



THOMSON

Phantom

TRANSFER ENGINE TE 2001

Operating Instructions

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THOMSON Broadcast & Media Solutions GmbH

Brunnenweg 9
D-64331 Weiterstadt, Germany
P.O. Box 1165

Tel: +49 (0) 6150-104-0
Fax: +49 (0) 6150-104-300

Web Site

www.thomsongrassvalley.com

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1 GENERAL

1.1 Overview

Phantom is a disk-based transfer buffer that optimizes transfer speeds for highly efficient data transfers. During record and playback, it's controlled like a VTR via a simple graphical user interface (GUI).

1.2 Making The Connection

This section describes how to connect the Phantom Graphical User Interface (GUI) to the Phantom Server.

1.2.1 Starting The GUI

The Phantom GUI can be started from the Icon Catalog on the desktop of the workstation.

Select **Find -> Icon Catalog -> Applications** to open the catalog browser. The Phantom application will appear in the collection of applications, see Figure 1.

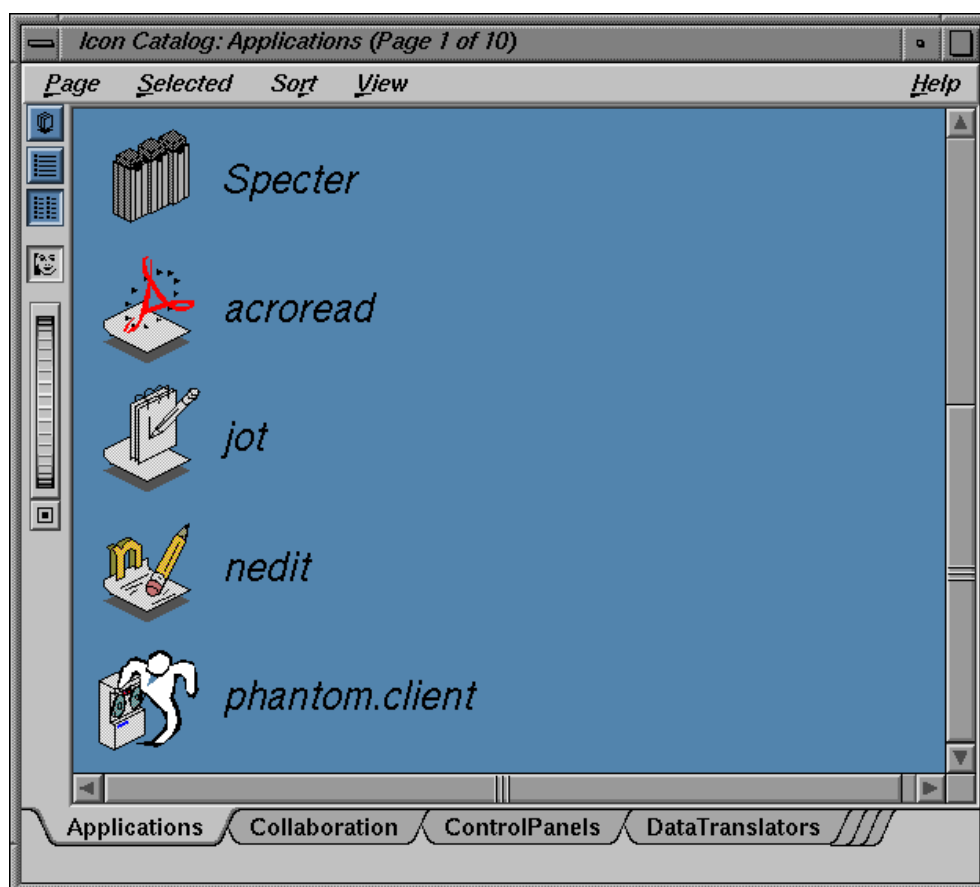


Figure 1: The Icon Catalog browser with the Phantom application in the applications collection.

Double click the Phantom icon to start the GUI in full screen mode.

1.2.2 Logging In

The Phantom GUI is a client of the Phantom Server. Upon startup the GUI will automatically try to connect to the default Phantom Server.

Note: The Phantom Server is designed to support only one concurrent GUI connection. Do not attempt to connect multiple GUIs to one Phantom Server at the same time.

If the GUI could not connect automatically to the default Phantom Server for any reason, the manual login dialog will appear, see Figure 2.



Figure 2: The login dialog.

In order to login, the following information must be provided to the Phantom Server:

Phantom Server: The host name of the SGI™ server running the Phantom Server application.

User Name: The user name of the account on the SGI™ server used to connect to the Phantom Server application.

User Password: The password of the user account on the SGI™ server.

If the Phantom Server is not running, start it by pressing the **Start Server** button in the login dialog. As with a login, the Phantom Server (Host Name), User Name, and Password (if any), must be filled in before starting the server. A separate window will display the startup messages from the server. A message will also show if the server is already running.

The default values for the Login window can be changed with the GUI-specific configuration elements

PHANTOM_DEFAULT_SERVER # default is "spirit-server" and

GUI_DEFAULT_USERNAME # default is "guest",

in the home directory of the current user in the file ".PhantomTE.config"

(for example /usr/people/spirit/.PhantomTE.config).



Figure 3: The startup messages from the server.

In normal operation, the Phantom Server will always be running. It should only be necessary to start the server when recovering from a severe error.

If the Phantom Server is already running, another server cannot be started and a message in the startup window will indicate this.

If the GUI is already connected to a Phantom Server, pressing the **Connect** button will allow a user to connect to a different Phantom Server.

1.3 Basic Screen Layout

Phantom’s full screen interface is divided into three areas: a **Mode Navigation Panel** at the top of the screen, a **Main Working Panel** that displays information relevant to the selected mode, and a **Status Panel** at the bottom of the screen.

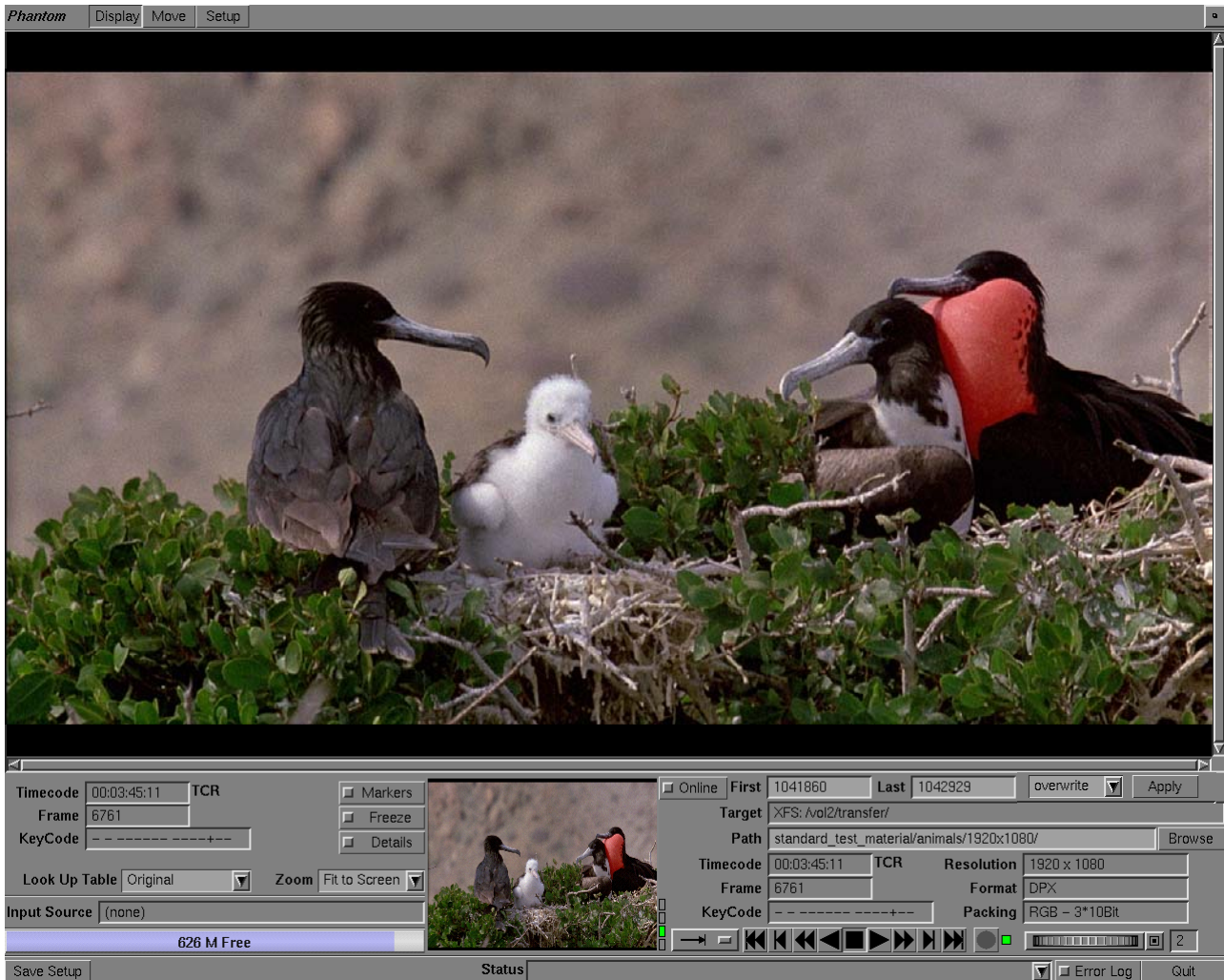


Figure 4: The Phantom screen in Display mode.

1.4 Mode Navigation Panel

The mode navigation panel at the top of the window has three buttons to switch the main working panel between the different modes of operation in Phantom: **Display**, **Move**, and **Setup**. Only one mode can be selected at a time. These modes are described in the following sections 2 through 4.

1.5 Main Working Panel

The main working panel shows the information relevant to the selected operating mode.

The **Display** operating mode is used to display image content that is read either from the image input (HiPPI data or HDTV) or from the disk storage. The image content is displayed as a low-resolution thumbnail as well as in full resolution (a HiRes image). See section 2 for further details about the Display mode.

The **Move** operating mode is used to move or copy image sequences from one type of offline storage to another. The supported storage types are XFS (file system), VRF (with a VDC install only), and several magnetic tape devices, including VooDoo Data. See section 3 for further details about the Move mode.

The **Setup** operating mode is used to setup the configuration parameters for the Phantom. Additional information is displayed including such details as the current version number, the application build date, and licenses. See section 4 about further details on the Setup mode.

1.6 Status Panel

The status panel is visible in all operating modes and provides an instant overview of the current state of the Phantom. The status panel, located at the bottom of the screen, shows the **Save Setup** button used to set the current settings as the default (see also section 4.3), a general status message area, the **Error Log** dialog button, and the button to quit the Phantom.

1.6.1 Status Field

The Status field contains information about actions in progress. For example, the status line reads:

Getting directory...

This line indicates that the Phantom is busy retrieving the directory.

The Status field is actually a scrollable pop-up list and will show all previous status messages. Click anywhere in the field to show the list.

1.6.2 Error Log Dialog

The Phantom keeps a log of all errors, warnings, and informational messages that occur during a connected session. The error log dialog can be viewed by pressing the **Error Log** button located in the status panel.

Whenever the Phantom GUI receives new messages from the Phantom Server, the **Error Log** button will turn red. Once the Error Log dialog has been opened to view the new messages, the button will return to its normal gray color. The GUI may be configured so that new error messages cause the Error Log dialog to be opened automatically. See section 4.2.1.

Each entry in the error log is classified as an error, a warning, or an informational message.

Each message is identified by a code. The first line of the message is displayed in the Message column of the error log.

Selecting a message by clicking on the error in the error log, may display a more extensive explanation in the Explanation box.

The log can be cleared with the **Clear Log** button. Press the **Close** button to return to the main window of the GUI.

Clicking a column heading will sort the log. The sort order toggles between ascending and descending. Ascending time is the default sort order.

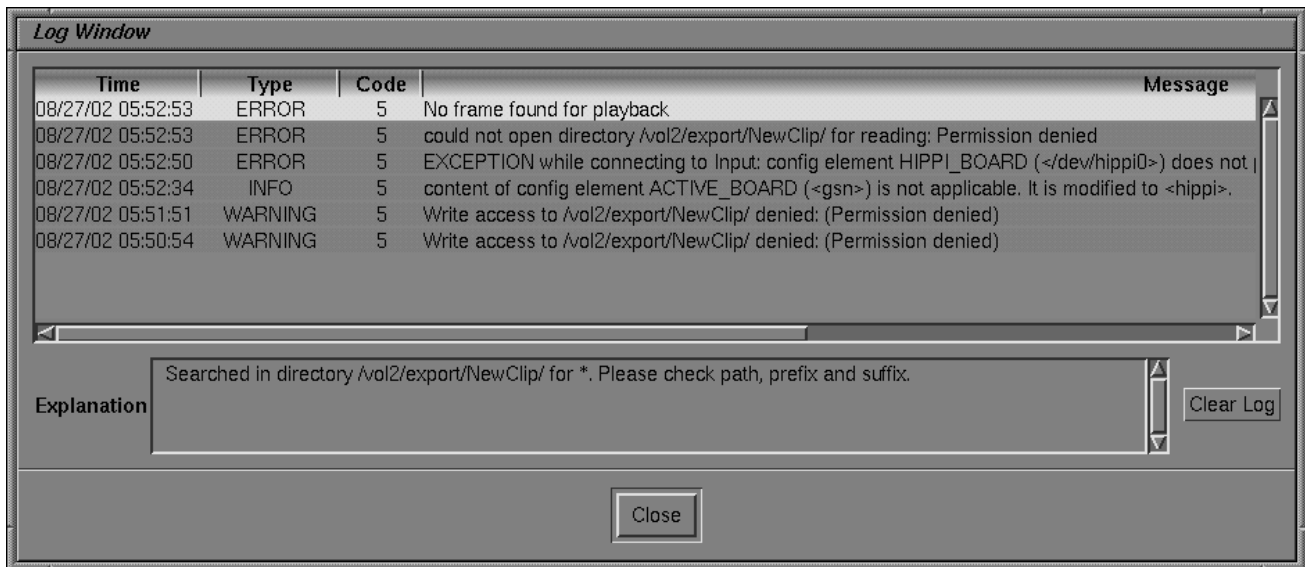


Figure 5: An example of an error log.

2 DISPLAY MODE

Refer to Figure 4 for an overview of the layout of the main window in Display mode. The following sections describe the individual controls and fields in detail.

2.1 Online

The **Online** button toggles between online and offline mode.

In **Online** mode the displayed images are read in from the external image source as indicated by the Input Source field (see section 2.8). In online mode the incoming images can be recorded to offline storage. This can be the XFS file system or the VRF (Virtual Reel File, only available in Specter VDC installations).

In **Offline** mode the external image source is switched off. The images that are displayed in the thumbnail or HiRes display are read from the file system (XFS) instead. Note that offline mode is not available when the current target is a VRF. Reading back out of the VRF is currently only supported in the Move operation mode and through the Specter Virtual DataCine.

2.2 Thumbnail Display

The thumbnail display shows images in a sub-sampled version. No filtering is applied whatsoever so the display can be used for general monitoring purposes. To look at details in the image content, refer to the HiRes display (see section 2.3).

In **Online** mode, the thumbnail display window always displays the image content that was at last available on the active image input (see section 2.8). If HDTV is the active input, this is always a live stream. However, in case of HiPPI this might be a still image as long as no new data is coming across the HiPPI channel, e.g., when the HiPPI source (like a Spirit DataCine) is temporarily not in data mode.

The vertical row of four lights to the right of the thumbnail display is constantly moving while the image stream is alive to indicate that the image content is being updated.

In **Offline** mode, the thumbnail display window displays the image content being read back from the XFS file system. Note that the offline mode is not available when the current target is the VRF.

2.2.1 Thumbnail Metadata

The thumbnail metadata section displays some of the metadata associated with the current image. This information is shown at the right side of the thumbnail display and is always updated according to the current image content.

Next to the timecode display is a three-letter code indicating where the displayed timecode originated.

A value of **TCR** means “Time Code Read” and indicates that the displayed value was read in from the appropriate external source and not modified by the application. A value of **TCG** means “Time Code Generated” and indicates that the displayed timecode value was (re-) generated by the Phantom application.

Thus, it was not read in through any external source. If this value shows up during the recording of material, it usually means that the images cannot be referenced through an external EDL because the original timecode reference has been lost.

2.3 High Resolution Display

The HiRes display (High Resolution display) displays the image content in full resolution. The only modification to the actual image data is done through the graphics hardware of the display machine. Refer to section 2.3.3 for details.

Since one image in full resolution consists of anywhere between roughly 8 MB and 16 MB of data, depending on size and encoding, this display cannot be updated live. Instead the **Snapshot** button (see section 2.3.1) has to be used to update the display. However, if the Phantom GUI and the Phantom Server are running on the same machine, the HiRes display is live updated just as the thumbnail display.

2.3.1 Snapshot / Freeze

The **Snapshot** button is used to update the HiRes display with a new image. It will take several seconds (depending on the performance of the network connection) to send a copy of the latest image available from the server to the client.

If the Phantom GUI and the Phantom Server are running on the same machine, this button is labeled **Freeze** instead of **Snapshot** and allows halting the continuous update of the HiRes display. As long as the HiRes display is “frozen” the thumbnail display continues to update with the actual input stream while the HiRes display shows the “frozen” image content.

2.3.2 Markers

This function displays four white lines along the borders of the HiRes image. This distinguishes any dark image content from the surrounding black canvas of the Phantom display.

Note: The Zoom value (see section 2.3.3) may need to be lowered in order to see the markers on the screen.

2.3.3 Zoom

This switch sets the zoom factor that is to be applied to the HiRes image for display. A factor of 100% maps one pixel of image data to one screen pixel. For all other factors the zooming algorithm itself and the applied filtering (if any) depends on the graphics implementation of the display machine.

2.3.4 HiRes Metadata

This section displays some of the metadata associated with the image that is currently displayed in the HiRes display. This information is shown below the HiRes display and is always updated together with the image data itself and is thus also subject to the Snapshot or Freeze functionality (see section 2.3.1).

See section 2.2.1 for further information on the displayed metadata.

2.4 Target Selection

The term “target selection” groups a number of fields that together specify the location where recorded material is written to or read from, respectively, depending on the online/offline status (see section 2.1).

2.4.1 Target

This field displays the un-modifiable part of the target directory. For an XFS directory, this is the path that is specified through the config variable XFS_PATH_<n> (see section 5.1 for details on configuring paths).

For a VRF, the name of the actual VRF is displayed, as configured through the config variable VRFNAME.

2.4.2 Path

This is the modifiable part of the target path. Press **Apply** to make the entry come into effect (see section 2.4.5).

For an XFS directory, a valid directory name can be entered here. This directory will be appended to the string displayed in Target (see above). Together, these two parts make up the full XFS directory name that will be used to read or write data.

For a VRF, this entry will be taken as the Material ID. This is the name under which the material is stored in the VRF. The entry is checked for validity (certain characters are not allowed) and then broken up into bins (directories) inside the VRF. That is, there will be no combination made with the string displayed in Target.

2.4.3 First/Last

These two fields specify the first and last frames that are to be recorded. The default is that these fields are blank which means that all frames get recorded. Press **Apply** to make the entry come into effect (see section 2.4.5).

The first and last frame can be specified either in terms of a Timecode or a Frame number value, depending on the setup. However, when the current input is the HiPPI channel, then these settings can be made only in terms of a Frame number.

2.4.4 Overwrite/Skip/Stop

This new combo box offers the three options "overwrite", "skip" and "stop". It is located next to the first / last frame fields. It affects the Phantom's recording behavior. As default the Phantom always overwrites what is on XFS or VRF (overwrite). With this new toggle one can specify whether he wants to keep the existing version (skip) or stop if there is already such an entry (stop).

2.4.5 Apply

This button is active only when any of the following fields have been modified: Path, First, Last (see sections 2.4.2 and 2.4.3). Press this button to apply the modified setting.

2.4.6 Browse

This button opens the Browser dialog shown in Figure 6. Existing contents and directory structures can be browsed with the dialog. Different XFS devices and the VRF can be chosen as the current target. However, when in offline mode, the VRF is unavailable as a choice (see section 2.1).

The selection is applied upon closing the dialog and is used as either the target for new recordings (in online mode) or as the source for playing back (in offline mode). See also section 3.1.5.

Clicking on an item from the list copies it into the Path field at the bottom of the dialog. There it can be modified. The First and Last settings can also be entered or modified in this dialog.

The frame chosen for the thumbnail is dictated by the **GUI_BROWSER_THUMBNAIL_FRAME**, see section 5.1.3.3.

Note: This dialog allows a better overview when specifying the target location for the recorded material. For the offline mode, it finds and selects the existing material in the XFS file system without having to remember and type the complete and correct path into the Path field.

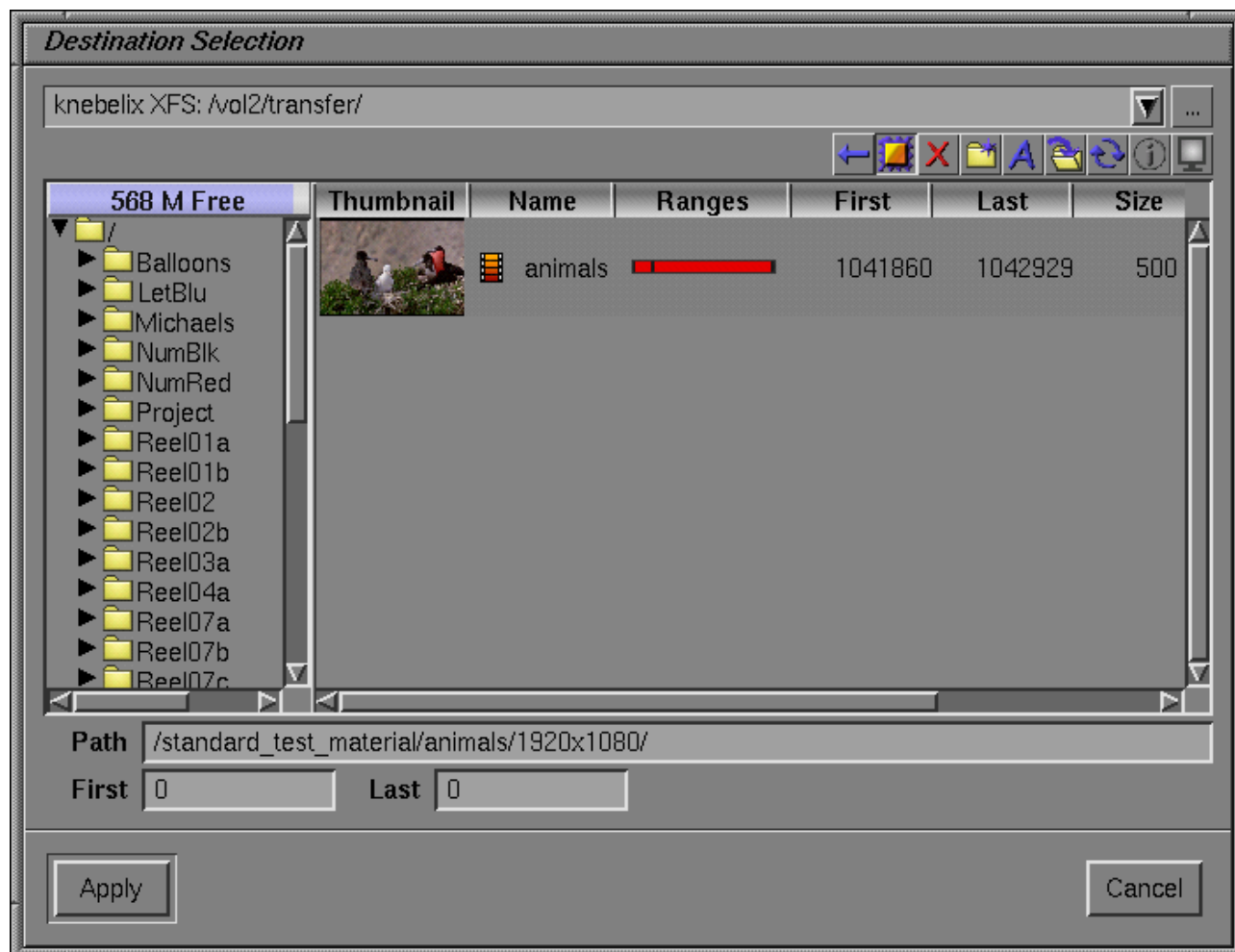


Figure 6: The Browser dialog.

2.5 Record

The **Record** button is available only in online mode (see section 2.1). When the **Record** button is pressed, the recording starts. Pressing the same button a second time ends the recording.

During recording, the images that are received at the active input get recorded to the offline storage (as specified in the Target Selection section described in section 2.4) if they lie within the First and Last limits (if specified). If a particular incoming image's Frame number or Timecode does not lie within these limits, it does not get recorded, even if the **Record** button is pressed.

*Note: The fact that an image is actually recorded is indicated by the red light next to the **Record** button. At the same time, the four vertical lights next to the thumbnail display turn from green to red.*

2.6 Playback Controls

When in offline mode, determined by the **Online** button in the Transfer Control panel, the playback controls become activated. In this state, playback of the image sequence specified in the Transfer Control panel can occur. A different image sequence can be selected by using the Target Selection functionality (see section 2.4).

*Note: When in offline mode, the **Record** button is disabled.*

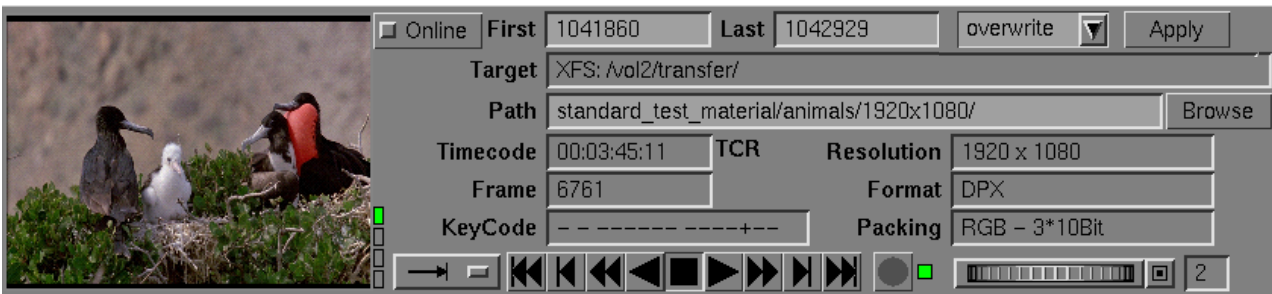


Figure 7: The Transfer Control panel in offline mode.

The playback controls are considered in three sections, moving from left to right in the panel: loop control, playback control and speed control.

2.6.1 Loop Control

This is an option menu specifying the looping functionality during playback. The selection can be one of, straight through playback (no looping), bounce (when either end of the sequence is reached, the play reverses direction), and loop (when the end of the sequence is reached, play resumes at the beginning).

2.6.2 Playback Control

The playback controls are various VCR-like controls for the playback, including Jump (to the beginning or end), Step (forward or back), Fast Play (forward or back), Normal Play (forward or back), and Stop.

2.6.3 Speed Control

The speed control thumbwheel determines the speed at which the Fast Play operates. It can be changed during playback.

2.7 Look Up Tables

Several Look Up Tables (LUTs) or Gamma Maps can be applied to the display hardware. This is achieved by selecting the LUT from a drop down list in the HiRes display panel.

The original Look Up Table that was present on the system when the Phantom application was initialized can be accessed through the drop down list as well. It is called “**Original**”. The original LUT will also be installed automatically when the application quits.

The following table outlines the available LUTs and how the LUTs correspond as inverses of the LUTs used by the Spirit DataCine and Specter Virtual DataCine.

Spirit DataCine or Specter Virtual DataCine LUT setting	Phantom LUT setting (used as inverse)	Notes
TV_Level / CRT on	TVLEV	
GR_Level / CRT on	TV to Graphics	
GR_Level / CRT off	Gamma 1.7	
TV_PD	TV_PD	
DXR	DXRtoCRT	Use for confidence monitoring only
TV-G / Genesis Emulation	TV-G	
DXR-G / Genesis Emulation	DXRtoCRT	Use for confidence monitoring only
LOG	DXRtoCRT	Use for confidence monitoring only
C-PD	C-PD	Use for confidence monitoring only
Not Applicable	Original	Original LUT installed when user starts Phantom application

Table 1: Available Look Up Tables (Gamma Maps).

2.8 Input Source

This field is a passive display of the currently selected input source. The input source can only be changed in the Setup panel (see section 4.1).

2.9 Target Device Space Available

The bar indicates the amount of free space available on the target device. The blue portion of the bar represents the used portion of the target device. The white portion of the bar represents the unused portion.

3 MOVE MODE

The Move panel is used for transferring clips from one device to another. It provides a means to build a list of clips to be transferred and mechanisms for executing and monitoring the transfer of a list. By building a transfer list separately from the action of transferring, the Mover creates flexible ways of organizing the transfer of clips that are large in number, size, and length.

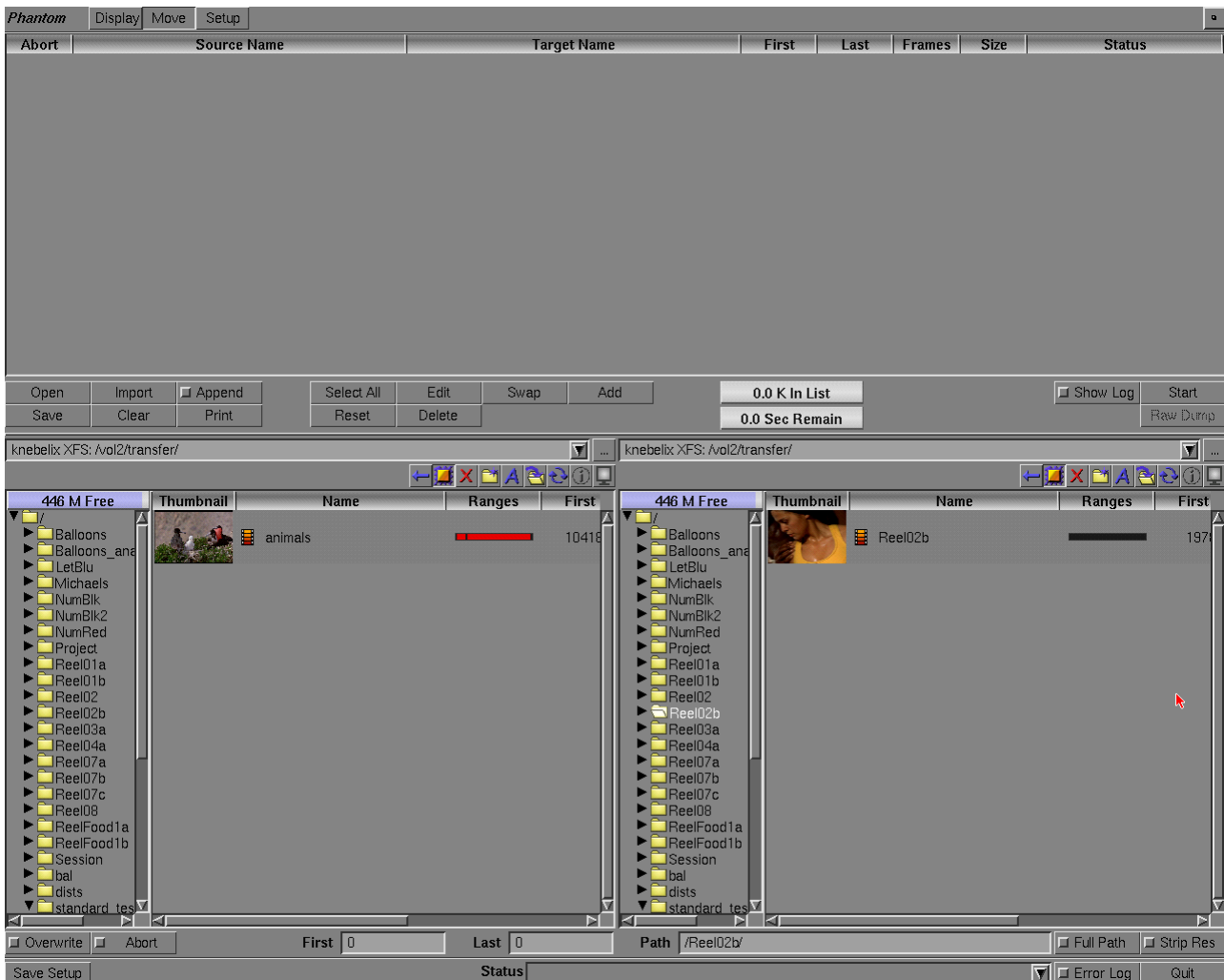


Figure 8: The Mover panel.

The Mover GUI is laid out with the transfer list display across the top half of the screen. The transfer list controls are directly below the list display. Below the list controls are the source and target device panels. The source device is on the left. The target device is on the right.

3.1 Devices

A Mover device is a physical device attached to the system that can provide or accept a sequence of images. The devices recognized by the Mover are XFS, VRF, DTF, DTF2, Exabyte, DAT, DST, VooDoo, DataCine and VTR. The VRF device support is available when Phantom is launched from within Specter or with the Mover integrated into Specter. Section 3.1.4 covers supported magnetic tape devices.

Mover devices need to be configured in order for the Mover to use them. Section 5.1.3.2 explains how to configure devices for Phantom.

3.1.1 Source And Target Devices

A device that provides clips is a source device. Devices that accept clips are target devices. Some devices, such as an XFS file system, can be both a source and a target device. XFS is unique in that it can be both at the same time. A tape can be used to store and retrieve clips, though not concurrently. Other devices, such as a DataCine device, can only be used as a source device. A DataCine has no way to accept clips. There are currently no target only devices.

Both a source and a target device are necessary for a transfer, but not all source and target device combinations are possible. A DAT tape device, for example, is unable to sustain the transfer rate necessary to be a target device for a VooDoo source device. Each time a source device is chosen in the GUI, only valid target devices for that device are displayed.

The following table shows the different source and target device combinations. Valid combinations are marked with an X.

Source/Target	XFS	VRF	DTF	DTF 2	Exa-byte	DAT	DST	Voo-Doo	Data-Cine	VTR	Frame-store
XFS	X	X	X	X	X	X	X	X			X
VRF	X	X	X	X	X	X	X	X			X
DTF	X	X	X	X	X	X	X				X
DTF2	X	X	X	X	X	X	X				X
Exabyte	X	X	X	X	X	X	X				X
DAT	X	X	X	X	X	X	X				X
DST	X	X	X	X	X	X	X				X
VooDoo	X	X						X			X
DataCine	X	X									
VTR	X	X									
Framestore	X	X	X	X	X	X	X	X			
HDRReel	X	X	X	X	X	X	X	X			X

Table 2: Source and target combinations.

3.1.2 Selecting Devices

The source and target panels each contain a pull down list of devices. A panel representing the currently selected device appears directly below the selection box. A browser is displayed for XFS, VRF, VooDoo, and tape. The browser shows a hierarchical view of the device's contents. A DataCine device does not have a directory. DataCine controls are shown in the panel instead of a browser.

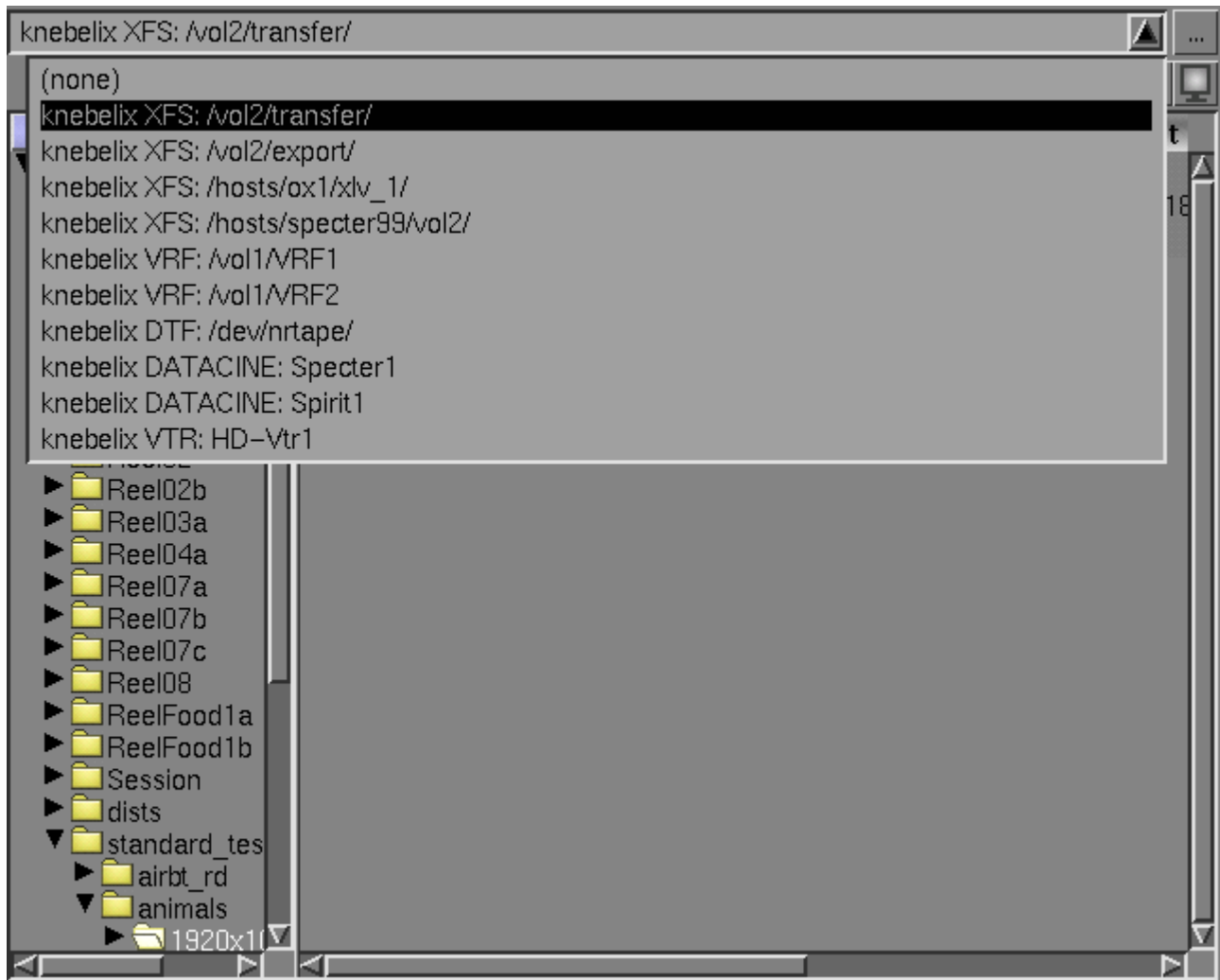


Figure 9: The device browser.

Tape devices need a tape directory before they can be browsed. All tapes written with the Mover have a directory. If the tape does not have a directory, one can be generated. See section 3.1.4 for more information on tape directories.

3.1.3 Remote Devices (DFA Link)

On the right hand side of the device drop down list there is a button, labeled by three dots, the **Remote Devices button**: 

Hitting that button will bring up the **Remote Browser Dialog**.

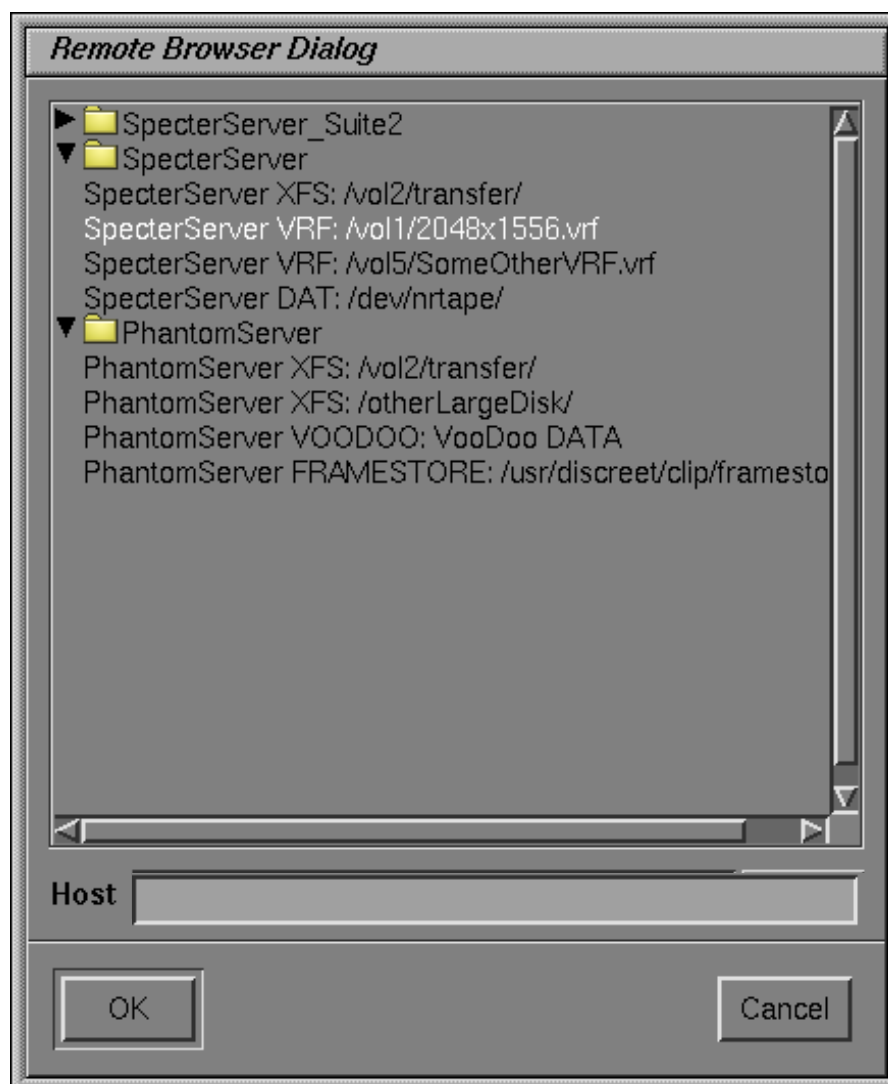


Figure 10: The Remote Browser Dialog.

The dialog shows all machines which have been configured through the server config entry DFALINK_SERVERS, see section 5.1.4. If a Specter or Phantom Server is running on the remote machine, selecting the machine name will display all devices of that remote server, excluding realtime devices. If the remote server is not running, clicking on the server name will create an error message.

Selecting a remote device and then hitting **OK** will add the selected device to the source and target device list of the Mover panel. From there on, the remote device is treated as any other local device.

3.1.4 Tape Devices

Tape devices need some special handling, mainly because they don't have random data access. Accessing a file on tape may take minutes because the tape has to be positioned first.

Also, displaying the entire content of a tape can be very time-consuming. To make this waiting time significantly shorter, the **DFA directory** was introduced.

The DFA directory is an ASCII file in XML format, which is appended after the last image file on tape. It contains the table of contents for the tape. Instead of reading an entire tape to determine its contents, only the DFA directory is read to determine exactly what data is stored on a tape. The DFA directory is updated automatically when writing to the tape.

Note: The DFA directory is a Thomson proprietary format. It is only created when writing to tape using Phantom or Specter. A tape that is written by another external application will not contain a DFA directory.

For more information on the organization of the image files on tape, see TAR_FILES_PER_ARCH in section 5.1.3.2.

The following types of tape devices are supported: VooDoo Data, Sony DTF, Ampex DST, DAT, and Exabyte. Before use, a new tape must be formatted. This can be done using the **Format** button. In order to erase the contents of a tape, it must be formatted. It is not possible to selectively delete pieces of data on a tape. It is not possible to overwrite existing data on a tape. When writing to tape, the new data is appended to any existing material.

When a tape gets full during a transfer, the transfer is automatically stopped. An error message informs the user of the last successfully archived frame. Before continuing with a transfer, a new tape must be inserted and, if necessary, formatted. Hitting the **Start** button will resume a transfer from where it finished in the previous tape.

When selecting a tape device as source or target device, a **Control** button is visible. Clicking the **Control** button adds several advanced control buttons that are not applicable to XFS or VRF devices. Each advanced control button is explained in the following subsections.



Figure 11: Tape-specific controls.

3.1.4.1 Auto Sort

This toggle button influences the read order of transfer items when transferring from tape. If it is switched on, the transfer list will be sorted internally to optimize the read performance. This means that the material that is positioned at the beginning of the tape will be read first and the material that is positioned at the end of the tape will be read last.

If the **Auto Sort** toggle button is switched off, then the material described with the first transfer item is read first and the material described with the last transfer item is read last.

In standard operation mode, there is no need to deselect the auto sort option.

The default setting is configurable through the config element SORTED_READ_FROM_TAPE described in section 5.1.3.3.

3.1.4.2 Create Dir

The **Create Dir** button is applicable for VooDoo Data tapes. The application will get VooDoo's TOC (table of content) without any tape positioning and will create the DFA directory out of the TOC. It is recommended to use the Create Dir button for VooDoo Data tapes instead of using the Refresh button as described in section 3.2.3. Using the Refresh button means that the tape will be positioned and this can take a significant longer time period. If there were problems (e.g. missing frames) when a VooDoo Data tape was written then it might be better to use the Refresh button because the TOC does not exactly reflect missing frames. This case one gets a warning that there could be missing frames.

For magnetic tapes the **Create Dir** button is only applicable when the tape does not contain a DFA directory. The application will read the entire tape and create a temporary DFA directory. This temporary DFA directory only exists in memory; it is not written to tape.

The process to read an entire magnetic tape can take a very long time and there is no progress indicator for remaining time or percentage done. Each file read from tape during this process is displayed in the log window. It is recommended to activate the log window before starting this process, because it is not possible to activate the log window during this process.

*Note: Activate the log window before clicking the **Create Dir** button for magnetic tapes.*

3.1.4.3 Write Dir

The **Write Dir** button is only applicable when the tape does not contain a DFA directory. It will write the temporary DFA directory, created by hitting the **Create Dir** button, to the tape.

3.1.4.4 Eject

Clicking the **Eject** button will eject the tape out of the machine. For most magnetic tapes the tape will be rewound before it is ejected. The VooDoo Data does not physically eject its tape out of the machine, but parks the tape in a so-called eject position. One has to press the eject button on the VooDoo Data's local control panel to remove the tape out of the machine.

3.1.4.5 Format

Clicking the **Format** button causes the tape to be formatted. This is necessary for new tapes or to completely and permanently erase the contents of a used tape.

3.1.4.6 Send

The **Send** button offers a number of user commands to get specific status information from a tape or to modify the position of a tape (see sections 3.1.4.6.1 and 3.1.4.6.2).

There is no need to use this functionality in standard operation mode.

To execute a user command the command has to be entered in the **Raw** text field and the **Send** button has to be clicked. The Enter key is not accepted. The user commands are case sensitive and cannot be abbreviated.

When issuing the command `help` or any invalid user command, a list of all supported user commands is displayed in the log window. The following two subsections list all supported user commands.

Results of a user command are displayed in the log window (see section 0). There are at least two messages displayed in the log window for each user command: "executing <command> for device <device path>" and "<command> done". The user commands to modify the position of a tape can be used together with the Raw Dump functionality (see section 3.8). User commands to get the status of a tape might be useful before accessing a tape the first time.

*Note: Activate the log window to see feedback when using the **Send** button.*

3.1.4.6.1 User Commands for Magnetic Tapes

The following table lists all supported user commands for magnetic tapes. The commands `rewind`, `fsf`, `bsf` and `feom` can be used to modify the current tape position and thus might be helpful before starting a “dump from tape” transfer.

These commands directly correspond to the UNIX command `mt`. The man pages of `mt` can be used to get a detailed description of each command.

User Command	Parameter	Description
<code>blksize</code>		Print the recommended block size for I/O.
<code>bsf</code>	<code>count</code>	Backspace count tape files.
<code>feom</code>		Forward space to end of recorded data.
<code>fsf</code>	<code>count</code>	Forward space count tape files.
<code>help</code>		Display all supported user commands.
<code>rewind</code>		Rewinds the tape to BOT.
<code>status</code>		Print status information about the tape unit.
<code>unload</code>		Inform the drive that it is OK for the tape to be removed.

Table 3 User commands for magnetic tapes.

3.1.4.6.2 User Commands for VooDoo Data

The following table lists all supported user commands for the VooDoo Data. One should avoid using any of these commands during standard operation mode, like transfer from or to a VooDoo Data. Care should be taken with any modifying commands like `record`, `setFilename` and `updateTOC`. The commands `rewind` and `cue` can be used to modify the current tape position and thus might be helpful before starting a “dump from tape” transfer.

User Command	Parameter	Description
<code>help</code>		Display this help menu.
<code>updateTOC</code>		Updates VooDoo Data's table of contents.
<code>stop</code>		Stops current playback or record. VooDoo Data will become idle.
<code>cue</code>	Filenumber Imagenummer	Cues to given file file number. Image number is optional its default to 0. VooDoo Data will go into park position. With the new introduced packet mode of the VooDoo Data it is now possible to cue to an arbitrary image within a VooDoo file.
<code>rewind</code>		Cues to begin of tape. VooDoo Data will go into park position
<code>endOfRecord</code>		Cues to end of recorded data. VooDoo Data will go into park position.
<code>play</code>	Filenumber	Plays out one file. The file number is optional. VooDoo Data will go into park position if not already parked.
<code>record</code>		Starts recording from current position.
<code>directory</code>		Displays current table of content.
<code>dirEntry</code>	Filenumber	Displays one directory entry.
<code>unthread</code>		Prepares a tape unload.
<code>hippi</code>	RoutingControl	Sets HiPPI destination.
<code>status</code>		Displays the current VooDoo Data status.
<code>setFilename</code>	Filenumber Filename	Renames an existing TOC entry. The filename is optional and defaults to no name.
<code>Version</code>		Queries the software version of the VooDoo Data.

Table 4 User commands for VooDoo Data.

3.1.5 Framestore Device

The Discreet Framestore Device can be used as either a source or target device in combination with all the other types of devices offered by the Mover. The exceptions are DATACINE and VTR devices.

This feature allows for the direct exchange of image data between the Discreet Framestore and any of the Mover's devices, like XFS, VRF, VooDoo DATA. One possible application of this is to use the VooDoo DATA as a very fast archiving device for a Discreet Framestore. This specific application is covered in more detail in section 5.5. The image data is transferred transparently between the Framestore's internal format and DPX images on all other devices. A user defined LUT can be applied at this point (see section 3.1.5.3). The translation between the different Framestore storage formats and DPX is also explained in section 3.1.5.3.

3.1.5.1 Hierarchy Of Contents

When you either have selected the Framestore Device as the source or target device, the browser will show the list of Framestore partitions as the content of the top-level directory. The clip libraries are shown as contents of the partitions. This part of the Framestore's content hierarchy is read-only from the perspective of the Mover. I.e. it is not possible to add or delete Framestore partitions or clip libraries through the Mover. Please use the Discreet software for these purposes.

A Framestore Clip-Library contains clips. These are displayed with their thumbnails as with all other devices. A clip can optionally reside inside a Framestore desktop, reel, or both. Both the desktop and reel will be represented as additional directory levels in the browser. So the maximum number of hierarchy levels above a clip in the Framestore Device can vary between 2 and 4 levels (desktop and reel are optional) as shown here:

```
/Partition/Library[/Desktop[/Reel]]/Clip
```

When writing into the Framestore with the Mover, the new clip will be created, including the desktop and reel if necessary. The partition and library must already exist. Only clips can be deleted through the browser's "delete" function.

3.1.5.2 Transferring

During the process of transferring image data in or out of the Discreet Framestore, there should be no other application actively using that same Framestore at the same time. That is, if there is an application like Discreet Flame using the Framestore while images are copied using Mover, this could result in significant performance penalties.

Note: Clips in the Discreet Framestore are sometimes named after the range of frame numbers, put into <> characters. E.g., "<10500-29000>" could be the name of a clip (including the <> characters). For compatibility reasons with Thomson DFA naming conventions, it is recommended that a clip like this is renamed when exporting from the Framestore with Mover, so that no special characters are in the clip's name.

3.1.5.3 Image Encoding

Spatial resolution

There is a new generation of Discreet's Framestore supporting partitions with mixed resolutions. The former restriction to have exactly one resolution and exactly one frame depth within a partition is obsolete. The older versions of the Discreet Framestore had a fixed spatial resolution (horizontal and vertical number of pixels per frame).

When the Mover is connected to a Framestore supporting mixed resolution, there is no restriction of the resolution anymore and material of any resolution can be imported to the Framestore. Exported DPX images from the Framestore will have the same resolution like the Framstore clip.

Still it is possible to connect to an older Framstore. When an older Discreet Framestore is used, the Mover is used to import DPX images into a Framestore Device, the spatial resolution of the two have to be identical. When the Mover is used to export from the Framestore Device the resulting DPX image will have the exact same spatial resolution as the source Framestore partition. When importing and the DPX frame has a larger spatial resolution than the target Framestore partition, the import is not possible. If the Framestore partition's spatial resolution is larger than the horizontal and/or vertical resolution of the DPX image, the resulting image inside the Framestore will be surrounded by black borders to fill the available space. This result is equal to the "Crop" option on Discreet Backdraft's Import function.

Color resolution

The Discreet Framestore encodes image data in one of three formats:

RGB-8Bit	1 Byte/channel,	24 Bit/pixel
RGB-12Bit	2 Byte/channel,	48 Bit/pixel
RGB-12Bit packed	1.5 Byte/channel,	36 Bit/pixel

The difference between the two 12Bit/channel formats is just in storage efficiency. So, with regards to color resolution (and thus for the remainder of this section) they can be regarded identical. The choice between these image-encoding formats is made at the time the Framestore partition is created using Discreet tools.

Any data that is transferred out of the Framestore with the Mover is stored in the Thomson standard 10Bit-DPX format on the target device. The DFA 10Bit-DPX format uses a 10Bit/channel color resolution (10:10:10:2 RGB) that results in a storage volume of 32Bit/pixel. The actual image data is copied 1-to-1 (no LUT).

When transferring from an 8Bit Framestore partition to 10Bit DPX, the missing color resolution will be generated by copying the 2MSB of the RGB8 data into the 2LSB of the resulting 10Bit DPX. When transferring from 10Bit DPX into an 8Bit Framestore partition, the 2LSB will be ignored.

When transferring from a 12Bit Framestore partition to 10Bit DPX, the 10MSB will be used directly. By default, the remaining 2LSB will be stored in the DPX user defined area. Therefore, the resulting DPX image file is 100% compliant to the DPX standard as 10Bit RGB, but is still containing the information to restore a 12Bit image from it. When transferring from 10Bit DPX into a 12Bit Framestore partition, the additional color resolution will be taken from the DPX user defined area (if present) to restore the 12Bit image data.

This special feature of storing a 12Bit image in a regular 10Bit DPX image without actually losing the 12Bit information can be turned off through the configuration variable `FRAMESTORE_2LSB_IN_DPX_USERDATA` (see section 5.1.3.5). In this case the conversion between 10Bit and 12Bit will be done in the same way as described for the 10Bit/8Bit case.

3.1.5.4 LUT Application

When importing/exporting image data into/from the Framestore Device, the user can optionally apply a lookup-table (LUT). This lookup table can be used to override the behavior described in section 3.1.5.3. The LUT has to be supplied in form of an ASCII textfile in the file system. The format of that file can be one of the following:

- 1) The Thomson DFA software LUT format as documented in Phantom manual, section 2.7 as well as inside the example files installed with Phantom.
- 2) The Discreet LUT format as generated with the programs from the Discreet Advanced System Tools family (Flame, Inferno, ...)

When the Framestore Device is selected as either source or target device, the Mover will show an additional element in the device's

browser panel to select the LUT file and switch that LUT on or off (see Figure 12).



Figure 12: Specification of user-LUT for Framestore Device.

The button labeled **Browse LUT** will bring up a regular file browser letting you browse the file system starting at the directory specified through the configuration element BROWSING_ROOT (see Phantom manual, section 5.1.2.1). This lets the user select the file containing the user-defined values. The selected file will be scanned at the time the file browser is closed using the OK button and any parse errors will be displayed at this time. The use LUT button will switch the selected LUT on or off.

If the **use LUT** button is switched off, then default processing of pixel values applies (as described above). If the button is switched on, then the specified LUT will be used instead of the default processing of pixel values. In this case, it is the user’s responsibility to supply a LUT that contains the right amount of entries (according to the following chart):

8/10 Bit conversion

- 8Bit-FS to 10Bit-DPX: 256 values mapping to 0...1023
- 10Bit-DPX to 8Bit-FS: 1024 values mapping to 0...255

12/12 Bit conversion

With default handling of the 2 extra bits of resolution as described above (FRAMESTORE_2LSB_IN_DPX_USERDATA set to TRUE)

- 12Bit-FS to 12Bit-DPX: 4096 values mapping to 0...4095
- 12Bit-DPX to 12Bit-FS: 4096 values mapping to 0...4095

10/12 Bit conversion

Overriding the default handling by setting FRAMESTORE_2LSB_IN_DPX_USERDATA set to FALSE

- 12Bit-FS to 10Bit-DPX: 4096 values mapping to 0...1023
- 10Bit-DPX to 12Bit-FS: 1024 values mapping to 0...4095

If the user defined LUT does not contain enough values for the required conversion, there will be a warning in the GUI’s error log and the output will be clipped to the last value in the LUT (i.e., the last available value will be re-used for all missing entries in the LUT).

3.1.6 HDReel Device

The HDReel is a portable storage solution by the company DVS configured for on-set capturing of uncompressed HDTV video signals. Powered by a unique AC/DC input power supply with an integrated battery pack as UPS (uninterruptible power supply) it can be used anywhere in the field.

There are different configurations of the HDReel, offering 108, 216, 288 or up to 438 GB disk capacity for recording in the mode 1080/24p 18, 36, 48, or 73 minutes.

The HDReel transports the data captured from an HDTV camera to the postproduction facility where via Dual Channel Ultra 160/ loop SCSI interface the data can be accessed fast and easy.

The HDReel Disc Device can be used only as a source device in combination with all the other target device types offered by the Mover.

3.1.6.1 Hierarchy Of Contents

When you have selected the HDReel Device as the source, the browser will show the content of the device. The HDReel is read-only from the perspective of the Mover. Therefore, renaming, deleting, renumbering and moving clips or creating new sub-directories is not possible.

For every clip thumbnails are provided.

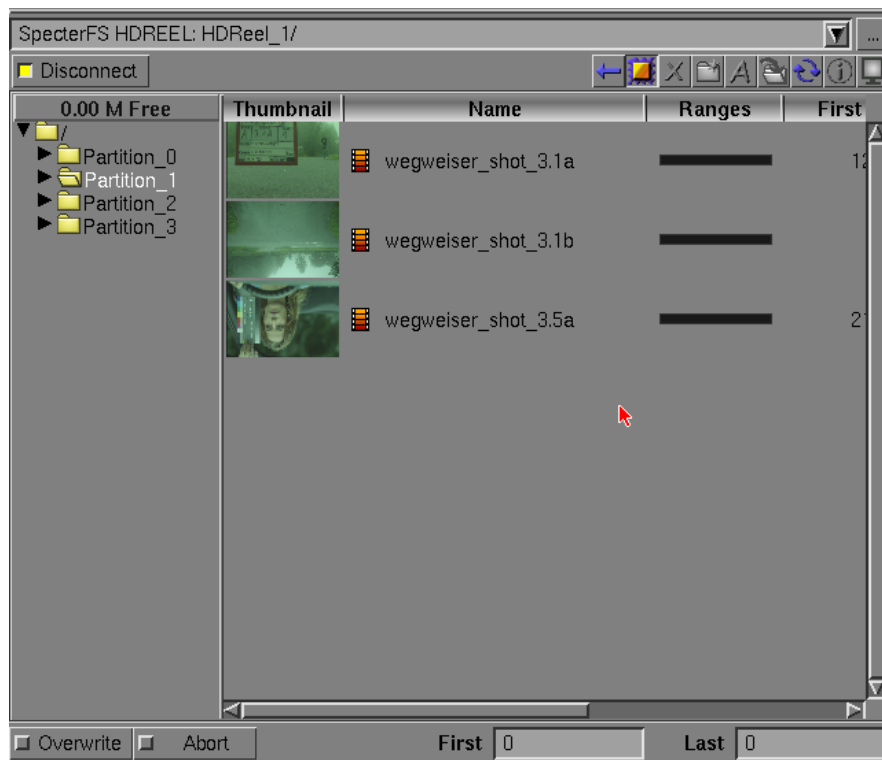


Figure 13: The HDReel Device.

3.1.6.2 Transferring

When initially recording to the HDReel disks (e.g. capturing from an HDTV camera), make sure to save the material in 10-bit-DPX format (ANSI/SMPTE 268M-1994), opposed to FilmStream format, a DVS proprietary image format. When using the Mover later on to transfer the HDReel content to some other target device (e.g. VRF), the material in FilmStream format will have to be converted into 10-bit-DPX format first, which is time-consuming. When the source material on the HDReel disks is already in 10-bit-DPX format, no further conversion is necessary, which makes the Mover transfer a lot faster. Without conversion, a read performance of 25 frames HD material per second can be reached.

3.1.6.3 Disconnect

When a connected HDReel should be used for recording in the field again or for connecting somewhere else, it is possible to disconnect the device via the Mover. Press the button Disconnect. Following dialog appears:

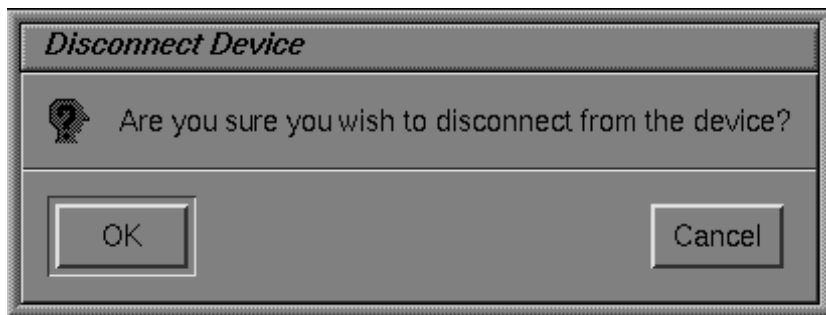


Figure 14: The Disconnect Device.

Press OK will disconnect the device which can be hot-plugged disconnect physical now.

A once disconnect HDReel can be connect again physically and has to be connected in a second step within the Mover.

3.1.7 Browsing

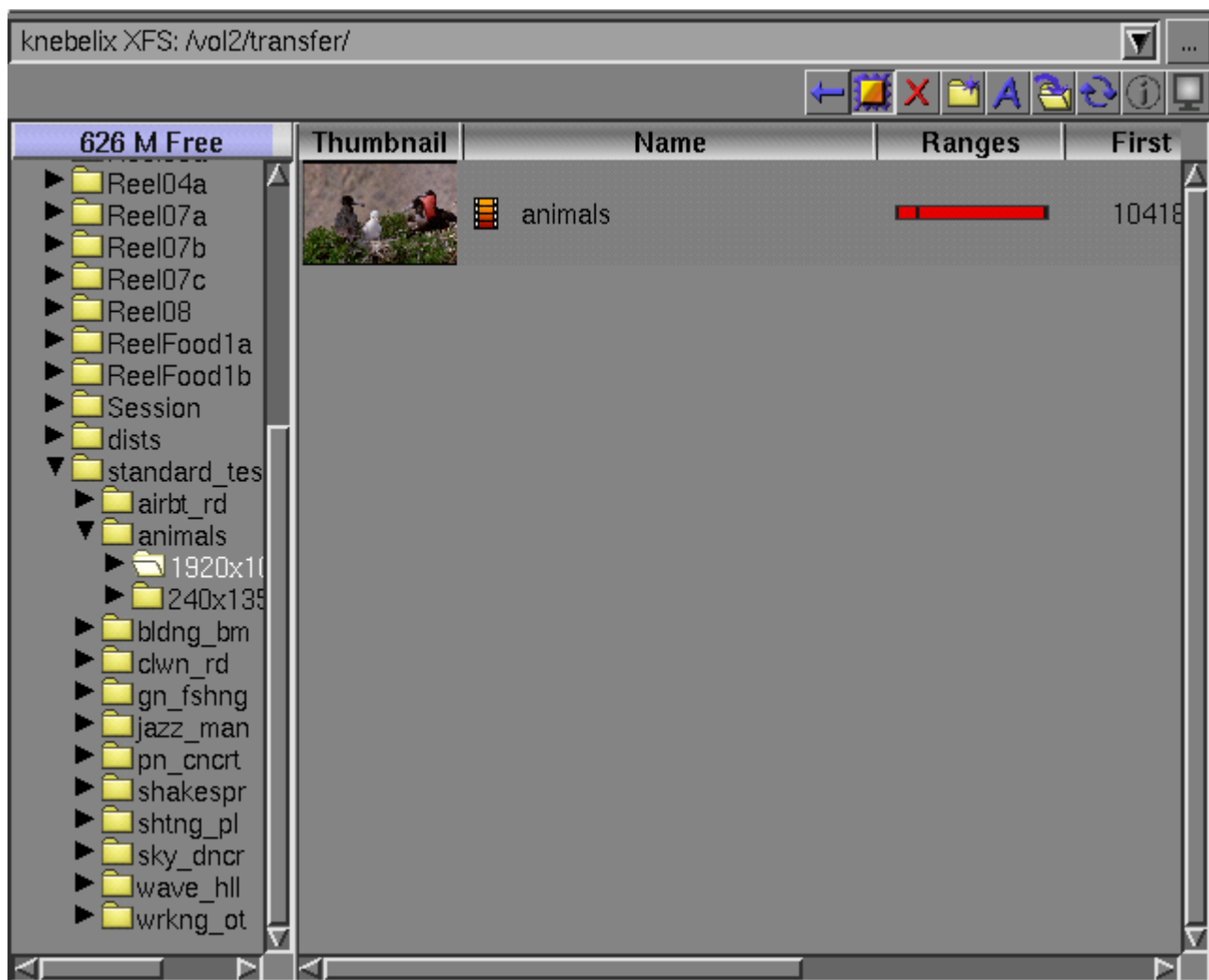


Figure 15: The graphical browser.

The hierarchical browser provides an organized way to access content on a device. This section covers general use of the graphical browser. All devices have subtle variations that result in differences in how content can be viewed and manipulated via the browser. See section 3.2 for browser differences for particular devices.

The browser has four main components. At the top is the toolbar. On the left is the folder tree. On the right is the content list for the currently selected folder. A bar above the folder tree indicates the space available on the device.

3.1.8 Toolbar

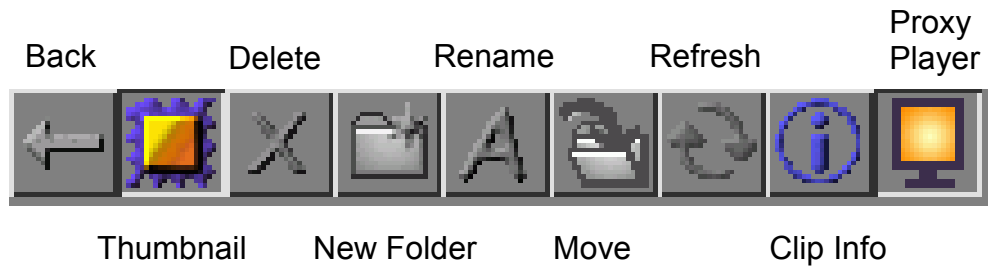


Figure 16: The Toolbar.

The toolbar contains the browser's function buttons. Most of the buttons have an icon representing their function.

A very short description of a button's functionality (tool tip) appears when the mouse is held over the button for few seconds.

The following sections describe each of the standard buttons and their associated functionality.

3.1.8.1 Back

The **Back** button backs up to the previously opened directory. There is no limit to the number of back up actions. It is not possible to back up past, or to, a directory that no longer exists.

3.1.8.2 Thumbnail

This button determines whether thumbnails are shown in the browser's content list. Toggling it off will allow one to see a greater number of entries in the list without scrolling.

3.1.8.3 Delete

This button deletes selected items from the device. Deleted items are **permanently** removed. There is no way to retrieve deleted items. Deleting a folder deletes all of the folder's contents recursively.

3.1.8.4 New Folder



Figure 17: The New Folder dialog.

This button creates a new folder inside the currently selected folder. The name of the new folder must be unique within its parent folder.

3.1.8.5 Rename



Figure 18: The Rename dialog.

This button renames a selected item in the list. The new name must be unique within the current folder. Only one item can be renamed at a time.

3.1.8.6 Move

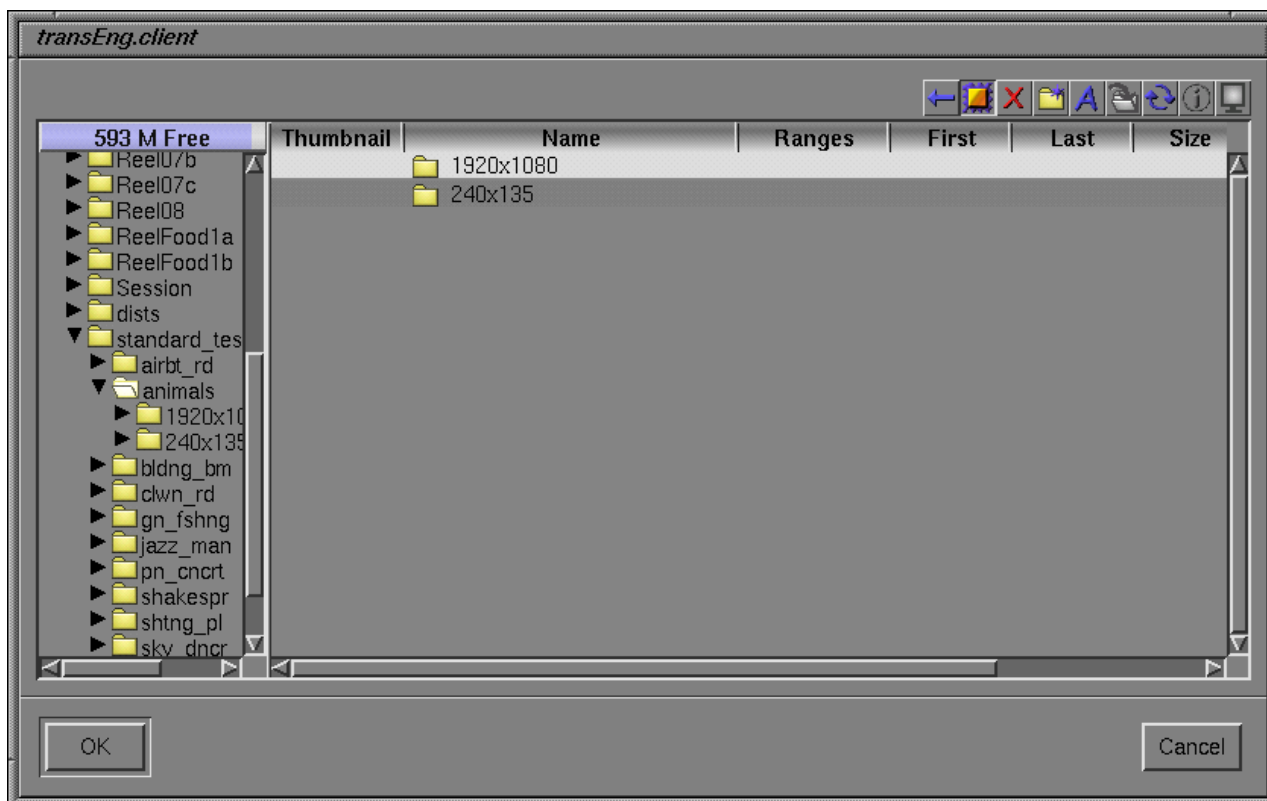


Figure 19: The Move dialog.

This button moves currently selected items to a different folder on the same device. A dialog containing a browser is displayed for the selection of the destination folder.

3.1.8.7 Refresh

This button refreshes the browser display. A refresh forces the contents of a device to be reread to ensure the display is accurate. In the case of an XFS device, for example, the browser is not aware of changes made to the device's contents by external sources. The thumbnail cache is regenerated by a refresh to ensure that the correct thumbnails are being displayed.

Use the refresh button with tape devices to request the directory to be read from the tape. The DFA tape directory is stored at the end of a tape. Due to the time it takes to move to the end of a tape, the directory is not retrieved automatically when refresh is performed on a tape device.

3.1.8.8 Clip Info

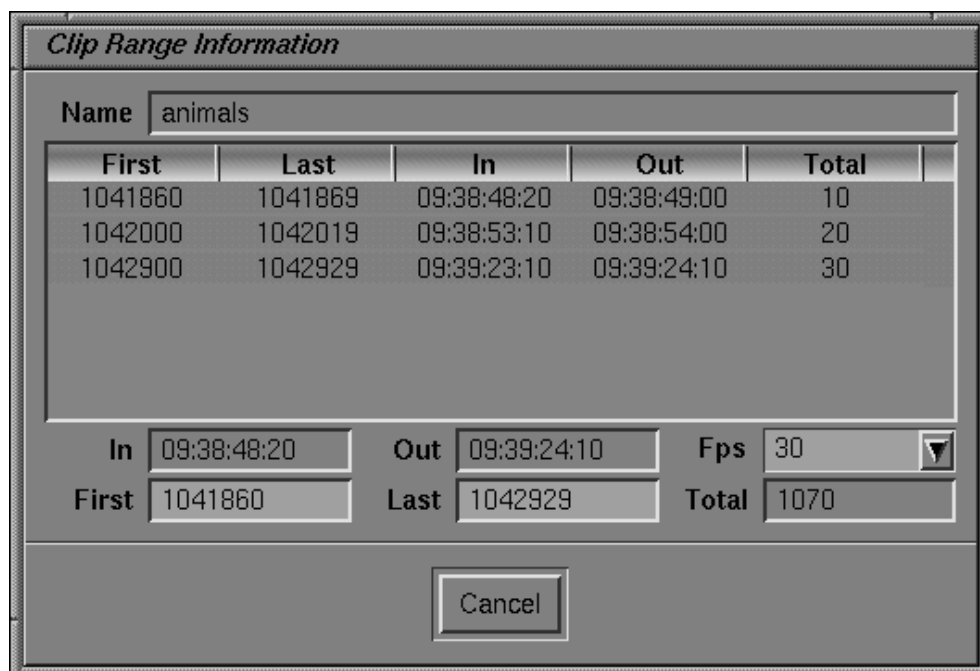


Figure 20: The Clip Info dialog.

This button displays each continuous frame range in a selected clip. For each range, the starting frame number, ending frame number, in timecode, out timecode, and number of frames is shown. The in and out timecode are calculated using the clip's timebase. In many cases, there is no way to determine the clip's timebase, so a default timebase of 30 FPS is used. Keep in mind that the out timecode is one frame after the last frame in a range.

The **Fps** selection box is provided to view the clip with an alternate timebase. Selecting a timebase makes the change. The change is not maintained after the dialog is closed. The clip is not altered in any way.

The **First** and **Last** fields initially show the first and last frames of the clip, respectively. The **Total** field displays the number of frames between the **First** and **Last** value, not considering any missing frames (gaps) that may be present. Selecting one or more ranges from the list changes the **First** field to the first frame of the first selection in the range list and the **Last** field to the last frame of the last selection in the range list.

3.1.8.9 Proxy Player

With this button the Proxy Player can be opened or closed. The Proxy Player can play out a selected clip of the source or target device browser (see section 3.3 for more details).

3.1.9 Folder Tree

The folder tree displays a hierarchical tree of folders on the device. Folders are opened and closed using the arrow to the left of each folder. Pressing the left mouse button over a folder selects it. The contents of a selected folder are displayed in the list at the right of the folder tree.

3.1.9.1 Space Indicator Bar

The bar indicates the amount of free space available on a device. The blue portion of the bar represents the used portion of the device. The white portion of the bar represents the unused portion.

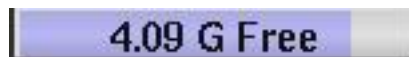


Figure 21: The space indicator bar.

3.1.10 Folder Contents



Figure 22: Information shown for an item in the browser.

Shows a list of all items contained in the currently selected folder in the folder tree. Double clicking on a folder changes it to become the currently selected folder. For files and folders, only a name is displayed. The following data is displayed for clips:

1. A thumbnail proxy of the first image in the clip.
2. A frame range bar to display gaps in a clip. Valid frame ranges are shown in gray. Missing frame ranges are shown in red.
3. The first and last frame of the clip.
4. The total number of frames in the clip.
5. The size of one frame in the clip.
6. The clip's X and Y resolution (width and height).

The items in the list are sorted by name. Pressing the left mouse button in a list column header changes the sorting to be based on the selected column. Selecting the same column header a second time reverses the sort order.

3.2 Browsing Devices

Clips and folders are displayed when browsing devices. Regular files are only shown when browsing XFS with the file manager as in when loading and saving transfer list files.

3.2.1 XFS Browsing

The XFS browser shows a folder tree relative to the root path of this device as specified in the startup configuration (see section 5.1.3.2). This is not necessarily the root of the partition as it is seen on a UNIX shell. Be aware of this when transferring to and from an XFS device.



Figure 23: Selection box showing an XFS device with a non-root relative path.

Clips on an XFS device are stored as individual frames in a folder. The frames often contain only numeric information that makes little sense as a way to name the clip in the browser. To reduce the impact of this limitation, the name of clip shown in an XFS browser is the name of the frames' parent folder unless the parent folder is a resolution directory. If the parent folder is a resolution directory, that folder's parent folder's name is used as the clip's name. Frames in the folder /project/boy/2048x1556 will show up in the browser as a clip named "boy" in the folder /project/boy/2048x1556.

It is not possible to rename or move a clip on an XFS device because on XFS, a clip is merely a representation of many uniquely named frames in a folder. Renaming or moving a clip's parent folder is the way to effectively rename or move a clip on XFS.

3.2.2 VRF Browsing

The following differences pertain to browsing a VRF device.

3.2.2.1 Rename

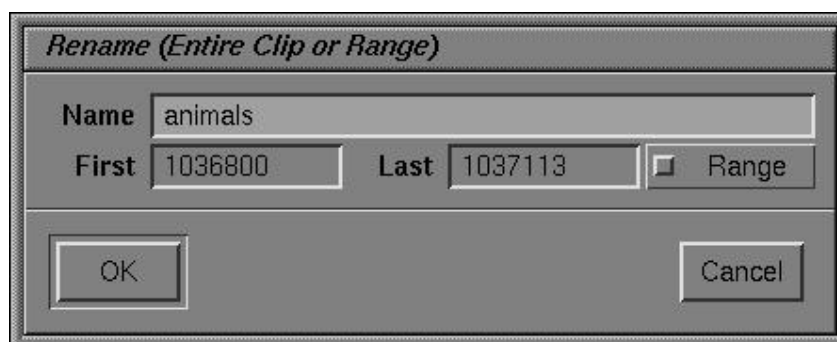


Figure 24: The Rename Range dialog.

The VRF rename offers the additional functionality of renaming a specific range of frames in a clip. The **Range** button toggles the feature on and off. When enabled, a new clip is created containing the selected frame range.

3.2.2.2 Delete

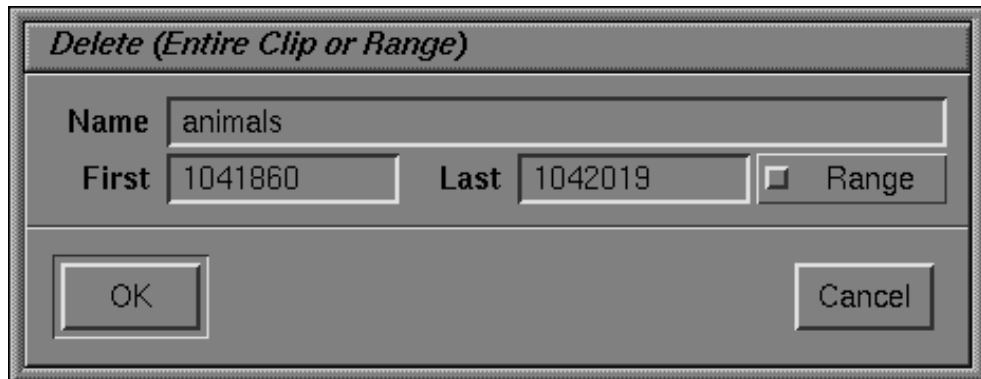


Figure 25: The Delete Range dialog.

The VRF delete offers the additional functionality of deleting a specific range of frames from a clip instead of deleting the entire clip. The **Range** button toggles the feature on and off. When deleting a range, the clip is removed if all the frames in the clip are deleted.

3.2.2.3 Renumber

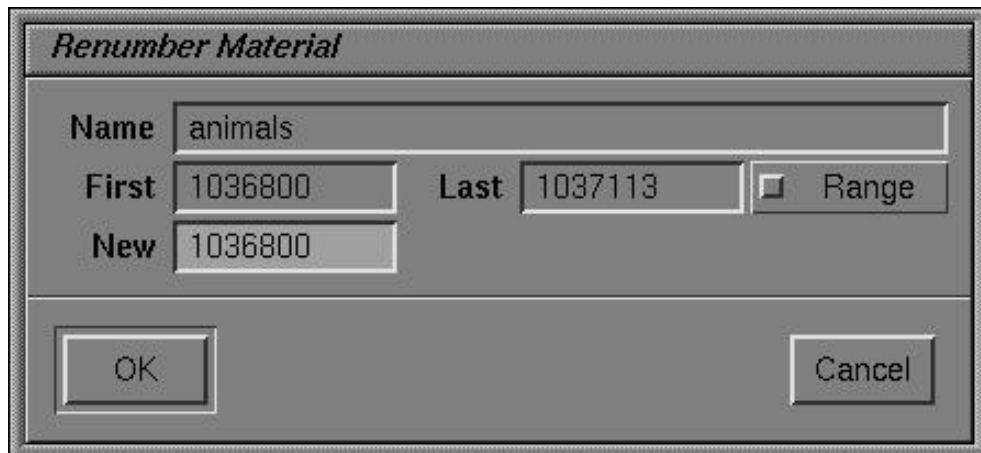


Figure 26: The Renumber Range dialog.

Renumbers the frames in a clip. The default behavior is to renumber an entire clip using a new starting frame number. By activating the **Range** toggle, only the chosen range is renumbered. It is not possible to renumber a range in a clip that would cause the resulting range to overlap an existing frame range.

3.2.2.4 Purge

Purging removes all the rendered effect clips in the Effects Bin not referenced by the Specter timeline. See the effects section in the Specter GUI manual for more information.

3.2.3 Tape And VooDoo Browsing



Figure 27: The tape browser.

When selecting a tape as source or target device, the content of that tape is not automatically displayed as it is in the case of XFS or VRF devices.

Before browsing a tape, a DFA directory for the tape must be retrieved or generated. Any tapes written by the Phantom has a DFA directory at the end. Working with tapes that do not have a DFA directory is covered in section 3.8.

Tape directories are stored at the end of tapes. Moving to the end of a large tape is not a quick process. For this reason the directory of a tape is not read for display until the **Refresh** button is pressed. If the tape does not contain a DFA directory, the user will be notified.

For VooDoo Data tapes one get either press the Refresh button or use the Create Dir button as described in section 3.1.4.2. For performance reason it is recommend to use the Create Dir button.

Tapes have other browsing limitations. **Thumbnail, Delete, New Folder, Rename, and Move** buttons are not available while browsing tapes.

3.2.3.1 Control

The **Control** button in the toolbar enables advanced tape controls in the browser. The advanced control panel is not shown by default.

The functionality of all advanced controls for the tape browser is explained in section 3.1.4.

3.3 The Proxy Player (Clip Preview Playout)

The Proxy Player can play out a selected clip of the source or target device browser. This means that every frame of a clip can be displayed in a smaller resolution and that one gets the possibility to play (or step, cue) this clip in that smaller resolution.


The Proxy Player can be opened or closed by a click with the left mouse button on the **Proxy Player button**: 



Figure 28: The Proxy Player.

The Proxy Player consists of the following sections:

Clip Title - the name and/or path of the clip that is playing is displayed as a line of text at the top.

Image Display - where the proxy images are shown.

Play Controls - VCR-like play controls, see section 3.3.1.

Positioning Controls - allow jumping to a pre-defined frame, see section 3.3.2.

Mini-Timeline - provides an overview of the clip being played, see section 3.3.3.

VRF, XFS, and Framestore Device clips can be played out. The Proxy Player allows the playback of clips located on local and remote devices. It is not possible to use the Proxy Player for Tape, DataCine or VTR Devices.

Playback of proxies aims to be in real time, nominally 30fps. It is important to note that proxies are generated on demand. The Specter client requests a proxy and the Specter server generates that proxy before sending the proxy image data over the network. Caching is performed to achieve a smooth playback process, however there could be noticeable delays and stutters in the playback. This may occur when the Specter client requests a proxy image, but the Specter server has not yet generated the proxy image. If this is indeed the case the image **Loading Please Wait** will be displayed.

If the image does not exist, for example when the image is not loaded into a VRF when playing proxies from the Source Bin, then the image **Media Offline** will be displayed.

3.3.1 Play Controls

The play controls act like VCR type controls.

The buttons, from left to right:



Go To Start

Jumps the current frame position to the start of the clip.



Go To In Point

Jumps the current frame position to the in point, see section 3.3.3.



Play Reverse

Plays the clip reverse. The play action is affected by the in/out markers, see section 3.3.3. Play Reverse will continue until either the start of the clip has been reached, or until an in marker is reached. Play will attempt to playback in real time.



Step Back (one frame)

Steps one frame reverse from the current position.



Stop (currently pressed)

Stops playback.



Step Forward (one frame)

Steps one frame forward from the current position.



Play (forward)

Plays the clip forward. The play action is affected by the in/out markers, see section 3.3.3. Play will continue until the end of the clip has been reached or until an out marker is reached. Play will attempt to playback in real time.



Go To Out Point

Jumps the current frame position to the out point, see section 3.3.3.



Go To End

Jumps the current frame position to the end of the clip.

3.3.2 Positioning Controls

The positioning controls allow positioning of the current frame position to a pre-defined point.

The buttons, from left to right:



Mark In Point

Sets the in point to the position of the current frame position.



Mark Out Point

Sets the out point to the position of the current frame position.



Current Frame Field

Displays the position of the current frame. The current frame position can be manually set by performing a single click inside the field and editing the value.



Cue To Frame

Moves the current frame position to the value specified in the current frame field.



Timecode / Frame Toggle

Display of frame values within the proxy player to be shown as timecode or frames. This affects both the current frame field and the values shown on the Mini-Timeline.

3.3.3 Mini-Timeline

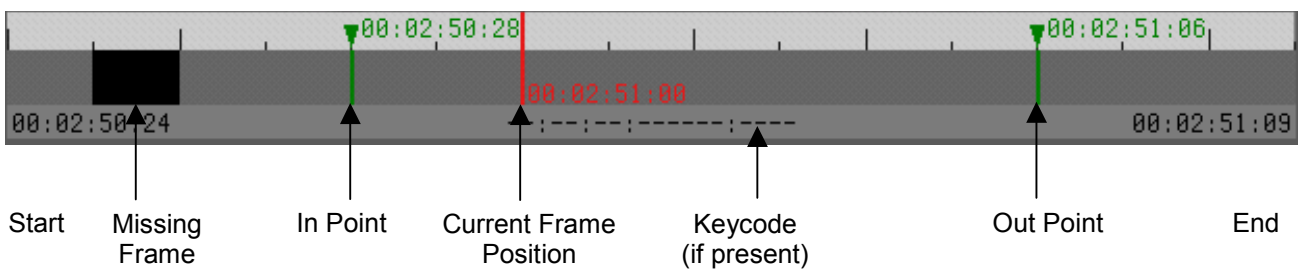


Figure 29: The Mini-Timeline.

The Mini-Timeline provides a graphical overview of the entire clip being played. The Mini-Timeline features:

A Ruler showing tick marks at frame positions.

Clip Overview Area shows the availability of frames from a clip. If the area is a solid grey then all frames defined by the clip are available to be played. Missing frames from a clip will be shown as black areas.

Information Line shows the start and end frame numbers, and the keycode value of the current frame, if applicable.

The red current frame position marker and the in/out point marker can be clicked and dragged, using the left mouse button, to any position within the timeline. When dragging the current frame position marker this will update the current frame and subsequently the proxy being displayed. When selecting one of the markers the current frame marker always has precedence, so if the current frame marker is directly over an in or out marker, and you want to move the relevant in or out marker, then you will have to move the current frame marker beforehand.

3.3.3.1 In And Out Markers And Play Forward And Play Reverse

The in and out markers affect how play forward and play reverse functions. Play forward will play from the in point to the out point. Although if the current frame is before the in point, play forward will pass through the in point to the out point. Play reverse performs in the exact opposite manner.

3.3.3.2 In And Out Markers And Clip Segment Section

If a clip is selected in the Source Bin browser, and then proxy play is selected. If Add Clip in the main timeline is performed, the positions of the in and out markers in the mini-timeline are used to specify a portion or segment of the clip to be added. A dialog is posted during the Add Clip process and the in and out values shown there will reflect the in and out marker positions.

3.4 The Transfer List

The transfer list contains a list of items to be transferred. It is not simply a list of clips. Each item in the list contains information about the location of a clip on a source device, the target device, the location on the target device, how the transfer is to be performed, and the state of the transfer.

A transfer list can be built by browsing and selecting clips from within the Move panel, or it can be loaded from a transfer list file. Once a list is assembled, it is executed to carry out the transfer.

The state of a transfer is preserved in the list when a transfer is stopped or completed. A partially transferred list can be saved and reloaded at a later time to finish a transfer.

There is one source device for each transfer list. When the source device is changed, it becomes the new source for all of the entries in the list. The location of an entry in the transfer list is known relative to the source. The Mover may not be able to find a sequence for transfer if its source is changed and the sequence doesn't exist in the same place on the new source.

3.4.1 List Display

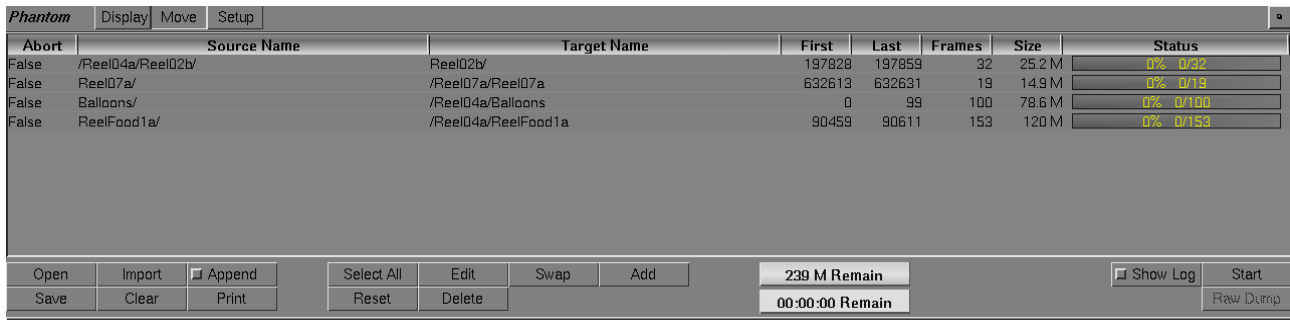


Figure 30: The transfer list display.

The transfer list panel displays information about each transfer item in the list. The panel is located at the top of the screen. The controls for the list are located directly below it.

The transfer list is not a sorted list. Items in the list are displayed and executed in the order that they appear. Items added to the list are appended to the end. The list can be resorted by selecting a column header in the list, but the previous order of the list is not kept.

Note: Hold down the Shift or Control key on the keyboard to select and deselect multiple items in the transfer list with the mouse.

3.4.2 List Progress

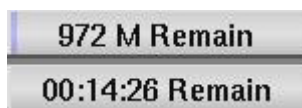


Figure 31: The progress meters.

There are two progress meters that pertain to the entire transfer list. The size progress meter indicates the total size of all the frames in the list that have not been transferred. The time progress meter indicates the estimated time to transfer the untransferred frames. The remaining time is only calculated during a transfer. It is reset to zero when a transfer stops.

3.4.3 Transfer Item

A transfer item holds all the information that the Mover needs to transfer a clip from one device to another.

3.4.3.1 Source Clip Information

1. The name of a source clip.
2. The path to the source clip relative to the source device.
3. The prefix, suffix, and padding information used to identify each frame in the source clip. This information only applies to clips on XFS and tape devices. See Figure 32 for a description of the prefix, suffix, and padding.
4. The name of the EDL file used to generate the source clip information, if the item was generated via an EDL import. See section 3.5 on EDL importing.
5. The EDL edit number from the EDL file used to generate the source clip information, if the item was generated via an EDL import. See section 3.5 on EDL importing.

3.4.3.2 Target Clip Information

1. The name given to the clip on the target.
2. The path to the target clip relative to the target device.
3. The prefix, suffix, and padding information used to name each frame in the target clip. This information only applies to clips on XFS and tape devices. See Figure 32 for a description of the prefix, suffix, and padding.
4. The first frame of the source clip to be transferred to the target.
5. The last frame of the source clip to be transferred to the target.

3.4.3.3 Transfer Information

1. An overwrite flag to indicate whether or not frames that already exist on the target are to be overwritten during the transfer.
2. An abort flag to indicate whether or not the entire transfer will stop if an error is encountered transferring any frame in the clip.

3.4.3.4 State Information

1. The number of frames that have already been transferred from the source to the target.
2. The percentage of frames already transferred.
3. An error flag to indicate whether or not an error occurred during the transfer that caused the transfer of the clip to fail.

3.4.3.5 Prefix

The prefix field shows the text that will precede the frame numbering in the name of the frames that compose the sequence.

3.4.3.6 Suffix

The suffix field shows the text that will appear after the frame numbering in the name of the frames that compose the sequence.

3.4.3.7 Padding

The padding field indicates the number of digits that will be used for the frame number in the name of the frames that compose the sequence.

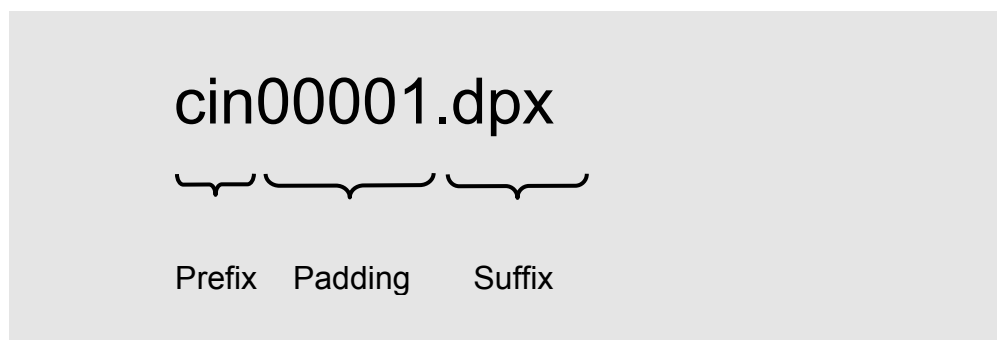


Figure 32: Sequence frame name.

3.4.4 Loading

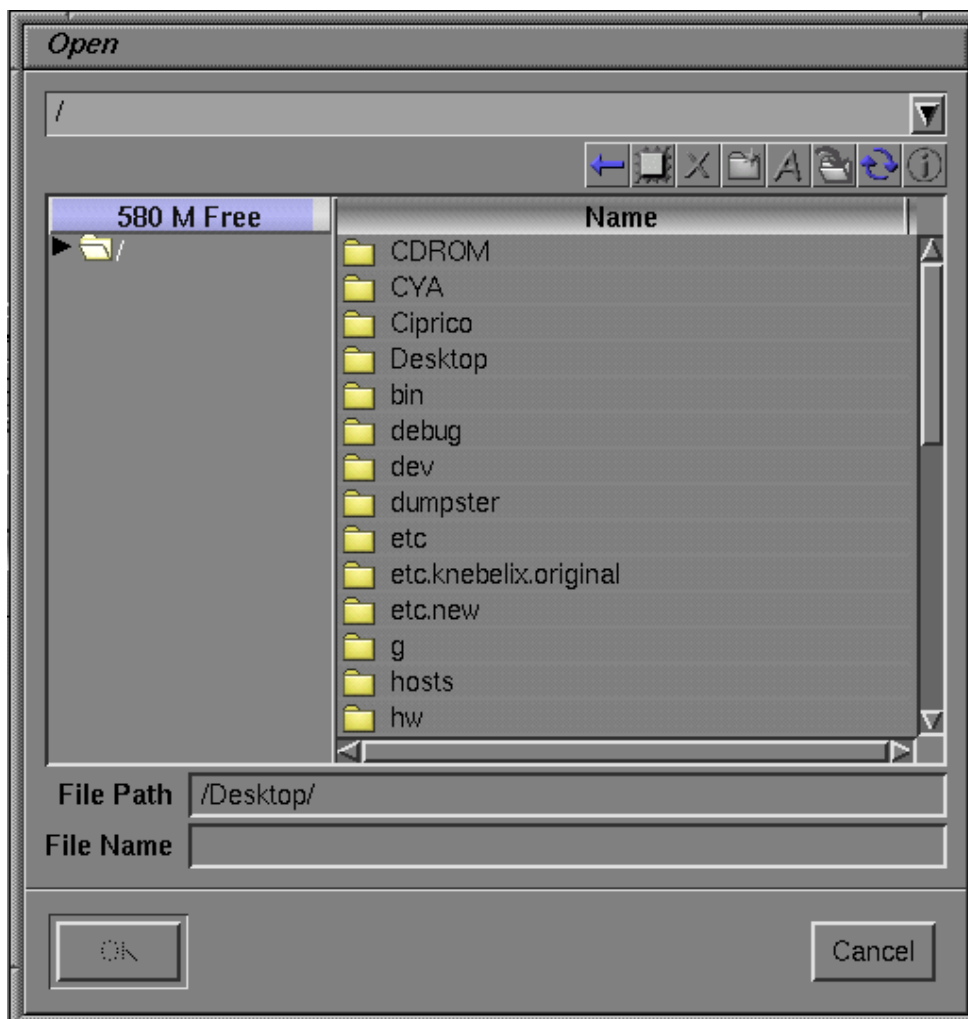


Figure 33: The Open dialog.

Loading a list from a file replaces the list currently being displayed if the Append toggle is off. If the Append toggle is on, the loaded list will append to the current transfer list. The **Open** button launches a file browser. Choose a transfer list file to load from the file manager dialog and load it by pressing the OK button. The loaded list will appear in the transfer list panel and the source and target devices will be set based on the loaded list. If the Mover can't find the source device for the list, no source will be shown. The same applies for the target device.

Remember that the source and target devices apply to all the entries in the list.

The file manager dialog shows files located on the host running the server, not the client.

Note: Files are shown relative to the path set by the BROWSER_ROOT configuration variable in the configuration file.

3.4.5 Saving



Figure 34: The Save dialog.

The **Save** button launches a file browser. Choose a location and name for the transfer list from the file manager dialog and save it by pressing the OK button.

Transfer lists are saved in an XML formatted ASCII text file. There is no official public specification of the format, but it can be viewed and edited with any standard text editor.

The file manager dialog shows files located on the host running the server, not the client.

Note: Files are shown relative to the path set by the `BROWSER_ROOT` configuration variable in the configuration file.

3.4.6 Importing

Importing generates a transfer list based on an EDL. See section 3.5 for more information about importing.

3.4.7 Clear

The **Clear** button clears the list by removing all entries from the transfer list. There is a dialog that asks for confirmation before clearing. A list is gone forever once it is cleared. Consider saving a transfer list before clearing it.

3.4.8 Append

The **Append** toggle determines how the current transfer list is affected when another transfer list is loaded or imported into the Mover. When the Append toggle is activated, an incoming transfer list is appended to the end of the current list. By default, the Append toggle is deactivated and the current transfer list is replaced by an incoming list.

3.4.9 Transfer List Printing

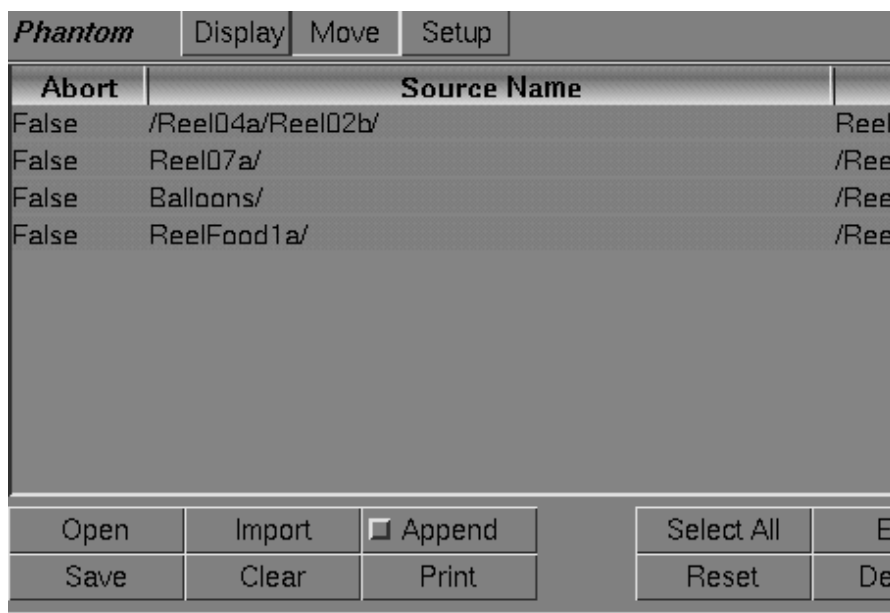


Figure 35: The Print button in the transfer list display (part of the Mover panel).

This functionality gives the opportunity to divert transfer lists from the Mover GUI to the connected default printer. Additionally, it is possible to divert the transfer list directly into a file in ASCII text format. The file name is editable by the user when the To File toggle is turned on.

Clicking on this **Print** button opens the dialog shown in Figure 36.

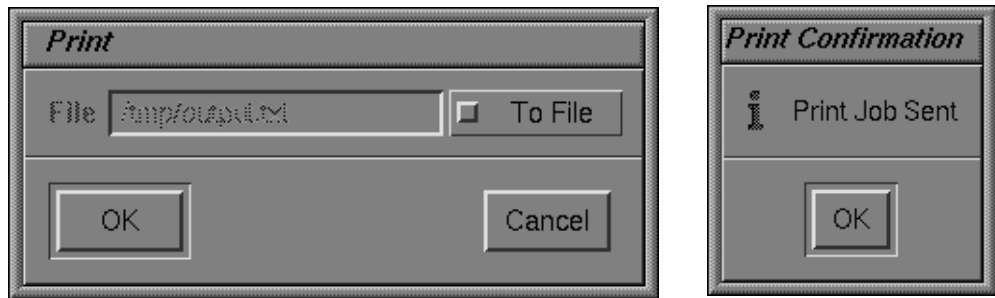


Figure 36: The Print dialog and the Print Confirmation dialog

For printing the current transfer list, it is also possible to use the keyboard shortcut CTRL+P.

3.4.10 Select All

Selects every entry in the list.

3.4.11 Reset

Resets the progress of the selected items back to 0% complete. Reset is important as it makes it possible to retransfer items in the list.

3.4.12 Editing Single Items

Transfer Item

Source Path: standard_test_material/animals/1920x1080/

Source Name:

Prefix:

Suffix: .dpx

Padding: 7

EDL File:

Edit Number:

Target Name: /Balloons/animals/1920x1080

Prefix:

Suffix: .dpx

Padding: 7

First: 1041860

Last: 1041869

Convert to: none

LUT File: Browse

Abort

Overwrite

OK Cancel

Figure 37: The single item edit dialog.

To change attributes of an individual item in the transfer list, select the item and press the **Edit** button. A dialog appears to facilitate changing the item's attributes. See section 3.4.3 on transfer items for information about each attribute.

To convert images into another image format via the **Convert to** drop down list, see section 3.4.14.

3.4.13 Editing Multiple Items

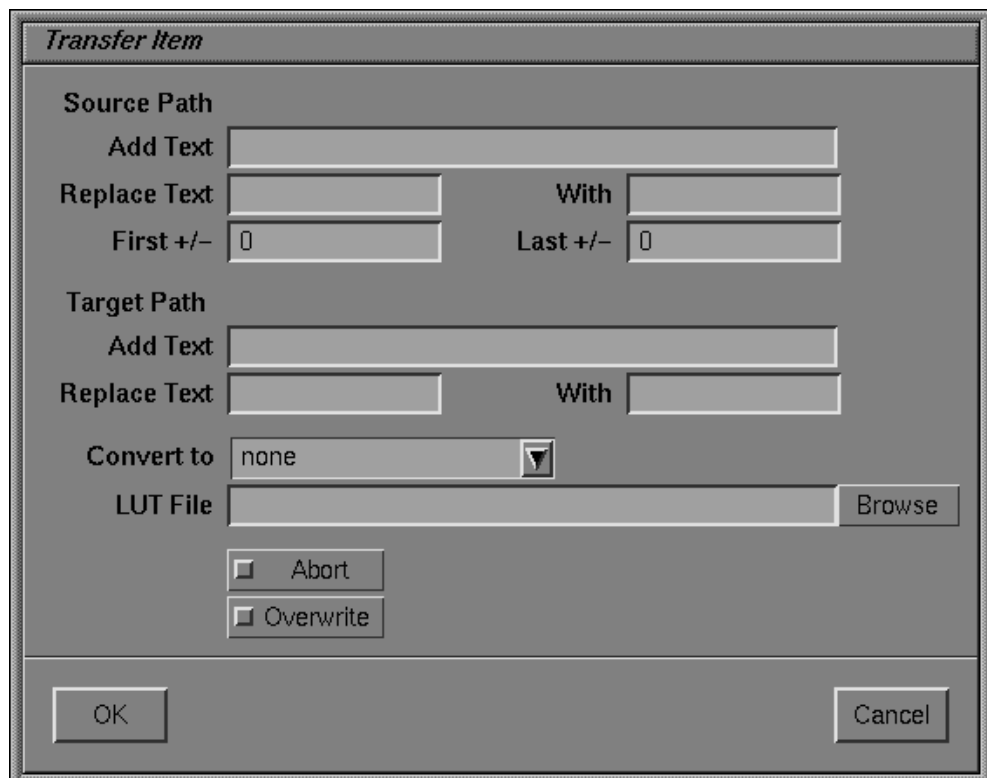


Figure 38: The multiple item edit dialog.

To change attributes of multiple selected items in the transfer list, select more than one item and press the **Edit** button. A dialog appears to facilitate changing the attributes. The following actions can be performed with the dialog:

1. Add text to the beginning of the source clip path.
2. Add text to the beginning of the target clip path.
3. Replace text in the source clip path with alternate text. The first occurrence of the text from left to right will be replaced.
4. Replace text in the target clip path with alternate text. The first occurrence of the text from left to right will be replaced.
5. Add front and back handles to all the clips. Handles change the first and last frames of a clip by adding or subtracting additional frames. The handle values can be positive or negative, but no clip will be reduced to less than 1 frame in length.
6. Set **Abort**.
7. Set **Overwrite**.

Note: Edit is the only way to edit items already added to the transfer list with the Mover client. Complicated edits can be performed outside of the Mover in the XML formatted transfer list file.

To convert images into another image format via the **Convert to** drop down list, see section 3.4.14.

3.4.14 Image Format Conversion

While moving images from a Source to a Target device, it is possible to convert those images into another image format. The **Convert to** drop down list in the single/multiple item editor shows all supported image formats which is a sub-set of the active SGI IFL database.

An additional user Look Up Table (LUT) can be specified by hitting the **Browse** button which will bring up the **Select LUT** dialog. Here, a file containing the LUT can be selected. The LUT location may also be entered directly into the **LUT File** field.

Be aware that image format conversion might slow down the Mover performance significantly.

3.4.15 Delete

The **Delete** button removes the selected items from the transfer list. There is no way to undo a delete.

3.4.16 Swap

Swap is a convenience feature. It swaps the source information in a list with the target information. The source name, path, prefix, suffix, and padding are swapped with the target.

The source and target devices are also swapped. Swap makes it easy to transfer clips from one location to another and transfer them back at a later time using the same list.

3.4.17 Adding Items To The List

Make sure a source and target device are selected. Next select one or more clips from the source device to be transferred, followed by selecting a destination folder on the target device.

Pressing the **Add** button adds the entry to the list. If the clip being added to the list contains missing frame gaps, each continuous frame range in the clip will be added as a separate item in the transfer list.

Information for an entry about to be added appears directly below the source and target device panels.



Figure 39: Information available when adding entries to the list.

3.4.17.1 Overwrite

Specifies whether or not existing frames encountered during the transfer of an item will be overwritten. The default value is false.

3.4.17.2 Abort

Specifies whether or not the entire transfer session will be halted if an error occurs while trying to transfer an item. The default value is false.

3.4.17.3 First

Shows the first frame of a clip to be transferred. The value is set to the first frame of the selected clip.

3.4.17.4 Last

Shows the last frame of a clip to be transferred. The value is set to the last frame of the selected clip.

3.4.17.5 Path

Displays the path of a clip, as it will appear on the target device after a transfer.

3.4.17.6 Full Path

When enabled, the path of the source clip is included in the **Path** field. For example, assume a source clip with a path /projects/new/clips/boy and a target folder with the path /archive. With **Full Path** enabled, the result shown in the **Path** field is /archive/projects/new/clips/boy.

Note: Any directories that are part of a target path and do not exist on the target device will be created as needed.

3.4.17.7 Strip Res

When enabled, the last resolution directory in the **Path** field is stripped. For example, assume a source clip with a path /projects/new/clips/boy/2048x1556 and a target folder with the path /project/clips. With **Strip Res** enabled, the result shown in the **Path** field is /project/clips/boy.

3.4.18 Raw Dump

Raw dump is used to extract clips from raw tar volume tapes. See section 3.8 for details.

3.4.19 Show Log Toggle

Turns the device log display on and off. The device log is shown at the bottom of the screen. See section 0 for details on the log window.

3.4.20 Starting A Transfer

The **Start** button starts the execution of the transfer list. The button changes to the **Stop** button as soon as execution begins.

The entire transfer list is sent to the Mover server upon start. All transferring takes place on the server. The status of each item in list is updated periodically as the transfer session progresses.

The items in the list are processed from top to bottom. This can cause unnecessary seek time when reading from a tape if the clips in the list are not transferred in the order that they appear on the tape. When transferring from tape, the default behavior of the mover is to transfer the clips in the order they appear on the tape instead of the order they appear in the list. See section 3.1.4.1 for more information.

Most other Mover actions are disabled during a transfer. If the Mover is being used inside the VDC, playback and conformance operations are still enabled. The transfer may slow or pause to accommodate playback.

3.4.21 Stopping A Transfer

Pressing the **Stop** button will stop the execution of the transfer list. It may take a few seconds to stop a transfer. The mover will finish any frame in the middle of being transferred before stopping and the transfer list will be updated with the latest progress information. If the target device is a tape, an appropriate DFA directory will be written to the end of the tape.

A list can be restarted immediately or it can be saved, reloaded and resumed at a later time. If a transfer is restarted, the transfer continues from where it was last stopped. When saving a partially transferred list, the state of the transfer is maintained so a partial transfer can be finished.

3.5 Importing An EDL Into A Transfer List

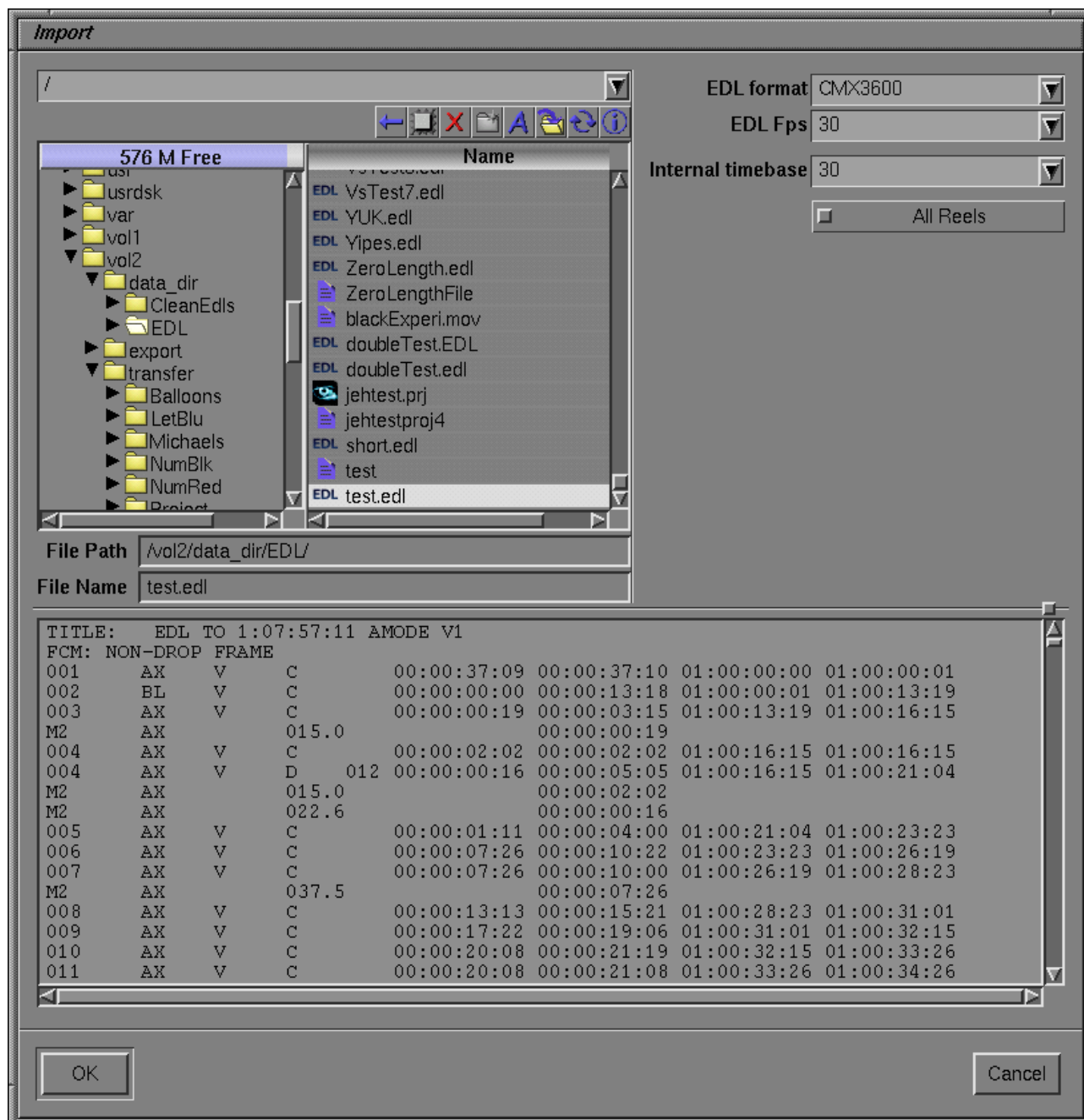


Figure 40: The EDL Import dialog with EDL Viewer window.

The transfer list can be generated by manually adding transfer items as described in section 3.4.17. The Mover also offers the possibility of generating a complete transfer list from an existing EDL file.

The **Import** button opens the **Import dialog**. This dialog allows the selection of an existing EDL file together with some import options. Here is a description of the options in the Import dialog.

EDL format

Only CMX3600 is currently supported as an input format for the import tool.

EDL Fps

Needs to be set to the FPS (frames per second) value for the EDL. This is the value that was used on the system that created the EDL file.

Internal timebase

Needs to be set to the appropriate FPS (frames per second) value depending on how the images are going to be used in the system.

All Reels

Every edit in an EDL specifies the name of the reel (or tape) from which the source material has to be taken. In a CMX3600 EDL, the reel name is stored in the second column of an edit. If the **All Reels** toggle button is switched off, the import dialog will be followed by the dialog shown in Figure 41 in which a selection has to be made from all reel names that can be found in the EDL. Multiple reels can be selected in that additional dialog by holding down the CTRL key. Only the EDL-edits from the selected reels are imported as transfer items.



Figure 41: Reel Selection dialog.

If the **All Reels** toggle is switched on, there will be no additional dialog and all EDL-edits will be converted into transfer items.

Once the dialog is closed with the OK button, if the Append toggle is off, the current transfer list is replaced with a new transfer list that was generated based on the information from the selected EDL. If the Append toggle is on, new transfer list generated will be appended to the current transfer list. For every edit (line) in the EDL there is a transfer item in the list. Dissolves and other effects in the EDL are processed such that the in points and out points for the source material used in the effect are extended. A separate transfer item for the effect itself is not generated.

The information about the EDL edit that was used to generate a particular transfer item is preserved. It can be displayed by selecting (highlighting) a single transfer item in the transfer list and opening the transfer item editor (see section 3.4.12 for details).

3.6 Pull List Transfer

This section only applies to a standalone Phantom installation that is a Phantom that is not part of a VDC installation.

3.6.1 Introduction

The term **pull list transfer** (or “pull list based transfer”) describes a scenario in which a series of clips, as defined by a pull list, is transferred automatically. This process is often applied in postproduction facilities to transfer all the clips that make up a particular project. The actual pull list is an ASCII text file describing all source clips that are needed for the project.

By combining some of the functionality described in earlier sections of this section, the Mover can be used to control a pull list transfer.

Section 3.5 describes the possibility of generating a transfer list from an external EDL file. Thus an EDL addressing all clips of one project can be used as a pull list. After that EDL is imported into the Mover, the resulting transfer list describes exactly the pieces of material that are referenced by the EDL.

When a DataCine device is selected as the source device for such a transfer list, it is possible to transfer all those clips directly from the film. Once the transfer list is set up and the correct devices are selected, all desired clips from one film roll can be transferred in one job, without further human interaction.

If individual color correction settings must be applied (as opposed to a one light transfer, where the same settings are applied to all clips) an external color correction system can be used to program the settings (based on a timecode reference). When the clips are then transferred sequentially, the color correction system will apply the programmed settings as it monitors the current timecode.

During a running transfer a preview image is shown with the last received image. Information about the frame number, timecode and resolution are given.

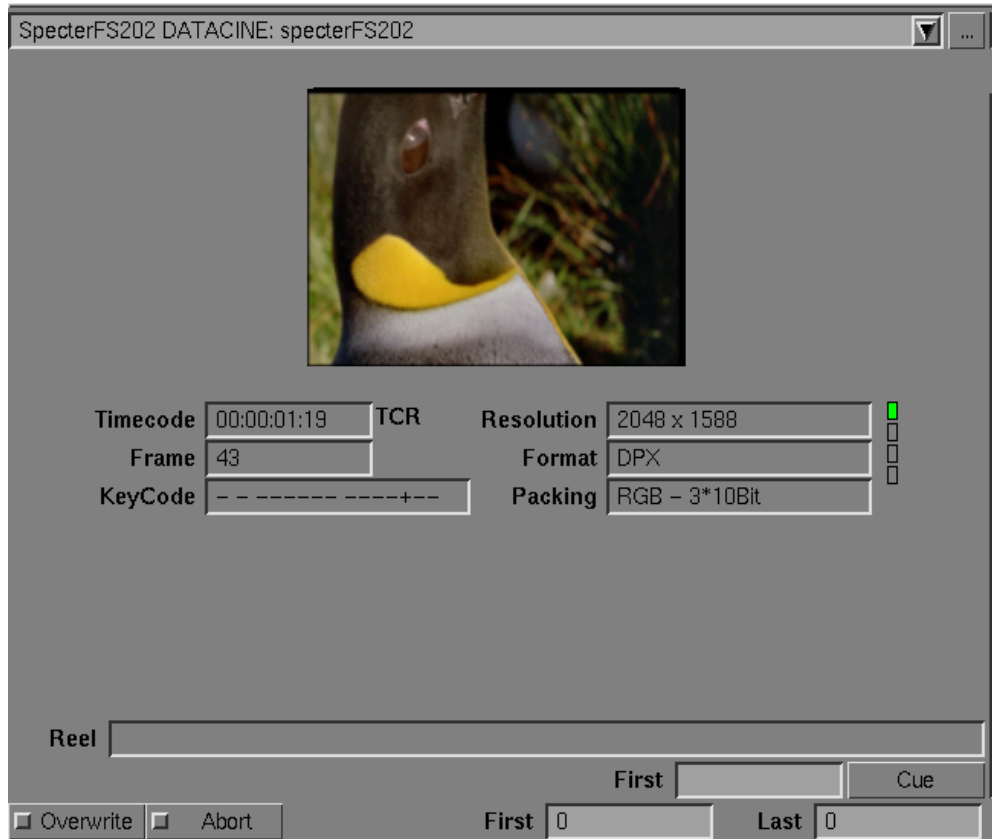


Figure 42: Proxy Preview for the Pull List.

3.6.2 The Workflow

This section contains a step-by-step description that can be followed to do a pull list transfer from film to XFS or VRF. The preconditions for this scenario are:

- The pull list is a CMX3600 EDL stored in a file system accessible to the Phantom server machine.
- A piece of film is mounted on a Spirit DataCine and the frame counter is initialized so that the timecodes in the EDL match the appropriate content on film.
- Some basic settings have to be made on the Spirit DataCine (using either a control panel like FCP or GCP or a Telecine Controller): the required output format (HDTV or HiPPI) has to be selected and the correct transfer speed must be set. In case of HiPPI, the data output has to be in Frame-by-Frame mode.
- The appropriate image output (HiPPI / HDTV) of the Spirit DataCine is connected to the input of the Phantom server.
- The Phantom is configured so that the image output is visible in Phantom's Display panel.

Based on these requirements, the following steps will perform the pull list transfer of material as specified in the EDL.

1. In the Move panel, press **Import** to import the EDL file. Make sure to specify the correct EDL FPS value. The Internal timebase value has to match the current FPS (frames per second) value of the Spirit DataCine. If the EDL has multiple reels, select the appropriate one. Refer to section 3.5 for details.
2. After closing the dialog with the OK button, there will be a transfer list with one transfer item per edit in the EDL. The correspondence between a transfer item and the original EDL edit number can be verified by double clicking on the transfer item in the list. This will open the dialog (see section 3.4.12) where the name of the EDL file and edit number are displayed.
3. Select the DataCine device as the source device.
4. Select either the VRF device or an XFS device as the target device.
5. (optional) Each transfer item can be modified by adding handles. This will transfer a few more frames than referenced by the pull list. See section 3.4.12 for a description of how to add handles.

6. (optional) Select an individual transfer item. The timecode of the first frame is copied to the **First** field. Clicking the **Cue** button will position the DataCine to that timecode. This function can be used to step through the transfer items and make scene-by-scene decisions on color correction and spatial processing. These decisions can be stored in an external color correction system that will apply them later during execution of the transfer list.
7. Pressing the Mover's **Start** button will start the pull list transfer. The Spirit DataCine will be positioned for each transfer item. Then it is put into normal play mode and the image data is captured with the Phantom Transfer functionality. During this process the Phantom GUI can be switched to the Transfer panel to monitor the image data as it is transferred.

Note: A minimum preroll time for a DataCine device is necessary to execute the pull list. This means that if one wants to pull from the very beginning of the timeline, filler in front of the first image has to be added. In case of a VDC, this has to be at least three frames.

3.7 Log Window

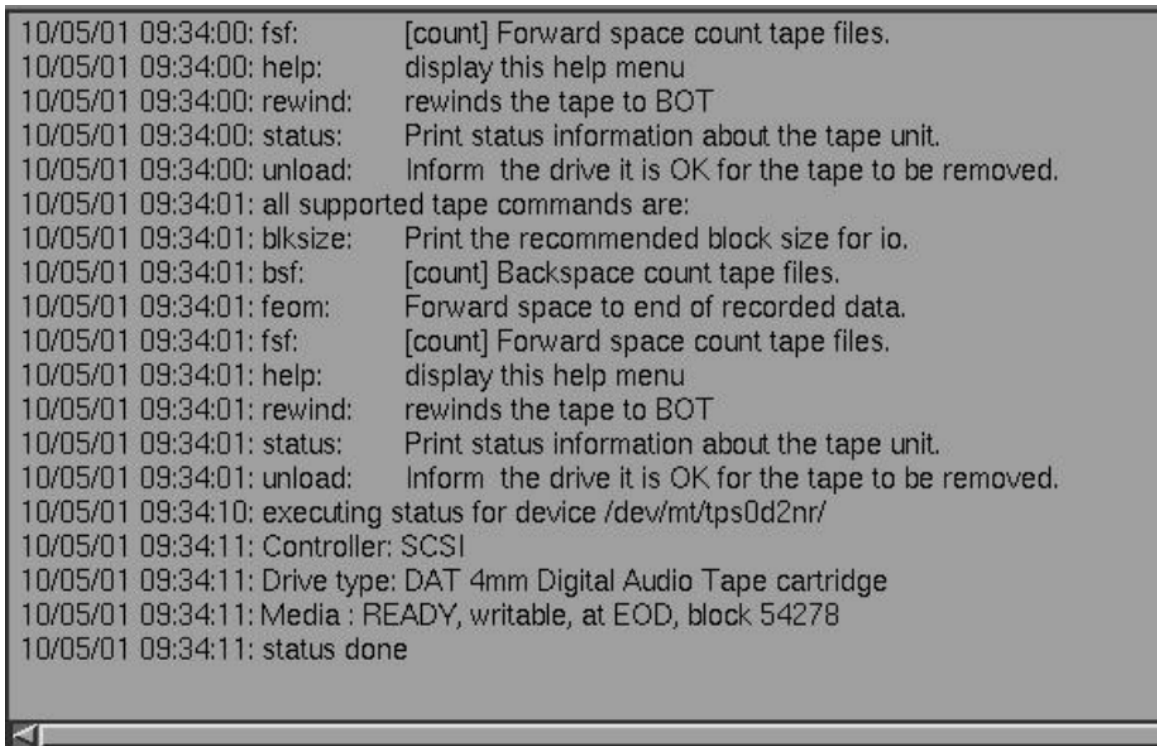


Figure 43: The log window.

If the **Show Log** button is on, the bottom part of the Mover panel displays an extra log window. The log window displays a log of raw device events. See the sections 3.8 and 3.1.4.6 on dumping a raw tape for more information.

3.8 Dumping A Raw Tape

An uncontrolled transfer from a tape to another target device can be started with the **Raw Dump** button. Uncontrolled means that all material, starting at the current tape position, is read and will be copied to a selected target device.

It is possible to stop a running raw dump transfer from tape by pressing the **Stop Dump** button. There is a short delay after this button is pressed and before the raw dump transfer is stopped.

There is no progress indicator like remaining time or percentage done while a raw dump transfer from tape is running. Only the log window displays messages indicating what files are read from tape.

The Raw Dump functionality is not recommended as a standard work procedure but allows more flexibility when copying material from a tape. Instead, it is recommended to get the DFA directory from tape (see section 3.2.3), select the desired material in the browser, create a transfer list as described in section 3.4.17 and start the transfer.

This way one can control exactly what material should be copied from tape.

The Raw Dump feature can be used in some special cases where the recommended working procedures are not as appropriate. The Mover can recognize tape created by Phantom, Specter (3.0 or higher), and Cineon®, but there are many other tools for creating tar volume tapes filled with image data. For those foreign tapes a directory cannot be retrieved without using the create directory function which must read every file on the tape (see section 3.1.4.2). If the tape is known to be a tar volume tape containing image data, the raw dump functionality can offer the advantage of not taking the time to read the tape twice, once while creating the directory and once while copying material.

See section 3.8.2 for performing a raw dump with a VooDoo Data device.

The **Raw Dump** button is only enabled if a tape device is selected as a source device. Additionally the target device has to be selected and one should specify the target folder where the read material from tape should be copied. The **Overwrite** toggle button can be activated, if desired. Care should be taken when using overwrite while dumping material from tape because the material on tape is usually not known. All other options like First, Last, Full Path and Strip Res are ignored when dumping from tape.

Use the following checklist to decide if raw dump is suitable:

1. If the tape DFA directory is already displayed then there is absolutely no need to use Raw Dump.
2. Don't use Raw Dump for VooDoo Data (see section 3.8.2).
3. If it is desired to copy the whole content of a tape to another target device then take Raw Dump into consideration. It is important to position the tape correctly before starting a Raw Dump (see section 3.8.1).

3.8.1 Tape Positioning Before Raw Dump

Before performing a Raw Dump, the tape has to be positioned correctly first. To position a tape correctly, one can use the tape browser's **Raw command** option (see section 3.1.4.6.1). Usually a tape should be positioned at the beginning of tape (BOT). This can be achieved with the user command `rewind` that has to be entered in the **Raw** text field, and then the **Send** button has to be clicked. Check the current tape position with the `status` command.

For magnetic tapes, it is possible to position the tape after a file mark. This can be achieved with the user command `fsf <count>`.

For VooDoo Data one can use the user command `cue <file number>` to position the tape before VooDoo file <file number>.

This way it is possible to dump all the material starting after a specific tape position instead of dumping the tape's entire contents.

One should be very cautious when positioning a tape at a position other than the BOT before starting a raw dump transfer from tape. A tape positioned incorrectly will most likely cause an error.

All results of the Raw commands are displayed in the log window (see section 0).

3.8.2 Raw Dump With VooDoo Data

It is always possible to get the DFA tape directory for a VooDoo Data tape without reading the entire contents from tape. Either there is a DFA directory stored at the end of the tape or `<Create Dir>` can be used to create the directory by interpreting VooDoo's TOC (table of contents) (see section 3.1.4.2).

The first case (read the DFA directory from the tape) means that the tape will be positioned automatically to the end before the DFA directory is read. This takes a little bit time.

The second case (create dir) means that the generated DFA directory might be inaccurate due to the limitations of the VooDoo's TOC.

If a VooDoo Data tape contents is known and all material will be copied from this tape (starting a specific position), then Raw Dump from a VooDoo Data tape might be a useful option. It is important to position the tape before a Raw Dump is started.

At the end of a raw dump transfer (unless it is stopped by clicking the **Stop Dump** button), the following error message is always displayed: "Did not receive a frame from HiPPI device. Timeout exceeded." This error message can be ignored in this specific case.

Note: A tape must be positioned before a Raw Dump is executed.

4 SETUP MODE

The **Setup Mode** displays current Phantom application settings.

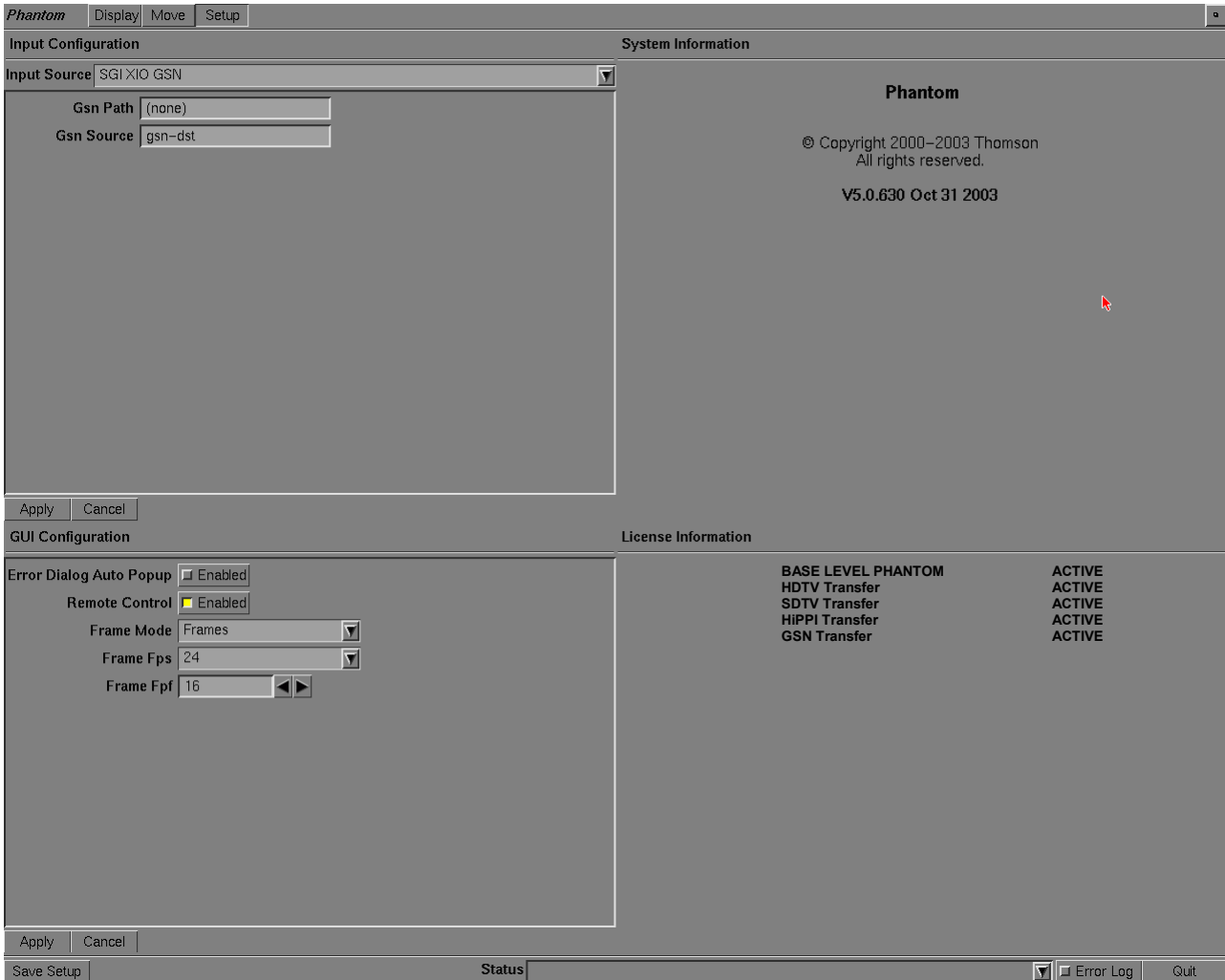


Figure 44: The Setup mode.

There are four sections in the Setup mode: Input Configuration (allowing the input source to be changed), GUI Configuration (allowing GUI specific settings to be changed), System Information (showing version numbers) and License Information (detailing the current state of licenses for the Phantom application).

4.1 Input Configuration

The Input Source where image information is received from can be specified and configured in this section. The input source choices appear in a drop down list. Only one input source can be specified at any time. When the input source is selected in the list, the corresponding configuration parameters for that particular setting are shown in a scrolling panel located beneath the drop down list.

If the input source is changed or any of the parameters pertaining to the input source are changed, then this information needs to be applied by pressing the **Apply** button. The chosen Input Source will not be effective until the **Apply** button is pressed.

Pressing the **Cancel** button will force parameters to their default state.

It is also possible to set the Input Source to “(none)”.

4.1.1 Configuration Parameters For HDTV And SDTV Input

Based on the underlying hardware Phantom supports two different HDIO cards: the XT HDTV card from SGI and the PCI HD/SDTV card from DVS. The following table lists all modifiable parameters for both cards and the following two subsections describe all modifiable parameters for the card specific settings.

Elements	Function	Supported Values
Format	Choose single link (4:2:2 YcrCb) or dual link (4:4:4 RGB) for HDTV or SDTV input.	4:2:2 (YCrCb) 4:4:4 (RGB)
Timecode Source	Choose between internal regeneration, or slave to external analog LTC signal.	internal external
Timecode Base	Choose the number of frames (last 2 digits) per second in the timecode signal. “auto” means follow video standard.	auto (follow video) 24 25 30
LTC Delay		-1 0 1 2

Table 5: Configuration elements for HDTV and SDTV input.

For the **Format** to a single link connection (4:2:2), pixel value transformation will be from 4:2:2 YCrCb (video) to 4:4:4 RGB (memory).

For a dual link connection (4:4:4), there will be a direct mapping from 4:4:4 RGB (video) to 4:4:4 RGB (memory). In this case, the pixel values are taken over directly (no headroom expansion).

For the **Timecode Source** set to “internal”, all received HDTV images will be stamped with an internally generated timecode. If “external”, the timecode will be received and decoded from the external analog LTC signal.

The **Timecode Base** setting needs to match the type of timecode that is being regenerated or received. It specifies the number of frames in one timecode second. For instance, a setting of 24 will generate a sequence that jumps from 01:00:00:23 to 01:00:01:00. Note that this setting must be made correctly for the “external”

timecode as well. Setting the Timecode Base to “auto” will let it follow the video standard. For instance, for a video standard of “1080 24P” the Timecode Base would implicitly be set to 24. The only situation in which to set the Timecode Base to something other than “auto” is to transfer 24 FPS material in faster than real-time (e.g., 1080 59.9i).

4.1.1.1 Configuration Parameters For XT HDTV Input

Elements	Function	Supported Values
Color Space	Select color space for incoming HD video signal.	CCIR 601 SMPTE 240M ITU-REC 709
Video Standard	Choose correct timing for HD input signal according to supplied signal.	1080 23.9P 1080 24P 1080 25P 1080 23.9SF 1080 24SF 1080 25SF 1080 50i 1080 59.9i

Table 6: Configuration elements for XT HDTV input.

It is very important to configure the correct **Video Standard**. Phantom will refuse to receive correct data if the Video Standard selected for Phantom does not match the video timing sent from the video source (VooDoo Media Recorder, Spirit DataCine, Specter Virtual DataCine, etc.) to the HDTV board.

The **Color Space** (CCIR 601 / SMPTE 240M / ITU-REC 709) must match the appropriate standard used for the input signal. This is important in order for the HDTV board’s drivers to correctly transfer the 4:2:2 YCrCb signals to 4:4:4 RGB in memory. Table 7 lists the correct match for Spirit / Specter Virtual DataCine HDTV timing and Phantom timing and color space. Note that for some video timing, the Spirit DataCine / Specter Virtual DataCine allows the choice from two different color spaces. See the Spirit / Specter Virtual DataCine manual for additional information. The appropriate selections are listed here, too.

Video Standard	Spirit / Specter Color Space	Phantom Color Space
1080 59.9	not supported	SMPTE 240M
1080 50I	274M	CCIR 601
	240M	SMPTE 240M
1080 25P	274M	CCIR 601
	240M	SMPTE 240M
1080 24P	274M	CCIR 601
	240M	SMPTE 240M
1080 23.9P	274M	CCIR 601
	240M	SMPTE 240M
1125 59.9	not supported	SMPTE 240M
720 59.9	274M	CCIR 601
	240M	SMPTE 240M
1080 23.9SF	not supported	not supported
1080 24SF	not supported	not supported
1080 25SF	not supported	not supported
1080 59.9I	not supported	not supported

Table 7: Matching timings and color spaces.

Please refer to the Spirit DataCine / Specter Virtual DataCine / Shadow Telecine manuals (HDTV and DTV) for further information on the color spaces used.

The configuration variable HDTV_HEADROOM will decide if the pixel values are expanded to full range (0...1023) or not (see section 5.1.3.11).

4.1.1.2 Configuration Parameters For PCI HDTV And PCI SDTV Input

Elements	Function	Supported Values
Video Standard	Choose correct timing for HD or SD input signal according to supplied signal.	525 SDTV NTSC 625 SDTV PAL 525 EDTV 625 EDTV 720 59.93P SMPTE 296 720 60P SMPTE 296 1080 23.97P SMPTE 274 1080 24P SMPTE 274 1080 25P SMPTE 274 1080 23.97SF SMPTE 274 1080 24SF SMPTE 274 1080 50I SMPTE 274 1080 59.93I SMPTE 274 1080 60I SMPTE 274 1125 60I SMPTE 240 1125 59.93I SMPTE 240 1250 50I SMPTE 295

Table 8: Configuration elements for PCI HDTV and SDTV input.

It is very important to configure the correct **Video Standard**. Phantom will refuse to receive correct data if the Video Standard selected for Phantom does not match the video timing sent from the video source (VooDoo Media Recorder, Spirit DataCine, Specter Virtual DataCine, etc.) to the HDTV board.

4.1.2 Configuration Parameters For HiPPI Input

The path to the device file of the appropriate HiPPI board can be set with the configuration parameter **HiPPI Path**. The path /dev/hippi0 is the first SGI™-type HiPPI board. The first Essential-type HiPPI board is mounted at /dev/hippi/h0.

4.1.3 Configuration Parameters For GSN Input

First configuration parameter is the path to the device file of the appropriate GSN board can be set with the configuration parameter **GSN_PATH**. The path /dev/gsn0 is the first SGI™-type XIO GSN or Genroco/VPI PCI GSN board.

Second configuration parameter is the IP address of the GSN data source called **GSN_SOURCE**. This address can be entered either in standard IP notation like "192.168.1.1" or as a host name like "gsn-spirit". This logical name must be well known to the server. Thus the configuration of the GSN subsystem must have introduced this name to the "/etc/hosts" file.

4.2 GUI Configuration

The GUI Configuration section contains settings that are specific to the GUI. Each setting is outlined below. Any changes need to be applied before they will take effect. Press the **Apply** button located below the panel to set the changes. Press the **Cancel** button to disregard the setting changes.

4.2.1 Error Dialog Auto Pop-Up

Enabling this setting will cause the Error dialog to pop-up automatically when an error message is received from the server.

4.2.2 Remote Control

The Phantom application can be remotely controlled by an external application. This can be achieved by setting the Remote Control toggle on. For details see section 5.2.

4.3 Making Changes Permanent

The **Save Setup** button in the status panel will save the current configuration into the configuration file. This includes all settings that are described in section 5.1.2. However, settings that are not modified from their default values are not written into the config file.

4.4 License Information

The Phantom application uses three licenses to determine available functionality. Information is shown in the Setup panel about the current state of those licenses. The state of each license can be one of the following: ACTIVE (all is fine), UNKNOWN (cannot determine license state), EXPIRED (license has expired), or NONE (license cannot be found).

The licenses shown in the Setup Mode are:

BASE LEVEL PHANTOM – this is required to run the application. If this license cannot be found, the application will quit at start up after an appropriate message has been displayed to inform the user.

HDTV Transfer – allows use of the HDTV related aspects of the application, including the ability to transfer using an HD card.

SDTV Transfer – allows use of the SDTV related aspects of the application, including the ability to transfer using the PCI HDIO (HD + SD TV) card from DVS.

HiPPI Transfer – allows use of the HiPPI data aspects of the application.

GSN Transfer – allows use of the GSN data aspects of the application.

5 ADMINISTRATION

5.1 Configuration Settings

This section gives an overview of all configuration settings of the Phantom system.

5.1.1 Environment Variables

While most of the configuration settings to Phantom are made through the configuration file (see section 5.1.2), some environment variables also have influence on the configuration of Phantom. They can be set through regular shell initialization files (`~/. cshrc`, etc.) that means that these adaptations have to be ensured for every user who starts Phantom.

Another possibility is to make appropriate entries into one of the following files:

```
/usr/thomson/etc/config/SITE.vars  
/usr/thomson/etc/config/SITE.phantom.server.vars  
/usr/thomson/etc/config/SITE.phantom.client.vars
```

While the first file (`SITE.vars`) is used by all Thomson DFA applications, the latter are specific to individual applications. These files are used to set additional environment variables for the executable to be run. The syntax to set a variable is to enter the name of a variable followed by an equal sign and the desired value. For example:

```
NEW_VARIABLE = "my value"
```

IFL_DATABASE

The Phantom Mover converts DPX images into different formats. This conversion is done through the SGI™ IFL (Image Format Library) (see man page for IFL (1)). Since DPX is not a format that is supported by IFL by default, an IFL extension for the DPX format has to be installed on the Phantom server machine. This is done during the installation with the help of the `ifldbgen` program. The program creates a new database `/usr/lib/ifl/ifl_database`. The database contains after the installation the DPX description as well. No further separate IFL textual definition file as in 3.1.6 is necessary anymore.

The environment variable `IFL_DATABASE` is used by IFL to determine which database definition file has to be used at runtime. `/usr/lib/ifl/ifl_database` is the default, but during the software installation of 4.0 the entry will be entered into the `/usr/thomson/etc/config/SITE.vars` file for visualization of the change.

All environment variable settings of `IFL_DATABASE` pointing to the old `/usr/philips/etc/config/ifl_database` has to be removed! Check the `.cshrc` file in the home directory for a definition and remove it. In an already opened shell call “`unsetenv IFL_DATABASE`” when the variable is set (call “`env | grep IFL_DATABASE`” for find that out).

This extension is registered to the IFL through a textual definition file. An appropriate definition file is copied to:

```
/usr/thomson/etc/config/ifl_database
```

The environment variable `IFL_DATABASE` is used by IFL to determine which database definition file has to be used at runtime. It is therefore necessary to make sure that this variable identifies the file mentioned above. The default is to have an appropriate entry in the `SITE.vars` file. This is done automatically during the software installation process.

On a system where a Cineon® package is installed, the variable's value can be changed to point to the provided file:

```
/usr/thomson/etc/config/ifl_database.cineon
```

5.1.2 The Configuration File

Phantom must be adapted to one's local environment and specific needs by editing the configuration file. The configuration file is located on the server machine only (i.e., not on the client machine) under the following filename and is scanned by Phantom at application startup.

For a standalone Phantom TransferEngine installation, the filename is `/usr/thomson/etc/config/phantom.config`.

Some of the settings in the configuration file are permanent during runtime (not modifiable). Other settings can be changed through the GUI (see section 4).

Whenever configuration settings are changed at runtime the current values can be made startup defaults by writing them back to the configuration file (see section 4.3).

The configuration file is an ASCII text file and editable with any text editor, such as `vi`, `jot`, `nedit`, `emacs`. Only the Phantom's administrator should directly modify the settings in the configuration file.

5.1.2.1 Configuration Elements

The following table lists all possible configuration items (also referred to as configuration elements) in the configuration file (see above).

The items in this list are the configuration elements of the core Phantom. Items can be set in the Phantom system in different ways (see below).

Any item that is not explicitly specified in the configuration file at application startup is given the default value (see Table 9).

Items marked with an asterisk "*" can be modified by the user during runtime.

Keyword	Brief Description	Default Value	Comment
Phantom Transfer (see section 5.1.3.1)			
FILE_PREFIX	prefix for generated file names	""	use carefully; see comments below
IMAGE_FORMAT	image format	"dpx"	"dpx" –or- "fido"
DPX_SUFFIX	suffix for generated DPX files	".dpx"	use carefully; see comments below
FIDO_SUFFIX	suffix for generated FIDO files	".fido"	use carefully; see comments below
LUTSPEC_PATH	path to search for LUT specification files (file names have to match "*.lut")	"/usr/thomson/etc/config/"	files named *.lut are taken from this path and used as export LUT definitions
TRANSFLIST_DIR	directory for transfer list files	"/tmp"	need to adapt to local configuration
GENERATE_RES_SUBDIRS	generate resolution subdirectories for new clips	NO	

Keyword	Brief Description	Default Value	Comment
Devices (see section 5.1.3.2)			
MODE_FILE	filesystem access rights of generated files	0664	
MODE_DIR	filesystem access rights of generated directories	0775	
NUM_VRFS	name and path of the VRF	0	need to adapt to local configuration
VRF_NAME_n	name and path of the VRF	"/	need to adapt to local configuration
NUM_XFS_PATHS	number of supported XFS devices	1	min: 0
XFS_PATH_n	starting directory for XFS device number <n>	"/	<n> can be any number between 1 and 20; numbers above NUM_XFS_PATH are ignored
NUM_TAPE_DEVICES	number of supported tape devices	0	min: 0
TAPE_DEV_PATH_n	non-rewinding tape device directory	""	"n" must not be greater than NUM_TAPE_DEVICES
TAPE_DEV_TYPE_n	type of tape device number n	"DTF"	supported: "DTF", "DTF2", "DAT", "EXABYTE", "DST", "VOODOO"
TAR_FILES_PER_ARCH	number of images written into one archive	10	min: 1
TAR_DTF_BLOCKING_FACTOR	same meaning as option -b in UNIX tar command for all connected DTF devices	0	use carefully
TAR_DTF2_BLOCKING_FACTOR	same meaning as option -b in UNIX tar command for all connected DTF2 devices	0	use carefully
TAR_DST_BLOCKING_FACTOR	same meaning as option -b in UNIX tar command for all connected DST devices	0	use carefully
TAR_DAT_BLOCKING_FACTOR	same meaning as option -b in UNIX tar command for all connected DAT devices	0	use carefully
TAR_EXABYTE_BLOCKING_FACTOR	same meaning as option -b in UNIX tar command for all connected Exabyte devices	0	use carefully
TAPE_DTF_SIZE	total size for a DTF cartridge	42000000000 (42 GB)	used to calculate the free tape space
TAPE_DTF2_SIZE	total size for a DTF2 cartridge	20000000000 (200 GB)	used to calculate the free tape space
TAPE_DST_SIZE	total size for a DST cartridge	33000000000 (330 GB)	used to calculate the free tape space
TAPE_DAT_SIZE	total size for a DAT cartridge	4000000000 (4 GB)	used to calculate the free tape space
TAPE_EXABYTE_SIZE	total size for a Exabyte cartridge	12000000000 (12 GB)	used to calculate the free tape space

Keyword	Brief Description	Default Value	Comment
Move Mode (see section 5.1.3.3)			
MOVER_INTRA_DISK_COPY	modify only if source and target are on different physical hard disks	YES	YES or NO
BROWSING_ROOT	starting directory for Mover's import browser	"/	
SORTED_READ_FROM_TAPE	process list in order best suited for source-tape	YES	YES or NO
GUI_BROWSER_THUMBNAIL_FRAME	use first, middle or last frame for thumbnail generation *	"0"	"0"; "1"; "2"
DataCine specific settings for Move Mode (see section 5.1.3.4)			
NUM_DATACINE_DEVICES	switch on/off DataCine device	0	0 or 1
DATACINE_DEV_1	name for GUI display only		
VooDoo specific settings for Move Mode (see section 5.1.3.7)			
VOODOO_HIPPI_BOARD	type of HiPPI board used for the VooDoo Data	"sgi"	supported: "sgi"; "essential"
VOODOO_I_FIELD	HiPPI I field for the VooDoo to send to	0	
VOODOO_USE_TOC_TO_CREATE_DIR	enable fast creation of tape directory	YES	YES or NO
VOODOO_WAIT_BEFORE_WRITING	modify only in case of problem	0	
HIPPI_MAX_TIMEOUT	modify only in case of problem	1000	

- If middle ("1") is chosen and it so happens to fall in a hole in the image sequence, there will be no thumbnail shown.

Keyword	Brief Description	Default Value	Comment
Data & Video Connection (see sections 0 and 5.1.3.11)			
ACTIVE_BOARD *	input board to be used at startup	"(none)"	supported: "gsn"; "hippi"; "xthd"; "pcihd", "(none)"
GSN_BOARD	type of GSN board	"xio"	supported: "xio"; "pci"; "(none)"
GSN_PATH	device file for GSN board	"(none)"	e.g. /dev/gsn0
GSN_SOURCE	IP address or logical name of GSN data source	"gsn-spirit"	value should be well know to server.
HIPPI_BOARD	type of HiPPI board	"sgi"	supported: "sgi"; "essential"; "(none)"
HIPPI_PATH *	device file for HiPPI board	"/dev/hippi0"	
ULP_ID	ULP ID of HiPPI connection	0x80	min: 0 / max: 255
VIDEO_BOARD	type of video board	"(none)"	supported: "(none)"; "xthd"; "pcihd"
XTHD_VLPATH *	configuration of the HDTV input parameters	"TIME 10 CS 2 FORM 7 PACK 64 XTIP 1"	
TC_SOURCE *	only in HDTV mode: read external TC or generate internally	"external"	supported: "external"; "internal"
TC_STARTVAL	first timecode in "internal" mode	"01:00:00:00"	

Keyword	Brief Description	Default Value	Comment
TC_BASE *	timebase for generated / received timecode (when in HDTV mode)	0	supported: "0": adapt to video, "24"; "25"; "30": FPS
LTC_OFFSET	frame offset for external timecode (LTC)	0	
HDTV_HEAD ROOM	VARIABLE HEADROOM	"-1"	supported: "-1"; "0"; "1"

Keyword	Brief Description	Default Value	Comment
Error Reporting (see section 5.1.3.12)			
LOGFILE	file to save log information	/usr/thomson/log/phantom.logfile	

Keyword	Brief Description	Default Value	Comment
Remote Control (see section 5.2)			
SOCKET_PORT	Phantom awaits connection from controlling device here	4812	
START_REMOTE	start executable with remote control enabled	1	0 or 1

Keyword	Brief Description	Default Value	Comment
Performance Tuning (see section 5.3)			
BUF_SIZE	size of image-buffers	0x1000000 (16 MB)	needs to be large enough for one image
BUF_NUM	number of image-buffers in buffer pool	8	read section 5.3
BUF_ALIGN	memory alignment of image-buffers	128	recommended not to be changed
WRITE_THREADS	number of execution threads writing to disk	4	recommended not to be changed
WAIT_FOR_PHYSICAL_WRITE	use of disk internal queue	FALSE	has to be set to TRUE or RAID systems to improve the write performance

Table 9: Phantom configuration elements.

5.1.2.2 Configuration Elements For Framestore Device

Keyword	Brief Description	Default Value	Comment
Configuration Elements for Framestore Device			
NUM_FRAMESTORE_DEVICES	number of framestore devices	0	Needs to be set to "1" to enable Framestore support
FRAMESTORE_DEV_1	path to the Framestore	/usr/discreet/clip/stonefs	The default value should be ok for most standard Discreet setups
FRAMESTORE_SIZE		0	To be set to the total size of the Framestore in Bytes. Setting this will enable a "remaining space" indication in the Mover's browser
FRAMESTORE_2LSB_IN_USER_DATA		TRUE	Set this to FALSE to discard 2LSB of color resolution when transferring from 12Bit Framestore to 10Bit DPX -> see section 3.1.5.4 for consequences on LUT size

Table 10: Configuration elements for Framestore Device.

The **NUM_FRAMESTORE_DEVICES** has to be set to “1” in order to switch on support for the Framestore Device. Only the values “0” and “1” are supported for this variable.

FRAMESTORE_DEV_1 points to the file system entry of the actual Framestore. For most standard Discreet installations, the default value (/usr/discreet/clip/stonefs) should not need a modification.

The variable **FRAMESTORE_SIZE** can optionally be set to the total size (in Bytes) of the Discreet Framestore. If this value is set here, then the Mover will be able to dynamically display the remaining space in the Framestore. Otherwise, the remaining space indicator will be empty.

NOTE: For technical reasons, the display of remaining space can only be set if there is at least one clip in one of the partitions of the Framestore. In other words: If the Framestore is completely empty, the display of remaining space in the Mover will be disabled.

The boolean variable **FRAMESTORE_2LSB_IN_USER_DATA** enables the special handling of the 2 Bit of color resolution when transferring from a 12Bit Framestore-partition to 10Bit DPX. This is explained in detail in section 3.1.5.3. This value should be set to TRUE when it is important that the 12Bit color resolution of the Framestore-data does not get lost. However, this will have the effect that the generated DPX images are approximately 20% larger than if this flag was not set. So for reasons of storage efficiency and transfer speed this variable can be set to FALSE when the exported images are used in other applications that do not recognize this special format.

5.1.2.3 Configuration Elements For HDReel Device

Keyword	Brief Description	Default Value	Comment
Configuration Elements for HDReel (see section 3.1.6)			
NUM_HDREEL_DEVICES	Number of HDReel devices	0	Maximal number is 1
HDREEL_NAME_1	User-definable logical device name of the HDReel device		Used for display in the GUI

Table 11: Configuration elements for HDReel Device.

5.1.3 Server Configuration

Unless otherwise noted, all configurations for the Phantom server must be done to the Phantom configuration file (see section 5.1.1).

Pre-installed Phantom software need not be reconfigured. However, if Phantom was not pre-installed, the applications configuration must be adapted to the local environment. In particular, make sure to configure the correct type of input board (see sections 0 and 5.1.3.11) and the correct storage locations (see section 5.1.3.2).

5.1.3.1 Configuration Elements For Phantom Transfer

FILE_PREFIX

In Transfer mode to XFS, all generated file names are prep ended with the string specified in FILE_PREFIX. So if FILE_PREFIX were modified from its default "" to "mypref." then a generated file would be named "mypref.00000.dpx" instead of "00000.dpx".

This setting only has an effect when transferring from HiPPI or HDTV to XFS.

IMAGE_FORMAT

By default, images received over HiPPI or HDTV are stored to XFS in the **DPX** format (SMPTE 268M). If the configuration element IMAGE_FORMAT is modified to "fido" then images are stored in the **CINEON** format, also known as **FIDO** format.

This setting only has an effect when transferring from HiPPI or HDTV to XFS.

DPX_SUFFIX

In Transfer mode to XFS, the content of this configuration variable is appended to all generated file names for DPX files. So if **IMAGE_FORMAT** were "dpx" (which is the default) and DPX_SUFFIX were modified from ".dpx" to ".mysuff" then a generated file would be named "00000.mysuff" instead of "00000.dpx".

This setting only has an effect when transferring from HiPPI or HDTV to XFS.

FIDO_SUFFIX

In Transfer mode to XFS, the content of this configuration variable is appended to all generated file names for Cineon® (FIDO) files. So if **IMAGE_FORMAT** were "fido" and FIDO_SUFFIX were modified from its default ".fido" to ".mysuff" then a generated file would be named "00000.mysuff" instead of "00000.fido".

This setting only has an effect when transferring from HiPPI or HDTV to XFS.

LUTSPEC_PATH

This identifies a directory in which the **Conversion** will look for **user defined lookup tables**. These lookup tables can be used when converting from DPX to other formats (as described in section 2.7) All files inside the specified directory that have the suffix “.lut” in their filename will be taken into account. Look at the example .lut files (“example1.lut” and “example2.lut”) for a description of the syntax used in defining a single channel or 3-channel LUT.

TRANSFLIST_DIR

This specifies a directory in which Phantom will generate a file for every transfer that has been completed. The file will have a name that includes the date and time when the transfer was completed. It will contain information about the last transfer in XML, which can be read into the move component through the open function of the Move panel.

GENERATE_RES_SUBDIRS

When this variable is enabled, a resolution subdirectory will be created for new clips transferred to XFS in Phantom Transfer Mode. So if the target directory is set to /transfer/clip1 and the images that come in from the image input (HiPPI or HDTV) have a resolution of 1920 by 1440 pixels, then the first image file will be created as /transfer/clip1/1920x1440/00000.dpx.

This setting cannot be changed at runtime.

5.1.3.2 Configuration Elements For Devices

These items are used to configure the devices that are used both in the Transfer and Move mode. All types of devices have to be configured as described below before they are available as source or destination devices in the Move or Transfer mode.

MODE_FILE

This element specifies the UNIX access rights for newly created files. This applies to any type of file, both image files and textual configuration files. The ownership of a new file is always set to the user who logged into the application at startup.

MODE_DIR

This element specifies the UNIX access rights for newly created directories. The ownership of a new directory is always set to the user who logged into the application at startup.

VRFNAME

This specifies the name of the VRF (Virtual Reel File). This option is only used in a Phantom that is part of a Specter Virtual DataCine installation.

NUM_XFS_PATHS

Up to twenty XFS devices can be configured. These are not necessarily individual physical devices. All XFS devices in the sense used here are individual access points into the local file system. This way the administrator can specify the parts of the file system that shall be used for image contents and restrict other parts by not making them available as XFS devices here.

NUM_XFS_PATHS specifies the number of XFS devices that are currently configured. The actual devices are configured through the XFS_PATH_*n* element (see below).

XFS_PATH_*n*

n has to be replaced by any number between 1 and NUM_XFS_PATHS (see above). Every single XFS device needs to be specified by a starting directory, or root directory. Any image sequence that is transferred into this device will be stored relative to this root directory.

Example:

- XFS_PATH_1 = /vol2/transfer
- The image sequence clip_1/mysubdir/1-1000.dpx is transferred into XFS device 1
- Resulting images are stored into /vol2/transfer/clip_1/mysubdir/

NUM_TAPE_DEVICES

Up to five tape devices can be configured. They can be different types (see below). NUM_TAPE_DEVICES specifies the number of tape devices that are currently configured. The actual devices are configured through the TAPE_DEV_PATH_*n* and TAPE_DEV_TYPE_*n* elements (see below).

TAPE_DEV_PATH_*n*

n has to be replaced by any number between 1 and NUM_TAPE_DEVICES (see above). If it is a regular magnetic tape device (DAT, Exabyte, Ampex DST, Sony DTF) the path has to point to a non-rewinding device driver like /dev/nrtape or /dev/mt/tps1d4nr (as opposed to /dev/tape or /dev/mt/tps1d4).

If the device is a VooDoo device, refer to section 5.1.3.7.

TAPE_DEV_TYPE_*n*

The corresponding tape device is configured to be of one of the following types:

DAT

EXABYTE

DTF Sony DTF

DTF2 Sony DTF2

DST Ampex DST

VOODOO Refer to section 5.1.3.7 for details on configuring a VooDoo tape device

TAR_FILES_PER_ARCH

When the move component writes data to a magnetic tape, the data is laid down to tape as follows. The individual image frames on tape are collected in tar archives (see man page for tar). A tar archive contains any number of image files. The physical delimiter between tar archives on tape is a file mark (FM). The very last tar archive on tape will not contain image data but a description of the contents of the tape. That is, this last tar archive contains one file that is an XML description of the tape contents. This is called the DFA directory.

```
|-----> tape
|- tar -|FM|- tar -|FM|- tar -|FM
|iiiiiii| |iiiiiii| |D      |

tar:      tar archive
FM:      file marker
i:       image file
D:       DFA directory file
```

The configuration entry `TAR_FILES_PER_ARCH` specifies how many frames should go into one tar archive. When generating a tape according to the above example, the value would have been 7. The more frames are stored in one tar archive, the more data will fit on the entire tape because fewer file markers are written. A file marker takes up some space on the tape, too. On the other hand, the more frames are stored in one tar archive, the longer will it take to access individual frames inside a tar archive.

In order to read back an individual frame from a tar archive, the complete tar archive has to be read in at regular play speed.

The default is to use 10 frames per tar archive. This value is only relevant when writing to tapes (creating new archives). The number of files per archive is determined automatically when reading in an existing tape.

Note: To create a tape that shall be readable by the Cineon® CiTransfer tool, the number of frames per tar archive must be set to 1. Otherwise, CiTransfer will not be able to read the tape.

TAR_type_BLOCKING_FACTOR

These variables have the same effect as the option `-b` in the UNIX `<tar>` command, where *type* is one of the supported tape device

types: DTF, DTF2, DST, DAT or EXABYTE. Refer to the UNIX man page for tar (1) for details. The default value of 0 means auto detect.

TAPE_type_SIZE

These variables define in bytes, the total size of a loaded cartridge, where *type* is one of the supported tape device types DTF, DTF2, DST, DAT or EXABYTE. This value is used to calculate the free space for tapes and will be displayed only on the GUI.

5.1.3.3 Configuration Elements For Move Mode

While the Move panel uses all the above device configuration settings (section 5.1.3.2), the following settings are specific to the Move panel's operation only.

MOVER_INTRA_DISK_COPY

When copying data between XFS to XFS or between XFS and VRF, the Mover will by default first read a number of frames into main memory and then write the frames from main memory to the destination device. This is the default where `MOVER_INTRA_DISK_COPY` set to YES. If this variable is set to NO, then frames will be read and written simultaneously. The second frame is read into memory while the first frame is written to the destination device. While this parallel method is faster in cases where source and destination are located on independent physical disks, it is much slower if source and destination device are accessing the same physical hard disk drives because then a lot of time is spent in "seeking" or moving the heads to another location on the magnetic surface.

When deciding to modify this value, consider that even separate volumes which show up as separate lines in the `<mount>` command can still be located on the same hard drives as independent partitions.

BROWSING_ROOT

This configuration item specifies the root directory for the browser on the Move panel that is used to save or open transfer lists.

SORTED_READ_FROM_TAPE

Setting this variable to YES enables the Auto Sort option of the tape device panel by default. Setting it to NO initializes the Auto Sort option as not enabled. The startup default as specified by this variable can be modified at runtime through the GUI. See section 3.1.4.1 for further details.

GUI_BROWSER_THUMBNAIL_FRAME

This item defines the frame that is used for thumbnail generation of a clip. The following values are supported:

- “0” means the first frame
- “1” means the middle frame
- “2” means the last frame

If **middle** is chosen and it so happens to fall in a hole in the image sequence, there will be no thumbnail shown.

5.1.3.4 Configuring A DataCine Device

If a DataCine device is configured correctly, then the Move panel in the Phantom application also supports transfer list controlled transfers from external sources (HiPPI, HDTV) into XFS or VRF devices. See section 3.6 (Pull List Transfer) for a general description of this feature. The Mover server has to be configured to setup a DataCine device, which serves the source device for this kind of transfer. This is done through the following configuration variables.

NUM_DATACINE_DEVICES

Setting this variable to 1 (default is 0) configures a DataCine device. The appropriate software modules will be initialized at application startup time.

DATACINE_DEV_1

This entry is evaluated if the NUM_DATACINE_DEVICES is set to 1. It is used as a unique identifier for controlled DataCine devices. The name will be used also within the Move panel's source browser.

DATACINE_TYPE_1

This entry is evaluated if the NUM_DATACINE_DEVICES is set to 1. Possible values are Spirit, Shadow, VDC for controlling a Virtual DataCine or Spirit4K.

DATACINE_INTERFACE_1

This entry is evaluated if the NUM_DATACINE_DEVICES is set to 1. The network interface values underneath the logical network names have to be set to the name of the SGI™ network controlling the DataCine Device. Use the IRIX command netstat -ia to find the active network interfaces for the machine.

DATACINE_REMOTE_1

This entry is evaluated if the NUM_DATACINE_DEVICES is set to 1. The Remote value determines the remote control number. This value must be changed if there is a conflict with other remote controllers, like the Pogle.

DATACINE_IP_1

This entry is evaluated if the NUM_DATACINE_DEVICES is set to 1 and the DATACINE_TYPE_1 is SPIRIT4K. It reflects the IP address of the controlled Spirit4K telecine.

Examples:

```

NUM_DATACINE_DEVICES 3 # default 0, max 5
DATACINE_DEV_1      Spirit1 # a string that is displayed
DATACINE_TYPE_1     Spirit
DATACINE_INTERFACE_1 ef1
DATACINE_REMOTE_1   2

DATACINE_DEV_2      Specter
DATACINE_TYPE_2     Vdc
DATACINE_INTERFACE_2 ef2
DATACINE_REMOTE_2   3

DATACINE_DEV_3      Spirit4K
DATACINE_TYPE_3     Spirit4K
DATACINE_INTERFACE_3 ef0
DATACINE_REMOTE_3   3
DATACINE_IP_3       192.168.7.21

```

5.1.3.5 Configuring A Framestore Device

This section explains how the Framestore Device has to be set up and configured so that the Mover will be able to work with it as described in section 3.1.4.

There are two things that have to be done as a minimal setup in order to configure the Framestore Device in the Mover: the additional moverfsd software package has to be installed and started (see section 5.1.3.5.1) and the NUM_FRAMESTORE_DEVICES configuration variable has to be set to "1" (see section 5.1.3.5.2).

5.1.3.5.1 Moverfsd Daemon Software

In order for the Mover to successfully access the Discreet Framestore, the moverfsd daemon must be installed and running on the system as described below. All of this only has to be done once. Once the daemon is installed, it will be started automatically together with the DFA server software (Specter or Phantom):

- Using any of the SGI software installation tools (swmgr or inst), install the optional `moverfsd.sw.base` subsystem that is supplied together with the DFA server software (Specter or Phantom).

- Configure the Framestore as a Device for the Mover by entering the appropriate configurations lines into the configuration file of the Phantom or Specter server. (see below)
- Restart the Phantom or Specter Server.
Using root permissions, type one of the following commands on the prompt:
root % /etc/init.d/Phantom_Server restart
root % /etc/init.d/Specter_Server restart
This will restart the appropriate server and at the same time start up the moverfsd daemon which can now be considered part of that server.

5.1.3.5.2 Configuration Variables

A number of new configuration variables are available to control certain aspects of the Mover's access to the Discreet Framestore:

NUM_FRAMESTORE_DEVICES

FRAMESTORE_DEV_1

FRAMESTORE_SIZE

FRAMESTORE_2LSB_IN_USER_DATA

The variable NUM_FRAMESTORE_DEVICES has to be modified explicitly in the configuration file in order to enable support of the Framestore Device. However, it should also be verified that the other variables (that are listed above) are set appropriately.

See section 5.1.2.1 for further details on these configuration variables.

5.1.3.5.3 Other Configuration Variables

The size of the buffers in Mover's buffer pool is configured through the configuration element **BUF_SIZE** (see section 5.3, Performance Tuning). One buffer must be large enough to store one complete image. The default size is 16MB, which should be enough for most projects. However, the Framestore partition encoding of RGB12 uses a 30% overhead (see section 3.1.5.3). This means that a 10Bit DPX image of 12MB will result in a chunk of data of $12\text{MB} * 12/10 * 1.3 = 18.7 \text{ MB}$ that has to be written into the Framestore.

So, especially when working with large images and the RGB12 version of Framestore partitions the default value of **BUF_SIZE** might not be sufficient and needs to be increased.

5.1.3.6 Configuring A VTR Device

If a VTR device is configured correctly, then the Move panel in the Phantom application also supports transfer list controlled transfers from external VTR sources (HDTV) into XFS or VRF devices. See section 3.6 (Pull List Transfer) for a general description of this feature. The Mover server has to be configured to setup a VTR device that serves the source device for this kind of transfer. This is done through the following configuration variables.

NUM_VTR_DEVICES

Setting this variable to 1 (default is 0) configures a VTR device. The appropriate software modules will be initialized at application startup time.

VTR_DEV_1

This entry is evaluated if the NUM_VTR_DEVICES is set to 1. It is used as a unique identifier for controlled VTR devices. The name will be used also within the Move panel's source browser.

VTR_TYPE_1

This entry is evaluated if the NUM_DATAACINE_DEVICES is set to 1. Supported entry right now is VTR.

VTR_INTERFACE_1

This entry is evaluated if the NUM_DATAACINE_DEVICES is set to 1. The network interface values underneath the logical network names have to be set to the name of the serial device controlling the VTR Device. The command `hinv` can be used to find a free serial port. In order to get the serial port in RS422 mode required for VTR communications the letter "4" has to be added in front of the letter "d" within the device name. E.g., `/dev/ttyd2` becomes `tty4d2`.

Examples:

```
NUM_VTR_DEVICES 1
VTR_DEV_1 HD-Vtr1
VTR_TYPE_1 Vtr
VTR_INTERFACE_1 /dev/tty4d2
```

5.1.3.7 Configuring A VooDoo Tape Device

The Mover server has to be configured to set up a VooDoo Data device that can serve as source or target device when transferring to or from a VooDoo Data Recorder. There are a few configuration elements in the Phantom config file that have to be set as described in this section.

The VooDoo data recorder receives and sends images using a HiPPI connection. This existing HiPPI connection has to be described in the Phantom config file. Therefore, the config elements `VOODOO_HIPPI_BOARD`, `TAPE_DEV_PATH_n` and `VOODOO_I_FIELD` are introduced and they must be set as described below.

All control commands (like “play” or “record”) to the VooDoo Data Recorder are sent over an iMCS network connection. For configuring a VooDoo Data Recorder as one of the tape devices, use the following guidelines:

VOODOO_HIPPI_BOARD

This variable has to be set to specify the type of HiPPI board that will be used for the VooDoo Data connection. The following settings are supported:

“sgi” use the SGI™ “IRIS XIO HiPPI” board

“essential” use the Essential “PCI-Short Serial HiPPI NIC” board

TAPE_DEV_PATH_n

The device path configuration variable for a VooDoo Data Recorder device consists of three parts which are separated by colons “:”.

- device path of the HiPPI device that is used for the data connection to the VooDoo machine (like `/dev/hippi6`).
- HiPPI ULP-ID to be used by the SGI™ driver to send data to the VooDoo (HiPPI specific address setting, use `0x80` if not sure).
- HiPPI I-field to be used by the SGI™ driver to send data to the VooDoo. This is a HiPPI specific address setting. It is only relevant if the HiPPI path is routed through a HiPPI router.

TAPE_TYPE_n

This entry has to be used for configuring VooDoo tape. Please enter `VOODOO` in that case.

TAPE_DEV_NAME_n

The device name configuration variable is used as a unique identifier for controlled VooDoo Data Recorder devices. The name will be used also within the Move panel’s source browser.

TAPE_INTERFACE_n

The network interface values underneath the logical network names have to be set to the name of the SGI™ network controlling the VooDoo Device. Use the IRIX command `netstat -ia` to find the active network interfaces for the machine.

Example:

Here is an example that would configure the third tape device to use the HiPPI board in /dev/hippi4, ULP-ID 0x80, and the I-field setting of 0x03000003:

```
NUM_TAPE_DEVICES 3 # devices 1 and 2 not shown here
TAPE_DEV_TYPE_3 VOODOO
TAPE_DEV_PATH_3 /dev/hippi4:0x80:0x03000003
TAPE_DEV_NAME_3 ec0
TAPE_DEV_INTERFACE_3 ec0
```

VOODOO_I_FIELD

The VooDoo machine and the SGI™ driver have to exchange image data for reading and writing. While these links both share the same physical HiPPI cable, the logical connection has to be configured independently.

The HiPPI protocol allows routing of individual data packages over a router. The I-field as part of the HiPPI protocol allows addressing of HiPPI packages to the correct destination. So if a HiPPI router is being used, the I-field has to be set according to the router configuration.

For the path from the SGI™ driver to the VooDoo (write data to tape) the I-field is configured as part of the TAPE_DEV_PATH_*n* variable (see above). For the link from the VooDoo to the SGI™ driver (read data from tape), the VooDoo will use the I-field as configured in this variable (VOODOO_I_FIELD). The default is 0. It has to be modified when a HiPPI router is used.

*Note: Whereas the I-field in TAPE_DEV_PATH_**n* *has to be set to the complete I-field (including for instance the logical routing information), the VODOO_I_FIELD has to be set to the routing information-only part of the I-field.*

VOODOO_USE_TOC_TO_CREATE_DIR

In order to keep track of the data on a particular tape there will always be a special file (the DFA directory) written to the end of the tape that contains information about the images on tape. This principle is explained under TAR_FILES_PER_ARCH in section 5.1.3.2, although the VooDoo does not use tar archives on tape at all.

When a VooDoo tape was not created with the DFA Mover (e.g., it could have been written by directly passing the data output of the Spirit DataCine into the VooDoo), then there is no such DFA directory on the tape.

In order to use that tape in the Mover, the DFA directory has to be created first. This has to be done by reading the complete tape in normal play speed to scan the material on the tape. Fortunately, the VooDoo has a separate built-in directory called the TOC (table of contents). It does not hold all the information needed for regular Mover operations, so it cannot be used as a replacement for the DFA directory. However, it can be used as a fast source when a DFA directory needs to be generated from scratch.

The default value of this variable (TRUE) uses the TOC to generate the DFA directory when it cannot be found on tape. If the variable is set to FALSE, the tape content itself will be scanned to generate the

DFA directory. This might be necessary if the TOC for some reason is not accurate or is damaged.

VOODOO_WAIT_BEFORE_WRITING

The VooDoo Data Recorder is an extremely fast data archiving tool with a constant data rate. This means that the data has to be read back from tape at the same data rate that was supplied when writing to tape.

This does not present a problem when reading and writing tapes on comparable machines (or even the same machine). But if a tape will be read back on a system with a significantly lower bandwidth than the machine that is used for writing, then this parameter can be increased from its default that is 0.

The units are 10 msec/frame, so setting the value of VOOODOO_WAIT_BEFORE_WRITING to 5 results in a delay of 50 msec for each frame that is written to tape. The perfect value for a particular environment depends on many factors and has to be determined heuristically.

HIPPI_MAX_TIMEOUT

This value should not be modified in normal operation. It specifies the maximum waiting time (in 10 msec units) before the SGI™ driver decides that the HiPPI input has failed to deliver any data (while reading data from tape). The default value of 1000 (which is 10 seconds) is enough for normal operation.

When a GUI message suggests modifying this value, other settings like the I-fields (see above) and physical HiPPI cabling should be checked first.

VOODOO_PLAYBACK_NUM_RETRIES

This value defines the number of retries if an error occurs when reading from a VooDoo Data tape. The default value is 1 and one might consider to increase it to 2.

5.1.3.8 Connection Of A DTF2

Example with a Sony DTF2, ID 5, on SCSI controller 1:

1. Connect the DTF via SCSI to the server and reboot.
 In the "hinv" you should see a tape recorder entry like "Sony GY-8240" under SCSI controller 1.
 If you don't see this entry, or an entry like "unknown" under SCSI controller 1, see the second step, otherwise go to 3.
2. You have to duplicate one of the entries, like "Sony GY-2180" (in this case), in the `/var/sysgen/master.d/SCSI` file and rename all "Sony GY-2180" entries into "Sony GY-8240".
 Build a new Kernel with **autoconfig -v**.
 Reboot the server and check the "hinv".
3. Edit the `fpe.config`.

```
##### read from and write to tapes #####

# specifies the number and definition of MT or DataVooDoo
# devices, that are accessible with the Phantom Mover

NUM_TAPE_DEVICES      1                # default 0

TAPE_DEV_PATH_1       "/dev/rmt/tps1d5nr" # default ""
# must be either a non rewinding local device e.g.
# "/dev/rmt/tps2d5nr" or a hippi device to the DataVooDoo e.g.
# "/dev/hippi0"

TAPE_DEV_TYPE_1       DTF2              # default "DTF"
# possible: "DTF", "DTF2", "DST", "DAT", "EXABYTE" or "VOODOO"

# TAPE_DEV_NAME_1     # only for TAPE_DEV_TYPE_X VODOO

# TAPE_DEV_INTERFACE_1 # network interface, only for
# TAPE_DEV_TYPE_X VODOO

# TAPE_DEV_UNIT_1     # VooDoo unit number, only for
# TAPE_DEV_TYPE_X VODOO
```

4. Restart the Specter_Server.
 The DTF2 entry should be visible now in the "Mover" window and you should be able to read / write to / from tape!

5.1.3.9 Configuring The GSN Input

The following configuration settings are relevant for setting up the GSN data input of Phantom to record image data.

GSN_BOARD

This variable has to be set to specify the type of GSN board that is to be used. The following settings are supported:

- “xio” use the SGI™ “XIO GSN” board
- “pci” use the Genroco/VPI “PCI GSN” board
- “(none)” switch off support for HiPPI data input

GSN_PATH

This variable specifies the device path for the GSN board as specified in the **GSN_PATH** variable (see above). Example settings are:

```
GSN_PATH            /dev/gsn0            # for SGI GSN board
```

GSN_SOURCE

This variable sets the address of the GSN data source. This address can be entered either in standard IP notation like “192.168.1.1” or as an host name like “gsn-spirit”. This logical name must be well known to the server. Thus the configuration of the GSN subsystem must have introduced this name to the “/etc/hosts” file.

5.1.3.10 Configuring The HiPPI Input

The following configuration settings are relevant for setting up the HiPPI data input of Phantom to record image data.

HIPPI_BOARD

This variable has to be set to specify the type of HiPPI board that is to be used. The following settings are supported:

- “sgi” use the SGI™ “IRIS XIO HiPPI” board
- “essential” use the Essential “PCI-Short Serial HiPPI NIC” board
- “(none)” switch off support for HiPPI data input

HIPPI_PATH

This variable specifies the device path for the HiPPI board as specified in the **HIPPI_BOARD** variable (see above). Example settings are:

```
HIPPI_PATH          /dev/hippi2          # for SGI HiPPI  
HIPPI_PATH          /dev/hippi/h2       # for Essential HiPPI
```

ULP_ID

This variable sets the HiPPI ULP-ID to be used when reading data from the specified HiPPI board. Many individual logical data channels can share a physical HiPPI link. The ULP-ID is used for correct addressing (de/multiplexing of logical channels).

This variable has to be set according to the appropriate selection on the sending side. The default in the DFA product family is 128 (same as 0x80).

5.1.3.11 Configuring The HDTV Input

After physically installing the HDTV board into the server machine together with the appropriate driver software (see release notes), the Phantom configuration must be adapted to use the board. Phantom's default configuration settings are optimized for HiPPI transfers. Since an HDTV transfer requires Phantom to provide much higher bandwidth, some changes are necessary.

In order to enable HDTV transfers in general, it is necessary to change the configuration variables VIDEO_BOARD and BUF_NUM from their defaults as described below. Other configuration variables (described further below) are optional.

VIDEO_BOARD

Setting this variable to "xthd" switches on support for HDTV input through an SGI™ XT-HD board, also known as XTHD board. Setting this variable to "pcihd" switches on support for HDTV and SDTV input through a DVS PCI HDIO board. The default for this variable is "(none)" which switches off HDTV support.

BUF_NUM

This variable, which configures the number of allocated image buffers in main memory, has to be set to at least 16. A value of 20 is recommended. The default is 8. See section 5.3 or details on this variable.

TC_SOURCE

In HDTV mode, the timecode that is associated with a recorded image can be regenerated internally, or can be read from an LTC signal (analog linear timecode) on an external analog audio connector. Setting the configuration variable TC_SOURCE to either "internal" or "external" switches between internal and external timecode.

This can be done at runtime through Phantom's setup panel.

In "external" mode, Phantom will automatically look for an audio input on the server machine. If available, that port will be used to detect an LTC signal. Additional settings need not be made to enable this capability.

TC_BASE

The LTC decoder of Phantom will by default decode a timecode signal from the audio stream according to the selected video standard. This means, for example, that for a 24p HDTV signal, a 24 frames-per-second timecode is expected.

To modify the timebase for the LTC decoder independently of the video standard, modify the configuration variable `TC_BASE`.

Note that it is important to make sure the specified timebase for the LTC decoder actually matches the audio signal coming in. Otherwise, the LTC decoder will not work reliably. Therefore, the default is to follow the video timing that is safe in most cases (`TC_BASE 0`).

LTC_OFFSET

The decoded timecode will be assigned to the appropriate image based on the exact time when the appropriate samples were received (match according to SMPTE standard).

Setting the environment variable `LTC_OFFSET` to 1 modifies the matching criterion. This will have the effect that image #1 will get a timecode value that would otherwise have been assigned to image #2.

In addition to the configuration variables that generally need to be set for HDTV support (see above) there are a number of dynamic settings needed for configuring the board. Based on the used board (XT or PCI) different configuration variables are evaluated.

XTHD_VLPATH (for XTHD only)

The configuration variable `XTHD_VLPATH` contains all the settings that are specific for the configuration of the HDTV board. It contains those settings that can be modified at runtime (in Phantom's Setup panel) plus additional settings that are static at runtime.

The basic pattern of the `XTHD_VLPATH` config string is the following: each setting has an associated tag (2-4 characters) that is followed by an integer value specifying the appropriate value.

The table below (Table 12) lists all the tags and their supported values. Because it is rather inconvenient to set up the HDTV by editing the configuration file like this, it is recommended to use Phantom's Setup panel instead and store the choices using the Save Settings command.

The default value for the `XTHD_VLPATH` config element is

```
"TIME 10 CS 2 FORM 7 PACK 64 XTIP 1"
```

According to the table below, this configures

- a video timing of 59.94i 1920x1080
- a color space of CCIR REC601
- a single link transmission in 4:2:2 YCrCb
- a memory packing of 10.10.10.2
- an interface precision of 10 Bit

Setting	Tag	Value	Meaning
video timing	TIME	10	1125 1920x1080 59.94i (74.25/1.001 MHz)
		11	1125 1920x1080 50i (74.25 MHz)
		14	1125 1920x1080 25p (74.25 MHz)
		15	1125 1920x1080 24p (74.25 MHz)
		16	1125 1920x1080 23.98p (74.25/1.001 MHz)
		20	1125 1920x1035 59.94i (SMPTE260M/240M 74.25/1.001 MHz)
		22	750 1280x720 59.94p (SMPTE296M 74.25/1.001 MHz)
color space (both video and memory)	CS	1,2,3,4	REC601
		5,6,7,8	240M
		9,10,11,12	REC709
video format	FORM	7	single link YCrCb 4:2:2
		9	dual link RGB 4:4:4
memory packing	PACK	55	8.8.8 RGB
		57	8.8.8.8 RGBA
		64	10.10.10.2 RGB
interface precision	XTIP	0	8 bit
		1	10 bit

Table 12: Contents of the XTHD_VLPATH configuration string.

HDTV_HEADROOM (for XTHD only)

This configuration variable enables variable headroom in Phantom HDTV input.

It enables the choice between <headroom> and <fullrange> color space on the HDTV input of Phantom.

Until version 3.1 Phantom only supported the features of xthd1.1:

- HDTV 4:2:2 -> RGB fullrange
- HDTV 4:4:4 -> RGB headroom

With this version 4.0 Phantom also supports the features of xthd1.2:

- HDTV 4:2:2 -> RGB fullrange
- HDTV 4:2:2 -> RGB headroom
- HDTV 4:4:4 -> RGB headroom

Note that HDTV 4:4:4 -> RGB fullrange is not supported by xthd1.2.

The configuration variable HDTV_HEADROOM supports the following values:

- -1 "compatibility mode": same as with xtdh1.1 as described above
- 0 "no headroom": try to use fullrange when possible (4:2:2)
- 1 "use headroom": always use the headroom mode (4:2:2 and 4:4:4)

The default value of this new variable is "-1".

5.1.3.12 Error Reporting

LOGFILE

A log file is used by the Phantom application. All error, warning, and information-only messages that are displayed in the GUI are also copied to this logfile. An existing logfile does not get erased, rather new content is appended.

The location of the file depends on the context.

For a standalone Phantom application, the default logfile location is:

```
/usr/thomson/log/phantom.logfile
```

The name and path of this default can be changed through the configuration parameter LOGFILE.

5.1.4 Configuring DFA Link

DFA Link provides access to devices (XFS, VRF, Tape, etc.) that reside on Specter / Phantom TransferEngine servers on remote machines. The following section describes how such a remote connection must be configured.

DFA Link Config variables

Precondition in network setup: Specter / Phantom server machines that shall be connected via DFA Link must contain each other's primary host address in /etc/hosts!

DFALINK_SERVERS

The config entry DFALINK_SERVERS is an optional GUI setting and defines a list of remote Specter / Phantom server machines that shall

by default show up in the “Remote Browser Dialog” of the GUI Mover Panel.

The format of DFALINK_SERVERS is a series of hostnames, separated by colons: “<hostname>:<hostname>:<hostname>...”
E.g. DFALINK_SERVERS Specter103:Specter115:Phantom

DFALINK_PATH_xxx

DFALINK_PATH_xxx defines the physical connection to the remote server, where xxx is the capitalized hostname of the remote machine. The format of DFALINK_PATH_xxx is a set of tags, separated by colons: <connectionType>:<tag1>:<tag2>:...

<connectionType> is currently limited to “TCP”. For “TCP”, just one more tag is needed, which is the hostname of the TCP connection. If no hostname is specified, the standard Ethernet connection will be used.

E.g., DFALINK_PATH_SPECTER103 TCP:hippi-specter103

DFA Link Configuration Example

A VDC server on Specter103 shall connect to a VDC Server on Specter99 and a TE Server on Octane_2.

The physical connection to Specter99 shall be TCP over Hippi:

- The TCP/HiPPI interface of Specter99 is known to Specter103 as <hippi-specter99>
- The TCP/HiPPI interface of Specter103 is known to Specter99 as <hippi-specter103>

The physical connection to Octane_2 shall be TCP over standard Ethernet.

On Specter103:

/usr/thomson/etc/config/fpe.config should contain the following config entries:

```
DFALINK_SERVERS           Specter99:Octane_2
DFALINK_PATH_SPECTER99   TCP:hippi-specter99
DFALINK_PATH_OCTANE_2    TCP
```

On Specter99:

/usr/thomson/etc/config/fpe.config should contain the following config entry:

```
DFALINK_PATH_SPECTER103   TCP:hippi-specter103
```

On Octane_2:

/usr/thomson/etc/config/phantom.config should contain the following config entry:

```
DFALINK_PATH_SPECTER103   TCP
```

5.1.5 Controlling The Phantom Server

The Phantom Server process can be started and stopped from the command prompt on the server machine.

5.1.5.1 (Re)Starting/Stopping The Phantom Server

A running Phantom Server can be stopped by root with the following command:

```
/etc/init.d/Phantom_Server stop
```

Root is also the only user who can restart a running Phantom Server. To restart, issue the following command:

```
/etc/init.d/Phantom_Server restart
```

A new Phantom Server can be started by all users provided that no other Phantom Server process is already running. Only one Phantom Server can be run at a time.

If there is already a Phantom Server process running, the startup script will abort with an error message. Start a new Phantom Server with the following command:

```
/etc/init.d/Phantom_Server start
```

Note that it is also not possible to start a Phantom Server on a machine where a Thomson Specter Server is already running. It is not recommended to install a Phantom Server on a Specter Server machine. The Specter Server v4.0 contains the complete functionality of the Phantom Server. The Specter GUI should be used to access that functionality.

5.1.5.2 Starting The Phantom Server Upon Booting

The Phantom Server can be configured to start upon boot up of the server machine. The default (after installing the Phantom software) is to not automatically start Phantom upon boot of the server machine. Use `chkconfig` and look for the `Phantom_Server` line to check the current configuration. To start upon boot up, the `chkconfig` value of the `Phantom_Server` should be on.

To change the setting, use the following command:

```
chkconfig Phantom_Server on|off
```

Choose “on” to start the Phantom Server automatically and “off” to turn the feature off.

5.2 Remote Control

The Phantom application can be remotely controlled by an external application. The remote control works on a text protocol exchanged through a TCP/IP socket between Phantom and the controlling application. Since a Telecine Controller (TC) mainly uses the remote control capabilities, the following section refers to the controlling application simply as “TC”. Nevertheless, any other type of application could control Phantom using the same protocol as well. A telnet client could even be used as described in section 5.2.1.1.

To successfully establish a remote control connection, the following requirements need to be fulfilled:

- The TC needs to support the Phantom remote protocol.
- Phantom and the TC need to have access to the same physical and logical network to establish the TCP/IP socket connection.
- The TC needs to be configured in a way that it knows which address to connect to (IP address and port number).
- Phantom needs to be set to “enable remote” (via the configuration variable `START_REMOTE`).

The following sections describe the general concept of remote access to Phantom (section 5.2.1) and how to verify a correct setup (section 5.2.1.1). There is a separate section for each Telecine Controller system that currently supports the Phantom remote protocol (sections 5.2.2 and 5.2.3).

5.2.1 Configuring For Remote Access

There is no additional software to be installed or started in order to make Phantom accessible from remote. Ensuring that remote mode is enabled is the only necessary step. This is the default and can be disabled with the configuration variable **START_REMOTE**. When the remote-option is enabled, there is no limitation to local operability through the GUI. The only difference is that Phantom Transfers can be additionally controlled through the remote interface. This remote controllability is only active as long as the Phantom GUI shows the Transfer panel. When the Move panel or the Setup panel is active remote control commands are ignored.

The controlling application needs to know where to contact to a running Phantom. The two numbers that make up a TCP/IP address are the host and the port number.

The **host** is the address of the (server/local) machine that runs Phantom. A machine in a network can have multiple addresses. Look for an address that identifies the machine from the point of view of the controlling machine (running the Telecine Controller).

The **port number** is a setting of Phantom and can be set by modifying the configuration element **SOCKET_PORT**. The default port number is 4812.

5.2.1.1 Testing The Remote Access

When Phantom is configured for remote control according to the above descriptions the following series of steps can verify a correct configuration without involvement of an actual Telecine Controller.

1. Find out the host name and port number as described in the previous section.
2. Start Phantom and with remote access enabled (see above). Make sure Phantom shows the Transfer panel.
3. On the controlling machine (the machine that will be running the TC), open a UNIX shell and start a telnet session as follows:

```
% telnet <host-name> <port-number>
```

The telnet program tries to connect to Phantom at the specified host/port. If this attempt does not succeed, find out the reason before proceeding. In this case make sure the correct host (alias name or IP address) and port number are specified.

4. Using the telnet prompt send the following commands to Phantom. The “answer” strings returned from Phantom are typed in *italics* here.

```
version          5
version         5
session          playback
session          display
```

This should toggle the Phantom GUI between online and offline mode (see section 2.1). If this is the case, go to the following sections. If this error message appears instead:

```
alert ignored remote
```

the Phantom is probably not set to “enable remote”.

5. Terminate the telnet session by first typing the telnet escape character (usually hold the <Ctrl> key and press “]”) and then type “quit”.

5.2.2 Pandora Platinum

To use the Pogle Platinum Software as remote controller for Phantom, the Platinum needs to know the hostname and port number as explained above. Two files must be edited on the Pogle machine:

- Edit the file `/etc/hosts` and give the alias name `<spirit-server>` to the machine running the Phantom server/local. If the Pogle machine is already configured as the Phantom's client, this is already done. See section 5.1.5 for details on how to do this.
- Edit the file `/pogle/bin/apps/platinum` and find the line that looks similar to the following

```
/pogle/bin/apps/comms 4812 spirit-server &
```
- Modify the number (4812 in this case) to the port number specified as the Phantom remote port, if it was changed from default (SOCKET_PORT).

See <http://pogle.pandora-int.com> -> Technical Information -> Platinum Manual -> Film to Data -> Engineering Setup for general information on controlling Phantom.

5.2.3 daVinci DUI

To use the daVinci DUI Software as a remote controller for Phantom, the DUI needs to know the hostname and port number as explained above. This is done in the following way (daVinci uses a completely different approach to the same goal):

- The DUI software reads the environment variable CINEON to find the IP address of the Phantom server/local machine. There are several places where this environment variable can be set. Editing the file `/.login` is recommended. This is a public script file that gets executed at login of any user. Open this file in an editor and add the following line:

```
setenv CINEON 192.9.0.100
```

The IP address (192.9.0.100 in this case) has to be the address at which the DUI machine reaches the Phantom server/local machine. Care must be taken when modifying this address or assigning this address to the Phantom machine. See section 5.2.3.1 for important details on assigning the correct IP address.
- The port number is not modifiable with the DUI software. It is fixed to 4812. Phantom's startup settings may have to be configured (see section 5.1.1) to set the variable SOCKET_PORT to 4812.

If the DUI software has been configured according to these explanations, the DUI can be started. Start the Phantom as well and open the DUI's "HiPPI Transfer" window. This window shows a number of controls that are all disabled except one red button. Click the red button. It should lose its red color and all the other controls should be enabled. This indicates a successful connection to Phantom.

Whenever the connection breaks down (by explicit break or by shutdown of either DUI or Phantom) the connection can be reestablished by clicking the red button.

See <http://www.davsys.com> for additional information in daVinci Color Correctors.

5.2.3.1 Assigning The Correct IP Address

The daVinci System uses the standard Ethernet adapter of the SGI™ O2® machine for the daVinci internal network to communicate with the daVinci control panels. There is a lot of communication traffic on this network and the system will stop from working reliably if the amount of traffic increases too much. This has an impact on the decision of how to connect the Phantom's server/local machine to the daVinci network:

The Phantom server/local machine can be connected directly to the daVinci internal network. In this case, it has to be configured with an IP address that matches the netmask of the daVinci net (192.9.0.xxx).

The additional network traffic from the Phantom remote control protocol does not overload the daVinci internal system. The disadvantage of this solution is, that the local facility's network cannot be connected to the same Ethernet card in the Phantom server/local machine.

Because the combined network traffic on the physical network (even if the logical networks would remain separated) would easily make the daVinci system inoperable.

If the Phantom server/local machine is required both in the daVinci network (to enable remote control by DUI) as well as in the facility's LAN (to copy files or for any other reason), there are two choices. Both of them require an additional piece of hardware that must be installed and configured.

1. Install a second network adapter into one of the two machines. This machine operates in both networks but the networks remain physically separated.
2. The two networks can be connected by a bridge, a switch or even a router. The task of this standalone hardware keeps the data traffic in both networks separated and lets only those data packages pass from one network to the other that are addresses for the other side. (When using a router, make sure to configure it to block any broadcast messages).

5.3 Performance Tuning

In earlier versions of Phantom (prior to version 3.1) it was necessary to tune a few configuration parameters in order to get maximum performance when transferring from HiPPI or HDTV to disk (XFS or VRF). This is no longer necessary. Phantom will adapt automatically to the available resources and make the maximum possible use of them.

However, those old configuration parameters are still recognized. Therefore, it is recommended that they be removed from the configuration files unless otherwise directed by Thomson support.

The only configuration parameters that still have to be considered are `BUF_NUM` and `BUF_SIZE`. The following paragraphs summarize the considerations for these parameters.

BUF_SIZE

Phantom allocates a pool of buffers as a central and flexible storage at runtime. Every single buffer in this pool has to be large enough to hold one complete image. The default size for a single buffer is 16 MB. This value has to be increased only if the size of the images that have to be processed is larger than this.

The value can be reduced if the size of images that are processed is significantly smaller than 16 MB. This would free up system resources that are then available to other programs.

The variable `BUF_SIZE` directly controls the size of a single buffer (in bytes).

BUF_NUM

The paragraph above introduces the basic concept of the buffer pool in Phantom. The variable `BUF_NUM` controls the number of buffers (of `BUF_SIZE` bytes each) that are allocated in the pool. The default value of 8 works fine on most systems with **HiPPI** input.

It has to be increased to at least 16 (recommended: 20) if **HDTV** is used as an input source.

If for any reason this number needs to be reduced, the number of **WRITE_THREADS** also has to be reduced (see below) so that there are always at least twice as many buffers in the pool as there are `WRITE_THREADS`.

The buffer pool is **allocated evenly across all nodeboards** (on Origin™ or Onyx® systems). In order to guarantee a reliable HDTV input, it is essential to make sure that none of the nodeboards runs out of physical memory.

This means that even if tools like `gmemusage` still show a certain amount of free memory, one of the nodeboards in the system might already be out of memory.

In this case, the `BUF_NUM` (and perhaps the `BUF_SIZE`) variables have to be decremented until all nodeboards contribute equally to the buffer pool.

The only way to monitor memory consumption on a per-nodeboard basis is to use the shell-tool `osview`. It will fill the screen with different system information. About halfway into the listings are segments titled `Node[0]`, `Node[1]`, `Node[2]`, etc. These show the `<totalmem>` and `<freemem>` for each nodeboard individually. Make sure that the `<freemem>` number does not drop to 0 after starting Phantom.

BUF_ALIGN

This parameter modifies the alignment of individual buffers in memory. It should not be modified unless a runtime error message in the Phantom GUI requires it.

WRITE_THREADS

A number of independent threads of execution are used to write images from main memory to disk. This number should not be made larger than the default of 4. It has to be lowered if the number of buffers in the pool (**BUF_NUM**) is lowered, so that there are always at least twice as many buffers in the pool as there are `WRITE_THREADS`.

WAIT_FOR_PHYSICAL_WRITE

Setting that flag to `TRUE` at a RAID system the disk internal CTQ queue is used. This allows to have more than one pending SCSI command per SCI device pending. With that the write performance of 4k images to XFS improves from some 260 MByte/sec to 370 MByte/sec.

5.4 Importing/Exporting From Framestore To VooDoo DATA

One major application of the Framestore being available as a Device in the Mover is to use Mover as a tool to transfer image data directly between the Framestore and VooDoo DATA. This is possible because the VooDoo DATA is already available as another type of I/O device in the Mover.

This is a supported way of working and the system has been explicitly designed to do a direct transfer between Framestore and VooDoo DATA. However there are some special requirements of the VooDoo DATA, which are also mentioned in the Phantom Manual (see section 5.1.3.7, "Configuring a VooDoo Tape Device"). This result in some things that should be kept in mind when planning for this special kind of transfer.

The VooDoo DATA has to be set up as a local device to the machine hosting the Framestore. That is, the HiPPI and iMCS connections of the VooDoo DATA must be connected directly to this workstation.

It is the nature of the VooDoo DATA that is can record and playback DPX data at very high speed (>85 MB/sec). However, when playing back image data from VooDoo DATA the receiver (in this case the Framestore) has to be able to keep up with that data rate. This means that the Framestore must not be used for any other I/O activity at the same time that the Mover is using it to transfer to/from a VooDoo DATA. That is, none of the Discreet Advanced System Tools (Flame, Inferno, ...) should be used while such a transfer is running.

In order to be able to buffer some of the image data in RAM during a transfer it is recommended that the number of available buffers (configuration element BUF_NUM) is set to 15 (or higher), see section 5.3. A higher number of buffers reduce the risk of stopping a transfer because some other I/O activity on the system was interfering with reading and writing the Framestore.

5.5 Troubleshooting

5.5.1 General

Upgrade the SGI™ software and hardware to the recommended levels. See below for a list of required versions.

OS: IRIX 6.5.19

For SGI XIO GSN:

GSN driver: SGI™ GSN I/O Driver Software, v3.0

ST software: SGI™ ST Bypass 2.0 (required for GSN data input)

Or for Genroco/VPI GSN:

GSN driver: GSN-DL Driver for VPI PCI NIC v2.0.0

HiPPI driver: SGI™ hippi 4.0
Essential PCI HiPPI driver 1.0.6 for
Octane®/Onyx®/Origin™
Essential PCI HiPPI driver 2.0 for O300

HDTV driver: SGI™ xthd 1.2 or higher

Also make sure that the patch level of the SGI™ system software is up to date. Get the latest patches from SGI™.

5.5.2 Logfile

Every time Phantom is started, it logs its actions by writing to a logfile. It is always a good idea to look into the logfile to find out about any potential problem that was not reported to the GUI at runtime.

See section 5.1.3.12 for details on the logfile.

5.5.3 No Connection Or Data In GSN Data Mode.

If the Phantom server reports “Could not connect.....” or “Timeout....”

- Try to re-establish a connection by going into the Setup-Panel of the Phantom GUI and return to the Display-Panel. If this does not help:
- Try to restart the GSN interface and re-establish a connection by going into the Setup-Panel of the Phantom GUI, press the Apply button underneath the Input pane and return to the Display-Panel. If this does not help:
- Check whether there is a connection between the GSN data source and the Phantom server. This will be displayed in the

GSN data menu of the GCP control panel a “connected” state in the GSN status area:

1. If there is a “connected” state and your Phantom server still reports not to have connection some other Phantom server might be currently connected. To resolve this find that other Phantom server, de-selecting the GSN input board in the Setup-Panel of its Phantom GUI and press the Apply button. Connect the own Phantom server by going to the Setup-Panel and return to the Display-Panel.
2. If there is a “Not connected” state one has to check whether it is possible to reach the GSN data source. To check this ...

for a SGI XIO GSN board:

On a UNXI shell of your server try to ping your GSN data source by typing: `%/usr/etc/ping gsn-source` where `gsn-source` has to be replaced with the IP address or logical name that is given as GSN source within your Setup_Panel of the Phantom GUI. If one doesn't get ping replies the GSN hardware setup and configuration has to be checked.

for a Genroco/VPI PCI GSN board:

On a UNXI shell of your server try to ping your GSN data source by typing: `%/usr/etc/gsnping gsn-source` where `gsn-source` has to be replaced with the IP address or logical name that is given as GSN source within your Setup_Panel of the Phantom GUI. If one doesn't get ping replies the GSN hardware setup and configuration has to be checked.

If the ping command succeeds one has to check whether the GSN board is in a healthy state.

For a SGI XIO GSN board:

Type `%gsncntl gsn0 status` command on the UNIX shell. If there are errors reported the GSN board might have to be reset. This will be described in the next section.

For a Genroco/VPI PCI GSN board:

Type `%gsnstat gsn0 status` command on the UNIX shell. If there are errors reported the GSN board might have to be reset. This can be currently only done via rebooting the machine.

- Restart the SGI XIO GSN board. There are two ways to do this. In both cases one should be extremely careful not to disrupt other operators and services going on on the Phantom server machine.

1. Restart your Phantom server machine.

Restart the GSN board explicitly. On the UNIX command line type:

```
%ifconfig gsn0 down
%gsncntl gsn0 rstshac
```

```
%gsncntl gsn0 rstsumac
%ifconfig gsn0 up
%gsncntl gsn0 status
```

Note: This last method is not officially supported by SGI.

5.5.4 No Picture In HiPPI Data Mode

When the Spirit DataCine / Specter Virtual DataCine is running in data mode and transferring images to the Phantom Server, but the Phantom Transfer panel does not display any images, check the following points:

- Check the proper settings (data mode, transfer mode, etc.) of the Spirit DataCine / Specter Virtual DataCine. On the Spirit DataCine / Specter Virtual DataCine control panel there should repeatedly appear the messages “transferring image” and “idle”. If there is only the “idle” message, the Spirit DataCine / Specter Virtual DataCine is not sending images. In this case, consult the Spirit DataCine / Specter Virtual DataCine manual.
- Test the receipt of data at the HiPPI board:
 1. Terminate the Phantom Server.
 2. In a UNIX shell, type the following command, replacing the digit 0 with the appropriate digit for one’s system:

```
% /usr/etc/hipcntl hippio status
```

(SGI™ HiPPI board)

```
% eshippi status ess0
```

(Essential HiPPI board)
 3. Transfer some data from the Spirit DataCine / Specter Virtual DataCine and issue the command above again. The figures `DST packets` and `DST rcv on bad ulp` should increase. If these figures are not growing, no data is arriving at the workstation.
 4. Try to reset the HiPPI interface by typing the following commands as user root:

```
% /usr/etc/hipcntl hippio shutdown
```

```
% /usr/etc/hipcntl hippio startup
```

(SGI™ HiPPI board)

```
% eshippi stop ess0
```

```
% eshippi start ess0
```

(Essential HiPPI board)
 5. If this does not help, check the HiPPI cabling and the setup of the Spirit DataCine.

- In case `hipcntl/esshippi` reports receiving data packets but Phantom still doesn't display images, monitor HiPPI activity with `hipcntl/esshippi` while Phantom is running. Now only the number of `DST packets` should grow; the number of `DST rcv on bad ulp` should remain constant. Otherwise, change either the setting of the ULP-ID on the Spirit DataCine / Specter Virtual DataCine or in the Phantom settings (config variable `ULP_ID`).
- If the HiPPI board cannot be accessed at all, check the **HiPPI board installation** and drivers.
- Make sure the Spirit DataCine / Specter Virtual DataCine is properly **connected to the HiPPI interface**. For the Silicon Graphics Onyx®, make sure the internal connections between the HIO board and the connector panel are not crossed.
- In case there are **multiple HiPPI interfaces** installed, make sure the Spirit DataCine / Specter Virtual DataCine is connected to the same interface Phantom is listening to. Otherwise, change either cabling or Phantom settings (config variable `HIPPI_PATH`).

5.5.5 Transfer Abort In Data Mode

In case a data transfer from Spirit DataCine or Specter Virtual DataCine to Phantom interrupts automatically, try the following actions:

- Check whether the file system of the fast disk array is full.
- Make sure there are no other applications doing I/O operations on the server/local workstation at the same time.
- Reduce the transfer rate from the Spirit DataCine / Specter Virtual DataCine until a continuous transfer is given.

5.5.6 Transfer Abort In HDTV Mode

In case an HDTV transfer to Phantom interrupts automatically, carefully read the error message in the GUI. If it reads "internal buffer overflow", then the cause is one of the following:

- The target file system might be full. Check the fill level that is displayed in the GUI.
- The number of buffers in the pool is not large enough. Make sure to go through the configuration steps for HDTV in section 5.1.3.11.

- The target file system is too slow to keep up with the bandwidth of incoming data. Make sure the target device is a fast disk array capable of the appropriate bandwidth.
- A different application might be performing I/O tasks on the same system. Make sure that no other application is running on a system that runs a Phantom HDTV transfer.

If the message in the GUI reads “Frame missed on video input”, then the cause is one of the following:

- The buffer pool has not been allocated evenly across all nodeboards. See BUF_NUM under section 5.3 for further information. Also make sure that no other application is running which might use up large parts of system memory.
- The video standard that is selected in the Setup panel does not match the video standard that the external source (HDTV player) provides.
- A different application might be performing I/O tasks on the same system. Make sure that no other application is running on a system that runs a Phantom HDTV transfer.

5.5.7 Frames Are Not Recorded

When there is a problem recording images coming from either HiPPI or HDTV, check the following list:

- Ensure that the Phantom is in online mode (see section 2.1).
- Ensure that a valid target is selected (see section 2.4). Ensure that different frames are received. The vertical row of four lights of the thumbnail display should be moving (see section 2.2).
- Ensure that the Phantom is record mode (see section 2.5).
- Check the error log. There might be no write access rights for the selected target.

5.6 Disk Striping

To get an optimum transfer performance, the method of disk striping should be used to access your disks. This can be done using an extended logical volume (XLV) on the SGI Extended File System (XFS).

To get the disk drives configured like this, follow the steps below. For additional information, see the SGI insight book (online book) *IRIX Admin: Disks and Filesystems* from the Administrative bookshelf.

URL: <http://techpubs.sgi.com>

Document no.: 007-2825-010

1. Get hardware information about disk drives

Example: two Ciprico disk arrays on Fibre Channel controller #4 and #5, unit ID of first array=8, unit ID of second array=9

```
% hinv
```

```
...
```

```
Integral SCSI controller 4: Version Emerald  
Fibrechannel
```

```
    Disk drive: unit 64 on SCSI controller 4
```

```
    Disk drive: unit 65 on SCSI controller 4
```

```
    Disk drive: unit 66 on SCSI controller 4
```

```
    Disk drive: unit 67 on SCSI controller 4
```

```
    Disk drive: unit 68 on SCSI controller 4
```

```
    Disk drive: unit 69 on SCSI controller 4
```

```
    Disk drive: unit 70 on SCSI controller 4
```

```
    Disk drive: unit 71 on SCSI controller 4
```

```
Integral SCSI controller 5: Version Emerald  
Fibrechannel
```

```
    Disk drive: unit 72 on SCSI controller 5
```

```
    Disk drive: unit 73 on SCSI controller 5
```

```
    Disk drive: unit 74 on SCSI controller 5
```

```
    Disk drive: unit 75 on SCSI controller 5
```

```
    Disk drive: unit 76 on SCSI controller 5
```

```
    Disk drive: unit 77 on SCSI controller 5
```

```
    Disk drive: unit 78 on SCSI controller 5
```

```
    Disk drive: unit 79 on SCSI controller 5
```

```
...
```

Unit number of the first module in each array = Ciprico unit ID * 8
(e.g., array #2: 9*8=72)

2. Repartitioning of all disks as option drives

Example: first disk module (#1) of array #1 – /dev/rdisk/dks4d64s0

```
% fx -x
fx version 6.3, Nov 26, 1996
fx: device-name = (dksc) dksc (4,64,0)

...performing selftest

fx:label
fx.label:set
fx.label.set:parameters
.
.
fx.label.set.parameters:Write Buffering
(disabled) enable
.
.

fx.label.set: ..
fx.label: ..
fx: repartition
fx/repartition: o
.
fx/repartition/optiondrive: type of data partition
= (xfs)
fx/repartition/optiondrive: create usr log
partition? (yes) no
.
fx/repartition: ..
```

Perform repartitioning for all Ciprico disk modules.

Note: It is essential that all disks of a logical volume are identical (check for identical firmware revision) and are set up identically with respect to partitioning as well as drive parameters.

This can be checked by choosing `label/set/parameters` in the `fx` main menu and stepping through all parameters. To achieve a good performance, it is advisable to enable drive buffered writes and set the number of cache segments to 1.

3. Creation of XLV

The striping parameters depend on the image resolution for which the best performance shall be achieved. The critical parameter is the stripe unit size; calculate the most appropriate value for your preferred resolution:

$$\text{stripe_unit_size} = \text{request_size} / (\text{number_of_disks} * 512)$$

`number_of_disks` is the number of disks used in the XLV for storing data (without external log drives).

`request_size` can be determined by taking $(\text{frame_size} + \text{header_size})$ and choosing the next higher value that is divisible by the `alignment_size`.

`frame_size` is the size of the frames to be transferred. The size can be calculated by multiplying pixels per frame with lines per frame with bytes per pixel; e.g., a 1920x1080 frame with 3x10 bit resolution has a size of $1920 * 1080 * 4$ bytes = 8,294,400 bytes.

`header_size` depends on the DPX implementation; choose 32768 bytes as a general rule.

`alignment_size` is determined by the disks or the system, whichever has the higher value. The `alignment_size` of the disks is the minimum allowable request size. The `alignment_size` of the system can be determined with the command "`sysconf PAGESIZE`".

Another constraint is the file system block size that is specified when creating the file system (see below). Choosing 16K as the `alignment_size` has proven to give good results (if not limited by one of the before mentioned constraints).

Example: 1920x1080 with 3x10 bit, disk minimum request size less than 16K, system PAGESIZE less than 16K; xlv using 16 disks.

```
stripe_unit_size = 8,306,688 bytes / (16 * 512) = 1014
```

For a detailed discussion of these topics see the manual page for the command `diskalign` contained in IRIX 6.5.

```
% xlv_make
xlv_make> vol XLV_1
xlv_make> data
xlv_make> plex (optional)
xlv_make> ve -stripe -stripe_unit 1014 \ (\ = line terminator)
xlv_make> /dev/dsk/dks5d6s7 /dev/dsk/dks5d7s7
                (append all used drives)
xlv_make> end
xlv_make> show
xlv_make> exit
```

4. Creation of XFS-type file system (e.g., block size 16K)

```
IRIX 6.5 % mkfs_xfs -b size=16k -d  
          name=/dev/xlv/XLV_1 -l internal
```

5. Creation of mount point

```
% mkdir /xlv_1
```

6. Mount logical volume

New entry in "/etc/fstab":

```
IRIX 6.5: /dev/xlv/XLV_1 /xlv_1 xfs rw,bg 0 0
```

7. Initialize XLVs

```
% /etc/init.d/xlv stop  
% /etc/init.d/xlv start
```

8. Mount volume

```
% mount -v /xlv_1
```

Note: The hostname is stored in the xlv header. If you change the name of your system or attach a configured disk array to a different system, the xlv will no longer be mounted automatically at boot time. You first have to change the hostname in the xlv header with xlv_mgr. This can be done without loss of data. (However, a backup of valuable data is always advisable.)

5.7 Phantom Licensing

Phantom 5.0 is licensed using FLEXlm node locked licenses placed in the file

```
/usr/local/flexlm/thomson/license.dat
```

The system ships with a temporary license file valid for at least one month. After the machine is installed and tested, a permanent license file will be supplied. The temporary license file should be replaced with the permanent license file.

Below is an example of the contents of a permanent license file. An explanation of each of the licensed features follows.

```
FEATURE Phantom thomson 5.0 permanent uncounted
XXXXXXXXXXXX \ HOSTID=6905f052 SIGN=YYYYYYYYYYYYY

FEATURE PhantomHD thomson 5.0 permanent uncounted
XXXXXXXXXXXX \ HOSTID=6905f052 SIGN=YYYYYYYYYYYYY

FEATURE PhantomHiPPI thomson 5.0 permanent uncounted
XXXXXXXXXXXX \ HOSTID=6905f052 SIGN=YYYYYYYYYYYYY

FEATURE PhantomGSN thomson 5.0 permanent uncounted
XXXXXXXXXXXX \ HOSTID=6905f052 SIGN=YYYYYYYYYYYYY
```

5.7.1 Licensed Features

Phantom is the base level license for the Phantom Transfer Engine.

PhantomHD is the HDTV Transfer license. It is required to enable transfer from HDTV sources to disk. The license is required for both 4:2:2 and 4:4:4 1920x1080 HDTV transfers (all formats).

PhantomHiPPI is the HiPPI Data Transfer license. It is required to enable transfer from HiPPI data sources.

PhantomGSN is the GSN Data Transfer license. It is required to enable transfer from GSN data sources.

APPENDIX A.**RS 422 VTR CONTROL CABLE FOR SGI OCTANE, ORIGIN, AND ONYX2**

VTR	Cable		SGI
	9 pin male	9 pin female	
Transmit B (+)	7	6	RxD+
Receive A (-)	8	3	TxD-
Transmit A (-)	2	2	RxD-
Receive B (+)	3	4	TxD+
		5	Signal Ground

APPENDIX B. TRANSFER ENGINE CONFIGURATION FILE TEMPLATE

```
#####
# file      : /usr/thomson/etc/config/phantom.config
# purpose   : configuration-file for Phantom
#####
# change log:
# date      sign  description
# -----  ----  -----
#####
#####
# This file sets up the basic configuration for the Phantom application
# Assign a value to a config-element by giving the name of the element
# followed by the appropriate value like in the following example
# THE_ELEMENT 14
# NOTE:
# - All characters following the '#' character are ignored until end of line
# - Blanks and tabs as well as empty lines can be added as desired
# - The format of this file (incl. comments) is preserved when saving an actual
#   configuration to the same file (menu: Settings|Save Settings)
#####
# uncomment the following elements to customize the startup-values
##### read and write the filesystem #####
# this string is put in front of all filenames
# FILE_PREFIX          # default: (empty)

# this can be set to 'dpx' -or- 'fido' to store one of these formats
# IMAGE_FORMAT        # default: dpx

# specifies the number and definition of XFS devices, which are
# accessible with the TransferEngine and Mover
# NUM_XFS_PATHS      # default 1
# XFS_PATH_1
# XFS_PATH_2
# XFS_PATH_3
# ...
# this is the root directory for the file manager
# BROWSING_ROOT      # default: "/"

# Config entries for HDReel:
NUM_HDREEL_DEVICES    1          # Currently max = 1
```

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```
HDREEL_NAME_1  "anyName"          # Only used for display in the GUI

##### Configuration for SPP protocol #####
#GCP_SPP          141.11.217.21      # own ip address
#GCP_SPP_PORT     20675              # own port
#GCP_SPP_REMOTE   141.11.216.146    # remote ip address
#GCP_SPP_REMOTE_PORT 50000          # remote port

##### pullist support #####

# specifies the number of controllable datacine devices
# NUM_DATAACINE_DEVICES          # default 0
# DATAACINE_DEV_1              Spirit1  # name of the device which will be displayed
#                               # in GUI
# DATAACINE_TYPE_1             Spirit   # supported: Vdc, Spirit, Shadow, Spirit4K
# DATAACINE_INTERFACE_1       ef2      # network interface
# DATAACINE_REMOTE_1          2        # 0=MCP 1=REM1 2=REM2 3=REM3 must be 1 when
#                               # GCP or 2 when FCP is connected to system
#                               # also remote control

# DATAACINE_DEV_2              Specter1
# DATAACINE_TYPE_2             Vdc
# DATAACINE_INTERFACE_2       ef3
# DATAACINE_REMOTE_2          2

# DATAACINE_DEV_3              Shadow1
# DATAACINE_TYPE_3             Shadow
# DATAACINE_INTERFACE_3       ef4
# DATAACINE_REMOTE_3          2

# DATAACINE_DEV_4              Spirit4K
# DATAACINE_TYPE_4             Spirit4K
# DATAACINE_INTERFACE_4       ef0
# DATAACINE_REMOTE_4          2
# DATAACINE_IP_4              192.168.7.21

# specifies the number of controllable VTR devices
# NUM_VTR_DEVICES              # default 0
# VTR_DEV_1                    HD-Vtr1
# VTR_TYPE_1                    Vtr
# VTR_INTERFACE_1              /dev/tty4d2  # local port
# VTR_DEV_2                    HD-Vtr2
# VTR_TYPE_2                    Vtr
```

```

# VTR_INTERFACE_2      /dev/tty4d3

# VTR_DEV_3            HD-Vtr3
# VTR_TYPE_3           Vtr
# VTR_INTERFACE_3      /dev/tty4d4

##### read from and write to tapes #####

# specifies the number and definition of MT or DataVooDoo devices,
# that are accessible with the Phantom Mover
# NUM_TAPE_DEVICES     # default 0
# TAPE_DEV_PATH_1      # default ""
#                       # must be either a non rewinding local device
#                       # e.g. "/dev/rmt/tps2d5nr"
#                       # or a hippi device to the DataVooDoo
#                       # e.g. "/dev/hippi0"
# TAPE_DEV_TYPE_1      # default "DTF"
#                       # possible: "DTF","DTF2","DST","DAT","EXABYTE" or
"VOODOO"
# TAPE_DEV_NAME_1      # only for TAPE_DEV_TYPE_X VOOODO
# TAPE_DEV_INTERFACE_1 ef1      # network interface, only for TAPE_DEV_TYPE_X
VOODOO
# TAPE_DEV_UNIT_1 1      # VooDoo unit number, only for TAPE_DEV_TYPE_X
VOODOO

# TAPE_DEV_PATH_2
# TAPE_DEV_TYPE_2
# TAPE_DEV_NAME_2
# TAPE_DEV_INTERFACE_2

# TAPE_DEV_PATH_3
# TAPE_DEV_TYPE_3
# TAPE_DEV_NAME_3
# TAPE_DEV_INTERFACE_3

# defines how many images will be written within one archive file
# for a mt devices
# TAR_FILES_PER_ARCH   # default 10
# defines the used blocking factor: 0 means same as 'tar' without -b option
# TAR_DAT_BLOCKING_FACTOR      # default 0
# TAR_DTF_BLOCKING_FACTOR      # default 0
# TAR_DTF2_BLOCKING_FACTOR     # default 0
# TAR_DST_BLOCKING_FACTOR      # default 0

```

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```
# TAR_EXABYTE_BLOCKING_FACTOR    # default 0

# defines the total size of a currently loaded tape for a specific tape type
# TAPE_DAT_SIZE                  # default  4000000000 ( 4 GB used for DAT)
# TAPE_DTF_SIZE                  # default  42000000000 ( 42 GB used for DTF)
# TAPE_DTF2_SIZE                 # default 200000000000 (200 GB used for DTF2)
# TAPE_DST_SIZE                  # default 330000000000 (330 GB used for DST)
# TAPE_EXABYTE_SIZE              # default  12000000000 ( 12 GB used for Exabyte)

##### DataVooDoo elements #####
# the above described elements TAPE_DEV_TYPE_<n> must be set to "VOODOO"
# and TAPE_DEV_PATH_<n> must be set to the hippi device path to be able
# to access a DataVooDoo with the Phantom's Mover.
# TAPE_DEV_PATH_<n> can be set to "<hippi-path>:<ulpId>:<iField>"
# the default values are: <ulpId> = 0x80, <iField> = <0x03000001>

# The type of hippi-board for the DataVooDoo
# VOODOO_HIPPI_BOARD    # * "sgi"          : Silicon Graphics HIO/XIO HiPPI
adapters

                        # "essential" : Essential Communications PCI HiPPI
adapter
# DataVoodoo uses this routing information when images
# are sent to the SGI server
# VOODOO_I_FIELD        # default 0

# If the directory from a foreign VooDoo cartridge has to be generated
# either DataVooDoo's TOC is used (default, that is much more faster but
# might be inaccurate) or the whole tape is read.
# VOODOO_USE_TOC_TO_CREATE_DIR          # default "TRUE"

# When reading from DataVooDoo and if the cartridge contains a DFADirectoryFile
# one can use either the Refresh button to read the DFADirectoryFile
# or one can use the "Create Dir" button to use the TOC to generate a directory.
# This case the TOC is only used if the following config element is set to true
# which is the default. This is faster but might be inaccurate.
# VOODOO_USE_TOC_TO_CREATE_DIR_DESPITE_DFA      # default "TRUE"

# Defines if the hippi connection from the SGI to the VooDoo Data
# shall be checked before a write transfer to the VooDoo Data is started.
# This check should not be deactivated if a HiPPI switch is involved.
# VOODOO_CHECK_HIPPI_CONNECTION              # default "TRUE"
```

```
# Reduces the performance when writing to the DataVooDoo.
# VOODOO_WAIT_BEFORE_WRITING          # default 3
#####
# DFA LINK CONFIGURATION SECTION
#
# This section contains values that must be modified if connecting to
# remote Specter / Phantom TransferEngine servers.
#####
# Optional GUI setting. Defines a list of remote Specter / Phantom server
machines,
# that shall by default show up in the 'Remote Browser Dialog' of the GUI Mover
panel.
# The format of DFALINK_SERVERS is a series of hostnames, separated by colons.
# Example: DFALINK_SERVERS    Specter103:Specter115:Phantom
#
# DFALINK_SERVERS          # default ""

# DFALINK_PATH_xxx defines the physical connection to a remote server, where
# xxx is the hostname of the remote machine in capital letters.
# The format of DFALINK_PATH_xxx is a set of tags, separated by colons:
# <connectionType>:<tag1>:<tag2>:...
# <connectionType> is currently limited to TCP. For TCP, only one more tag is
# needed, which is the hostname of the TCP connection. If no hostname is
# specified, the standard Ethernet connection is used.
# Example: DFALINK_PATH_SPECTER103 TCP:hippi-specter103
#
# DFALINK_PATH_xxx

#####
# DISCREET FRAMESTORE
#
# This section contains values that must be modified if connecting the
# Mover to a local Discreet Framestore. This requires a Discreet
# Framestore to be properly installed and configured. It also requires
# the dfa.moverfsd subsystem to be installed. See documentation for
# further details
#####

# switch on the Framestore Device in the Mover by setting this to 1
# NUM_FRAMESTORE_DEVICES          # default:0

# path to access local Framestore. In normal (default Discreet)
```

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```
# configurations this should not need to be changed. Needs to match
# the local Discreet setup
# FRAMESTORE_DEV_1          # default: "/usr/discreet/clip/stonefs"

# enter the total size (all partitions) of the Framestore (in
# Bytes). This will enable the display of remaining space of the
# Framestore in the Mover. Note that the display of remaining space in
# the Mover can only contain valid data, if there is at least one clip
# stored in a partition. I.e. the total size of a completely empty
# framestore cannot be displayed.
# FRAMESTORE_SIZE          # default: "0"

# This boolean switch toggles the usage of the DPX userdata area for
# storage of the 2 LSBs when converting 12Bit Framestore data into 10Bit
# DPX data. This additional data will be used when the same file is
# converted back from 10Bit DPX into 12Bit Framestore format. See user
# documentation for additional information.
# FRAMESTORE_2LSB_IN_DPX_USERDATA # default: TRUE

#####
# HDREEL CONFIGURATION SECTION
#
# This section contains values that must be modified if connecting a
# DVS HDREEL disk array to the Specter.
#####

# specifies the number of HDREEL devices, that are accessible with the Mover
# NUM_HDREEL_DEVICES      # default 0

# User-defined name of the HDREEL device. Solely used for display in the GUI.
# HDREEL_NAME_1          # default ""

##### error reporting and logging #####

# a file into which a log of the performed actions is written
# LOGFILE                # default: /usr/thomson/log/phantom.logfile

##### Thomson DataCine data connections #####
# the default values are marked with an asterisk '*'

# the GSN board (if any)
# GSN_BOARD              # * "(none)"      : no GSN card
```

```

# "xio"      : SGI XIO GSN board
# "pci"      : Genroco/VPI PCI GSN board

# the VIDEO board (if any)
# VIDEO_BOARD # * "(none)" : no video card
# "xthd"      : SGI XIO XT-HDIO board (HDTV)
# "pcihd"     : DVS PCI HDIO board (HDTV)

# the type of hippi-board used (if any)
# HIPPI_BOARD # * "sgi"      : Silicon Graphics HIO/XIO HiPPI
adapters
# "essential" : Essential Communications PCI HiPPI
adapter
# "(none)"   : no HiPPI adapter at all

# which data board to use at startup
# if this setting is not applicable (either the indicated board is not
configured
# or the setting is complete nonsense) the setting will be modified to use the
# *first* board available in the order: (1) xthd, (2) hippi.
# ACTIVE_BOARD # "hippi"    : use configured HiPPI adapter
# "xthd"       : use configured XTHD board
# "pcihd"     : use configured PCIHD board
# "gsn"       : use configured GSN board
# * "(none)"  : use any board configured (xthd if both
available)
# -----
# some settings specifically for the GSN boards
# the special device file name for the hippi-connection
# GSN_PATH      # default: /dev/gsn0

# the hostname or IP address of the GSN data source
# GSN_SOURCE    # default: gsn-spirit

# -----
# some settings specifically for the HiPPI boards (both types)
# the special device file name for the hippi-connection
# in case of essential hippi board HIPPI_PATH should be set to /dev/hippi/h0
# HIPPI_PATH    # default: /dev/hippi0

# the ULP-ID of the HIPPI-connection used
# ULP_ID        # default: 0x80

```

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```
# -----
# some settings specifically for the PCI HDTV board
# PCIHD_DEVICE_NAME      # * "PCI,card=0"

# -----
# some settings specifically for the XIO HDTV board
# XTHD_VLPATH            # default: "TIME 10 CS 2 FORM 7 PACK 64 XTIP 1"
                        # you can add several key-value pairs to the string.
                        # The appropriate values can be taken from the file
                        # </usr/include/dmedia/vl.h> or the TransferEngine
manual
                        # supported keys:
                        # TIME : VL_TIMING
                        # CS   : VL_COLORSPACE
                        # FORM : VL_FORMAT
                        # PACK : VL_PACKING
                        # XTIP : VL_XTHD_INTERFACE_PRECISION

# -----
# some settings specifically for the HDTV board

# the source for the HDTV timecode to be assigned to recorded images
# TC_SOURCE              # "internal" : generate TC internally, starting at
TC_STARTVAL
                        # * "external" : read LTC from analog audio input

# LTC_OFFSET modifies the matching of LTC (external analog audio
# timecode, see above) values to images. Setting LTC_OFFSET to "1"
# will have the effect that image #100 will be associated with a
# timecode value that would otherwise (LTC_OFFSET="0") have been
# assigned to image #101. Note that this setting only has effect when
# transferring HDTV with TC_SOURCE set to "external"
# LTC_OFFSET            # integer value, default: "0"

# the timecode value to be assigned to the first recorded image in <internal>
TC_SOURCE.
# this setting is completely ignored in <external> TC_SOURCE mode.
# TC_STARTVAL          " default: "01:00:00:00"

# the timecode base for generated or received timecode.
# NOTE: the Thomson-DFA LTC-signal encodes the timecode base in the
# userbits. If Phantom detects this type of LTC userbit encoding
# the appropriate setting for the timecode-base takes precedence over
```

```
# the setting specified here
# TC_BASE          # * 0: auto-sense (set according to video standard)
#                  # 24: count 00 ... 23 frames per second
#                  # 25: count 00 ... 24 frames per second
#                  # 30: count 00 ... 29 frames per second

##### remote control #####

# socket port to establish remote control TCP/IP connection
# SOCKET_PORT      # default: 4812

# switch to remote=on at startup ( '0' -or- '1' )
# START_REMOTE     # default: 1

##### System tuning #####
# Please read the documentation about TransferEngine's Tuning
# parameters before modifying these values

# number of buffers
# BUF_NUM          # default: 8

# size of each buffer
# BUF_SIZE         # default: 0x1000000 (16 MB)

##### general appearance #####
# these gammamaps influence the monitor gamma during and after runtime
# supported entries for both elements are:
# "NONE"
# "Gamma 1.0"
# "Gamma 1.7"
# "Kodak DXR"
#
# Gammamap          # default: "NONE" (defines monitor gamma during runtime)
# Gammamap_DEF     # default: "NONE" (defines monitor gamma after prog.
termination)

# end of file config
```


APPENDIX C. KEYBOARD SHORTCUTS

The following keyboard shortcuts are defined for use in the Phantom. The shortcuts can be used in addition to the normal mouse usage and aid in using the Phantom more effectively.

Device Browser

Key	Description / Action
Home	Moves the view of the list to the top. Top entry becomes selected.
End	Moves the view of the list to the bottom. Bottom entry becomes selected.
Cursor Up	Moves selection up one position. Selection is moved, not the entry itself.
Cursor Down	Moves selection down one position. Selection is moved, not the entry itself
Page Up	Moves the view of the list up one page. Selection is not altered.
Page Down	Moves the view of the list down one page. Selection is not altered.
Delete	Delete selected entries. Same action as Delete button.

Transfer List

Key	Description / Action
Home	Moves the view of the list to the top. Top entry becomes selected.
End	Moves the view of the list to the bottom. Bottom entry becomes selected.
Cursor Up	Moves selection up one position. Selection is moved, not the entry itself.
Cursor Down	Moves selection down one position. Selection is moved, not the entry itself.
Page Up	Moves the view of the list up one page. Selection is not altered.
Page Down	Moves the view of the list down one page. Selection is not altered.
Delete	Delete selected entries. Same action as Delete button.
Ctrl P	Print Transfer List. Same action as Print button.

Application

Key

Description / Action

Alt F1

Raise window.

Alt F3

Lower window.

Alt F9

Iconify window.