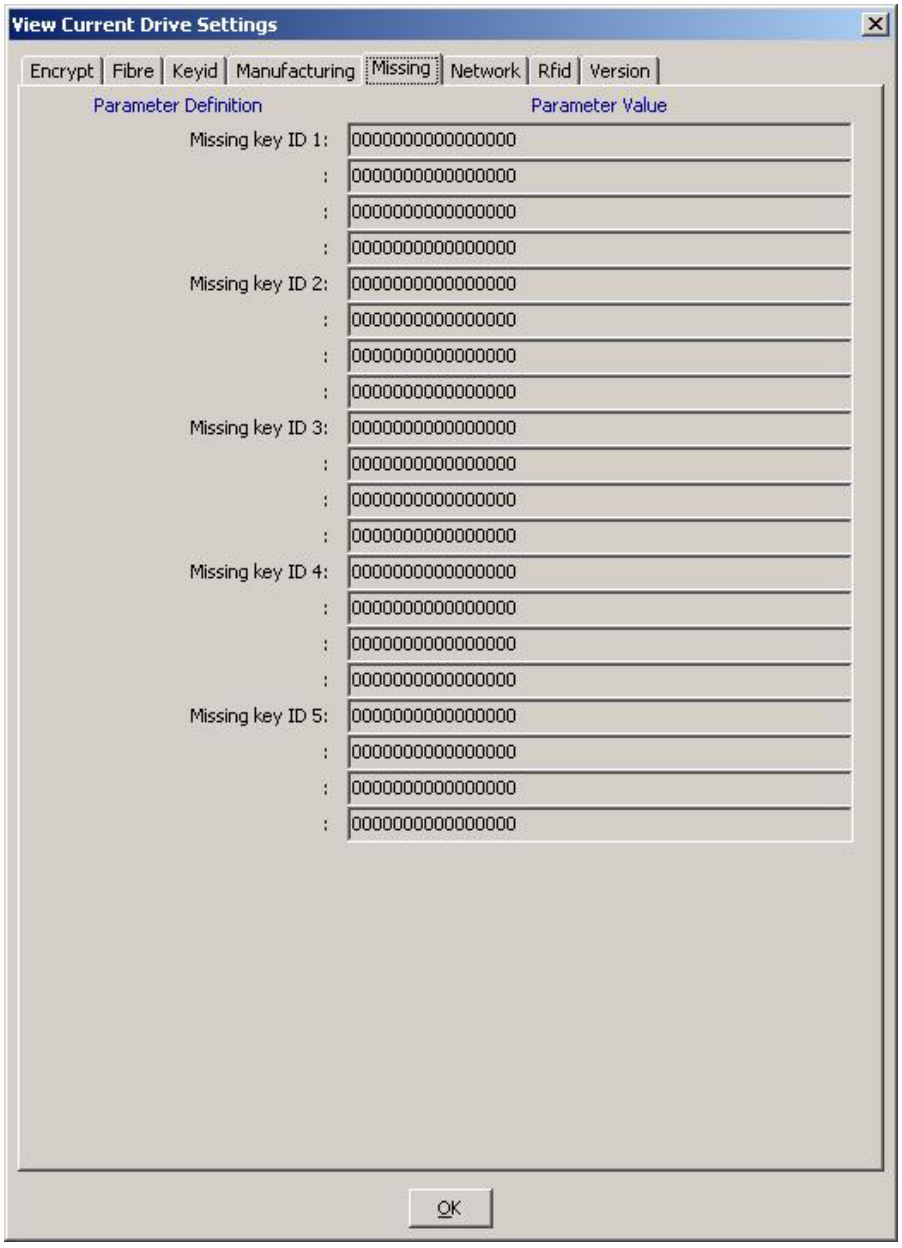


Note – The serial number of a T10000A drive begins with 531, a T10000B drive begins with 572, and a T10000C drive begins with 576.

Missing Page

The Missing page (FIGURE 4-17) shows a list of missing key identifiers.

FIGURE 4-17 View Current Drive Settings, Missing Page

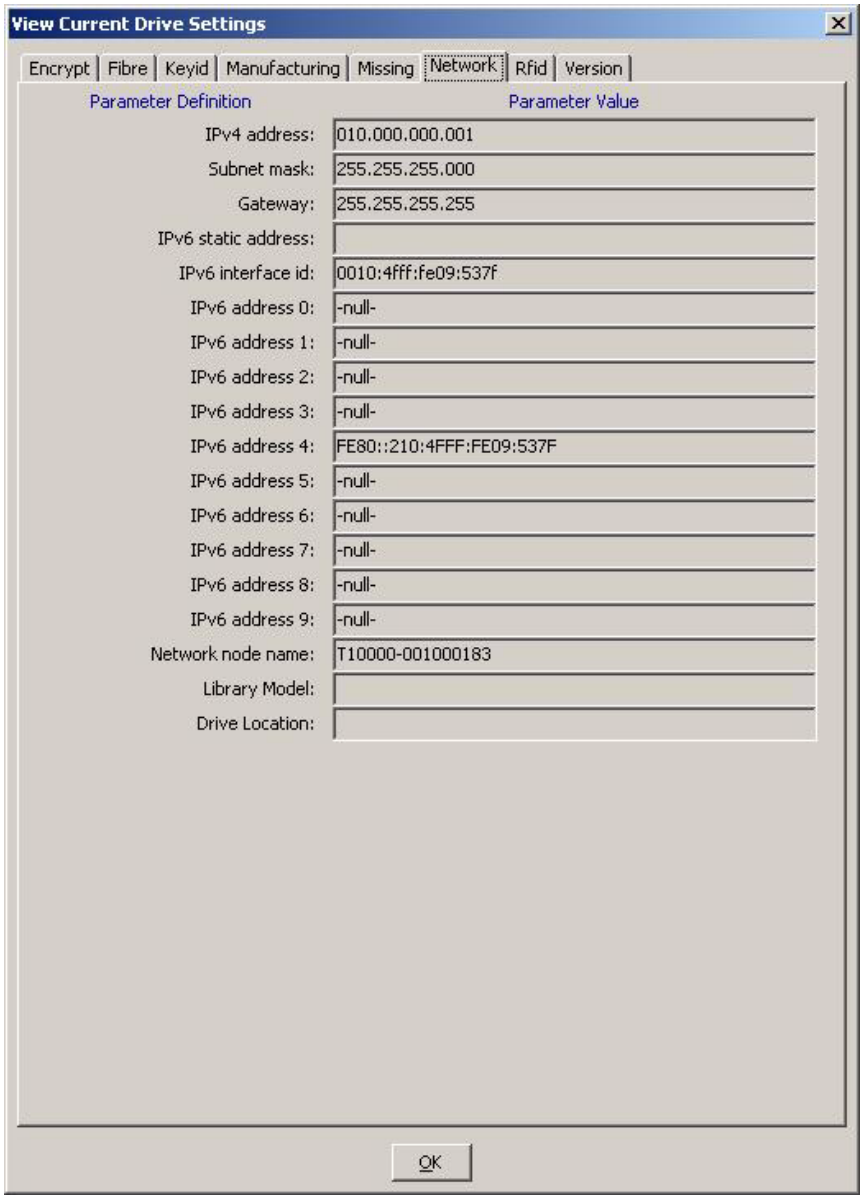


Network Page

The Network page (FIGURE 4-18) shows the Network node name. The factory preset default is comprised of the drive model number (t10000) and the last nine digits of the drive serial number.

This tab also shows the current static IP settings. FIGURE 4-18 shows factory preset static IP parameters, which can be changed through the Configure menu (see "Network Page" on page 92).

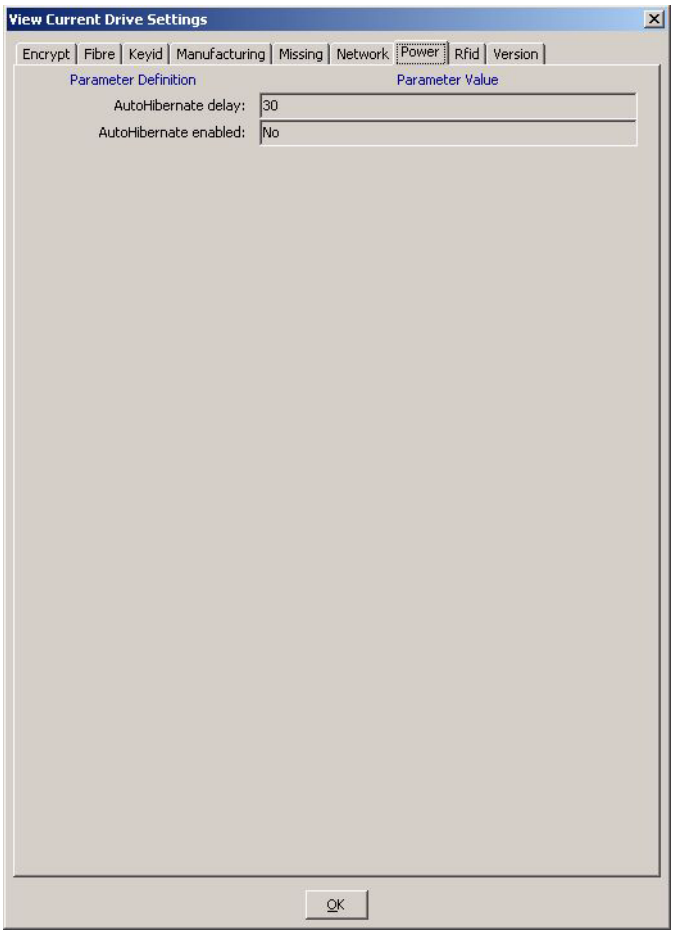
FIGURE 4-18 View Current Drive Settings, Network Page



Power Page

The Power page (FIGURE 4-19) shows the delay time for automatic hibernation and whether hibernation is enabled for the T10000C tape drive.

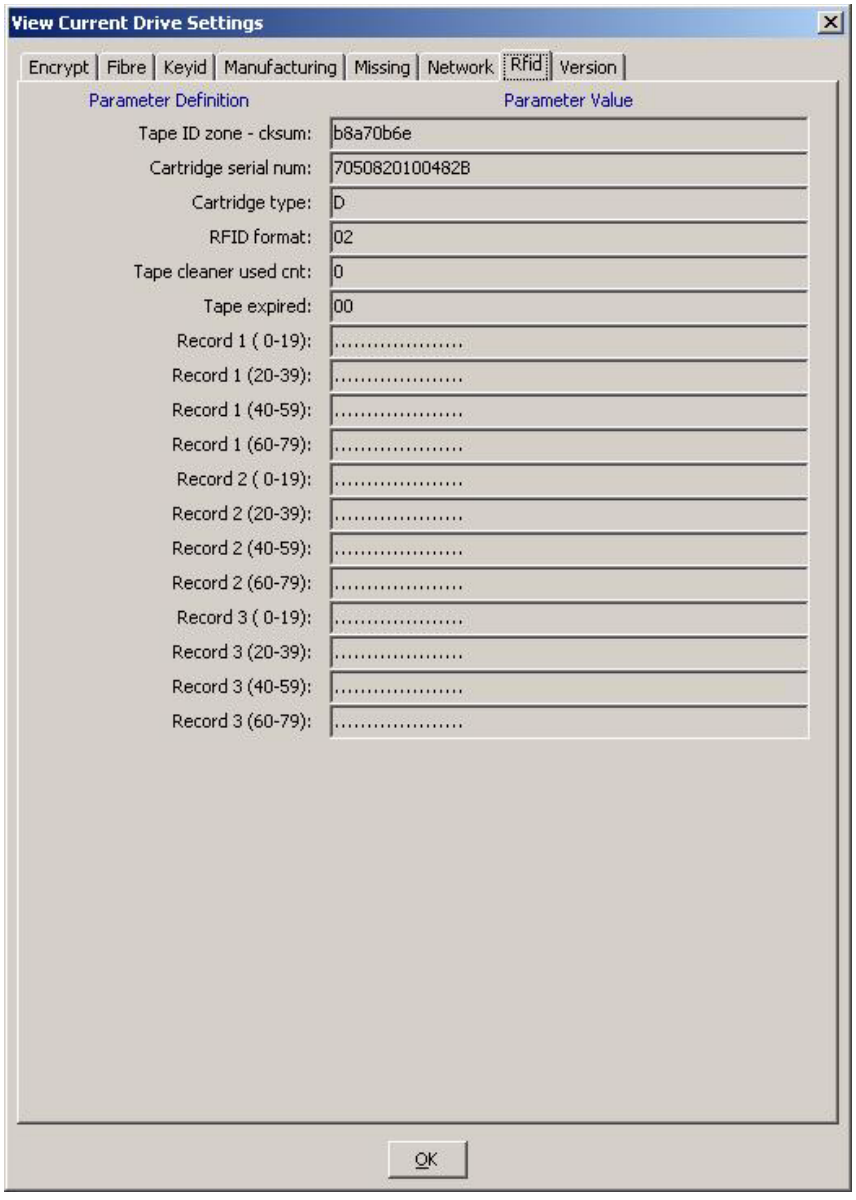
FIGURE 4-19 View Current Drive Settings, Power Page (T10000C)



Rfid Page

The Rfid page (FIGURE 4-20) shows data stored in the radio-frequency identification (Rfid) memory chip in the T10000 tape cartridge. The Rfid chip stores data related to cartridge contents and statistics. The data is similar to data stored in the media information region (MIR) on the tape, and is updated with each cartridge mount/dismount. An Rfid module in the drive reads the Rfid chip while the cartridge is loaded, and is viewable (read-only) by the VOP application.

FIGURE 4-20 View Current Drive Settings, Rfid Page

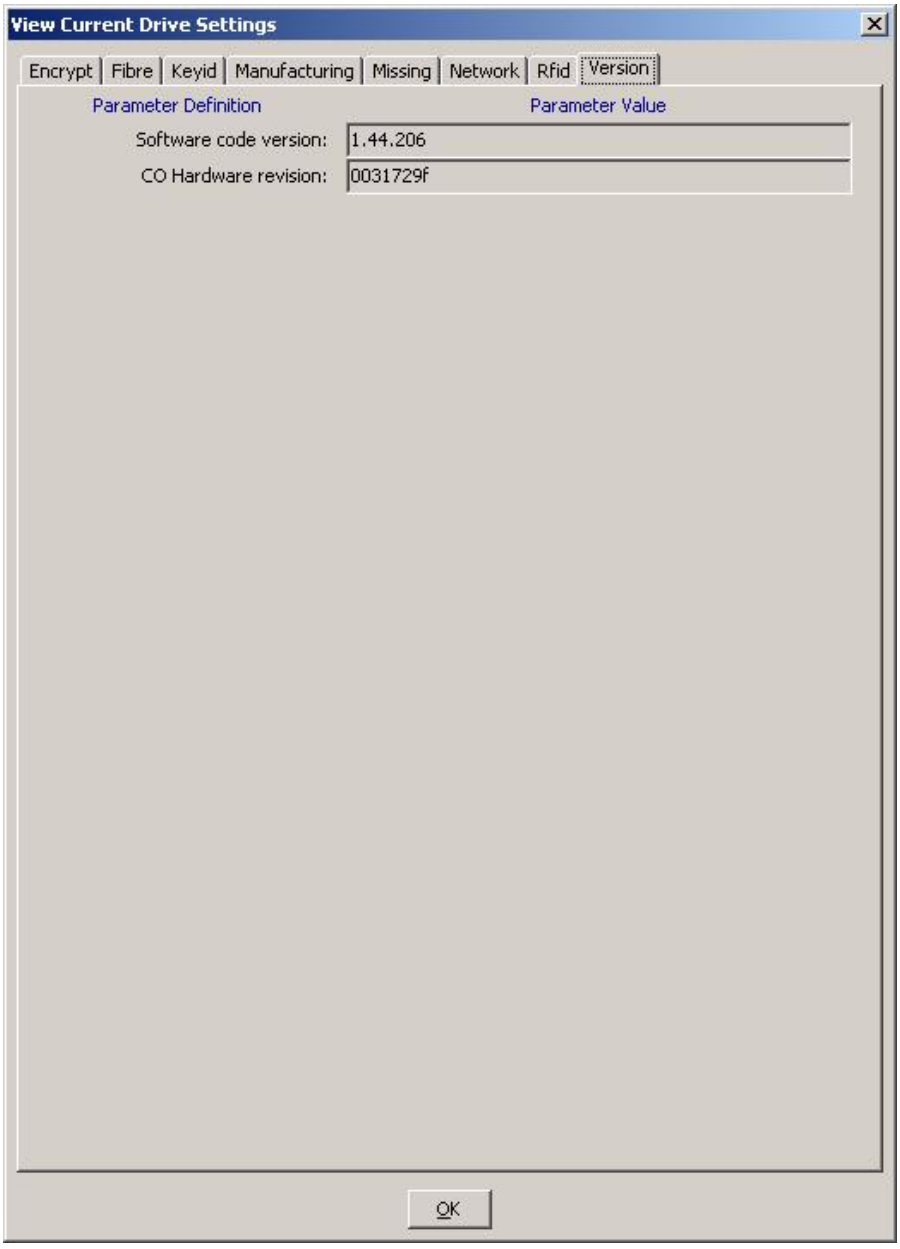


Version Page

The Version page (FIGURE 4-21) shows the current firmware and hardware levels.

> **Note –** Depending on the tape drive model, there might be additional hardware revision level information.

FIGURE 4-21 View Current Drive Settings, Version Page (T10000B example)



▼ To Use the View Date & Time Command

1. **Open the Retrieve menu.**
2. **Click View Date & Time.**

The drive date and time appears in the VOP transcript pane, as shown below.

```
8:55 AM Aug 2, 2007 - VOP LOGGED IN to Drive
8:59 AM Aug 2, 2007 - Tape Drive Clock set to 07/30/2007 11:52:44.670
```

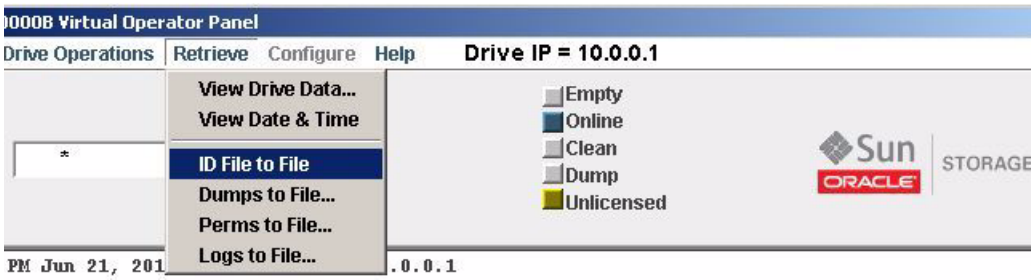
Notice the drive clock setting (8:59) is behind the VOP time on the same text line. The drive clock only operates while the drive is powered; therefore, the drive clock time can fall behind real clock time whenever the drive is not powered. Most library configurations set the drive clock in-sync with the library clock.

> **Note –** For VOP versions prior to 1.0.17, set the drive offline to access functions in the Configure menu.

See "To Use the Set Clock Command" on page 74 to change the drive clock setting.

▼ To Use the ID File to File Command

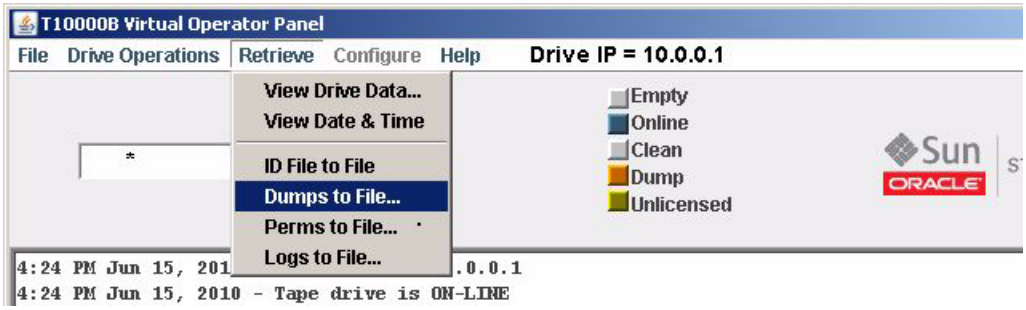
1. **Open the Retrieve menu.**
2. **Click ID File to File.**



The file is saved to the ID folder in the VOP directory.

▼ To Use the Save Dumps to a File Command

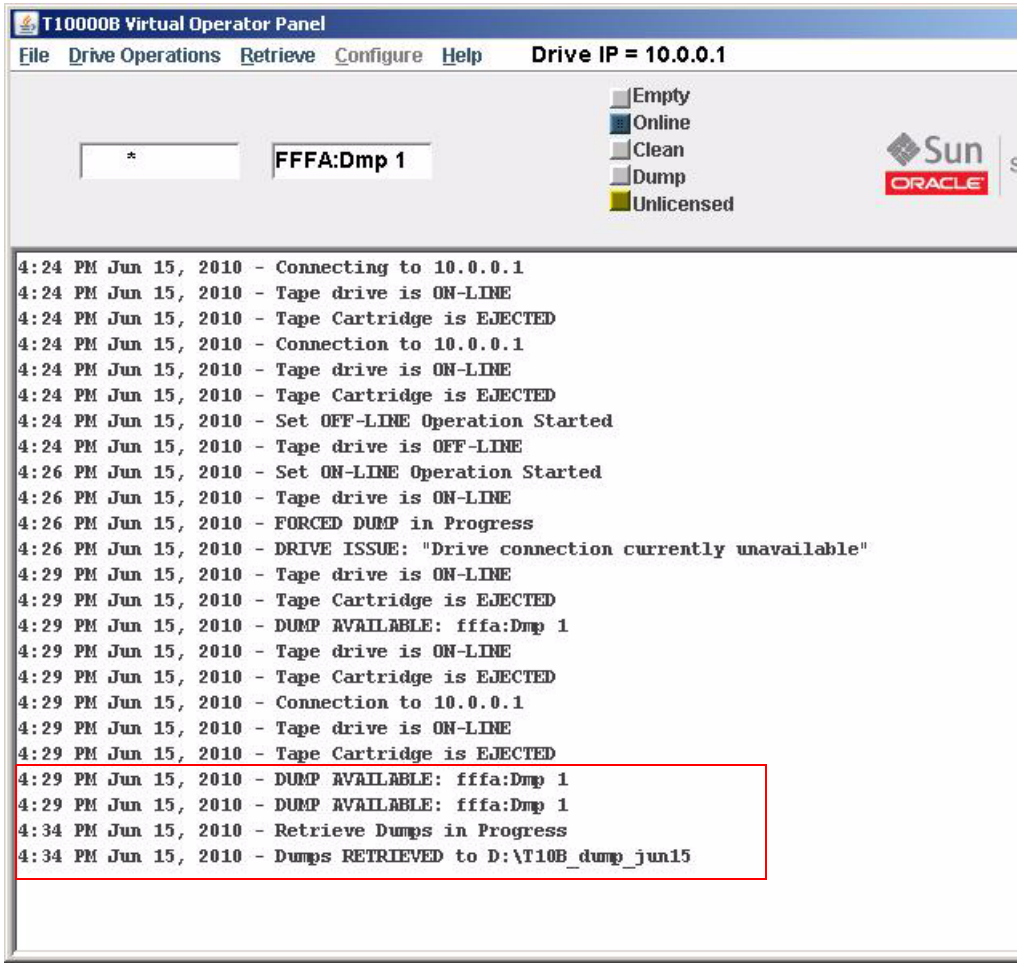
1. **Open the Retrieve menu.**
2. **Click Dumps to File.**



The save dialog box appears to allow you to name the file and identify where to save it.

3. **Name the file, specify the target folder, and click Save.**

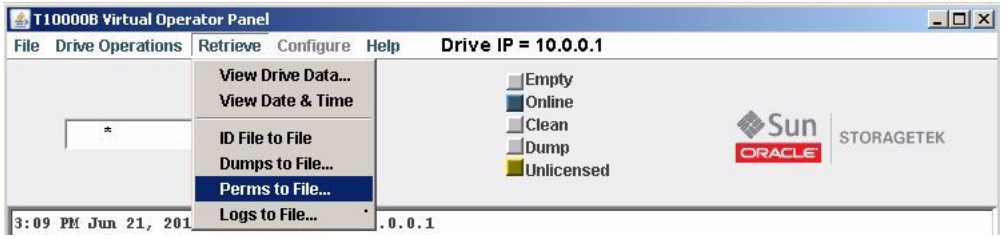
   The operating system saves the dump file in the specified location. The VOP transcript (shown below) documents the action, including the path to the file.



Note – The dump indicator dimmed after retrieval of the dump file. However, the dump is still present in drive memory until intentionally deleted by a service representative or until the drive firmware is updated.

▼ To Use the Perms to File Command

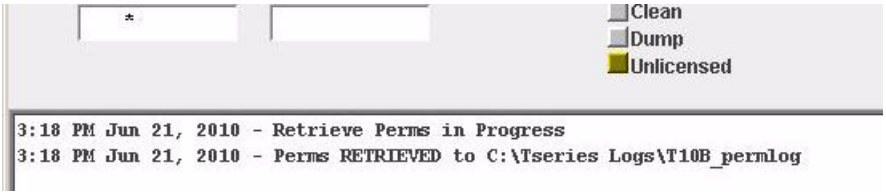
1. **Open the Retrieve menu.**
2. **Click Perms to File.**



The save dialog box appears for you to name the file and identify where to save it.

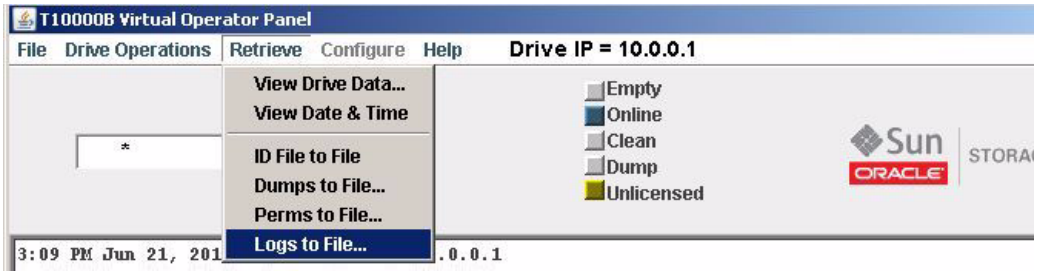
3. **Name the file, specify the target folder, and click Save.**

The operating system saves the perm file in the specified folder. The VOP transcript (shown below) documents the action, including the path to the file.



▼ To Use the Logs to File Command

1. **Open the Retrieve menu.**
2. **Click Logs to File.**



The save dialog box appears for you to name the file and identify where to save it.

3. **Name the file, specify the target folder, and click Save.**

The operating system saves the log file in the specified folder. The VOP transcript (shown below) documents the action, including the path to the file.

Configure Menu

The Configure menu (FIGURE 4-22) has four commands. You can access the menu by choosing Configure in the menu bar or by using the ALT+C shortcut keys. A description of each command is provided in the following table.

> **Note –** Most of the menu commands are performed on an offline drive, and the drive should not be available to the host when you exercise any change that results in the drive performing an Initial Program Load (IPL) to implement the configuration change.

TABLE 4-5 Configure Menu Commands

Command	Description
Drive Data	This command allows you to change configuration settings.
Save Drive Config	This command allows you to save the current drive configuration settings to a file. You can retrieve the saved file to restore configuration settings.
Set Clock	This command allows you to set the drive's internal clock to the current time in your computer. With VOP version 1.0.17 and higher, this command can be performed while the drive is online.
Firmware Update from Tape	This command allows you to update the drive's firmware to the release level contained on a prerecorded code tape (cartridge).

Additional details are provided in the following sections:

- "Online Configuration Options" on page 74
- "Offline Configuration Options" on page 75

Online Configuration Options

The Set Clock command is available when the drive is either online or offline.

▼ To Use the Set Clock Command

1. **Open the Configure menu from the menu bar or use the ALT+C keyboard shortcut.**

   The Configure menu label must be blue to allow menu selections with VOP versions prior to 1.0.17. For older versions of VOP, place the drive offline to access functions in the Configure menu.

2. **Click Set Clock.**

The drive internal clock is set to your computer's clock (see the transcript entry).

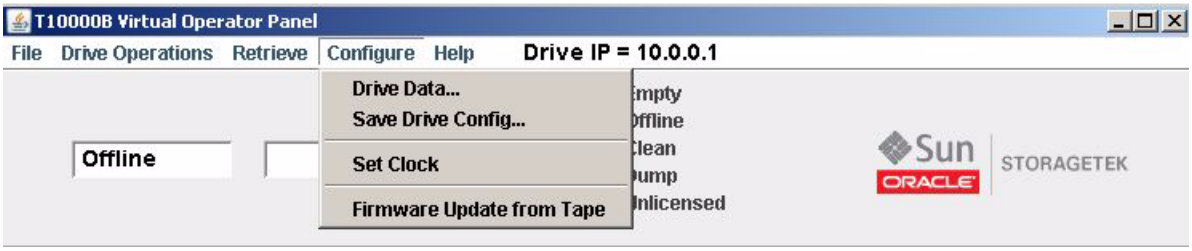
```
8:59 AM Aug 2, 2007 - Tape Drive Clock set to 07/30/2007 11:52:44.670
9:00 AM Aug 2, 2007 - Set OFF-LINE Operation Started
9:00 AM Aug 2, 2007 - Tape drive is OFF-LINE
9:01 AM Aug 2, 2007 - Clock Set To 08/02/2007 09:01:27
```

Offline Configuration Options

The Configure menu commands are available after the drive is offline

- "Drive Data Command" on page 75
- "To Use the Save Drive Config Command" on page 96
- "To Use the Firmware Update from Tape Command" on page 97

FIGURE 4-22 Configure Menu



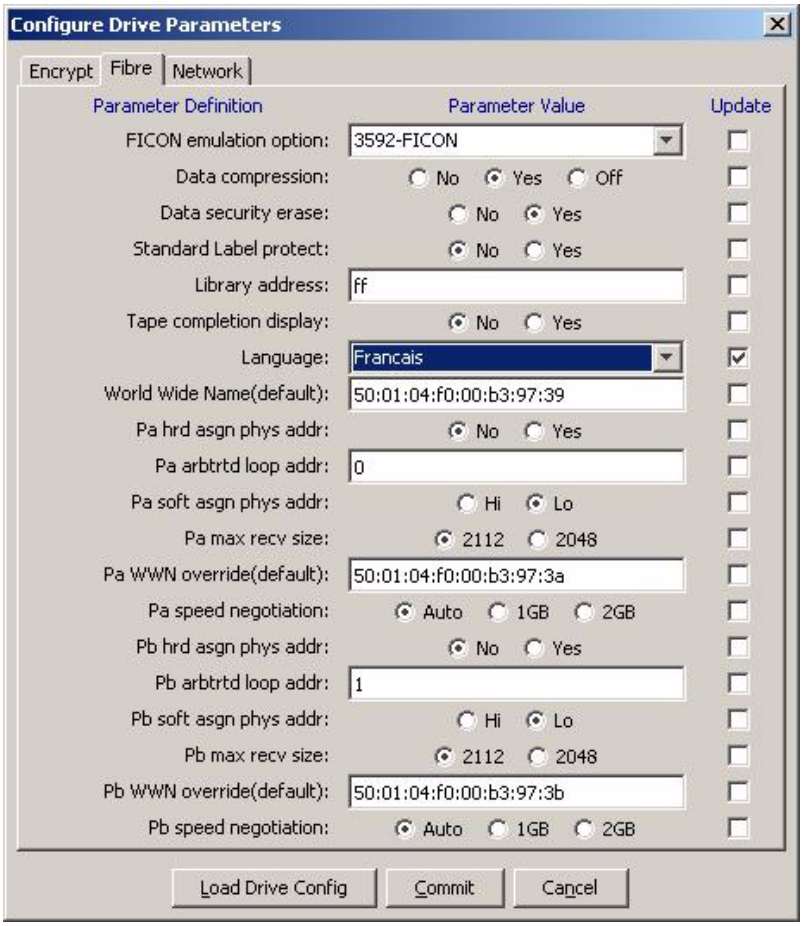
Note – The drive must be offline to perform most of the menu commands, and it should not be available to the host when you exercise any change that results in the drive performing an Initial Program Load (IPL) to implement the configuration change.

Drive Data Command

Note – The current drive parameter settings were selected by the installation team to match pre-determined site requirements. Changing the drive parameter setting could materially affect drive performance. Therefore, you should change drive parameter settings only as instructed by your IT manager or StorageTek Support.

The Drive Data command presents you with the Configure Drive Parameters dialog box to change configuration settings. When you select a page (tab), the current drive parameter values appear. If you change a setting, the adjacent Update checkbox indicates a pending change. Deselecting the checkbox cancels the pending change of only that parameter.

The following figure shows the Fibre page with a language change to Francais, and the corresponding check mark in the Update column.



Notice that there are a variety of methods to define parameter values:

- Lists
- Options
- Text fields

Across the bottom of the Configure Drive Parameters dialog box, there are three command buttons that directly affect drive configuration settings. The buttons are described in the following table.

TABLE 4-6 Configure Drive Parameter Buttons

Button	Description
Load Drive Config	This function allows you to retrieve a previously saved file containing drive configuration parameters/settings. After the retrieved file is opened, all tabs are populated with the saved configuration parameter values/settings. Marked Update checkboxes identify changed parameter values/settings. **Note:** The imported saved configuration file includes parameters specific to the originating drive. Make sure you clear or reset drive-specific parameters to accurately reflect the drive that imported the saved configuration file. See "To Use the Save Drive Config Command" on page 96 for guidelines on saving a drive configuration.

TABLE 4-6 Configure Drive Parameter Buttons

Button	Description
Commit	Initiates a drive IPL to activate pending changes.
Cancel	Clears any/all pending change selections for all four tabs.

> **Note –** During the commit process, VOP loses connection to the drive when IPL begins. However, VOP automatically reconnects to the drive after a successful IPL.

After the drive completes IPL and VOP reconnects to the drive, you should review the Drive Data tabs in the Retrieve menu to verify the new parameter values/settings (see "View Drive Data Command" on page 57). If required, place the drive offline and repeat the configuration process.

▼ To Use the Drive Data Command - Manual Entry

1. **Open the Configure menu from the menu bar or use the ALT+C keyboard shortcut.**
2. **Click Drive Data or use the SHIFT+D keyboard shortcut.**

   The multi-tab Configure Drive Parameters dialog box appears.

3. **Click the tab for the parameters that you want to change.**

   > **Note –** The Encrypt page opens for an encryption-capable drive or the Fibre page opens for drive that is not encryption-capable.

4. **Enter a change.**

   A mark appears in the check box in the Update column to the right of your change.

   > **TIP –** Repeat this step as necessary to identify additional changes.

5. **(Optional) Click the tab for a different page and enter your change(s).**

   > **Note –** You can use the Cancel button or the ALT+N keyboard shortcut to cancel all pending changes.

6. **Click the Commit button or use the ALT+C keyboard shortcut.**

   The drive performs an IPL to implement the identified change(s).

▼ To Use the Drive Data Command - Config File

1. **Open the Configure menu from the menu bar or use the ALT+C keyboard shortcut.**
2. **Click Drive Data or use the SHIFT+D keyboard shortcut.**

   The multi-tab Configure Drive Parameters dialog box appears.

   Note – Depending on the tape drive model and firmware level, additional tabs might be present.

3. **Click the Load Drive Config button or use the ALT+L keyboard shortcut to import a saved configuration file.**

   A dialog box appears where you enter the file name and path or use the browse function. The property sheets are populated with data from the retrieved file.

4. **(Optional) Remove the check or alter unneeded parameter changes imported from a configuration file.**

   TIP – Pay particular attention to the drive-specific parameter values on each of the property sheets.

   Note – You can use the Cancel button or the ALT+N keyboard shortcut to cancel the pending changes.

5. **Click the Commit button or use the ALT+C keyboard shortcut.**

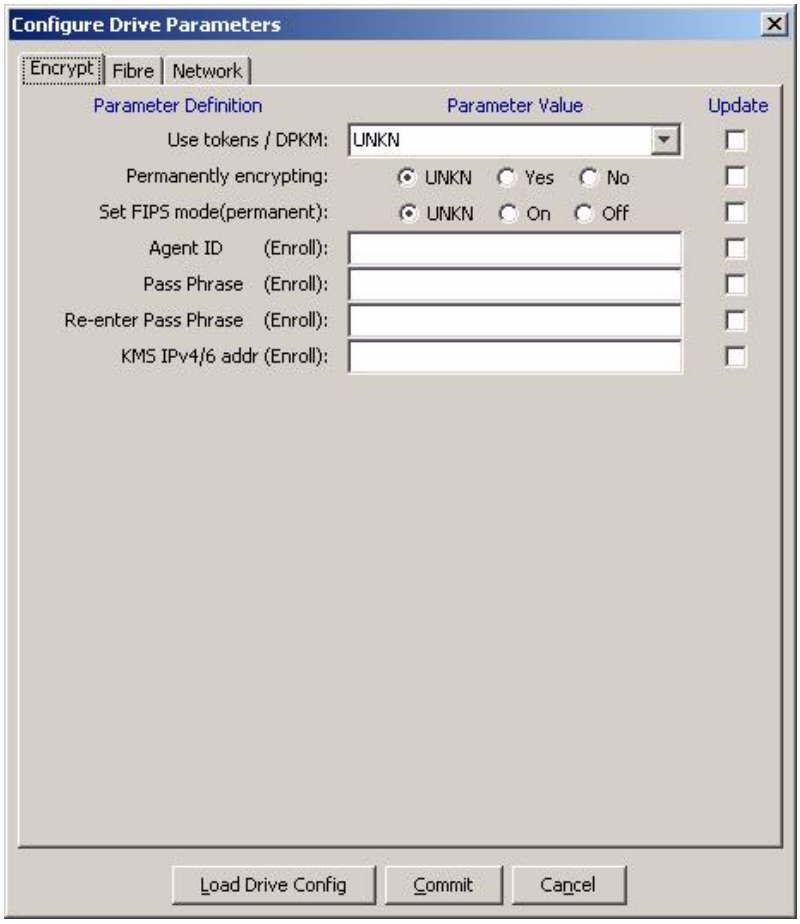
   The drive performs an IPL to implement the identified change(s).

Encrypt Page

The Encrypt page contains information about the encryption characteristics of the drive (such as, use of tokens or permanently encrypting) and enrollment information. FIGURE 4-23 shows the page for a T10000 drive and FIGURE 4-24 on page 80 shows the page for a T9840D drive.

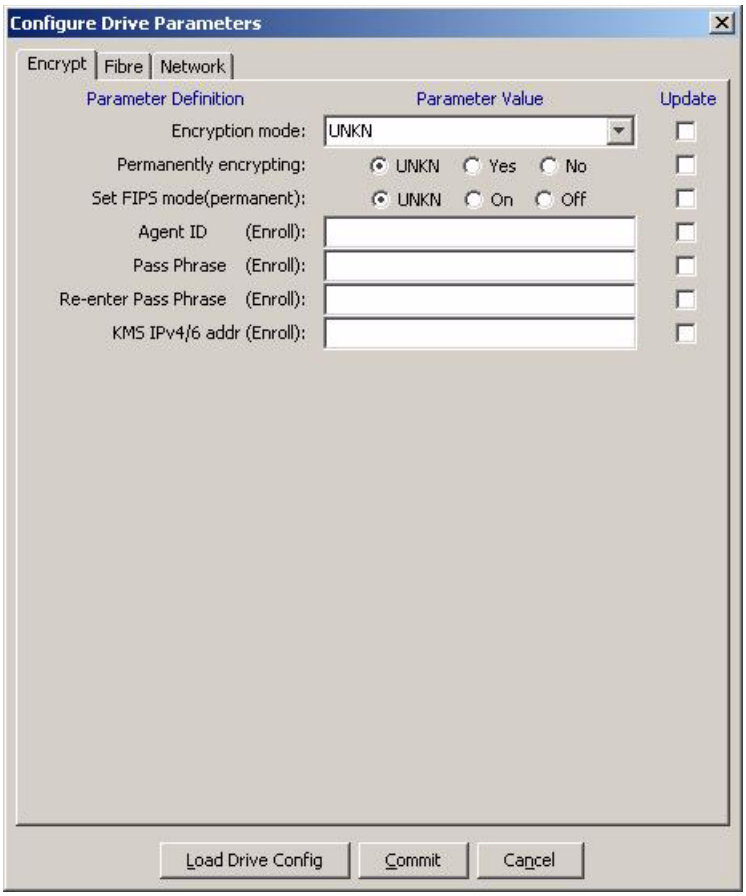
> **Note –** See either the encryption documentation for guidelines on how to use this property sheet or the *T10000 Tape Drive Operator's Guide* for information on using Data Path Key Management (DPKM).

FIGURE 4-23 Configure Drive Parameters, Encrypt Page (T10000 Tape Drive)



If you want additional information on FIPS aspects of the drive, see the document titled either *T10000A Encrypting Tape Drive Security Policy, T10000B Encrypting Tape Drive Security Policy,* or *T10000C Encrypting Tape Drive Security Policy.*

FIGURE 4-24 Configure Drive Parameters, Encrypt Page (T9840D Tape Drive)



Fibre Channel Fibre Page

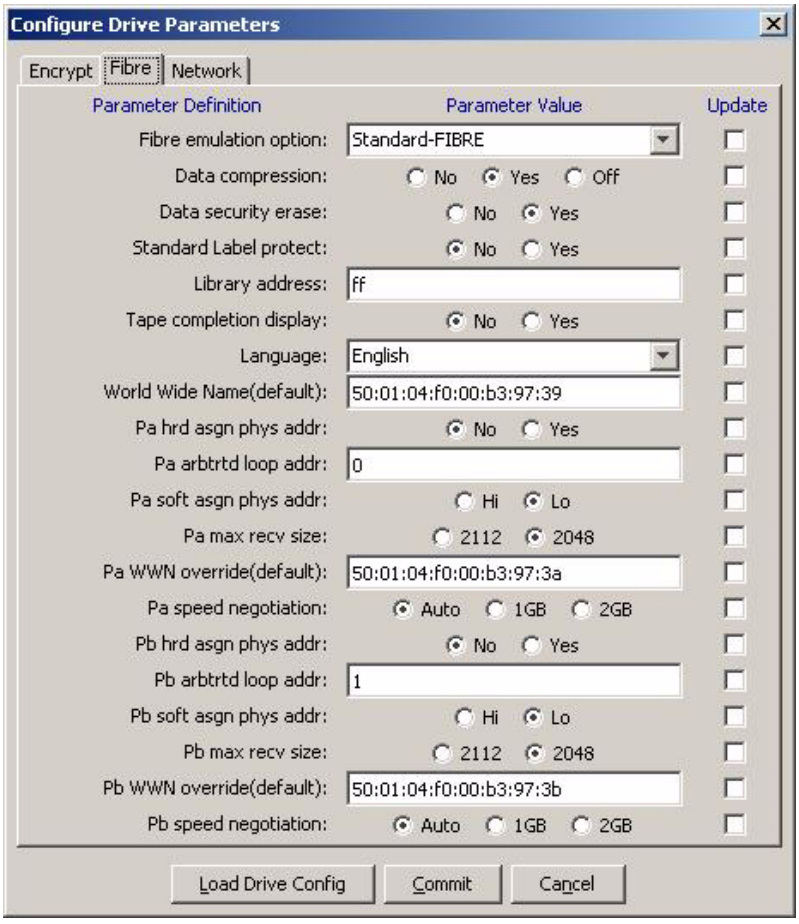
The Fibre page (FIGURE 4-25) contains drive Fibre Channel configuration settings for the T10000A tape drive. The parameters are similar for the T10000B or T9840D tape drive. However, the T10000C has additional parameters (see FIGURE 4-26 on page 82).

Notice that there are three different selection methods on the Fibre tab:

- List boxes - Emulation, Language, Pa/b max recv size, and Pa/b speed negotiation.
- Options - Data compression, Data security erase, Standard Label protect, Tape completion display, Pa/b hrd asgn phys addr, and Pa/b soft asgn phys addr.
- Text fields - Library address and World Wide Name (drive, ports A & B).

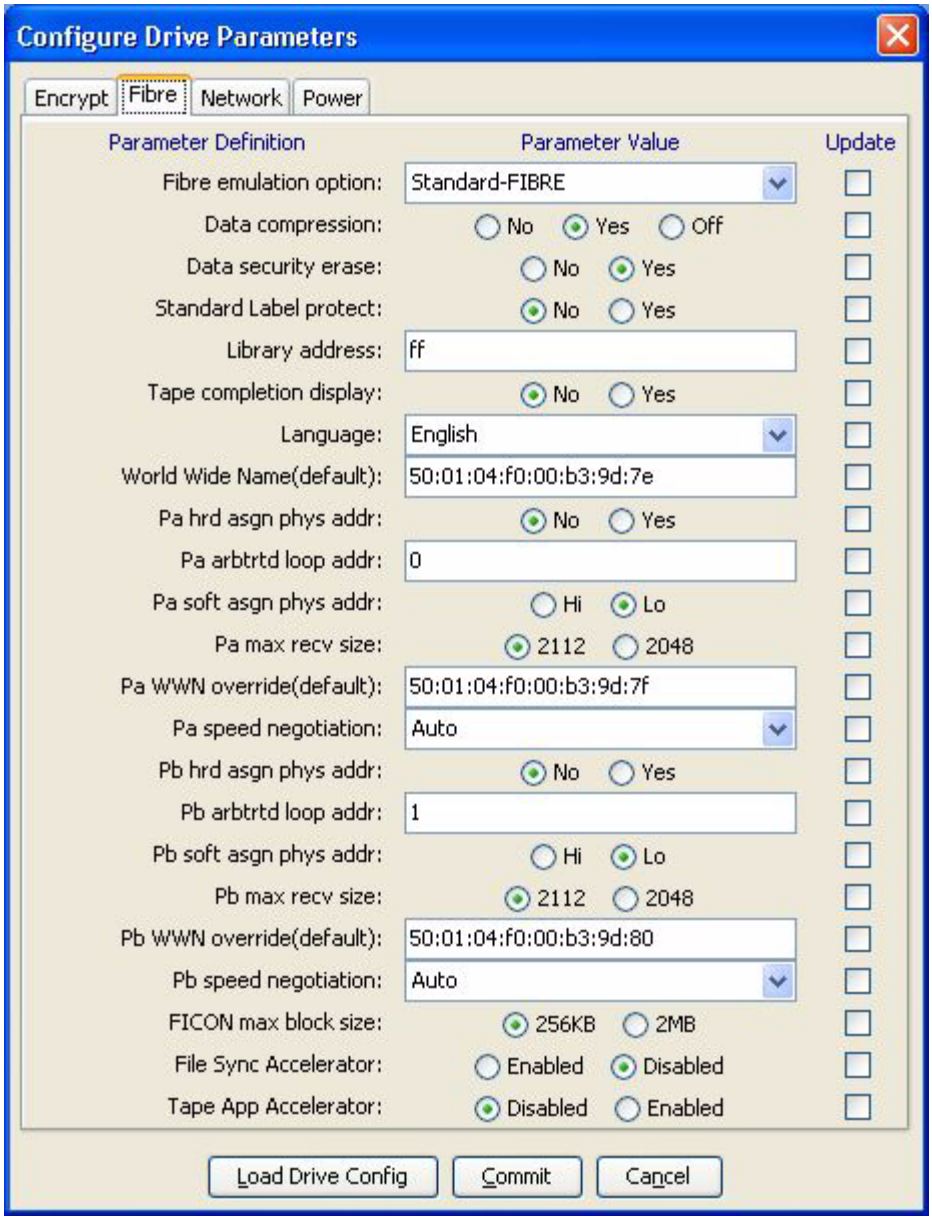
Note – See FIGURE 4-27 on page 83 for the FICON Fibre tab.

FIGURE 4-25 Configure Drive Parameters, Fibre Page (FCP)



The Configure Drive Parameters dialog box contains a page for the T10000C tape drive power functions (see FIGURE 4-26). In addition, the Fibre page has two additional parameters: File Sync Accelerator and Tape App Accelerator.

FIGURE 4-26 T10000C Configure Drive Parameters, Fibre Page (FCP)



FICON Fibre Page

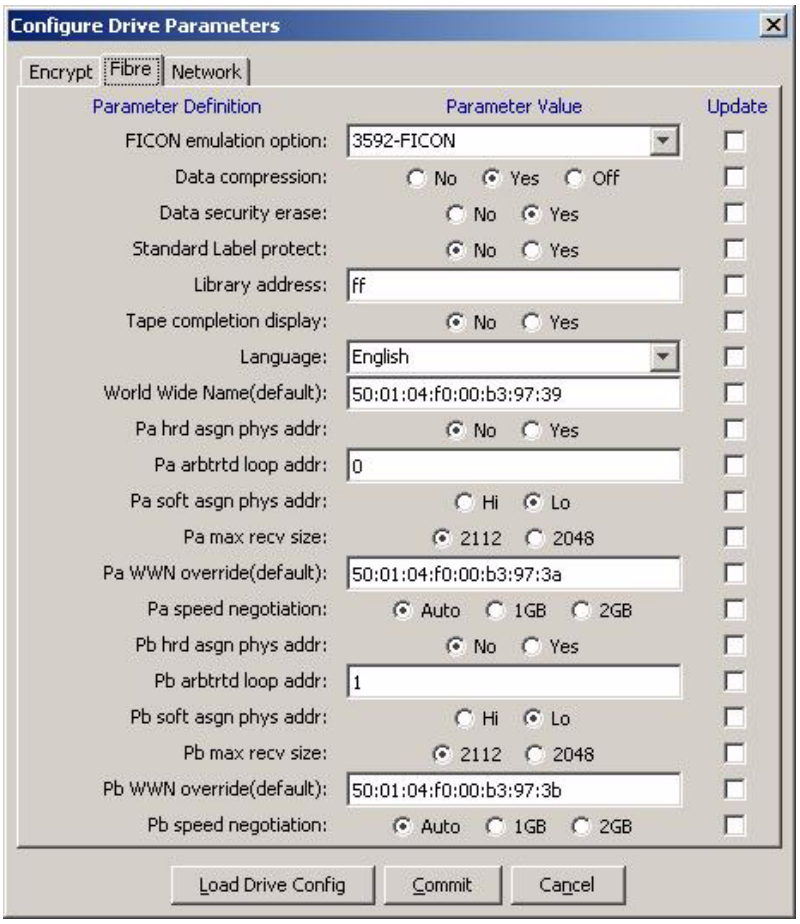
The FICON Fibre page for a T10000 tape drive (FIGURE 4-27) or a T9840D tape drive (FIGURE 4-28 on page 84) contains drive FICON configuration settings.

Notice that there are three different selection methods on the Fibre tab:

- List boxes - Emulation, Language, Pa/b max recv size, and Pa/b speed negotiation.
- Options - Data compression, Data security erase, Standard Label protect, Tape completion display, Pa/b hrd asgn phys addr, and Pa/b soft asgn phys addr.
- Text fields - Library address, and World Wide Name (drive, ports A & B).

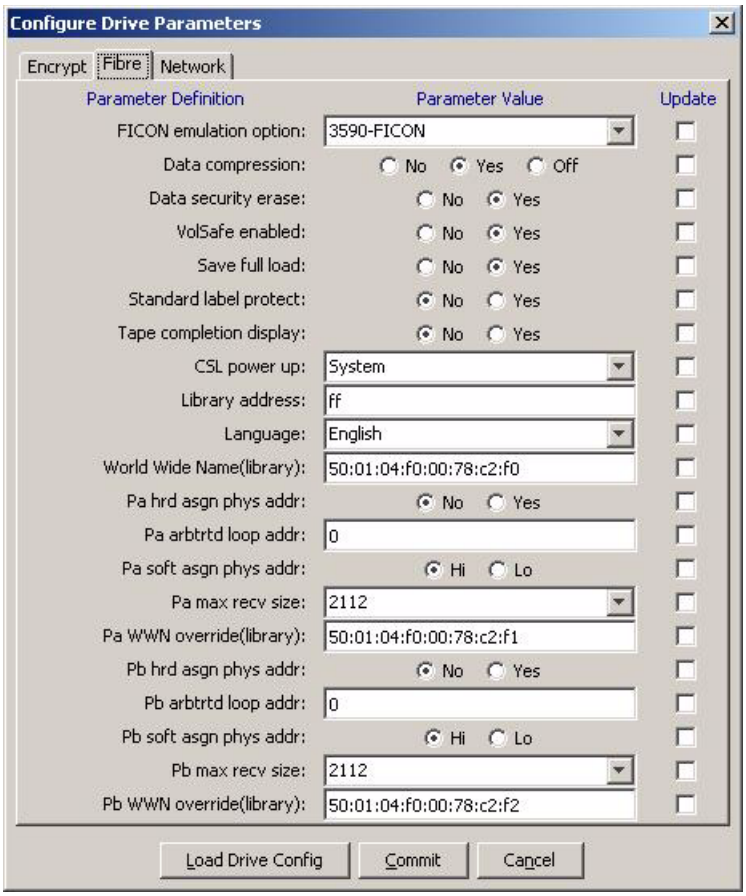
Note – See FIGURE 4-25 on page 81 for the FCP Fibre tab.

FIGURE 4-27 Configure Drive Parameters, Fibre Page (FICON)



The Fibre page for the T10000C FICON tape drive also has the additional parameters (File Sync Accelerator and Tape App Accelerator) and the drive power page just as the FCP configuration (see FIGURE 4-26 on page 82).

FIGURE 4-28 Configure Drive Parameters, Fibre Page (T9840D)



The following sections provide additional detail for parameter settings.

> **Note –** The current drive parameter settings were selected by the installation team to match predetermined site requirements. Changing the drive parameter setting could materially affect drive performance. Therefore, you should change drive parameter settings only as instructed by your IT manager or StorageTek Support.

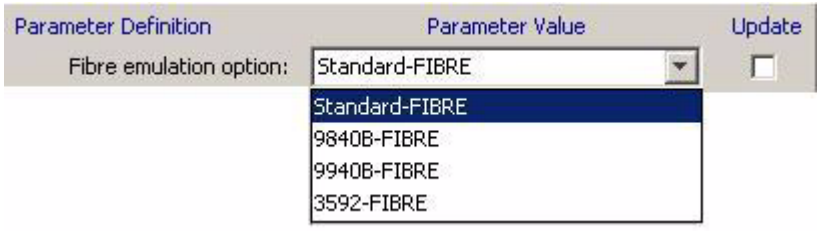
Emulation

The available emulation options are specific to the active interface and the tape drive model.

> **Note –** The option list nomenclature or the specific options available might differ from those shown based upon the version of drive microcode.

FIGURE 4-29 shows a *representative* list of T10000A Fibre Channel options: Standard-FIBRE, 9840B-FIBRE, 9940B-FIBRE, and 3592-FIBRE.

FIGURE 4-29 T10000A Emulation Options - FCP



Note – Available emulation options can vary with drive model and firmware version.

FIGURE 4-30 shows a representative list of T10000A FICON options: VSM3490-FICON and 3592-FICON.

FIGURE 4-30 T10000A Emulation Options - FICON

Note – T9840D emulation options are different.

Data Compression

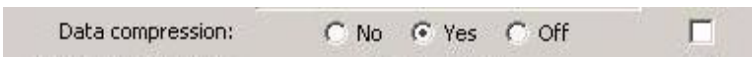
TABLE 4-7 provides a description of the available data compression options.

TABLE 4-7 Data Compression Option Descriptions

Option	Use/Meaning
No	Data is not compressed, by default, but can be overridden by the host for a job.
Yes	Data is compressed, by default, but can be overridden by the host for a job.
Off	Data compression is disabled by default, and cannot be overridden by the host.

Note – Data compression radio buttons are mutually exclusive. The option defaults to the last saved selection. *Yes* is the factory setting.

The following figure shows the data compression options.



Data Security Erase

TABLE 4-8 provides a description of the available data security erase options.

TABLE 4-8 Data Security Erase Option Descriptions

Option	Use/Meaning
Yes	Enables a full data security erase. A random binary pattern is written on the media, over-writing existing data, from the point of an “Erase” command to the End of Tape mark.
No	Writes an end of data mark on the media that indicates valid data does not exist beyond the point of an “Erase” command. Data is actually still present beyond the end of data mark, and it can be retrieved by special tape utilities.

Note – The data security erase radio buttons are mutually exclusive. The option defaults to the last saved selection. *Yes* has been the factory setting since June 2008 (drives manufactured before that date were set to No).

The following figure shows the data security erase options.

Standard Label Protect

TABLE 4-9 provides a description of the available standard label protect options.

TABLE 4-9 Standard Label Protect Options

Option	Use/Meaning
No	Disables standard label protection.
Yes	Enables standard label protection.

Note –

Consider the following:

1. Select Yes if label overwrite code is loaded, or if running standard labels and wish the drive to display a fatal error (CHK 33EX) when writing a non-80-byte record for VOLSER or HDR1.
2. Select No if you are using NL or NSL tape processing.
3. POST WRCART cannot be run with *Yes* selected

Note – The standard label protect radio buttons are mutually exclusive. The option defaults to the last saved selection. *No* is the factory setting.

The following figure shows the options.

Library Address

The Library Address is a text field that contains a two-character hexadecimal value that the factory sets to *ff* as shown in the following figure.

Note – The setting should remain at *ff* for all libraries except the 9310 PowderHorn Library. A valid entry for the 9310 is based upon the tape drive position in the 9741/9741E drive cabinet (*00* through *09* [top, down], left column; or *0A* through *13* [top, down] right column) as viewed from the access door of the cabinet.

Tape Completion Display

The Tape completion display provides an indication of tape completion (percentage of tape media with written data) as shown in the following figure.

Note – The view-only tape completion display is superseded by higher priority messages that require use of the secondary window.

When you select No, the tape completion display is disabled.

When you select Yes, the tape completion display appears in the secondary drive message window when there is a cartridge loaded in the drive.

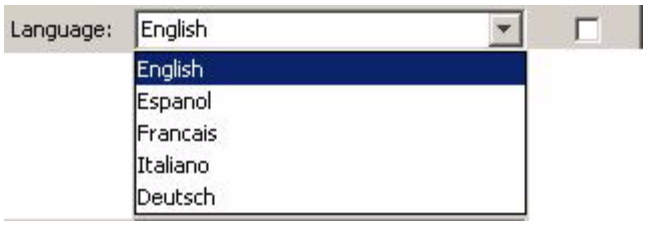
The available options are shown in the following figure.

Note – The radio buttons are mutually exclusive. The option defaults to the last saved selection. *No* is the factory setting.

Language

Note – *English* is preset at the factory.

The available language selections are shown in the following figure.



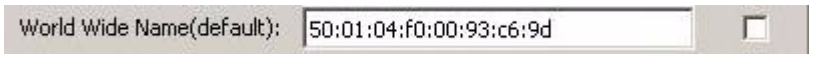
This option sets the language in which certain operational drive messages (such as loading, unloading, etc.) appear in the drive message windows.

World Wide Name

Caution – Indiscriminately changing the WWN could result in the drive being unavailable to the host.

The World Wide Name (WWN) identifies the drive node. This string of 16 hexadecimal characters (FIGURE 4-31) represents a 64-bit, unique identifier that distinguishes the individual drive from all other devices worldwide. Characters 2 through 6 identify the specific manufacturer. StorageTek branded devices have the company ID “00104F”. Other characters reveal additional drive-specific information.

FIGURE 4-31 World Wide Name Text Field



Note – When a customized WWN is active, ‘(custom)’ appears in the label.

Manufacturing assigns a block of three WWNs (from a pool of company-specific WWNs) to each tape drive during the manufacturing process. One for the drive and one each for the two fiber-optic interface ports. The drive node is assigned the first WWN of the block, and the next two WWNs, in sequence, are assigned to the ports. Notice the last two characters in FIGURE 4-31 are 9d. If you refer back to the entire fibre tab (FIGURE 4-25 on page 81, FCP or FIGURE 4-27 on page 83, FICON) the port A WWN ends with 9e, and the port B WWN ends with 9f. In addition, the *(default)* indicates that this WWN was preset at the factory.

Certain libraries override the default WWN with a library-assigned dynamic WWN (dWWN). Typically, only the last four characters differ from the default WWN. When dWWNs are active, *(library)* appears in the label.

You can also manually override the WWN with a custom WWN. In some circumstances, a service representative might customize a replacement drive’s WWN to be the same as the replaced, defective drive’s WWN. This precludes a requirement for a full system reset to acknowledge a new WWN.

Note – If you apply a custom WWN to the drive node, custom WWNs must also be applied to the interface ports.

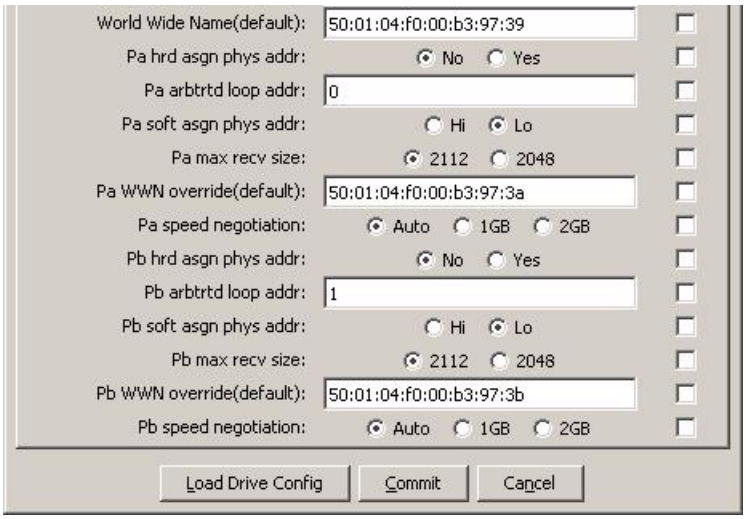
Attributes of Interface Ports

Note – Port physical address attributes are only used when the drive is in an arbitrated-loop. The settings are not applicable when the drive is in an interface fabric.

There are two identical interface port attribute groups (FIGURE 4-32):

TIP – Pa = Port A, Pb = Port B

FIGURE 4-32 Interface Port Attributes



Hard-assigned Physical Address (No/Yes)

When Yes is selected, the drive uses a specified hard physical address (PA). When No (factory-preset default) is selected, the drive seeks a soft PA.

Arbitrated Loop Address (loop ID)

This entry (*0 - 125*) specifies the loop ID when the Hard PA selection is Yes. Factory-preset defaults are: *0* for Port A, *1* for Port B.

Soft-assigned Physical Address (Hi/Lo)

Soft PA is valid when the Hard PA selection is No.
When Soft PA is Hi, the drive seeks an available loop ID in a descending order.
When Soft PA is Lo (factory-preset default), the drive seeks an available loop ID in a descending order.

Maximum Receive Size

Caution – *POTENTIAL DRIVE DAMAGE*. Older versions of VOP display several size options. The smaller size options are not valid with the T10000 drive. Furthermore, an attempt to switch to any

setting other than 2112 or 2048, could cause the drive to fail to complete the IPL. DO NOT select a size option other than 2112 or 2048.

The maximum receive (max recv) size value, shown in the following figure, determines the maximum data frame size for data processing.

The radio buttons are mutually exclusive. The option defaults to the last saved selection.

Note – 2112 is the factory setting. Do not change the value unless directed by your IT manager or StorageTek Support.

▼ To Enable the Port World Wide Name Override

Each port has a unique WWN (see FIGURE 4-33) that you can override. See "World Wide Name" on page 88 for additional information/detail.

Note – If you apply a custom WWN to the drive node, you must also apply custom WWNs to the interface ports.

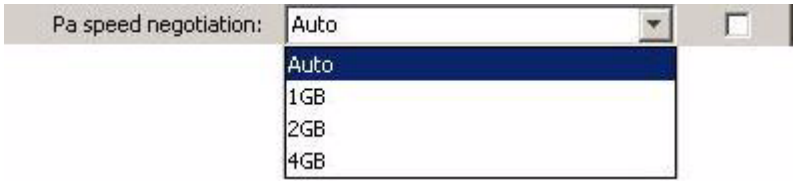
FIGURE 4-33 Port World Wide Name Text Fields

Note – When a customized WWN is active, *(custom)* appears in the label.

Speed Negotiation

Note – Do not change the speed setting unless directed by your IT manager or StorageTek Support.

The Speed Negotiation options depend on the capability of the interface transceiver present in the drive. The following figure shows the options available for a 4 Gbit drive.



- When you select Auto, the drive operates at the negotiated interface speed, which is typically determined by the slowest attached device. *Auto* is preset at the factory.

- When you select a fixed rate, the drive only operates at the specified speed and might cause the drive to be unavailable, unless all other interface devices are set to the same speed.

File Sync Accel

The StorageTek File Sync Accelerator (FSA) allows applications to reduce or eliminate back hitches that are normally caused by writing a tape mark or other sync operations. Click the appropriate button to enable or disable the feature.

Tape App Accel

The StorageTek Tape Application Accelerator (TAA) avoids back hitches by converting tape marks to buffered tape marks and syncs to NO-OPs. The feature is only available with FICON. Click the appropriate button to enable or disable the feature.

> **Note –** This feature must only be used in environments that handle deferred errors. When this feature is enabled, sending a tape mark does not ensure that data has successfully been written to the tape. A deferred error may be reported when buffered data is written to tape after the command has completed. In a FICON only environment, duplex write operations should use this feature.

Max Capacity

Maximum capacity allows the use of tape capacity that is normally reserved to ensure tape-to-tape copy operations succeed. Enabling this feature can increase cartridge capacity by five to ten percent.

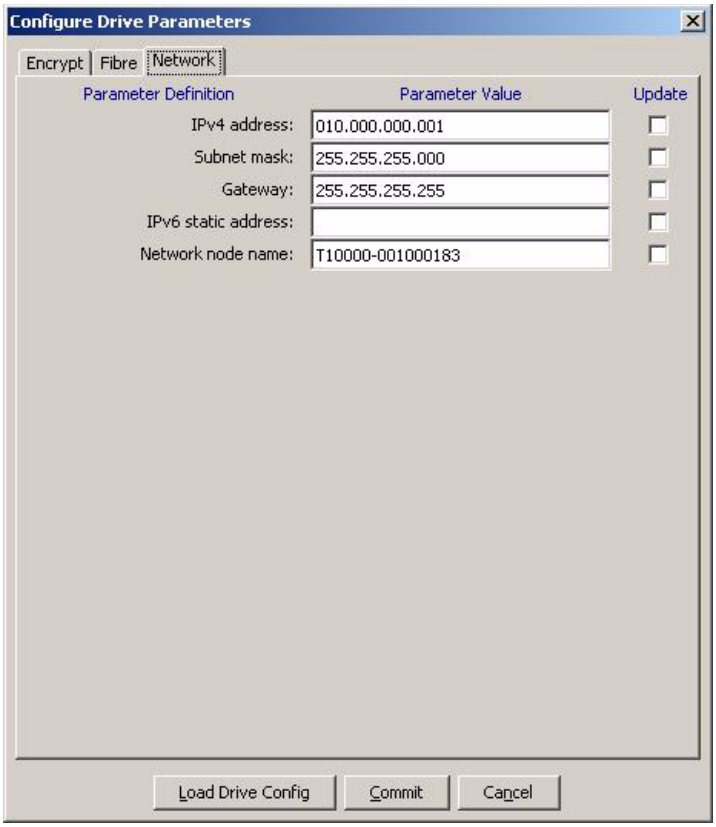
Network Page

The Network page (FIGURE 4-34 on page 92) provides network related options. When you select the Network tab, the current settings appear. The information in the following figure is from a T10000 tape drive. The parameter list in the dialog box can vary based upon the VOP version and the drive microcode level.

> **Note –** The entries shown in FIGURE 4-34 on page 92 are preset at the factory, and they should only be changed at the direction of your IT manager.

The dialog box for the T9840D tape drive is similar, but instead of the Network node name parameter there are two parameters (MIM host IP address and MIM file path).

FIGURE 4-34 Configure Drive Parameters, Network Page



▼ To Set a Drive Static IPv4 Address

> **Note –** If your drive is monitored by a Service Delivery Platform (SDP), the SDP incorporates a dynamic host control protocol (DHCP) server that assigns a dynamic IP address to the drive.
>
> You cannot directly connect the customer VOP to drives monitored by an SDP.

The parameters shown in the following table determine the static IPv4 addressing for the drive. Each parameter has four 3-digit groups, factory preset to the value shown in the table.

Parameter	Factory Preset	Valid Entries
IP address	010.000.000.001	000 - 255 (each 3-digit group)
Subnet mask	255.255.255.000	000 - 255 (each 3-digit group)
Gateway	000.000.000.000 or 255.255.255.255	000 - 255 (each 3-digit group)

For drives not monitored by an SDP, use the following procedure to edit the static IP address fields:

1. **Overwrite the IP address digits with the specified new digits.**

   A check mark appears in the Update checkbox.

2. **Overwrite the Subnet mask digits with the specified new digits.**
3. **Overwrite the Gateway digits with the specified new digits.**
4. **Click Commit, at the bottom of the dialog box.**

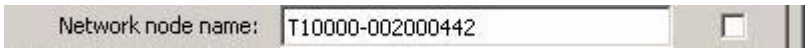
   Commit initiates a drive IPL to implement the changed configuration settings. You should click Commit only after completing all drive parameter setting changes.

   Note – If you want use VOP with this drive, you must use the Connect to Drive process and specify the new IP address (see "To Use the Connect to Drive Command" on page 46).

▼ To Set the Network Node Name

This text field (FIGURE 4-35) determines the network node name for the T10000 tape drive.

FIGURE 4-35 Node Name



Note – The factory preset default is: t10000 - <last nine digits of *drive serial number*>.

To set a different network node name:

1. **Overwrite the appropriate characters with the specified new characters.**

   A check mark appears in the Update checkbox.

   Note – The factory preset network node name should only be changed by specific instructions from your IT manager, or StorageTek Support.

   If you use a saved configuration file (from a different drive) to change settings, clear the update check box. Otherwise, the network node name will change, which could negatively impact network operations.

2. **Click Commit, at the bottom of the dialog box, if you do not have other changes. Otherwise, go to another section to select additional changes.**

> **Note –** Commit initiates a drive IPL to affect changed configuration settings. You should click Commit only after completing all drive parameter settings for change.

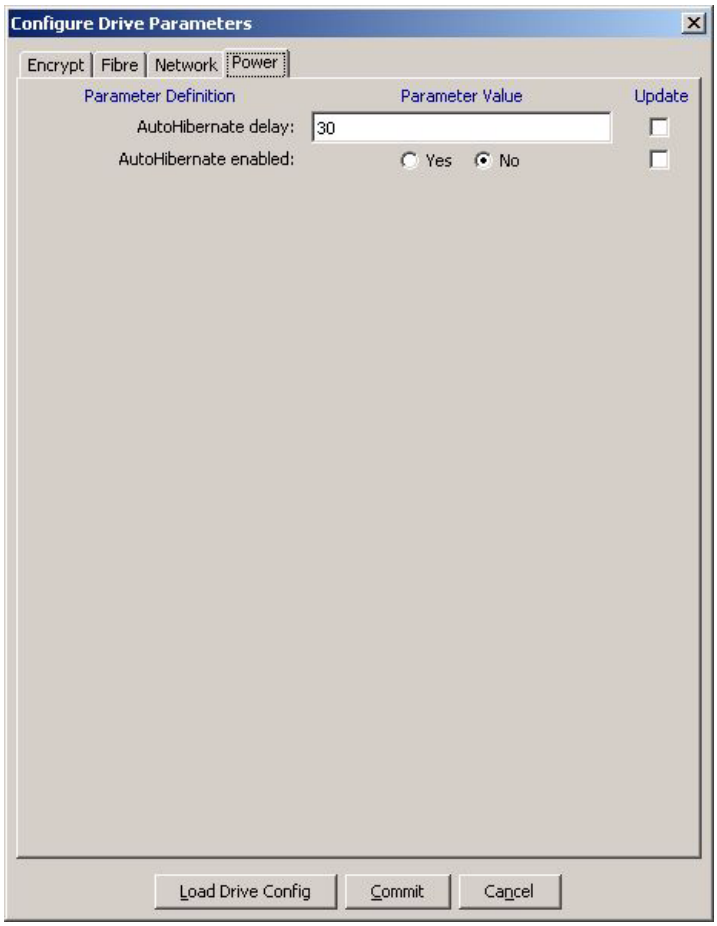
Power

The T10000C drive can automatically hibernate to save power when a cartridge has not been mounted for a specified period of time. When hibernating, the drive cannot detect the presence of a cartridge. Therefore, some external action must be taken to wake the drive so it can detect when a cartridge is present and load it. Normally, the library monitors whether a drive is hibernating and commands a drive to wake up whenever a mount is about to take place.

> **Note –** SL3000 code level FRS_3.00 and SL8500 code level FRS_7.00 fully support the T10000C hibernate function.

The default time delay is 30 minutes while the range is zero to 60 minutes, and the AutoHibernate manufacturing setting is No.

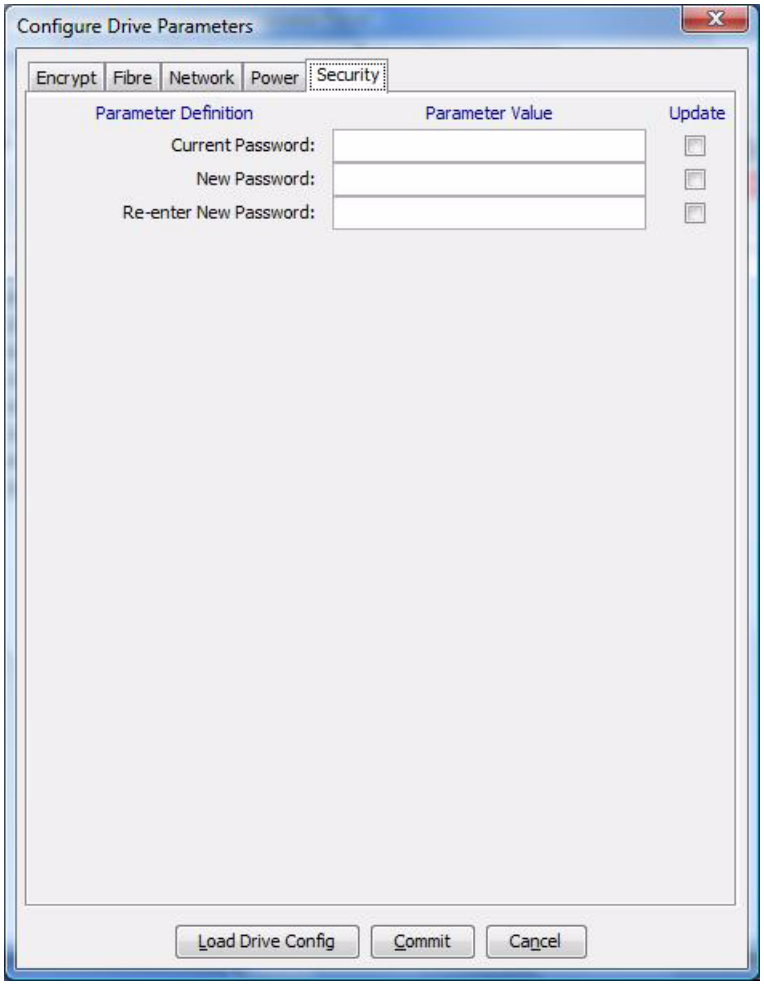
FIGURE 4-36 Configure Drive Parameters, Power Page (T10000C Drive)



Security

The Security page contains parameters to set or change the tape drive password.

FIGURE 4-37 Configure Drive Parameters, Security Page (T10000C Drive)



After a drive password is defined, you must enter the password as part of the authentication process during VOP startup.

Note – If there are three successive login failures, the login is disabled. A service call is required to reset the password.

▼ To Change the Tape Drive Password

1. **Enter the password in the Current Password field.**

   Note – If the drive password has not been changed previously, type *default* as the password.

2. **Type your password of 8 to 16 characters in the New Password field.**

   A password must contain one of each of the following character categories:

   - Uppercase character
   - Lowercase character
   - Number
   - Special character

   Note – ! @ # $ % ^ & * ( ) { } [ ] + = - _ are the valid special characters.

3. **Type your password in the Re-enter New Password field.**
4. **Click Commit.**

   The drive performs an IPL.

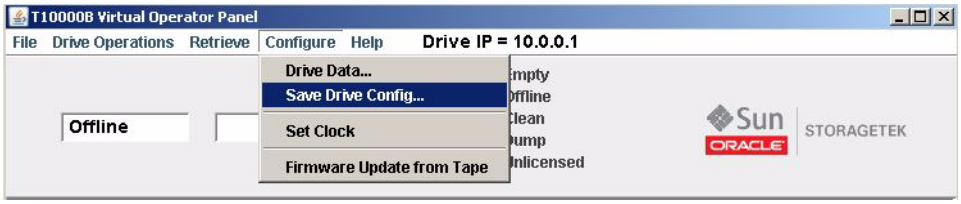
▼ To Use the Save Drive Config Command

1. **Create a folder to store the drive configuration file.**
2. **Make sure the drive is offline.**

   If the drive is not offline, set it offline.

   Note – The Configure label must be blue to allow menu selections.

3. **Open the Configure menu from the menu bar or use the ALT+C keyboard shortcut.**
4. **Choose Save Drive Config.**



   A typical operating system SaveAs dialog box opens.

5. **Name the new file, specify the target folder, and click Save.**

   TIP – Use a file name that differentiates it from similar files or overwrite an existing file.

   The operating system saves the configuration file in the specified location. You can retrieve it with the Load Drive Config command button, on page 75.

▼ To Use the Firmware Update from Tape Command

Note – You need a code tape to complete this command (see Make Code Tape in TABLE 4-3 on page 52).

The following procedure describes loading code in a T10000 tape drive. The process is similar for a T9840D drive but there are some noticeable differences.

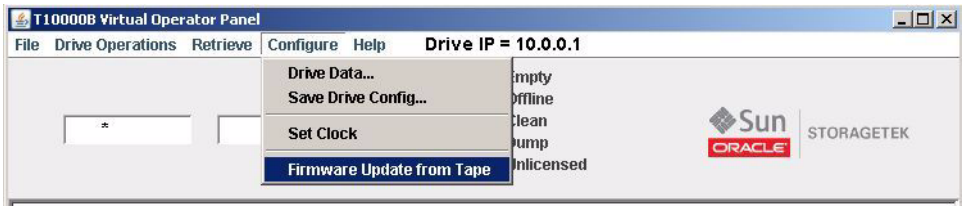
1. **Make sure the drive is offline.**

   If the drive is not offline, set it offline.

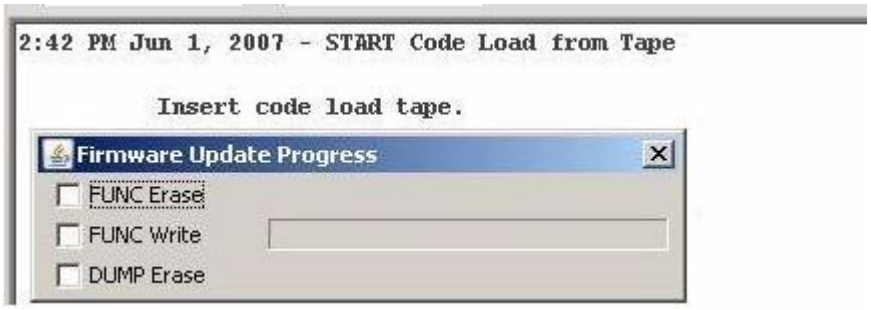
   Note – The Configure label must be blue to allow menu selections.

2. **Open the Configure menu from the menu bar or use the ALT+C keyboard shortcut.**

3. **Click Firmware Update from Tape in the Configure menu.**



A text prompt to insert a code tape appears as a VOP text message, and a Firmware Update Progress box appears (see below).

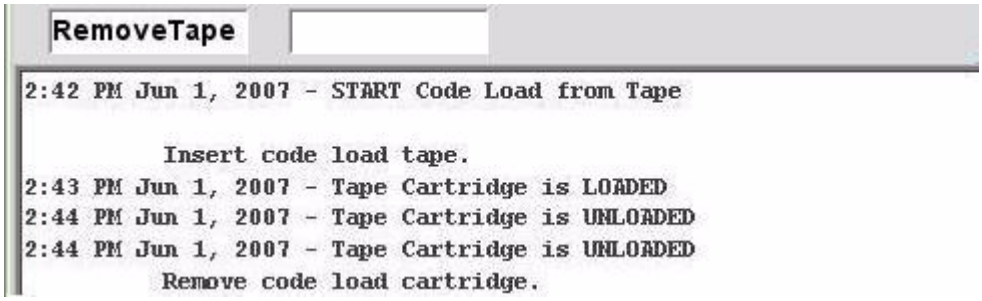


Note – The progress box has a different appearance when loading code in the T9840D tape drive.

4. **Insert the code tape/cartridge containing the proper firmware release level.**

   The Firmware Update Progress box (below) tracks the update.

When the firmware update is completely loaded into the drive memory, the progress box disappears, the code tape/cartridge unloads, and a prompt to remove the cartridge appears in the VOP text message pane (see below).



5. **Remove the code load cartridge from the drive load slot.**

   When the cartridge clears the drive load slot, a drive IPL starts, which will load/activate the updated firmware level into the drive RAM.

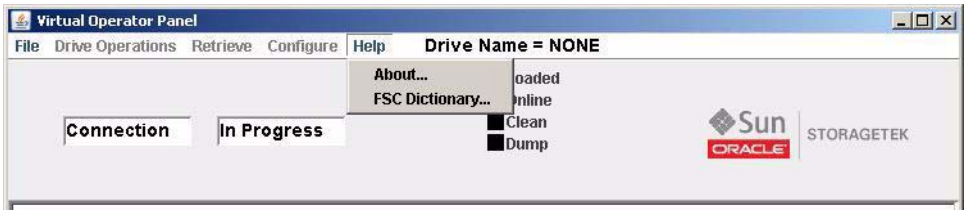
   Note – VOP loses connection to drive during IPL, but automatically reconnects after IPL completes successfully.

6. **View the Drive Data Version tab to verify the updated firmware level.**

   See FIGURE 4-21 “View Current Drive Settings, Version Page (T10000B example)” on page 70.

Help Menu

The Help menu has a command that displays information about the virtual operator panel and a command to access the Fault Symptom Code dictionaries.

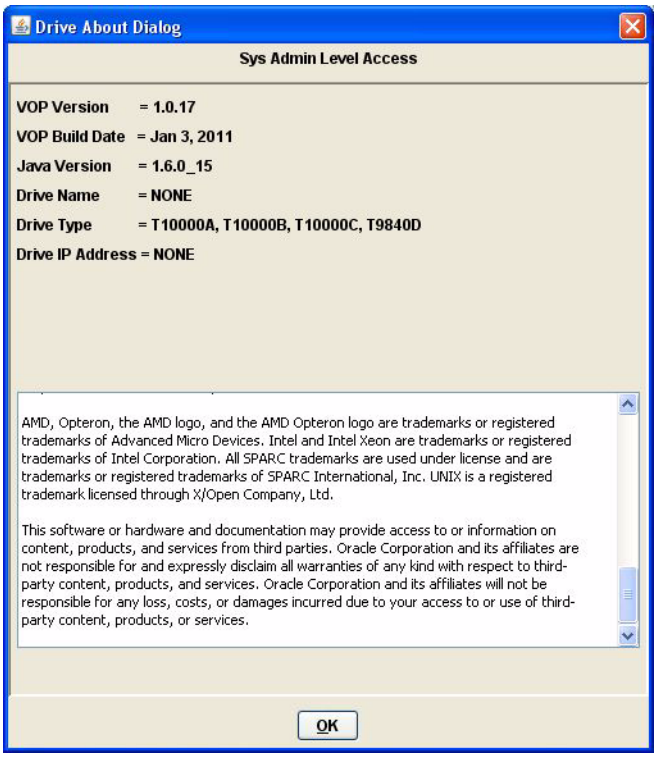


▼ To Use the About Command

1. **Open the Help menu.**
2. **Click About or use the SHIFT+A keyboard shortcut.**

   The Drive About Dialog box (FIGURE 4-38) lists information about the VOP application, Java version, lists the drive name and IP address (if connected to a drive), and with version 1.0.16 lists the copyright and trademark information.

FIGURE 4-38 About Dialog Box



3. **Click OK or use the ALT+O keyboard shortcut to close the dialog box.**

   You can also click the X in the upper-right corner of the dialog box.

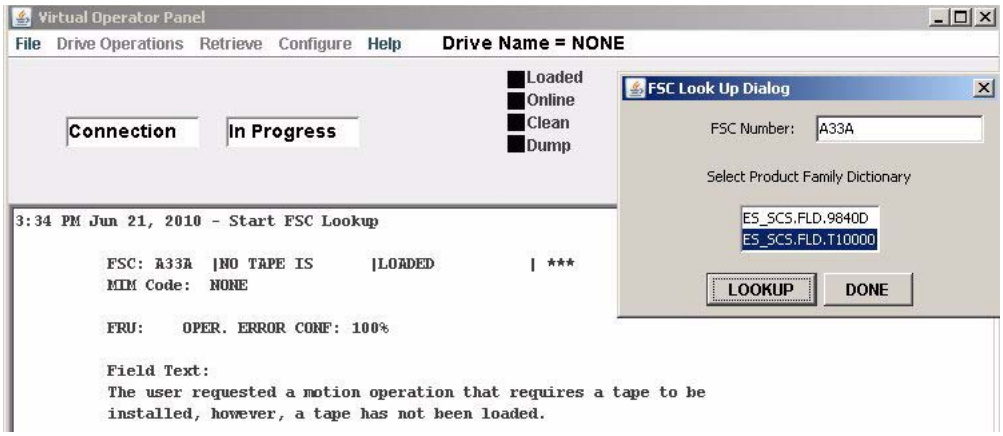
▼ To Use the Fault Symptom Code (FSC) Dictionary

VOP version 1.0.15, or higher, includes the FSC Dictionary command in the Help menu.

1. **Open the Help menu.**
2. **Click FSC Dictionary.**
3. **Enter the four character FSC.**
4. **Select the tape drive model.**
5. **Click the Lookup button.**

   The description of the FSC appears in the transcript pane.

   The dialog box and transcript pane are shown in the following figure.



Note – The FSC Dictionary is available with or without a drive connection.

5

VOP Operation—LTO

This chapter provides guidelines for operation of the Virtual Operator Panel (VOP) with a single LTO Ultrium tape drive (LTO-4 and LTO-5 are supported). The VOP does not provide any interconnection with the host data input/output interface.

The VOP application window has three basic operational functions:

- Monitor drive status
- View or change drive configuration settings
- Perform drive service tasks

Use ltoVOP Controls

The ltoVOP graphical user interface (GUI) shown in the figure below provides a menu for window control (see FIGURE 1-3), the Connect button, a series of status indicators, and several tabs. During the course of selected operations, the VOP text message pane located on the Service Drive tab displays a transcript of the VOP actions and prompts for additional input.

FIGURE 5-1 ltoVOP Graphical User Interface

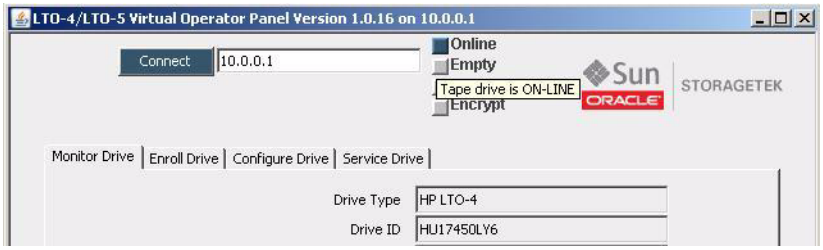
The status indicators show the current drive state. The indicators in the figure above have the following meanings:

- Online status indicator is dark blue - the Ethernet adapter card is online
- Empty status indicator is grey - no cartridge is loaded in the drive

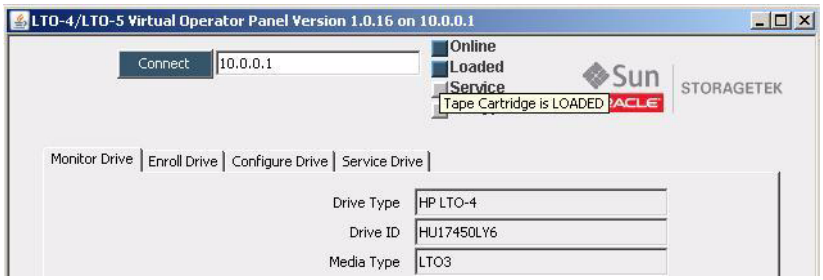
- Service status indicator is grey - shows that the Ethernet card is communicating with the tape drive
- Encryption status indicator is grey - the drive is not enrolled

Some status indicators are also an active link that enables you to toggle the state of the monitored drive item. Note that the mouse cursor does not change when you place the cursor on that type of indicator.

The GUI provides tooltips that appear when you move the cursor to selected areas on the window. The figure below shows the tooltip for the first status indicator (Online). The tooltip indicates that the tape drive is online. Use a tooltip to display the meaning of a status indicator.



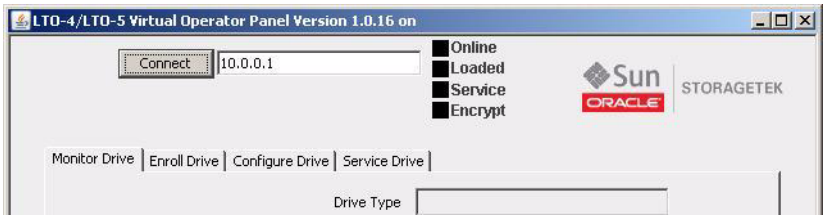
When you load a cartridge in the drive, the cartridge status indicator (the second indicator) color changes to dark blue and the label shows Loaded. In addition, the Media Type value appears in the Monitor Drive tab (the example below indicates an LTO3-formatted cartridge).



VOP to Drive Connection

Note – It is assumed that you have a physical connection between your processing platform and the Ethernet port on the tape drive and that you have started VOP (see "VOP Application for LTO Tape Drives").

When VOP is not communicating with the tape drive, the IP address is missing from the title bar, the Connect button is grey, and the four indicators to the left of the StorageTek logo are black as shown in the figure below.



▼ To Connect VOP to the Drive

1. **Enter the IP address of the tape drive Ethernet port in the white box beside the Connect button.**

   Note – The factory sets the address to 10.0.0.1.

2. **Click the Connect button.**

   The IP address appears in the title bar, the Connect button color is blue, the indicator color is no longer black, and data appears in the Monitor Drive tab (see the figure below). In addition, transcript messages appear in the Service Drive tab (see FIGURE 5-1 on page 101 for an example).

Drive Online/Offline Status

To perform some operations from VOP, the drive must be offline. You can use the toggle function of the first status indicator or the Set Online/Offline button located in either the Enroll Drive or Configure Drive tabs.

▼ To Change Drive Status to Offline

1. **Determine the current drive state.**

   If the drive is Online (see the first status indicator in FIGURE 5-1 on page 101), proceed with the next step. If the drive is Offline, stop.

2. **Change the drive state to Offline by using one of the following instructions:**

   a. **Click the first status indicator.**

   b. **Click the Enroll Drive tab and click the Set Offline button.**

      See FIGURE 5-5 on page 107 for the location of the button.

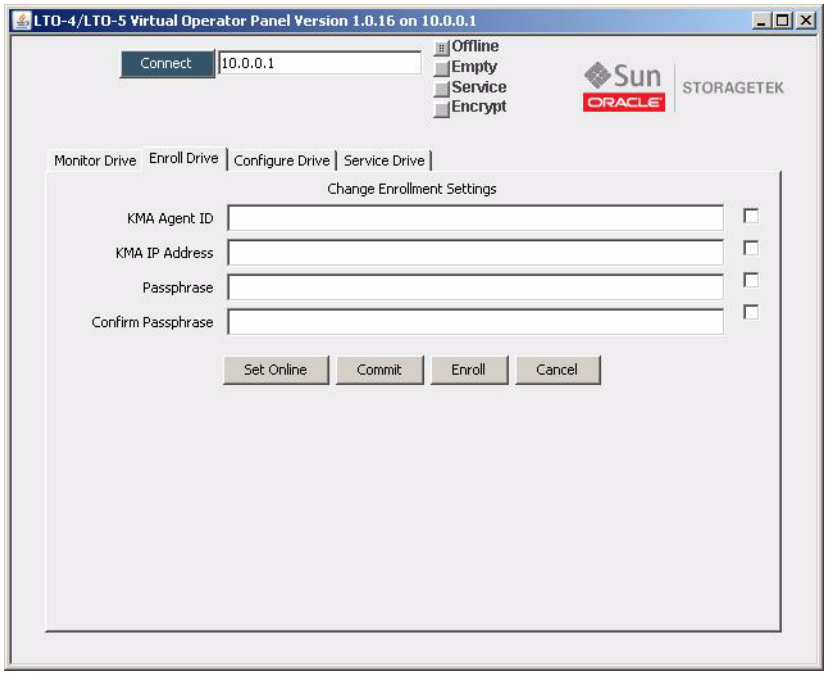
   c. **Click the Configure Drive tab and click the Set Offline button.**

      See FIGURE 5-6 on page 108 for the location of the button.

3. **Verify that the drive status indicator is Offline**

The figure below shows that the first status indicator is grey and the label states offline. In addition, the button label in the Enroll Drive tab states Set Online.

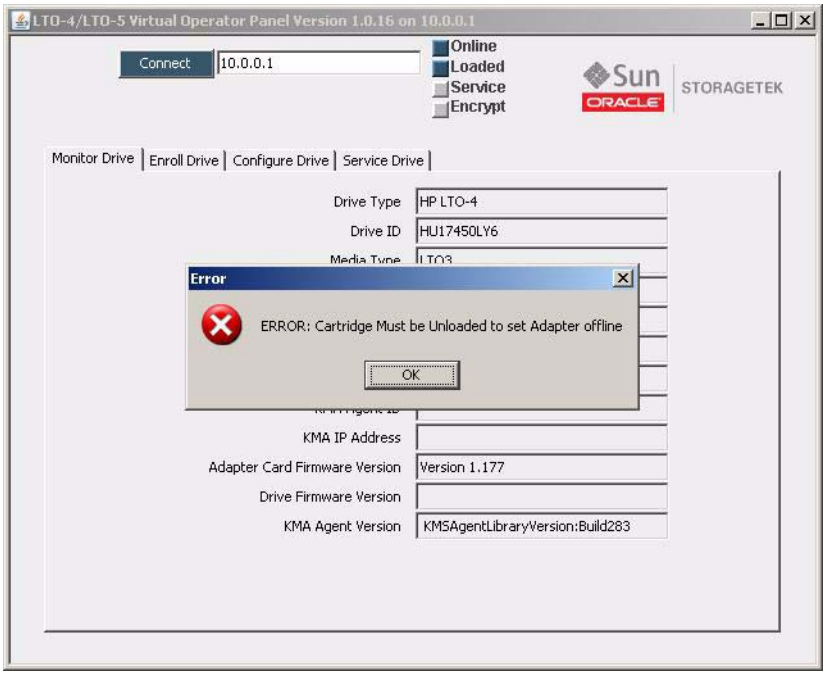
FIGURE 5-2 Set Online Button



Error Messages

Certain actions from the GUI result in error conditions. For example, an error occurs if you attempt to place the drive (adapter card) offline while a tape cartridge is loaded. The following figure shows the resulting error message.

FIGURE 5-3 Error Message

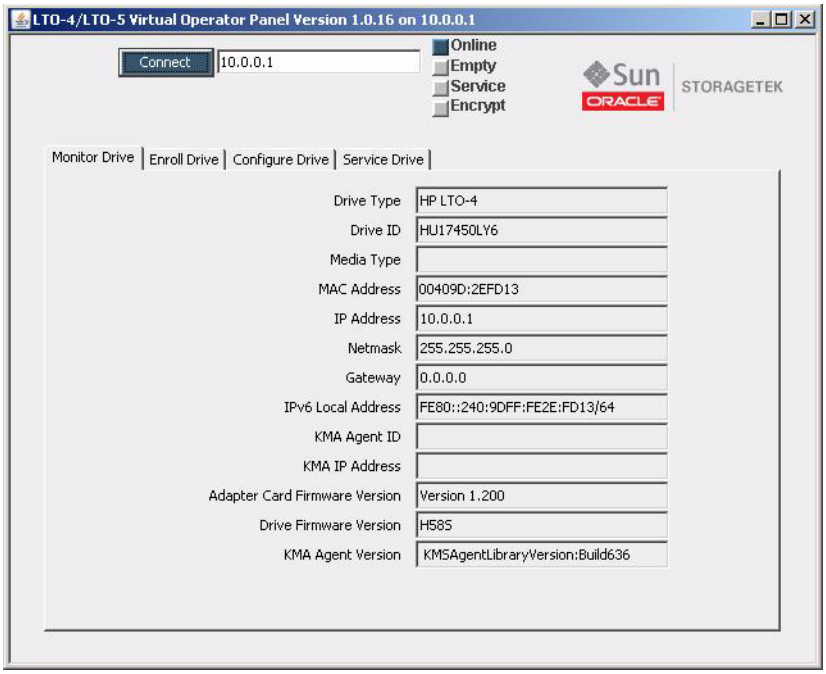


Read and understand the error message before clicking the OK button.

Monitor Drive

Click the Monitor Drive tab (see the figure below) to display a list of drive, cartridge, and Key Management Station agent attributes and values for those attributes. Some attributes require another action, such as drive enrollment for encryption, before the associated data appears.

FIGURE 5-4 Monitor Drive

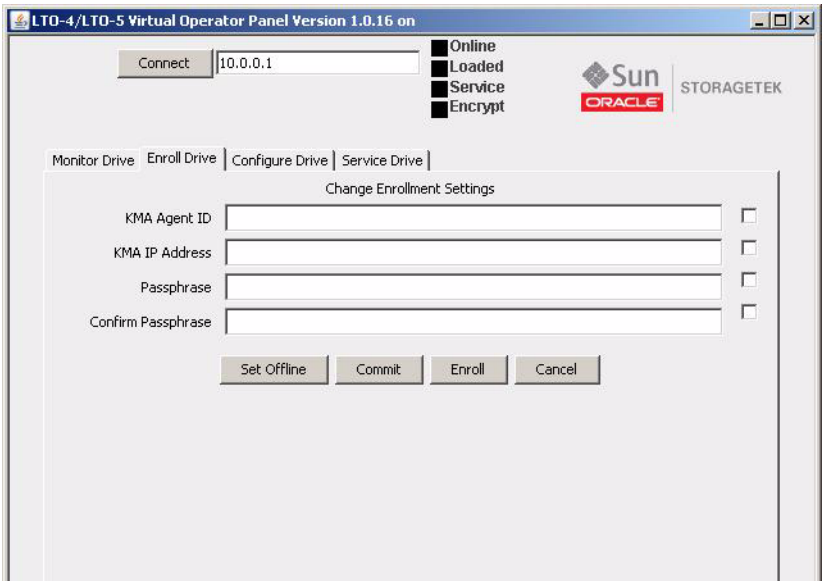


Enroll Drive

Note – Refer to the encryption documentation before using this screen. The sequence for using the Configure Drive and Enroll Drive tabs is critical to success.

The Enroll Drive page has a Change Enrollment Settings section and four buttons.

FIGURE 5-5 Enroll Drive



Enter a value in the text field to change an enrollment parameter setting. A check mark appears in the checkbox to the right of the text field. If you decide against an entered change, uncheck the box and the commit operation ignores that value.

This process actually enrolls the adapter card instead of the LTO4 tape drive. If a service representative replaces the tape drive, no re-enrollment is necessary.

The agent must have already been created with a pass phrase assigned in the Crypto Key Management System (KMS) before you can enroll the drive. The KMS must be able to communicate with the adapter card and tape drive.

The KMA IP address must be a *service network* address.

- Set Offline - click this button to set the drive offline.

  Note – The label on this button changes depending on the current drive state (for example the label is Set Offline when the drive state is Online).

- Commit - saves the enrollment parameter changes in NVRAM. (The Ethernet card does not reboot if you only change the enrollment settings.)

  Note – Only those fields with an active check box are updated when you click the Commit button.

- Enroll - performs drive enrollment after committing the enrollment settings.
- Cancel - clears all pending change selections.

Configure Drive

> **Note –** Refer to the encryption documentation before using this dialog box. The sequence for using the Configure Drive and Enroll Drive tabs is critical to success.

The Configure Drive page contains a Change IP Settings section and three buttons (see FIGURE 5-6 on page 108). This page is typically used by the service representative to configure the drive to use settings other than those set during the manufacturing process.

Enter a value in the text field to change an IP parameter setting. A check mark appears in the check box to the right of the text field. If you decide against an entered change, deselect the box and the commit operation will ignore that value.

- Set Offline - click to set the tape drive (adapter card) offline.

  > **Note –** The label on this button changes depending on the current drive state (for example, the label is Set Offline when the drive state is Online).

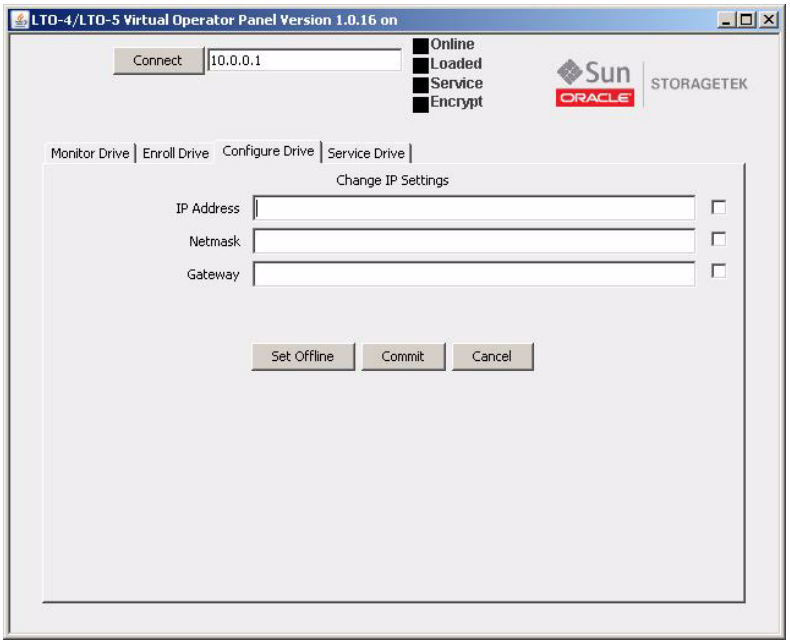
- Commit - click to save the desired IP change in NVRAM (the Ethernet card does a reboot when you change an IP setting).

  > **Note –** Only those fields with an active check box are updated when you click the Commit button.

  When the IPL completes, the *new* IP address is in use. Depending on the IP address, you might need to make a similar IP address change for the device running VOP.

- Cancel - click to deselect all pending change selections.

FIGURE 5-6 Configure Drive



Service Drive

The Service Drive page contains a text-based transcript area and seven buttons (see FIGURE 5-7 on page 109).

- Support Logs - saves the log files with the name you enter and your specified location.
- Clear Transcript - erases the content from the text pane.
- IPL - performs an initial program load of the Ethernet card.
- Run Loopback Test - performs an internal loopback test with the LTO-4 drive. Results are posted in the text pane.
- Load Firmware - implements the Ethernet card firmware update procedure. You are prompted to identify the directory that contains the Ethernet card firmware files.
- Adapter Dump - saves the Ethernet card log file with the name you enter and your specified location.
- About - provides information about the VOP version, basic drive information, and with version 1.0.16 the copyright and trademark information is provided (see FIGURE 5-8 on page 110).

> **Note –** Most of the functions on the Service Drive tab are for use by the service representative. Refer to the encryption documentation for additional information regarding the use of this screen.

FIGURE 5-7 Service Drive

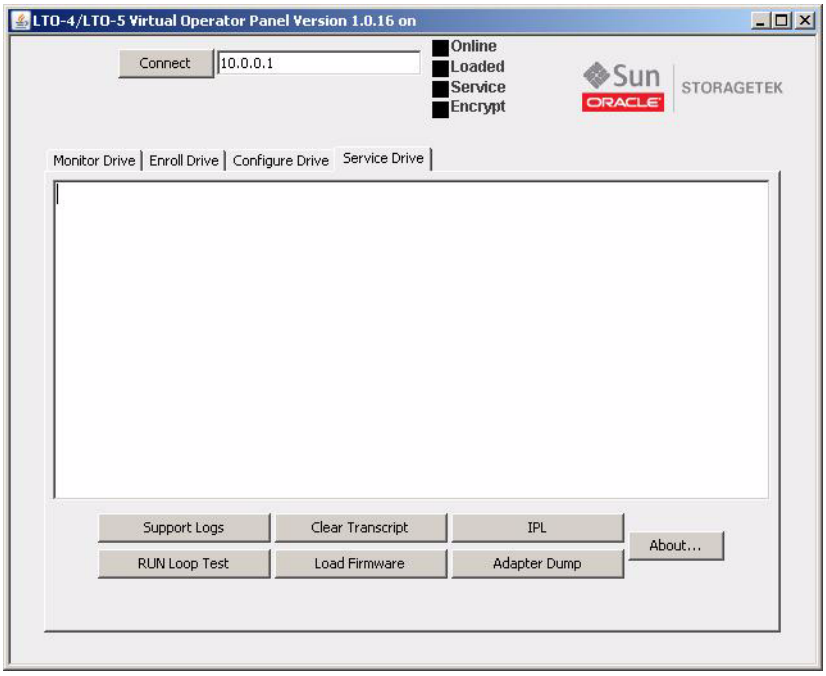
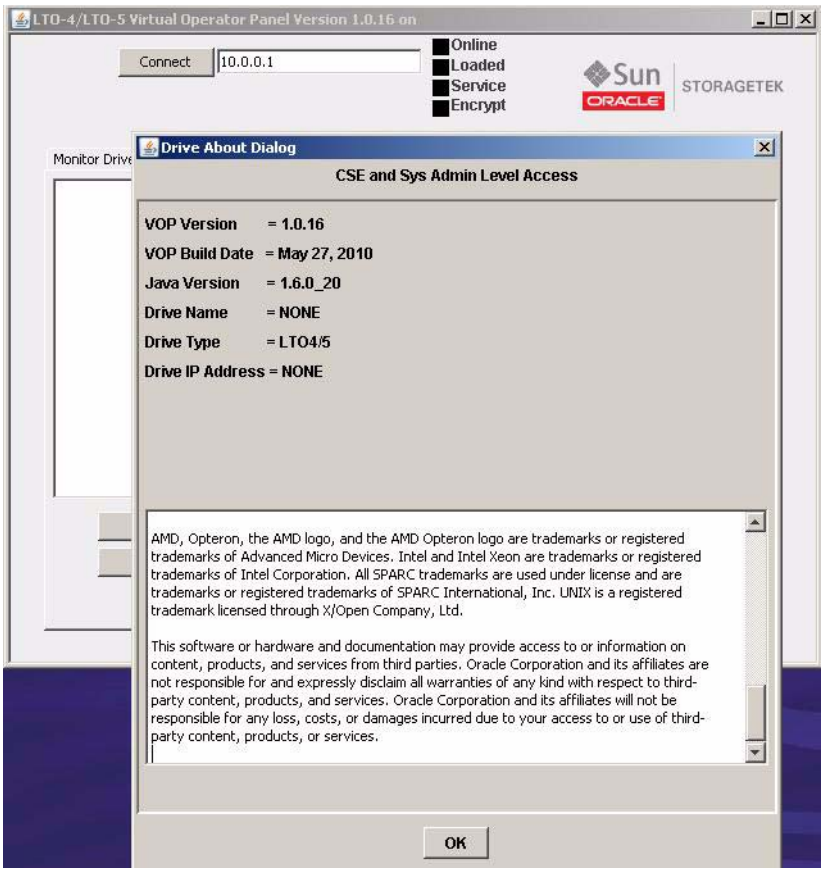


FIGURE 5-8 About LTO Virtual Operator Panel



A

Changing the Computer IPv4 Address

This appendix provides guidelines to set a static IPv4 address required to connect to the drive, and to reset a single Ethernet port for obtaining a dynamic IP address.

> **Note –** If your computer has two or more Ethernet ports, you can dedicate one for static IP addressing and leave the one used to connect to the LAN set for dynamic IP.

Static IPv4 Address

To connect VOP to a T10000 tape drive that has a static IPv4 address, you must make sure your computer has a functional Ethernet port with compatible static IPv4 address.

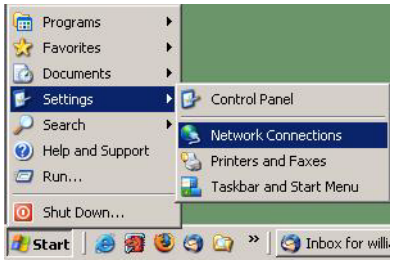
> **Note –** See your system administrator for Linux/UNIX operating systems.

▼ Setting static IP, Windows OS

Use the following procedure to check or set a static IP address for your computer:

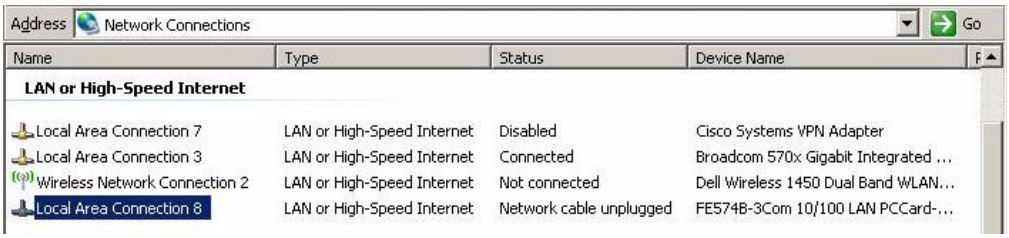
1. **Click Start, point to Settings, and click Network Connections. (FIGURE A-1).**

FIGURE A-1 Network Connections Selection



The Network Connections window (FIGURE A-2) lists all network connections.

FIGURE A-2 Network Connections Window

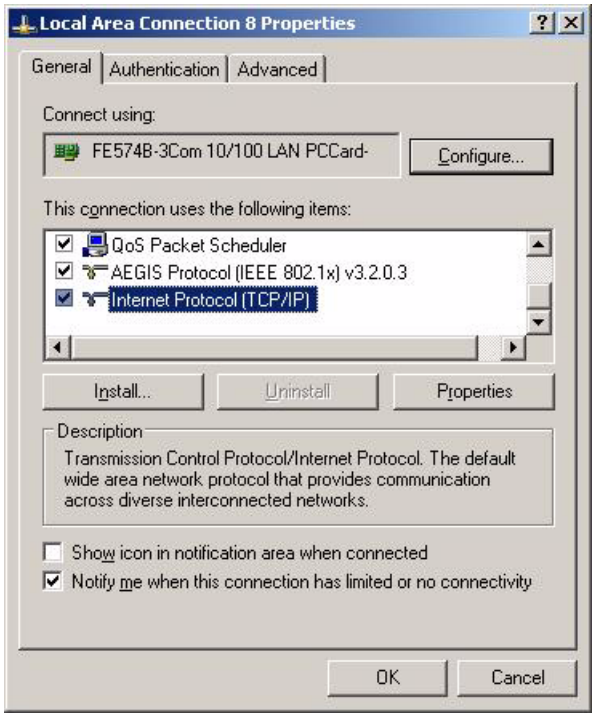


2. **Double-click the appropriate connection.**

   The Local Area Connection Properties dialog box (FIGURE A-3) opens.

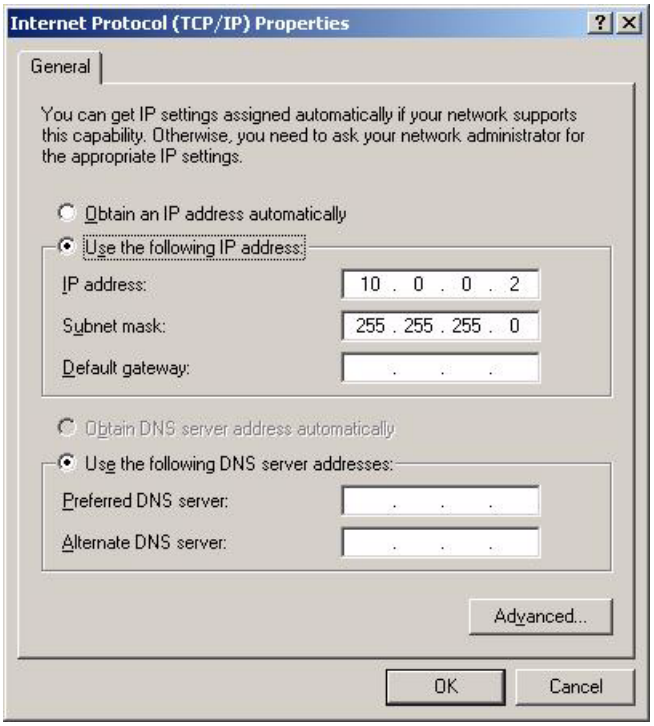
3. **Scroll down, select Internet Protocol (TCP/IP), and click the Properties button.**

FIGURE A-3 Local Area Connection Dialog Box



The TCP/IP properties dialog box (FIGURE A-4 on page 113) opens.

FIGURE A-4 Internet Protocol (TCP/IP) Properties Dialog Box



Note – If the port is set for the proper static IP and subnet mask, skip to Step 5. Otherwise, perform step 4 to enter/edit the static IP address and subnet mask.

4. **Make sure the Use the Following IP Address option is selected, and enter a compatible static IP address, Subnet mask, and Default gateway.**

   See your system administrator, as needed for assistance.

   Note – Static IP address 10.0.0.2 is typically used for the computer to be compatible with a drive factory preset static IP address 10.0.0.1. However, if the drive's static IP has been customized for your site, you must set the computer's static IP to be compatible with the target drive. The first three digit sets must match, and the last digit set must be different from the target drive. The last digit set should also be different than any other possible target drive on your site.

5. **Click OK.**

   The Local Area Connection Properties dialog box (FIGURE A-3 on page 112) reappears.

6. **Click OK.**

   You can now connect to any on-site drive that has a compatible static IP address.

Dynamic IP Address

If you set a temporary static IP address for an Ethernet port normally used to connect to the LAN, you will need to reset the port to automatically obtain a dynamic IP address.

▼ Resetting IP to Auto, Windows OS

Use the following procedure to reset a local connection for dynamic IP address:

1. **Click Start, point to Settings, and click Network Connections (FIGURE A-1 on page 111).**

   The Network Connections window opens (FIGURE A-2 on page 112).

2. **Double-click the Local Area Connection associated with the Ethernet port that requires change.**

   The Local Area Connection Properties dialog box (FIGURE A-3 on page 112) opens.

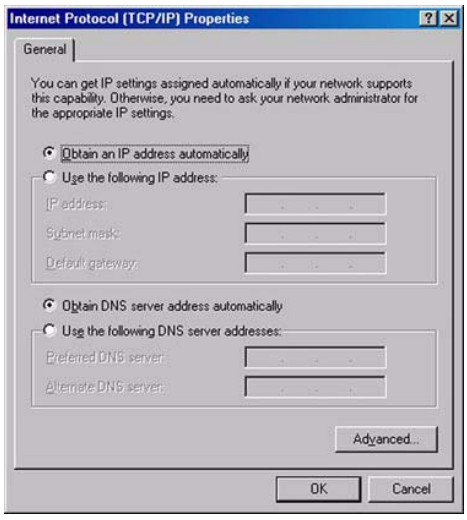
3. **Scroll-down, select Internet Protocol (TCP/IP), and click the Properties button.**

   You will need to scroll down as TCP/IP is the last selection. The TCP/IP properties dialog box (FIGURE A-5) opens.

4. **Click Obtain an IP address automatically.**

   The three IP address fields go blank, and become unavailable for entries.

FIGURE A-5 Internet Protocol (TCP/IP) Properties (auto IP) Dialog Box



5. **Click OK to save the reset.**

   The Local Area Connection Dialog box (FIGURE A-3 on page 112) reappears.

6. **Click OK.**

The Ethernet port is now set to connect to a LAN.

B

VOP to Drives on Private Networks

This appendix provides supplemental information about VOP to drives connected on an IPv4 private network.

Private Network, SDP-Controlled

When a Service Delivery Platform (SDP) is present, all monitored drives are connected into an IPv4 private network controlled by the SDP site server.

The Ethernet port of every monitored drive is 100% dedicated to the service network, and each drive has an SDP-controlled dynamic IP address. Therefore, you do not have access to the drive Ethernet port and cannot connect your customer-version VOP to such drives.

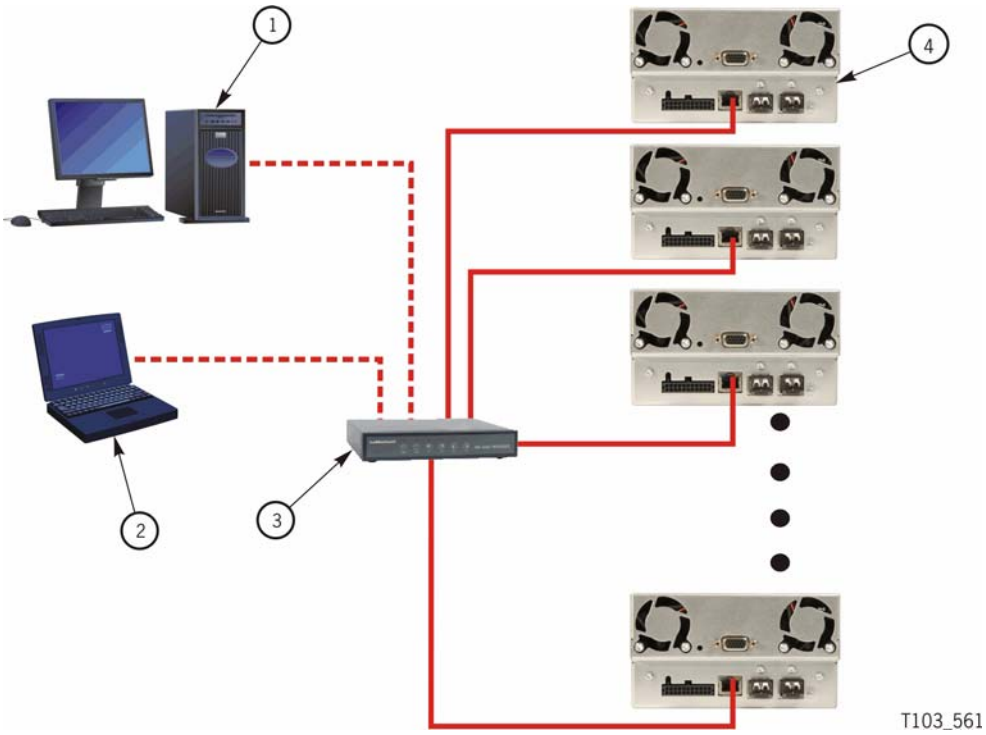
> **Note –** Only service representatives are authorized to access drives connected to an SDP-controlled private network. *Never* disconnect an Ethernet cable associated with an SDP-controlled private network.
>
> Contact your service representative to change drive configuration settings of any drive in the SDP-controlled private network.

However, when an SDP site server is not present, your site personnel can interconnect drives from one or more drive cabinets into a non-SDP private network. See "Private Network, non-SDP" on page 116.

Private Network, non-SDP

When an SDP site server is not present, a non-SDP private network (FIGURE B-1), can be set up, interconnecting the installed drives to one or more cascaded Ethernet switches. Such a network allows you to access any connected drive from a central point.

FIGURE B-1 Private Network, non-SDP



1. Desktop PC
2. Notebook PC
3. Ethernet switch
4. T10000 tape drives

Overview

In a non-SDP, customer-controlled private network, the Ethernet port of each drive is connected to an Ethernet switch. A desktop and/or notebook PC, running the customer-version VOP application, would also be connected to the network.

> **Note –** Each connected drive and each computer requires an individual static IP address.

Components

The following table lists the required components for operating VOP in a non-SDP private network.

Component	Description
Computer	One or more desktop or notebook computers Note: The computer(s) must use the single-drive, version of the VOP, and an Ethernet port configured with a compatible static IPv4 address.
Ethernet switch(es)	One or more Ethernet switches might be required to provide a port for each drive, one port for each computer, plus additional ports to cascade multiple switches. Note: See the Ethernet switch vender documentation for setup guidelines.
Ethernet CAT5 cables	One cable for each drive, one cable for each computer, plus additional cables to cascade multiple switches with enough length to connect to the switch port and allow strain relief.
Ethernet cross-over cable	One cross-over cable for direct computer-to-drive connection.

▼ Setup

Consult with your site IT manager, system administrator, and support personnel to install and setup the Ethernet components, and obtain the private network static IP addresses.

> **Note –** Each drive should have been preset at the factory with the following:
> Static IP address: 010.000.000.001
> Subnet mask: 255.255.255.000
> Default gateway: 255.255.255.255
> However, it is a good idea to verify the data using the drive data property sheet for the network settings in the Retrieve menu of VOP.

Use the following procedure to set up each drive for the private network.

1. **Set your computer static IP address to 10.0.0.2 and the subnet mask to 255.255.255.0.**

   See "Static IPv4 Address" on page 111.

2. **Start VOP.**

   See Chapter 3, "Starting VOP Programs" on page 35.

3. **Connect the Ethernet cross-over cable to the computer Ethernet port and to the drive Ethernet port.**

4. **On each installed drive, perform the following steps:**

   a. **Connect VOP to the cabled drive.**

      See "To Use the Connect to Drive Command" on page 46.

b. **Reset the drive static IP address to one that is compatible with the new network and commit the change.**

   See "To Set a Drive Static IPv4 Address" on page 92.

c. **Disconnect the Ethernet cross-over cable from the drive port.**

   Note – The VOP does not reconnect to the drive following the IPL because the drive static IP is no longer 10.0.0.1.

d. **Connect a CAT5 Ethernet cable from the open drive port to an available port on the Ethernet switch.**

   If this is the last drive that needs an IP address change, continue with Step 5.

   Note – Any drive can be connected to any available Ethernet switch port. It is not necessary to assign ports to specific drives. However, you should make a listing of the assigned IP address for each drive location.

e. **Connect the computer Ethernet cross-over cable to the next drive Ethernet port.**

   The VOP should automatically connect to the drive because it is still attempting to reconnect to IP address 10.0.0.1.

5. **Disconnect the cross-over cable from the computer.**
6. **Reset the computer static IP address to the private network-designated IP address.**

   See "Static IPv4 Address" on page 111.

7. **Connect a CAT 5 cable to the computer Ethernet port and to an available port on the Ethernet switch.**
8. **Connect VOP to a selected drive.**

   See To Use the Connect to Drive Command.

   Note – Use the private network-designated drive static IP address.

9. **Repeat Step 8 for a few different drives.**

   Note – You only need to enter the other drive's designated IP address into the Connect to Drive dialog box (FIGURE 4-4 on page 46).

The non-SDP private network is now ready for VOP access to any connected drive.

C

Java Software Installation

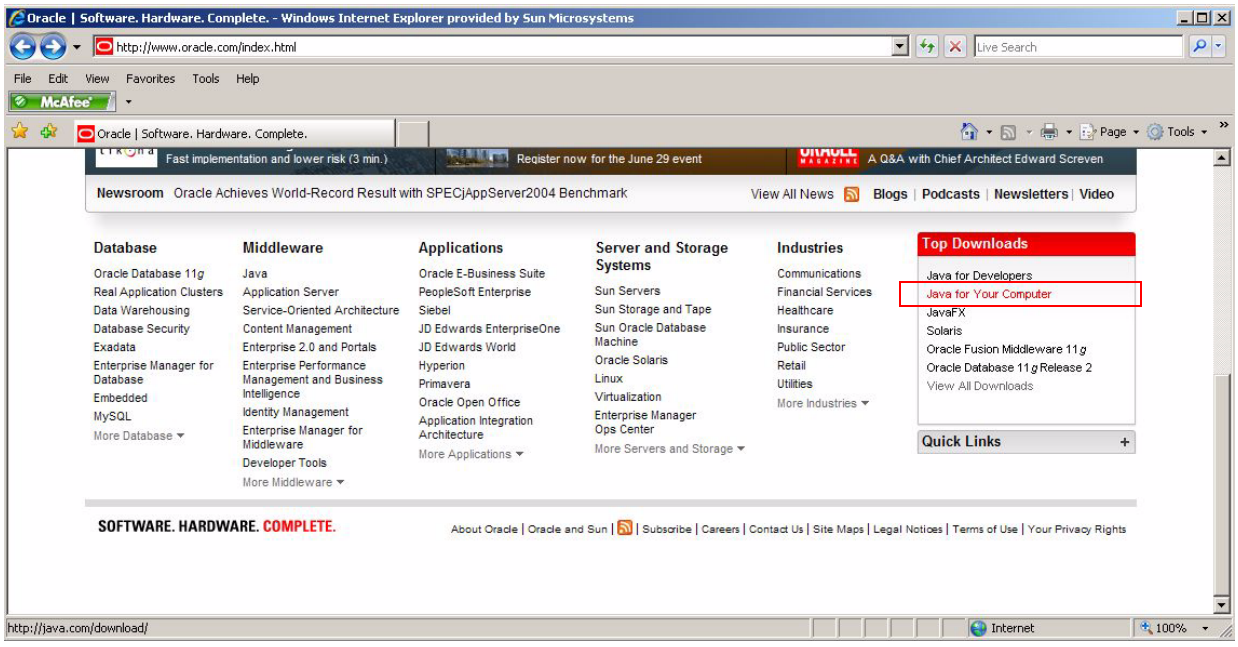
This appendix provides instructions to install/update the Java Runtime Environment (JRE).

To install/update the Java Runtime Environment, go to http://www.oracle.com.

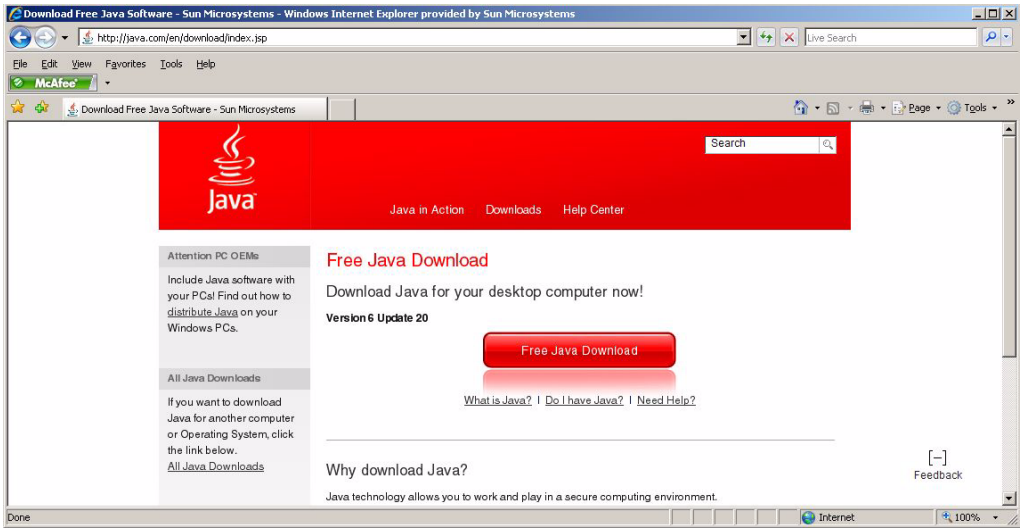
> **Note –** The Oracle web pages are dynamic and subject to frequent changes. Therefore, the actual pages you see might differ from the examples in this section.

1. **Click the *Java* for Your Computer link in the Top *Downloads* area in the lower right of the screen.**

FIGURE C-1 Oracle Home Page



A page containing the current Java download appears.



2. **Click Free Java Download.**

A page containing a description of the download for your browser appears.

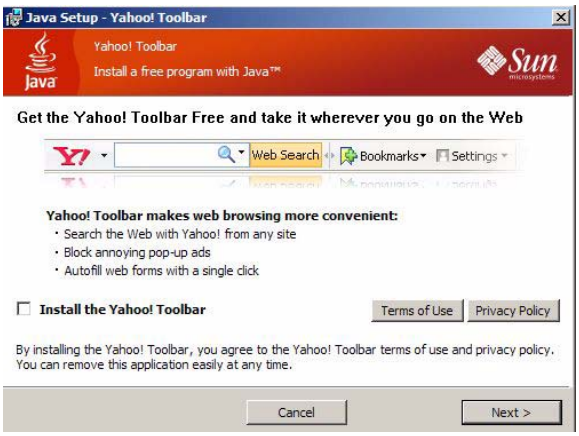
Note – A link is present below the Free Java Download button that provides access to Java for other operating systems. There is also a link for Installation Instructions.

3. **Click Free Java Download.**
4. **Follow the on-screen prompts to start the installation.**

You can choose to run or save the file. If you choose to run the software, the Welcome to Java window appears.

5. **Click Install.**

The Java Setup dialog box offers the installation of the Yahoo! toolbar.



6. **Make your selection and click Next.**

A progress bar appears.

An installation complete message appears.

Glossary

This glossary defines terms and abbreviations in this publication.

Some of the definitions are taken from other glossaries. The letters in the parentheses that follow some definitions indicate the source of the definition:

(A) *The American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI).

(E) The ANSI/Electronic Industries Association (EIA) Standard-440-A, *Fiber Optic Terminology*.

(I) The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and International Electrotechnical Commission (ISO/IEC/JTC1/SC1).

(IBM) *The IBM Dictionary of Computing*, copyright 1994 by IBM.

(T) Draft international standards committee drafts, and working papers being developed by the ISO/IEC/JTC1/SC1.

A

address
A character or group of characters that identifies a register, a particular part of storage, or some other data source or destination. (A).

alphanumeric
A character or group of characters that identifies a register, a particular part of storage, or some other data source or destination. (A).

C

capacity
Total amount of User Data stored on one data cartridge in 8 bit bytes. *Synonymous with* "User Capacity" or "Native Capacity". This is the capacity that the user sees after the ECC/Format/ERP etc. overhead has been assessed (no compression).

capacity, raw
Total amount of data stored on one data cartridge in 8 bit bytes before any ECC/Format/ERP etc. overhead has been assessed (no compression).

capacity, user
Total amount of data stored on one data cartridge in 8 bit bytes that is sent by the host computer. This is the capacity that the user sees after the ECC/Format/ERP etc. overhead has been assessed (no compression).

cartridge
A storage device that consists of magnetic tape on supply and takeup reels, in a protective housing. (IBM)

cleaning cartridge
A data cartridge that contains special material to clean the tape path in a transport or drive.

compress
To save space by eliminating gaps, empty fields, redundancy, or unnecessary data to shorten the length of records or files. (IBM)

configuration
The manner in which the hardware and software of an information processing system is organized and interconnected. (T)

connector
An electrical or optical part that joins two or more other parts.

D

data cartridge
A container holding magnetic tape that can be processed without separating the tape from the container.

data path key management (DPKM)
The use of the SCSI 4 commands *Security Protocol In* and *Security Protocol Out* to implement host-based key management encryption on StorageTek tape drives.

data security erase (DSE)
A random binary pattern, over-writing existing data, from the point of an Erase command, to the end-of-tape.

data tape
A data cartridge formatted for use as a regular data tape for the system in which it is used.

data track(s)
The region(s) of recorded tape containing user data formed as discreet longitudinal "tracks" (similar to railroad tracks).

diagnostics
Pertaining to the detection and isolation of errors in programs and faults in equipment. (IBM)

DPKM
See data path key management.

drive
A device for moving magnetic tape and controlling its movement. (IBM)

dump
To copy the contents of all or part of virtual storage to collect error information. (IBM)

E

emulation
The use of programming techniques and special machine features to permit a computing system to execute programs written for another system. (IBM)

encryption
The translation of data into a secret code. Encryption is one of the most effective ways to achieve data security. To read an encrypted file, you must have access to a special key or password that enables you to decipher it.

EOT
End of Tape.

erase
To remove data from a data medium, leaving the medium available for recording new data. (I) (A)

error
A discrepancy between a computed, observed, or measured value or condition and the true, specified, or theoretically correct value or condition. (I) (A)

ESD
Electrostatic Discharge.

F

fault symptom code (FSC)
A four-character hexadecimal code generated in response to an error to help isolate failures within the device.

FC
See fibre channel.

fiber optics
The branch of optical technology concerned with the transmission of radiant power through fibers made of transparent materials such as glass, fused silica, and plastic. (E)

fiber-optic cable
A cable made of ultrathin glass or silica fibers which can transmit data using pulses of laser light. Fiber-optic cables have several advantages over copper cables: they have much less signal loss; they allow information to be transmitted at higher speeds and over longer distances; they are not affected by external electrical noise; and they are better for transmissions which require security.

fibre channel
The National Committee for Information Technology Standards standard that defines an ultrahigh-speed, content-independent, multilevel data transmission interface that supports multiple protocols simultaneously. Fibre Channel supports connectivity to millions of devices over copper and/or fiber-optic physical media and provides the best characteristics of both networks and channels over diverse topologies.

fibre connection (FICON)
An ESA/390 and zSeries computer peripheral interface. The I/O interface uses ESA/390 and zSeries FICON protocols (FC-FS and FC-SB-2) over a Fibre Channel serial interface that configures units attached to a FICON-supported Fibre Channel communications fabric.

FICON
See fibre connection (FICON).

FICON channel
A channel having a Fibre Channel connection (FICON) channel-to-control-unit I/O interface that uses optical cables as a transmission medium.

file-protect
To prevent the erasure or overwriting of data stored on data cartridges.

FIPS
Federal Information Processing Standards

FRU
Field Replaceable Unit.

FSC
Fault Symptom Code.

FTP
Generic definition: File Transfer Protocol.

G

GB
See gigabyte (GB).

Gb
Gigabit, equal to 10^9 bits.

Gbps
Gigabits per second.

gigabyte (GB)
One billion (10^9) bytes.

H

hardware
All or part of the physical components of an information processing system, such as computers or peripheral devices. (T) (A)

hub
A Fibre Channel Arbitrated Loop switching device that allows multiple servers and targets, such as storage systems, to connect at a central point. A single hub configuration appears as a single loop.

I

indicator
A device that provides a visual or other indication of the existence of a defined state. (T)

interface
Hardware, software, or both, that links systems, programs, or devices. (IBM)

internet protocol (IP)
A protocol used to route data from its source to its destination in an Internet environment. (IBM)

internet protocol (IP) address
A four-byte value that identifies a device and makes it accessible through a network. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be from 0 to 255. For example, 129.80.145.23 could be an IP address.

IP
See *internet protocol (IP)*

internet protocol v4 (IPv4) address
A four-byte value that identifies a device and makes it accessible through a network. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be from 0 to 255. For example, 129.80.145.23 could be an IP address.

internet protocol v6 (IPv6) address
The next generation internet protocol. It provides a much larger address space than IPv4. This is based upon the definition of a 128-bit address - IPv4 used a 32-bit address. The IPv6 address format is eight fields of four hexadecimal characters separated by colons (for example, 2001:0db8:85a3:0000:0000:8a2e:037 0:7334)

L

library
A robotic system that stores, moves, mounts, and dismounts data cartridges that are used in data read or write operations.

Linear Tape-Open (LTO)
A set of data format standards created to enable data interchange among tape drive produced by a consortium of manufacturers. With LTO standards, the tape cartridges are interchangeable among tape drive brands.

link
A physical connection (electrical or optical) between two nodes of a network.

M

magnetic tape
A tape with a magnetizable layer on which data can be stored. (T)

menu
A list of options displayed to the user by a data processing system, from which the user can select an action to be initiated. (T)

N

network
An arrangement of nodes and branches that connects data processing devices to one another through software and hardware links to facilitate information interchange.

O

offline
Neither controlled by, nor communicating with, a computer. (IBM)

online
Pertaining to the operation of a functional unit when under the direct control of the computer. (T)

P

performance
One of two major factors, together with facility, on which the total productivity of a system depends. Performance is largely determined by a combination of throughput, response time, and availability. (IBM)

R

read/write head
The data sensing and recording unit of a diskette magazine drive or tape drive. (IBM)

release
A distribution of a new product or new function and fixes for an existing product. (IBM)

R/W
Read/Write.

S

SDP
Service Delivery Platform.

submenu
A menu related to and reached from a main menu. (IBM)

sub-system
A system that is part of some larger system.

switch
In Fibre Channel technology, a device that connects Fibre Channel devices together in a fabric.

system
A combination of functionally interrelated interacting mechanical and electrical elements designed to work as a coherent entity.

T

T10000 Tape Drive (VOP)
A software application that allows a user to monitor and perform some operations on a tape drive.

tape
See magnetic tape.

tape cartridge
A container holding magnetic tape that can be processed without separating the tape from the container.

tape drive
A device for moving magnetic tape and controlling its movement. (T)

TCP/IP
Transmission Control Protocol/Internet Protocol

transmission control protocol/internet protocol (TCP/IP)
A set of communication protocols that support peer-to-peer connectivity functions for both local and wide area networks. (IBM)

U

Ultrium
An LTO tape format optimized for high capacity and performance with outstanding reliability. The Ultrium tape format uses a single reel cartridge to maximize capacity.

V

VOLSER
VOLume SERial Number. It is, usually 6 characters long and is both the paper label stuck on the back edge of the cartridge and in the VOLID label that is recorded, particularly by MVS systems, at the beginning of the media.

volume serial number (VOLSER)
An alphanumeric label that the host software uses to identify a volume. It attaches to the spine of a cartridge and is both human- and machine-readable.

VOP
See *T10000 Tape Drive (VOP)*.

W

wrap
A single pass of tape from either BOT to EOT or EOT to BOT with the head(s) in a fixed transverse location.

write-enabled
A setting on a data cartridge that allows data to be written on the tape.

write-protected
A setting on data cartridges that prevents data from being written on the tape. Reading data is still possible.

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