DigiCart® ex

Owner's Manual

360 Systems®

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DigiCart ex®

HARD DISK and MEMORY CARD RECORDER
with ETHERNET AUDIO™ FILE SHARING

OWNER'S MANUAL

MODEL E-3000

SOFTWARE VERSION 1.24

June, 2013

360 Systems®

SAFETY COMPLIANCE

DigiCart/EX complies with the following safety standards:

- UL 60950, 3rd Edition, dated December 1, 2000, Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment.

EU ELECTROMAGNETIC COMPATIBILITY

Type of Equipment: Professional Use Audio Equipment.

Conforms to the Following Standards:

- EN55103-1 (1997) (Emissions) Electromagnetic compatibility – Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.
- EN55103-2 (1997) (Immunity) Electromagnetic compatibility – Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.

FCC COMPLIANCE

The equipment was tested to FCC Class A (using CISPR 22 Limits), EN55103-1 and EN55103-2: 1996 (for Environment 4). The unit complies with the standards.

This equipment complies with 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 owners manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

This device will accept any interference received, including interference that may cause undesired operation. The user is cautioned that changes made to the equipment without the approval of the manufacturer could void the user's authority to operate this equipment. It is suggested that only shielded and grounded cables be used to ensure compliance with FCC rules.

NOTICE

This Class A digital apparatus meets all requirement of the Canadian Interference-Causing Equipment Regulations.

Français: Cet appariel numérique de la classe A respecte toute les exigences du Reglement sur le matériel brouilleur du Canada.

Contents

WARRANTY AND REPAIR POLICY

The DigiCart/EX recorder is warranted against defects in material and workmanship for a period of one year from date of original purchase. This warranty includes parts and labor. This warranty excludes units that have been modified, repaired by unauthorized personnel, or damaged by rough handling, abuse, improper operation, dirt, lightning strike, or static electricity.

360 SYSTEMS ASSUMES NO LIABILITY WHATSOEVER FOR REAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS, INCONVENIENCE OR ANY OTHER LOSSES DUE TO OPERATIONAL FAULTS OF DIGICART/EX RECORDERS. 360 SYSTEMS' SOLE LIABILITY UNDER THIS LIMITED WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF DEFECTIVE PRODUCT OR COMPONENTS DURING THE WARRANTY PERIOD.

Products being returned under warranty shall be sent to 360 Systems or one of its foreign service centers, freight prepaid, in the original or equivalent packaging. Please call 360 Systems for a return authorization number before returning any merchandise for any reason.

PRODUCT IMPROVEMENTS AND UPGRADES

360 Systems reserves the right to make changes and/or improvements to its products without incurring any obligation to incorporate such changes or improvements in units previously sold or shipped.

COMPANY ADDRESS

Please use the following addresses for shipping and correspondence. The Corporate Office in California is open Monday through Friday, from 8:30 AM to 5:00 PM, Pacific Time.

Corporate Office and Customer Services

3281 Grande Vista Drive
Newbury Park, CA 91320 USA
Telephone: (818) 991-0360
Fax: (818) 991-1360
E-mail info@360systems.com
Website www.360systems.com

Please call 360 Systems for a return authorization number (RMA) before returning merchandise for any reason.

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- Dolby® is a registered trademark of Dolby Licensing Corp.
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PATENTS

Designs incorporated in this product may be the subject of current or pending United States and foreign patents.

WARNING SYMBOLS

THE FOLLOWING WARNING SYMBOLS ARE USED ON THE PRODUCT IN THIS MANUAL:

ENGLISH	ATTENTION: REFER TO OWNER'S MANUAL FOR IMPORTANT INFORMATION.
FRANÇAIS	ATTENTION: VEUILLEZ VOUS RÉFÉRER AU MODE D'EMPLOI POUR UNE INFORMATION IMPORTANTE.
ITALIANO	ATTENZIONE: FATE RIFERIMENTO AL MANUALE PER INFORMAZIONI IMPORTANTI.
ESPAÑOL	ATENTCION: FAVOR DE REFERIR AL MANUAL DE OPERACION POR INFORMACION IMPORTANTE.

ENGLISH	WARNING*:* ELECTRICAL SHOCK HAZARD.
FRANÇAIS	AVERTISSEMENT: DANGER DE CHOC ÉLECTRIQUE.
ITALIANO	AVVERTIMENTO: PERICOLO DI SHOCK ELETTRICO.
ESPAÑOL	ADVERTENSIA: PELIGRO DE CHOQUE ELECTRICO.

GENERAL CAUTIONS

Please heed the following important cautions regarding the DigiCart/EX:

- Do not remove the cover. No user serviceable parts inside. Refer servicing to qualified service personnel.
- DigiCart/EX recorders contain a hard disk drive. While today's hard disks are very reliable, they may be vulnerable to shock. Please handle with care, and exercise caution not to drop or bump the recorder — damage to the internal hard disk may result. Ensure that power is off before moving the unit.
- To reduce the risk of fire or electric shock, do not expose this unit to rain or moisture.

Overview

Introduction to the DigiCart Recorder

As the 1980s came to a close, the promise of high-quality digital audio became a reality with the introduction of compact disks – but only for pre-recorded music. 360 Systems responded by designing the first practical digital cart machine, introducing it to the broadcast industry at the 1990 NAB Convention. Aptly named DigiCart®, this new broadcast standard rapidly replaced the industry's analog NAB tape carts.

By including an internal hard disk as a standard component, the DigiCart recorder provides fast access to many thousands of cuts, plus a degree of reliability never before achieved with tape recorders. Remote controls, networking and distributed storage now make the DigiCart recorder a standard in broadcast facilities throughout the world.

There have been several advances since the original DigiCart, but all models share these common features: The ability to record and store thousands of cuts and play them back instantly, the ability to do routine editing, convenient front panel controls, automation control, and removable media for backups and file transfers. Transportable recordings for archiving and backup are now stored on removable SD format memory cards. These economical, re-recordable cards are DigiCart's "carts".

DigiCart offers several recording formats and sampling rates. Generally, linear recording is recommended because it will produce the highest quality playback and because today hard disk storage space is inexpensive. However, for compatibility with earlier DigiCart recorders, DigiCart/EX can record and play files using Dolby® AC-2 compression. AC-2 uses 5 times less disk space, while delivering full bandwidth stereo. It should only be used for new recordings when absolutely necessary for compatibility with older DigiCarts, or to make recordings longer than possible with the .WAV format.

DigiCart/EX stores supplementary information along with each individual audio recording, including:

- An index file ID reference that identifies drive, directory and cut
- A name of up to fifteen alphanumeric characters
- Total running time
- Sampling rate
- Recording format
- Editing information for Head and Tail times, Fade In, Fade Out, and Gain

Much of this information is displayed on the front panel of the DigiCart to assist in managing a large audio library.

What's New in DigiCart/EX

DigiCart/EX is the most advanced hard disk/cart system in the broadcast industry. Building on the proven design of the industry-standard DigiCart II and DigiCart/E, your new DigiCart/EX delivers many significant enhancements, such as SD memory card removable media, network connectivity through 360 Systems' Ethernet Audio network, 24-bit audio, WAV file format, a separate sync input, larger display, larger internal disk drive and many other refinements. Please refer to 360 Systems *Ethernet Audio Network Manual* for information on setting up the network.

The star feature of the new DigiCart/EX is its connection to the Ethernet Audio™ network. This 100Mb Ethernet connection allows file transfers, playback over the network, and recording to a network drive. With Bit-for-Bit™ technology, DigiCart/EX and the Ethernet Audio network are also fully compatible with non-PCM audio data such as Dolby-E and AC-3.

A notable feature of DigiCart is selectable recording formats. Choices include linear sampling rates of 96, 88.2, 48, or 44.1 kilosamples/second in stereo, or 48K Dolby AC-2. All formats can coexist. Further, DigiCart/EX has a built-in sample rate converter that can be switched into either the incoming or outgoing audio path. Now, each digital recording can be converted on-the-fly so an entire library can be maintained in at one sample rate standard. Alternately, a library of recordings may be maintained as a mixture of native sample rates; DigiCart/EX can convert these files on output to a predetermined standard (e.g. 48K, for broadcast).

DigiCart/EX can now build and store Playlists on network drives that can be accessed from any DigiCart on the network. Playlists can be used concurrently from many locations, or can be accessed from anywhere in the plant as a production moves from studio to studio.

Hot Keys have always been a DigiCart accessory, but fixed Hot Keys have now been added to the front panel of DigiCart/EX. Hot Keys allow pre-assignment of a cut or Playlist to a trigger key, so that it can be played immediately. This takes the work out of searching for a file when it is needed in a hurry.

An important feature in DigiCart/EX is network Hot Key assignments. Hot Keys can be stored and recalled in two ways, either Network Drive or Local Drive. The chief benefit of using Net Drive Hot Keys is that those Hot Key assignments can be accessed by more than one user concurrently from anywhere on the network.

DigiCart/EX now has a separate AES-11 sync input. An AES-75 ohm input connection is dedicated to this task. Also new are gain adjustment trims on the analog outputs so that DigiCart/EX can be matched perfectly with downstream equipment.

DigiCart/EX now provides power to the 360 Systems RC-320 remote control via the serial cable, so there is no need for a separate wall-mounted power supply. Additionally, there is now a second serial port available for ES-Bus or Peripheral Bus controls, so that the RC-320 remote control can always remain attached.

Finally, DigiCart/EX's LCD display and menus have been organized to provide a clear understanding of the machine state and settings.

Supported File Formats

DigiCart/EX normally records audio in WAV format. Previous DigiCart models used a proprietary recording format. To ensure compatibility with existing DigiCarts and recordings, DigiCart/EX can also play and record those proprietary file formats.

DigiCart/EX displays a three-character abbreviation for each file's format on its LCD display (Format Code). Certain operations are compatible with, or limited to, specific file formats. Understanding the formats will be useful in getting the most out of your DigiCart/EX.

The file suffix in the table below is the file name suffix assigned to Cuts recorded on or copied to a Network Drive. These suffixes can be seen when viewing files on the network using a PC. WAV audio files created on DigiCart/EX can be played by any program supporting that standard.

FILE FORMAT INDICATORS ON THE FRONT PANEL LCD

DigiCart II Compatible

Format	Format Code	Sample Rate	DigiCart/EX Support	File Suffix
Compressed [5]	AC2	48000	(Play/REC)	.DC2
16-bit stereo linear [5]	S16	44100, 48000	(Play/REC)	.DC2
16-bit mono linear [3,5]	M16	44100, 48000	(Play only)	.DC2

New to DigiCart/E

16-bit stereo linear	W16	44100, 48000	(Play/REC)	.WAV
24-bit stereo linear	W24	44100, 48000, 88200, 96000	(Play/REC)	.WAV
16-bit mono linear [3]	T16	44100, 48000	(Play only)	.WAV
24-bit Non-PCM Audio [4]	D24	44100, 48000, 88200, 96000	(Play/REC)	.WAV

NOTES ON FILE FORMATS

1. DigiCart/EX will play DigiCart II files obtained via D-Net.
2. DigiCart/EX does not support 32K sample rate files.
3. Mono recordings (made on earlier DigiCarts) will be played from both channels. DigiCart/EX does not make mono recordings.
4. Non-PCM audio files are used to contain data for encoded or data-compressed audio formats(Dolby-E, Dolby AC-3 , etc.). This data can be recorded and played through the digital I/O ports only. DigiCart/EX will not play it on the analog outputs. DigiCart/EX does not encode or decode the data, instead using "Bit-for-Bit" technology to play back exactly the same data as recorded when using this file type.
5. D-Net can import or export DigiCart II-compatible file types (AC2, M16, S16). No file type conversions are performed during the D-Net transfer process.
6. The "COPY EDITED" utility can be used to convert between DigiCart II formats and WAV file formats. This applies only to linear 16-bit stereo recordings, not AC-2.
7. Non-destructive edits (Head/Tail Trim, Fade In/Out, Gain) can be performed on all formats. The edit parameters are saved in a vendor-specific area of the file header. When playing WAV files on non-DigiCart machines, the edits will not be recognized. However, the "COPY EDITED" utility can be used to render Head/Tail Trims to WAV files playable on other machines.
8. If WAV and DC2 files have the same sample size and sample rate, they may be mixed in a Playlist that is to be converted into a cut.

Storage Capability

Storage time on DigiCart/EX drives will vary depending upon the sampling rate and recording format used. The table below shows approximate recording times, based on stereo recording at different sampling rates. Dolby AC-2 operates only in 48K stereo, 16-bit format.

DRIVE STORAGE TIMES

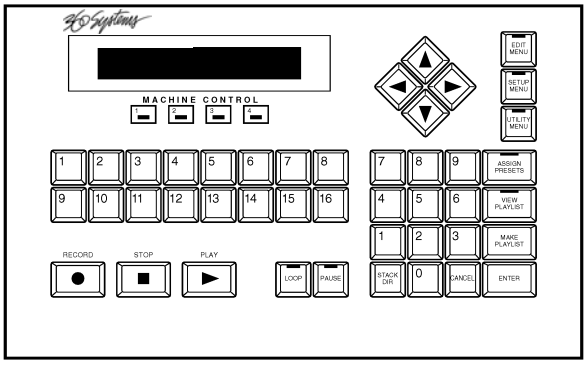
Storage per 1GB	96K LINEAR	88.2K LINEAR	48K LINEAR	44.1K LINEAR	48K/16-bit DOLBY AC-2
STEREO 16-bit	*Not available*	*Not available*	86 min	94 min	462 min
STEREO 24-bit	28 min	31 min	57 min	63 min	

Times quoted are approximate. Storage times may vary with actual use, depending on the combinations of bandwidths, formats and sample rates stored on a drive and the length and number of cuts and Playlists.

Accessories

The following accessories are available separately from 360 Systems.

RC-320 Remote Control



- Fast, Easy Total Control of All DigiCart Functions
- Clear, Intuitive Display of All Operations
- Sixteen Hot Keys for Single Keystroke Playback
- Full Functions for Production Room Operations
- Controls four DigiCart/EX recorders

Remote control Model RC-320 provides full access to DigiCart functions. Each unit is housed in a low profile package that allows for convenient placement. User interface with DigiCart is enhanced through large format, color-coded keyboard-type buttons sensibly placed across the panel. The RC-320 is especially practical when building and editing Playlists and assigning Hot Keys.

A bright display duplicates the command line display on DigiCart/EX and is readable even in brightly lit rooms.

Programmable Hot Keys play back cuts with single-keystroke speed. Once the Hot Keys are assigned, they will remain in memory even if power is turned off between uses. Linear Playlists may also be directly assigned to Hot Keys. Hot Keys are ideal for frequently used cuts, such as sound effects, jingles, and station IDs.

In operation, cuts are found by simply typing in an ID number or scrolling through the directory listings. The RC-320 Pause button works in playback or analog record mode, while the Loop button is handy for repeating a cut without breaks.

The three menu choices, Utility, Setup and Edit, allow access and decision making on all related items. Use the Setup and Utility menu functions to reconfigure DigiCart to best accommodate current operational needs. The Edit menu works for both cuts and Playlists.

Four Machine Select keys allow a single RC-320 to independently control four DigiCarts.

RC-320 Operational Features

Display	In the cued position, the display shows cut name, Index number, length of cut, assigned directory and drive source. It also shows the cuts sampling rate and recording mode— linear or Dolby AC-2 encoded. In the play mode, it shows remaining or elapsed time, current cut and the next cut cued up.
Position Arrows	Select drives and directories.
Select Arrows	Review cuts by scrolling through directory listing. Displays cut name and time.
Hot Keys	Provide rapid playback of sixteen pre-assigned cuts or Playlists.
Find (NO DEDICATED KEY)	Access cuts from any directory (including the Playlist directory), by entering the ID number.
Keypad	Use these 10 keys to enter cut ID numbers. Simply punch in the number and hit Enter for visual verification of the proper cut— then press Play.
Playlist Directory	Direct access to the Playlist directory.
Cancel	Cancels incorrect entries.
Enter	Enters/confirms new selections or entries.
Assign Hot Keys	Selected cuts or Playlists are "mapped" to the sixteen Hot Keys.
View Playlist	Visual preview of a Playlist before use.
Make Playlist	Assemble groups of cuts together.
Play-Stop-Record	Control DigiCart transport functions via RC-320.
Loop	Plays a cut or a Playlist continuously.
Pause	Places machine on "hold" in both Play and Record modes.
Edit Menu	Selects Edit Menu options.
Setup Menu	Selects Setup Menu options.
Utility Menu	Selects Utility Menu options.

Mechanical Specifications

Dimensions	1.875" x 11.5" x 7" (47.6mm x 292mm x 178mm) (H-W-D)
Weight	5 lbs. (2.3 kg)
Display	2-line x 20 character display.
Power Supply	External UL/CSA/VDE approved 9-volt modular supply. Feeds RC-320 through 9-conductor cable via connector at DigiCart end.
Cable	25 foot (7.5 meters) highly flexible 9 conductor cable. Connects directly to DigiCart.

360 Systems

Chapter 1

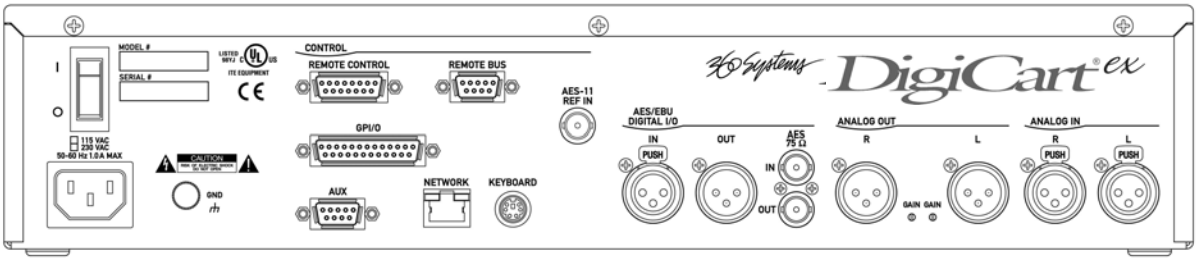
Installation

Mounting

DigiCart/EX may be used on a tabletop or mounted in a 2U, 19″ equipment rack. Rack mounting ears are provided as part of the faceplate and chassis. Four 10-32 truss head screws with washers are provided for this purpose. In some cases, it may necessary to support the back end of the chassis or attached cables. 360 Systems does not provide a bracket for this purpose.

Depending on the space available in the rack, you may need to remove the four rubber feet from the bottom of the chassis to allow the chassis to fit into the rack space. Simply pry these rubber feet from the chassis holes with a small flat blade screwdriver.

Rear Panel Connections



Rear Panel Interface	Connector Type
Power cable connector and switch	IEC-320
Thumbscrew for chassis ground, *not for safety ground*	Thumbscrew
Remote Control Port – dedicated to RC-320 Remote Controls	9-pin “D” female
Remote Bus Port - EIA-485 (EIA-422 compatible) – connection of Remote Bus to other DigiCarts	15-pin “D” female
GPI/O interface	25-pin “D” female
Serial Port - EIA-485 (EIA-422 compatible) serial communications including ES-Bus and Peripheral Bus	9-pin “D” female
Connection to Ethernet network	RJ-45
Port for QWERTY keyboard	6-pin Mini DIN
Connection for IEEE-1394 device	IEEE-1394
Connection for AES-11 Sync Input	BNC female
AES/EBU digital audio input, left and right; AES/EBU digital audio output	3-pin XLR female 3-pin XLR male
IEC-958 TYPE II or AES/SMPTE 75Ω digital audio input	Dual BNC female
Right and Left balanced analog audio outputs	3-pin XLR male
Right and Left balanced analog audio inputs	3-pin XLR female

POWER

WARNING

CONNECT ONLY TO A GROUNDED 50/60 HZ AC OUTLET PROVIDING THE CORRECT VOLTAGE (115 VAC OR 230 VAC, AS DELIVERED).

DO NOT REMOVE OR DEFEAT THE GROUNDING PIN ON THE AC POWER CORD.

A SERIOUS SHOCK HAZARD MAY RESULT FROM FAILING TO MAKE CONNECTION TO A PROPERLY GROUNDED ELECTRICAL OUTLET.

DO NOT USE THE CHASSIS SIGNAL GROUND THUMBSCREW AS A SAFETY GROUND POINT.

DO NOT USE THIS PRODUCT OUT OF DOORS, IN RAIN, OR IN DAMP OR WET ENVIRONMENTS.

Each DigiCart/EX is factory configured for only 115VAC or 230VAC operation. Please check the marking on the rear panel to see if you have the correct DigiCart for your power supply. Use the AC service cord provided to connect the unit to utility power. Use only Underwriters Laboratories recognized replacement cords.

Chassis Ground Screw

A thumbscrew is provided to reduce longitudinal grounding errors between devices having interconnected low-level signals. This feature may reduce hum on the analog input ports.

CONTROL SIGNALS

Several of the most useful standards have been selected to interface DigiCart/EX with professional audio-video equipment and allow functionality with automation systems for the development of custom applications. Detailed technical information about the interfaces will be found in the Appendices.

Remote Control

A Remote Control port is included on the rear panel for connecting DigiCart/EX with a 360 Systems RC-320 desktop remote control.

The control port provides bi-directional serial communication and power. This port is dedicated to an RC-320 remote. Since an RC-320 remote can control more than one DigiCart, a Remote Bus connector is also supplied on DigiCart/EX to daisy-chain remote commands to several DigiCarts. The Remote Bus can be connected to a mix of DigiCart IIs and DigiCart/Es. The pinout used on the Remote Control port can be found in Appendix A, Interface Wiring. Specifics of supported protocols can be found in Appendix B, Serial Control Protocols.

Remote Bus

The Remote Bus connector on DigiCart/EX is used to daisy-chain remote commands to several DigiCarts. The Remote Bus can be connected to a mix of DigiCart IIs and DigiCart/Es. Automation systems can also control DigiCarts through this port. (The Remote Bus connector should not be used as an input when an RC-320 is connected to the Remote Control port)

See "Set Remote Control" in the Setup menu for machine addressing. The pinout used on the Remote Control port can be found in Appendix A, Interface Wiring.

GPI/O Connector

TRANSPORT CONTROLS

The PLAY, STOP, RECORD, PAUSE and LOOP remote control inputs are optically isolated from DigiCart/EX's circuitry; a common floating return is provided. +12V may be sourced from pin 17, or provided from an external source. Current limiting devices are provided within DigiCart/EX so that voltage may be applied directly between ground on pin 4, and any of the transport control inputs.

NOTE: If +12V is sourced from DigiCart/EX, the optical isolators no longer provide isolation. Refer to the partial schematic of the DigiCart/EX interface circuits in Appendix A.

TRANSPORT LAMPS/TALLY OUTPUTS

Open-collector outputs are provided for the PLAY, STOP, RECORD, PAUSE and LOOP tally outputs. An open-collector transistor is used to bring the low side to ground to turn on the external lamp. A +12V source is available on pin 17 of the remote connector for use with external lamps. Refer to the partial schematic in Appendix A, Interface Wiring.

Aux Serial Control

An EIA-485 (RS-485) serial port is included on the rear panel. DigiCart/EX supports ES-Bus and Peripheral Bus protocols, selectable from the Setup menu. All of the functions of DigiCart/EX can be accessed and controlled via this serial port. EIA-485 is a multi-drop version of the EIA-422 specification, and is fully compatible.

With properly terminated lines this port can communicate up to 1,000 meters. The connector pin assignments used on the serial and Remote ports can be found in Appendix A, Interface Wiring. Specifics of supported protocols can be found in Appendix B, Serial Control Protocols.

Alphanumeric Keyboard

An alphanumeric keyboard may be connected to the keyboard connector on your DigiCart/EX for controlling the machine and adding names to cuts, directories, Playlists and disks. Available models include a standard 101-key keyboard, a small footprint mini-keyboard (Model RC-205), or an infrared-linked mini-keyboard (Model RC-235) available from 360 Systems. Contact 360 Systems for details on these accessories.

The SETUP menu must be set to your choice of the standard 101-key PC-AT style keyboard or mini-keyboard types.

Network

An RJ-45 connector is provided for connection to the Ethernet Audio network.

DIGITAL AUDIO

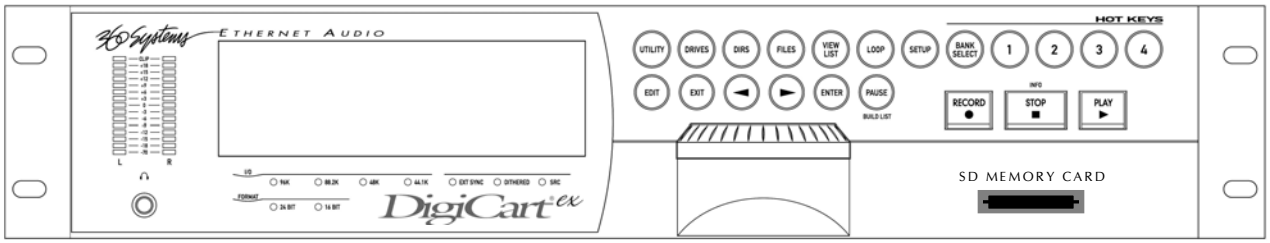
The pinout for the digital audio ports will be found in Appendix A, Interface Wiring on page 63.

ANALOG AUDIO

The pinout for the analog audio ports will be found in Appendix A, Interface Wiring on page 63.

Chapter 2

Control Panel



LCD Display

DigiCart/EX employs a graphics LCD with backlight as it's main display. The display is generally divided into three areas. In the upper left area are the command lines that show machine dialogs, status, and menus. The upper right area is used to display context sensitive navigation clues. The lower area is used to display lists of files in a directory. The selection knob or navigation arrow buttons can scroll lists.

LED Indicators

A series of LED indicators below the LCD display indicate machine settings and I/O conditions. These indicators are arranged in three groups, I/O, Format, and a miscellaneous group.

I/O

Four front panel I/O indicators note the sample rate for recording. Available sample rates are 44.1K, 48K, 88.2K, 96K. During Playback, the I/O indicators show the current playback sample rate, while the recorded sample rate of the file being played is displayed on the LCD. (DigiCart/EX has separate Setup menu settings for record and play sample rates, see "Setup Menu Features" on page 22 for descriptions.)

Format

Two front panel Format indicators note the word size (24- or 16-bit) of the recorded file. During Playback, the I/O indicators show the sample rate at the connectors, while the recorded sample rate of the file being played is displayed on the LCD. DigiCart/EX has separate Setup menu settings for record and play word size, see "Setup Menu Features" on page 22 for descriptions.

Miscellaneous

EXT SYNC illuminates to indicate that sync source is set to an external reference in the Setup menu. The LED blinks if there is no valid sync signal presented at the connector. EXT SYNC may also illuminate or flash when D-NET Receive is on, see page 22.

The DITHERED LED illuminates during record when 24-bit digital audio is being dithered down to a 16-bit word size. It is also turned on during playback of a 24-bit cut when the output word size is set to 16-Bits. Dithering settings can be changed in the Setup menus.

SRC illuminates to indicate that the Sample Rate Converter has been switched into the data path between the recorded file and connectors. SRC may illuminate during either record or playback. SRC settings can be changed in the Setup menus.

When the machine is idle with Input Monitors on, or is in Record Ready, or is recording; the front panel indicators show the state of the signal to be recorded.

When the machine is idle with Input Monitors off, or while playing a cut; the front panel indicators show the state of the currently selected cut.

All front panel indicators are off while a D-Net send is in progress.

Peak Level Meters

DigiCart/E uses quasi-peak reading LED level meters for monitoring left and right channel audio levels. These meters have been selected over standard VU meters for their advantages in monitoring digital audio.

When a +4dBu reference signal is applied to an analog input, the amplitude of the resulting digital signal will be 16dB below digital full scale. Unity gain is always maintained from analog input to analog output, unless the cut's output gain has been adjusted.

The meters on DigiCart/EX have a Clip level indication. The Clip LED will turn on during record whenever the signal exceeds digital full scale. If a clipped file is played, the Clip LED will only turn ON during the period when the signal exceeds digital full scale.

Headphone Jack

DigiCart/EX has a ¼" stereo headphone jack on the front panel for convenient monitoring. The master volume control for this jack is set via a menu item in Setup|Set Headphone Level. The level can be adjusted from 0-64 (1dB per step), and is saved in non-volatile memory.

Selection Knob

The front panel selection knob can be rotated to:

- Select audio files (Cuts) for playback or editing
- Scroll and select items in a list, such as Directories or Drives
- Select from different parameters or choices in a menu
- Adjust values in editable fields

Buttons

NAVIGATION ARROWS

The NAVIGATION ARROW buttons are used to:

- Navigate between drive, directory and cut levels
- Select from different values in a menu
- Select units for editing operations
- Move the cursor during naming operations

ENTER BUTTON

The ENTER button is used to:

- Confirm, execute, or continue an operation
- Answer "Yes" to a query from the display
- Save a playlist

EXIT BUTTON

The EXIT button is used to:

- Exit from a menu
- Cancel or abort an operation
- Answer "No" to a query from the display

On keyboards, the Escape [ESC] key is the equivalent to the EXIT button.

DRIVES BUTTON

The DRIVES button is used to immediately display a drive selection list. The button illuminates when the display is at the Drives level.

DIRS BUTTON

The DIRS button is used to immediately display a list of all available directories on the current drive. The button illuminates when the display is at the Directory level.

FILES BUTTON

The FILES button is used to immediately display a scrollable list of all available files in the current directory. The button illuminates when the display is at the Files level.

SETUP BUTTON

The SETUP button is used to access functions related to machine preferences and configurations. After selecting SETUP, use the selection knob to choose the parameter to be changed. Use the Arrow buttons to change the parameter setting. Setup options are displayed alphabetically in a rotating list. Press EXIT or SETUP to exit the setup menu.

Setup settings are stored in non-volatile memory. The button illuminates while in Setup mode.

UTILITY BUTTON

The UTILITY button is used to access functions such as Hot Key assignments, copy, rename, delete, and disk format operations. Use the selection knob to select a particular Utility function. Utility options are displayed alphabetically in a rotating list. Press the ENTER button to initiate the chosen function. Press UTILITY or EXIT to exit the utility menu.

Your last menu selection is stored in temporary memory. For example, if you need to repeat a copy operation, that option will be displayed first upon subsequent presses of the UTILITY button. After recording, the Rename utility is pre-selected. The button illuminates while in Utility mode.

EDIT BUTTON

The EDIT button is used to access non-destructive editing functions such as head and tail trims, and fades. It is also used to edit a playlist. Rotate the selection knob to view options.

Your last menu selection is stored in temporary memory. For example, if you need to repeat a fade-in operation, that option will be displayed first upon subsequent presses of the EDIT button.

RECORD BUTTON

When the RECORD button is pressed:

> The Input Monitor function will turn on,. the LED meters will be active and the RECORD button will illuminate.
>
> Pressing the PLAY button will initiate recording and illuminate the PLAY button. If a RECORD THRESHOLD level is set, recording will actually begin when the audio level exceeds the threshold level setting.

Audio will be recorded at the sampling rate and recording format currently selected in the SETUP MENU. If using digital inputs, the sampling rate will be automatically set at the sampling rate of the incoming signal, unless Sample Rate Conversion is selected.

PLAY BUTTON

Press the PLAY button to initiate playback of a cut or Playlist. Play has precedence over other machine functions and will cancel Setup, Utility, or Edit menus and begin to play the currently selected cut or playlist.

Subsequent presses of the PLAY button will cause the next selection to play immediately or on completion of the current one, dependent on the RESTART MODE.

A blinking PLAY button indicates another cut is ready for Follow-On play or that Loop mode is active.

A steadily illuminated PLAY button indicates DigiCart/EX will stop after the current cut.

STOP BUTTON

Press the STOP button to terminate playback or recording. When DigiCart/EX's "virtual tape transport" is stopped, the button will be illuminated.

During Follow-on play, or playing a Playlist or loop; pressing STOP will end playback upon completion of the present cut. Press STOP a second time to stop the current cut and delete the Follow-on play list.

When DigiCart/EX is not playing a file, STOP may be pressed to display information about [INFO] the current drive number, name, and the available recording time remaining on the drive (based on the currently selected recording format).

VIEW LIST BUTTON

The VIEW LIST button will immediately display the contents of a Quickstack or Playlist. VIEW LIST is a toggle button that illuminates when active. The displayed list is scrollable. VIEW LIST can be used only when there is a current list to view. If there is no current list, the button will not respond.

LOOP BUTTON

Press the LOOP button to cause the current cut (or current cut in the queue or Playlist) to continue to cycle until the loop is disabled. Looping can only be activated during Play. The LOOP button will illuminate and the PLAY button will flash to indicate Looping.

To disable a loop, press LOOP again or press STOP. The LOOP button indicator will turn off, and the current cut will finish playing, but will not continue to loop. Press STOP a second time to immediately stop playback of the current cut.

To disable a loop that was enabled while playing a Quickstack or Playlist:

- Press LOOP again. The LOOP button indicator will turn off, the current cut will finish playing, and the Quickstack or Playlist will continue playing.

OR

- Press STOP *once*. The LOOP button indicator will turn off, the current cut will finish playing, and playback will stop at the end. (Quickstacks will be deleted).Pressing STOP a second time will immediately stop playback

PAUSE BUTTON

The PAUSE button is used to:

1. Pause playback. The button illuminates when active. Press PAUSE again to disengage it and playback will resume from the paused position.
2. Pause recordings. The button illuminates when active. Press PAUSE again to disengage it and recording will resume from the paused position. Note that Pause during Record does not work when using digital input.
3. In Stop mode, PAUSE is used to build a Quickstack or Playlist.

BANK SELECT AND HOT KEY BUTTONS

DigiCart/EX has four Hot Key buttons on its front panel (labeled 1 through 4), which can be used to trigger playout of a pre-assigned cut or Playlist. Any cut or Playlist can be assigned to any Hot Key. Hot Keys allow any cut to be played on command by a single key press.

Whenever an assigned Hot Key is pressed, the corresponding Cut is selected and played at once. (If PLAY RESTART MODE is set to ON COMPLETION, the Cut will be played after any playing Cut and any other Cuts that are waiting to play.) A Hot Key will interrupt any other operation.

Hot Keys can be triggered from an RC-series remote control, a keyboard, or the DigiCart/EX front panel. The front panel buttons are arranged into two banks that can be switched by pressing the BANK SELECT button. In this way, up to eight Hot Keys can be set up for play from the front panel. The button toggles between the two banks, and illuminates when bank B is active.

Memory Card Reader

The Memory Card Reader allows the use of SD memory cards for audio storage. The Card Reader appears in the system as a Drive at ID 0, with the standard directories numbered 0 to 9, and an S directory for Stacks.

MEMORY CARD INSERTION

Insert the card label side up, with the contacts facing down. Slide it into the card slot until you feel a slight resistance, then press until the card reaches the end of the slot. The card will return slightly as you release pressure then remain locked in the Card Reader.

If the card is difficult to insert, check its orientation and try again. ***DO NOT FORCE THE CARD INTO THE READER.*** *Objects inserted into the reader may damage it.*

A Memory Card must be formatted in the DigiCart/EX before use. See formatting instructions on page 37. Unformatted cards will display NOT FORMATTED FOR DIGICART and NON-DIGICART DISK.

Cards formatted in a PC cannot be used unless reformatted in DigiCart/EX, and DigiCart formatted cards will not be recognized by a PC or other device.

Most memory cards will mount automatically after a short delay. The display will indicate MOUNTING MEMORY CARD (along with the detected size of the card; this is the total capacity, not the remaining capacity).

If the card does not mount automatically, press the **Stop** button to mount the card. The display will indicate CHECKING FOR MEMORY CARD. If the card is recognized the display will indicate MOUNTING MEMORY CARD. If the card is not recognized then the display will indicate NO MEMORY CARD FOUND. This can be caused by a faulty or incompatible card.

If the Card has been formatted the display will show INITIALIZING MEMORY CARD followed by the contents of Directory 0 or the first directory that contains recordings. Unformatted cards will display CARD NOT FORMATTED FOR DIGICART.

If a Card is inserted during Record or Playback, it may or may not mount automatically when the operation is stopped. If not, select Drive 0 and press Stop to mount the card.

MEMORY CARD REMOVAL

It is best to remove and insert memory cards only when the DigiCart is idle. REMOVING A CARD DURING MEMORY CARD PLAYBACK, MEMORY CARD RECORD, COPY OR RENAME OPERATIONS MAY RESULT IN LOSS OF DATA.

To remove the memory card, press inward lightly until the card reaches the back of the card slot. Upon release the card will unlatch and should be easily removed from the card slot. **DO NOT USE FORCE TO REMOVE THE CARD**, try pressing inward again until the mechanism releases the card.

Wait for the DigiCart to display the message MEMORY CARD REMOVED PLEASE WAIT... before continuing operation.

If you do remove a card during Playback, DigiCart/EX will lock out selection of the Card Reader (Drive 0) until after Playback has stopped and a MEMORY CARD REMOVED message has been displayed.

APPROVED MEMORY CARDS

The following memory cards have been tested and are known to work with DigiCart/EX.

- Kingston UltimateX 100X SDHC Class 10 SD10G2 - 4GB, 8GB and 16GB.
- Kingston SDHC Class 10 SD10V – 8 GB.
- Kingston Ultimate 100x SDHC Class 6 SD6G2 – 8 GB.
- Patriot LX Secure Digital High Capacity Class 10 – 8GB.
- PNY Professional High Speed SDHC Class 10 20MB/s – 8 GB.
- Sandisk Extreme SDHC UHS-1 Card Class 10 - 4GB, 8GB, 16GB.
- Sandisk SDHC Card Class 4 – 8 GB.
- Sony SDHC Class 10 SF-8NX/TQ2 - 8GB.
- Team Group Inc. SDHC High Performance Memory Card Class 10 – 4GB.

NOTES ON CARD COMPATIBILITY

Memory cards contain controller electronics that adhere to different revisions of industry standards. Because of these differences, some cards will not mount automatically upon insertion. If you are unable to find Approved cards, try to use cards that are SDHC compliant, and speed class 6 or greater, preferably class 10. The higher speed is not required for operation, but it increases the chances that the card uses newer industry standards.

Approved cards are known to mount automatically. Most cards will work well in the system even if they require mounting with the Stop button, however a few have been seen to cause other issues. See page 62 for notes on troubleshooting memory card operation.

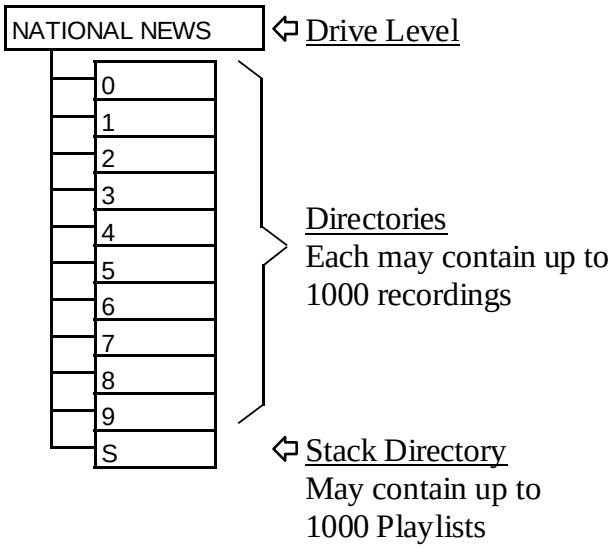
Chapter 3

File Organization and Navigation

Overview of Drive and Directory Structure

DigiCart/EX retains the same drive and directory structure as previous DigiCarts. DigiCart/EX can have up to seven "logical" drives (numbered 0-6). Drive 0 is always the Memory Card Reader. Drive 1 is always the internal hard disk. The internal hard disk can be partitioned into 1 to 5 logical drive partitions (see Format Disk under Utility Menu Features). Finally, up to four of remaining drive numbers may be mapped to Network Drives. (See Mount Network Drive under Utility Menu Features.)

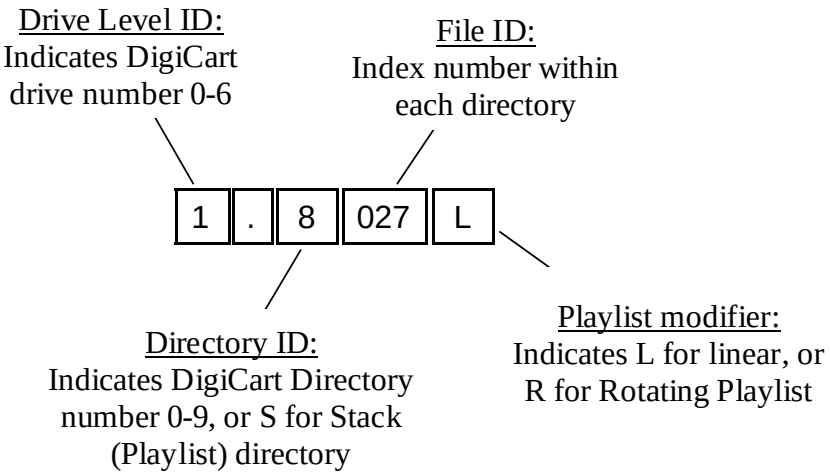
It may seem overwhelming to consider that DigiCart/EX may access tens of thousands of individual recordings and Playlists. Yet the ID and name system of DigiCart/EX simplifies and clarifies the location and identity of every cut and Playlist.



Each drive has 11 directories (numbered 0 through 9, plus "S"). Drives and Directories can be labeled for convenience. Each directory contains 1,000 Index numbers for audio files, called "Cuts". Cuts can be of any length, but are identified by this fixed Indexing scheme. Directory S is reserved for up to 1,000 Playlists (or Stack files). Playlists are not audio files, but merely listings of file IDs. Audio files cannot be stored in the Stack Directory.

Network Drives are folders on a server, PC or other network storage resource. Four can be mounted on a single DigiCart/EX at a time. However, many of these "virtual drives" can be created on the network, and selected through the Mount Network Drive process. These folders can be shared by multiple DigiCart/EX units, and with proper network configuration can also be shared by other PC users.

Files may be accessed by name or by file ID number. The key to the file ID system is an easily understood five-character basic identifier. The first character represents the logical disk drive.



After a "." (decimal) the second character represents one of ten directories, ranging from 0 - 9. A unique eleventh character, "S" is used to identify the **S**tack Directory (or Playlist Directory).

The next three digits identify individual cuts or Playlists: 000-999 so there can be 1000 cuts in each of the 10 regular directories. An extra character follows Playlist numbers: L for Linear Playlists, R for **R**otating Playlists. For example:

Cut 27 in Directory 8 on the internal hard disk would have the ID: 1.8027

Rotating Playlist 5 on the Memory Card Reader would be identified as: 0.S005R

Every drive, directory, cut and Playlist can be given a 15-character alphanumeric name, so it is not necessary to crosscheck between a printed index and the screen display. DigiCart/EX can sort contents numerically by file ID, or alphabetically by name.

Drive Organization Strategy

As a network organizational strategy, it is recommended that all DigiCart/EX recorders in a network be configured largely with the same drive organization. This will simplify network management and sharing of Playlists and Hot Key assignments.

Each DigiCart drive has 10 fixed directories for audio recordings and one additional directory for Playlists. Each directory can hold up to 1000 files of any length. Depending upon your recording and organizational requirements, you may choose to partition this internal disk with 2 to 5 equally sized partitions within this 137 GB system capacity.

DigiCart/EX has a flexible drive arrangement that allows a mix of internal drive partitions and network drives. There are seven (0 through 6) drive selection numbers available on a DigiCart. Drive 0 is always the removable media drive. Drive 1 is always the first hard disk partition. Drive 6 is always available for a network drive assignment. Drives 2 through 5 can be either internal disk partitions or mapped to network drives. As more local partitions are created, fewer drive numbers are available to map to network drives. Once the internal disk is partitioned, drive numbers associated with those partitions cannot be re-mapped to network drives unless the internal disk is reformatted.

For example, if the internal disk is partitioned into three drives (Numbers 1, 2, and 3), three drive numbers (4, 5, and 6) are available to map network drives. If the internal disk is not partitioned (is only Drive 1), then drives 3, 4, 5, and 6 are available to map network drives; Drive 2 is not available in this case. See *DigiCart/EX will exit the* Utility menu when formatting is complete.

Allocation of Logical Drives on page 37 for detailed information on setting up drives.

Network drives become available to DigiCart/EX by mapping their mount path to a DigiCart/EX drive number. A mount path is simply a shared directory on the server. From the DigiCart/EX's point of view, it looks like another drive, hence the name "network drive." Using the Mount Network Drive utility, a list of available mount paths from the server can be viewed and selected for mounting to a particular drive number. Drive number-to-mount path associations can be changed at any time. Network drives are available to all DigiCart/EX recorders concurrently.

A common scheme for network organization will be to create a central library drive on the network. The central library is intended to hold recordings and Playlists that need to be available to all DigiCart/EX recorders on the network. Like all other DigiCart drives, the central library drive will have ten sub-directories and a Playlist (Stack) directory. Each sub-directory can be organized to hold homogenous material such as music or sound effects. While many "virtual drives" can be created on the network server, consideration should be given to the organizational strategy, so that DigiCart/EX users will be able to locate desired drive mount paths.

Different DigiCart/EX recorders in the facility may each have a different number of internal drive partitions, depending upon individual work requirements. Since drive 6 is always available for network use, regardless of the number of hard disk partitions, it should be assigned to your central library. Drives 3, 4, and 5 can be assigned to more task-specific network drives, such as a particular entertainment project or news production.

NETWORK PLAYLISTS AND HOT KEYS

Playlists on network drives can be accessed and played by any DigiCart/EX. It is recommended that all files called from a Playlist reside on the same drive as the Playlist (sources can be in any directory on the drive). Because individual DigiCarts might have unique drive path assignments, Playlists may not play correctly (or at all) if calls are being made to drives that are not correctly mapped.

Hot Key assignment lists (a new feature of DigiCart/E) allow users at any DigiCart/EX on the network to access the same Hot Key assignments. This allows several people to use the same setup when working together on a production. Hot Key assignment lists can be used concurrently.

Each drive contains one Hot Key assignment list. The Hot Key list on each drive is automatically selected when the PLAY HOT KEY USING parameter in the Setup menu is set to "Net Drive." All files called from a Hot Key list must reside on the same drive as the Hot Key list, itself, though source files can be in any directory on that drive.

The PLAY HOT KEY USING parameter can be set to "Local Assignment," causing DigiCart/EX to use a different Hot Key assignment list that is associated only with that particular DigiCart. Local Hot Keys can be assigned to cuts or Playlists on a local drive, only. If the PLAY HOT KEYS USING parameter is set to "Local Assignments", the Local Hot Keys list will always be used, regardless of the current drive.

Structure Details

DIRECTORIES

DigiCart/EX provides directories to organize and group audio cuts that have something in common; e.g.: spots, jingles, station IDs, production music beds, common types of sound effects, etc.

An additional directory, S, is used to store information about Playlists.

FILES

Files, or "Cuts" are individual recordings. Each recording creates an individual audio data file. Each audio file stores its ID and name, plus information about total playing time, sampling rate and recording format. This information is shown on DigiCart/EX's front panel display each time a cut is selected for playback.

Other information contained in the file is not shown on the display unless called up by EDIT menu activities. This includes HEAD and TAIL markers, FADE IN and FADE OUT markers, OUTPUT GAIN settings and other information.

Cuts may be edited using DigiCart/EX's non-destructive editing features. You can also place Secondary cue markers in cuts, and copy cuts to other drives and directories or other index numbers in the same directory. All cuts may be played back-to-back, even if they reside in different drives or directories. *Note: there may be a slight audible click between cuts when the cuts are of different sample rates.*

PLAYLISTS

There are two types of Playlist: Linear and Rotating. Once started, a Linear Playlist will continue with Follow-On play until all of its contents have been played, or the user presses STOP. A Rotating Playlist will stop after each cut and wait for a PLAY command to continue. Playlists may contain other Playlists, this nesting is called a Compound Playlist.

For example, by recording several different leads and tags to a recurring song or break, the rotation lets you automatically vary the front- or back-announcement. When programmed as a Linear Playlist with a rotating lead or tag, the item will have a different nature with each occurrence.

Network Drive Error Messages

NO NETWORK LINK

A mount path for the drive has been assigned using the MOUNT NET DRIVE utility, but no connection to the network was detected. This typically means the network cable is not plugged in.

SERVER UNAVAILABLE

The server must be configured to provide the Dynamic Host Configuration Protocol (DHCP). This service is used by the DigiCart/EX to obtain its Internet Protocol (IP) address.

If this message persists, it may be that the DHCP service has not been enabled on the server. It could also mean that the server is turned off, or there is no connection between the server and the hub to which the DigiCart is connected.

WAITING FOR NFS

The unit has successfully determined its IP address, either using DHCP or by using a fixed address assignment. However, if this message persists for more than a few seconds, then the unit was unable to find a server configured to run the Network File System (NFS) protocol. This service is needed by DigiCart to access files on the server.

WAITING FOR MOUNT

If this message persists for more than a few seconds, then the current mount path established using the MOUNT NET DRIVE utility, and saved in the setup file on the DigiCart's hard disk, could not be found in the list of exported paths provided by the NFS server.

Either enable NFS sharing on the server for this path, or select a different mount path using the DigiCart's MOUNT NET DRIVE utility.

File Navigation User Interface

DigiCart/EX display is divided into three areas. In the upper left area are the lines that show current machine activity. These two lines also appear on the RC-series remote controls. The upper right area is used to display context sensitive navigation clues. The lower area is used to display file lists in the current directory. Using the selection knob you can scroll lists.

NAVIGATION CONTROLS

You can easily move between the Drive/Directory/Files levels by pressing the DRIVES, DIRS or FILES keys or using the navigation arrow keys. Once a list is selected, use the selection knob to peruse the list. The current file (or directory or drive) will be displayed in the upper left area of the LCD.

DRIVES Button

Pressing DRIVES activates the drive selection field. The current drive will be highlighted. Use the selection knob to make a selection.

DIRS Button

Pressing DIRS presents the directory selection list. The current directory will be highlighted. Use the selection knob to make a selection.

FILES Button

Pressing FILES will display a list of all files in the current directory. The current file will be highlighted. Use the selection knob to make a selection.

File Find Function

By using the alphanumeric keyboard, you can instantly find any cut by name or ID. RC-320 users can find cuts or Playlists by ID number. Cuts in the current directory only require entry of their cut number or name. However, a search by name will search all directories. You may also find them by

typing only as much of their name as makes them unique. For example: If there is a cut named "BOSTON" and another named "BOND", BOS <ENTER> will find the first and BON <ENTER> will find the other. This search progresses from the currently selected cut, so if there is more than one cut with the same or similar names, subsequent FIND operations will find each one in turn.

NOTE: For cuts in other directories, use the full four-number Identifier. "S" indicates the Playlist Directory. For cuts on other drives, use the full five-number Identifier.
The " . " (decimal) separator is not needed with the FIND function.

Find can be used in the process of creating a Quickstack. Please see Playlists on page 47.

USING THE FIND FUNCTION WITH A KEYBOARD

Press the keyboard's Find function key. The display will show a blinking cursor on the top line. Begin typing your search name or file ID. Use the S key when finding I.D. Numbers in the Stack (Playlist) Directory. Press ENTER to make the selected cut or Playlist current.

Information on the bottom line of the command display pertains to the currently selected cut.

Note: SCROLL LOCK enables the keyboard to play Hot Keys. Be certain that SCROLL LOCK is OFF when using the keyboard for Find or other functions, otherwise a Hot Key may be accidentally triggered.

USING THE FIND FUNCTION WITH AN RC-320

Begin typing your search file ID on the gray number keys on the RC-320 keypad. The numeric keypad on the RC-series remotes automatically assumes that you are beginning a new file ID search. The information on the bottom line pertains to the currently selected cut.

Press ENTER to select the cut when the correct selection is found. The screen will display information about the newly selected cut.

Press PLAY to play the cut or enter it into a Playlist (see Quickstack in Creating a Playlist on page 49). Repeat as necessary for Follow-On Play.

The RC-320 STACK DIR Key

Find Playlist (Stack) operations on the RC-320 are expedited by use of the STACK DIR key. Instead of using the remote's navigation arrows to move to the Playlist Directory, you may quickly select a Playlist on any mounted drive by pressing the STACK DIR key on the remote.

The top line of the display will prompt you to "FIND STACK:". Enter four digits – the first digit represents the drive number, the next three digits indicate the file ID number. Press ENTER to make that Playlist current. The screen will show information about the newly selected Playlist.

Press PLAY to play the Playlist or enter it into a Compound Playlist. Repeat as necessary for Follow-On Play.

Chapter 4

Setup and Utility Menus

Menu Navigation

The SETUP menu defines the operational behavior of the DigiCart/EX. Setup options are displayed alphabetically in a rotating list.

- Press SETUP. Rotate the Selection Knob to view the options.
- Use the navigation arrow buttons to select the available settings for the selected option.
- Setup parameters are stored on DigiCart's internal hard disk. Settings do not have to be confirmed, changes take place immediately.
- Press EXIT.

The UTILITY menu is used to access special operations such as Assign Hot Keys, Copy, Delete, Rename, , and disk format operations. Utility operations are displayed alphabetically in a rotating list.

- Some Utility operations are dependent on the selection of DRIVE, DIRECTORY or FILE. Select the Drive, Directory or Cut you want to operate on before entering the Utility menu.
- Press UTILITY. Rotate the Selection Knob to view the options.
- Press the ENTER button to initiate the chosen operation.
- Press UTILITY or EXIT to exit the menu.

The Utility menu selection is stored in temporary memory. If you need to repeat a copy operation, that option will be displayed first upon subsequent presses of the UTILITY button. The button illuminates while in Utility mode.

Setup Menu Features

D-NET RECEIVER

Setting this parameter ON configures the digital I/O ports to allow receiving D-Net file transfers from other DigiCarts. See Appendix D on page 70 for a complete discussion of D-NET. The following four parameters appear only if D-NET Receiver is ON:

D-NET RECEIVER INPUT - Select the digital input to be used to receive D-NET. See page 83.

D-NET RECEIVER DIR - Select where received files are placed. See page 83.

D-NET RECEIVER NAME - Give this DigiCart/EX a name to allow addressed transfers. See page 83.

D-NET RECEIVER ECHO - Allow this DigiCart/EX to pass transfers through its digital outputs to 1 or more other units. See page 83.

PLAY DIGITAL FORMAT

- PROFESSIONAL FORMAT
- CONSUMER FORMAT

The DigiCart/EX can output audio on all output connectors simultaneously. The digital outputs can output data in one of two selected formats. The PLAY DIGITAL FORMAT menu sets the format of the digital audio at the outputs.

The Professional Format setting will provide an AES/EBU signal at the XLR-3M digital output connector, and an AES/SMPTE 75 ohm signal at the BNC digital output connector.

The Consumer Format setting will provide an IEC-958 Type II signal at the BNC connector. The XLR outputs should not be used when the CONSUMER output is selected.

Recordings are not copyright protected when output in the consumer format.

PLAY HOT KEYS USING

- LOCAL ASSIGNMENTS
- NET DRV ASSIGNMENTS

As a new feature in DigiCart/EX, Hot Key assignments can be stored and recalled in two ways, either Network Drive or Local. The PLAY HOT KEYS USING parameter controls the default behavior for Hot Key assignment lists.

If this parameter is set to "Net Drive", DigiCart/EX will use the Hot Key list on the currently selected network drive. While set to play Hot Keys from a network drive, if the current drive selection is changed to a local drive, the Local Hot Keys list will automatically become active.

If the PLAY HOT KEYS USING parameter is set to "Local Assignments", the Local Hot Keys list will always be used, regardless of the current drive.

PLAY RESTART MODE

- ON COMPLETION
- IMMEDIATE

While one cut or Playlist is playing, you can choose other selections for playback. Restart Mode determines whether DigiCart/EX will discontinue playback of the current Cut and begin playback of the next selected Cut immediately when PLAY (or a HotKey) is pressed, or wait until the current selection has completed.

PLAY SAMPLE RATE

- AS RECORDED
- OUTPUT AT 44100
- OUTPUT AT 48000
- OUTPUT AT 88200
- OUTPUT AT 96000
- CONVERT TO REFIN
- CONVERT TO DIGIN BNC
- CONVERT TO DIGIN XLR

This menu item sets the sample frequency and sync reference source for digital outputs. The "As Recorded" setting will play any file using its recorded sample rate during play out.

Files recorded at various sample rates can be converted to a selected rate at play out. Files are not permanently converted; the sample rate converter is switched into the data path and operates "on the fly" during output. For example, if this setting is "Output at 48000", all files will play at 48000.

Files recorded at any sample rate may be converted to match an external reference frequency during play out. Setting this menu item to "Convert to Ref In" or "Convert to Dig In" will place the SRC in the output path and use the externally supplied signal to clock the output rate. Ref In is the AES-11 BNC connector, Dig In is the digital audio input on either the BNC or XLR connectors.

The recorded sample rate of the current file is displayed on the LCD. Whenever the SRC is switched into the signal path, the SRC indicator on the front panel will illuminate. The EXT SYNC indicator on the front panel will illuminate if the sync source is set to one of the external sources.

PLAY WORD SIZE

- 16 OR 24 AS RECORDED
- 16 BIT

This menu item sets the data word width for digital outputs.

Files recorded at various word sizes can be converted to a selected size at play out. Files are not permanently converted.. When set to "As Recorded", no conversion is applied. When set to "16-Bit", all files will be play in 16-bit format; dithering will be applied to 24-bit files. . Whenever dithering is switched into the signal path, the DITHERED indicator on the front panel will illuminate.

If the sample rate of the file to be played is 96000 or 88200 then dithering is not performed, regardless of the PLAY WORD SIZE selection

RECORD AUDIO SOURCE

- ANALOG
- DIGITAL XLR
- DIGITAL BNC

Sets the audio input port for recording. Sub-menus set record sample rates and sync sources.

RECORD SAMPLE RATE

Options if Record Audio Source is set to ***ANALOG:***

- 44100
- 48000
- 88200
- 96000
- REFIN RATE
- DIGIN RATE (BNC)
- DIGIN RATE (XLR)

DigiCart/EX will convert analog signals to digital data at a sample rate selected here. Internal clock signals are used, except for the Ref In Rate and Dig In Rates, which are external sync sources. Ref In is the AES-11 BNC connector. Dig In is selected to be one of the digital audio inputs.

Options if Record Audio Source is set to ***DIGITAL:***

- AS RECEIVED
- CONVERT TO 44100
- CONVERT TO 48000
- CONVERT TO 88200
- CONVERT TO 96000
- CONVERT TO REFIN

When set to "AS RECEIVED", DigiCart/EX will use the AES data stream clock as its sample rate.

When "CONVERT TO *a specific sample rate*" is selected, the recording will always be made at this rate. If the incoming digital audio sample rate is not already at this rate, the sample rate converter will be automatically switched into the data path to obtain the specified rate.

Digital audio presented at any sample rate may be converted to match an external reference frequency during record. Setting this menu item to "CONVERT TO REFIN" will place the SRC in the input path and use the externally supplied signal to clock the input rate. RefIn is the AES-11 BNC connector.

The recorded sample rate of the current file is displayed on the LCD. Whenever the SRC is switched into the signal path, the SRC indicator on the front panel will illuminate. The EXT SYNC indicator on the front panel will illuminate if the sync source is set to an external source.

Some of the RECORD SAMPLE RATE options may be suppressed depending on the current RECORD DATA FORMAT. For example, if the AC2 compressed file format is selected, the sample rate is limited to 48000 only. Also, the 88200 and 96000 rates are available only if the 24-bit WAV format is selected.

RECORD DATA FORMAT

- 24 BIT WAV
- 16 BIT WAV
- 16 BIT DC2
- 16 BIT AC2
- 24 BIT DIGITAL DATA

Sets the data format for the recorded file. DigiCart/EX will normally record in either 16- or 24-bit linear stereo WAV format. Additionally, recordings can be made in 16-bit linear DigiCart (DC2) format, or 16-bit AC-2 format.

See Appendix E for details on using the 24Bit Digital Data format. This can be used to record encoded signals such as Dolby E.

RECORD DITHERING

- OFF
- DITHER DIGIN 24>16

Sets dithering ON or OFF for digital inputs during Record. The system does not make any assumptions about the word size of the incoming stream. If you have selected a 16-bit record data format and the digital input is known to be 24-bits then select the DITHER DIGIN option.

RECORD OVERWRITE

- CREATE NEW CUT
- REPLACE EXISTING CUT

Record Overwrite sets a default behavior for new recordings. "Create New Cut" assigns the next available cut ID number in the current directory to the new recording. "Replace Existing Cut" records new audio to a previously-used cut ID number.

When the RECORD button is pressed while Record Overwrite is set to "Replace Existing Cut", DigiCart/EX goes into Record Ready mode with the currently selected cut ID in the command line. Press PLAY to begin recording to the Cut ID number, overwriting the existing audio. If you elect not to overwrite the targeted Cut, select an unused ID in the same directory (existing Cut IDs will not be displayed), or press STOP to cancel recording.

RECORD THRESHOLD

- -6 dB
- -12 dB
- -18 dB
- -24 dB
- -30 dB
- -36 dB
- -42 dB
- -48 dB
- -54 dB
- -60 dB
- OFF

DigiCart/E provides the option of recording "upon audio". When in Record Ready mode, DigiCart/EX will wait to trigger on incoming audio at or above a pre-selected threshold. Select a threshold level value (default is –42dB), or OFF. When OFF is selected, recording begins immediately after pressing RECORD and PLAY. The threshold trigger level will be displayed on the command line while in Record Ready mode while waiting for the threshold to be crossed.

When using this mode, if the recorded cut sounds "upcut" or clicks at the beginning, reset the threshold to a lower threshold dB value and try again. If recording starts too soon due to noise in the source being recorded, select a higher threshold value. In some cases, programming a short fade-in will eliminate a pop at the head of a recording, eliminating the need to re-record.

Threshold Recording with a Digital Input

Once digital recording has been initiated, DigiCart/EX waits for a valid digital input before commencing. The digital signal must be present, valid and stable from the time recording commences until the recording ends. Any interruption or change will terminate the recording.

In some cases, the source machine may require time to stabilize. It may be helpful to pre-roll and start the source before placing DigiCart into record, or to pause a CD player before recording, rather than commencing record and then starting the source player from a standstill.

RECORD TIME LIMIT

- NONE
- 30 SEC
- 1 MIN
- 5 MIN
- 30 MIN
- 60 MIN

Enhances the management of available Disk space of DigiCart/EX and accelerates entry to the Record Ready condition when set to smaller values. Furthermore, you can start a recording and walk away knowing that after the specified time limit (setting +5%), the unit will stop recording.

SET AUX PROTOCOL

- ES-BUS
- PERIPHERAL-BUS (GV)
- PERIPHERAL-BUS (SONY)

Defines the serial protocol for the AUX serial port on the rear panel. See Appendix B for Serial Protocol documentation.

SET CONTRAST

- 0 to 100

Adjusts the LCD contrast. Select a value that works best for your viewing angle and lighting conditions.

SET HEADPHONE LEVEL

- 0 to 64 (1 db per step)

Adjusts the volume for the ¼" headphone jack on the front panel. Select a value.

The Headphone level can also be set by pressing the Setup button during playback. Press Setup again to keep the new setting and return to the normal playback display.

SET INPUT MONITOR

- OFF
- ON *or DISABLED BY D-NET*

Allows you to monitor audio that has been processed through the digital audio circuitry.

Digital monitoring cannot be accomplished if the D-NET receiver is enabled. The message, "Disabled by D-Net" will appear to advise you that the input monitor cannot be turned on.

NOTE: DigiCart/EX provides "pass through" A/D - D/A audio when the REC button is pressed. Therefore, most operations may be accomplished with the INPUT MONITOR: OFF.

SET IP ADDRESS

- AUTOMATIC
- 192.168.1.16 – 31, 192.168.2.16-31

DigiCart/EX can automatically set its IP address using network DHCP services. If running on a network without DCHP service, the IP address can be set manually. One of thirty-two addresses can

be selected in the range of 192.168.1.16 to 192.168.1.31 or 192.168.2.16 to 192.168.2.31. The factory default setting is AUTOMATIC.

SET KEYBOARD TYPE

- MINI
- STANDARD

Full size and miniature keyboards use different key codes because of key overlaps. This menu item provides a setup for the standard 101-Key AT-style keyboard or small footprint mini-keyboards (RC-205) or infrared-linked mini-keyboards (RC-235).

NOTE: The keyboard must be connected at the time of power-up, or it will not be recognized.

Keyboard Mapping Assignments

The chart below shows mapping of keys to DigiCart/EX functions. Function keys F1 through F12 and arrow keys emulate front panel buttons and the selection knob for remote control of all DigiCart/EX functions.

KEY	FUNCTIONS ON MINI-KEYBOARDS	FUNCTIONS ON 101-Key KEYBOARDS
F1	UTILITY MENU	UTILITY MENU
F2	SETUP MENU	SETUP MENU
F3	EDIT MENU	EDIT MENU
F4	VIEW LIST	VIEW LIST
F5	FIND	PAUSE
F6	PAUSE	LOOP
F7	LOOP	SECONDARY
F8	RECORD	D-NET XFER
F9	STOP	FIND
F10	PLAY	RECORD
F11*	SECONDARY	STOP
F12*	D-NET XFER	PLAY
UP ARROW	SELECTION KNOB CW	SELECTION KNOB CW
DOWN ARROW	SELECTION KNOB CCW	SELECTION KNOB CCW
LEFT ARROW	LEFT NAVIGATION ARROW	LEFT NAVIGATION ARROW
RIGHT ARROW	RIGHT NAVIGATION ARROW	RIGHT NAVIGATION ARROW
ENTER / RETURN	ENTER	ENTER
ESCAPE	EXIT	EXIT
0 - 9	INDEX NUMBER LOCATORS	INDEX NUMBER LOCATORS
SCROLL LOCK	TOGGLE HOT KEY ENABLE	TOGGLE HOT KEY ENABLE

NOTE: F11 and F12 are Shifted keys on mini-keyboards.

SET REMOTE CONTROL

- INACTIVE
- ADDRESS (01-32)

When set to INACTIVE, DigiCart/EX can be taken "off-line" from the remote control bus and will not respond to remote commands. To activate remote control, select an ADDRESS (1 - 32) to establish communication with one of 360 Systems' RC-series remote controls, an automation system that uses the DigiCart serial protocol, or a Peripheral Bus (also called P-Bus or E-MEMS) serial connection. Addresses 1 to 4 correspond to the four machine control buttons on a 360 Systems RC-320 remote control. See Appendix B for DigiCart ES-Bus or P-Bus Serial Protocol documentation.

SET SORT ORDER

- BY INDEX
- BY NAME

Selects the display sort order of cuts or stacks listed on the LCD display.

SET TIME DISPLAY

- ELAPSED TIME
- TIME REMAINING

Determines whether the counter will display time as ELAPSED (count up) or REMAINING (count down) during play or edit operations.

Utility Menu Features

The UTILITY MENU is used to manage Hot Keys, rename Drives, Directories, Playlists or Cuts; and how to copy them to different directories and drives. Also explained are procedures for formatting memory cards.

ASSIGN HOT KEY (PRESET)

This utility allows assignment of a cut or Linear Playlist to a Hot Key on DigiCart/EX, an RC-series Remote Control, or to the letter keys of an alphanumeric keyboard. When assigned, the selection will play immediately with a keystroke. Hot Keys may only be assigned to cuts on hard disk drives (not memory cards), but may be on either the local drive, or a network drive.

Hot Key assignments created on network drives are available from any DigiCart/EX on the network. For example, make a standard set of Hot Keys for all the edit studios working on the same production, or make a personal Hot Key list that can be accessed in any studio.

- Hot Keys are subject to the currently selected RESTART MODE. (*i.e.* IMMEDIATE or ON COMPLETION).
- Contents of a directory may be mass assigned to Hot Keys by entering the UTILITY MENU'S ASSIGN HOT KEY from the directory level.
- The alphanumeric keyboard's Scroll Lock must be ON to assign or play Hot Keys from the keyboard. Scroll Lock may be ON or OFF to CLEAR HOT KEYS.
- It is *not* necessary to clear a Hot Key before reassigning it.

Hot Key Mapping

Hot Keys assigned on one trigger device (*e.g.* a keyboard) also map to keys on the other available trigger devices (*e.g.* an RC-320). The following table shows equivalency of Hot Key assignments on different trigger devices. Keyboard devices can also use compound-alpha keys (*e.g.* SHIFT + A, CTRL + A, ALT + A, etc.), but compound-key assignments have no equivalents on the other devices and are therefore not detailed in the table. The Hot Key ID number is the number shown in the assignment utility and is also used in the Hot Key assignment list file (ASSIGN.HOT) found on Network Drives.

Hot Key ID	Keyboard (PC/AT 101-Key, or mini-keyboard such as RC-205/235)	RC-series Remote Control	DigiCart/EX Front Panel
1	A	1	Bank A, Key 1
2	B	2	Bank A, Key 2
3	C	3	Bank A, Key 3
4	D	4	Bank A, Key 4
5	E	5	Bank B, Key 1
6	F	6	Bank B, Key 2
7	G	7	Bank B, Key 3
8	H	8	Bank B, Key 4
9	I	9	
10	J	10	
11	K	11	
12	L	12	
13	M	13	
14	N	14	
15	O	15	
16	P	16	
17	Q		
18	R		
19	S		
20	T		
21	U		
22	V		
23	W		
24	X		
25	Y		
26	Z		
27-52	Shift A-Z		
53-78	Alt A-Z		
79-104	Ctrl A-Z		

Note Scroll Lock must be ON for a keyboard to play Hot Keys, otherwise keyboard input performs normal operations.

Assigning a Hot Key on the DigiCart/EX Front Panel

- Select the cut or Playlist to be assigned.
- Press UTILITY. Select Assign Hot Key. The display will prompt to select a key.
- Press BANK SELECT to choose the preferred Hot Key bank. The Bank Select button will illuminate when Bank B is currently selected. Then press the HOT KEY button (1-4) to be assigned.
- *Note: Assignments made to these buttons will also be assigned to equivalent keys on RC-series remote controls or an attached keyboard.*
- The selected item is now assigned. Press the Hot Key to play it.

Assigning a Hot Key using an RC-320 Remote Control

- Select the cut or Playlist to be assigned.
- Press ASSIGN PRESETS on the remote control. The display will prompt to select a key.
- Press the HOT KEY button to be assigned (1-16) on the remote control.

Note: Assignments made to these buttons will also be assigned to equivalent keys on DigiCart/EX or an attached keyboard. Ref. Hot Key Mapping, above.

- The selected item is now assigned. Press the Hot Key to play it.

Assigning a Hot Key using a Keyboard

- Select the cut or Playlist to be assigned.
- The alphanumeric keyboard's Scroll Lock must be ON. Press F1 (Utility) on the keyboard, then use the keyboard Utility menu key and navigation arrows to select the Assign Hot Key menu item. The display will prompt to select a key.
- Press any alpha- or compound-alpha key (e.g. A, SHIFT + A, CTRL + A, ALT + A, etc.).

Note: Assignments made to these keys will also be assigned to equivalent keys on RC-series remote controls and DigiCart/EX's front panel, but compound-key assignments have no equivalents on the other devices and are therefore not shown in the table.

- The selected item is now assigned. Press the Hot Key to play it.

Mass-Assignment of Hot Keys

One method of quickly reassigning Hot Keys is to place all required cuts into a single directory. The cuts can be mass-assigned to Hot Keys from the directory level. Organize the cuts in the directory by Index number. The lowest index number in the directory will be assigned to Hot Key "A" and its equivalents, and so on. More than one directory can hold cuts for this purpose, so that by using mass-assignment, the entire set of Hot Keys can be re-mapped quickly. These directories can hold more cuts than will be used for Hot Keys, only cuts up to Index number 103 will be assigned.

- Select the *first* cut or Linear Playlist in a directory you wish to assign.
- Go to the directory level.
- Press the UTILITY button (or F1) and select ASSIGN HOT KEY.
- Turn ON the keyboard's Scroll Lock. Use the selection knob to choose the Hot Key number or alpha-character for the Hot Key where the assignment is to begin.
- Press the ENTER button to begin the mass assignment. Assignment will continue until all cuts in the directory are assigned or all available Hot Keys are filled.

Viewing Hot Keys

- Press the UTILITY button (or F1) and select ASSIGN HOT KEY or CLEAR HOT KEY.
- Use the Select Knob or Arrow Keys to scan the list of Hot Keys. The lower line of the display will show ID and name of assigned Cuts.
- Exit the mode by pressing EXIT, or either F1 or ESC on the keyboard.

Clear Hot Key

Clears a Hot Key assignment. Equivalent key assignments on other devices will be cleared at the same time. For example, clearing key A on the keyboard will also clear the assignments for Hot Key 1 on an RC-series remote, and Bank-A/Key-1 on the DigiCart/EX front panel.

- Press the UTILITY button (or F1) and select CLEAR HOT KEY.
- Use the selection controls to scan the list of Hot Keys. The lower line of the display will show ID and name (if labeled) of assigned items.
- Press ENTER to clear the assignment. Continue making other Hot Key assignments, or exit the mode by pressing either F1 or ESC.

You may clear multiple Hot Keys in the current directory by entering the CLEAR HOT KEY mode from the directory level. Clearing begins with the Hot Key index number shown on the display. EXIT terminates after clearing the currently displayed selection.

Hot Key Lists

As a new feature in DigiCart/EX, Hot Key assignments can be stored and recalled in two ways, either Network Drive or Local. The chief benefit of using Net Drive Hot Keys is that those Hot Key assignments can be accessed by one or more users concurrently from anywhere on the network. All recordings linked to Net Drive Hot Keys must be on the current network drive, in any of the current drive's directories.

Local Hot Key assignments are saved in a separate list stored on each DigiCart/EX. Local Hot Keys can be made up of any mix of events from *different* local drives and directories (i.e. any partitioned drive on the internal hard disk).

The PLAY HOT KEYS USING parameter in the Setup menu controls the default behavior for Hot Key assignment lists. If this parameter is set to Net Drive, DigiCart/EX will use the Hot Key list on the currently selected network drive. As you move from one network drive to another, the Hot Keys list of the current drive will load automatically. If the current drive is changed to a local drive, the Local Hot Keys list will automatically become active. There is only one Local Hot Keys assignment list, rather than one per local drive partition.

If the PLAY HOT KEYS USING parameter is set to Local Assignments, the Local Hot Keys list will always be used, regardless of the current drive.

Net Drive Hot Key assignments can be reprogrammed from any DigiCart/EX that has access to them.

Editing Hot Keys Assignment Lists on Net Drives

Hot Keys Assignment List files are ASCII text files that can be edited with any simple text editor program, such as Wordpad. This applies to Net Drive assignments only; internal drive assignments do not use this method of storage. The file format lists the Hot Key ID number (see the Hot Key Mapping Table, above) with a DigiCart File ID number and reference information. When Hot Key assignments are made on a DigiCart, this file is created automatically. DigiCart updates the file as Hot Keys are reassigned.

The following format is used:

"xxx d.ynnn reference"

where:

xxx = 3 digit Hot Key ID number

d = DigiCart drive number

y = DigiCart directory number

nnn = 3 digit DigiCart index number, 000-999

reference = When the Hot Keys Assignments file is created by DigiCart, additional information will be added to each line about the file. This information is for reference only. DigiCart does not use this information when playing a Hot Key. When editing the Hot Key assignments, reference information may be omitted or added to suit your own needs.

Notes:

- There is a space between the Hot Key ID and File ID number fields.
- The File ID number contains a decimal point between the drive and directory fields.

COPY ORIGINAL

DigiCart/EX can copy the contents of drives, directories, cuts and Playlists to any location of the same type. You may use this feature to create nearly identical Playlists with only one or two items that are different.

CAUTION

IF YOU COPY TO AN OCCUPIED DESTINATION ID, THE CONTENTS AT THAT DESTINATION WILL BE REPLACED.

COPYING A CUT USING COPY ORIGINAL

Copies the current file another location.

Select the recording to be copied, then select COPY ORIGINAL from the Utility menu.

The display will ask for a destination. Use the selection knob to select a file ID in the destination drive and directory, press the ENTER button when you have finished searching. The display will prompt to either replace the current file ID (Index) number, or select an unused ID number.

- Press ENTER to copy the recording to the selected Index number, overwriting the existing recording at that location.

OR

- Select an unused file ID with the selection knob. The display will show only unused locations in the directory.

COPYING A PLAYLIST (STACK) USING COPY ORIGINAL

DigiCart/EX handles Playlists in the same manner as cuts. Use the same COPY ORIGINAL procedures as for cuts. Original Playlists may only be copied to other file ID numbers in a Stack Directory.

NOTE: Playlists use file ID numbers to find files when they are to be played. Moving or copying a Playlist from one drive to another may cause unpredictable results during playout. For example, file IDs in the playlist may not exist on the new drive, or they may be assigned to different audio. Use Playlists only on the drive where they were created.

COPYING A DIRECTORY USING COPY ORIGINAL

Duplicates cuts in a source directory to any destination directory.

Select a directory as the source. You must stay in the directory level, not the Files level. Select COPY DIRECTORY from the Utility menu.

The display will prompt to select a destination. Navigate to the destination directory and press ENTER.

The display will prompt Replace Duplicate Indexes?

If NO (press EXIT), the cuts in the source directory will copy to the same Index Number in the destination directory unless that Index is occupied. If an Index Number is occupied, the cut will be copied to the next open Index Number.

If YES (press ENTER), the cuts in the source directory will replace any cut in the destination directory that has the same Index Number (the last three digits of the I.D. Number).

The display will prompt to Replace Duplicate Names in the destination directory.

If NO, all cuts in the source directory will be copied to the destination directory, leaving all cuts in the destination directory in place (subject to your choice for Replace Duplicate Index.)

If YES, cuts from the source directory that have names that duplicate a cut name in the destination directory will replace those in the destination directory. The display will indicate "Replacing". If the source directory has more than one cut with the same name, the cut with the highest Index number in source directory will be the only cut with that name left in the destination directory.

If you respond NO to both the Index and Name queries, DigiCart/EX will copy all cuts from the original directory to the destination directory, starting with the lowest available ID number. The display will indicate the name of each cut and its position in the destination directory as it is copied. Copying begins with the cut currently selected in the source directory.

You may elect to copy less than the entire directory. When the name of the *last* cut to be copied appears in the bottom line of the command display, press EXIT. DigiCart/EX will stop the Copy Directory procedure and return to directory select mode.

COPY EDITED

Copying a Cut using *Copy Edited*

Copies the *edited* version of a cut from its original location to a new one. The copy will include only the audio information between the HEAD and TAIL pointers; the trimmed HEAD and TAIL sections will be deleted. The procedures are the same as for COPY ORIGINAL.

Because Copy Edited deletes audio data outside of the Head and Tail points, this operation can trim recordings and save disk space. This is especially useful if Head and Tail trims are large.

An edited cut may be copied to a different Index number and the original cut deleted. Once the original Index number is vacant, the edited cut may be copied back to the original number, if desired.

Non-destructive audio file edits (Head/Tail Trim, Fade In/Out, Gain) can be performed on all playable formats. The edit parameters are saved in a vendor-specific area of the file header. When playing WAV files on non-DigiCart machines, the edits will not be recognized. However, the COPY EDITED utility can be used to render Head/Tail Trims to WAV files playable on other machines.

If you are performing a COPY EDITED operation on a 16-bit linear stereo cut, you are presented with the option to convert between DigiCart file format and WAV file format. Dolby AC2 DigiCart files cannot be converted to WAV files. Select FILE FORMAT CONVERT option to be:

- DISABLED
- 16-BIT WAV TO DC2
- DC2 TO 16-BIT WAV

Copying a Playlist using *Copy Edited*

You may convert a Linear Playlist to a cut using COPY EDITED. HEAD and TAIL trims will be copied as edits, deleting audio data outside of the Head and Tail points for each cut in the list. FADE IN and OUTPUT GAIN settings will be those of the first cut. FADE OUT will be that of the last cut. The format, sample rate and word size of all cuts in the Playlist must be the same.

NOTE: Though seldom used, this procedure can be performed using COPY ORIGINAL. However, the Head and Tail markers of the cuts in the Playlist will be ignored.

Copying a Directory using *Copy Edited*

Copies the edited versions of all cuts in a directory. HEAD and TAIL trims will be copied as edits, deleting audio data outside of the Head and Tail points for each cut. This helps to conserve disk space by copying only the essential portion of each cut. Fade and gain settings for each cut are retained in the copies. File Index numbers and file names are retained in the new directory, but drive and directory portions of the Index numbers will necessarily be different.

Select COPY EDITED from the UTILITY MENU. The procedures are the same as for copying a directory using COPY ORIGINAL with the addition of the FILE FORMAT CONVERT option.

If the FILE FORMAT CONVERT option is enabled, only linear 16-bit files with sample rates up to 48000 samples/sec will be converted. All others are copied in their original format.

DELETE

DELETE permanently erases the currently selected cut, Playlist, directory or drive.

- Select the directory, cut or Playlist to be erased. Press UTILITY and select DELETE.
- Confirm the command by pressing ENTER, or abandon it by pressing EXIT.

Multiple copies of the same file each have a unique file ID number in DigiCart. Make sure that the ID and name appearing in the top line of the display is what you intend to erase. A copied cut, directory, or Playlist will have a different ID and will not be erased.

RENAME

In addition to the ID numbers automatically provided by DigiCart/EX, each local drive, directory, cut or Playlist may have its own name containing up to 15 characters. Letters, numbers, spaces and hyphens are allowed. Network drives cannot be renamed from DigiCart.

- Select the drive, directory, cut or Playlist to be renamed.
- Press the UTILITY button and select RENAME.
- Use an attached a keyboard or turn the selection knob to choose a letter or number. When using the selection knob the navigation arrow buttons move to the next character. Using the arrow buttons on either the keyboard or the front panel before making any entry allows the existing name to be edited.
- Confirm the new name by pressing ENTER, or press EXIT to abandon the name change.

FORMAT DISK

The Format Disk utility is used to prepare disk drives or memory cards for use in DigiCart/EX. Format Disk works only on local disks, not on networked disks. Memory cards must be formatted before they can be used with DigiCart/EX.

The internal hard disk used in DigiCart/EX is factory formatted as one logical disk, but you may choose to re-format it with up to five partitions. The advantage of this is that there will be ten directories and 10,000 Cut Indexes possible per partition; it does not increase the total recording time available. Note that this choice should be made before initial use. If you want to keep the demo cuts copy them to a memory card. If you choose to create more than two partitions, this will reduce the number of Network Drives that can be mounted. For example, by creating four partitions, the internal hard drive will occupy drive numbers 1,2,3 and 4, leaving only 5 and 6 to mount Network Drives. See Allocation of Logical Drives below.

Use care during format operations. Formatting is an irreversible process and **destroys all previous data** on the disk or memory card. Also note that when formatting the internal disk, all logical drive partitions on that disk will be formatted at the same time.

To Format a Memory Card:

- Select Format Disk from the Utility menu and press ENTER.
- The display will prompt to select a drive for formatting, INTERNAL MEMORY CARD or INTERNAL HARD DRIVE. Select INTERNAL MEMORY CARD and press ENTER.
- The memory card will be checked to see if it is already formatted for use with DigiCarts. Press ENTER to erase all data on the card and format it for DigiCart. You will be prompted to confirm the format operation. Press ENTER (yes) to confirm the operation, then EXIT (no) to confirm that you do not want to cancel the operation. (Pressing the opposite key at either prompt cancels the operation.)

DigiCart/EX will exit the Utility menu when formatting is complete.

Should the card fail to initialize correctly, an error is displayed. Remove and reinsert the memory card. If this does not correct the problem, the memory card may be incompatible or faulty, or the card reader may require service.

NOTE: A memory card formatted for use with DigiCart/EX will not work in a PC and vice versa.

To Format the Internal Hard Disk:

- Select Format Disk from the Utility menu and press ENTER.
- The display will prompt to select a drive for formatting, MEMORY CARD or INTERNAL. Select INTERNAL and press ENTER.
- You will be prompted for the number of equally sized logical drive partitions to create on the disk. Press ENTER to erase all data on the disk and format it for DigiCart. You will be prompted to confirm the format operation. Press ENTER (yes) to confirm the operation, then EXIT (no) to confirm that you do not want to cancel the operation. (Pressing the opposite key at either prompt cancels the operation.)

DigiCart/EX will exit the Utility menu when formatting is complete.

Allocation of Logical Drives

DigiCart/EX has a flexible drive arrangement that allows a mix of internal drive partitions and network drives. Drive 0 always refers to the Removable Media Drive (the Memory Card Reader in DigiCart/EX). There is one internal physical hard disk that is factory formatted as Drive 1. However, this internal disk can be re-formatted to create up to five logical drives of equal size. This may allow the user more flexibility in organizing large libraries. Partitioning divides the physical hard disk space equally from two to five drives (1/*n*). Partitions are assigned drive numbers 1 though 5, depending upon how many are created. These drive numbers are used in the file ID scheme in the same way as the original drive 0 and 1. Partitioning is destructive, all data on the hard disk, in all existing partitions, will be lost during this process.

A logical drive created by this partition process may be formatted, erased, named, etc. in the same manner as the original drive, without affecting other partitions.

Additionally, up to four Network Drives may be associated (mapped) to the DigiCart/EX. See page 102.

DRIVE 0	Internal Memory Card Reader
DRIVE 1	Internal Hard Disk
DRIVE 2	Internal Hard Disk Partition (if internal disk is formatted with 2 or more partitions) *or* Not Used.
DRIVE 3	Internal Hard Disk Partition (if internal disk is formatted with 3 or more partitions) *or* Network Drive
DRIVE 4	Internal Hard Disk Partition (if internal disk is formatted with 4 or more partitions) *or* Network Drive
DRIVE 5	Internal Hard Disk Partition (if internal disk is formatted with 5 partitions) *or* Network Drive
DRIVE 6	Network Drive

Drive IDs 3, 4 and 5 can be Internal Hard Disk Partitions or Network Drives. This is determined by the number of partitions chosen when formatting the internal hard disk. For example, if the internal disk is formatted with three partitions, these become Drive IDs 1, 2, and 3. There are then three drive numbers (4, 5, and 6) available to be assigned to Network Drives. If the internal disk is formatted with only one partition, it is Drive 1, and drives 3, 4, 5, and 6 are available to map Network Drives; Drive 2 is not available in this case.

MOUNT NETWORK DRIVE

DigiCart/EX can attach to up to four Network Drives at a time. Refer to Appendix M and specifically page 102 for more details.

The Mount Network Drive utility is used to establish a link between an available drive number on DigiCart/EX and one of the available Network Drives on the network. This link is called a 'drive map'. The basic process is to select a local drive number to be mapped, and then select a network drive to which it will be linked. DigiCart/EX will always have at least one drive number that can be mapped to the network, but depending upon the number of drives assigned to local partitions, up to four drive numbers may be available for network assignments (see the table above).

UPDATE DIRECTORIES

This feature allows the user to force the creation of or update the summary file for a directory, or all directories if performed from the drive level. Originally, this feature was included to facilitate the transfer of material between DigiCarts with different versions of software. In some cases it may restore a disk that appears to have lost a cut, has a cut that cannot be erased, or exhibits other problems.

ALERT!

When this feature is used at the Drive level, it will update all 10 cut Directories, and it will open and close each file on the drive.
If the disk has many cuts, the update procedure can be protracted.

D-NET FILE TRANSFER

Please refer to Appendix D on page 70 for detailed information on this feature.

Chapter 5

Recording

DigiCart/EX can record audio to a Memory Card, to its internal hard disk or to a network drive. To record to a network drive, simply select the drive, directory, and file location as you would for a local drive.

DigiCart/EX will record 16- or 24-bit linear stereo at 44.1K, 48K, 88.2K, or 96K sample rates in WAV format. DigiCart/EX can also record 16-bit stereo in 44.1K, 48K, or AC-2 @ 48K in DigiCart II format. Mono recording is no longer supported.

See Appendix E for information on recording non-audio digital data, such as Dolby-E encoded data.

Ext Sync illuminates to indicate that the sync source is set to an external reference in the Setup menu. The LED blinks if there is no valid sync signal presented at the connector.

While it is not mandatory, it is recommended that one sample rate be chosen as 'standard' for all your work. To change the default settings for recording, refer to Setup Menu Features on page 22.

When making a recording, do not be concerned with "tight" starts of the source material or quick stops of the recording at the end of a cut. DigiCart/EX simplifies precise, *non-destructive* HEAD and TAIL trims. Optional THRESHOLD RECORD mode provides automatic HEAD trims. DigiCart/EX limits the minimum length of a recording to 2 seconds.

Sampling Rate

Four front panel indicators note the sample rate present at the connectors during record, regardless of the Sample Rate Converter (SRC) setting. During record, the sample rate being recorded to disk is noted in the LCD display. During Playback, the recorded sample rate of the file being played is displayed on the LCD while the I/O indicators show the sample rate at the connectors. DigiCart/EX has separate Setup menu settings for record and play sample rates and word size, see "Setup Menu Features" on page 22 for descriptions.

SRC illuminates to indicate that the Sample Rate Converter has been switched into the data path between the recorded file and connectors. SRC may illuminate during either record or playback. SRC settings can be changed in the Setup menus. DigiCart/EX cannot perform "off-line" file-based sample rate conversions.

Dithering

Two front panel Format indicators note the word size (24- or 16-bit) present at the connectors during record, regardless of the Dithered setting. During record, the word size of the file being recorded is noted in the LCD display. During Playback, the recorded word size of the file being played is displayed on the LCD while the Format indicators show the Word Size at the output connectors. DigiCart/EX has separate Setup menu settings for record and play Word Size, see "Setup Menu Features" on page 22 for descriptions.

The Dithered LED illuminates to indicate that the word size of the recorded file is different than the word size present at the connectors. Dithering settings can be changed in the Setup menus. DigiCart/EX can make either 16-bit or 24-bit recordings. 16-bit recordings can be made in either

WAV or DigiCart format, 24-bit recordings are WAV file format. DigiCart/EX cannot perform internal data format conversions. Recordings must pass through the I/O connectors to be converted.

It is sometimes desirable to output a smaller digital word size for use by external equipment, such as a 16-bit DAT recorder. The OUTPUT WORD SIZE selection in the Setup menu gives you two choices: 24-BITS (no dithering*), or 16-BITS (8-bit dithering.)

The following tables list record and play format options, menu settings, and front panel indicators:

Record Modes

Input Data Format	Recorded Format	Setup Menu	Format Indicator	Dithered Indicator
24	24	SETUP | Record Data Format = 24-Bit	24	OFF
24	16	SETUP | Record Data Format = 16-Bit Dithered	16	ON
16	24	SETUP | Record Data Format = 24-Bit	24	OFF
16	16	SETUP | Record Data Format = 16-Bit	16	OFF

The RECORD DATA FORMAT parameter in the Setup menu specifies both the sample size (16 or 24 bits) and the file format (DigiCart, WAV, or compressed as AC-2) to be used for recordings.

The RECORD DITHERING setup parameter is used to tell the machine that 24-bit digital data is being supplied to the digital inputs with the intention of making a 16-bit recording. If the RECORD DATA FORMAT parameter is set to 16-BIT, then the 24-bit incoming audio is dithered down to 16-bits during the recording, illuminating the Dithered indicator on the front panel.

Play Modes

Recorded Data Format	Output Data Format	Setup Menu	Format Indicator	Dithered Indicator
24	24	SETUP | Play Word Size = 24-Bit	24	OFF
24	16	SETUP | Play Word Size = 16-Bit	16	ON
16	16	SETUP | Play Word Size = 16-Bit	16	OFF

The PLAY WORD SIZE parameter in the Setup menu specifies the sample size (16 or 24-bits) at the digital output connectors. If the selection is set to 16-BIT and a 24-bit cut is being played, then the sample size is dithered down to 16-bits, illuminating the Dithered indicator on the front panel.

* Truncating 24-bit samples to 16-bits can result in signal distortion, especially noticeable at low levels. Dithering is a technique of adding appropriate random data to the 24-bit digital output stream before reducing the word size. This results in a very low-level broadband noise being added to the signal, rather than the more objectionable signal distortion. DigiCart/EX dither uses a zero-mean random noise source with a triangular probability distribution. Its peak level corresponds to the magnitude of the least significant bit of the reduced word size within the 24-bit field. The method is called "LSB TPDF dither" for Least Significant Bit Triangular Probability Density Function.

Transport Controls

Control of the DigiCart/EX transport may originate from the front panel, a keyboard, the GP inputs on the rear panel, or via the serial ports using an RC-series remote control or automation equipment. Basic transport controls include RECORD, STOP, PLAY, LOOP and PAUSE. Front panel controls have equal authority with commands issued by remote controls or via rear panel connections. If a Record command is issued via a serial connection, a subsequent Stop command from the front panel may override it.

All of the transport buttons illuminate when active, regardless of whether the command was initiated from the front panel or remote interfaces.

All transport commands also have tally signals on open collector outputs, available in the GPI/O connector. See Appendix A for wiring details.

Setup to Record

SELECTING A FILE LOCATION FOR RECORDING

DigiCart/EX contains an internal hard disk, an internal Card Reader and will also support network drives. You must select a particular drive for your recordings. DigiCart/EX can record directly to a network drive.

Use the navigation controls to display the drive and directory where you want the file to be recorded. If you select only the drive, DigiCart/EX will automatically record the file into the last used directory on that drive. Later you may easily move the recording.

Each directory has 1,000 pre-numbered file IDs (000 through 999). You may choose to make a recording to a specific ID. If you do not choose an ID number, DigiCart/EX will assign the recording to the next available Index number. Also, if Record Overwrite is on, you can deliberately overwrite existing audio at a specific Index number.

> ***Use Record Overwrite with care.*** When enabled, you ***WILL*** record over an existing Cut unless you specifically select a new Index number. Once you do this, you are only selecting available open Index numbers – in order to record over a specific Index you must select it before pressing RECORD.

Checking Available Disk Space

Before recording or copying a cut, you may check the available disk space by holding down the STOP [INFO] button. Remember that the remaining time is valid only for the currently selected sampling frequency and format.

If the selected disk becomes full during a recording, DigiCart/EX It will indicate DISK IS FULL and stop the recording. The portion of the recording obtained up until the Disk Full error will be saved, just as if STOP had been pressed to end the recording.

SETTING RECORD LEVELS

- Using tone, set a "zero" level on the mixer or other program source.
- Press the REC button to go to Record Ready mode and monitor the input.
- Adjust the input source level controls as required so that the "0" meter segments are lighted and the "+3" segments are "just off." At this setting the output level matches the input level providing unity gain plus 16dB headroom. If tone is not available, play some program material and adjust the controls to place peak readings in the green (above **0**) on the loudest signals.

The meters on DigiCart/EX have a Clip level indication. Any illumination of the red **"CLIP"** segments indicates signal clipping. The Clip LED will turn ON for 1 second whenever the signal exceeds digital full scale. While a clipped file is played, the Clip LED will also turn ON during the period when the signal exceeds digital full scale.

RECORDING COMMANDS

Recording can be initiated from the front panel, an RC-series remote control, keyboard, GPI or serial port control. This example will use the front panel button for clarity, but all transport control methods work identically.

- Press the REC button. DigiCart/EX will quickly scan the drive you have selected, identifying available space on which to record. The meters also begin monitoring the input signal.
- When DigiCart/EX determines that the sync source is valid, the display prompts: "PRESS PLAY TO START". Press the PLAY button to begin recording. The clock will begin counting upward.

Threshold Record

If you are using Threshold Record, the display will indicate the awaited Trigger Level and DigiCart/EX will not actually begin recording until that input level is reached, even though the PLAY button was pushed.

Depending on the type of material you are using, you may decide to adjust the Setup menu THRESHOLD TRIGGER LEVEL in 6 dB steps from -60 to -6 dB.

When Threshold Record (Setup menu) is set to OFF, recording will begin immediately when you press PLAY.

Pause During Record

You can use DigiCart/EX for multiple takes within the same recording file by pressing the PAUSE button between each take. Press PAUSE again to resume recording.

This technique does not place edit cue markers in the recorded file where Pause was enabled.

The automatic cut identification system of DigiCart/EX is designed to speed things up in a fast-paced production setting. To audition a newly recorded cut, you can press the PLAY button immediately after recording it, or press the RECORD button and DigiCart/EX will immediately set up for another recording.

Recordings are initially identified by the Index number of where they were recorded. You may copy cuts to other Index numbers. Cuts may also be given titles. See descriptions of these tasks in the Utility and Edit menu descriptions.

Chapter 6

Playback

DigiCart/EX can play audio files in many different ways. These range from the straight-forward press of the PLAY button, to using Hot Keys, to building complex Playlists. Playback can be initiated from the front panel, a keyboard, dedicated RC-series remote control, GPI, or serial control via DigiCart serial protocol or Peripheral Bus. DigiCart/EX can play audio from its internal hard disk or directly from a network drive. To play from a network drive, simply select the drive, directory, and file location as you would for a local drive.

Front Panel Indicators

Four front panel I/O indicators indicate the sample rate present at the digital outputs during playback, regardless of the Sample Rate Converter (SRC) setting. Available sample rates are 44.1K, 48K, 88.2K, 96K. During Playback, the recorded sample rate of the file being played is displayed on the LCD while the I/O indicators show the sample rate at the connectors. DigiCart/EX has separate Setup menu settings for record and play sample rates, see "Setup Menu Features" on page 22 for descriptions.

SRC illuminates to indicate that the Sample Rate Converter has been switched into the data path between the recorded file and connectors. SRC settings can be changed in the Setup menus. DigiCart/EX cannot perform "off-line" file-based sample rate conversions.

Two front panel Format indicators note the word size (24- or 16-bit) present at the connectors during playback, regardless of the Dithered setting. DigiCart/EX can dither 24-bit files to 16-bit format during playback. During Playback, the recorded word size of the file being played is displayed on the LCD while the Format indicators show the Word Size at the connectors. DigiCart/EX has separate Setup menu settings for record and play Word Size, see "Setup Menu Features" on page 22 for descriptions.

The Dithered LED illuminates to indicate that the word size of the recorded file is different than the word size present at the connectors. Dithering settings can be changed in the Setup menus.

Ext Sync illuminates to indicate that the sync source is set to an external reference in the Setup menu. The LED blinks if there is no valid sync signal presented at the connector. Note that this may happen when the D-NET file receiver is on, even if the playback sync is not set for an external reference. Turn off D-NET if you do not have another transmitting DigiCart connected.

Transport Controls

Basic transport controls include RECORD, STOP, and PLAY. LOOP and PAUSE are also available. Playback can be initiated from the front panel, from the rear panel GPI or serial port, an RC-series remote control, or a keyboard. Front panel controls have equal authority with commands issued by remote controls or via rear panel connections. If a Play command is issued via a serial connection, a subsequent Play command from the front panel may override it, depending on the Setup menu Restart Mode setting.

All of the transport buttons illuminate when active, regardless of whether the command was initiated from the front or rear panel interfaces.

All transport commands also have tally signals on open collector outputs, available in the GPI/O connector. See Appendix A on page 65 for wiring details.

Playing a Single Cut

- Select a cut using the Navigation keys and the selection knob to locate the Drive | Directory | file ID/Name of the cut. Only IDs containing program material will be displayed.
- Press the PLAY button. Playback will begin immediately.

Hot Keys

Hot Keys are a convenient way to play pre-determined audio files with a single button press. DigiCart/EX has two banks of four Hot Keys on the front panel, and can also be triggered by dedicated Hot Keys on DigiCart remotes or Hot Keys assigned to alpha keys on a keyboard.

As a new feature in DigiCart/EX, Hot Key assignments can be stored and recalled in two ways, either Network Drive or Local. The chief benefit of using Net Drive Hot Keys is that those Hot Key assignments can be accessed by one or more users concurrently from anywhere on the network. All source material linked to Net Drive Hot Keys must be on the current network drive; however, source cuts may reside in any of the drive's ten directories.

Local Hot Key assignments are saved in a separate list stored on each DigiCart/EX. Local Hot Keys can be made up of any mix of events from *different* local drives and directories. All source files used in Local Hot Key assignments must reside on local hard drives (any partitioned drives on the local hard disk).

The PLAY HOT KEYS USING parameter in the Setup menu controls the default behavior for Hot Key assignment lists. If this parameter is set to Net Drive, DigiCart/EX will use the Hot Key list on the currently selected network drive. As you move from one network drive to another, the Hot Keys list of the current drive will load automatically once you enter the Directory selection level . If the current drive is changed to a local drive, the Local Hot Keys list will automatically become active. There is only one Local Hot Keys assignment list, rather than one per local drive partition.

If the PLAY HOT KEYS USING parameter is set to Local Assignments, the Local Hot Keys list will always be used, regardless of the current drive.

Net Drive Hot Key assignments can be reprogrammed from any DigiCart/EX that has access to it.

Playing Multiple Cuts — *Follow-On Play*

In Follow-On Play, a second cut may be selected and queued to play while a cut is currently playing.

NOTE: For Follow-On Play, the RESTART MODE selection in the SETUP menu must be set to "ON COMPLETION".

NOTE: If you are selecting a cut from a network drive while playing another cut, an alert message might appear on the LCD, indicating "DIR OUT OF DATE." This message occurs when DigiCart has detected that another user has modified the contents of the network directory, but DigiCart is busy playing audio and cannot update the list of contents. The list of contents will automatically update when DigiCart is idle.

While a cut is playing, use the navigation controls to select another cut or playlist from any drive or directory Press PLAY. The PLAY button will blink indicating that another cut is cued for immediate Follow-On play.

You may select as many cuts as you wish for automatic Follow-On Play by repeating the steps above. The last selected cut will be visible in the first line of the command display; the second line of the command display shows name and time information about the cut that is currently playing. This queue is essentially an unsaved Playlist, or Quickstack.

While it is not mandatory, it is recommended that only files of the same sample rate be used for follow-on play operations and Playlists, especially when using the digital outputs. Keeping the same sample rate consistent avoids the possibility of an audible 'pop' and slight delay as the sample rate changes from cut to cut during playback of Playlists with multiple sample rates. Use the Play Sample Rate parameter to make all Cuts to play back at a set sample rate. See page 23 for details.

To see the list of queued cuts following the one now playing:

- Press the VIEW LIST button.
- Use the selection knob to scan the list.

To cancel an automatic Follow-On playlist:

- Press the STOP button *once*. The PLAY button will stop flashing, indicating that DigiCart/EX will end playback at the end of the current cut.
- Press the STOP button again to immediately cancel playback of the current cut.

Quickstacks

CREATING A QUICKSTACK

A Quickstack is a one-time-only playback sequence, created "on the fly". A Quickstack can also be saved as a Stack if desired; this decision must be made before the Quickstack is played. Each drive's Stack Directory can hold 1000 Playlists, so you might want to establish the practice of saving each new Quickstack as a Playlist. See more information about Playlists in the next chapter.

While it is not mandatory, it is recommended that only files of the same sample rate be used for Quickstacks, especially when using the digital outputs. Keeping the same sample rate consistent avoids the possibility of an audible 'pop' as the sample rate changes from cut to cut during playback. Use the Play Sample Rate parameter to make all Cuts to play back at a set sample rate. See page 23 for details.

Building a Quickstack

- Press the PAUSE [BUILD LIST] button. (It will illuminate when pressed.)
- Select a cut or Playlist (an event) to be added to the Quickstack.
- Press the PLAY button to add the first event to the Quickstack. The number displayed under the event ID counts the entries in the Quickstack. The PLAY button will begin to blink, indicating that item has been entered into the Play queue. The time under the name shows total Quickstack duration.
- Repeat the above steps to add as many events the list as are needed.

If you wish to check the Quickstack's contents:

- Press the VIEW LIST button.
- Use the selection knob to scan through the Quickstack.

(NOTE: Because the viewable list represents events in the queue, the currently playing event will not read out as cut #1, only the events that follow will be listed. Once the list is saved, the current event will be #1 and all others will read in order.)

- Release PAUSE (or press the MAKE PLAYLIST button on an RC-320 remote) to play the Quickstack. The top line of the command display shows the last item in the Playlist, the bottom line presents the current item and its timing information.

While playing, use the VIEW LIST button and selection knob to see the remaining items in the list. The number at the upper left shows how many items the selected event is *away* from the Cut that is currently playing.

Pause and Loop may be used while Playlists are running. At any time during playout of a Quickstack, you may press the LOOP button. The current selection will repeat until Loop is disengaged. Refer to button operational descriptions in Chapter 2, Control Panel.

Chapter 7

Playlists

A Playlist (also known as a Stack) is a list of audio cuts that can be stored on any drive on the DigiCart/EX or network. Some of the most powerful capabilities of DigiCart/EX are its Playlist features. You can create Playlists consisting of multiple cuts *and* other Playlists. You can edit and update Playlists, and select between two types of Playlists called "Linear" and "Rotating". A third type, Quickstack, is used to play back a particular sequence of events one time only, or to easily create a sequence of Cuts to be saved as a Stack.

A new feature of DigiCart/EX Playlists is that they are now ASCII text files, and can be edited with any common text editor program. This gives you the ability to edit a list using the search and replace features of the editor. DigiCart/EX Playlists use .PLA as the file name suffix. Playlists can be moved or copied between DigiCart/EX recorders and network servers, can be edited in place on network servers, or can be moved or copied from network servers to another PC for editing. Remember that Playlists copied from DigiCart/EX to a memory card can be moved to another DigiCart/EX, but cannot be read by other computers.

Playlists may be made up of files from several drives or directories, however this may present complications later. If a Playlist refers to source files on different *drives*, the Playlist will only play if all the source drives are currently mounted. Multiple users can access Playlists on network drives concurrently, but each user must have access to all drives listed in the Playlist. Playlists copied from one drive to another may lose their path associations and fail to play, or play with unanticipated results. To simplify Playlist usage it is recommended that all files in a Playlist reside on the same drive as the Playlist, however files may reside in different directories on the drive. When copying or moving a Playlist, copy or move all of its referenced files along with it.

Playlists conform to certain basic rules of operation:

- A Playlist is only a *list* of events to be played and does not include audio information.
- A Playlist event can be either a single cut or another playlist.
- Playlists may only exist in a Stack (Playlist) Directory.
- Each drive contains one Stack Directory, which may contain 1000 Playlists.
- A Playlist may contain up to 1000 events.
- There is no limit to the total length of playing time in a Playlist.
- A single cut may be used in multiple event locations within a Playlist.
- If a cut is edited, its edited version will play in a Playlist.
- If a cut in a Playlist has been erased or moved, or is unavailable (perhaps because a drive cannot be accessed) a " * " will be displayed ahead of the Playlist time, and the Playlist will not play. Restoration of the missing selection or deletion of the event eliminates the " * " and the Playlist will play.
- Any event can be deleted from a Playlist by editing.

PLAYLIST TYPES

Before you begin using Playlist mode, it is important to understand the differences between Linear and Rotating Playlists. They each have unique applications and different operating characteristics. Compound Playlists are Playlists that contain other Playlists. Compound Playlists can be either Linear or Rotating Playlists. and the Playlists within them can be Linear and/or Rotating.

Linear Playlist

A Linear Playlist is a list of items that can be played in sequence from a single PLAY command. When each item in a Playlist has been properly edited, Linear Playlists provide seamless playback of multiple audio cuts. This feature is particularly useful for editing music files, production beds, news interviews, or creating spot sets.

MUSIC AND VOICE EDITING

A single piece of music can be edited into different individual pieces (i.e.- intro., verse, chorus, etc.). These pieces may be re-assembled to create a different musical rendition, shorter or longer than the original, by placing them into a Linear Playlist. For example, production music beds of longer duration can be edited into shorter pieces for ten- or thirty-second spots. News interviews sourced in the field may be condensed into shorter, more succinct versions for airplay.

CREATING SPOT SETS

Using the Linear Playlist feature, you can compile spot sets in advance and initiate playback of a complete set on a DigiCart/EX with a single PLAY command. Each spot is stored in sequence within a Linear Playlist. By viewing the Playlist (see "Scan Mode" in Playlist Edits, page 51), you can confirm that the correct spots have been selected, and also make adjustments or last minute changes to the list. A single spot may be used as many times as needed within a Playlist. Because the number of spots in a Playlist can be very large, it is possible to create a Playlist of all the spots and IDs needed for an entire day, or individual day parts.

Rotating Playlist

A Rotating Playlist is a list of events, which play one at a time, in order. The PLAY command single-steps through the event list. This feature is particularly useful for spot rotation, or sequential playback of a series of individual effects, IDs, spots, news actualities, etc.

NEWS ACTUALITIES

Interviews in the field or on the telephone may be acquired using portable recorders. Once in the production studio, the raw material is transferred to DigiCart/EX for editing and prep. The individual parts can then be placed in a Rotating Playlist, with each item sequenced in the proper order. The Playlist is then made available to the on-air studio, where the newsperson will be able to initiate playback of each actuality clip in sequence, simply by pressing the PLAY button when the next item is needed.

AUTOMATED LINERS & IDS

Multiple IDs, promos and liners can be stored in sequence in a Rotating Playlist. This feature is powerful when used in conjunction with DigiCart/EX cut ID numbers. An entire day, or several days worth of IDs and promos can be recorded, edited and updated by overwriting audio associated with pre-defined cut IDs listed in the Rotating Playlist. Each time an automation system or operator sends a PLAY command to DigiCart/EX, it can play the next event in the Playlist.

SPECIAL EFFECTS

Rotating Playlists can be useful for grouping together various effects to be used in production or during an air-shift. By dialing back and forth within the Playlist in Edit Mode, any item can be accessed and played immediately. Hot Keys may be similarly useful.

Compound Playlist

A Compound Playlist is one that contains other Playlists; it can also contain individual Cuts. For a Linear Playlist containing a Rotating Playlist, each time the Linear Playlist is played the Rotating element will be different. This allows you to introduce an ever-changing freshness into a routine "air break" package. A Rotating Playlist containing a Linear Playlist will play all of the Linear elements and then wait for the next play command to play the next element.

*NOTE: A Compound Playlist may not be used in another Playlist. A Playlist with more than one level of embedding will be marked with an " * " and will not play. If you attempt to save a Quickstack that contains a compound Playlist, a "STACK ERROR" message will result.*

CREATING A PLAYLIST

The process of making a Playlist (Stack) begins with creating a Quickstack, which is then saved. While it is not mandatory, it is recommended that only files of the same sample rate be used for Playlists. Keeping the same sample rate in all recordings avoids the possibility of an audible 'pop' as the sample rate changes from cut to cut during playback of Playlists with multiple sample rates.

Playlists on network drives can be accessed and played by any DigiCart/EX. It is recommended that all files used in a Playlist reside on the same drive as the Playlist (sources can be in any directory on the drive). Because individual DigiCarts might have unique drive path assignments, Playlists may not play correctly (or at all) if calls are being made to drives that are not mapped to the same Drive IDs as in the DigiCart/EX that originally created the Playlist.

Building a Playlist

- Press the PAUSE [BUILD LIST] button (or MAKE PLAYLIST on the RC-320 Remote Control). (It will illuminate when pressed.)
- Select a Cut or Playlist to start the Quickstack.
- Press the PLAY button to add the first event to the Quickstack. The number displayed under the event ID counts the entries in the Quickstack. The PLAY button will begin to blink, indicating that an item has been entered into the Play queue. The time under the name shows total Quickstack duration.
- Repeat the above steps to add as many events the list as are needed.

To check the contents of a Quickstack:

- Press the VIEW LIST button.
- Use the selection knob to scan through the Quickstack.

(NOTE: Because the viewable list represents events in the queue, the currently playing event will not read out as cut #1, only the events that follow will be listed. Once the list is saved, the current event will be #1 and all others will read in order.)

Saving a Playlist

After you have built a Quickstack you may store it as a Playlist. To save a Quickstack:

- Press the ENTER button before releasing the PAUSE (or MAKE PLAYLIST) button.
- Select either Linear or Rotating Playlist type with the navigation controls.
- Press the ENTER button to confirm the selection. DigiCart/EX will assign the next available ID and name.

Use CHANGE NAME in the UTILITY MENU to give the Playlist a new name if desired. The Playlist will be saved on the drive that contains the first event in the Playlist. Use COPY ORIGINAL to place it on another drive, if desired.

PLAYING A PLAYLIST

Playing a Linear Playlist

Linear Playlist IDs are followed by an " L " in the display. All items in a Linear Playlist will play in sequence without interruption.

Once you begin playback of a Linear Playlist, the current selection and its playing time will be shown on the bottom line of the display.

Rotating cuts in a Linear Playlist will play only the next single event in rotation then wait for another PLAY command before continuing.

Events in a Linear Playlist may be looped. By pressing LOOP during a particular event, that event (only) will loop until looping is disabled, then the playlist will continue normally. (To loop an entire list, APPEND the list to itself using the Edit Menu. See page 51.

To cancel a playlist, press the STOP button *once*. The PLAY button will stop flashing, indicating that cuts in the queue have been cancelled; the STOP button will remain lit. The current cut will continue to play to its end, then stop.

Press the STOP button again to immediately cancel playback of the current cut.

Playing a Rotating Playlist

Rotating Playlist IDs are followed by the letter " R " in the display. Each time a Rotating Playlist receives a PLAY command, it will play the next event in the list, then stop. If the Restart Mode is set to IMMEDIATE, then subsequent PLAY commands will interrupt the current event and begin to play immediately. The list remembers the next element to play until power is turned off, on restart all lists start from the first element.

When playback of a Rotating Playlist begins, the current selection and its playing time will be shown on the bottom line of the display.

Events in a Rotating Playlist may be looped. By pressing LOOP during a particular event, that event (only) will loop until looping is disabled, then the playlist will continue normally. Rotating lists loop as a whole by their nature; when the last element has played the list starts over when the next Play command is received.

To reset the Playlist to any other event, edit the Playlist and select the desired event. Press ENTER to index to the currently selected event, then EXIT Edit mode and select Save Changes.

You can use the Edit mode for normal playout activity. This allows rapid selection within a particular group of cuts. You also have control over the order in which they are selected by defining the playlist order. Simply dial to the desired event and Play.

VIEWING A PLAYLIST

To view the contents of the Play queue at any time, press VIEW LIST button and rotate select to see Playlist items remaining to be played. Use the selection knob to scan the events in the list. The number at the upper left of the display shows the event's position in the Playlist. If the machine is currently playing, the number at the upper left shows how far away the selected event is from the currently playing Cut.

Playlist Editing

The Playlist Edit Menu provides five options:

- INSERT – Add a Cut or Playlist at the current list position.
- APPEND – Add a Cut or Playlist to the end of the Playlist.
- REMOVE – Remove the currently selected event.
- TRUNCATE – Remove ALL events *after* the currently selected event.
- CHANGE PLAYLIST TYPE – Change between Linear and Rotating modes.

SCAN MODE

Scan mode allows viewing the contents of a Playlist. Use the selection knob or navigation arrows to scan through the Playlist. Playlist Edit operations begin from and return to the Scan mode.

- Select the Playlist to be edited, then press EDIT. to enter Scan mode.
- The top line displays the Playlist event number, ID and name. Event duration, sampling rate and record format are shown on the second line. If the event is a Playlist, the second line displays the name of the first cut in that Playlist.
- To review the contents of the Playlist, rotate the selection knob to scan the list.
- At any time, you may press the PLAY button. The Playlist will play, beginning with the event selected. Linear Playlists will play to the end. Rotating Playlists will play only the selected item, then cue the next item.
- To edit the list, press ENTER. Then use the selection knob to choose the edit function you need, Insert, Append, Remove Truncate or Change Playlist Type. Press ENTER again to begin using that function. See the following descriptions for further information.

INSERT

Adds a cut or Playlist immediately *before* the current selection highlighted in Scan mode. (To add a cut *after* the last cut in the list, use Append.)

- Select the Playlist to be edited, then press EDIT. Select the event that will contain the inserted cut or playlist.
- Press ENTER and select INSERT from the Edit Tools list. Use the selection knob or navigation arrows to locate the cut or playlist you wish to insert. Press ENTER to complete the operation and return to Scan mode.
- Press ENTER to continue editing,
  OR
- Press EDIT or EXIT. Press ENTER to save the edited list, EXIT to discard all edits.

APPEND

Adds a selected file to the *end* of the current Playlist.

- Select the Playlist to be edited, then press EDIT. (Append is not affected by position within the list.)
- Press ENTER and select APPEND from the Edit Tools list. Use the selection knob or navigation arrows to locate the file you wish to insert, then press ENTER to append it to the end of the Playlist and return to Scan mode.
- Press ENTER to continue editing,
  OR
- Press EDIT or EXIT. Press ENTER to save the edited list, EXIT to discard all edits.

Looping a Linear Playlist

Using APPEND, select the Playlist *itself* as the Appended event. This tells DigiCart/EX to play the Playlist again as the next event. In the Playlist Directory, looped Playlists may be recognized by a Playlist time display that reads: 99:99:99.

REMOVE

Removes a cut or Playlist event from the current Playlist.

- Select the Playlist to be edited, then press EDIT. Scan the Playlist for the event you wish to delete.
- Press ENTER and select REMOVE from the Edit Tools list. Press ENTER to remove the item and return to Scan mode.
- Press ENTER to continue editing,
  OR
- Press EDIT or EXIT. Press ENTER to save the edited list, EXIT to discard all edits.

*NOTE: If a cut required for a Playlist has been deleted, or resides on a drive not currently available to DigiCart/EX, then " * " will be displayed next to the Playlist time when that Playlist is selected. Use SCAN to determine which item is missing. The " * " will appear when the missing event is selected. Remove the missing event or recreate it with the same* file ID number. *If the Playlist with the missing event is included in a Compound Playlist, the warning " * " will appear on those too.*

TRUNCATE

Deletes all items *following* the currently selected event.

- Select the Playlist to be edited and press EDIT. Scan the Playlist for the last event to leave in the Playlist.
- Press ENTER and select TRUNCATE from the Edit Tools list. Press ENTER to remove all items listed after the current event and return to Scan mode.
- Press ENTER to continue editing,
  OR
- Press EDIT or EXIT. Press ENTER to save the edited list, EXIT to discard all edits.

CHANGE PLAYLIST TYPE

Switches between Linear and Rotating Playlist (Stack) types.

- Select the Playlist to be edited, then press EDIT.
- Press ENTER and select CHANGE LIST TYPE from the Edit Tools list. Press a navigation arrow button to change the Playlist type between Linear and Rotating. Press ENTER to complete the operation and return to Scan mode.
- Press ENTER to continue editing,
  OR
- Press EDIT or EXIT. Press ENTER to save the edited list, EXIT to discard all edits.

NOTE: A looped Linear Playlist may not be converted to a Rotating Playlist.

Converting a Linear Playlist to a Cut

You may store a Playlist as a cut. This can be useful to allow a Playlist to be consolidated onto a memory card for transfer to another system.

There are limits to the kind of Playlist that may become a cut:

- The Playlist must not include other playlists (Compound Playlists).
- All cuts in a Playlist to be copied must be of the same Sample Rate and Format.

The new cut will occupy disk space equal to the run time of the Playlist.

When converting a Playlist to a cut, an unoccupied index location must be used.

This operation uses only audio between the HEAD and TAIL points from each cut in the Playlist, resulting in a single cut made up of the concatenated audio that would have played in the original Playlist. Fade In, Fade Out and Gain settings are not applied between cuts from the Playlist. The Fade-in and Gain setting of the first cut of the Playlist is applied to the new conglomerate cut and the Fade-out of the last cut in the Playlist is applied to the end of the resulting single cut.

If WAV and DC2 files have the same sample size and sample rate, they may be mixed in a Playlist that is to be converted into a cut.

TO CONVERT A LINEAR PLAYLIST TO A CUT

- Select the Playlist to be copied. Press the UTILITY button. Select COPY EDITED*.
- Use the navigation controls to choose a destination drive and a directory from 0 TO 9 (remember that you are creating a new cut, not a new Playlist).
- Rotate the selection knob to choose an index number. Press the ENTER button to copy the Playlist.

When copying is completed, DigiCart/EX returns you to the cut level.

The new cut is automatically given the same name as the source Playlist. The source Playlist is not deleted.

* Copy Original will also perform a Playlist-to-cut conversion. It will copy the cuts in their entirety, ignoring Head and Tail trim edits.

Chapter 8

Audio Editing

This chapter covers editing of audio files and Playlists. DigiCart/EX can make basic edits to audio files, such as Head and Tail Trims, Fades (In and Out), Output Gain adjustment, and Pre-roll. Playlist edits provide lots of flexibility to change Playlists, rather than rebuild them.

Non-destructive audio file edits (Head/Tail Trim, Fade In/Out, Gain) can be performed on all playable formats. The edit parameters are saved in a vendor-specific area of the file header. When playing WAV files on non-DigiCart machines, the edits will not be recognized. However, the COPY EDITED utility can be used to render Head/Tail Trims to WAV files playable on other machines.

The COPY EDITED utility can be used to convert between DigiCart II formats and WAV file formats. This applies only to linear 16-bit stereo recordings.

User Interface

The Editing menus follow the convention of first selecting the file to be edited, then press the EDIT button. Next use the selection knob or Navigation Arrow buttons to select the operation that you wish to perform. Follow the on-screen prompts to complete the operation.

Edit Audio Files

Edit Menu functions of DigiCart/EX are non-destructive and can be undone or changed at any time. Edit information is stored as part of a cut and remains active until changed or removed. The following parameters can be modified using the Edit menu:

- HEAD
- FADE IN
- PRE-ROLL
- TAIL
- FADE OUT
- OUTPUT GAIN

Most Edit Menu functions are time-based. By adjusting HEAD and TAIL trim, you determine the total playing time of a cut. Audio gain will ramp up or down according to the time values selected for FADE IN and FADE OUT. PRE-ROLL sets the length of audio that will play prior to TAIL and FADE OUT edits when auditioning selected values.

Times are displayed in HH:MM:SS:FF.BB (Hours, Minutes, Seconds, Frames, and SMPTE Bits). The selected unit of measure is shown in the display in brackets, for example <F> for Frames.

Use the Left and Right Arrow buttons to select units.

After Head and Tail editing you can use the Copy Edited feature in the Utility Menu to create a new cut that contains only the audio material between the HEAD and TAIL pointers. Deleting the original cut frees up drive space by eliminating the audio material that is no longer needed.

HEAD

Head determines the point in a recorded file where playback begins when the PLAY button is pressed. DigiCart/EX has a minimum length of two seconds for any cut. It is not possible to use HEAD trim to further reduce this length. Since tight HEAD trims are usually more important than TAIL trims, always perform the HEAD trim first, and then trim the TAIL if cut length permits.

In addition to its function as an editing tool, Head Trim allows auditioning of any part of a file by selecting the desired start time. Pressing EXIT when done restores any programmed Head Trim value or 00:00:00:00.

Setting HEAD POINT to a Specific Value

Allows setting of the Head point to a known value. This method is accomplished without playing the audio.

- Select a cut and press EDIT. Select HEAD by using selection knob. Press ENTER. The current Head point will be indicated on the display.
- Use the selection knob and navigation arrows to adjust the Head position value. The current field is shown in brackets:

  <H> = Hours, <M> = Minutes, <S> = Seconds, <F> = Frames or <B> = Bits.
- Press PLAY to audition the new Head point. Repeat the previous steps as needed to adjust the Head point position.
- Press ENTER to save the new Head point, EXIT to close the cut with no change.

Setting the HEAD POINT using Auto-Set

The Auto-Set feature allows setting the Head point during audition. In Edit mode, use the PLAY button to start playback and the STOP button to set the Head point location and stop playback.

- Select a cut and press EDIT. Select HEAD by using the selection knob or Navigation buttons. Press PLAY and the cut will begin playing from the first audio sample in the file. Press STOP to set the new HEAD point location.
- After pressing STOP, the display will show the existing Head point on the top line and the newly selected Head point on the second line. You may use the selection knob or navigation arrows to adjust the new Head position value.
- Press PLAY to audition the new Head point. Repeat the previous steps as needed to adjust the Head point position.
- Press ENTER to save the new Head point, or EXIT to close the cut with no change.

TAIL

TAIL determines the point in the selected cut where play ends. DigiCart/EX limits audio files to a minimum length of two seconds. Therefore, the Tail point cannot be set earlier than two seconds after the Head point.

When setting a new Tail point in a cut that contains a programmed Fade In and/or Fade Out, DigiCart/EX will not allow the Tail pointer to be set to less than the combined total of Fade In and Fade Out times.

Setting TAIL POINT to a Specific Value

Allows setting the Tail point to a known value. This is accomplished without playing the audio.

- Select a cut and press EDIT. Select TAIL by using selection knob. Press ENTER. The current Tail point will be indicated on the display.
- Use the selection knob and navigation arrows to adjust the Tail position value. The current field is shown in brackets:

<H> = Hours, <M> = Minutes, <S> = Seconds, <F> = Frames or <B> = Bits.

- Press PLAY to audition the new Tail point. Repeat the previous steps as needed to adjust the Tail point position.
- Press ENTER to save the new Tail point, or EXIT to close the cut with no change.

Setting the TAIL POINT using Auto-Set

The Auto-Set feature allows setting the Tail point during audition. In Edit mode, use the PLAY button to start playback and the STOP button to set the Tail point location and stop playback.

- Select a cut and press EDIT. Select TAIL by using the selection knob. Press PLAY and the cut will begin playing from the Head point. The display will begin counting from 00:00:00:00.00, which represents time from the current Head point. Press STOP to set the new TAIL point location.
- After pressing STOP, the display will show the previous TAIL point on the top line and the newly selected TAIL point on the second line. You may use the selection knob and navigation arrows to adjust the TAIL position value.
- Press PLAY to audition the new TAIL point. Playback will begin before the edit according to the current Pre-Roll setting. Repeat the previous steps as needed to adjust the Tail point position.
- Press ENTER to save the new TAIL point, or EXIT to close the cut with no change.

PRE-ROLL

Enables you to set the time ahead of the TAIL or FADE OUT point for auditioning during edits. Depending upon the nature of the cut, or its total length, you may want to vary the length of the PRE-ROLL. If the PRE-ROLL length exceeds the duration of the cut, it will be ignored and the entire cut will play.

- Press EDIT. Select PRE-ROLL by using selection knob. Press ENTER to edit the value.
- Use the selection knob and the navigation arrows to adjust the PRE-ROLL value.
- Press ENTER to save or EXIT to abandon the PRE-ROLL setting without changes.

FADE IN

After you have recorded a cut, you can program a FADE IN. FADE IN always begins at the HEAD point of a cut, and cannot exceed total cut length or the amount of time between the HEAD point and the beginning of a FADE OUT or the TAIL. The maximum FADE length is 40 seconds.

When adjusting FADE IN duration, time is measured as the number of seconds from the HEAD point to the end of the fade. A value of 00:00:00:00:00 equals no Fade In.

NOTE: If you use PAUSE during the FADE IN period of the cut's playback, when PAUSE is released the FADE IN will start over from silence.

Setting FADE IN to a Specific Value

This method allows setting the Fade In length to a known value. This is accomplished without playing the audio.

- Select a cut and press EDIT. Select FADE IN by using selection knob. Press ENTER. The current Fade In duration will be indicated on the display.
- Use the selection knob and navigation arrows to adjust the Fade In duration.
- Press PLAY to audition the new Fade In. Repeat the previous steps as needed to adjust the FADE IN duration.
- Press ENTER to save the new Fade In duration, or EXIT to close the cut with no change.

Setting FADE IN using Auto-Set

The Auto-Set feature allows setting a new FADE IN end-point during audition. In Edit mode, use the PLAY button to start playback and the STOP button to set the Fade In duration and stop playback.

- Select a cut and press EDIT. Select Fade In by using the selection knob. Press PLAY and the cut will begin playing from the Head point. You will not hear the fade at this time. Press STOP to set the new FADE IN end-point location.
- After pressing the STOP button, the display will show any previous Fade In end-point on the top line and the newly selected Fade In end-point on the bottom line. You may use the selection knob and navigation arrows to adjust the FADE IN end-point value.
- Press PLAY to audition the new Fade In. Playback will begin from the Head point and continue playing until the cut ends or STOP is pressed. Repeat the previous steps as needed to adjust the Fade In time.
- Press ENTER to save the new Fade In duration, or EXIT to close the cut with no change.

FADE OUT

After you have recorded a cut, you can program a FADE OUT length. FADE OUT is linear and always ends at the TAIL point of the cut, and cannot exceed total cut duration. DigiCart/EX limits FADE OUT length to the time between the end of a FADE IN (if used, otherwise the HEAD point), and the TAIL point of a cut. The maximum FADE length is 40 seconds.

When adjusting FADE OUT duration, time is measured as the number of seconds from the start of the fade to the TAIL point. A value of 00:00:00:00:00 equals no Fade Out.

Setting FADE OUT to a Specific Value

This method allows setting the Fade Out length to a known value. This is accomplished without playing the audio.

- Select a cut and press EDIT. Select FADE OUT by using selection knob. Press ENTER. The current Fade Out duration will be indicated on the display.
- Use the selection knob and navigation arrows to adjust the Fade Out duration.
- Press PLAY to audition the new Fade Out starting at the Pre-Roll distance before the Fade Out point. Repeat the previous steps as needed to adjust the FADE OUT duration.
- Press ENTER to save the new Fade Out duration, or EXIT to close the cut with no change.

Setting FADE OUT using Auto-Set

The Auto-Set feature allows setting a new Fade Out time during audition. In Edit mode, use the PLAY button to start playback and the STOP button to set the Fade Out duration and stop playback.

- Select a cut and press EDIT. Select Fade Out by using the selection knob. Press PLAY and the cut will begin playing from the Head point. You will not hear the fade at this time. Press STOP to set the new FADE Out time.
- Fades are limited to 40 seconds in length. If STOP was pressed at a point in the file earlier than 40 seconds from the Tail point, the FADE OUT value will be set to 40 seconds.
- After pressing STOP, the display will show any previous Fade Out time on the top line and the newly selected Fade Out on the bottom line. You may use the selection knob and navigation arrows to adjust the FADE OUT value.
- Press PLAY to audition the new Fade Out. Playback will begin before the edit according to the current Pre-Roll setting. Repeat the previous steps as needed to adjust the Fade Out end-point position.
- Press ENTER to save the new Fade Out time, or EXIT to close the cut with no change.

OUTPUT GAIN

Allows the adjustment of the Output Gain (level) of a cut *after* it has been recorded. Gain may be adjusted over a range of +6 dB to -90 dB, referenced to the initially recorded level. Output Gain is the only Edit Menu function that is not time based. Output Gain may be adjusted for decibels or tenths of a decibel.

Just as with all other Edit Menu functions, this function is non-destructive and the gain setting is stored as part of a cut's header. DigiCart/EX automatically play the file with the adjusted gain setting.

- Select a cut and press EDIT. Select OUTPUT GAIN using the selection knob. Press ENTER or STOP. The display will show the current gain setting for the cut, relative to the originally recorded level.
- Use the navigation arrows to select the value for decibels (<1.0>) or tenths of decibels (<0.1>). Use the selection knob to adjust the Output Gain.
- Press the ENTER button to save changes or EXIT to abandon changes.

Output Gain is not applicable to cuts in the Digital Data format.

Chapter 9

Maintenance

Your DigiCart/EX has no required adjustments. Maintenance issues relate to keeping it clean, operating at a safe temperature and correctly connecting external devices.

Because hazardous voltages may be present inside this product, refer service to qualified electronics service technicians. Qualified technicians may obtain a factory service manual from 360 Systems Technical Support Department.

> ***WARNING***
>
> Connect only to a grounded 50/60 Hz AC outlet providing the correct voltage (115 VAC or 230 VAC, as delivered).
>
> Do not remove or defeat the grounding pin on the AC power cord.
>
> A serious shock hazard may result from failing to make connection to a properly grounded electrical outlet.
>
> Do not use this product out of doors, in rain, or in damp or wet environments.

General Cleaning

Your DigiCart may be cleaned periodically with glass cleaner and a soft cotton cloth. Please note the following important cleaning tips:

- Do not use paper tissue wipes as these may scratch the display window.
- It is recommended that you spray cleaning solutions onto a cloth before wiping the DigiCart. *Do not* spray fluids directly on the DigiCart.
- Silicon rubber keypads may be cleaned with mild soap and water, using a soft sponge. Be certain to wring excess solution from the sponge prior to wiping the DigiCart.

Calibration

DigiCart/EX is factory calibrated to provide unity gain from analog input to analog output with a 100K ohm impedance load. When a +4dBu reference signal is applied to an analog input, the amplitude of the resulting digital signal recorded to disk will be 16dB below digital full scale. There should be no need to re-calibrate the analog input section.

The analog output gain can be user-adjusted to match the input impedance of externally connected equipment. With the external audio equipment connected to the analog outputs, play the 1KHZ.WAV file supplied with DigiCart/EX to produce a 1kHz sine wave signal at +4dBu. Observe the signal level on the meters of the external equipment while adjusting the GAIN pots on the rear panel of DigiCart/EX. The Gain pots have an adjustment range of +/- 0.5dB.

Disk Maintenance

Internal hard disk maintenance is limited to functions such as Format/Partition Disk, Rename, and Update Directories, which are all covered under Utility Menu Features beginning on page 29.

Program Updates

From time to time, 360 Systems may release new versions of the DigiCart/EX operating system program that can be installed by the user via either a memory card or a file on the Ethernet Audio server. Memory card program updates must be ordered from 360 Systems because a specially formatted card is required. A DCSYS.360 file for use from a Network Drive can be downloaded or emailed; contact 360 Systems Customer Service Department for details.

To check the current version number, press the ENTER button while DigiCart/EX is idle (stopped and *not* in a menu mode). The current version number will appear on the top line of the command line display.

UPDATE THE PROGRAM FROM A NETWORK SERVER

Move or copy the update file, named "DCSYS.360" to one of the exported DigiCart base directories on a DigiCart/EX network server. A base directory is the directory that the server makes available to DigiCarts, and which can be seen with the Mount Network Drive utility.

From DigiCart, make the drive containing the program file the current drive.

Be certain the DigiCart is in the idle state. Press and hold UTILITY, then press HOT KEY 1 concurrently.

You will be prompted to confirm, "Write system from disk?" Press ENTER to continue.

The update will take approximately 10 seconds. Upon completion, DigiCart should report, "Flash Update Success".

Turn off the power switch, wait a moment, and then restart DigiCart/EX. The new program will now be current.

UPDATE THE PROGRAM FROM A MEMORY CARD

After obtaining a specially formatted memory card with the operating system program from 360 Systems, insert it into the DigiCart/EX Card Reader.

Make Drive 0 (the Card Reader) the current drive.

Be certain the DigiCart is in the idle state. Press and hold UTILITY, then press HOT KEY 1 concurrently.

You will be prompted to confirm, "Write system from disk?" Press ENTER to continue.

The update will take approximately 10 seconds. Upon completion, DigiCart/EX should report, "Flash Update Success".

Turn off the power switch, wait a moment, and then restart DigiCart/EX. The new program will now be current.

RESTORING PREVIOUS VERSION

DigiCart/EX stores two versions of its operating system in flash memory, the current version and the version previous to it. If you need to revert to the previous version of the DigiCart/EX operating system, power the system OFF. Press and hold the UTILITY button while turning ON the power switch.

You will be prompted to confirm, "Restore Previous Version?" Press ENTER to continue.

The update will take approximately 10 seconds. Upon completion, DigiCart should report, "Flash Update Success".

You will be prompted to confirm, "Do you want to make this version permanent?" Press ENTER to make this the current version for future start-ups, or press CANCEL to use this version for this session only.

Memory Cards and Card Reader

The Memory Card Reader is accessed just like an additional drive, and in fact is configured to operate as though it is a hard drive. See the section Recommended Memory Cards for a list of compatible memory cards.

Note: If the card is difficult to insert, check its orientation and try again. ***DO NOT FORCE THE DISK INTO THE CARD READER****. Objects inserted into the front of the reader may damage it. Such action will void the manufacturer's warranty.*

CARE AND HANDLING OF MEMORY CARDS

Although the plastic shell protects the card from most accidental damage, the following rules MUST be observed:

- DO return cards to a protective case to prevent loss or damage from dirt and spills.
- DO NOT bend or apply pressure to the surface of a memory card.
- DO NOT attempt to remove a memory card from the reader before pressing inward to release the card retention mechanism.
- DO NOT expose the memory card contacts to static discharge. Handle the card by the portion farthest from the contacts.
- DO NOT insert objects into the card reader.
- DO NOT handle the front edge of the card. Oils can be transferred from hands to the contact surface.
- DO NOT transport the DigiCart/EX with the card inserted.
- DO NOT expose cards to direct sunlight or moisture.
- DO NOT store cards at temperatures above 125° F (50° C).

TROUBLESHOOTING MEMORY CARD OPERATION

Incompatible cards may cause a considerable delay in the power up sequence. The display may stay blank for an extended period and error messages may displayed during initialization. This will normally just require additional waiting time, or the card can be removed until after the DigiCart/EX has initialized.

In rare cases, incompatible cards can leave the card reader in an unresponsive state upon removal, causing the next card inserted to fail to mount, even when Stop is pressed. Try reinserting the card or inserting a different card. If this does not correct the problem power may need to be cycled to restore the card reader's operation.

Special Button Sequences

SPECIAL BUTTON SEQUENCE FUNCTIONS

Button Sequence	Function
Utility+Power Switch	Restore previous operating system version
Utility+Hot Key 1	Load new operating system to flash memory from Memory Card or network drive.
Utility+Hot Key 2	Copy operating system from networked drive to Memory Card.
Utility+Hot Key 3	Not assigned
Utility+Hot Key 4	Front panel LED test. All indicators should illuminate together for 3 seconds.

Appendix A

Interface Wiring

Audio Connector Wiring

XLR	BALANCED	UNBALANCED
PIN–1	GROUND (SHIELD)	GROUND.
PIN–2	AUDIO " + "	AUDIO " + " OR "HOT"
PIN–3	AUDIO " – "	AUDIO " – " (SHIELD) (JUMPER TO PIN–1 FOR GROUND REFERENCE)
SHELL	GROUND (NORMALLY NOT CONNECTED)	GROUND

NOTE: If AC hum problems are encountered, disconnect the cable shields from pin–1 (cut the jumper in unbalanced systems). Shield grounding will then be provided from the other end only, and the path for a probable "ground loop" is broken.

CAUTION

Do not use "AC ground lifters" to solve hum problems.
A serious shock hazard may result.

AUDIO I/O INTERFACE TABLE

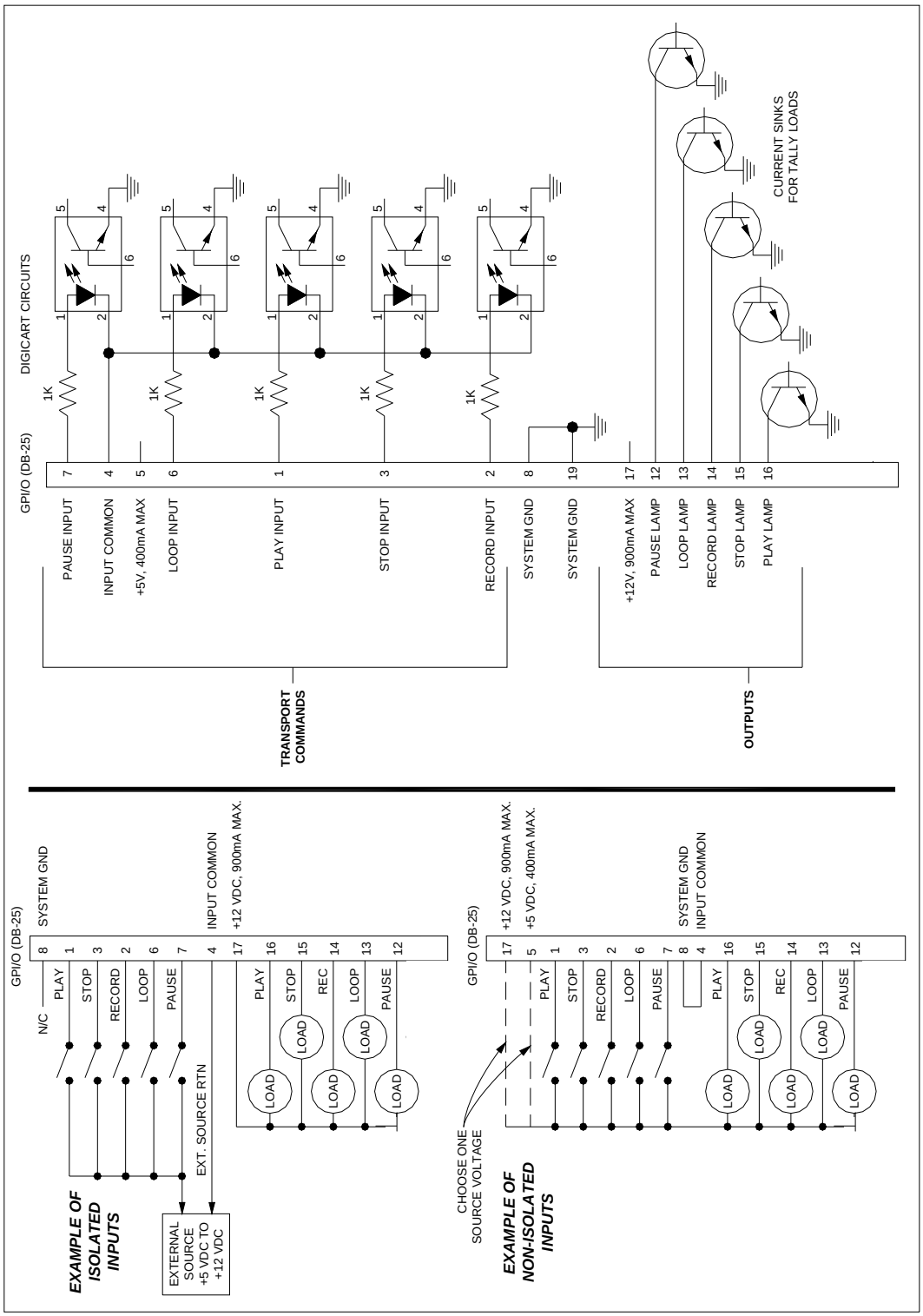
INTERFACE	DESCRIPTION	CONNECTOR
ANALOG INPUT	Electronically Balanced	XLR-3F
ANALOG OUTPUT	Phase Corrected Balanced +20 dBu Maximum Signal Level	XLR-3M
DIGITAL INPUT	AES/EBU (Professional)	XLR-3F
	AES-3id-2000 75 OHM (Professional)	BNC female
	IEC-958 TYPE II (Consumer)	BNC female
DIGITAL OUTPUT	AES/EBU (Professional)	XLR-3M
	AES-3id-2000 75 OHM (Professional)	BNC female
	IEC-958 TYPE II (Consumer)	BNC female

SYNC INPUT

INTERFACE	DESCRIPTION	CONNECTOR
SYNC INPUT	AES/EBU (Professional)	XLR-3F (Digital Input)
	AES-3id-2000 75 OHM (Professional)	BNC female (Digital Input)
	REF IN (AES-11)	BNC female (REF IN)

GPI/O (General Purpose I/O)

NOTE: If your DigiCart/EX is replacing a DigiCart II, or will be connected to an older DigiCart, you should review the following diagram to be certain that the wiring is compatible. If necessary, contact 360 Systems for documentation on the older machines (units that do not have AES/EBU connections).



GPI/O Connector Pinout

PIN	SIGNAL
1	Play Switch Input
2	Record Switch Input
3	Stop Switch Input
4	Opto-isolator Common Ground
5	+5 Volts
6	Loop Switch Input
7	Pause Switch Input
8	System Ground
9-10-11	No Connect
12	Pause Lamp
13	Loop Lamp
14	Record Lamp
15	Stop Lamp
16	Play Lamp
17	+12 Volts
18	No Connect (Was Secondary Cue Out)
19-25	No Connect

Remote Control

This connection is dedicated to a 360 Systems RC-320 Remote Control with a D-SERIAL-320 Remote Control interface cable. This port communicates with the remote control and also provides its power.

PIN	SIGNAL
1	GND
2	+5 VOLTS (Not normally used)
3	GND
4	TX + (DigiCart Transmitter, wire to RX+)
5	TX – (DigiCart Transmitter, wire to RX-)
6	Remote Present RTN
7	+12V
8	GND
9	N/C
10	N/C
11	RX + (DigiCart Receiver, wire to TX+)
12	RX - (DigiCart Receiver, wire to TX-)
13	Remote Present signal
14	+12V
15	GND

Remote Bus

This connection is dedicated to 360 Systems RC-210/220 Remote Controls and/or the RC-210/220/320 Control Bus daisy-chain.

PIN	SIGNAL
1	GND
2	+5 VOLTS (Not normally used)
3	GND
4	TX + (DigiCart Transmitter, wire to RX+)
5	TX – (DigiCart Transmitter, wire to RX-)
6	HSK OUT (Not normally used)
7	HSK IN (Not normally used)
8	RX + (DigiCart Receiver, wire to TX+)
9	RX - (DigiCart Receiver, wire to TX-)

This connection can also be used as an input for control by automation systems. It should not be used as an input any time the Remote Control connection is in use such as when an RC-320 is connected.

Aux Serial Port

This port is dedicated to external third-party serial controllers using either ES-Bus or Peripheral Bus protocols. Configure this setting in SET AUX PROTOCOL in the SETUP menu.

PIN	SIGNAL
1	GND
2	RX - (DigiCart Receiver, wire to TX-)
3	TX + (DigiCart Transmitter, wire to RX+)
4	TX GND
5	N/C
6	RX GND
7	RX + (DigiCart Receiver, wire to TX+)
8	TX - (DigiCart Transmitter, wire to RX-)
9	GND

Keyboard Port

A PS/2 style connection, any 101-Key or compatible keyboard may be connected.

PIN	SIGNAL
1	DATA
2	N/C
3	GROUND
4	+5 V
5	CLOCK
6	N/C

Network Port

This is a 100Base-T standard Ethernet port. Connection is made with an RJ-45 cable connector. Two LED status indicators are included on the connector. The green LED lights to indicate a valid network connection. The yellow LED lights to indicate communication activity.

This connection is intended for use only with 360 Systems' Ethernet Audio Server system. It is not suitable for connection on a generic LAN or WAN system.

Appendix B

Serial Control Protocols

A general description of DigiCart/EX Serial Control Interface Protocols is included in this section.

DigiCart/ES-Bus

This section covers a general description of DigiCart/EX ES-Bus interface protocol. The following Message Summary provides an outline of commands and responses that can be executed via the Serial Port.

HOST DEVICE MESSAGE SUMMARY

Add To Playlist	**Get Preset Info**	**Simulate button**
Assign/Clear Preset	**Get Playlist Info**	**Simulate Knob**
Copy	**Get Timer Info**	**Stop**
Create Playlist	**Loop**	**Cart Info**
Display Message	**Pause**	**Cart Status**
	Play	**Cut Info (Find cut - Index)**
Erase	**Play Preset**	**Cut Info (Find cut - Name)**
Find cut - Index	**Record**	**Cut Notes**
Find cut - Name	**Rename**	**Device Info**
Get Cart Status	**Reset Cart**	**Directory Info**
Get cut Notes	**Select**	**Preset Info**
Get Device Info	**Set Cart Info**	**Stack Info**
Get Directory Info	**Set cut Info**	**Timer Info**

Complete protocol documentation is available to qualified parties. Authorization as a DigiCart/EX third party software developer may be discussed by contacting the 360 Systems Customer Service department.

HARDWARE FORMAT

The serial connection is a 4-wire EIA-485 (RS-485) full-duplex channel. EIA-485 is a multi-drop version of the EIA-422 specification, and is fully compatible.

DATA FORMAT

The data format follows the ES-Bus specification in that the data transfer is asynchronous, 8 bits per byte, even parity, 1 start and 1 stop bit, for a total of 11 bits, 38.4K baud.

In all cases, the message structure is fully compatible with ES-Bus. In general, all messages will be acknowledged by an ACK if successful or NAK if an error occurred.

Peripheral Bus

This section covers a general description of the Grass Valley switcher Peripheral Bus II protocol implementation on DigiCarts. (Also known as P-BUS and E-MEMS) The commands are ASCII strings terminated with a carriage return. All data values are represented as hex ASCII digits. Data field widths are fixed, thus all digits must be supplied. No intervening white space is required and any found will be ignored.

If a line error or line break is detected, the input queue is cleared. Invalid commands are ignored.

The following commands are recognized:

Command	Description
L bbbbbb rrr	Learn (save current cut number to a register)
R bbbbbb rrr	Recall (select cut saved in a register)
T bbbbbb f	Trigger (see below)
Q dd	Query (respond with "QDIGICART\r")
C dd	Clear All registers in DigiCart at address dd

Where:

bbbbbb	Six hex digits which represent a 24-bit binary device address list (actually a bit map array). Each bit represents one of 24 devices that should respond to this command if the bit is set. Setting multiple bits will trigger multiple devices. This corresponds to the DigiCart/EX Remote Control Address setting. (Some PBUS devices start numbering at 0, in which case 0=Digicart Address 1, 1=2, etc.
rrr	Three hex digits indicating the learn/recall register number on the DigiCart which holds learned cut numbers. The DigiCart supports 128 register numbers (0x00 through 0x7f). Register values outside this range are ignored.
f	Single hex digit identifying the trigger function to be performed: Grass Valley [PBUS – (GV)] 0 = Play 1 = Stop 2 = ignored 3 = Loop 4 = Pause On 5 = Pause Off 6 = ignored 7-F = Play Sony [PBUS – (SONY)] 0 = Stop 1 = Play 2 = ignored 3 = ignored 4 = Stop 5 = Pause On 6 = Pause Off 9 = Play
dd	Two hex digits indicating one of 24 peripheral device numbers (0x00 through 0x17). 0x00 is ignored, addressing begins at 0x01 for DigiCart remote address = 1.

The SET AUX PROTOCOL setting in the Setup Menu determines whether Grass Valley or Sony trigger function codes are used. Complete protocol documentation is available from Grass Valley Group and Sony.

HARDWARE FORMAT

The serial connection is a 4-wire EIA-485 (RS-485) full-duplex channel. EIA-485 is a multi-drop version of the EIA-422 specification, and is fully compatible. Baud rate is 38400.

DATA FORMAT

The data format follows the Peripheral Bus specification in that the data transfer is asynchronous, 8 bits per byte, 1 start and 1 stop bit. GV format uses even parity, Sony format uses odd parity.

Appendix C

DigiCart History

DigiCart

Originally introduced at NAB in 1990. The original DigiCart recorded analog audio to hard disk or removable Iomega Bernoulli disks.

DigiCart II

DigiCart II was introduced in 1994. DigiCart II included digital audio I/O. DigiCart II was later enhanced with a software upgrade to provide D-Net file transfer capability.

DigiCart II Plus

Introduced in 1998, DigiCart II Plus replaced the Bernoulli removable drive with the Iomega Zip 100 drive.

DigiCart/E

Introduced in 2001, DigiCart/E introduced network operation with the 360 Systems Ethernet Audio Server system and featured the Iomega Zip 250 drive as the removable media.

Appendix D

D-Net File Transfer

The D-NET capabilities of your DigiCart/EX allow you to use its digital audio interfaces for making audio data transfers between machines using the AES ports. D-NET is particularly useful for maintaining compatibility with older DigiCarts. D-Net enables the digital audio interfaces of your DigiCart/EX to transfer audio files between DigiCart II, DigiCart/E and DigiCart/EX systems. This feature protects the investment you've made in recording, editing and organizing your audio library. All edit and titling information is retained through D-NET transfers, and all audio formats created on a DigiCart II are playable on DigiCart/EX.

D-NET is the fastest way to move existing DigiCart II libraries onto the new Ethernet Audio network. DigiCart/EX can store and play all legacy DigiCart files. Recordings made on a DigiCart/EX can also be transferred to DigiCart II using D-Net. D-Net transfers are limited to DigiCart II-compatible file types (AC2, M16, S16). No file type conversions can be performed during the transfer process. See page 35 for information on converting WAV files to DigiCart II formats using Copy Edited.

Key Features

You can transfer individual audio cuts, or directories and their associated file information from a DigiCart II to one or more DigiCart/Es. Transfer rates are faster than playback rates and all directory names, file names, and edit information is retained.

D-NET supports both the AES/EBU and AES/SMPTE-75 digital interfaces. The "Echo" Feature lets you relay a transfer from one DigiCart to the next in a "Daisy Chain" network. Individual machines can be configured to allow or disallow automatic reception of transfers.

Transfers are one-way and are initiated from the sending machine.

Files can be transferred to a specific cut index or to the 'Mail Box' at the destination. The 'Mail Box' is always in the same place and protects you from accidentally overwriting existing files.

Destination machines automatically discard files received with errors.

Only 16-bit recordings can be transferred via D-NET.

TRANSFER RATES

SAMPLE RATE	FORMAT	D-NET TRANSFER RATE vs. REAL TIME TRANSFER
48K	AC-2	8:1
	STEREO	1.5:1
	MONO	3:1
44.1K	STEREO	1.6:1
	MONO	3.2:1

ELECTRICAL SPECIFICATION FOR D-NET TRANSFERS

File transfers may be accomplished via either of two digital audio interfaces:

- AES-3id-2000 (AES standard, 75Ω impedance, BNC connector)
- AES-3 (AES standard, 110Ω impedance, XLR connector)

Both outputs always carry the same signal. There is no output selection necessary.

AES-3ID

The AES-3id-2000 interface has been designed to operate using coaxial cable with a nominal impedance of 75Ω with a male BNC. DigiCart/EX does not terminate this signal internally. When a coax cable is connected from a DigiCart II output to the input of a DigiCart/EX, a 75Ω termination must be added at the receiver end of the line (DigiCart/EX). This can be done with a T-connector and terminating cap. If DigiCart II is the receiving end, do not use external termination.

If other devices are inserted in the data path (such as routers or switchers), the user should ensure that the transmitting DigiCart drives a nominal impedance of 75Ω and that the receiving DigiCart is being driven by an output presenting a nominal 75Ω output impedance. This will serve to maintain correct signal amplitude and to minimize transmission errors caused by signal reflections from the far end of the cable.

The AES-3id-2000 interface has been successfully tested using 150m of Belden 8281, 75Ω coaxial cable.

AES-3

The AES-3 interface has been designed in compliance with the AES-3 recommended practice for serial transmission format for two-channel digital audio data. The connectors required for this interface are described in IEC 268-12, and are XLR three-pin connectors. The pin usage is:

PIN 1: CABLE SHIELD OR SIGNAL EARTH

PIN 2: SIGNAL

PIN 3: SIGNAL

Note: The polarity of pins 2 and 3 is not significant.

The recommended cable for use with AES-3 is balanced and shielded with a nominal impedance of 110Ω at frequencies from 0.1 to 6.0 MHz. The maximum recommended cable run for file transfer using AES-3 is 100 meters.

D-Net Setup

A D-NET transfer is always initiated at the Source DigiCart. However, both the Source and Destination DigiCarts require setup.

You can access the File Transfer menu by selecting DNET FILE TRANSFER from the Utility menu. Once in the File Transfer Setup menu, you'll navigate through the options with the selection knob and Navigation buttons. You'll confirm selections with the ENTER button and cancel them by pressing the EXIT button.

NOTE: Setup can be done from a 360 Systems RC-320 remote control or a keyboard. Please refer to the operations manual of your remote control for complete instructions.

The following is a description of the File Transfer Setup options and how to set them.

D-NET Receiver

Setting the File Receiver enables or disables file reception on your DigiCart/EX. When set to ON your DigiCart/EX will receive file transfers. When set to OFF, the machine will not receive file transfers. Setup menu items, not related to D-Net, will not be displayed.

The EXT SYNC indicator shows the state of the receiver when D-Net Receiver is on, or a D-Net Receive is in progress. All other front panel indicators are turned off. EXT SYNC is off when there is no signal at the receiver. The indication is on when there is a valid signal at the receiver, and the indication blinks when there is a non-conforming signal at the receiver.

NOTE: DigiCart/EX automatically disables Input Monitor when File Receive is ON. It will resume automatically when File Transfer is turned OFF. Input monitoring during Record Ready is unaffected.

- To set the File Receiver on your DigiCart/EX select DNET FILE TRANSFER from the Utility menu. Rotate the selection knob to set DNET RECEIVER to ON or OFF.
- Confirm the setting by pressing ENTER, or abandon it by pressing EXIT.

Selecting the D-Net Input Connector

The DNET RECEIVER INPUT setting selects between BNC and XLR digital input connectors on your DigiCart/EX.

- To set the File Receiver on your DigiCart/EX select DNET FILE TRANSFER from the Utility menu. Rotate the selection knob or use the LEFT and RIGHT POSITION buttons to set DNET RECEIVER INPUT to BNC or XLR-3.
- Confirm the setting by pressing ENTER, or abandon it by pressing EXIT.

Mail Box and Destination Location Transfers

A convenient method for making D-NET transfers is to send to the "Mail Box" on the receiving machine. For convenience, the Mail Box is always Directory 9. If you transfer to the Mail Box, it will be stored in the next available index.

There are two significant benefits of transferring to the Mail Box:

- The transfer will never overwrite existing cuts in the Mail Box.
- A Receiver can be set up to accept ONLY those transfers addressed to its Mail Box, thus enabling it to accept non-destructive transfers only.

You may also enter a specific destination location when making a D-NET transfer. This method enables you to transfer files to the location that is most useful. Many DigiCart users have well structured name and location conventions that make this type of transfer very convenient because you can transfer a cut directly to its final destination and be able to find it easily. Index numbers assigned to Playlists or Hot Keys maintain those associations. This allows Playlists to be updated, or parts of a Hot Key-driven set of effects to be changed.

The destination location defaults to the Index number that the file originated from on the source machine.

The 360 Systems Instant Replay® can receive cuts in certain formats from your DigiCart/EX. All models of Instant Replay can receive AC-2 and 48K linear files. Models DR-552 and DR-554 can also receive 44.1K linear files. As the Instant Replay has only a single directory, specific designation transfers must be made to Disk 1, Directory 0. Mail Box transfers will be placed in the next available Index number, after the last-occupied Index.

To set the type of transfers your DigiCart/EX will accept, select DNET FILE TRANSFER from the Utility menu. Rotate the selection knob to choose the TRANSFERS TO ACCEPT option. Choose either "ALL" or "MAIL BOX ONLY".

If desired, use the Left and Right POSITION buttons to select alternate menu items. Confirm your option choice by pressing the ENTER button.

Receiver Names and Destination Names

Each DigiCart/EX may be assigned a receiver name to identify it as the "target" for a file transfer from another DigiCart. This is especially useful when multiple DigiCarts are daisy-chained for D-Net transfers. When initiating a file transfer, enter the name of the intended receiver DigiCart on the source DigiCart.

If a DigiCart/EX is not assigned a receiver name, it will receive all transfers (sent with or without a receiver name), provided the destination drive and directory are valid. For most systems, if you plan to use receiver names, each unit should have a unique receiver name. Duplicate receiver names can be assigned to units that are intended to be mirrored redundant backups.

Assigning a Receiver Name

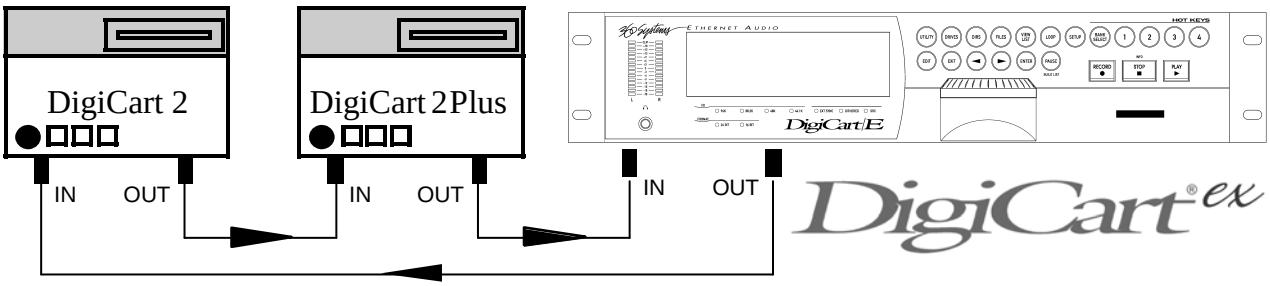
To assign a receiver name select DNET FILE TRANSFER from the Utility menu. Rotate the selection knob until the RECEIVER NAME option appears. Press the ENTER button. The display will prompt for a new Receiver Name.

Using the selection knob and the navigation arrow buttons, enter the new Receiver Name. The name can have from 1 to 15 characters consisting of any combination of letters, digits, dashes and spaces. Leading and trailing spaces are not significant and are removed when the name is saved. When you have spelled out the new Receiver Name, press the Right NAVIGATION ARROW button until the cursor is to the right of the last character in the new destination name. Press the ENTER button to save the new name. The display will show the new Receiver Name.

To erase a Receiver Name and allow a DigiCart/EX to receive all transfers, regardless of destination name select DNET FILE TRANSFER from the Utility menu. Rotate the selection knob until the RECEIVER NAME option appears. Press the ENTER button twice. The display will show the Receiver Name set to (NONE – RECEIVE ALL).

Echo Function

If your D-NET network is configured in a "Daisy Chain," or loop, and the Echo Function is ON, you will be able to relay the incoming transfer to the digital input of a DigiCart/EX to the digital output on that machine and on to the next DigiCart/EX in the network.



To set ECHO DURING RECEIVE on a DigiCart/EX select DNET FILE TRANSFER from the Utility menu. Rotate the selection knob to set ECHO DURING RECEIVE to ON or OFF.

Confirm the setting by pressing ENTER, or abandon it by pressing EXIT.

NOTE: If a DigiCart in the loop or chain is powered OFF, is in Play or Record mode, or has its RECEIVER INPUT set OFF, it will not "echo" to the next machine in the network.

Echo should be turned OFF whenever the digital outputs are used for audio transmission. Using the digital outputs for digital audio with Echo ON can cause clicks and pops in the unit receiving digital audio from the DigiCart. Facilities that make extensive use of digital audio should consider the use of a distribution amplifier or router and implement a "Star" D-NET network to avoid the use of the Echo function. The signal output through the BNC connectors on a DigiCart/EX is compatible with standard 75Ω video routers and distribution amplifiers.

MAKING A FILE TRANSFER

On the source machine, select DNET FILE TRANSFER from the Utility menu and the display will prompt to "TRANSFER CUT". If you choose to transfer a directory or drive, rotate the selection knob to your choice. Press the ENTER button to confirm your choice.

The display will prompt for a Destination Name.

To assign a new destination name, press the ENTER button. The display will prompt for a Destination Name selection.

Using the selection knob and the navigation arrow buttons, enter the new destination name. When you have spelled out the new destination name, press the Right arrow button until the cursor is to the right of the last character in the new destination name. Press the ENTER button to confirm your entry.

Rotate the selection knob. The display will prompt for a Destination Location in the target machine. If desired, using the selection knob and the Left and Right Arrow buttons, enter a new location name or choose the Mail Box. Confirm your choice by pressing the ENTER button. Note that the Removable Media Drive 0 (the Memory Card Reader in DigiCart/EX) cannot be used as a destination for DNET Transfers.

Rotate the selection knob until the display prompts "BEGIN CUT XFER". When ready, press the ENTER button.

NOTE: A transfer can be canceled by pressing either the STOP or EXIT buttons. You'll be prompted to confirm before the transfer is aborted.

During the transfer the display will update the completion percentage of the transfer as it progresses. When transferring drives or directories, the file number within the group updates as each individual file transfer is completed.

The display will indicate when the transfer is complete.

Note: D-Net transfers are one way ONLY. There is no communication from the receiving DigiCart to the source DigiCart. To confirm transfers, you will need to go to the receiving DigiCart. The receiver status display remains on until any button is pressed.

WILDCARD TRANSFERS

A powerful feature of D-NET is the ability to perform wildcard transfers. A wildcard transfer is a simultaneous, selective transfer to multiple machines. To enable a wildcard transfer, the target machines must share a common component in their receiver names.

For example, you may need to simultaneously transfer from one DigiCart in a production room to all the DigiCarts in master control. Simply assign "MASTER 1, MASTER 2,...etc." as receiver names on the machines in master control. To make a wildcard transfer to all of the machines, use "MASTER *" as the destination name on the source DigiCart in the production room. The "*" (asterisk) symbolizes the variable component on all of the receiver names of the machines in master control.

If you set "*" only as the destination name for a transfer, the transfer will be made to every DigiCart that is enabled to receive transfers. Setting the receiver name to "MAILBOX ONLY" will still block direct access transfers.

Transfer Messages

SOURCE MACHINE DISPLAYS

Incomplete Transfer

After a brief error message the display alerts that the transfer was incomplete.

Press ENTER or EXIT to acknowledge the message.

The display will show the number of files transferred without errors as "FILES SENT", and the number of files not sent.

This signifies the number of files transferred without errors and the number of files not sent due to errors.

Errors in a transmitting unit are extremely rare and indicate a hardware problem in the unit itself not in the D-NET connections or in the receiving unit.

ABORTED TRANSFER

If you press the EXIT or STOP buttons on the source DigiCart during a transfer, the transfer will continue to proceed while the display queries "QUIT TRANSFER? PRESS ENTER/EXIT"

If you press the EXIT button, the display will revert to normal and the transfer will continue.

If you press the ENTER button, the transfer is aborted and the display briefly shows:

"TRANSFER ERROR, CANCELLED BY USER"

followed by:

"TRANSFER INCOMPLETE, PRESS ENTER/EXIT"

RECEIVING MACHINE DISPLAYS

Display During Transfer

If the receiving DigiCart is idle and the receiver name matches the Destination Name on the source DigiCart, when a file transfer begins, the display indicates transfer status in the number of files transferred and percent complete for that file.

When the transfer completes without errors, for a few seconds the display shows:

"TRANSFER COMPLETE, NO ERRORS"

Then the display shows:

"GOOD FILES: NN, BAD FILES: NN"

This indicates the number of files received without errors and the number of files discarded due to errors. This message will only appear after multi-file transfers.

During Error Occurrence

When an error occurs for a received file, the cause of the error is displayed briefly and the percent complete display changes briefly to "SKIPPING FILE"

When the transfer is complete, the display will briefly show:

"TRANSFER INCOMPLETE, ERRORS OCCURRED"

Then the display will show:

"GOOD FILES: XX, BAD FILES: XX"

This indicates the number of files received without errors and the number of files discarded due to errors. Errors in the receiver can be due to:

- A faulty D-NET connection.
- Excessive disk fragmentation causing space allocation time to exceed the time allowed.
- Hardware failure in the receiving unit.
- Errors caused by the transmitting unit will usually be shown on the display of the transmitting unit.

D-Net Messages

MESSAGE LOCATION	MESSAGE	MEANING
SOURCE	COULD NOT OPEN FILE	FILE TO SEND COULD NOT BE OPENED
SOURCE	FILE IS EMPTY	FILE TO SEND IS EMPTY
SOURCE	NO FILES TO SEND	DRIVE TO SEND IS EMPTY
SOURCE	PART OF FILE MISSING	FILE IS SHORTER THAN EXPECTED
EITHER	DISK ERROR	ERROR READING / WRITING THE FILE TO BE SENT / RECEIVED
EITHER	TOO MANY ERRORS	20 DISK OR FILE ERRORS OCCURRED
EITHER	CANCELED BY USER	USER ABORTED TRANSFER BY PRESSING EXIT or STOP
RECEIVER	TIMED OUT	DATA WAS NOT RECEIVED FOR 10 SECONDS
RECEIVER	MAIL BOX FULL	INDEX 999 IN THE MAIL BOX IS IN USE
RECEIVER	OUT OF DISK SPACE	DRIVE DOES NOT HAVE ENOUGH SPACE TO SAVE THE FILE
RECEIVER	DATA OVERRUN	DRIVE CANNOT ALLOCATE SPACE IN TIME DUE TO FRAGMENTATION

Appendix E

Recording Encoded Digital Data

As of version 1.14 there is a specific selection in Record Data Format for 24 Bit Digital Data. This can be used to record Dolby E and other formats that use non-audio (really meaning non-PCM) data.

When recording the encoded data:

- Set the Record Data Format (in the Setup Menu) to 24 BIT DIGITAL DATA.
- Set the Record Audio Source to Digital XLR or Digital BNC. If Analog Input is selected then when Record is pressed the error "No Dig In Selected" is displayed.
- The Record Threshold setting is ignored.
- The record sample rate is derived from the digital input in use and no input or output sample rate conversion will be applied.

The resulting file will be displayed with the file type D24.

Digital Data recordings cannot be edited by Fade In, Fade Out, or Output Gain. Head and Tail trim are allowed (as of version 1.16).

When recording or playing in this format, the analog outputs and headphone output are muted. In addition, several Setup Menu settings are temporarily overridden so that the data is recorded and played back with no modification whatsoever to the digital data:

- Dither is forced OFF.
- Play Word Size is forced to 24 bits.
- Playback Sample Rate is forced to AS RECORDED and if an external digital reference is used the reference frequency must match the sample rate of the file.
- The Audio/Non-Audio bit in the Channel Status of the AES digital output data is set to Non-Audio.

These changes are only in effect during recording or playback of Digital Data files. The actual menu settings are not changed and become effective when one of the other recording formats is selected or when another format file is played back.

Notes on use with Dolby E

- The 16 bit Dolby E formats can be used, but the DigiCart/EX always records 24 bits in this mode.
- The Dolby E decoder model DP572 should have its Bypass PCM parameter set to Disabled.
- The DigiCart should be used to play back only Dolby E encoded material through the Dolby E Decoder.

Appendix F

Technical Specifications

General Specifications

INTERNAL HARD DISK

(Drive data from manufacturer)

Capacity	160GB
Hard Disk Reliability	MTBF: >250,000 hours

MEMORY CARD READER

Type and Capacity	SDHC Class 10. 2GB to 64GB

MISCELLANEOUS

Cue to Next Cut	Instantaneous on all drives.
Display	240 x 64 pixel (7 x 40 characters) backlit LCD
Level Metering	Quasi-peak responding LED display
GPI Remote controls	Remote contacts with return lamp drive; 25-pin "D" connector
Serial Remote control	Full control with EIA-485 (EIA-422 compatible); ES-Bus interface; 9-pin "D" connector
Cue Controls	Secondary: N.O., Open collector output
Cue Erase	SEC cues may be individually erased
Cue Relocate	Placing a cue overwrites any previous cue marks
Rack Mount Form Factor	2U, 19” rack width
Agency Approvals	See “Safety Compliance”, inside front cover.
Power	115/230 volts AC, 50/60 Hz, 1.0 A Max
Country of Origin	USA

Physical Dimensions (nominal)

Height	3.48" [89mm] (Standard EIA Rack, 2U High)
Width	17" [432mm], except rack mounting ears at 19" [483mm]
Depth	12" [305mm]
Net Weight	12.75 Lbs [5.6 Kg]
Shipping Weight	20 Lbs [9 Kg]

Audio Configuration Specifications

Sampling Frequencies	96 kHz, 88.2 kHz, 48 kHz, 44.1 kHz
Audio Coding	24- or 16-bit Linear PCM
Audio Sync References	Internal crystal, AES-3 receiver, or AES-11 sync
Input Impedance	20K ohms, each leg
Input Circuit	Balanced, RF suppressed, XLR-3
Output Circuit	Balanced, XLR-3
Digital Inputs/Outputs	AES/EBU, XLR-3 110Ω; AES-3id-2000, BNC, 75Ω; IEC-958 Type II, BNC (requires RCA adapter)
Sample Rate Conversion	24-bit, input or output, ratio = 3:1 maximum
Data Reduction	Optional, Dolby AC-2 at 16-bit, 48K only
File Formats	.WAV (16 or 24-bit); .DC2 (16 bit); .AC2
Headphones	Stereo, ¼" front panel jack

Audio Performance Specifications

	24-Bit Linear PCM
Signal-to-Noise, A/D	115 dB typical
Signal-to-Noise, D/A	116 dB typical
Distortion, A/D (THD+N)	0.0015% ref. to full scale
Distortion, D/A (THD+N)	0.0015% ref. to full scale
Bandwidth, 44.1K or 48K	10Hz – 21 kHz ±0.2 dB
Bandwidth, 88.2K or 96K	10 Hz – 42 kHz ±0.2 dB
Max Input Level	+20 dBu
Headroom Above +4 dBu	16 dB
Max Output Level	+20 dBu
Nominal Output Level	+4 dBu
Interchannel Crosstalk	< -100 dB 10 Hz – 20 kHz
Interchannel Phase Deviation	< 0.1 degree at 15kHz

Appendix N

Networking

Overview

The Ethernet Audio Network is designed to allow the following capabilities:

- Share, back up and restore audio recordings between multiple DigiCart/EXs.
- Record and Play audio directly from shared network storage.
- Share .WAV files with other applications such as Digital Audio Editors.
- Use industry standard off the shelf network components and storage systems.

There are several important points about the design and use of the network capabilities of DigiCart/EX.

The DigiCart/EX connects to shared folders on the Ethernet Audio server, and treats the shared folder as though it were another drive. Each share that is mounted has a Drive ID, contains 0-9 directories and an S directory, just like a local DigiCart drive. Network shares that can be mounted on the DigiCart/EX are referred to as Net Drives.

Each DigiCart/EX can mount up to four Net Drives at a time. There can be as many Net Drives on the server as required, selected from the DigiCart/EX as part of the Mount Network Drive process.

Multiple DigiCart/EX units can access the same Net Drives concurrently.

Net Drives are functionally equivalent to local drives. The DigiCart/EX can record and play on a Net Drive, and files can be copied between local and Net Drives or between two Net Drives.

Net Drives can be configured on the server to be accessible only to the DigiCart/EX, or they can be shared as both NFS shares and Windows shares, allowing access to other users.

The DigiCart/EX is not accessible from the network, the internal hard drive can only be accessed by the local operator. Material to be shared is stored on Net Drives. This ensures that the internal hard drive is protected from change via the network.

DigiCart/EXis designed to connect to the Ethernet Audio server via a dedicated private network. Wider area sharing should be accomplished by using a server with two or more Network Interface cards. This guarantees that network bandwidth is always available and that unknown network protocols cannot affect the operation of the DigiCart. It also prevents the DigiCart from attempting to mount shares of any unrelated NFS services on the network.

Digital Audio Workstations that do not need access to wide area networks or the Internet can also be connected to the Ethernet Audio network.

Historical Information

The Ethernet Audio system initially used Windows Server 2000 and then Server 2003 using NFS services from Windows Services for Unix. These operating systems are no longer available, but the historical information is available in the original Ethernet Audio Network Manual.

Choosing a Server

The Ethernet Audio system is designed to work with standard computer hardware, Windows operating systems, and storage systems. While we use the term server, it is acceptable to use a suitably appointed standard PC.

One of the first choices to be made is to specify the size of the hard drive system, based on how much audio material will be stored. Below is a table showing the approximate number of hours of audio per decimal Gigabyte for various formats:

Sample Rate	Word Size	Hours/GiB
44.1KHz	16 bit	211
48Khz	16 bit	194
48KHz	24 bit	129

Storage Time Per Gigabyte for Various Formats

While it is possible to use network attached storage or drive letter-mapped network storage locations to offload stored audio, it is not possible to use these for DigiCart/EX Network Drives because the NFS service will only share local devices.*

The next consideration is whether the system is intended to support direct recording and playback for a large number of DigiCart/EXs, or if the primary use is for file backup and sharing with minimal direct recording and playback.

Systems that are only used for file transfer are not relying on the server and network for mission critical playout. File transfer operations will proceed with whatever bandwidth is available, but playout and record require a minimum of bandwidth and a maximum of response time.

Systems that are only used for file transfer can theoretically support more than 16 DigiCartEXs, assuming DHCP is used to assign IP Addresses.

Systems that will play and record directly on the server may require a RAID 5 or 6 disk system to guarantee high data throughput and reliability.

Tests using a recent model desktop computer with a SATA hard drive and Gigabit Ethernet interface prove that it is possible to simultaneously run 16 DigiCartEXs in record and playback at 48KHz 24 bit. However, we recommend the use of a RAID array due to the higher reliability factor.

The system may require multiple Ethernet interfaces. Each network interface can handle 16 DigiCart/EX units. If the server needs to be connected to a local or wide area network this should be through an additional separate interface. Contact 360 Systems Customer Support if you need further guidance on specifying or configuring a large system.

Other system design criteria include redundant power and cooling, and the need for audio monitoring from the server itself (many enterprise server systems do not include audio hardware on the motherboard).

* It is possible to set up two servers, each with its own NFS service. When the DigiCart/EX detects more than one NFS service on the network, it asks the operator to choose between two or more IP addresses before presenting the available Net Drives. All Net Drives on a DigiCart/EX must be from the same NFS Service.

Setting up the Network

DigiCart/EX should be connected to a server through a Gigabit switch. (If a 10/100 Switch is used, it should have a Gigabit connection to the server.) The DigiCart/EX must be on the same subnet as the Ethernet Audio server. Use high quality CAT-5e or CAT-6 cable.

An Ethernet Audio Network is designed to support up to 16 DigiCarts. It is possible to set up two separate network interfaces on two different subnets, each serving 16 DigiCart/EX units. Note that this will require high speed storage such as a RAID 5 or 6 system if all of the DigiCarts are to be used for direct recording and playback on the network simultaneously.

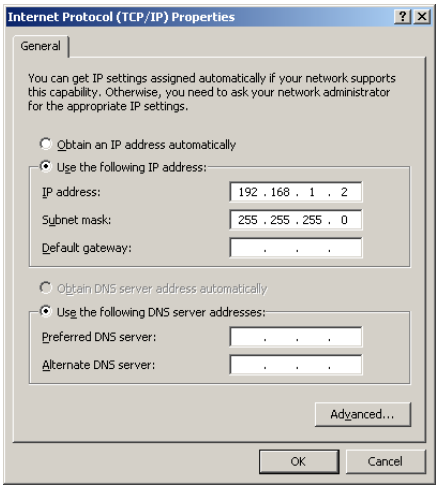
If the server has a DHCP service, this can be used to supply IP addresses to the DigiCart/EX units. Otherwise, set up the network interface with an IP address in the subnet 192.168.1 (or 192.168.2 if setting up a system with two subnets.)

Connecting a Computer Directly to a DigiCart/E

It is possible to connect a DigiCart/EX directly to a server or computer with no additional network hardware. This requires that either:

- The computer's network interface has the ability to auto-negotiate the connection type, ***or***
- A crossover cable is used.

When connecting to a PC or laptop that does not have a DHCP service to manage automatic IP addressing, the DigiCart IP address should be set to one of the set addresses such as 192.168.1.16 and the computer's network interface set for IP 192.168.1.2. Searching for "Set IP Address" in Windows Help will direct you to instructions and possibly a link to the page to accomplish this on your system. In the Internet Protocol properties page, select Use the Following IP Address (this disables Obtain an IP Address Automatically). In the IP Address field, enter an address such as 192.168.1.2. Enter the Subnet Mask 255.255.255.0. The Default Gateway and DNS Server addresses are not required.



Setting up the Ethernet Audio Server

This is a brief overview, followed in the next section by detailed instructions on setting up a system with Windows Server 2008, and Windows 7 with the Hanewin NFS Server program. These are complete for simple systems, however the complete subject of Windows system configuration is beyond the scope of this document. Also, there may be specific configuration procedures for your organization – consult with your network administrator if this is the case. The following are a few specific items that need to be configured:

- When setting up Windows 2008 server, you are prompted for Server Role. Set this to File Server.
- Disable the Indexing Service. (It is not sufficient to set this for individual storage volumes, the service itself should be stopped.)
- Configure the Network Interface. In systems with an additional network interface for connection to a local area or wide area network, the configuration of the interface that connects to the outside world may require information from your network administrator.
- Configure the DHCP service if applicable. Refer to Windows documentation for details on configuring the DHCP service. Set the DCHP Lease time to be permanent or as long as possible.

CREATING NETWORK DRIVES

A Network Drive (or Net Drive) is a Windows directory that has been prepared for use with DigiCart/EX. In this discussion, we will refer to Windows directories on the server as folders. Within these folders are other folders that represent the DigiCart/EX Directories 0-9 and S.

Briefly, the process of creating a DigiCart/EX Net Drive is:

1. Create a folder in Windows. Give it the name that you will use to refer to it on both the Windows system and the DigiCart/EX. (See below about character set limitations.)
2. Inside that folder, create 11 new folders named for the DigiCart file system directories 0 through 9 and S.
3. Repeat Steps 1 and 2 to create as many Net Drive folders as you need. Or, simply make copies of the original folder while it contains only the 0-9 and S folders, and rename the copies. Keep one of the copies to use as a template if you wish (leave it with only the 0-9 and S folders and do not share it).
4. Share the folders on the NFS service you are using. This step includes configuring the Share Name (normally the same as the Windows folder name) and permissions. In the following discussion this programming is referred to as the NFS Share.
5. If desired, share the folders over Windows file sharing as well. This allows files to be delivered to and from other audio editors on the Ethernet Audio network, or a LAN or WAN connection.
6. On the DigiCart/EX, use the Mount Network Drive selection in the Utility Menu to choose a DigiCart/EX Drive number on which to mount the Net Drive, and then the Share Name of the Net Drive that you want to connect to.

As it is best practice to maintain the same names for the actual Windows folder names as the NFS share names, only use letters and numbers for folder names, and use "_" (underscore) for the space character.

Do not add additional folders to a network drive folder. It is best to avoid adding non-DigiCart files to a DigiCart network drive; however, a limited number of data files can be placed there. For example, a text file for network users describing the contents of the drive.

NFS SHARES

The method of creating NFS shares is different depending on the NFS service used; refer to the relevant directions in the sections on installing the NFS service. Below are some general instructions about NFS Shares and their use.

The NFS Share names should be the same as their Windows folder names. The DigiCart/EX user sees the NFS Share name, not the folder name, when mounting a network drive or selecting drives. A user working at the server or other networked computer sees the folder name, and can only see the share name by viewing the NFS Share properties. Keeping the names the same makes it much easier to reference the proper location.

Use only letters and numbers and the underscore character in NFS share names. NFS Share names cannot contain spaces, the underscore character (_) is often used instead. Adhere to this rule when naming the Windows folders that you will share, as if the names are legal they will be transferred directly into the NFS Share Name when the share is created.

The NFS Shares must have read/write access to allow the DigiCart/EX to create recordings, or rename Cuts. The ability to rename Cuts is also required when copying .WAV files into a DigiCart directory from other sources.

If you want to create a Net Drive that is protected against changes from the DigiCart/EX, first get the material recorded or transferred into the directories and allow the DigiCart/EX to index the material, then change the properties of the NFS share to Read Only. If you need to add files later, reset the permissions to Read/Write, and then from the DigiCart/EX select any directory that has changed to allow the DigiCart/EX to re-index the contents. You can also use the Update Directory operation in the Utility Menu (see page 38) either on a selected Directory or all Directories in a selected Drive. When done reset the permissions to Read Only.

The following instructions detail two different approaches to providing NFS sharing on Windows. One is Windows Server 2008, the other is Windows 7 (and some earlier systems such as Vista and XP) with the addition of the Hanewin NFS server. More information about the Hanewin NFS server can be found at http://www.hanewin.net/nfs-e.htm. Instructions on setting up Hanewin for use with Ethernet Audio are on page 99.

If you are updating an existing Ethernet Audio server from Windows Server 2000 or 2003 you would follow the same instructions as a new installation, where applicable there are additional notes. We recommend that you first remove all existing NFS shares under the existing operating system before updating. We do not recommend creating a dual boot system that references the same shares under two different operating systems.

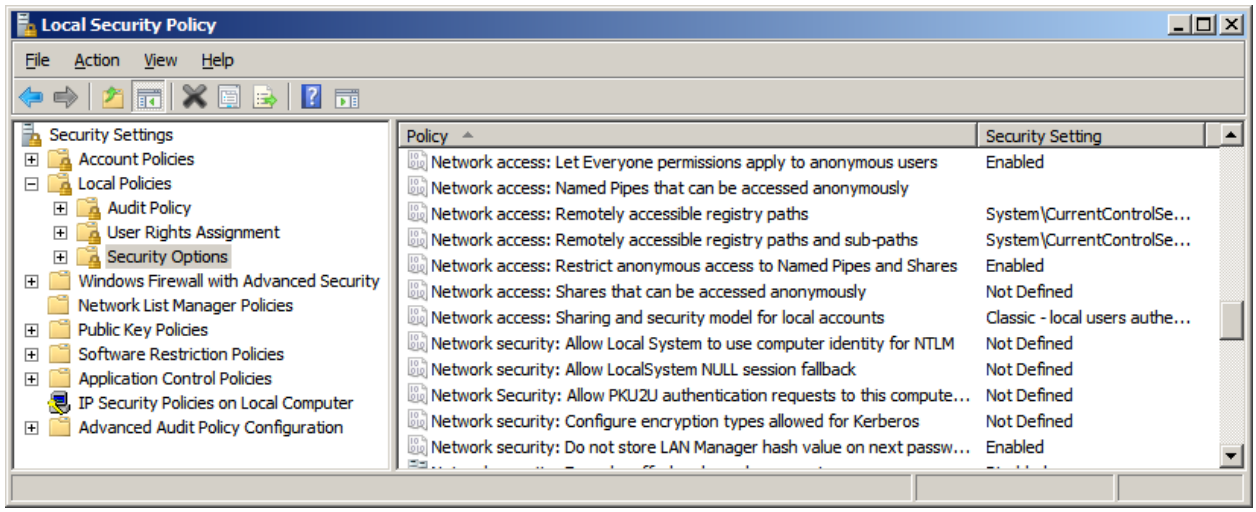
Setting up Windows Server 2008

This assumes that the Windows 2008 system has been installed, authorized and updated.

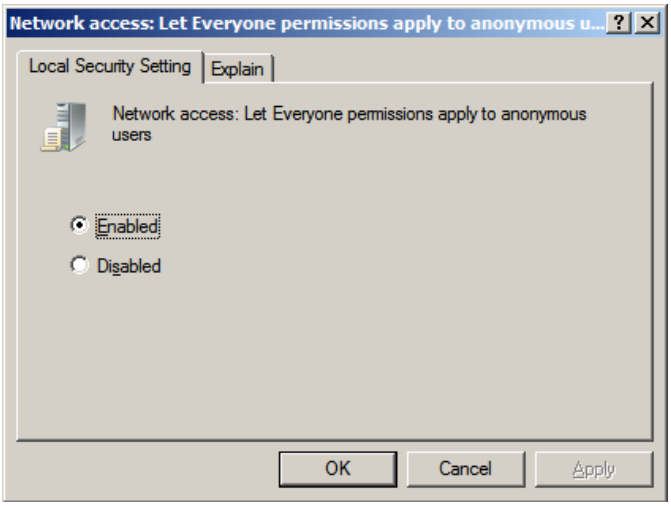
Note that these instructions do not take into account the possible effects of joining the server to a domain. Depending on the way the overall network system is configured, the domain controller may take over control of certain security policies. Consult with your network administrator about the security policies in effect, especially if you find that you cannot control aspects of the configuration covered in these instructions.

Before starting the server configuration, open **Administrative Tools > Local Security Policy.** Click the "+" box next to the **Local Policies** item. Click **Security Options**.

Find the item Network access: Let Everyone permissions apply to anonymous users and double click on it.

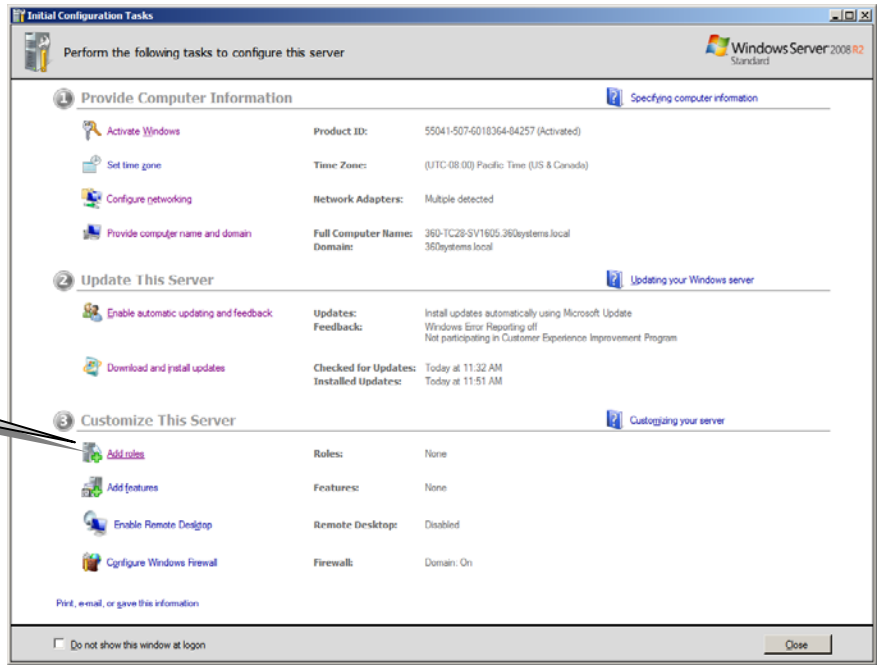


Select **Enabled** and click **OK**.



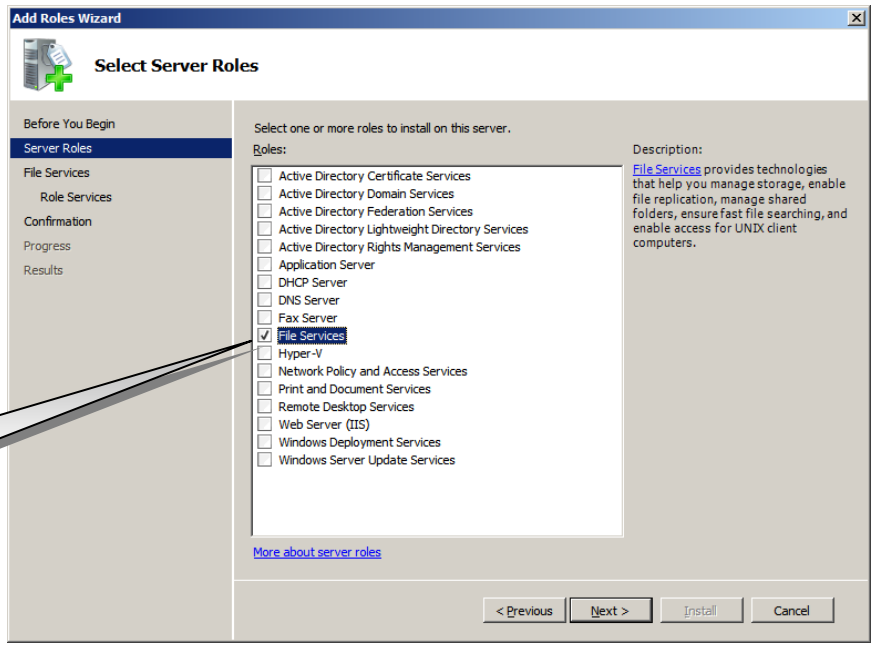
If the Initial Configuration Tasks dialog below is not displayed, open it by selecting **Start > Administrative Tools > Server Manager**

In Initial Configuration Tasks, click **Add roles**.

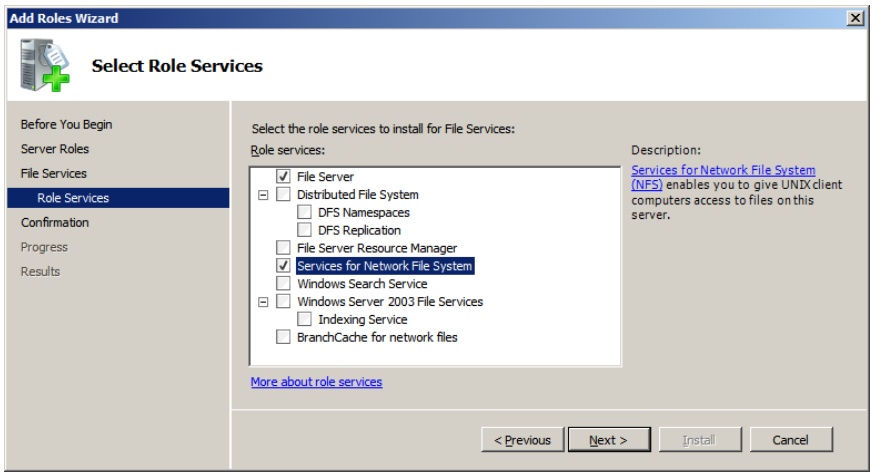


Add the **File Services** role by clicking the check box.

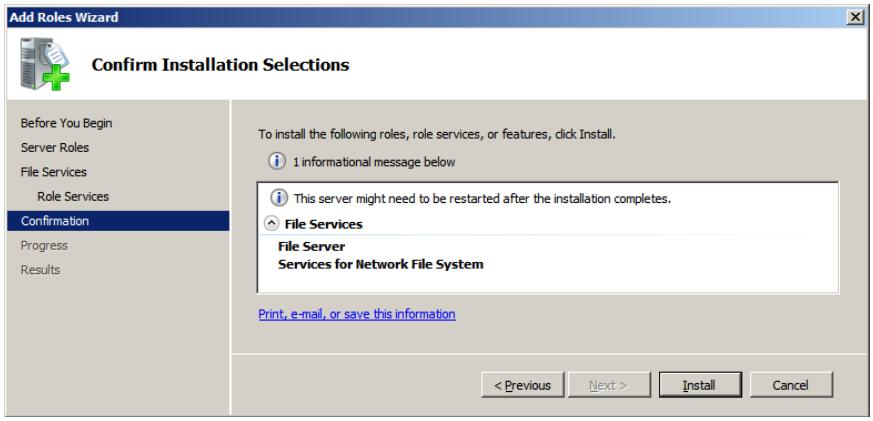
Click **Next.**



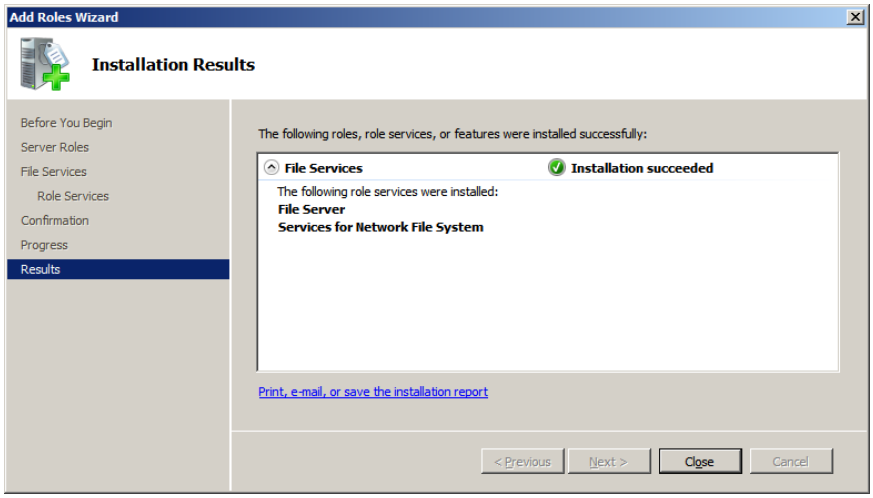
Click the **Services for Network File System** check box. Click **Next.**



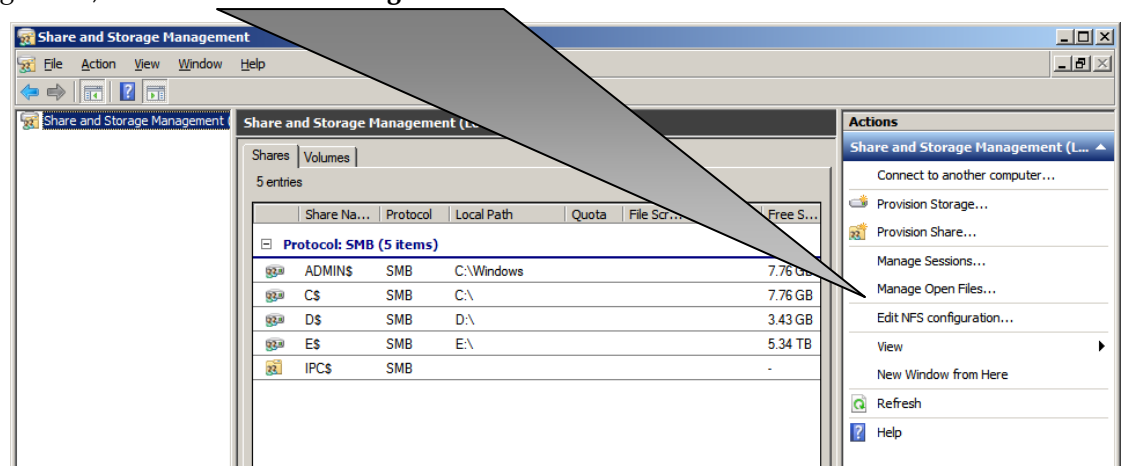
Click **Install** in the Confirm Installation Selections screen.



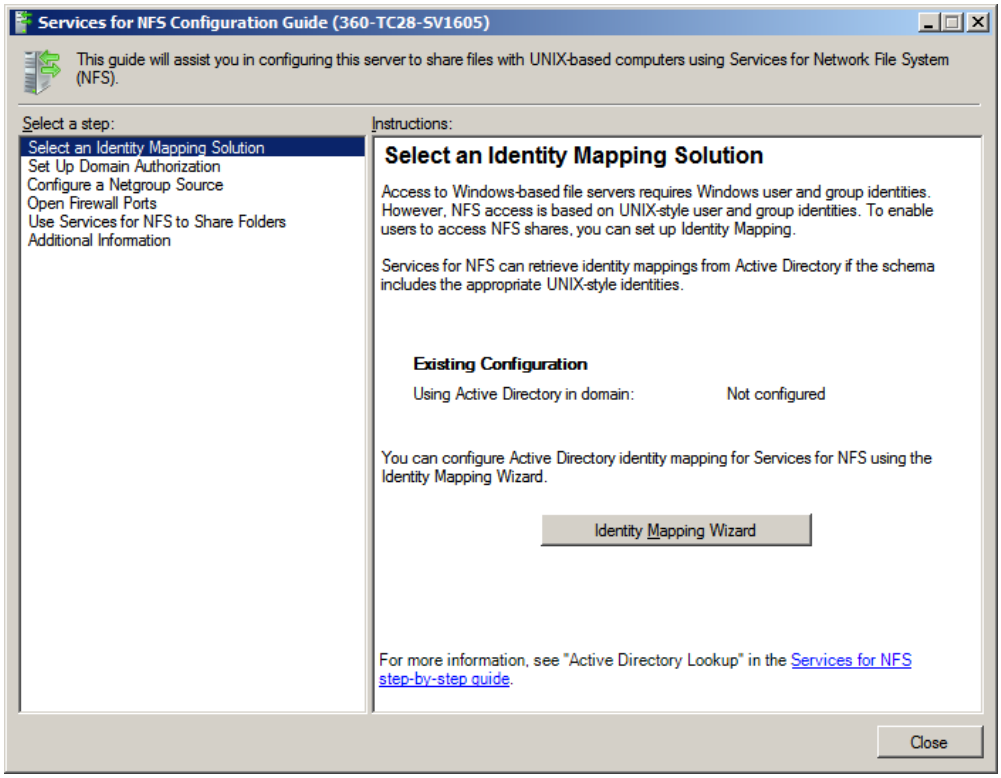
After installation, the results will be displayed. Click **Close**.



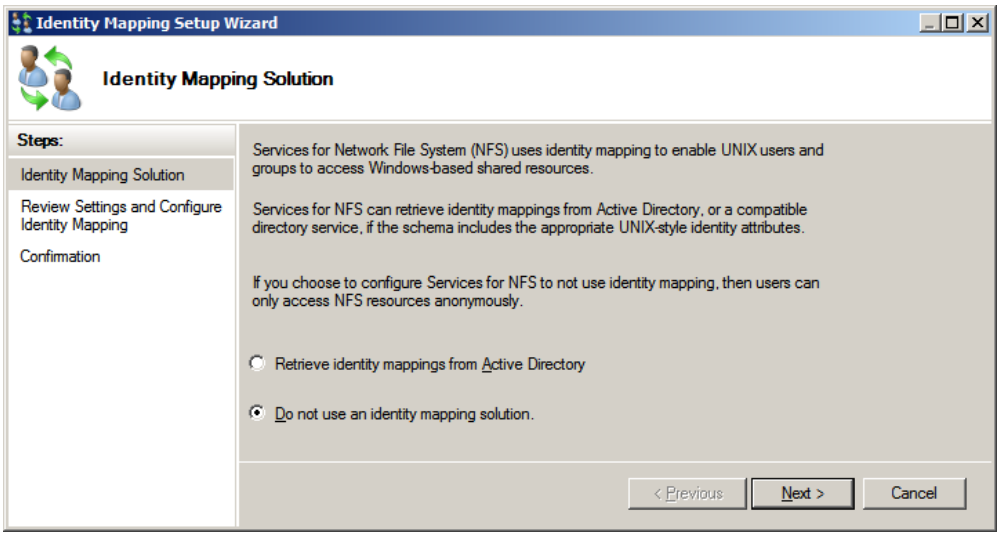
Go into Share and Storage Management (Start > Administrative Tools > Share and Storage Management). Select **Edit NFS Configuration**.



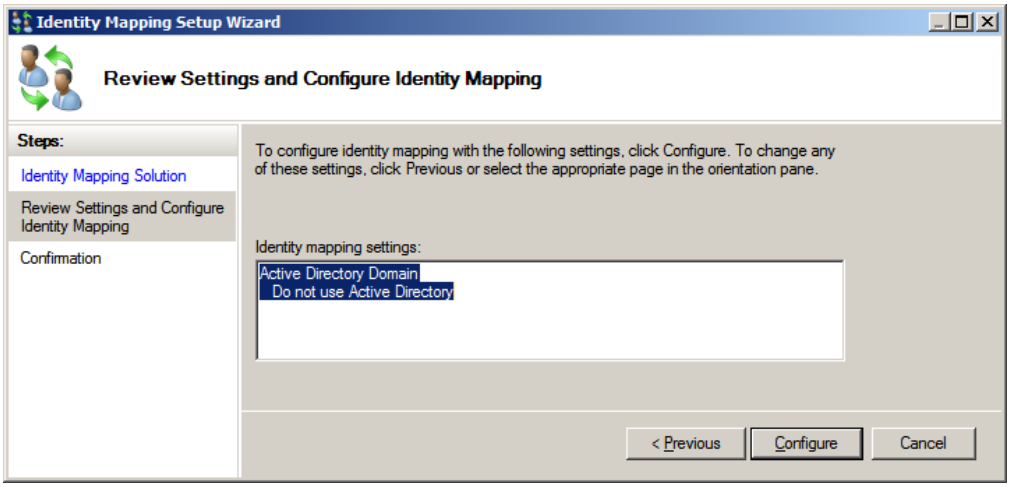
The first step is Select an Identity Mapping Solution, click on **Identity Mapping Wizard**.



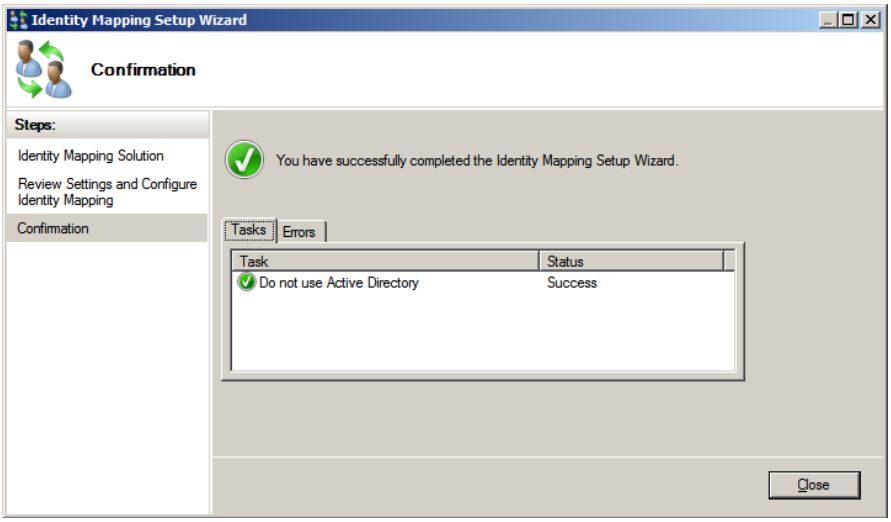
Select **Do not use an identity mapping solution**, then click **Next**.



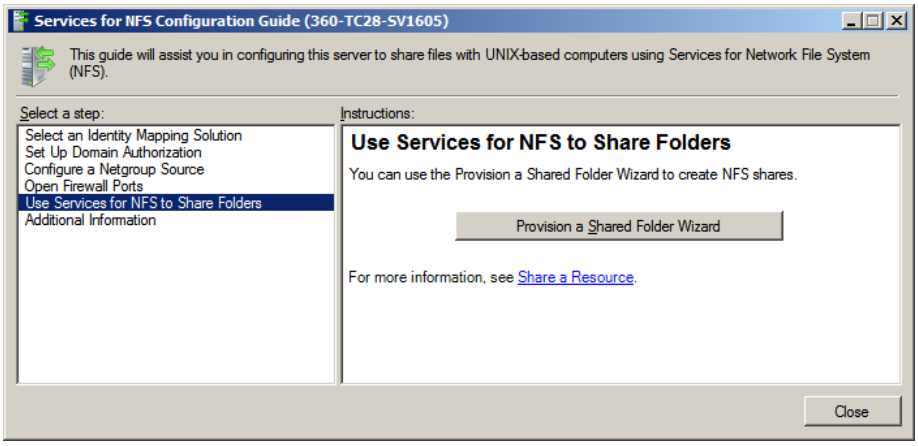
Review the setting and click **Configure**.



Confirm by clicking **Close**.

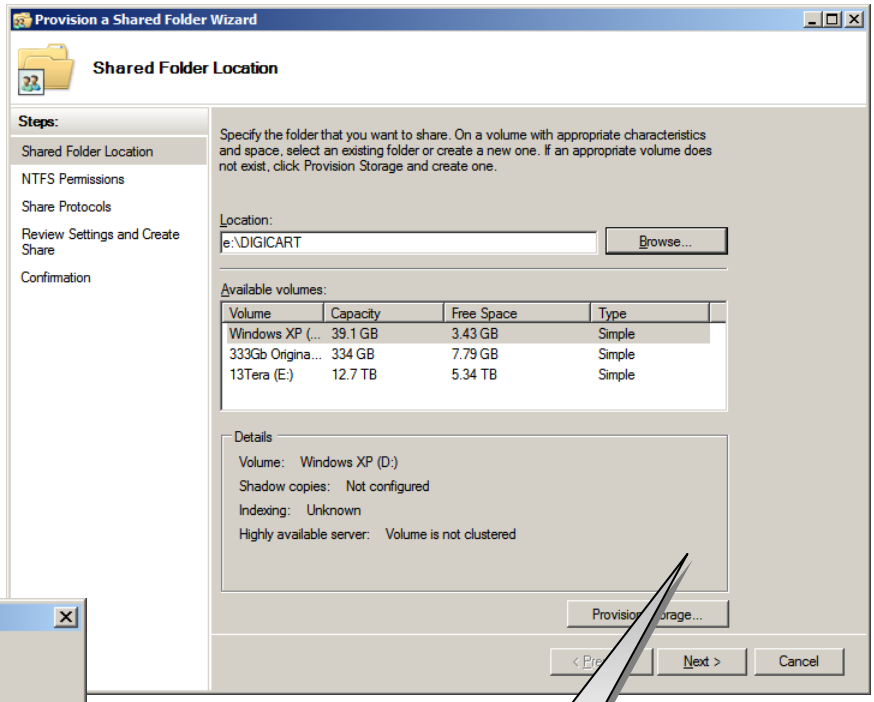


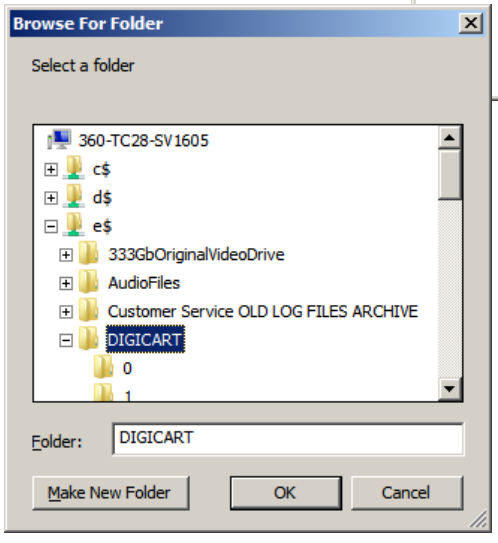
Next, select **Use Services for NFS to Share Folders** and click on **Provision a Shared Folder Wizard**.



Click the **Browse** button to select an existing folder or create a new folder.

(Return to this screen to create additional shares. See the end of this section.)



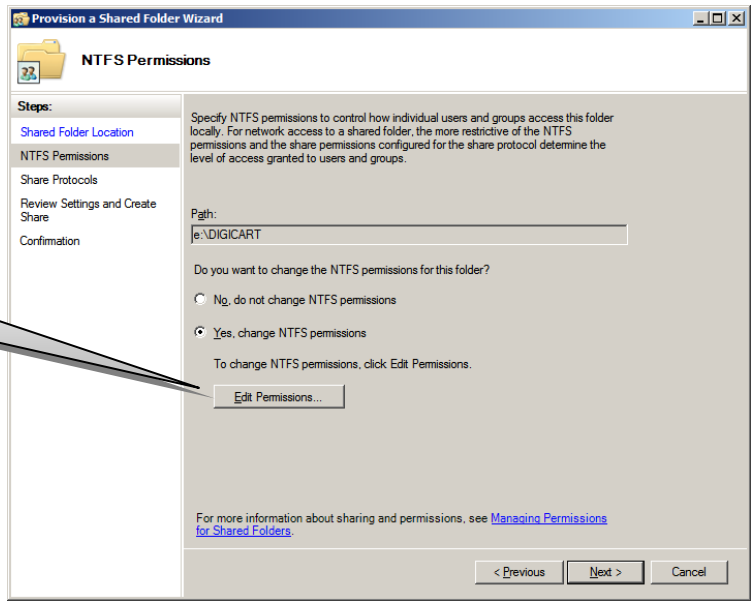


Select an existing folder or click **Make New Folder**.

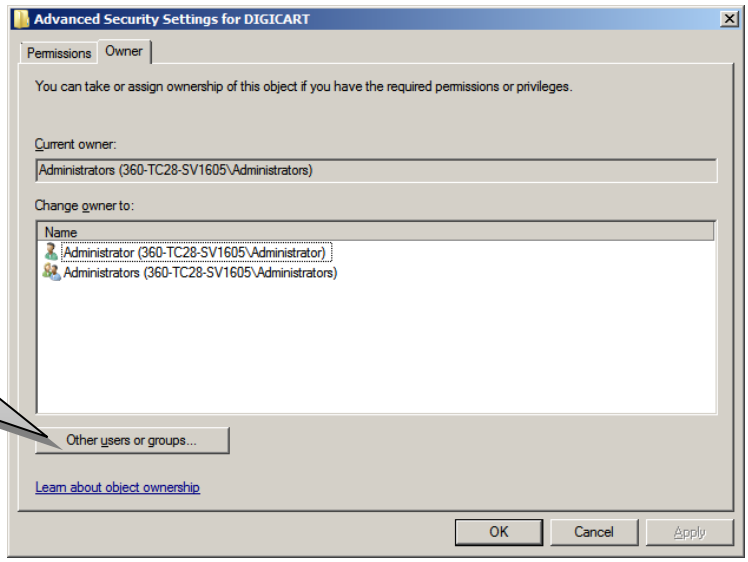
Click **OK**.

Click **Next** in Shared Folder Location.

In the NTFS Permissions screen, click **Edit Permissions.**



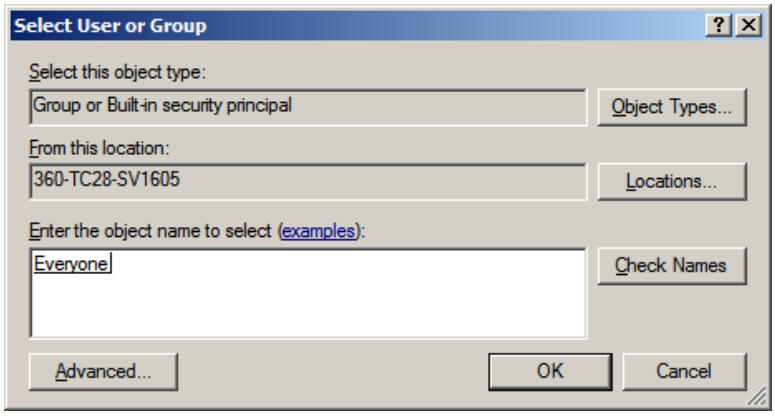
Click **Other Users or Groups**.



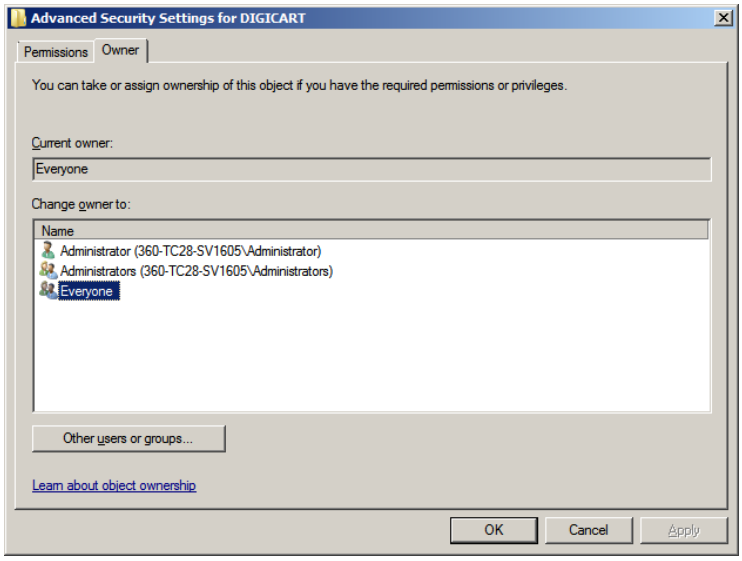
Click **Object Types** and set to **Group or Built-in security principal.**

Click **Locations** and select the local computer if there is more than one choice (cancel any requests for a username and password).

Enter **Everyone** as the Object Name and click **Check Names**, then **OK**.

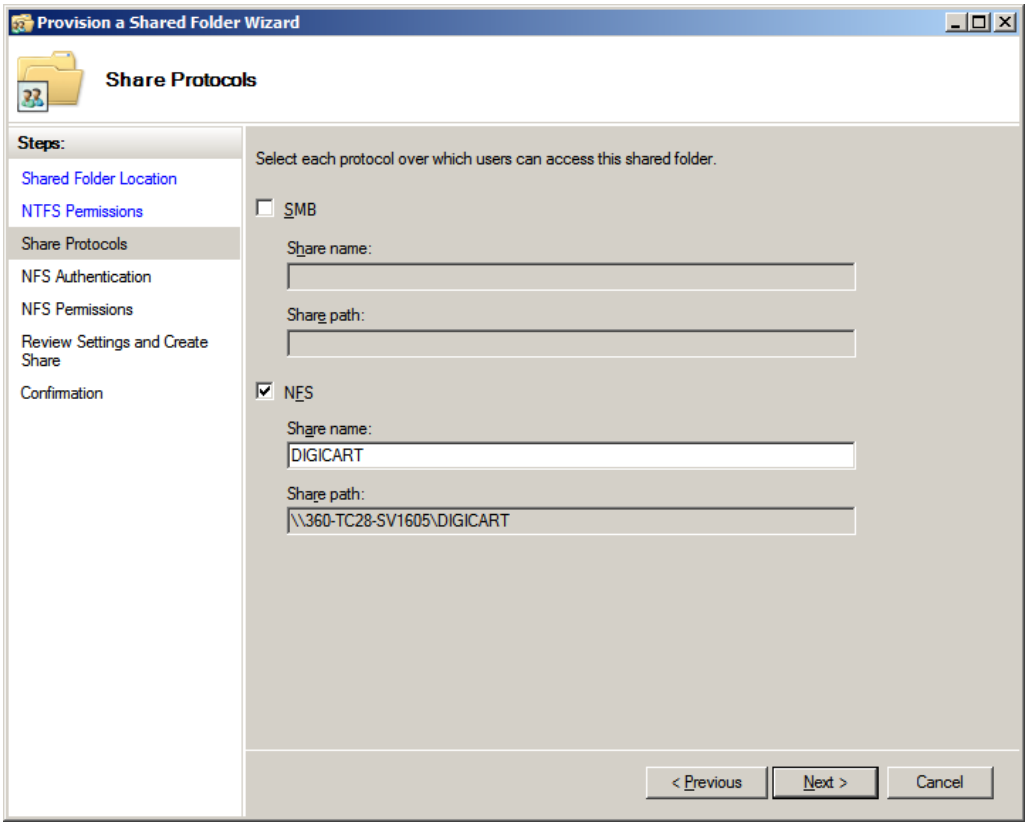


Click **OK**, then **Next** in the NTFS Permissions screen.

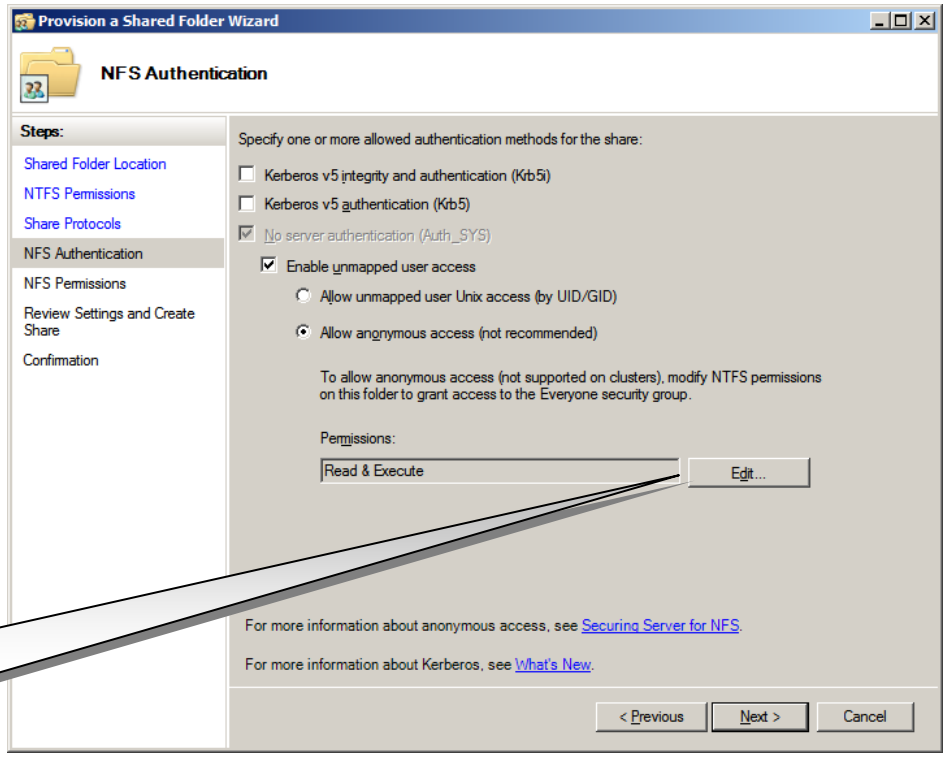


Select **NFS** by clicking the check box. Edit the **Share name** if necessary to include only capital letters, no symbols or spaces (except that underscores_can_be_used). The name can be no more than 15 characters long.

Click **Next**.

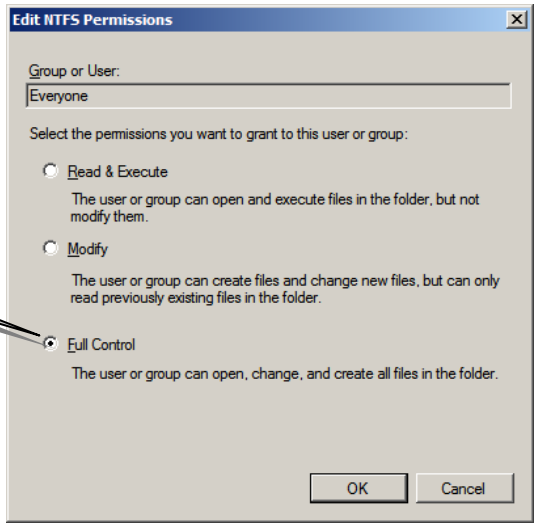


Select **Enable unmapped user access** and **Allow anonymous access**.

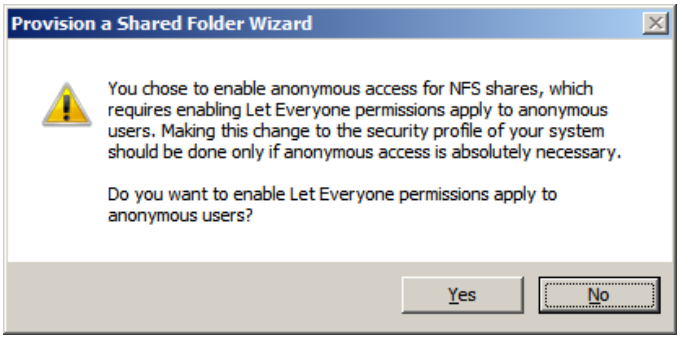


Click **Edit** Permissions.

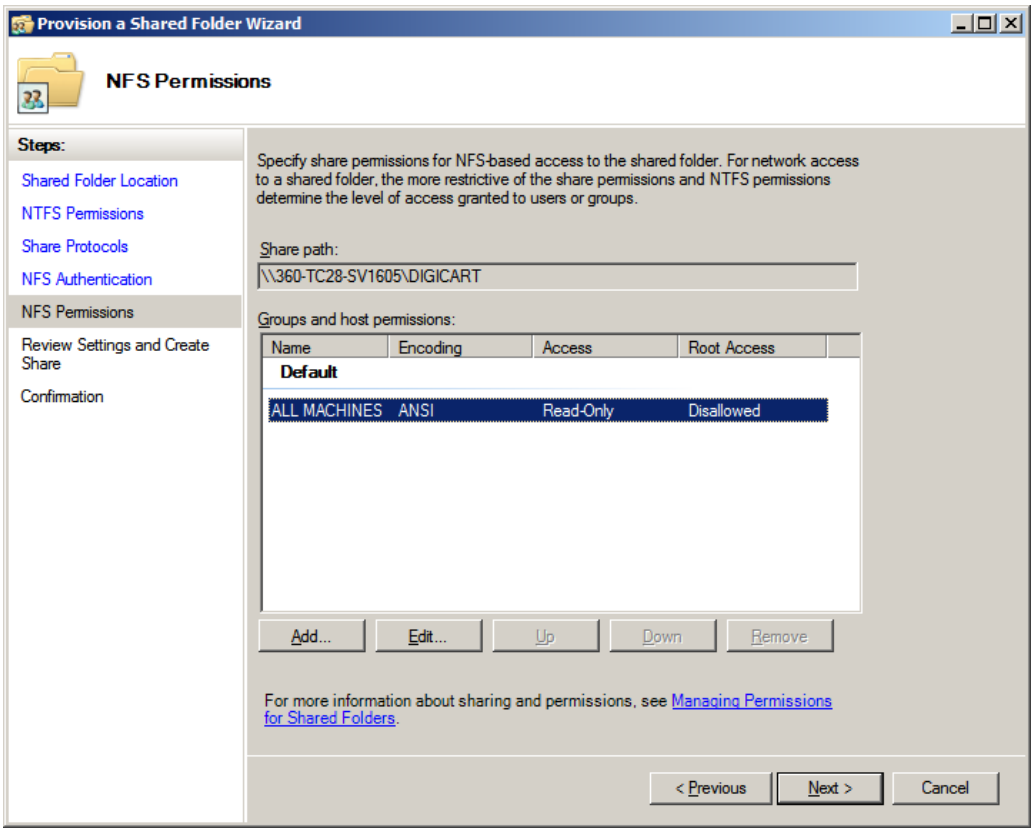
Select **Full control**.



A dialog will appear, click **Yes**.



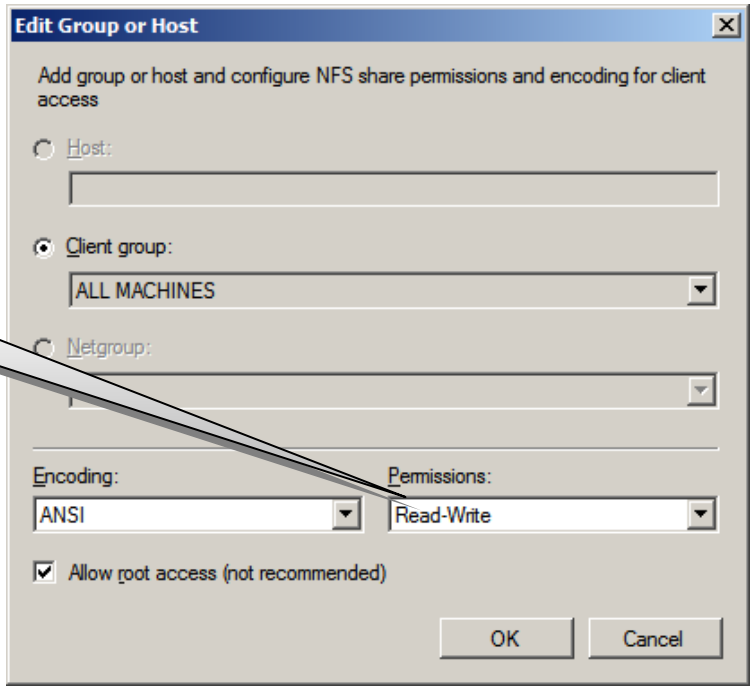
Select **ALL MACHINES** and click **Edit**:



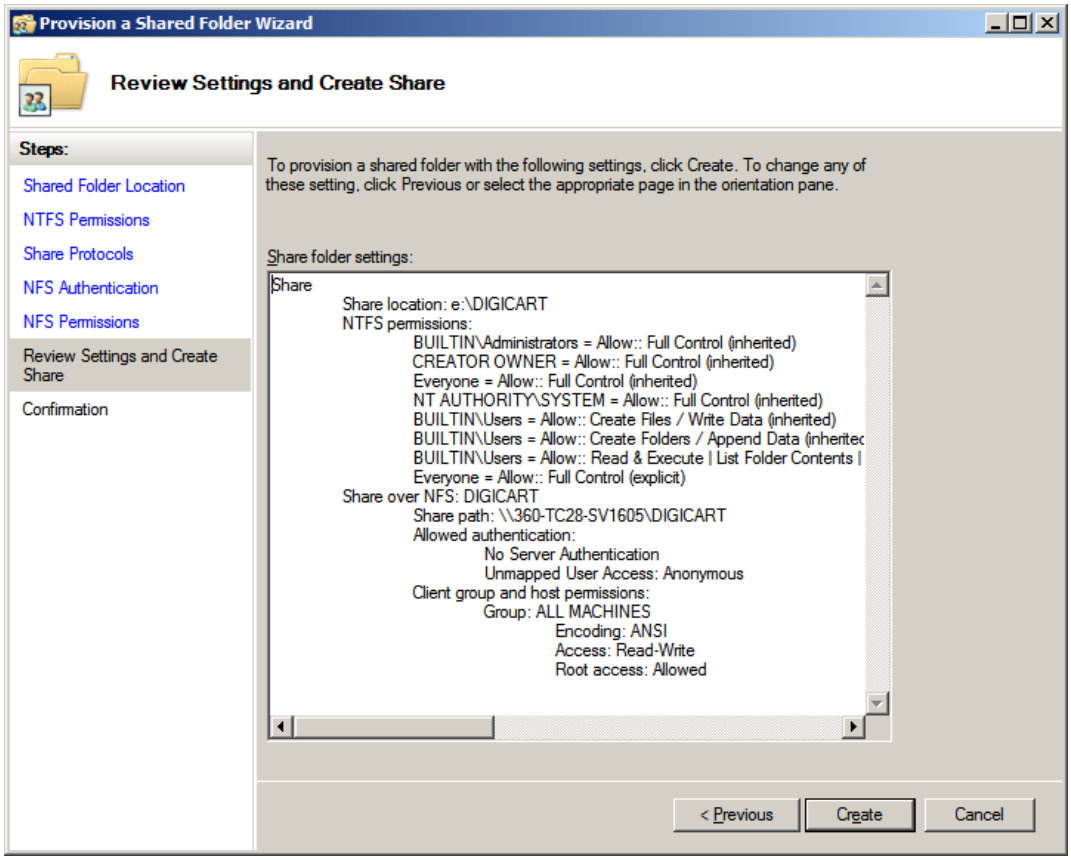
Select **Read-Write** in **Permissions**.

Check **Allow root access**.

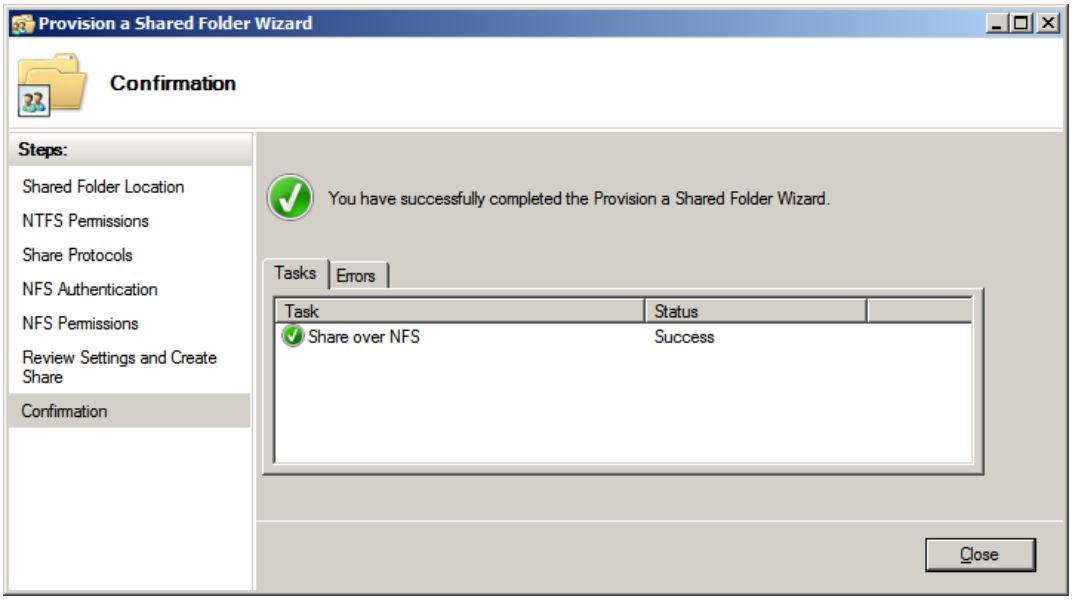
Click **OK** then **Next**.



The settings are displayed for review. Click **Create**.



Click **Close**, or click **Shared Folder Location** and repeat these instructions from the note on page 91 to create another share.



This completes the process.

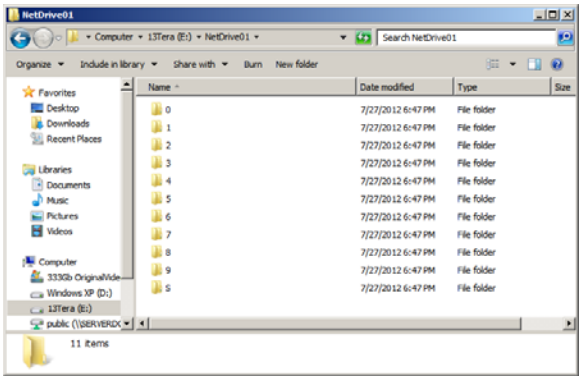
Creating Net Drives in Windows Explorer

You can also create Net Drives directly in Windows Explorer:

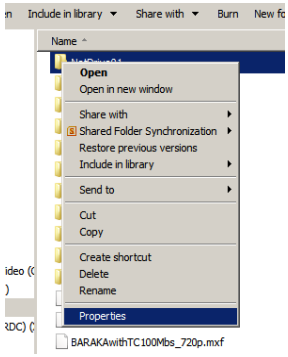
Open Windows Explorer (**Start > Programs** (or **All Programs**) **> Accessories > Windows Explorer**, or, click **My Computer**) Select the drive and folders where you want to create the Net Drive.

Create a folder that will be your Net Drive, or select an existing folder.

Open the folder and create the 11 DigiCart/EX directories 0-9 and S.

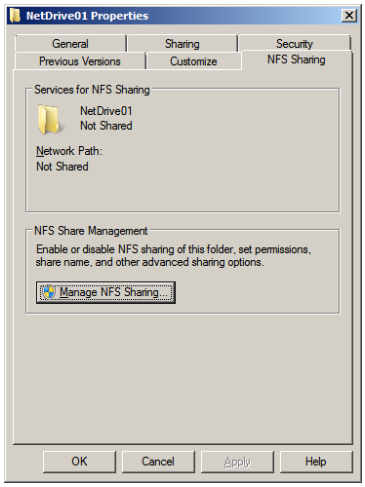


Go back to the previous window and right-click the Net Drive directory. Select **Properties** from the pop up menu.



Click the **NFS Sharing** tab.

Click on the **Manage NFS Sharing** button.

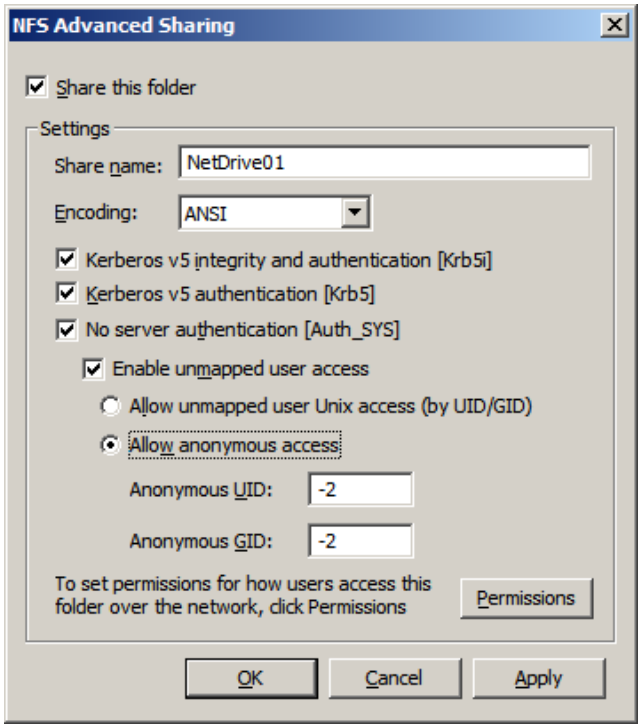


Select **Share this folder** by clicking on the check box.

Select both **Kerberos** options and **No server authentication** if necessary.

Select **Allow anonymous access**.

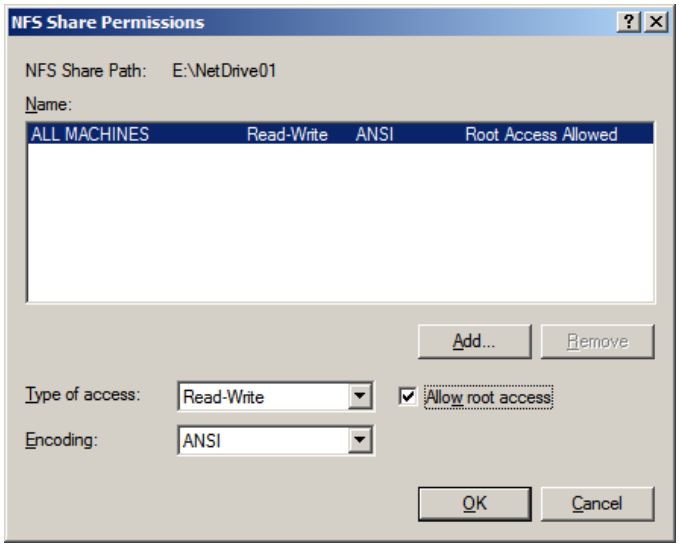
Click on the **Permissions** button.



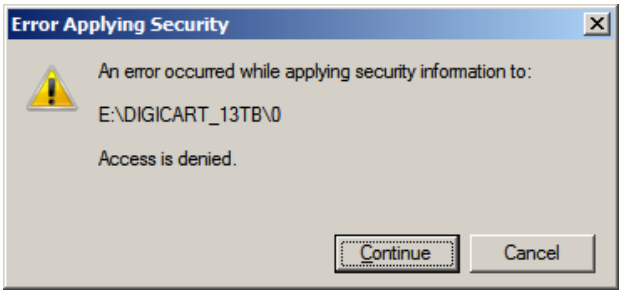
Set **Type of access** to **Read-Write**.

Check **Allow root access**.

Click **OK** on each open properties window.



If you are updating an existing Windows installation to Server 2008 and you are configuring an existing DigiCart share, you may see a series of eleven error messages corresponding to the DigiCart 0-9 and S directories – simply click **Continue** on each one.



In the event that you experience problems with files copied into these Net Drives being recognized by the DigiCart/EX, the easiest remedy is to create new Net Drives as shown above and copy the old material into them. Delete the old Net Drive folders.

Configuring Windows with Hanewin NFS Server

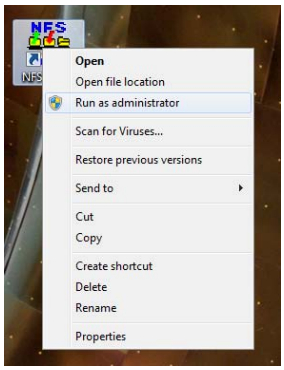
Windows 7 does not have any option for native NFS service, but there is a package available from Hanewin that does the job nicely. It is also possible to use it with older Windows versions such as Vista and XP. It is very easy to set up, and does not require any programming of Windows permissions.

Hanewin is available on the Web at http://www.hanewin.net. It will run for an evaluation period so that you can try it at no charge, and the license is inexpensive.

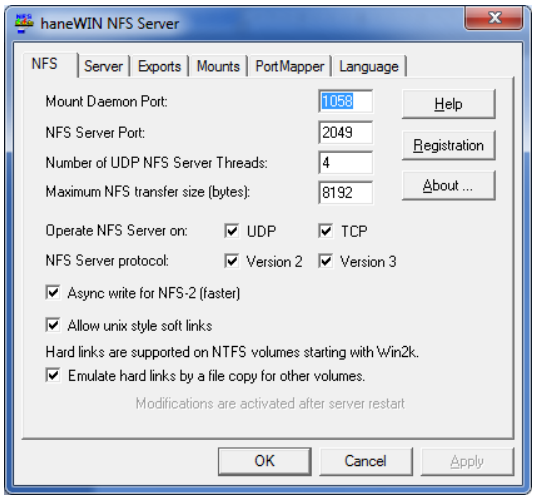
Install Hanewin per the instructions for your operating system. The instructions presented here are specific to Windows 7, but the configuration values are the same for any version of Windows.

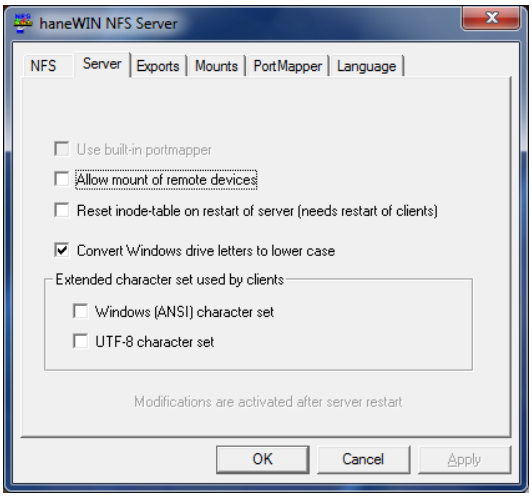
Start by creating one or more folders that you will use as Net Drives (see page 97). Next, install and configure the Hanewin software.

You must have administrator rights to configure the software, and you must run it as the administrator. (Right Click the NFS Server icon and select **Run as Administrator**.)



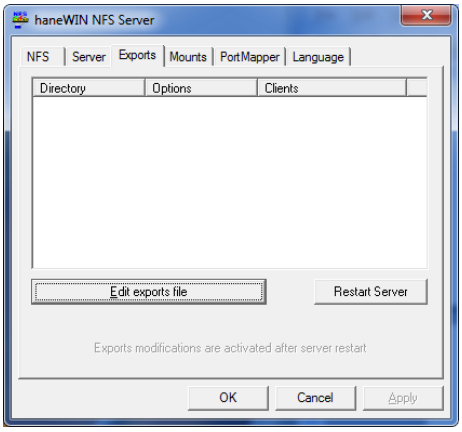
Configure the **NFS** and **Server** tabs as shown.





Number of UDP NFS Server Threads should be 4, this controls how many DigiCart/EX units can record on each share. 4 is the maximum for other reasons, if you need to make more than 4 recordings at once then use different net drives for some units.

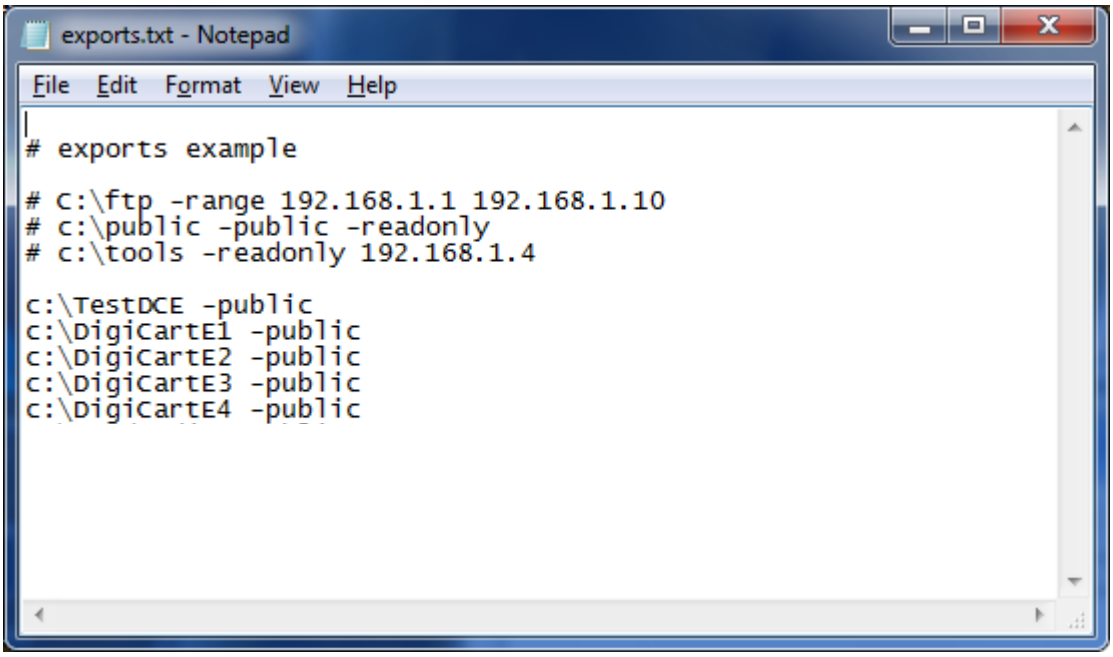
Select the **Exports** tab and click on **Edit exports file.**



A file will appear with the first four example lines.

These lines are for example and are not active because of the "#" characters that begin each line. This feature can be used to temporarily disable shares if you wish.

Add lines that represent the folders that you wish to use as Net Drives. Below are several that are in the Windows C drive.



To use folders that are in other subfolders, add them between backslash characters:

`c:\Subfolder\DigiCartNetDrive -public`

`c:\Subfolder1\Subfolder2\DigiCart -public`

Select **File > Save** when done. Note that if you did not start the program using **Run as Administrator** you will not be able to save the file.

Press the **Restart Server** button on the Exports tab to activate the new shares.

Turn off Windows Firewall, or see the next section on configuring it.

Go to the DigiCart/EX. Follow the directions on mounting a Network Drive.

Configuring Windows Firewall for Hanewin

As the system is designed for use on a private trusted network there should be no need for the firewall, however it can be configured to allow access to the Hanewin program's services.

- Go to Control Panel > System and Security > Windows Firewall > Advanced Settings.
- Select Inbound Rules > New Rule. Select Port. Click Next.
- Select TCP and in Specific Local Ports enter numbers 1058, 111, 2049. Click Next.
- In When Does This Rule Apply, uncheck Public. Click Next.
- Name the rule, for example "Hanewin TCP port exceptions". Click Next.
- Again, select Rules > New Rule. Select Port.
- This time select UDP. In Specific Local Ports enter the same port numbers 1058, 111, 2049. Click Next.
- In When Does This Rule Apply, uncheck Public. Click Next.
- Name the rule, for example "Hanewin TCP port exceptions". Click Next.

Note that in When Does This Rule Apply, the Private, Domain and Public check boxes refer to the type of network as set in the security settings for the Network Interface. With this setting you must select either Home or Work network, not Public.

Managing Net Drives on the DigiCart/EX

MOUNT NETWORK DRIVE

DigiCart/EX can attach to up to four network drives at a time. It can be helpful to think of these "virtual drives" as individual projects, each with a set of ten subdirectories that can help you organize your studio. There may be dozens of projects (or "virtual drives") available on the network. Each time you start a new project, simply create a new shared subdirectory on the server.

Multiple DigiCart/EXs can attach to the same network drives. This scheme allows a network to be organized with "central" network drives for a music library, sound effects, and commercials, and "project-specific" network drives for individual productions, or individual people. With this powerful organizational scheme, many DigiCart/EXs can be connected to the central library drives and still connect to networked project-specific drives from any studio on the network.

The Mount Network Drive utility is used to establish a link between an available drive number on DigiCart/EX and one of many available drives on the network. This link is called a 'drive map'. The basic process is to select a local drive number to be mapped, and then select a network drive to which it will be linked. DigiCart/EX will always have at least one drive number that can be mapped to the network, but depending upon the number of drives assigned to local partitions, up to four drive numbers may be available for network assignments (see the table on page 37).

To Mount a Network Drive

Press UTILITY and select MOUNT NETWORK DRIVE, press ENTER. Select a local drive number to link to the network, press ENTER. Scroll the list of available mount paths and press ENTER to link the selected path to the DigiCart/EX. Repeat this process to establish other links. Links may be changed, or deleted at any time. If the network is not on-line when this is invoked, you can manually enter the path name.

To Dismount a Network Drive

Press UTILITY and select MOUNT NETWORK DRIVE, press ENTER. Select a local drive number to unlink from the network, press ENTER. Use the knob to select the "NONE" option for the mount path assignment and press ENTER. If the network is not on-line, you will be able to edit the mount path name manually. Enter a blank name to dismount. Use the keyboard to erase the name of the network drive, press ENTER to confirm. Note that pressing the left and right arrow buttons at the same time will clear the field from the cursor position to the end of the line. Breaking a link by erasing the drive map name will cause DigiCart/EX to omit this drive number from the scrolling list of drives. It is also beneficial because DigiCart/EX will not spend time attempting to re-establish the link. Repeat this process to break other links.

Troubleshooting Network Drive Errors

If a connection to the network cannot be established (network connection is broken; network path name changed, deleted, etc.), then an error message indicating the nature of the problem will appear when the network drive is selected.

Waiting for Network implies that there is no Ethernet connectivity, either due to a physical or software configuration problem:

- Bad or disconnected Ethernet cable.
- Misconfigured IP Address on DigiCart/EX or server
- Bad switch port.

Waiting for NFS implies that the DigiCart/EX sees the network, but cannot find any NFS services:

- Server side Ethernet connectivity problem.
- NFS service not running. If running Hanewin, the Evaluation Period may have run out or there may be a problem with the license.
- No shared folders or shared folders moved without reconfiguring NFS service information.

NOTE ABOUT CREATION OF DIRECTORY FOLDERS

The DigiCart/E was originally designed to automatically create its 0-9 folders when it first logs in to a Net Drive that does not already contain them. The DigiCart/EX maintains this for compatibility with existing legacy systems. However, in modern Windows versions this causes complications when using .WAV files from other sources.

Files placed in folders created by the DigiCart/EX do not inherit the permissions and ownership of the top level folder. The DigiCart/EX will not be able to recognize them until both of these parameters are reset for each individual file. Folders created on the Windows system allow .WAV files copied into them from any source to be recognized without additional changes.

Instead, create the folder for the Net Drive, then create a series of eleven subfolders named 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and S. Use this folder as a template to make the folders that you will use as your Net Drives by making copies of it and renaming the copies to the names you will use for your Net Drives.

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