

Digital Recorder

DN-60



Quick Start Guide

www.datavideo-tek.com

Contents

Warnings and Precautions	2
Warranty	4
Disposal	5
Outline and Features	6
Packing List	7
Front Panel	8
CF Card Slot	10
Rear Panel	11
Operation Procedures	12
Menu Navigation	13
Remote Control of the DN-60	29
Connect CF Card to PC	30
APPENDIX A	32
APPENDIX B	33
Specifications	39
Service and Support	40

Warnings and Precautions

1. Read all of these warnings and save them for later reference.
2. Follow all warnings and instructions marked on this unit.
3. Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this unit in or near water.
5. Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage.
6. Slots and openings on the cabinet top, back, and bottom are provided for ventilation. To ensure safe and reliable operation of this unit, and to protect it from overheating, do not block or cover these openings. Do not place this unit on a bed, sofa, rug, or similar surface, as the ventilation openings on the bottom of the cabinet will be blocked. This unit should never be placed near or over a heat register or radiator. This unit should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should only be operated from the type of power source indicated on the marking label of the AC adapter. If you are not sure of the type of power available, consult your Datavideo dealer or your local power company.
8. Do not allow anything to rest on the power cord. Do not locate this unit where the power cord will be walked on, rolled over, or otherwise stressed.
9. If an extension cord must be used with this unit, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord's rating.
10. Make sure that the total amperes of all the units that are plugged into a single wall outlet do not exceed 15 amperes.
11. Never push objects of any kind into this unit through the cabinet ventilation slots, as they may touch dangerous voltage points or short out parts that could result in risk of fire or electric shock. Never spill liquid of any kind onto or into this unit.
12. Except as specifically explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks, and will void your warranty. Refer all service issues to qualified service personnel.

13. Unplug this product from the wall outlet and refer to qualified service personnel under the following conditions:
 - a. When the power cord is damaged or frayed;
 - b. When liquid has spilled into the unit;
 - c. When the product has been exposed to rain or water;
 - d. When the product does not operate normally under normal operating conditions. Adjust only those controls that are covered by the operating instructions in this manual; improper adjustment of other controls may result in damage to the unit and may often require extensive work by a qualified technician to restore the unit to normal operation;
 - e. When the product has been dropped or the cabinet has been damaged;
 - f. When the product exhibits a distinct change in performance, indicating a need for service.
- **Use the supplied AC adaptor to charge the battery. Alternately use a charger specifically designed to charge a 12 Volt NiMh battery.**

Warranty

Standard Warranty

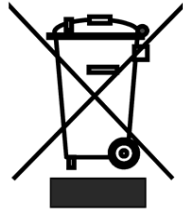
- Datavideo equipment is guaranteed against any manufacturing defects for one year from the date of purchase.
- The original purchase invoice or other documentary evidence should be supplied at the time of any request for repair under warranty.
- Damage caused by accident, misuse, unauthorized repairs, sand, grit or water is not covered by this warranty.
- All mail or transportation costs including insurance are at the expense of the owner.
- All other claims of any nature are not covered.
- Cables & batteries are not covered under warranty.
- Warranty only valid within the country or region of purchase.
- Your statutory rights are not affected.

Two Year Warranty

- All Datavideo products purchased after 01-Oct.-2008 qualify for a free one year extension to the standard Warranty, providing the product is registered with Datavideo within 30 days of purchase. For information on how to register please visit www.datavideo-tek.com or contact your local Datavideo office or authorized Distributors
- Certain parts with limited lifetime expectancy such as LCD Panels, DVD Drives, Hard Drives are only covered for the first 10,000 hours, or 1 year (whichever comes first).

Any second year warranty claims must be made to your local Datavideo office or one of its authorized Distributors before the extended warranty expires.

Disposal



For EU Customers only - WEEE Marking

This symbol on the product indicates that it will not be treated as household waste. It must be handed over to the applicable take back scheme for the recycling of electrical and electronic equipment. For more detailed information about the recycling of this product, please contact your local Datavideo office.

Outline and Features

- ◆ Portable recorder with Compact Flash memory card (CF card). The CF card is protected under a secured cover to protect from harsh environment such as rain or sand...etc.
- ◆ CF card can be used in any PC with CF card reader, stand-alone as portable media device, or with any of the PC interface adapters offered.
- ◆ Record and Playback as you would a tape recorder with familiar operational settings.
- ◆ Record and playback using rugged internal Transactional File System technology and data presented in CF card through emulation of standard file systems compatible with Windows and Mac.
- ◆ Firmware update via simple file transfer in CF card.
- ◆ Small form factor.
- ◆ External 6.0 volt DC power or internal power by 4 x AA batteries.

- **Enhanced VTR type features**
 - External time code record.
 - Time-lapse (animation) recording.
 - 99 Bins, independent of each other.
 - Automatic clip marking, up to 97 per bin.
 - Playback in fast or slow motion, forward or reverse.
 - RS232 control via the Sony 422 protocol.
 - Selected bin is remembered when power is interrupted.

- **CF card features**
 - Records popular *.avi, *.mov, *.mxf and *.m2t file formats for use with most NLEs (non-linear editing suites) presently on the market.
 - Selectable NTFS or FAT32 file system compatibility.
 - Every bin appears as a folder, every clip as a file.
 - Unique volume names so multiple CF cards can be mounted at the same time, very useful for multi-camera shoots.

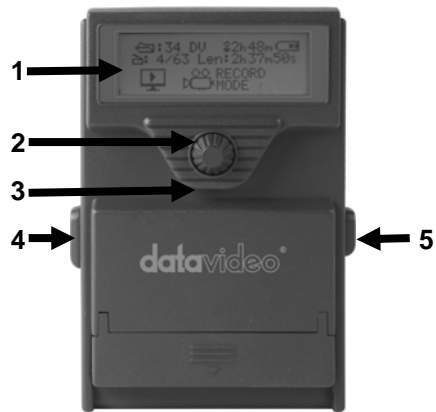
- **Support signal format**
 - NTSC DV-25, DVC-25, DVC Pro-50, DVC Pro-100(2nd Release)
 - PAL DV-25, DVC-25, DVC Pro-50, DVC Pro-100(2nd Release)
 - HDV, HD1, HD2

- **Support CF Cards**
 - SanDisk Extreme III

Packing List

Items	Description	Q'ty
1	DN-60	1
2	IEEE1394 6-4 50CM	1
3	IEEE1394 6-6 50CM	1
4	Switching Adaptor DC 12V/500mA	1
5	DN-60 Instruction Manual	1

Front Panel



1. LCD Display

There are four lines in the LCD Display. The first line is used to display icons that reflect some of the current settings of the unit. These settings include:

- Battery Level
- Loop Play enabled
- Time Remaining
- Signal type

The second line will display the bin length. While playing or recording it also displays the current clip number and the total number of clips in the bin.

The third and fourth line annotates the different recorder mode.

2. Knob Switch

Indicates unit is recording when lit red, Flashes red when Mediapac is not inserted or when there is less than 2 minutes of capacity while recording.

3. Tally Light

The DN-60 has three kinds of tally mode:

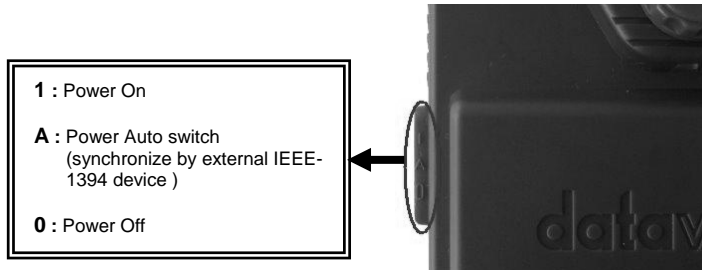
Always On - When DN-60 Recording.

Glimmered - 1. No CF card inserted.
2. No signal input.
3. DN-60 set mode and input signal is different.

Slowly Glimmered - 1. When DN-60 making media file.
2. When DN-60 format media.
3. When record pause

4. Power Switch

The DN-60 has three kinds of power switch mode:



5. External DC Power Input Connector

DC In socket. Connect the supplied 12V/500mA PSU to this socket.

CF Card Slot

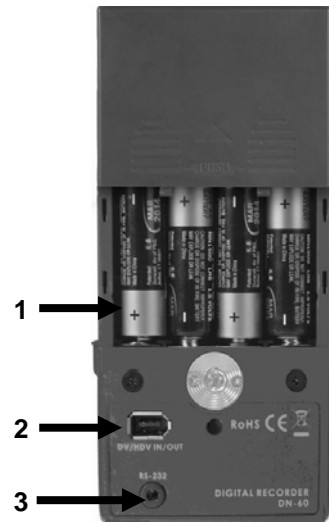


1. CF Card Protection Cover – Lift open this cover to get access to the CF card and the eject button.

2. CF Card Eject Button – Press to eject the CF card. When the slot is empty (no CF card inserted), this button is normally in the depressed position. Upon inserting a CF card, the button pushes out.

NOTE: There is an orientation and key lock on the CF card. If you put wrong orientation and force CF card into the slot, it will damage the device.

Rear Panel



1. Internal Battery: Batteries size AA x 4 is provided for 2 hours power supply.

2. DV/HDV IN/OUT: Six-pin IEEE1394B (400Mbps) connector used to send and receive digital signals as well as to connect as an HDD to a computer. Power is not accepted from this connector.

3. RS-232: 3.5mm 4-pin connector used to remotely control the DN-60.

Operation Procedures

Providing Power

The DN-60 can be powered on by internal battery or external DC power connected through the DC power connector at right side of the device. It is recommended that you have a CF card inserted in the Bay before power up. Not having one at this time, does not influence normal device operation. Move the power switch to the ON position. The DN-60 will turn on immediately into Home mode.

VTR MODE (Capturing or Play Back)

Formatting the CF card

The DN-60 will format a CF card to handle one of three signal types; HDV (all frame rates), or NTSC DV, DVCPro or PAL DV, DVCPro. If an unformatted CF card is inserted, the DN-60 will recognize it and suggest it be formatted to its signal type. If a CF card is inserted and is formatted for a signal type different than that of the DN-60, the choice will be given to either re-format the CF card or eject the CF card.

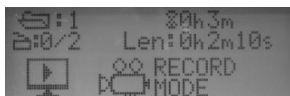
Organize your shoot

A recorded length of video between its start point and following pause or stop point is called a clip. A clip can be as short as one frame or as long as the whole storage capacity. Clips are stored in bins; a bin is analogous to a tape. 99 bins are made available; Clips can be added to any bin at any time as long as there is room available. The DN-60 always displays the clip number as well as the bin number.

Menu Navigation

Home

Power on idle mode or any time user choose to return to HOME, the display will show as following:



From HOME mode, user can use the knob switch to select different mode to go to. To choose a mode, just simply turn the knob to move icon to the selected option and then press the knob to confirm the selection. This will take user to the next selection mode.

There are 5 modes and they are:

RECORD MODE
PLAY MODE
TOOLS
SETUP
STATUS

Pressing the knob will bring up the next option down on the list and will return to the top option from the bottom. Table 1 details the actions for each option.

Menu Option	Action taken
RECORD MODE	This will take DN-60 into record mode. At this mode, the device checks input signal and ready for recording immediately. Other options are to change to different bin or to return to HOME.
PLAY MODE	At this mode, the device is ready to playback a recorded bin.
TOOLS	Allow user to select different system tools for DN-60.
SETUP	Allow user to perform different setup for DN-60.
STATUS	This is a quick way to see the DN-60 system status.

Table 1 HOME Options

RECORD MODE



Entering RECORD MODE, DN-60 will start checking the input signal immediately. If there is no signal at input port, it will flash NO INPUT message to alert user. If the input signal is wrong signal type, it will also flash warning message WRONG SIGNAL to alert user. DN-60 displays the current bin length on the third line. If the signal type is correct, it will also display either timecode or frame count on the second line. User can select the Timecode display type from the system setup menu in SETUP Mode. There is an icon displayed on the third line left side to show the current recording status, stop, record or record pause.

Three different options are available in RECORD MODE:

RECORD
BINS
HOME

Menu Option	Action taken
RECORD	Start to RECORD.
BINS	Allow user to select different BINS folder to do the recording.
HOME	Return to HOME mode.

Table 2 RECORD MODE

RECORD



Current timecode is displayed on the second line.
Third line will display recording status and BINS length in the minimal unit of second.

There are three options during RECORD:

Menu Option	Action taken
STOP	Select STOP to stop recording.
PAUSE	Select PAUSE to pause recording.
MARK	Press MARK to drop a marker in the current location.

Table 3 RECORD

BINS



Turning the knob to select the target BINS and press the knob to confirm the selection and exit from the BINS menu.

MARK



Press the knob to drop a mark. This will create a video clip when you Make Media File.

PLAY MODE



DN-60 will display the signal type of the current selected BINS, DV, HDV or DVCPRO on the first line.

It also displays clip number and timecode on the second line. User can choose the timecode display type (either timecode or frame count) through the system setup in the SETUP MODE.

The third line will show the current play status, STOP, PLAY or PAUSE.

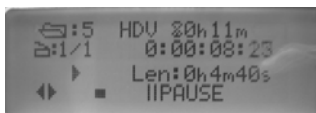
There are three options in PLAY MODE:

PLAY
BINS
HOME

Menu Option	Action taken
PLAY	Press play knob will play the selected BINS immediately.
BINS	Allow user to playback different BINS folder.
HOME	Return to HOME mode.

Table 4 PLAY MODE

PLAY



During PLAY, DN-60 will display output signal format on the first line, clip number and timecode on the second line. It will pause at the last frame of the playing BINS. Any time during PLAY, user can use the knob to select one of the five play options to achieve the function they want.

There are five different options available during PLAY.

PAUSE
STOP
FF/REW
CLIP +/-
Frm +/-

Menu Option	Action taken
PAUSE	Pause playing.
STOP	Stop playing.
FF/REW	Play Fast Forward or Fast Rewind
CLIP +/-	Pause for Clip search
Frm +/-	Pause for Frame stepping

Table 5 PLAY

TOOLS

There are five useful tools available in TOOLS mode.

MAKE MEDIA FILES
EMPTY CURRENT BINS
FORMAT MEDIA
UPGRADE FIRMWARE
FIRMWARE REVISION

Menu Option	Action taken
MAKE MEDIA FILES	Prepares the recorded content to be seen by the computer in the CF card. The operating system environment is previously set to either FAT32 or NTFS. This action is taken once before removing CF card to connect to PC and is done for all the recorded content.
EMPTY CURRENT BINS	Empties or erases the content within the presently selected BINS, this step is irrevocable once the final question has been asked.
CHANGE BIN	Change the content within the presently selected BIN.
FORMAT MEDIA	Empties or erases the content in ALL of the bins. This step is irrevocable once the final question has been asked.
UPGRADE FIRMWARE	Allow user to do field firmware upgrade.
FIRMWARE REVISION	Displays the current revision of the recorder's firmware

Table 6 TOOLS

Updating the Firmware

To update the DN-60's firmware, take a CF card that has undergone the MAKE MEDIA FILES process with FAT-32 file system option selected, and then connect it to your computer. Copy the firmware update file to the root directory, level where all bin folders appear, and rename it *flash.bin*. Next, insert the CF card in the DN-60 and select the UPDATE FIRMWARE option and follow the instructions. Use AC power source when update firmware. Make sure there's no 1394 cable hooked to DN-60 during upgrade process.

SETUP

There are four different setup menu options available in SETUP mode.

PLAY SETUP
RECORD SETUP
SYSTEM SETUP
SAVE SETUP
RECALL SETUP

Menu Option	Action taken
PLAY SETUP	Enters the PLAY Setup Menu group detailed in the named section
RECORD SETUP	Enters the Record Setup Menu group detailed in the named section
SYSTEM SETUP	Enters the System Setup Menu group detailed in the named section
SAVE SETUP	DN-60 has the capability to store 2 user preset SETUP. Using this feature, user can store the current DN-60 setup under USER setup #1 or USER setup #2.
RECALL SETUP	This is to allow user to recall previously saved user setup.

Table 7 SETUP

PLAY SETUP

This menu provided the options to sets the DN-60 to loop play a track; the track will continuously loop until stopped.

RECORD SETUP

This menu provide the options to setup RECORDING related features such as record file type, power on auto recording...etc.

There options are:

FILE TYPE m2t ONLY
 SET SYNC TO TAPE
 RECORD ON POWER UP

FILE TYPE m2t ONLY	Where the choice of file type is made for all unrecorded bins. File types cannot be mixed within a bin. Choices are m2t only.
SET SYNC TO TAPE	Where the recorder will look to the time code changing to indicate the need to record. If the time code pauses then the recording is paused. With this setting turned off, the record process will continue regardless of the time code behavior. Note that the current selection will be marked with an asterisk.
RECORD ON POWER UP	When enabled, the recorder will go directly into a record mode in the last bin selected once power is applied.

Table 8 RECORD SETUP

SYSTEM SETUP

SYSTEM SETUP mode allows user to setup DN-60 for different type of signal, or file system.

Menu Option	Action taken
SET SIGNAL TYPE	Where to choose HDV, DV-NTSC or DV-PAL signal to be recorded. When in DV mode, DN-60 will automatically detect different DV signal format such as DVC-25, DVCPRO-50 or DVCPRO-100, and change the recording setup automatically.
SET FILE SYSTEM	This option chooses the computer's file system to emulate, NTFS or FAT32. Note that FAT32 has a 2GB file size limitation so clips longer than 2GB are split into approximately 2GB files with no frames dropped. Note that the current selection will be marked with an asterisk.
SET VOLUME ID	When connecting to a computer in the HDD mode, the disk will have for volume name DATAVIDEOxx. This option sets the xx value. A useful feature when connecting multiple volumes at the same time as from a multi-shoot.
TIMECODE DISPLAY	During recording and playback, this option chooses to display either the Internal or the External time code. Note that the current selection will be marked with an asterisk.
SET BATTERY TYPE	Choose battery type for battery indicator

Table 9 SYSTEM SETUP

SAVE SETUP

Menu Option	Action taken
SAVE AS USER #1	Save current setup into USER setup #1
SAVE AS USER #2	Save current setup into USER setup #1

Table 10 SAVE SETUP

RECALL SETUP

Menu Option	Action taken
USER #1	Recall USER setup #1 to be loaded into current setup
USER #2	Recall USER setup #2 to be loaded into current setup
FACTORY HDV 50/60HZ	Recall FACTORY HDV 50/60HZ to be loaded into current setup
FACTORY DV NTSC	Recall FACTORY DV NTSC to be loaded into current setup
FACTORY DV PAL	Recall FACTORY DV PAL to be loaded into current setup

Table 11 RECALL SETUP

STATUS

```
⏪:5 ==STATUS, BIN  
Z:0/1 Len:0h.4m.40s  
File:m2t Sig:HDU  
3 PAGES: ↑/↓ EXIT:⏩
```

```
==STATUS==SYSTEM  
File:mov CF:02GB  
FSys:FAT32Media:DV
```

```
==STATUS==RECORD  
ST:OFF Date:1/21/10  
TLPS:OFF @1f/0m1s  
PreTrg:OFF OnPwr:ON
```

```
==STATUS==PLAY  
OnPwr:OFF Loop:ON  
↑/↓ EXIT:⏩
```

Press STATUS will display DN-60 current status information. It displays the selected recording signal type, recording file format, recording file system, and the selected recording media type. It also displays the recording setup such as sync to tape is ON or OFF, time-lapse recording information, pre-trigger and power on auto recording feature setup.

General Setup

Before using your DN-60, there are a few basic operational conditions that must be set. These are found under the System Setup Level of the menu tree (see table 4).

Set the signal type

Select HDV or DV. If DV, select between NTSC or PAL.

Note: Changing between signal types will erase the content in all bins.

Choose operating system file system, FAT32 or NTFS

This option will set up the file system type seen by the computer in the CF card. NTFS does not have the 2GB file size limitation imposed by the FAT32 file system. With NTFS a recorded clip becomes one file no matter its length. Although this choice can be done at any time before the making media file process it is best to simply make it once.

Set the CF Card volume ID

When connecting as a CF card created by DN-60, the volume name is *DATAVIDEO xx*. If your application calls for multiple CF card to be connected to the computer at the same time, it becomes helpful to have the volume name be different for each CF card. This option allows xx to be set between 00 and 99.

Select which time code to display

With DV, while recording or playing, the time code displayed can be either the externally generated time code or the internally generated one. If the signal is analog and no time code is connected then the External is generated the DN-60 and is in the dropped-frame format. The internal time code referred to here is the absolute frame number of the recording in the selected bin and is in the non-dropped-frame format. The absolute frame number starts at 00:00:00:00 in each bin. When the content is changed to files, the time code presented to the NLE starts with the External value of the first frame of the content; if this value is invalid then 00:00:00:00 is substituted.

Empty the current or all bins

The DN-60 is primarily a capture device, as opposed to an archiving device, and it is best to start out with a fresh CF card. Emptying (erasing) ALL bins will not only clear the CF card at once but it will also conveniently reset the file system.

Updating the Firmware

To update the DN-60's firmware, take a CF card that has undergone the MAKE MEDIA FILES process with FAT-32 file system option selected, and then connect it to your computer. Copy the firmware update file to the root directory, level where all bin folders appear, and rename it *flash.bin*. Next, insert the CF card in the DN-60 and select the UPDATE FIRMWARE option and follow the instructions.

WARNING: Once the ERASE FLASH option has been selected, DO NOT turn power off until the firmware has been updated. If the update is prematurely ended the recorder will be made inoperable.

Recording**Normal Record Checklist**

A few parameters must be set properly for a standard recording and they are mostly grouped in the menu level RECORD SETUP:

Select the DV or HDV video source

Use system setup to select the target recording signal type. And FORMAT MEDIA to make sure the CF card is formatted to DN-60 file system format.

Set the file type:

A choice must be made for the eventual file type of choice should you want to connect the DN-60 CF card in your computer and drag and drop your video content as files. The choices for DV are Microsoft .avi type II, Canopus .avi type II, both commonly used in PCs, .mov, the QuickTime format used in Macs and .mxf a new universal file format supported by a growing number of applications, Avid being the most well known. In HDV mode, the file type is fixed at .m2t.

Note: The file format started with one bin will apply to all subsequent recordings in that bin and can only be changed after the bin is erased or emptied.

Synchronize to tape motion

The recording of the DN-60 can be synchronized to the camera's record button by turning Sync To Tape ON (**ST:ON**). Whenever the tape in the camera is rolling, so will the time code. DN-60 recognizes the motion and will record along with the tape. When the motion stops, DN-60 will pause the recording. To record continuously without regard for tape motion, switch Sync To Tape off (**ST:OFF**). Some cameras control the DN-60 directly through the 1394 interface and in these cases, use ST:OFF and let the camera do the work.

Recording

Starting

Select one of 99 Bins by using BIN menu. Turning the knob to select the bin and press the knob to confirm the selection.

Two common ways of starting to record are 1) by entering the record mode manually by pressing the knob in the RECORD MODE. Or 2) the camera or device connected to the 1394 port sends a record command. A third way is to issue a record command from the remote serial interface. See the command protocol in Appendix B.

Pausing

The DN-60 will pause recording if time code is not moving and ST:ON is set, otherwise it will record. When the video source is digital the time code is embedded in the stream and it is always the time code recorded. When the video source is analog, time code is the SMPTE longitudinal time code at the breakout cable. To cause the recording to pause, that time code must be valid and not moving. If SMPTE time code is not present then a time code is substituted starting at 00:00:00:00 for each bin and incrementing from there in a dropped-frame manner (NTSC only). In this case, ST:ON has no meaning. It is also possible to pause a recording by pressing the PLAY key, in this mode, recording is resumed by pressing the PLAY key once more and a new clip is created.

Warning: If power is interrupted while the recording is paused, all clip numbers added during the current record session will be lost. No content however will be lost. Future firmware upgrades may fix this behavior.

Note: If power is interrupted while recording, up to two seconds of the last video may be lost.

Recording

When recording, by selecting and entering MARK mode, then pressing the knob while recording will start a new clip with no frames lost. Each time a recording is started a new clip is created. Up to 97 clips can be numbered in each bin.

Note: Recording is done in a bin. A clip is automatically started at the beginning of the bin if the bin is empty or appended to the last clip in the bin. A clip is never inserted between other clips in a bin.

Note: The minimum length of a clip is 2 seconds.

Stopping

It is best to stop a recording by selecting Stop and then press the knob before turning power off.

Special Record Setups

Do elapsed time recording

In the Time-lapse Record menu, user has to specify the total time-lapse cycle and then specify how many frames will be recorded during this cycle. The minimal time-lapse cycle is 1 second. And the minimal frame is 1 frame.

Note: This option is not currently valid with HDV. Later firmware upgrades may turn this function on.

Use Record Pre-trigger

When this option is enabled the DN-60 is always in a record-ready mode when it is not playing. In this mode it is continuously storing live data in its internal buffer which is 8 seconds in length. In this manner, when a recording is started 8 seconds of history prior to the trigger already exists and is then captured to disk.

Power on auto record

When this option is enabled, DN-60 will begin recording immediately after power up.

Playback**Playing**

Play mode can be entered by one of three ways, the most common is to press the knob in PLAY MODE, the other two are by issuing a PLAY command through the IEEE-1394 interface or the serial port interface if it is enabled. When playing, the time displayed is controlled by the TC DISPLAY FORMAT option. When play is stopped, the time displayed is the time code of the last frame displayed.

Remote Control of the DN-60

IEEE-1394

The DN-60 accepts the AV command set defined in the IEEE-1394 protocol and as such can be connected to most computers and stand alone editing equipment using that interface. At this stage, this command set does not allow the selection of different bins so this function must be manually made as if a tape were asked to be changed. The AV command set also does not allow random access to the start of the clips but most editors will recognize the clip boundaries sequentially through the time code discontinuity likely to take place at the beginning of each clip.

Note: The acquisition of video in the DN-60 is instantaneous so requires to pre-roll. This limits the random access of an early frame in a batch capture by an editor that is setup to ask for a minimum pre-roll greater than zero. That limit is equal to the number of frames in the minimum pre-roll time.

RS232 INTERFACE

This option is enabled through the System Setup Menu. The DN-60 can be controlled via the RS232 port. This port requires a special adapter sold separately. The command set is based on the Sony 422 protocol and includes a substantial set of vendor specific commands which allow selection of bins and playing from point A to point B across bins, for example. The protocol can be found in the appendix section of this manual.

Connect CF Card to PC

General

Preparation

Prior to removing the CF card in DN-60 and seeing your video as files instead of clips, the MAKING MEDIA FILES process must be undertaken. MAKE MEDIA FILES

This operation prepares the recorded content to be seen by a computer by building the file wrappers around the recorded content and emulating the computer's operating file system. Two choices are available, FAT32 and NTFS and they are chosen by the SETUP FAT32/NTFS option.

Operating File System limitations

The FAT32 format is compatible with both Macs and PCs. This format limits the size of a file to a maximum of 2GB, in DV that translates to approximately 9+ minutes of video. A clip that lasts longer than 9min is broken into multiple files each 2GB long with the last one making up the remaining time. If the split files are strung on the time line of an NLE, no frame is lost over the transition. In addition, FAT32 has a clip boundary has a resolution of 2 seconds so the beginning of a clip other than the first in a bin is most likely to contain the end of the previous clip, up to 2 seconds' worth. Conversely the end of a clip is most likely to be found in the first file of the next clip. For an accurate correlation of clip numbers between the VTR and the HDD mode, it is best to keep each clip longer than 2 seconds and to have fewer than 97 per bin.

The NTFS format is fully compatible with PCs and is read compatible with Macs. Its main advantage is that it does not impose a file size limitation to the DN-60 resulting in one file per clip. NTFS' clip boundary is frame accurate and therefore has perfect correlation with clip numbers in the VTR mode.

Note: Some NLEs cannot accept file sizes greater than 40GB, make sure your NLE is not one of them if you plan on shooting one continuous take greater than 3 hours and using NTFS.

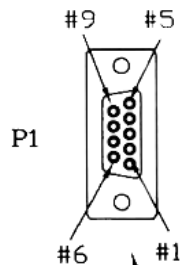
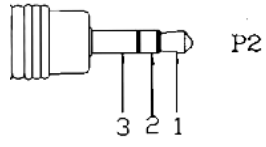
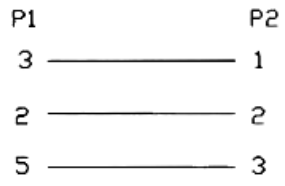
File Organization

After the media conversion is made, all bins that contained video will appear to the computer as folders named BINxx where xx represents the BIN number ranging from 01 to 99. Inside each folder, each clip will be represented as a file with an extension name .avi, .mov e.g. depending on the type chosen prior to recording.

Each file will be named xxCnnyyy in FAT32 and BxxCnn in NTFS where xx again represents the bin number; nn represents the Clip number ranging from 01 to 97. The number yyy is the number of the split file caused by the FAT32 limitation

APPENDIX A
I/O CONNECTORS PIN-OUT

PIN ASSIGNMENT



APPENDIX B

Datavideo 232 Controller Command Set

Rev 3.1 July 29, 2006

Communication format:

Mode : no synchronization
Character Length : 1 start bit + 8 data bits + 1 parity bit + 1
stop bit
Data Rate : 38,400 BAUD
Parity : Odd parity

Command Format :

CMD1, CMD2, DATA bytes, Checksum Byte

A command is made up of two address bytes, CMD1 and CMD2, a variable number of data bytes, DATA, from 0 up to 15 and a checksum byte. The checksum byte is the modulo 256 sum of all preceding bytes. The most significant nibble of the CMD-1 byte represents the command group. The least significant nibble represents the number of data bytes to follow the CMD-2 byte.

Command Protocol:

CMD1, CMD2, DATA bytes, Checksum Byte
Response: ACK

Other than the sense command, the unit will respond to all commands affirmatively by sending the three-byte acknowledge (ACK) if the checksum is valid. If the checksum is not valid, the unit will ignore the command. Most commands will be responded to within 8msec. A Play command from an Idle state will result in a response delay of up to 700msec. During this busy time, all commands will be ignored.

Summary List of Commands:

Command	Name	Response	Name
	System Control		
00h, 11h, 11h	Device Type Request	12h, 11h, 00, 00, 23h	Device Type
00h, F1h, F1h	Next Bin	10h, 01h, 11h	ACK
00h, F2h, F2h	Previous Bin	10h, 01h, 11h	ACK
00h, F4h, F4h	Disable Loop Play	10h, 01h, 11h	ACK
00h, F5h, F5h	Enable Loop Play	10h, 01h, 11h	ACK
01h, F0h, XXh, csum	Select Bin	10h, 01h, 11h	ACK
01h, F3h, XXh, csum	Select and Empty Bin	10h, 01h, 11h	ACK
	Transport Control		
20h, 00h, 20h	Stop	10h, 01h, 11h	ACK
20h, 01h, 21h	Play	10h, 01h, 11h	ACK
20h, 02h, 22h	Record	10h, 01h, 11h	ACK
20h, 0Dh, 2Dh	Eject	10h, 01h, 11h	ACK
20h, 10h, 30h	Fast Forward	10h, 01h, 11h	ACK
20h, 20h, 40h	Fast Rewind	10h, 01h, 11h	ACK
20h, 14h, 34h	Frame Step Forward	10h, 01h, 11h	ACK
20h, 24h, 44h	Frame Step Reverse	10h, 01h, 11h	ACK
21h, 11h, nnh, csum	Jog Forward	10h, 01h, 11h	ACK
21h, 12h, nnh, csum	Variable Forward	10h, 01h, 11h	ACK
Command	Name	Response	Name
21h, 13h, nnh, csum	Shuttle Forward	10h, 01h, 11h	ACK
21h, 21h, nnh, csum	Jog Reverse	10h, 01h, 11h	ACK
21h, 22h, nnh, csum	Variable Reverse	10h, 01h, 11h	ACK
21h, 23h, nnh, csum	Shuttle Reverse	10h, 01h, 11h	ACK
21h, 11h, 00h, 32h	Play Pause	10h, 01h, 11h	ACK
21h, F0h, nn, csum	Select Bin and Play	10h, 01h, 11h	ACK
	Sense Request		
61h, 0Ch, 04h, 71h	Current Time Sense	74h, 00h, TC(3:0), csum	Time Code
61h, 20h, OL, csum	Status Sense	7Lh, 20h, Stat(L), csum	Status
61h, F0h, 04h, 55h	Current Frame Offset	74h, 00h, FO(3:0), csum	Frame Offset
61h, F1h, 01h, 53h	Current Bin	71h, 00h, nn, csum	Bin Number

System Control

00h, 11h Device Type request

The response is 00, 00 indicating QuickCapture

00h, F1h Next Bin

When this command is issued from the Idle state the next bin is selected. If the present bin is 99 then the next bin is 1.

00h, F2h Previous Bin

When this command is issued from the Idle state the previous bin is selected. If the present bin is 1 then the next bin is 99.

00h, F4h Disable Loop Play

When this command is issued from the Idle state the Loop Play feature is disabled. Loop Play is where the the last play command is repeated from its beginning when the end is reached.

00h, F4h Enable Loop Play

When this command is issued from the Idle state the Loop Play feature is enabled. Loop Play is where the the last play command is repeated from its beginning when the end is reached.

01h, F0h, XXh Select Bin XX

When this command is issued from the Idle state bin XX is selected. XX varies between 1 and 99. Illegal bins are ignored.

01h, F3h, XXh Select and Empty Bin XX

When this command is issued from the Idle state bin XX is selected and **all of its content is permanently deleted**. XX varies between 1 and 99. Illegal bins are ignored.

Transport Control

20h, 00h, Stop

The unit enters the idle state. In the A2D, the outputs reflect the video source as selected by the Front Panel.

20h, 01h Play

Content of the present bin is played at 1x speed. This command may be issued from the idle state or any other Play state.

20h 02h Record

The video is recorded from the selected source onto the current Bin. This command may be issued only from the idle state.

20h, 10h Fast Forward

A play state where video is played at the highest speed of 32x in the forward direction.

20h, 20h Fast Rewind

A play state where video is played at the highest speed of 32x in the reverse direction.

NOTE: When receiving one of the following commands (JOG, VARIABLE or SHUTTLE), the unit will play forward or backward according to the speed data. The first data byte may only be a maximum of 80:

$$\text{Play Speed} = 10^{(nn/32-2)}$$

Note that setting nn to 0 will result in pausing the unit.

21h, 11h, nnh

Jog Forward

21h, 12h, nnh

Variable Forward

21h, 13h, nnh

Shuttle Forward

A Play state where video is played at the commanded play speed as described above in the forward direction. **Note: Setting the speed to 0 causes the play to pause.**

21h, 21h, nnh

Jog Reverse

21h, 22h, nnh

Variable Reverse

21h, 23h, nnh

Shuttle Reverse

A Play state where video is played at the commanded play speed as described above in the reverse direction. **Note: Setting the speed to 0 causes the play to pause.**

21h, F0h, nnh

Select Bin and Play

Content of the bin number nn is played at 1x speed from the beginning. This command may be issued from the Idle state or any other Play state.

Sense Request

61h, 0Ch, 04h

Current Time Sense

Requests the Time code data. The unit responds with 4 bytes indicating the present time code in Binary-Coded-Decimal. The first byte hold the frame number, the second byte holds the seconds, the third the minutes and the fourth the hour. In the play state, the time code returned is the time associated with the current frame being played, in the record state, the time code returned represents the elapsed time recorded in the present bin.

61h, 20h, 0L

Status Sense

Requests the status of the unit. The status is mapped onto 16 bytes. A variable number of bytes can be requested by specifying the offset (O) byte within this map and the length (L) of bytes wanting to be return. The offset ranges from 0 to F and the length ranges from 1 to F. The sum of O and L cannot exceed 15. The map is bit significant and is tabulated below. Data 8 is the present Bin Number binary encoded.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Data 0	Busy	0	0	0	0	0	0	Local Enable
Data 1	0	0	Stop	0	Rewind	Fast Forward	Record	Play
Data 2	0	0	0	0	0	Reverse	Pause	0
Data 3	0	0	0	0	0	0	0	0
Data 4	0	0	0	0	1	0	0	0
Data 5	0	0	0	0	0	0	0	0
Data 6	0	0	0	0	0	0	0	0
Data 7	0	0	0	0	0	0	0	0
Data 8	BIN7	BIN6	BIN5	BIN4	BIN3	BIN2	BIN1	BIN0
Data 9	0	0	0	0	0	0	0	0
Data 10	0	0	0	0	0	0	0	0
Data 11	0	0	0	0	0	0	0	0
Data 12	0	0	0	0	0	0	0	0
Data 13	0	0	0	0	0	0	0	0
Data 14	0	0	0	0	0	0	0	0
Data 15	0	0	0	0	0	0	0	0

61h, F0h, 04h

Current Frame Offset

Requests the current Frame Offset number. Unit responds with 4 bytes indicating the present frame offset in Binary-Coded format with the least significant byte first.

61h, F1h, 01h

Current Bin

Requests the current bin number. The single byte answer is in Binary-Coded format.

Specifications

Digital Video In/Out	IEEE-1394, 400Mbps max, 6-pin
Recording and Playback Formats Digital Input and Output:	DV25, HDV
Recording time (minutes per 10GB) DV25: HDV:	46.3 49.4 at 1080i, 64.3 at 720p
Media File Format DV25: HDV:	*.avi (Type II, Microsoft, Canopus), *.mov, *.mxf (OP1A) *.m2t
Operating File System Compatibility	FAT32, NTFS
Input Voltage Requirement	12V typical, 8V min , 24V max
Power Consumption @ 12V	Idle: 4.3W, Play/Record: 6W, HDD mode: 5.3W
Size (W x H x D):	4.0" x 1.9" x 7.0" (101.6mm x 48.3mm x 177.8mm)
Weight:	DN-60: ??oz (500g), CF card: 6oz (170g)
Temperature Operating: Non-Operating	+40°F to +104°F (+4°C to +40°C) -40°F to +149°F (-40°C to +65°C)
Vibration: Operating: Non-Operating:	1.0G (5-500 Hz) 5.0G (10-500 Hz)
Shock: Operating: Non-Operating:	250G (2ms) 5,000 (0.5ms)

Service and Support

It is our goal to make your products ownership a satisfying experience. Our supporting staff is available to assist you in setting up and operating your system. Please refer to our web site www.datavideo-tek.com for answers to common questions, support requests or contact your local office below.

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