

QuVIS, Inc.

Digital Image Technologies

User's Guide to QuBit™

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<ftp://support.quvis.com/pub/>

Or, use the links on our primary web page to locate and download updates:

<http://www.quvis.com>

Thank you for purchasing this digital motion-image recorder. Before using it, read and follow all instructions carefully to take full advantage of the recorder's capabilities.

SAFETY PRECAUTIONS

IMPORTANT INFORMATION

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION:
To reduce the risk of electric shock, do not remove cover. Refer servicing to qualified service personnel.

CAUTION:
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's instructions.

This recorder is equipped with a 3-blade grounding-type plug to satisfy FCC rules. If you are unable to insert the plug into the outlet, contact your electrician.

FCC INFORMATION (USA ONLY)
CAUTION: Changes or modification not approved by QUVIS, INC., could void the user's authority to operate the equipment.
NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IMPORTANT SAFEGUARDS

Read and understand all instructions, including these "Important Safeguards," before using this product. Retain all safety and operating instructions for future reference.

This unit has been engineered and manufactured to assure your personal safety. Improper use can result in potential electrical shock or fire hazard. In order not to defeat the safeguards incorporated into this product, observe the following basic rules for its installation, use and service.

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

Do not use attachments not recommended by the manufacturer as they may be hazardous.

Do not use this product near water. Do not use immediately after moving from a low temperature to a high temperature as this causes condensation which may result in fire, electric shock, or other hazards.

Slots and openings in the cabinet are provided for ventilation. These ensure reliable operation of the product and prevent it from overheating. Do not block or cover these openings.

This product is equipped with a three-wire plug. This plug will fit only into a grounded power outlet. If you are unable to insert the plug into the outlet, contact your electrician to install the proper outlet. Do not defeat the safety purpose of the grounded plug.

To prevent shock, this product should be operated only with the type of power source indicated on the label.

Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords at doors, plugs, receptacles, and the point where they exit from the product.

Do not overload wall outlets, extension cords, or convenience receptacles on other equipment as this can result in a risk of fire or electric shock.

SAVE THESE INSTRUCTIONS

IMPORTANT SAFEGUARDS (Cont.)

For added protection of this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the product due to lightning and power surges.

Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltages and other hazards. Refer all service to qualified service personnel.

Unplug this product from the wall outlet and refer service to qualified personnel under the following conditions:

- a) When the power supply cord or plug is damaged.
- b) If liquid has been spilled, or objects have fallen on the product.
- c) If the product has been exposed to rain or water.
- d) If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the User's Guide or Operating Manual, as an improper adjustment of controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
- e) If the product has been dropped or damaged in any way.
- f) When the product exhibits a distinct change in performance--this indicates a need for service.

The product should be placed more than one (1) foot away from heat sources such as radiators, heat registers, stoves, and other products (including amplifiers) that produce heat.

When connecting other products such as computer equipment, you should turn off the power of this product for protection against electric shock.

SAVE THESE INSTRUCTIONS

EQUIPMENT LOCATION

PHYSICAL LOCATION

QuBit should be mounted upright on a desk, table, or in an equipment rack using the optional rack mount kit.

- When locating QuBit on a desk or table, do not place it on either of its sides, or upside down. Ensure that the table or desk is capable of supporting QuBit's weight (55 lb.) plus the weight of any additional equipment that is located with it. The QuBit case is not designed to support any external loads; do not place any equipment on top of QuBit.
- When mounting QuBit into a rack, be sure that the rack is capable of supporting QuBit's weight (55 lb.) plus any additional equipment that is placed in or on the rack. Placement of QuBit in the rack should be such that the rack's mechanical operation (loading and unloading) does not cause the rack or QuBit to fall. The QuBit case is not designed to support any external loads on top of it; therefore, do not place any equipment directly atop QuBit in a rack mount location. Do not use side-mount rails as they block air-flow; mount QuBit on a rack shelf instead.

AMBIENT TEMPERATURE AND AIR FLOW

The manufacturer's rated operating ambient temperature range for QuBit, assuming an unimpeded airflow of four to eight meters/sec provided by the internal cooling fans, is 15 °C to 45 °C.

- When placing QuBit on a table or desk, enough spacing on either side of the unit must exist to ensure that the airflow requirements listed above are met.
- When mounting the QuBit in a rack, ensure that the temperature inside the rack does not exceed the recommended operating range, and that enough airflow exists to meet the requirements specified above.

Failure to provide for adequate airflow into and out of the QuBit, or operating the QuBit outside the recommended ambient temperature range, will cause a degradation of performance.

PROPER GROUNDING

Before connecting QuBit to an AC power source be sure that proper earth ground is available for connection to QuBit through its AC power cord. Be sure to use only the AC power cord supplied with the QuBit or the manufacturer's recommended equivalent. Do not use an adapter for converting a 3 prong AC plug to a 2 prong AC plug.

- When mounting the QuBit in a rack, ensure that the rack is at earth ground before applying AC power to the QuBit. Failure to ensure a proper earth ground for the QuBit may create a shock hazard.

AC POWER

Proper operation of the QuBit requires that its AC power source is capable of supplying the AC input requirements of the QuBit. AC input requirements are listed on a label on the back of the unit next to the power entry receptacle. Failure to ensure an uninterrupted source of AC power with the necessary capacity may cause a degradation of performance.

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Introduction

Congratulations on your purchase of QuBit, the most advanced digital motion-image recorder on Earth.

QuBit is a digital motion image recorder rather than a video tape recorder or a digital disk recorder because it is far more flexible and powerful than either of those devices alone. QuBit is designed to complement and enhance all forms of image recording in a variety of industries:

- ❖ Broadcast and cable production
- ❖ Commercial insertion
- ❖ Computer graphics for television and film
- ❖ Video recording, nonlinear editing, and post-production
- ❖ Film-to-video transfer (telecine), film editing and post-production
- ❖ Medical imaging
- ❖ Distance learning
- ❖ Scientific imaging
- ❖ Security (national, corporate)

What is Motion Imagery?

Motion imagery is a phrase used to describe a sequence of still frames such as those you find on a filmstrip. Since QuBit is capable of handling video, film, scanner, computer and other forms of image input, we describe it as a digital motion-image recorder. Of course, it will accept individual still frames of any size as well as various forms of sequential images that make up motion imagery.

How QuBit Handles Motion Imagery

As a bridge between film, video, computers, and other devices QuBit processes a great deal of digital data. QuBit employs a proprietary image encoding format that allows it to treat recorded data as both a playable clip (in the manner of a video recorder) and a sequential series of still images (in the manner of a computer workstation) at the same time. This duality allows QuBit to manipulate the data any way you desire. You can play/sequence/edit clips or instead load them directly to a 2D paint or 3D animation system for rotoscoping and single-frame animation.

Keep in mind also that a clip may contain images of any size, from a small frame size like the small window-sized CIF/SIF Internet standards to the larger high-definition standard (HD 1080i). At frame rates below 30 frames/second, QuBit can capture image sizes larger than HD. You are not limited to a fixed frame size or aspect ratio when you have QuBit.

QuBit is highly configurable, and can be set to record the appropriate type of signal for any number of applications. In addition, QuBit connects to far more types of equipment than most recorders, including a wide array of professional video equipment (from serial digital to composite video), computer systems (from RS-232 to Ethernet 10- and 100-base-T), and control mechanisms (including Mouse, Keyboard, and RS-232/422 ports).

Scope of the User's Guide

The central section of the QuBit User Guide focuses on three primary areas: *installation* and *operation*, as well as more detailed *technical* information.

Installation

The Installation section directs you in setting up QuBit in your facility. Although you may be familiar with connecting new equipment, there is more to QuBit than just hooking up the hardware. Even if you skip the general hookup instructions, review the following sections to ensure that QuBit is configured properly for your facility.

- ❖ If you have an Ethernet network, you must assign QuBit an IP address according to your network's addressing scheme. Turn to "Setting Up Ethernet" (page 7).
- ❖ After the physical installation, you must configure QuBit to accept audio, video and control signals from the proper inputs. Turn to "Configuring QuBit for Operation" (page 10).

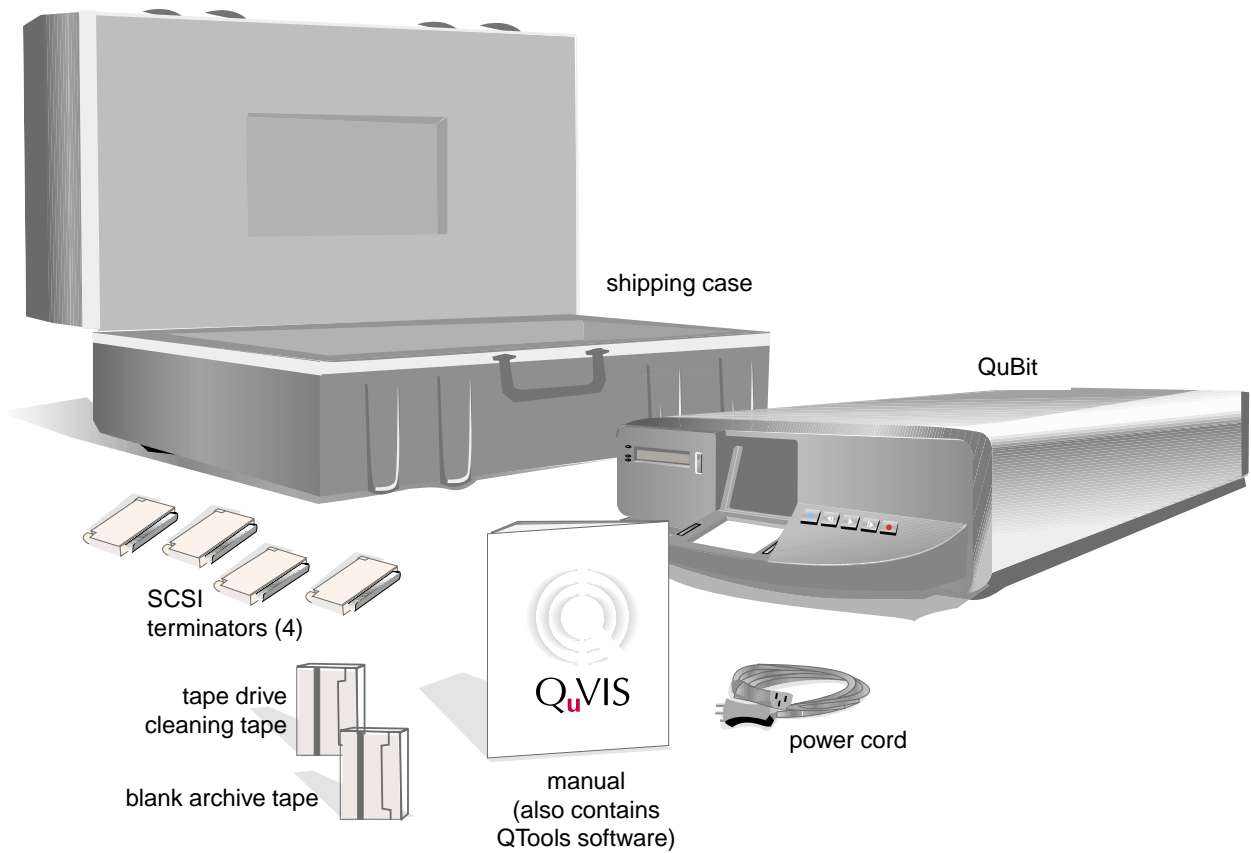
Operations

The Operations section follows a task-oriented workflow. Use this section when you have questions such as "How do I record a clip?" or "How do I back up clips to the tape drive?" These tasks are written in an unassuming style so that even novice users should feel comfortable operating QuBit.

Appendices (Technical)

The Appendices contain detailed information about technical aspects of QuBit. Use this section when you want to know about different image formats or "What are the pinouts for QuBit's digital audio connector?"

Installation



Preparing to Install QuBit

Verify the Hardware

Double-check the Parts List

Please take a moment to confirm that you have received all of the items shown on the previous page. If any item is missing or damaged, contact QuVIS before proceeding.

Useful Accessories (Optional)

QuBit has a built-in touchpad with selection buttons for GUI navigation and QuBit operations. QuVIS has found it useful to connect a mouse and keyboard to QuBit to make these tasks faster and simpler. You may wish to use them also. If so, connect these items to the underside of the front bezel (below the sloping shelf that supports the VTR transport buttons) prior to turning QuBit on.

When QuBit is powered on any PS/2-style mouse, keyboard or touchpad that is connected to the front panel PS/2 ports will be autodetected. There is no need to issue a software command or activate any software or hardware switch to enable the usage of these devices, as long as they are in place prior to power-up.

You can still perform all navigation and text input from the GUI. The mouse and keyboard are simply a convenience.

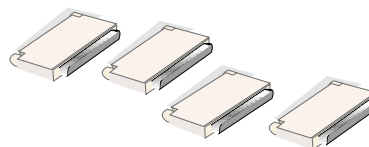
Important!

Unless you have installed a QuBit before, please take the time to read through each step thoroughly before actually hooking up QuBit. This can help avoid errors or oversights that will prevent proper setup and operation.

Step 1

SCSI Termination: *Internal Exabyte Tape Drive*

Note: If you have an external tape drive, proceed to the next column for instructions on installing it. Otherwise, if you have an internal tape drive, follow the steps below.



SCSI terminators (4)

Attach the Four SCSI Terminators

You should have received four SCSI terminators with QuBit: attach these to the SCSI connections on the rear panel by pushing them on and tightening the screw gently.

If you do not find terminator plugs enclosed, STOP: contact QuVIS for a replacement set before installing and operating QuBit. SCSI drives that are not terminated can quickly become corrupted and cause you to lose recorded data.

Next...

Proceed to Step 2: Hooking Up Power.

SCSI Termination: *External Exabyte Tape Drive*

Verify the Exabyte Drive's SCSI ID Number

On the back of a Exabyte drive you will find a small switch that lets you choose a unique SCSI ID number for the drive. Set this switch value to 8. (This is the same ID number used when the drive is mounted internally.)

Attach the SCSI Cable

The Exabyte drive requires a SCSI cable to QuBit. The connectors on each end of the SCSI cable are the same. Hook up one end to the Exabyte drive and the other end to QuBit, to the connector labeled SCSI 1 (this is the same SCSI connection used when the drive is mounted internally).

Attach the SCSI Terminators

You should have received four SCSI terminators with QuBit. Attach three of these to the unused SCSI connections on QuBit's rear panel by pushing them on and tightening the screw gently. Attach the fourth connector to the remaining unused SCSI connection on the back of the Exabyte external tape drive. This terminates the SCSI signal at the drive.

If you do not find terminator plugs enclosed, STOP: contact QuVIS for a replacement set before installing and operating QuBit. SCSI drives that are not terminated can quickly become corrupted and cause you to lose recorded data.

Next...

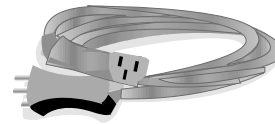
Proceed to Step 2: Hooking Up Power.

Step 2

Hooking up Power

AC Power

QuBit requires either 110-120VAC 60Hz on a 15-amp circuit, or 220-240VAC on a 10-amp circuit. QuBit's power supply is auto-switching, so do *not* change the power setting tab on the power module on the rear of QuBit.



power cord

Simply use the correct type of AC power cord for your country, and plug the power cord into QuBit and the other end into an AC power outlet.

Next...

Step 3: How do you plan to run QuBit?

Step 3

How do you plan to run QuBit?

The remaining installation steps are optional, and they are determined by you based on your answer to the question: *How you plan to control QuBit?* Of the steps listed below, follow only those necessary to set up QuBit for your facility. Skip the steps that do not apply to you.

Before You Continue...

At This Point, You May “Skip” Certain Steps

Depending how you plan to operate and control QuBit, you may not need to follow every installation step. Based on this criteria, use the table below to determine which steps you should follow. The table will appear on the next few pages as a reminder.

Step 4

Setting Up an Edit/Show Controller

Connect an RS-232 Null Modem Cable

To connect an edit or show controller device that uses RS-232 communications you will need an RS-232 null modem cable, and you may need to perform some “machine customization” with regard to how QuBit starts up. First, turn off the equipment involved and hook up the cable.

For either controller you may need to edit a QuBit file called `custom.bat` which governs how the serial ports communicate with external equipment. Serial Port A is by default “occupied” when the LCD GUI is active. You can edit this startup file to either open a controllable shell on Serial Port B, or disallow the GUI from starting (leaving Port A available).

A video edit controller requires specific setup commands, as described in Appendix N. Turn to this reference for operating instructions.

The choice is up to you. The benefit of opening a second port is that you can control QuBit both remotely and by the GUI. The benefit of disallowing the GUI from running is security—the front panel remains blank and QuBit cannot be operated from it. Your needs will determine how to proceed. See your show controller’s documentation on how to create show scripts for control.

Next...

If this is the only form of control you need for QuBit, skip to Step 7: Connecting Video. Otherwise, glance at the table below and choose your next step.

Installation Table *(remember, follow only those steps you need)*

Front Panel Operation	Steps 7 and 8	Serial/Terminal	Steps 5, 7 and 8	All Steps 4, 5, 6, 7, 8
Edit/Show Control	Steps 4, 7 and 8	Telnet/Ethernet	Steps 6, 7 and 8	

Step 5

Setting Up a Terminal Connection

Attaching Serial Communications

QuBit's RS-232 serial connections allow you to control QuBit from a computer, an edit or show controller, or another device. For RS-232 devices, you need an "RS-232 null modem" serial cable.

Note: RS-232 and RS-422 serial connections are not used to transfer data between QuBit and your computer or network; they are used for remote control of QuBit only. (An Ethernet connection is used for data transfer, along with an FTP program or QTools.)

Turn off both the controller and QuBit. Connect one end of the 9-pin null modem cable to QuBit's serial port A and the other to your computer or edit control device. Then turn power back on for both systems.

Verifying the Serial Connection

At this point, open a terminal program. Open a connection with QuBit using these settings:

Bits per second:	38400
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	Xon/Xoff

Step 5 continues on the next page

Step 5 (continued)

If the cabling and settings are correct, you should see a message like this:

Type <CTRL-D> to exit GUI

If you do not see this or a similar message, check your cabling and settings and try again.

This message means that you have successfully started up QuBit and that your terminal is receiving communications from it. (The message itself refers to the fact that the QuBit's LCD GUI has been loaded; you cannot interact with QuBit via the shell until you "turn off the GUI" by holding CTRL and pressing D on your keyboard. After a shell session, if you wish to restore the GUI, type GUI and press Enter.)

When you press CTRL-D you should now see something like:

QuBit:>

The prompt indicates that QuBit is ready to accept commands. The prompt label may be different, and can be changed to suit your preferences (see Appendix H "Shell Commands").

Next...

If this is the only form of control you need for QuBit, skip to Step 7: Connecting Video.

Otherwise, consult the installation table at the top of the page to choose your next step.

Installation Table (remember, follow only those steps you need)

Front Panel Operation	Steps 7 and 8	Serial/Terminal	Steps 5, 7 and 8	All Steps 4, 5, 6, 7, 8
Edit/Show Control	Steps 4, 7 and 8	Telnet/Ethernet	Steps 6, 7 and 8	

Step 6

Setting Up Ethernet

Warning!

QuBit's factory IP Address may conflict with the IP Address of another device in your network! *Before you connect QuBit to your network*, follow the steps below to set the proper address for your network installation.

Setting QuBit's IP Address

Turn QuBit on and allow the system to startup. Once the GUI shows ready, press the left or right navigation buttons beside the touchpad to access the screen titled Setup.

The specific controls for Ethernet settings were not complete as of this writing; however, if you view the GUI Setup screen you will see the controls you need to use. You may need to enter up to three different sets of numbers here so that QuBit and your network can communicate.

IP Address is an internet protocol address. This number is required. **Subnet Mask** and **Default Gateway** may or may not be needed for your installation (consult your network administrator to find out if you need to enter values for these settings).

Once all values are correct, click OK and restart QuBit. The new values will be used from this point onward.

Note: Restart QuBit after changing the IP Address for the new number to become active.

Attaching an Ethernet Connection

Ethernet TCP/IP protocol is used to transfer data of any form (files, images, audio and more) between QuBit and your computer. You use either the QTools software or an FTP client program to transfer data between a computer and QuBit. (Search for FTP programs on the Internet at www.tucows.com, www.winfiles.com, or try WS-FTP at www.ws-ftp.com.)

Connect one end of an Ethernet cable to your computer. Connect the other end to QuBit's Ethernet connection. The cable has the same connector at each end, so it does not matter which end is which.

On the rear of QuBit, when both units are connected, you should see either the 10-base or the 100-base lamp illuminate, depending on the type of network you use. You may also see the yellow ACT (activity) lamp and/or the red COL (collision) lamp illuminate. This is normal for Ethernet networks.

Testing the Ethernet Connection

To test the Ethernet connection and QuBit's presence on your network, you can either ping QuBit's IP Address (described in the next column) or use an FTP program and try to connect to QuBit.

As long as either method works, QuBit is functioning properly.

Installation Table (remember, follow only those steps you need)

Front Panel Operation	Steps 7 and 8	Serial/Terminal	Steps 5, 7 and 8	All Steps 4, 5, 6, 7, 8
Edit/Show Control	Steps 4, 7 and 8	Telnet/Ethernet	Steps 6, 7 and 8	

To check QuBit's presence via a Shell

Open a shell from within your computer and type the following (using your QuBit's IP address in place of the example one given):

```
ping 192.168.1.50
```

If QuBit is online you will see a response like this one that indicates a reply was received:

```
Pinging 192.168.1.50 with 32 bytes of data:
Reply from 192.168.1.50: bytes=32 time=150ms TTL=253
Reply from 192.168.1.50: bytes=32 time=161ms TTL=253
Reply from 192.168.1.50: bytes=32 time=131ms TTL=253
Reply from 192.168.1.50: bytes=32 time=176ms TTL=253
Ping statistics for 192.168.1.50:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)
Approximate round trip times in milli-seconds:
Minimum = 131ms, Maximum = 176ms, Average = 154ms
```

If for any reason QuBit is not online you should see an error message indicating that the ping attempt "timed out" or was otherwise unsuccessful. You will want to verify the IP address, the physical cable connection, and the command line you typed to ensure there are no errors.

Next...

Step 7: Connecting Video.

Step 7

Connecting Video

Attaching video

Depending on your QuBit configuration, QuBit may support a variety of analog and digital I/O signals.

- ❖ To connect to equipment utilizing a single serial digital data signal, connect your cable to the BNC jack labeled SD1 on the back of QuBit.
- ❖ To connect to equipment that accepts video signals via a parallel connection, connect your cable to the Parallel connector on the rear of QuBit. See the note below for details on making a parallel adapter cable.

***Note:** If you choose to use the parallel input or output, you will need to use a custom interface. See the Appendix "QuBit Parallel Connection Pinouts" for information on making or obtaining the proper parallel cable for use with QuBit and your equipment.*

Next...

Step 8: Connecting Audio.

Installation Table (remember, follow only those steps you need)

Front Panel Operation	Steps 7 and 8	Serial/Terminal	Steps 5 , 7 and 8	All Steps 4 , 5 , 6 , 7 , 8
Edit/Show Control	Steps 4 , 7 and 8	Telnet/Ethernet	Steps 6 , 7 and 8	

Step 8

Connecting Audio

Attaching audio

QuBit audio support includes 2-channel analog or up to 8-channel digital. As of this writing, audio is sampled at 44.1 or 48 KHz, with 16-, 18-, 20-, or 24-bit resolution. Make your choice from the GUI.

For analog audio, connect your XLR audio cables to the proper input and output jacks on the rear panel of QuBit.

For digital audio, connect your audio input and output cables to the proper jacks to your custom or third-party breakout cable/breakout box (see note below).

***Note:** For digital audio input or output, you will need an interface cable to connect to QuBit's digital audio connector. See the Appendix "QuBit Digital Audio Connector Pinouts" for information on making or obtaining the proper parallel cable for use with QuBit and your equipment.*

Analog audio configurations:

- ❖ 2-channel analog
- ❖ 2-channel analog and 2-channel digital (total 4 channels)
- ❖ 2-channel analog and 4-channel digital (total 6 channels)
- ❖ 2-channel analog and 6-channel digital (total 8 channels, see note next column)

Digital audio configurations:

- ❖ 2-channel digital
- ❖ 4-channel digital (total 4 channels)
- ❖ 6-channel digital (total 6 channels)
- ❖ 8-channel digital (total 8 channels, see note below)

***Note:** The 2 analog channels serve as the first 2 channels of any 8-channel configuration. You cannot use 2 analog channels **and** 8 digital channels (10 simultaneous channels is not possible.)*

First-Time Startup

Switching on Power

Once you've completed the physical installation of QuBit, it's time to power up and configure the software for use. QuBit displays its startup progress on the main LCD screen.

***Note:** You may monitor QuBit's startup progress in greater detail. Do so by connecting either a terminal or a computer via the RS-232 serial port connection (see steps 5, 6, 7, 8 of the installation). This can be useful for troubleshooting, or if you already plan to use a serial connection, but is **not** necessary for normal operation. For more, see Appendix O "QuBit Startup & Diagnostics."*

Depending on the hardware configuration of your QuBit, startup may take several minutes. When you see the QuVIS logo showing on QuBit's front panel LCD screen, QuBit is ready for use.

Diagnostics and Troubleshooting

If you should see an error message on either the LCD or the serial output, turn to the Appendix "Troubleshooting QuBit's Startup" for possible solutions.

Configuring QuBit for Operation

Once QuBit is running, touch the touchpad to display the Setup screen. QuBit is configured at the factory with the following settings (these may differ slightly in the shipping product):

Genlock	Internal
Video Input	Parallel
Image Size	720 x 486 (+ vert. int)
Image Quality	51 dB
Audio Input	Analog
Audio Quality	16 bit resolution, 48 KHz sampling

The factory settings will not apply to every installation. You will want to step through the menu system and choose the proper settings for your installation.

To Configure QuBit for Your Installation

Follow the numbered steps that follow to configure QuBit for your facility. First, you may wish to review the tip below on navigating the LCD graphical user interface (GUI).

On-Screen Navigation Tips

- ❖ Navigate the LCD screen using the touchpad and the three buttons near it (left, front center, and right).
 - ❖ Use the buttons to the sides of the touchpad to navigate left or right through the top-level menus (or, up and down, when lengthy file listings are showing on screen).
 - ❖ To move the pointer on the LCD screen, drag a fingertip on the surface of the touchpad.
 - ❖ Tap the center button to select buttons on the screen.
-

1 From the front panel, click the right touchpad button to navigate through the top-level menu system. At each screen, take a moment and study the name of each button and the setting (or value) for each button.

Note: You can navigate the top-level menus in either direction because the screens “loop around” back to the beginning.

2 When you see a setting that does not match your installation, move the pointer to that item and click the center touchpad button once. Depending on the type of button you select, you will be able to change its current setting (examples of data types follow) :

Example A:

Selecting an Option from a List (Radio Buttons)

Navigate to the Video Menu. Notice the Input Source button has a right-pointing arrow (it lights up when you place the pointer over the button). This indicates that there are several possible input choices for the button. Like old-fashioned car radio buttons, only one may be selected at a time.

Click on the Input Source button to see the choices. Notice the indicator light on the button beside one choice, indicating that it is the currently selected input to monitor for recording.

Choose any source to make it active and return to the top level Video menu.

Example B:

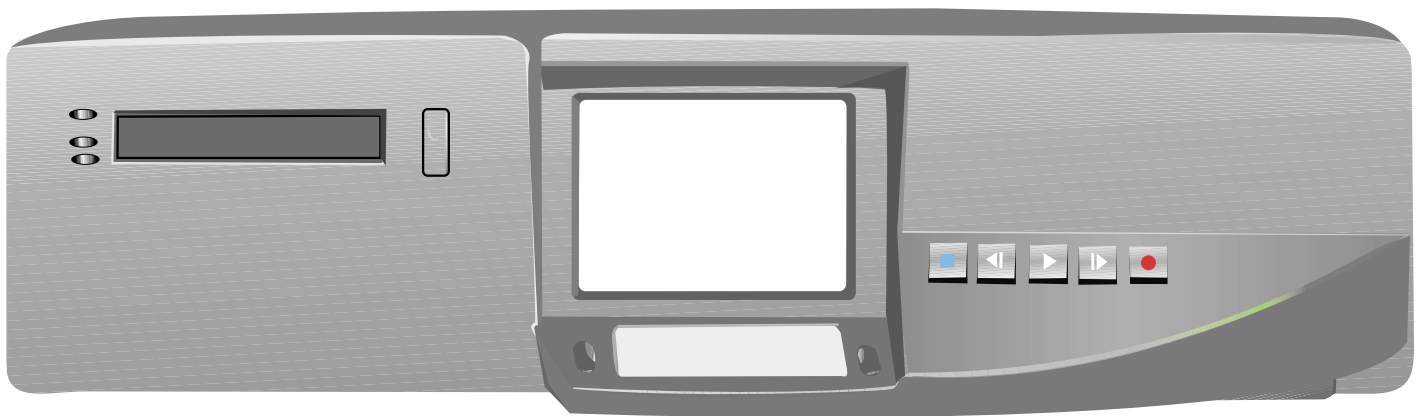
Adjusting a Setting by Dragging.

Navigate to the Audio Menu. Notice the Audio Attenuation button has an arrow that points both up and down (it lights up when you place the pointer over the button).

Click on the Audio Attenuation button and drag up or down on the touchpad. This is a “button slider” that allows you to set the attenuation value for the incoming audio signal on the analog audio channels. Click again to leave it set at the current value (or the value you set it to).

3 Continue the review process for every top level menu and adjust any settings that need to match your installation. Some sub-menus have an exit button to return to the top level.

Operations



Operations

The Operations portion of the User's Guide to QuBit guides you through specific tasks, from frequent duties such as playing clips to less-frequent ones such as configuration and setup.

Operations may be performed *locally* from the front panel LCD or *remotely* from a computer connected via a serial or Ethernet connection.

Controlling QuBit

Once you have QuBit connected, powered, and configured, you are ready to go!

QuBit's versatility shows in the number of choices you have for controlling it. There eight different interface/command program choices available to you, described below (some of them use the same physical cable connection, but perform different functions): **Standard GUI** for front panel control. **CineGUI** for digital cinema (playback only). **Telnet shell** for remote network control. **Serial shell** for terminal control and startup options. **QTools** for frame extraction and clip creation. **FTP** for transferring data such as scripts, clips, audio and updated software. **RS 422/232** for edit control. **GPI** "triggers" that automate synchronous playback/record tasks.

Your options are determined by the physical connection to QuBit: you may operate QuBit locally from the front panel or remotely via a serial connection, an Ethernet connection, or an edit controller.

Each control form differs from the others in the commands and options available to it. Further, some of these tools may "overlap" one another in functionality.

- ❖ For general control, like recording and playing clips, you may use the front panel, a serial connection, a telnet Ethernet connection, or an edit controller.
- ❖ For the transfer of data (such as imagery) from a computer to and from QuBit, you can use the Windows-based Qtools software (provided) via Ethernet or, if you do not have a Windows-based system, you can use an FTP program via Ethernet.

Choose the means by which you intend to control QuBit, and turn to that section for details on how to operate QuBit.

	Recording	Playback	Create Clips from Stills	Extract Stills from Clips	Backup/Restore	Add'l Commands
Standard GUI	yes	yes	no	no	no	yes
CineGUI	no	yes	no	no	no	no
Shell (telnet or serial)	yes	yes	no	no	yes	yes
QTools/FTP Ethernet	no	no	yes	yes	no	no
RS-422 Controller	yes	yes	no	no	no	yes
GPI Triggers	yes (scripted)	yes (scripted)	no	no	no	yes (scripted)

Playing Clips: An Overview

The most important aspect of *playback* you should know is that when you play clips of different formats *from the front panel*, QuBit will reconfigure itself for each type of clip so that it can play them properly. As long as your monitor supports the selected format, you'll see the playback.

If you play clips *via the command line shell*, you will need to issue a series of commands that set QuBit up for the proper format and the proper function before the clips can be played. Shell operations require these additional steps.

The reason for this is that QuBit supports a vast combination of image format choices. We've automated many functions where it made sense, and allowed for greater user-control where it too made sense. Shell users are typically "power users" who desire more control over a product. The QuBit OS allows for this.

To understand what's going on behind-the-scenes, you should know about two *modes* that affect QuBit operation: **image format** and **operating state**. They determine what type of imagery QuBit is set for (height by width, and the frame rate), and whether QuBit is ready to play or to record in that format.

When a GUI user presses the play button, this is like the shell user directing QuBit to set up for "playback mode." The clip that the GUI user selects prior to pressing **PLAY** equates to the shell user performing two steps: setting the proper image format, and then telling QuBit to "play this clip."

And so to Summarize

If you use a command line shell to control QuBit, you need to "set up" the image format and operating mode prior to either recording or playback (i.e., for both operations). The commands for playback are shown in the next few pages. The gist of the steps is this sequence: From the shell, enter the command to set the correct image size, enter the command to setup the "playback" state, and then issue the playclip command.

Notes: As long as you work with clips in one format, you can go from playback to record without having to re-issue the format command. You only need to change the image format mode when you go to use a clip of a different format.

Also, Shell users can use: show mode to verify the current image size; and vmode to verify the rec/play status. Finally, if you do not know the settings needed for a specific clip, use the command stat clipname to find out. These commands may be entered at any time.

To play a clip from the GUI, you select it from the screen and press the **PLAY** button. QuBit will change to the clip's format and play the clip.

Playing a Clip

From the front panel of QuBit, you can select and play clips with ease. From a remote shell you can play clips or play lists. Here are the instructions for both methods.



Front Panel

- 1 Press the **PLAY** button. QuBit displays the File and Clip Manager.
- 2 Navigate to the clip you wish to play and select it.
- 3 Press the **PLAY** button. Press **STOP** to interrupt playback.

During Clip Playback...

If you choose to play more than one clip, you can navigate between the selected clips from the front-panel transport buttons.

During Playback You Can...

pause (freeze current frame)
 stop all playback
 scan forward through a clip
 scan in reverse through a clip

When You...

press play
 press stop
 hold FWD
 hold REW

While Paused You Can...

toggle play and pause
 step fwd 1 frame at a time
 step back 1 frame at a time

When You...

press play
 tap FWD
 tap REW



Serial/Telnet Shell

- 1 Set the proper image mode (examples below).
 D-1 NTSC type ntsc , press Enter
 D-1 PAL type pal , press Enter
 HD 960 x 1080i type hhd , press Enter
 HD 1920 x 1080i type hd , press Enter
- 2 Prepare QuBit for playback mode by typing:
 vmode p
- 3 Example: to play a clip named myclip from within the clips directory, type:
 playclip myclip
- 4 To stop playback, press the **STOP** button on the QuBit or type:
 stopclip

Note: Here's a partial list of playback options you can include at the end of the command line. See the appendices for complete descriptions.

loop - play repeatedly until **CTRL-C**

speed x/x - play at the designated speed (examples: 1/2 = half-speed, 2/1 = 2x speed)

shuttle - activate shuttle mode; once activated, use shuttle x/x to set shuttle speeds (same as **speed**)

noaudio - play without audio

ltc|sys <hh:mm:ss:ff> - play from specified time code value

hold - at the end, pause at the final frame

Playing a Play List

QuBit utilizes two kinds of playlists – those created “on the fly” when you select a set of clips via the GUI, and those that are run from a text file. Text file playlists are lists that name commands and clip names. The difference is that you can “stack up” commands and clips one after another so they run in an automatic sequence.

Although you cannot create nor edit batch text files from the GUI, you can run them from the front panel. You can even select and run multiple playlists. A playlist can even refer to another playlist so that you can nest different lists into one master list. Playlists are useful for standalone kiosks, public displays, and presentations.



Front Panel

- 1 Press the **PLAY** button. QuBit displays the File and Clip Manager menu.
- 2 Navigate to the batch file play list you wish to play and select it.
Note: You may select any combination of clips and play lists to play from the GUI.
- 3 Click on the “Queue” button.

During Playback You Can...

stop all playback
 scan in reverse through a clip
 skip to the next clip
 skip to the previous clip

When You...

press stop
 hold REW
 tap FWD
 tap REW



Serial/Telnet Shell

- 1 Set the proper image mode (examples below).
 D-1 NTSC type ntsc , press Enter
 D-1 PAL type pal , press Enter
 HD 960 x 1080i type hhd , press Enter
 HD 1920 x 1080i type hd , press Enter
- 2 Set the proper operating mode by typing:
 vmode p , press Enter
- 3 Example: To run a batchfile called playnow.bat, type:
 playlist playnow.bat , press Enter

To stop the list playback, press **CTRL-C**.

To stop after the current clip, press **CTRL-D**.

Note: See How to Create a Play List in the appendices for information on creating play lists, transferring them to QuBit, and running them.

Note: There are no play list commands to set video playback modes, so at this time you must enter these commands manually prior to running a play list.

Playing Multiple Clips

Play a group of clips by selecting them in the order you want them to play. Or, locate an existing playlist and “play” it just like a clip. From a remote shell you can run pre-made playlists (batch text files). Stop a playlist by pressing **CTRL-C**.



Front Panel



Serial/Telnet Shell

NOTE: AS OF 5.12.2000 MULTI-CLIP OPERATION FROM THE LCD GUI IS PENDING.

1 Press the **PLAY** button. QuBit displays the File and Clip Manager.

2 Navigate to the proper directory and select clips in the desired playback order.

If you click on one you do not wish to include in the playlist, click again to deselect it.

Note: All clips must reside within the same directory. If you exit the current directory, the selected file list will be cleared.

3 Press the **PLAY** button (or click on the title button of the File and Clip Manager screen to toggle playback).

To stop playback, press **STOP** (or click on the title button of the File and Clip Manager screen to toggle off playback).

Note: You can select playlists as well as clips.

Clearing or Deselecting selected files

1 To clear all selections from the playlist, exit the current directory.

From a remote shell you can run a batch file that contains the names of a group of clips to be played. There is no “on the fly” method of stringing together clips via the shell.

You must first create an ASCII text file on your computer that lists the full name and pathname for each file to be played, along with any specific playback options. Then transfer the batch file to QuBit via FTP. Once the file has been transferred, set QuBit to the proper mode and run the play list.

1 Set the proper image mode.

2 Set the proper operating mode.
Type:
vmode p, press Enter

Assuming you had a batch text file named playnow.bat, here's how to run it from a shell.

3 To run the batchfile playnow.bat, type the following:
playlist playnow.bat, press Enter

To stop playback immediately, press **CTRL-C**.

To stop playback at the end of the current clip within the playlist, press **CTRL-D**.

Note: See How to Create a Play List in the appendices for information on creating play lists, transferring them to QuBit, and running them.

Jog/Shuttle 1: Jogging Clips

QuBit's jog function allows you to jog through selected clips as quickly (or as slowly) as you move your finger on the touchpad. A true jog function is not possible from a remote shell via the keyboard, but we have implemented a form of "go-to" that can jump you to a specific frame. Used in conjunction with the shuttle option, you can jump to any frame and shuttle forward or backward from there easily.



Front Panel

- 1 Press the **PLAY** button. QuBit displays the File and Clip Manager.
- 2 Locate and select the clip you wish to play. Click the jog/shuttle button. The jog/shuttle knob appears on the GUI.

QuBit will be in either jog or shuttle mode, based on its last-known state when this control was in use.

- 3 To jog, drag your fingertip in a circle on the touchpad. To go forward rotate clockwise. To go backward, rotate counter-clockwise.

QuBit will jog at a rate that corresponds to the speed of your movement on the touchpad. When you stop, QuBit will hold on the current frame.

Additional JOG Controls

step forward 1 frame
 step backward 1 frame
 toggle between jog/shuttle
 exit jog/shuttle mode

Press

press **FWD**
 press **REW**
 center touch-
 pad button
 press **STOP**



Serial/Telnet Shell

To access the jog feature you must invoke the *shuttle* option when playing a clip.

- 1 To jog a clip named *myclip*, type the following:
`playclip myclip shuttle`, press Enter

The clip appears on your video monitor, paused on the first frame.

- 2 To jog to frame 600, type the following
`jog 600`, press Enter

Frame 600 appears on the monitor. At this time you may enter any valid frame number and skip around within the clip. You may even invoke shuttle commands to play the clip at various speeds, alternating between jog and shuttle commands.

- 3 To exit jog mode, type
`jog stop`, press Enter

This quits the jog/shuttle mode entirely.

Jog/Shuttle 2: Shuttling Clips

QuBit's shuttle function allows you to shuttle smoothly through selected clips at a variety of preset speeds in both forward and reverse. From a shell you may also shuttle through clips.



Front Panel

- 1 Press the play button. QuBit displays the File and Clip Manager.
- 2 Navigate to the clip you wish to play and select it. Click on the jog/shuttle button to enter jog mode. Press the center touchpad button to toggle to shuttle mode.
- 3 To shuttle, move your fingertip in an arc corresponding to the arc formed on a clock face from 8 o'clock through 12N (reverse shuttle speeds) and onward from 12N to 4 o'clock (forward speeds).

Additional Shuttle Controls

shuttle @ next higher speed
 shuttle @ next lower speed
 toggle between jog/shuttle
 exit jog/shuttle mode

Press

press **FWD**
 press **REW**
 center touchpad button
 press **STOP**



Serial/Telnet Shell

- 1 To shuttle a clip named myclip once, type the following:
`playclip myclip shuttle`, press Enter

The clip appears on your video monitor, paused on the first frame.

- 2 To shuttle through the clip at 2x play speed, type the following:
`shuttle 2`, press Enter
- 3 Shuttle also accepts fractions. To shuttle at 1/2 play speed, type:
`shuttle 1/2`, press Enter
- 4 You can also use the jog option to jump to a specific frame within the clip. To jump to frame 1000, type:
`jog 1000`, press Enter
- 5 Exit shuttle mode by typing:
`shuttle stop`, press Enter

Note: Both jog and shuttle options are available when you play a clip with the shuttle option. You can type either "jog" or "shuttle" followed by a numeric value to engage the jog or shuttle function.

Recording with QuBit: An Overview

To gain mastery over QuBit you need to understand what's going on behind-the-scenes, specifically with regard to QuBit's *modes*. There are two types: **image format** and **operating state**. These two items determine what type of imagery QuBit is set for (height by width, and the frame rate), and whether QuBit is ready to play or to record.

No other recorder gives you the vast combination of format choices that QuBit offers, so you need to know how to select the right image size and ensure that QuBit is ready to record before you can begin recording with confidence.

If the data you wish to work with is NTSC D-1, then QuBit may be told to work with standard NTSC D-1 video signal data. If you wish to work with HD 1080i, QuBit can be programmed to work with interlaced 1920 x 1080 images. The number of "data types" QuBit can work with is almost limitless. So let's find out what we need to do in order to ensure the right settings are in place.

If you use a command line shell to control QuBit, you need to "set up" the image format and operating mode prior to either recording or playback (i.e., for both operations). The commands are shown in the next few pages.

If you use the GUI to control QuBit, you only need to setup for recording; setup for playback is automatically handled by QuBit. You'll find the steps outlining this on the next few pages.

It takes several seconds for QuBit to change from record mode to playback mode (it is not an immediate change); it can also take a few seconds to change from one image size mode to another. At the moment, these changes are programmed into the GUI's operation but not from the shell.

The simplest rule of thumb is: doublecheck QuBit's settings before recording critical content. Always record a short test clip first.

GUI or Shell Operation—Different Yet Alike

Depending how you choose to do control QuBit (shell or GUI), the steps differ slightly. *Read this section carefully! It is easy to make a recording error by selecting the incorrect image format.*

Recording in Brief

Recording from the GUI is a lot like any other VTR: once you verify all the settings, press **REC** + **PLAY** together to begin. You verify the settings by navigating the menus and checking that the image, format, SNR, and inputs are correctly chosen.

To record from a shell, you need to enter a command to set the correct image size, enter the command to setup the "record" state, and then issue the `recclip` command.

See the charts on the next pages for a list of supported formats.

Playback in Brief

To play a clip from the GUI, you select it from the screen and press the **PLAY** button. QuBit will change to the clip's format and play the clip.

From the shell, enter the command to set the correct image size, enter the command to setup the "playback" state, and then issue the `playclip` command. *Note: As long as you work with clips in one format, you can go from playback to record without having to re-issue the format command. You only need to change the image format mode when you go to use a clip of a different format.*

The specific commands for these operations are spelled out in the pages that follow, where you will find step-by-step instructions for recording clips.

Note: Shell users can use: `show mode` to verify the current image size; and `vmode` to verify the `rec/play` status. Finally, if you do not know the settings needed for a specific clip, use the command `stat clipname` to find out. These commands may be entered at any time.

Recommend Recording Settings

Here are some recommended SNR recording settings based on the source format you may be using. (If you are recording directly from a camera source, use this chart as a guide for choosing an SNR value that approximates the “look” of the format you wish to maintain.)

SOURCE FORMAT	NATIVE FORMAT SNR	SUGGESTED QUBIT SNR	MAX SUGGESTED QUBIT SNR *
VHS/U-Matic	42dB	42dB	48dB
S-VHS/Hi-8	45dB	45dB	51dB
M-II	47dB	47dB	53dB
DVC/DVC-Pro	51dB	51dB	57dB
BetaCAM SP	51dB	51dB	57dB
D-2/D-3	51dB	51dB	57dB
HDCAM	51dB	51dB	57dB
HDD5	54dB	54dB	60dB
D-1/D-5/D-6	60dB	60dB	66dB
Digital BetaCAM	60dB	60dB	66dB

* Higher values than these not recommended; the additional data recorded by QuBit is high-frequency noise and not useful picture information.

For digital cinema transfers from a telecine, very high quality is achieved using 51, 54, 57, or 60dB. Your settings will likely vary depending on the film stock, telecine chain, and color correction settings used.

These settings take into account the amount of film grain, essentially a form of noise, in the image, that increase the data rate of film.

HD, HDW, HHD and HD2: What do they Mean?

Some of the terms you will see on the next two pages include a form of short-hand code, chosen for the simple task of making filenames easier. At first glance it's certainly confusing.

HD indicates a half-bandwidth signal High Definition mode, requiring only one image processing engine (we call 'em video signal processors, or a VSP for short). **HD2** indicates a full-bandwidth signal High Definition mode, requiring two VSPs in QuBit. (If your QuBit is incapable of running an HD mode, it will tell you when you try to change to one of the HD2 formats). **HHD**, if you see this, is an older convention for the half-bandwidth HD signal. It is the equivalent to what we call HD above.

HDW is a special format designed for specific customer needs. The 'w' refers to *window*, where the image format chosen actually plays back as if it were a smaller window inserted into a larger image frame (the outer part of the frame is digital noise, just an unused part of the signal). Early digital cinema projectors used this format and used only the windowed portion of the image out of the larger frame.

More About HD and HD2

Both high-definition (full-bandwidth, dual VSP) and half-high-definition (half-bandwidth, single VSP) modes operate with the same 74.25 MHz pixel rate, so an HD or HHD clip looks like a normal high-definition signal on playback.

The difference? HD image size is 1920 by 1108 pixels with a luminance frequency response of 30 MHz, while HHD image size is 960 by 1108 with a luminance frequency response of 15 MHz. Other equipment that play, record, or display high definition signals will accept this as a normal HD signal with only half the horizontal detail of a true high-definition recording.

The half-band mode is appropriate for many display devices that will accept HD signals but do not have full HD bandwidth, such as small to medium sized CRTs, many HD front- and rear-projection systems, and many consumer HDTV units that lack sufficient bandwidth to show the detail in a full HD signal.

In other words, even if your equipment cannot display the full bandwidth of a high-definition signal, you can use HHD instead and still enjoy sharper-than-normal image quality at a data rate far below that of HD. You'll be able to record more material because HHD requires less disk space.

Image Formats Supported by All QuBits

Below is a list of image formats supported by all QuBit that have a single Image Processor Engine, current as of August 1, 2000. Note that new releases of QuBit software may have new formats added. Always check QuBit's format list for an up-to-date listing.

WIDTH/HEIGHT	FRAMERATE	DISPLAY TYPE	ENCODING	QUBIT FILENAME*	NOTES
720 x 508	30	interlaced	12-bit	ntsc	all standard definitions (D-formats, BetaCAM formats, etc.)
720 x 508	30	interlaced	8-bit unencoded	ntsc8	all standard definitions (D-formats, BetaCAM formats, etc.)
720 x 608	30	interlaced	12-bit	pal	all standard definitions (D-formats, BetaCAM formats, etc.)
720 x 608	30	interlaced	8-bit unencoded	pal8	all standard definitions (D-formats, BetaCAM formats, etc.)
960 x 720	60	progressive	12-bit	hd_960hx720_60p	windowed 1280 x 1024**
960 x 720	60	progressive	12-bit	hdw_960hx720_60p	
1280 x 720	60	progressive	12-bit	hd_1280hx720_60p	
1280 x 1024	24	progressive	12-bit	hd_1280x1024_24p	windowed 1920 x 1080**
1280 x 1024	25	progressive	12-bit	hd_1280x1024_25p	
1280 x 1024	25	progressive	12-bit	g_1280x1024_25p	windowed 1920 x 1080**
1280 x 1024	30	interlaced	12-bit	hd_1280Hx1024_30i	
1280 x 1026	24	progressive	12-bit	hd_1280x1026_24p	windowed 1920 x 1080**
1280 x 1026	30	interlaced	12-bit	hd_1280Hx1026_30i	windowed 1920 x 1080**
1600 x 1200	30	interlaced	12-bit	g_1600hx1200_30i	
1920 x 1080	24	segmented frame	12-bit	hd_1920hx1080_24sf	
1920 x 1080	25	interlaced	12-bit	hd_1920Hx1080_25i	
1920 x 1080	25	segmented frame	12-bit	hd_1920hx1080_25sf	
1920 x 1080	30	interlaced	12-bit	hd_1920Hx1080_30i	

* From a shell interface, simply type the file name as shown, followed by Enter. Remember to use "vmode r" or "vmode p" to set up QuBit for recording or playback, afterward. From the GUI, you may select record formats from a list; playback modes are handled automatically.

** Windowed modes are custom formats designed for special installations: playback of the specified format occurs within a larger image size signal.

Additional Image Formats Supported by Dual-Processor QuBits

Below is a list of *additional image formats* supported by QuBits that have two Image Processor Engines installed, current as of August 1, 2000. This list is *in addition to* the list shown on the previous page. With every release of QuBit software, new formats may be added. Always check your QuBit for an up-to-date listing.

WIDTH/HEIGHT	FRAMERATE	DISPLAY TYPE	ENCODING	QUBIT FILENAME*	NOTES
720 x 508	30	interlaced	12-bit	ntsc	all standard definitions (D-formats, BetaCAM formats, etc.)
1024 x 768	60	progressive	12-Bit	g2_1024x768_60p	
1280 x 720	60	interlaced	12-bit	hd2_1280x720_60p	
1280 x 1024	24	progressive	12-bit	hd2_1280x1024_24p	windowed 1920 x 1080**
1280 x 1024	30	interlaced	12-bit	hd2_1280x1024_30i	windowed 1920 x 1080**
1280 x 1026	24	progressive	12-bit	hd2_1280x1026_24p	windowed 1920 x 1080**
1280 x 1026	30	interlaced	12-bit	hd2_1280x1026_30i	windowed 1920 x 1080**
1600 x 1200	30	interlaced	12-bit	g2_1600x1200_30i	
1920 x 1035	30	interlaced	12-bit	hd2_1920x1035_30i	
1920 x 1080	24	progressive	12-bit	hd2_1920x1080_24p	
1920 x 1080	24	segmented frame	12-bit	hd2_1920x1080_24sf	
1920 x 1080	25	progressive	12-bit	hd2_1920x1080_25p	
1920 x 1080	25	segmented frame	12-bit	hd2_1920x1080_25sf	
1920 x 1080	30	interlaced	12-bit	hd2_1920x1080_30i	High Definition (US) "1080i"
1920 x 1080	30	progressive	12-bit	hd2_1920x1080_30p	

* From a shell interface, simply type the file name as shown, followed by Enter. Remember to use "vmode r" or "vmode p" to set up QuBit for recording or playback, afterward. From the GUI, you may select record formats from a list; playback modes are handled automatically.

** Windowed modes are custom formats designed for special installations: playback of the specified format occurs within a larger image size signal.

Recording a Single Clip

Before You Record Clips

The most common error made when recording clips is not ensuring that all settings are correct **before** you press the RECORD+PLAY buttons. Always take a moment to review the GUI or retrieve the mode from the Shell, double-checking items like image, image quality, and operating mode.



Front Panel

Note that you do not have to follow all these steps every time. Settings remain in place for the duration of the current session.

- 1 Go to the Video Settings screen. Verify or select your settings for:
 - INPUT SOURCE
 - IMAGE FORMAT
 - IMAGE QUALITY
- 2 Go to the Audio Settings screen. Verify or select your settings for:
 - SAMPLING FREQUENCY
 - SAMPLING RESOLUTION
 - INPUT SOURCE
- 3 Press the REC button once to display the current recording settings.
- 4 Press the REC button again to engage pass-through mode. Audio and video will now pass through to the output display connected to QuBit.
- 5 Press REC + PLAY to begin recording. Press STOP when you are done.
- 6 Enter a name using the character browser screen.



Serial/Telnet Shell

- 1 Set QuBit to the proper input source (see note below). For example:


```
SERIALHD ... set video,inputsrc parallel
PARALLEL ... set video,inputsrc serialhd
SERIALSD ... set video,inputsrc serialsd
```
- 2 Set QuBit to the proper image size (examples below).


```
D-1 NTSC ..... type ntsc ,press Enter
D-1 PAL ..... type pal ,press Enter
HD 1920 X 1080i ..... type hd ,press Enter
```
- 3 Set the image quality. Type `set video,lumsnr ##` and press Enter (use your preferred SNR values for ##).
- 4 Set QuBit to record mode. Type `vmode r` and press Enter.

You are now ready to record. At this point, you have told QuBit the image size and image quality you desire. You are also in record pass-through mode and should be seeing and hearing signals.

The `recclip` command allows you to record clips to QuBit. Clips are written to the directory where the `recclip` command is issued from, unless the command specifies a different location. See the examples below.

Note: Only QuBits with SD-enabled and HD-enabled serial digital connections support these two input choices (a.k.a. VIO 8).

Recording a Single Clip (continued from previous page)



Front Panel (cont.)

- 7** Click RENAME to accept either the default name or the name you have entered. Click DELETE to cancel the saving of this clip entirely.

Note: QuBit's versatility in recording "any size" and "any quality" comes at a small cost in time.

When you go to play a clip that you have just recorded, QuBit reprograms itself to "play mode." Conversely, when you go to record a clip, QuBit reprograms itself to "record mode." Changing modes takes a few seconds.



Shell (cont.)

- 5** To record a clip of specific length, follow this example (a 10-second clip named triomphe to the clips directory):

```
recclip qubit:clips/triomphe 300 stats
```

- 6** To record a clip of unknown length, follow this example (note that this clip will be recorded to the current directory, since a destination path is not specified):

```
recclip triomphe 0 stats
```

Press CTRL-C to stop the clip manually when you have recorded enough.

***Why use "stats" when recording?** The stats option turns on an output display that shows you data as the clip is being recorded. It's particularly useful when the QuBit is not nearby so you can monitor the record process. The output gives you information about the length of time being recorded, and any errors that may make for a problem clip. You can record without this option, but the feedback it provides is invaluable.*

***Note:** A Review of the commands and settings used in this tutorial:*

```
show mode
```

to verify the image mode

```
vmode
```

to see QuBit's rec/play status; add p or r to set playback or record mode.

```
set video,lumsnr ##
```

to set image quality (SNR)

Recording Clips II (Multiple Clips)

When You Need to Record a Quick Series of Clips

If you have to record a set of clips quickly, with no time to stop and name each clip as it is recorded, you have the option of setting up a “name and number” convention ahead of time to make recording simpler.



Front Panel



Serial/Telnet Shell

Note that you do not have to follow all these steps every time. Settings remain in place for the duration of the current session.

Multi-clip recording with automatic numbering is not available from a shell.

- 1 Go to the Video Settings screen.
Verify or select your settings for:
 - INPUT SOURCE
 - IMAGE FORMAT
 - IMAGE QUALITY

 - 2 Go to the Audio Settings screen.
Verify or select your settings for:
 - SAMPLING FREQUENCY
 - SAMPLING RESOLUTION
 - INPUT SOURCE

 - 3 Press the REC button once to display the current recording settings.

 - 4 Press the REC button again to engage pass-through mode.
Audio and video will now pass through to the output display connected to QuBit.

 - 5 Select MULTIPLE CLIP RECORDING SESSION.

 - 6 Select DESTINATION and choose the destination directory for the clips you plan to record.

 - 7 Select CLIP NAME and enter the “base” name to be used for every clip recorded in this session.
-

Recording Clips II (continued from previous page)



Front Panel (cont.)

- 8 Select **AUTO NUMBERING** and determine the automatic clip numbering format you'd like for this session.

For example, if you use "Hawaii" for the base name and "0000" for the numbering format, here's how QuBit will name the first four clips you record:

hawaii0001
hawaii0002
hawaii0003
hawaii0004

- 9 Select **IMAGE QUALITY** and choose the SNR value you want for this set of clips.

You're now ready to record. Press **REC+PLAY** to record a clip. Press **STOP** to halt recording. Continue in this manner and QuBit will automatically handle the naming and numbering of each clip without interrupting your work flow.

Transferring files: an Overview

QTools, FTP, and SCSI

To move data (such as text, audio, or images) to and from QuBit you'll need an Ethernet cable and the appropriate software.

QuBit does not support SCSI commands so you cannot issue commands or transfer data via a SCSI connection with another system.

- ❖ If you use a Windows-based system, you have a choice between QTools or an FTP-client software program.

Although Windows users may choose either means for data transfer, there are compelling reasons to use both. QTools transfers image data only, while FTP also transfers other types of files such as batch text files used for playlists. If you wish to create and edit playlists, you'll want to have an FTP software program handy.

- ❖ If you use another OS such as Macintosh or Unix, you will need to use an FTP program set to use *binary* file transfers.

Non-Windows users *must* use FTP software.

What is FTP?

FTP is a term used to describe the means for transferring files from one computer to another. It stands for *file transfer protocol*.

There are FTP servers and FTP clients. Generally the FTP server runs on a remote computer that houses the files other computer operators want to access. The client is used by someone who is accessing the server from another location, usually with the intent to transfer files to their own "local" system.

Since QuBit is effectively the server, you'll need FTP client software for your computer.

How FTP Works

FTP works over an Ethernet connection. Once you have set up QuBit with a valid IP address for your network, you can use FTP software to communicate with QuBit and transfer files.

A unique feature of FTP is that QuBit's display of clips is different for an FTP client than its display to a shell (or on the GUI). From shell or GUI, a clip looks like a file. From an FTP program, a clip appears as a directory. You can double-click on the clip name to view its contents – the numbered frames that make up the clip. These may be copied (extracted) directly from the clip to your computer if you wish. They may also be either appended onto the end of a clip, or re-inserted into the clip from which they came.

Where to get an FTP client

There are many commercial and "shareware" FTP client software programs available. If you do not have one, you can purchase one at a computer/software outlet or download trial versions from the Internet. There are many online sources for such software, often with useful reviews to guide you.

How to Transfer A Play List to QuBit

With an Ethernet connection to QuBit, and FTP client software on your computer, you can transfer files to and from QuBit. This tutorial assumes you've already hooked up to QuBit and verified an Ethernet connection. Although it is geared toward transferring a play list to QuBit, it applies to any type of standard data file transfer (similar to a copy operation where the data to be transferred remains unchanged).

If you wish to transfer images without converting them to a clip, audio files, text files, or any other kind of data, use FTP. If you wish to convert images into a clip, use QTools. Note that the specifics for each FTP client software program vary, however the basic steps are fundamental to all programs.

- 1 Start your FTP program.
- 2 Open the connection panel where you can enter the IP address of the remote site you wish to connect to. Enter the IP address of QuBit.
- 3 Navigate to QuBit's *clips* directory as the remote directory (unless you have a specific directory where you prefer to place playlists).
- 7 Double-check that the remote directory is the clips directory. Navigate there if needed.
- 8 Press the "transfer" button to send the play list to QuBit.

Once the transfer is complete, you can use a shell to run the playlist.

Note: You can keep this connection open to QuBit at the same time as a telnet shell. The convenience of this is that you can continue to fine-tune the playlist, send it to QuBit, then review it as many times as you wish without having to open and close each program as you work.

Most FTP software operate with the concept of "local" and "remote" directories. These serve as the source and destination directories for file transfers.

- 4 Now select the CONNECT button to complete the connection.
- 5 Check the "options" or "preferences" settings of your ftp program—make sure that it is set for "non-binary" file transfers.

Binary file transfers (either to or from QuBit) usually create files that you cannot read.

- 6 Within the local directory browser, select the playlist you wish to transfer.

Creating a Single-Frame Animation

The traditional term for the computer-generated animation is *single frame animation* (where a computer rendered images, sent them to a video display, then triggered a VCR to record each frame to video tape; this process was repeated until every frame of the animation had been transferred to tape, after which the animator could view the animation). It's much simpler with QuBit. All you need to do is choose the files to be transferred, then transfer computer images using QTools. QTools will take care of the rest.



QTools (Win32 only)

- 1 Start QTools, open the QuBit tab, enter the IP number of the destination QuBit, and click the **CONNECT** button.
- 2 Use the left-hand browser to navigate to (and select) the files to be made into a QuBit clip.

You may select files or folders—but not both—in one operation. To select all files in the current directory, right-click and choose **Select All**. To select one or more folders, just drag a box around them, or select them singly while holding the **CTRL** key.

- 3 On the right, navigate to QuBit's clips directory and click **CREATE PROJECT**. Enter a name for this project, select the proper image format, and click **OK**.
- 4 Ensure that **SEND** is checked.
 - **If you selected multiple folders**, do not enter a clip name. Each clip will receive the same name as the folder the stills originated from.
 - **If you selected multiple files**, enter a clip name.
- 5 Set the proper **SNR** value for these clips, and click **GO**. Once QTools is finished, you may view the clip.



FTP (all OS's)

Clips cannot be created via a shell console at this time.

Extracting Images from a Clip

For special effects work, it can be useful to extract the images that make up a clip and run them through a 2D/3D compositing or editing package. Follow the steps below to extract images from a clip on QuBit.



QTools (Win32 only)



FTP (all OS's)

- 1** Start QTools, go to the QuBit tab, and enter the IP number of the QuBit you wish to work with, and click the **CONNECT** button.
- 2** On the right, navigate to the directory containing the clip to extract from, and click on the clip name to select it.
- 3** Check the **RETRIEVE** button, and select the start and end frames you wish to extract.
- 4** Choose the file format for the extracted frames, and enter 4 characters for the local base name to apply to each frame. (QTools will automatically number each frame, using 4 digits.)
- 5** On the left, navigate to the directory that will receive the extracted frames, then click the **GO** button.

You cannot extract images from clips via a shell console.

QTools will begin processing, and provide a gauge showing the expected processing time. Once this is complete, you may and use the extracted images in other applications.

Analog and Digital Audio Overview

QuBit supports both analog and digital audio standards. QuBit does not compress recorded audio, though it supports audio that has been compressed before transfer to QuBit (such as several surround-sound formats, for example).

About Surround Sound

Surround sound is the term used to describe a multi-channel mix of a soundtrack or audio recording designed for a multi-speaker playback where the speakers are placed all around the listener, in effect *surrounding* the listener within the sound experience.

The “5.1” surround sound systems are both six-channel mechanisms. Each encodes six discrete channels of audio into tracks that are played back through left front, right front, and center front channels; left rear, right rear, and an optional subwoofer (the .1 in 5.1) channel.

QuBit supports surround sound formats that employ AES/EBU standards for encoding such as Dolby Digital and dts (which are 6-channel formats) and others like SDDS that use up to 8 channels to recreate the full surround experience.

QuBit neither encodes nor decodes surround sound formats. It faithfully records the material it is sent, and then plays that exact material back upon playback. You will need a decoder to properly decode and hear previously encoded audio that has been recorded to QuBit.

About Digital Sampling

In the case of a traditional compact disc, the 16-bit PCM digital audio coding yields a total dynamic range of 96dB from the noise floor to the loudest sound. For each channel, this is achieved by taking 16-bit samples 44,100 times per second. With QuBit you can alter both the sampling resolution (select 16-, 20-, or 24-bit) and the sampling frequency (choose 22,500, 32,000, 44,100 or 48,000 samples per second).

About Signal Levels

The low level output of microphones is referred to as *mic level*. The higher output of equipment like QuBit is referred to as *line level*. However, the electrical voltage of line level equipment varies among *consumer* and *professional* grades. QuBit's line level output is at +4dBu.

If you need to use QuBit with a piece of equipment whose signal levels do not match, you may need something called a *match box*, *matching box*, or *direct box*, which can make the necessary voltage level changes allowing equipment to work together correctly.

Table 1: Voltage Levels of Audio Recording Equipment

Application	Voltage (RMS VOLTS)	Level (DB PER NOTE BELOW*)
Consumer/Semi-Pro	-10 dBV	316 mV
Professional 1	0 dBV	775 mV
Professional 2 (QuBit)	+4 dBV	1.228 mV
Professional 3	+8 dBV	1.948 mV

* dBV reference: decibels relative to 1 Volt.

dBu reference: decibels relative to 0.775 Volts.

Audio Dubbing Overview: Inserting Audio Tracks into Clips

QuBit clips may contain zero, two, four, or eight data slots—called *channels*—that may contain audio data—called *tracks*—depending whether the clip was generated via recording or via QTools. A channel may be empty, or it may contain an audio track.

When you record a clip, QuBit faithfully records all of the inputs to which you have audio connected (creating up to eight channels with eight tracks of audio data). When a series of still images is transferred to QuBit through QTools the resulting clip contains no audio (neither audio channels nor audio track data).

In either case, if you wish to modify a clip's audio, you may have some or all of these options available to you:

- Create new audio channels to store additional audio tracks (up to a maximum of eight) ;
- Extract audio from one or more existing channels using the `postdub` command;
- Insert—or *dub*—new or sweetened audio into one or more existing channels using the `postdub` command.

To find out how many tracks a clip has, see “Identifying a Clip's Audio Tracks”

To add or remove some if necessary, see “Adding or Removing Audio Channels”

To extract any audio you wish to sweeten or edit, see “Extracting Audio Tracks from a Clip”

To dub one or more audio tracks back into the clip, see “Dubbing Audio in a Clip”

Note: These are shell commands only and not available from the GUI.

Identifying a Clip's Audio Tracks

Before you create audio channel space or write audio track data into a channel, you'll need to verify whether audio channels exist. Here's how.



Front Panel

Currently there is no way to verify the presence of audio channels or audio tracks with them from the front panel GUI.

Although the GUI audio meters do show the presence of audio, often there are softer passages that may not show up on the meters.

Therefore, use the shell method described in the next column.



Serial/Telnet Shell

1 Open a shell and cd to the directory containing the clip in question. Type the following (use the real name of the clip, not this example name):

```
stat clipname
```

QuBit will display results that look something like this:

```
307D-temp:clips>stat clipname
clipname (clip) 6.5 GB RWX- 10-28-1999
01:27:17
Duration: 00:10:00;18
Video: 1920 x 1108 Cb,Ylo,Cr,Yhi
Rate: 29.97 Hz
Bits: 12
Coded: Yes
WPSNR: 51 dB
Audio: 2 channels
Bits: 16
Freq: 48000 Hz
```

The last three lines tell you the number of audio channels and their data format.

Adding or Removing Audio Channels

A clip with fewer than eight audio channels may be expanded to a maximum of eight. Using the source clip as a basis, invoke the `modclip` command to create a new clip with these additional channels. You can then dub audio tracks into the additional channels in the new clip.

Important!

Modclip will not work if the original clip has not been indexed properly (this can happen if the clip was improperly finished after recording or transfer. If modclip gives you an error message, reindex the clip by typing: `reindex <filename>` where the filename is the name of the clip. Afterward, you may proceed with the modclip operation as described below.



Front Panel

Currently, adding/removing audio channels is only available via a command line shell.



Serial/Telnet Shell

To change the number of channels in a clip, use the `modclip` command. The template for modclip is:

```
modclip <inclip> <outclip> [<options>]
```

Requirements

Modclip has several requirements as you can see from the template. The *inclip* is the name of the source clip. The *options* are switches that let you specify the number of channels to modify and how they should be modified. The *outclip* is the name of the destination clip that will be created with these new properties. You cannot use the same clip name for the *inclip* and *outclip* values.

If no options are specified, the new clip simply duplicates the entire clip (same video rate, number of audio channels, and bits/sample as the original clip) by default.

These defaults can be changed by using any of the options described on the next pages. Note that options may be entered in any order on the command line, and that the proper format must be maintained as shown (hyphen, option letter, a space, and then a number).

Options for Modclip

Options for the `modclip` command are described on the pages that follow. Examples may be found at the end of this section.

Setting the number of audio channels

On the command line, use the option shown below to set the total number of channels in the clip, where n is either 0, 2, 4, or 8.

```
-c n (or) -chans n
```

If new channels are being added, they contain blank (0-valued) audio data.

If the number of channels specified is less than the number in the original clip, then channels will be deleted downward from the highest-numbered channel. Therefore if 8 channels exist, and the option specifies 4 channels total, the channels 8, 7, 6, and 5 will be removed in the new clip.

Setting the number of bits per sample

On the command line, use this option, shown below, to specify the total number of bits per sample (where n is either 16, 18, 20, or 24).

```
-b n (or) -bits n
```

If not specified, default is 16.

If the original clip already has one or more audio channels that the user wants to preserve, this parameter either (a) should not be specified or (b) should be set to match the original clip's value, if known. If the values are different, the original audio data will be destroyed in the new clip.

Setting the audio sample rate

On the command line, use the option shown below to set the audio sample rate, where n is either 44100 or 48000.

```
-q n (or) -samprate n
```

If the original clip already has one or more audio channels that the user wants to preserve, this parameter either (a) should not be specified or (b) should be set to match the original clip's value, if known. If the values are different, the original audio data will be destroyed in the new clip.

Setting the video playback rate

On the command line, use the option shown below to set the video playback rate in frames per second, where n is either 24, 25, or 30.

```
-r n (or) -rate n
```

If the video rate is changed, the audio data will be truncated or appended to create the correct data size. This may result in a lack of the original audio data present in the new clip.

Setting drop/nondrop frame status

Use the option shown below to choose drop frame mode or non-drop frame mode, where n is either 0 (non-drop frame) or 1 (drop frame).

```
-d n (or) -drop n
```

This option does not change existing audio data.

Setting the starting frame

On the command line, use the option shown below to select the video frame to start at, where n is any frame number in the clip.

```
-s n (or) -start n
```

If not specified, the default is frame 0.

This can be used in conjunction with option `-f` (the number of frame to process) to create a new clip that is a subset of the original.

Setting the duration (or length)

On the command line, use the option shown below to specify the number of video frames to include in the new clip, where n is any number in the clip after the number specified by the starting frame option (above).

```
-f n (or) -frame n
```

If not specified, defaults to 0 (the end of the clip, no matter how many frames it contains).

This can be used in conjunction with option `-s` to create a clip that is a subset of the original.

Examples

Here are several command line examples that illustrate possible `modclip` operations.

Example 1: Creating a new clip with space for 8 audio channels that match the pre-existing audio channel settings. This example will keep the pre-existing channels, and add more, to the total of 8 in the new clip.

```
modclip clip1 clip2 -c 8
```

Example 2: Creating a new clip with space for 8 audio channels, 24 bits/sample, 48000 samples/second (existing channels may be in the new clip if these settings match the original):

```
modclip clip3 clip4 -c 8 -b 24 -q 48000
```

Example 3: Creating a new subclip (i.e., a portion of the original clip) with no audio changes:

```
modclip clip5 clip6 -s 300 -f 1800
```

Inserting or Dubbing Audio Tracks into a Clip

To dub audio into a clip, make sure the clip has available audio tracks first (see “Identifying a Clip’s Audio Track”). If necessary, add channels for those tracks using `modclip` (see “Adding or Removing Audio Channels”). If these steps have already been performed, the clip is now ready to receive an audio dub using the `postdub` command.

The audio file format must be `.aiff` or `.wav`.



Front Panel

Currently there is no way to verify the presence of audio channels or audio tracks with them from the front panel GUI.

Although the GUI audio meters do show the presence of audio, often there are softer passages that may not show up on the meters.

Therefore, use the shell method described in the next column.



Serial/Telnet Shell

To dub audio into a clip, use the `postdub` command. The template for `postdub` is:

```
postdub <clip> <audiofile> [<options>]
```

Requirements

`Postdub` has several requirements. The *clip* is the name of the clip to receive new audio data. The *audiofile* is the name of the file you wish to dub into the clip. The *options* are switches that let you specify the number of channels to modify and how they should be modified. You can specify multiple options at a time on the command line.

Both the clip and the audio file must reside on QuBit. Use an FTP program to transfer the audio file to the QuBit (see “How to Transfer Files to QuBit”). If it resides in a separate directory, you will need to include the full path for the file in the `audiofile` parameter. The same directory is easiest.

The default behavior is for all audio channels to be dubbed, starting with the lowest audio channel in the clip, at the beginning of the clip. The entire clip will be dubbed even if the length of the audio file does not match the length of the video clip. However, the audio clip will not be stretched to fit the video clip; it may end early, or run too long and be cut off. `Postdub` does not mix pre-existing audio with new audio; audio is overwritten entirely.

Important: `Postdub` dubs four channels at a time. Dubbing more than four channels into a clip requires two separate `postdub` operations. See the descriptions below for details on how to do so.

Options for Postdub

Postdub options include *base channel*, *starting channel*, *delay*, *starting frame*, *trim*, *ending frame*, and *audio file format*. These options are described in the paragraphs that follow. Note that *n* refers to a numeric value that you must include after any command switch. Examples may be found at the end of this section.

Setting the base channel (starting channel)

`-b n (OR) -basechan n`

This would be the first channel in the clip that you want to dub audio data into. On the command line, use this option to select the starting channel for dubbing, where *n* is a number from 0 to 7. The default base channel is 0.

QuBit will dub additional audio from the audio file (if it exists) into consecutively higher-numbered channels (if they exist).

For example, if you dub a stereo (2-channel) audio file into a QuBit clip, and you start with a base channel of 3, then channels 3 and 4 of the clip will receive new audio.

Channels from the group 0 through 3 and group 4 through 7 cannot be dubbed in the same operation. To dub 6 channels of audio in a clip (channels 0 thru 5), channels 4 and 5 would have to be dubbed in a separate operation from the first four.

Setting the number of channels to be dubbed

`-c n (OR) -chans n`

On the command line, use this option to specify how many channels should be dubbed, where *n* is a number from 1-4. The default value for the number of channels is 2.

Use this option in conjunction with the base channel option (-b) to specify which audio channel(s) of the clip to replace.

There is currently no way to “pick and choose” channels out of a multi-channel .aiff or .wav file when dubbing into a clip. The first channel is used, then the next, up the number of channels specified. For this reason, you may wish to create an audio file with only the track(s) you want prior to dubbing.

Specifying a "coarse" audio source file inpoint

`-d n (or) -delay n`

On the command line, use this option to specify where to start reading audio samples out of the audio file in units of "video frames" where *n* may be any number between the start and end of the audio file. For finer control over the audio timing, see the `-t` option in the next pages.

For example, `-d 60` would skip the first two seconds of audio in the audio file (assuming 30 Hz video). Increase this value to move the audio earlier in time in relation to the video; decrease it to shift the audio track later in time. The default value is 0.

Setting a "fine" audio source file inpoint

`-t n (or) -trim n`

On the command line, use this option to specify where to start reading audio samples out of the audio file in units of audio samples. This may be in addition to option `-d`, if a coarse frame inpoint has been specified. This effectively gives a "sub-frame" delay control, specified in audio samples. The default is 0.

If your sample format is based on 44100 sampling, then *n* may be from 0 to 1470 (the number of audio samples in one video frame). If your sampling is based on 48000 then *n* may be from 0 to 1600.

Specifying the length of the dub

`-f n (or) -frame n`

On the command line, use this option to specify how many frames of the clip should be dubbed, where *n* may any number.

The default is to dub from the starting frame throughout the remainder of the clip.

Specifying the destination clip's inpoint for dubbing

`-s n (or) -frame n`

Use this option to specify the video clip frame number where dubbing should start. The default is 0, the start of clip.

Dubbing less than the entire clip is useful to verify proper sync on a section of a clip before you `postdub` the entire length of a large clip.

Specifying the audio sourcefile format

`-w (or) -wav`

Use this option, which has no further requirements, to instruct QuBit that the audio file for dubbing is in the `.wav` format.

If this option is not included, then QuBit assumes the input audio file is an `.aiff` file.

Examples

Following are several command line examples that illustrate possible postdub operations.

Example 1: Dubbing 2 new stereo tracks into an existing clip, using the default settings. This will overwrite the pre-existing data in tracks 0 and 1 with the new audio data.

```
postdub fairlawn holmgrentune
```

Example 2: Dubbing 6 new tracks into a clip for 5.1 cinema mix. Assuming that there are two .aiff-format stereo tracks, with left/right data for front and rear, and two .wav-format mono tracks for center and subwoofer, here are the four commands needed to postdub these audio files into a single clip.

Dub the first stereo pair into the first two channels (numbered 0 and 1).

```
postdub fairlawn frontpair.aiff -b 0 -c 2
```

Dub the center channel into channel 2.

```
postdub fairlawn center.wav -b 2 -c 1 -w
```

Dub the sub channel into channel 3.

```
postdub fairlawn sub.wav -b 3 -c 1 -w
```

Dub the second stereo pair into the second two channels (numbered 4 and 5).

```
postdub fairlawn rearpair.aiff -b 2 -c 2
```

Note: Surround sound channel assignments are:

- Channel 0 = Left
- Channel 1 = Right
- Channel 2 = Center
- Channel 3 = Sub
- Channel 4 = Left surround
- Channel 5 = Right surround

Extracting Audio Tracks from a Clip

To extract one or more audio tracks from a clip, use the `pullaud` command. `Pullaud` will create a `.wav` or `.aiff` format audio file in the same directory as the originating clip. Extraction does not remove the audio data from the clip—it simply duplicates it in audio file form. If you wish to wipe clean one or more audio tracks in a clip, use `postdub` instead.



Front Panel

To extract audio files from video clips, you will need to use a command shell. It is not possible from the GUI.



Serial/Telnet Shell

To pull audio files from a clip, use the `pullaud` command. The template for `pullaud` is:

```
pullaud <clip> <audiofile> [<options>]
```

Examples may be found at the end of this section.

Requirements

`Pullaud` has several requirements.

The *clip* is the name of the video clip containing the audio to be extracted. The *audiofile* is the name of the audio file you wish to create (include the 3-letter `.aif` or `.wav` extension when you specify the audio filename). The *options* are switches that let you specify which channels should be pulled, start and end points, and audio file format. You can specify multiple options on the command line.

These options are described in the paragraphs that follow. Note that **n** refers to a numeric value that you must include after any command switch.

Options for Pullaud

`Pullaud` options include *base channel*, *number of channels*, *starting frame*, *number of frames*, and *audio file format*. These options are described in the paragraphs that follow. Note that **n** refers to a numeric value that you must include after any command switch.

Note: The current template for `Pullaud` shows options `-d` and `-t`. This is an error, as these options have no bearing on `pullaud`.

Setting the base channel (starting channel)

`-b n (or) -basechan n`

This is the starting channel that you want to extract audio from. On the command line, use this option to select the starting channel for extraction, where *n* is a number from 0 to 7. The default base channel is 0, the first channel in the clip.

Use this option with `-chans`, below, to pull up to four tracks on in operation.

Setting the number of channels to be extracted

`-c n (or) -chans n`

On the command line, use this option to specify how many channels should be pulled, where *n* is a number from 1-4. The default value for the number of channels is 2.

QuBit will pull the number of audio tracks you specify, starting with the base channel (above). For example, if you specify a base channel of 4, and use the `-chans` option to specify 3 channels, then channels 4, 5, and 6 will be extracted.

Specifying the starting frame number

`-s n (or) -start n`

On the command line, use this option to specify the starting frame, when you wish to extract audio from a specific point that is not the beginning of the clip.

The default is to extract from the starting frame throughout the remainder of the clip.

Specifying the length of the extraction

`-f n (or) -frame n`

On the command line, use this option to specify how many frames of the clip should be pulled and written to the new file, where *n* may any number.

The default is to extract from the start point to the end of the clip.

Specifying the audio file format

`-w (or) -wav`

The default audio format for “pulled” audio tracks is `.aiff`. Use the `-wav` option to extract the audio data as a `.wav` file instead.

Examples

Following are several command line examples that illustrate possible pullaud operations.

Example 1: Extract both channels of audio from a 2-track clip, creating an `.aiff` format file on QuBit.

```
pullaud passion bennett.aiff
```

Example 2: Extract the first 2 channels of audio from a 6-track clip, creating a `.wav` format file on QuBit.

```
pullaud woolaway solo.wav -b 0 -c 2 -w
```

Advancing/Delaying Audio to Match Video

QuBit can make small adjustments to the audio portion of a clip in relation to the video portion using either a global setting or a clip-specific setting (through QScript, currently only available when running the theatrical application CineGUI; see the CineGUI appendix for details). Although the global setting approach should not be used to correct for one improperly synchronized clip, it can be used to experiment with timing adjustments before doing a postdub operation to make them permanent.



Front Panel

Currently there is no way to slip audio in relation to video from the GUI.

Therefore, use the shell method described in the next column.



Serial/Telnet Shell

To slip the audio in time, either forward or backward in relation to the video, use the global environment variable `set audio,delay n` where `n` is a number of frames, from -7 forward to 23 back.

The template for this adjustment can be entered from the QuBit shell as follows:

```
set audio, delay <frames>
```

This is best used on a global basis to compensate for delays in external equipment, since it's common that passing the signal through a digital device incurs a 1-2 frame delay that does not affect the audio channels.

Legal values for this delay are usually from -7 to +23 frames, but this range may vary depending on the particular video mode of the QuBit.

The value for audio delay should normally be 0 so that the audio and video portion of a frame exit the QuBit at the same time.

Note: You can temporarily change the audio delay using the command `set audio,delay <frames>` from a command shell.

Important: If you place this command line in the `custom.bat` startup file, then you will be inserting a the delay that affects all playback. If your facility installs QuBit permanently, you may wish to use this option.

Creating QTools Clips with Audio Channels

When you process images into clips with QTools, the resulting clips contain no allocated audio channel space (nor audio data). If you intend to insert audio into these clips at a later time, you will have to undertake a two-step process to first “expand” the clip to include the necessary audio channels, then “dub” audio tracks into those channels.

If you wish, you can reduce this process by one step, saving yourself time. To create clips that have built-in channels ready to receive audio tracks via the postdub utility later on, follow the steps below.

By editing a special text file found within the project directory you can cause QTools to create clips with empty (blank) audio tracks. The file is created whenever you create a project from within QTools. A hidden file is also created in that directory, which tells QTools the image size and SNR values to use for any clips created within it.

WELL?

Document History

The pages that follow serve as a history of the changes that have been made at each stage of documentation. Consult this list with each new revision to learn "what's new." Latest changes will be at the bottom.

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this file: userguide.history.txt

references file: userguide[date].qxd (user guide for QuBit)

maintained by: jhebert@quvis.com

contents: contains descriptions of updates/change made to QuVIS product documentation.

4.17.2000

updated postdub command to include wav file format

revised postdub "Inserting or Dubbing Audio Tracks into a Clip (Shell only)"

revised pullaud "Extracting Audio Tracks from a Clip (Shell only)"

revised Adjusting Audio Delay on Playback (Shell only) to mention audio delay

saved as userguide[04.17.2000].qxd

created userguide[04.17.2000].pdf

4.19.2000

updated "playing batch file" GUI version (play via queue button only now)

updated "playing multiple clips" (on-the-fly playlisting broken for now)

updated "creating a single-frame animation" (file/folder selection in QTools added)

updated audio dubbing overview

revised modclip layout for greater clarity/navigation

saved as userguide[04.19.2000].qxd

4.20.2000

continued revision of audio overview

continued revision of modclip, postdub, pullaud

pullaud on hold due to errors in template

5.01.2000

completed pullaud

revised recording clips - both gui and shell

5.02.2000

further revision to recording clips via shell

5.03.2000

completed multiple clip recording steps started on 5.01.2000 (oops).

5.15.2000

updated audio sampling/resolution figures

5.22.2000

updated multiclip playback from LCD GUI (currently not functional)

6.06.2000

fixed some typos in the install section. nothing major.

6.08.2000

updated info in install section on edit/show control

06.19.2000
fixed pagination error

06.27.2000
typos fixed per D-Storm. (thanks, Junya!)

07.2.2000
revised Install Step 2 to accommodate the fact that Exabyte drives now ship externally.

07.5.2000
typos fixed per Junya at D-Storm!

07.17.2000
Updating audio to add digital/analog overview

07.21.2000
Completed audio overview page

07.31.2000
typos fixed per Junya at D-Storm!
revised some text on audio overview page

8.7.2000
revised pages 20-23 (image format text revised, supported-format tables created)
incorporated history files into main document body (final pages)

08.11.2000
added table of suggested SNR values when recording footage to page 22
added page 15 (overview of playing)
revised page 21 (overview of recording)

08.22.2000
formatting cleanup
added note to find ftp programs on the internet or at ws-ftp.com

08.23.2000
formatting changes in postddub/pullaud
some corrections and rewriting of the options for pullaud

09.15.2000
added support phone numbers to front page

09.29.2000
updated business/support layout on front page.
updated recording with notes on SD/HD serial inputs.
changed note regarding updates and downloads

10.02.2000
typos fixed through (thanks to a silent contributor)
