

ANALOGUE / DIGITAL RECORDER

DN-200



Instruction Manual

www.datavideo-tek.com

Rev 300410

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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 slightly damp cloth for cleaning.
4. Do not use this unit in or near water.
5. Do not place this unit on an unstable surface, cart, stand, or table. The unit may fall, causing serious damage.
6. Any slots and openings on the case 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 may become blocked. This unit should never be placed near or over a heat source 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, damaged 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 case 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 case has been damaged;
 - f. When the product exhibits a distinct change in performance, indicating a need for service.

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

Packing List

Item No.	Description	Quantity
1	Instruction Manual	1
2	DN-200 Recorder	1
3	12V DC 1A PSU	1
4	3.5mm Jack to RCA Breakout cable	1

Product Overview

The DN-200 is a small and portable video recorder/player capable of very long record times. A built-in, large capacity hard drive (HDD) stores the video. It can record up to 23 hours of video depending on the recording format, drive settings and hard drive size. The DN-200 HDD can have one or two partitions. A second 6GB partition can be set up. The recorder will have no effect on this partition so the user is free to name it, format it, store any type of data on it with complete confidence that the recorder will not alter it. The unit can easily be set up for FAT32 or NTFS; PAL, NTSC or HDV frame rates too.

This unit is capable of recording from digital or analogue sources using IEEE-1394 or Composite and RCA stereo connections. It can also be set up to record PAL or NTSC Time Lapse sequences at a variety of standard or triggered intervals. Set it up to buffer live video and when you press record within 8 seconds of an event you can be confident that you have recorded that must have shot.

Once recorded Drag and Drop these video files directly to the time-line of your Non-Linear Editing program using popular DV file wrappers such as Microsoft AVI type 2, Canopus AVI, QuickTime MOV, MXF OP1A as well as HDV M2T. With this many useful features the DN-200 is ideal for a variety applications within broadcast, education, animation, science, medical, construction and security, etc.

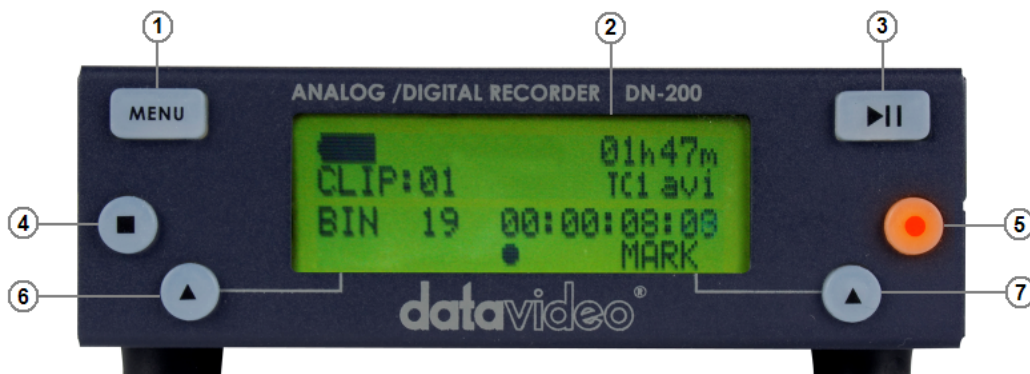
Features

- Small, easy to carry, high capacity hard drive recorder
- Input Video Connections:
Composite video (BNC) and RCA stereo audio (PAL or NTSC)
IEEE-1394 supports DV,HDV including embedded external Time Code Input
- Output Connections:
Composite video (BNC) and RCA stereo audio (PAL or NTSC) via breakout cable
- IEEE-1394 in playback can supply DV,HDV signals
- IEEE-1394 connection in AVHDD Mode also supports PC and Mac FW400 connections
- Supports DV AVI, DV MOV, DV MXF-OP1A and M2T file formats directly, QuickTime HDV and MXF-OP1A through a quick utility program
- Set audio sampling rate to match 48KHz (16bit) or 32KHz (12bit)
- Time-lapse single frame recording at standard intervals
- Manually triggered single frame recording. Useful in model animation recordings
- 8 second pre-record buffer, useful in recording unexpected events especially in science research, outdoor recording, Health & Safety or security applications
- Loop Playback of video in a selected bin
- Auto record or Playback to or from current video bin when powered on
- Backlit LCD panel showing a comprehensive layout of the recorders status
- Allocate a second 6GB HDD partition as a dedicated area for other files
- Built-in 2.5" 320GB SATA HDD, allows up to 23 hours of video to be recorded*
- RS-232 and GPI interfaces for simple update, trigger and control

**subject to HDD size, partitioning chosen, available HDD space and video data rate*

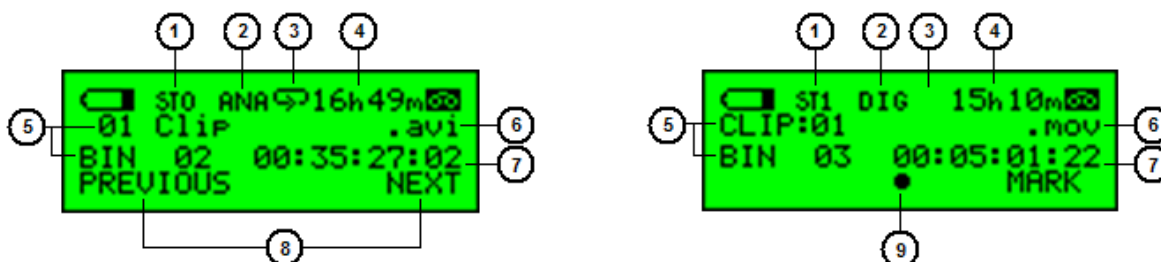
Connections & Controls

Front Panel



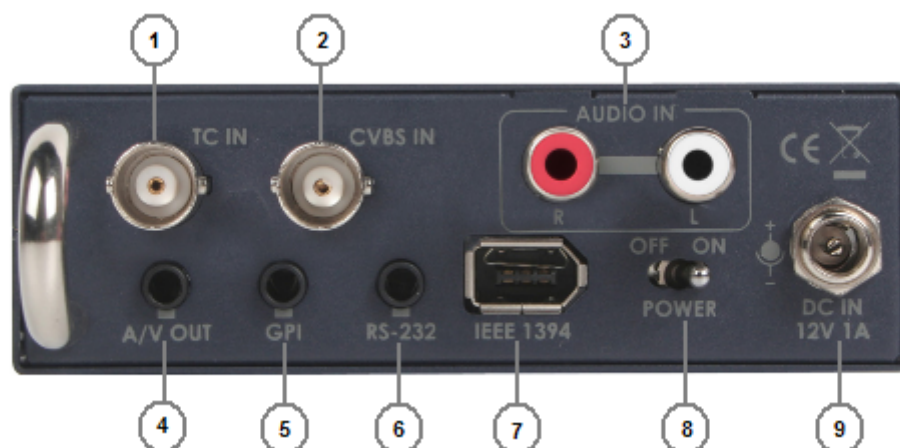
1. **Menu Button** - Calls up the menu display which is navigated using buttons 6 & 7.
2. **Display Panel** - Displays the status and set up of the DN-200 unit or if the Menu Button is pressed the DN-200 Menu options.
3. **Play / Pause Button** - Starts playback of a track, or pauses playback of a track with the current status shown on the Display Panel. Also Starts / Pauses a recording when the unit is in Record mode.
4. **Stop Button** - Stops playback or record.
5. **Record Button** - Puts the DN-200 into Record Mode. To start recording press the Record Button and the Play Button simultaneously. **The unit will not record if no video signal is present.**
6. **Navigation Button** – Used to navigate the menus and confirm set up choices.
7. **Navigation Button** – Used to navigate the menus and confirm set up choices.

DN-200 Clip Status Display Explained



1. Sync to Tape Indicator OFF=ST0 and ON=ST1
2. Analogue / Digital Source indicator
3. Loop Playback indicator
4. Remaining Recording Space in Hours and Minutes
5. Current Bin and Clip
6. File type indicator
7. Current Time Code or total length of clip
8. Menu options
9. Record, Pause, FFWD, REV and Playback indication

Rear Panel Connections



1. **TC IN** – This BNC connection allows the unit to record External Time Code from a source Camera or Deck.
2. **CVBS IN** – This BNC connection allows the unit to accept an analogue Composite NTSC or PAL video input.
3. **AUDIO IN** – These RCA L & R channel inputs allow line level analogue audio to be recorded to the same clip as input 2 above.
4. **A/V OUT** – Allows output of Composite video and analogue L & R channel audio via a breakout cable from a 3.5mm jack connection.
5. **GPI socket** – Can be used for simple external control. The DN-200 can accept pulse or level trigger inputs, these can trigger record, playback and pause commands.
6. **RS-232 Socket** – The DN-200 can be controlled via RS-232 from external devices. See Page 19.
7. **6 Pin IEEE-1394 In/Out Port** – supports DV25 / HDV M2T input sources or output a DV25 signal to a monitor or supports Firewire 400 communication with a PC/Mac for file transfer.
8. **Power On/Off Switch.**
9. **DC In Socket.** Connect the supplied 12V 1A PSU to this socket. The connection can be secured by screwing the outer fastening ring of the DC In plug to the socket.

Powering On

Connect the DN-200's own power supply to the rear DC In socket. Ensure the power supply unit is connected to a suitable mains socket. Switch the power ON/OFF switch to the ON position.

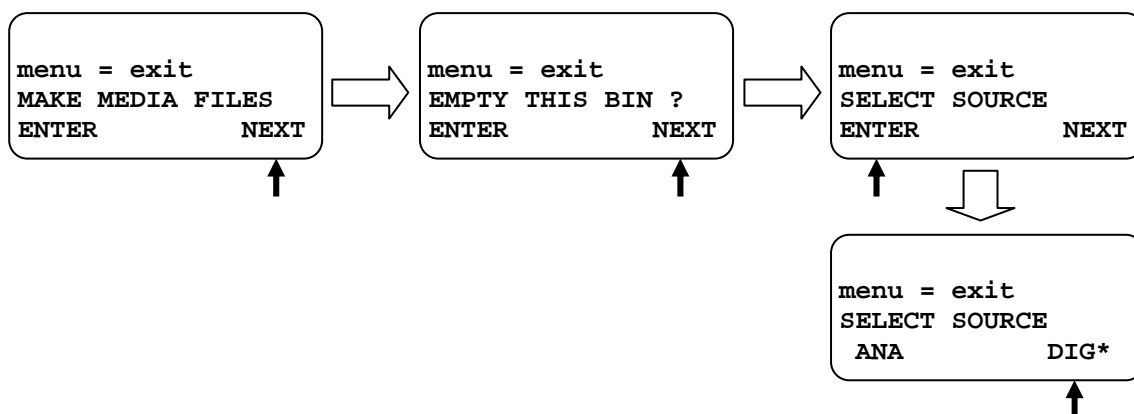
The LCD display panel will show *"FOR AVHDD MODE PLEASE PRESS MENU"*, ignore this message and after a few seconds the Clip Status Display will be shown. The DN-200 is now ready for use as a recorder or playback device.

DN-200 Menus

The DN-200 is a menu driven unit; there are several menus which are used to set up the unit. The menu settings are non-volatile (settings are stored even when the unit is switched off). So general settings, such as date and file type, may only need to be set once. We will look at specific set ups in more detail later on in this manual, but here is an overview of the available menu options.

Pressing the Navigation Button labelled **NEXT** will display the next menu option. If all menu options have been displayed and next is selected then the unit loops back to the first menu option once more. Pressing the Navigation Button labelled **ENTER** will select the displayed menu option. The next level of menu options or a specific setting choice will then be displayed. Pressing the **MENU** Button will allow exit of the current menu or setting.

Example menu selection:



Main Menu Options

There are 8 initial main menu level options and they are:

Menu Option	Action taken
MAKE MEDIA FILES	Prepares the content to be seen by the computer in the AVHDD mode. The operating system environment needs to be previously set to either FAT32 or NTFS. This action is taken once before connecting to a computer in AVHDD mode and is done for all the recorded content.
EMPTY THIS BIN	Empties or erases the content within the selected bin, this action cannot be undone once selected.
SELECT SOURCE	The signal to be recorded can be chosen to come either from the IEEE-1394 input (DIG) as a digital signal or come from the BNC and RCA inputs as NTSC or PAL analogue signals (ANA).
EMPTY ALL BINS	Empties or erases the content in ALL of the bins. This action cannot be undone once selected.
RECORD SETUP	Enters the Record Setup Menu group detailed on page 10
PLAY SETUP	Enters the Play Setup Menu group detailed on page 10
SYSTEM SETUP	Enters the System Setup Menu group detailed on page 11
FIRMWARE REVISION	Displays the current firmware revision for the DN-200

Table 1 Main Menu

Record Setup Options

Entered from the Main Menu, this set of options enable various record related parameters and modes to be setup.

Menu Option	Action taken
SET RECORD FILE TYPE	Where the choice of file type is made for all un-recorded bins. File types cannot be mixed within a bin. Choices are .mov, 2 types of .avi, .mxf and for HDV .m2t only. Note that the current type chosen will be marked with an asterisk as well as being indicated on the 2nd line of the Clip Status Display, see Page 7.
SYNCtoTAPE CONTROL	ST1, 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, ST0, the record process will continue regardless of the time code behaviour. Note that the current selection will be marked with an asterisk as well as being indicated on the top line of the Clip Status Display, see Page 7.
SET RECORD DATE	This option always modifies the date attribute of the created file when the source is analogue. When the source is digital if the date in the digital stream is invalid then the unit will use this date instead.
RECORD PRE-TRIGGER	When enabled, the last 8 seconds of video before the record trigger is captured ahead of the video following the trigger. Note that the video in the pre trigger buffer is lost when the unit is power cycled.
SET DEFAULT DV AUDIO	When the audio source is analogue, this option sets the audio sampling frequency to 48KHz or 32KHz. When the source is digital, this option helps the recorder match the incoming audio sampling frequency. Note that the current selection will be marked with an asterisk.
SET ASPECT RATIO	When the source is analogue, this option sets the 16:9 or 4:3 aspect ratio flag in the stream to be recorded.
TIMELAPSE RECORD	Allows the recording of NTSC or PAL video at slower than real time through a choice of 6 options. Note that the current selection will be marked with an asterisk.
PWR ON AUTO RECORD	When enabled, the recorder will go directly into record mode in the last bin selected once power is applied.

Table 2 Record Setup Menu

Play Setup Options

Entered from the Main Menu, this set of options enable various record related parameters and modes to be setup.

Menu Option	Action taken
SET LOOP PLAY	When enabled the DN-200 will loop play all clips in the current bin, the playback will continuously loop until stopped. Note that the chosen mode is indicated by an asterisk as well as the presence or absence of the loop play icon on the top line of the Clip Status Display, see page 7.
PWR ON AUTO PLAY	When enabled, the recorder will go directly into a play mode in the last bin selected once power is applied.

Table 3 Play Setup Menu

System Setup Options

Entered from the Main Menu, this set of options enable various record related parameters and modes to be setup.

Menu Option	Action taken
SET SIGNAL TYPE	Where the recorder is set to operate with one of three signal types, NTSC, PAL or HDV. Note: <i>Changing between signal types will erase the content in all bins and the DN-200 will restart. Backup any content first.</i> The current selection will be marked with an asterisk.
SET FAT32 / NTFS	This option will set up the file system type seen by the computer in AVHDD mode as either NTFS or FAT32. Note: <i>Changing between types will erase the content in all bins and the DN-200 will restart. Backup any content first.</i> The current selection will be marked with an asterisk.
MODIFY HDD VOLUME ID	When connecting as an HDD the DN-200 volume name is shown as <i>Mediapac_xx</i> . This option sets the xx value between 0 and 99. A useful feature when connecting multiple units at the same time from a multi-shoot.
SETUP HDD PARTITION	The DN-200 HDD can have one or two partitions. A second 6GB partition can be set up. The recorder will have no affect on this partition so the user is free to name it, format it, store any type of data on it with complete confidence that the recorder will not alter it.
SET TIMECODE DISPLAY	During recording and playback, this option allows display of either the Internal or the External time code. Note that the current selection will be marked with an asterisk.
SET REMOTE CONTROL	This option either enables or disables the remote control capability. Note that the current selection will be marked with an asterisk.
TOTAL SPACE	Displays the video capacity of the DN-200 hard drive in Hours, Minutes, Seconds and Frames HH:MM:SS:FF.
UPGRADE FIRMWARE	Allows the user to update the firmware of the recorder, provided a proper file has been copied on to the DN-200 hard drive in AVHDD mode.
SET GPI TRIGGER MODE	The GPI socket can be used for simple trigger control. The DN-200 can accept Pulse or Level inputs on this socket, which will trigger record, playback and pause commands. See Page 15
SET FACTORY DEFAULT	Recall FACTORY DEFAULT to be loaded into current setup
NTSC SETUP LEVEL	The setup level is set to 7.5 or 0 IRE. 7.5 IRE is most commonly used in the U.S.A. and Canada and 0 IRE in far eastern countries such as Japan. Not used in PAL or HDV modes.

Table 4 System Setup Menu

DN-200 General Setup Notes

Before using your DN-200 for the first time, there are a few basic operational settings that must be chosen. These are found under the System Setup option in the menu tree (see Table 4 on the previous page).

Set the signal type

WARNING: Changing between signal types will erase the content in all bins. Backup any content first.

Select between NTSC, PAL or HDV. If the standard chosen is NTSC, then a choice of **NTSC SETUP LEVEL** is also given. This allows the IRE Black level to be set to 0 or 7.5 for NTSC. 7.5 IRE is most commonly used in the U.S.A. and Canada and 0 IRE in far eastern countries such as Japan.

Set HDD partition to 1 or 2

WARNING: Changing **SETUP HDD PARTITION** will erase all content. Backup any content first.

The HDD storage space can be broken into 2 partitions; the second partition reserves 6GB and is not seen or used by the recorder. The second partition will appear as a second drive to the computer and the user is then free to use this drive to store any data including stills, text documents, spreadsheets, metadata and/or finished work. The DN-200 is guaranteed not to overwrite data in this second partition. Deleting all bins will also not erase any data in this second partition. The recorder will show a total record capacity less approximately 30 minutes record time once the second partition is created.

Choose a file operating system, FAT32 or NTFS

This option will set up the file system type seen by the computer in AVHDD mode. NTFS does not have the same 2GB file size limitation imposed by the FAT32 file system. An NTFS recorded clip stays as one file no matter what its length. This choice should only be made once before making any media files. **Note:** Some editing systems cannot handle NTFS files larger than 40GB.

Set the HDD volume ID

When connecting as an HDD the DN-200 volume name is shown as *Mediapac_xx*. If your application calls for multiple DN-200s to be connected to the computer, it becomes helpful to have a unique volume name for each DN-200. This option allows xx to be set between 00 and 99.

Select which time code to display

With DV, whilst recording or playing, the time code displayed can be either externally or internally generated. If the input signal is analogue and no time code is supplied then the External Time Code generated by the DN-200 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 from 00:00:00:00 in each bin. When the content is changed to files, the time code presented to the editing system starts with the External value of the first frame of the content; if this value is invalid then 00:00:00:00 is substituted. For HDV, the time code displayed is always the External time code.

Empty the current or all bins

The DN-200 is primarily a capture device, as opposed to an archiving device, and it is best to start out with a fresh DN-200 on each project just remember to backup any existing content to computer first. Emptying (erasing) ALL bins will not only clear the DN-200 but it will also conveniently reset the file system.

Normal Recording

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

Select the video source

For any recordings use SELECT SOURCE in the Main menu. Recordings can be made from the analogue BNC composite connection (ANA) or the IEEE-1394/DV/HDV port (DIG).

Note: The breakout AVOUT port, Composite and RCA audio from 3.5mm jack connection, is always live, regardless of the SD input signal source, ANA or DIG. When the source is analogue, the signal is also converted to DV digital and output on the IEEE-1394 port.

Note: In a HDV set up, both input and output is sent through the same IEEE-1394 port and the analogue connections are made redundant.

Set the file type

Should you wish to connect the DN-200, in AVHDD mode, to your computer and drag and drop your video content to it as files. The choices for file types are Microsoft .avi (Type II), Canopus .avi, both commonly used in PCs, QuickTime .mov format used in Macs and .mxf (OP1A) for use with other systems such as Avid. In HDV mode, the only file type supplied is .m2t and this may need conversion before being edited, depending on your computer's specifications and its editing software.

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

Synchronize to tape motion

DN-200 recording sessions can be synchronized to the camera's record button by turning Sync to Tape ON (**ST1** is shown on the *Clip Status Display*, see page 7). Whenever the tape deck in the camera is rolling, so will the time code. The DN-200 recognizes this information and will record along with the deck. When the deck stops, the DN-200 will pause the recording. To record continuously without regard for tape or deck motion, switch Sync To Tape off (**ST0** is shown). Some cameras control the DN-200 directly through the IEEE-1394 interface and in these cases use ST0 and let the camera do the work.

Select the audio sampling rate in DV mode

This option will set the audio sampling rate to 32KHz or 48KHz when the video source is analogue. When the video source is digital this setting will be used to match the audio portion of the digital stream. If the audio sampling rate is incorrect and does not match then the first two frames of data will be discarded as the DN-200 resets itself.

Note: Only one type of audio sampling rate can be used within a bin.

Set the record date (optional)

The date attribute of the created file is set to this value when the source is analogue. Each file representing a clip gets its own date. If the source is digital then the record date from the digital stream is used. If that date is not valid then the current record date set by this option is used instead.

Before starting to Record

Select an empty Bin by pressing the PREVIOUS or NEXT keys when looking at the Clip Status Display (see page 7). An empty Bin will display 00:00:00:00.

Starting the Record Process

Common ways of starting to record with the DN-200 are:

- 1) Manually, by holding the Record button down and then pressing the Play button.
- 2) Automatically, the camera or device connected to the IEEE-1394 port controls the record action.

A third way is to issue a record command via the Remote Serial interface or RS-232 port. The DN-200 RS-232 command protocol is listed in this manual from page 19 onwards.

Pausing the Record Process

The DN-200 will automatically pause recording if time code is not moving and ST1 (Sync to Tape) is displayed. When the video source is digital this time code is embedded in the data stream and it is always recorded. However, when the video source is analogue, the time code used is the SMPTE longitudinal time code supplied on the BNC connection. To cause the recording to pause, that time code must be valid but not moving. If SMPTE time code is not present at all then a DN-200 generated 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, ST1 (Sync to Tape) 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 within the same bin.

Warning: *If power is interrupted whilst 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 behaviour.*

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

Marking the Recording

Whilst recording the right hand navigation button is labelled MARK. Pressing this key whilst recording will start a new clip within the current bin, no frames are lost in doing this. Each time a recording is Marked a new clip is created. A single recording can be marked up 97 times within the current bin.

Note: Recording is started in an empty bin. A clip is automatically started at the beginning of recording to the bin. A clip can never be inserted in between other clips already in the bin. Marking or Pausing a recording forces clip numbers to be incremented, each clip is written to the current bin.

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

Stop a recording before powering down

It is best to stop a recording session by pressing the Stop key before turning the DN-200's power off, otherwise the whole recording or part of it may be lost.

Power on auto record

When this option is enabled and the unit is powered on the DN-200 will attempt to begin recording immediately to a chosen bin using the latest stored settings for source, file type etc.

Time Lapse Recording

In this option a recording can be set up to capture using one of six time lapse settings.

These are:

1 frame per second every 4 th frame	1 frame per 2 seconds every other frame	1 frame per 5 seconds or 1 frame per trigger
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Note: *When power is interrupted and then restored the unit will need to be restarted within a new bin.*

Note: *A new clip is created only at the beginning of a time lapse recording. Frames are appended.*

Note: *This option is currently not available with HDV sources.*

Using Record Pre-trigger

When this option is enabled the DN-200 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 the last 8 seconds of history prior to the trigger is then captured to disk and video after the trigger is appended after it.

Note: This mode is not saved when power is interrupted and the 8 second buffer is flushed.

DN-200 GPI Trigger connection and operation

GPI Trigger cabling and circuit

The DN-200 GPI circuit runs on less than 5V DC. This current is supplied by the DN-200 GPI port. You will need a pre-manufactured GPI trigger cable or, you could make your own GPI trigger using a 3.5mm stereo jack connected by 2 core cabling to a simple 'contact on closure' button or similar trigger. Wiring from Tip and sleeve on the 3.5mm stereo jack should show roughly 3.28V DC when plugged into the DN-200 GPI port. Jack Tip is positive(+), jack sleeve is negative(-) and ring is not used.

SET GPI TRIGGER MODE

In the DN-200 SYSTEM SETUP menu use the option labelled SET GPI TRIGGER MODE. You can then make a choice between the PULSE or LEVEL trigger. The selected choice is marked with an asterisk.

PULSE trigger Record process

Using the Clip Status Display and navigation buttons select an empty DN-200 bin. Make sure the source device is connected and working and the target file type on the DN-200 has been chosen. Press and hold in the Record button on the front panel and then press the Play button. This should start the record process. The button on the connected GPI cabling is then pressed forcing the unit into record pause mode. The unit is then ready to activate record on the next press of the contact closure button. Each time the DN-200 starts recording a new clip will be added to the bin. Press the stop button on the front panel of the DN-200 to end recording to the bin.

LEVEL trigger Record process

Using the Clip Status Display and navigation buttons select an empty DN-200 bin. Make sure the source device is connected and working and the target file type on the DN-200 has been chosen. Press and hold in the Record button on the front panel and then press the Play button. This should start the record process. The button on the connected GPI cabling is then pressed forcing the unit into record pause mode for the length of the press. However, when the button is released the recording process starts again. Each time the DN-200 starts recording a new clip will be added to the bin. Press the stop button on the front panel of the DN-200 to end recording to the bin.

The contact closure button may be working in the opposite way to the type of action you want to perform. A mechanical change to the GPI contact closure trigger should fix this. IE when pressed down the circuit is broken and recording starts. When released the contact is made causing the pause action.

Note: You may have a couple of seconds footage at the beginning of the bin that you may wish to remove later once the footage is transferred to a computer for editing.

PULSE trigger Playback process

Using the Clip Status Display and navigation buttons select a pre-recorded DN-200 bin. Make sure the output device/monitor is connected and working with the DN-200. Press in the Play button on the DN-200 front panel. This should start the playback. The button on the connected GPI cabling is then pressed forcing the unit into play pause mode. The unit is then ready to playback from this point on the next press of the contact closure button. Press the stop button on the front panel of the DN-200 to end playback of the bin.

LEVEL trigger Playback process

Using the Clip Status Display and navigation buttons select a pre-recorded DN-200 bin. Make sure the output device/monitor is connected and working with the DN-200. Press in the Play button on the DN-200 front panel. This should start the playback. The button on the connected GPI cabling is then pressed forcing the unit into play pause mode for the length of the press. However, when the button is released the playback starts again. Press the stop button on the front panel of the DN-200 to end playback of the bin.

Playback

Set up loop play

When loop play is enabled and the last frame of the last clip is reached the DN-200 will start over playing from the first frame of the first clip seamlessly.

Power on auto play

When this option is enabled at power up the DN-200 will begin playing back immediately from the first clip of the last selected bin.

Play out

Play out mode can be entered by one of three ways, the most common is to press the PLAY button; 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 back is stopped, the time displayed is the time code of the last frame displayed.

When entering play back the soft keys will be fast reverse FREV and fast forward FFWD respectively. Repeatedly pressing either soft key will cause the play function to go repeatedly faster in the chosen direction up to 32x speed. A speed other than 1x is displayed in the bottom line.

Also whilst playing out pressing the Menu button will give an alternate set of soft keys; SLOW and FAST. These keys, while keeping the same current play direction, will extend the control of the speed down to the slow motion range of 1/32x. The menu button will toggle between the two sets of keys.

If play back is entered after a recording, the play back will start at the beginning of the first clip of the current bin. For example, a record session starts with clip 1, during the record the Make key is used to create clips 2 and 3. Play back will start at clip 1. This will remain until another bin is selected or power is turned off.

Pause and Go To Mark

While playing, pressing the PLAY key will pause the image. Pressing Play again will return to 1x play in the forward direction.

While in the play-pause mode, the soft keys will be |< and >|. These keys allow direct access to the marks that are the starting and end frames of each clip. Counting the end frame of the last clip, there will always be one more mark than there are clips. In this mode, the clip number display will be substituted with a mark number display.

Again, pressing the Menu key will present an alternate set of soft keys, these will be <|| and ||> for frame stepping reverse and forward respectively. Holding either key down for more than 2 seconds will cause a rapid stepping.

Connection to a Computer in AV HDD Mode

The AV HDD mode is where the DN-200 appears to the computer as a Hard Disk Drive (HDD) and not as a video device. The connection to the computer is via the IEEE-1394 connector. The AVHDD mode is entered by pressing the Menu key within the 5 seconds just after the DN-200 is powered on. When connecting as an HDD the DN-200 volume name is shown as *Mediapac_xx*.

Note: Care must be taken when connecting the 6pin IEEE-1394 cable in the DN-200 when the other end is already connected to the computer. Do not attempt to insert the connector backwards as DC power from the computer is present on the cable and can damage the sensitive receiver circuits in the DN-200. **Note:** No software drivers are necessary for the computer to recognize the DN-200 as an HDD.

Preparation

Prior to using the DN-200 in the AV HDD mode and seeing your video as files instead of clips the MAKING MEDIA FILES menu process must be undertaken.

MAKE MEDIA FILES

This menu operation prepares the recorded content to be seen by a computer by building pre-selected file wrappers around the recorded content and emulating the computer's operating file system. There are two choices available, FAT32 and NTFS and they are chosen within SYSTEM SETUP MENU under the SETUP FAT32 / NTFS option.

Operating File System limitations

The FAT32 format is compatible with both Macs and PCs. However, 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 this sequence of 2GB files are placed in the correct order and end to end on an editing time line no frames are lost at the joins. In addition, FAT32 has a clip boundary that has a limit 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 clips 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-200 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 BxxCnny where xx again represents the bin number; nn represents the Clip number ranging from 01 to 97. The number yy is the number of the spilt file caused by the FAT32 limitation

Updating DN-200 Firmware

From time to time Datavideo may release new firmware to either add new features or to fix reported bugs in the current DN-200 firmware. Customers can update the DN-200 firmware themselves if they wish or they can contact their local dealer or reseller for assistance should they prefer this method.

This page describes the firmware update process, it should take **approximately 15 minutes total time to complete**.

Once started **the update process should not be interrupted in any way** as this could result in a non-responsive unit.

As well as a working DN-200 you will need:

- The latest Firmware update for the DN-200.
This can be obtained from your local Datavideo office.
- The DN-200 power supply.
- A 6 pin IEEE-1394 cable.
- A PC or Mac computer.

The AV HDD mode is where the DN-200 appears to the computer as a Hard Disk Drive (HDD) and not as a video device. The connection to the computer is done via the IEEE-1394 connector. The AVHDD mode is entered by pressing the Menu key within the 5 seconds just after the DN-200 is powered on. When connecting as an HDD the DN-200 volume name is shown as *Mediapac_xx*.

Note: Care must be taken when connecting the 6pin IEEE-1394 cable in the DN-200 when the other end is already connected to the computer. Do not attempt to insert the connector backwards as DC power from the computer is present on the cable and can damage the sensitive receiver circuits in the DN-200. **Note:** No software drivers are necessary for the computer to recognize the DN-200 as an HDD.

To update the DN-200's firmware:

1. Take a DN-200 that has been set to the FAT32 file system and has been taken through the MAKE MEDIA FILES process and connect it to your computer in AVHDD mode as described above.
2. Copy the firmware update file to the root directory level, where all bin folders usually appear, and rename it **flash.bin**.
3. Next, dis-mount or eject the DN-200 from the computer and power cycle the unit.
4. Once re-started enter the SYSTEM SETUP menu and select the UPDATE FIRMWARE option.
5. Follow the display screen instructions.*
6. The unit will re-start itself once the process is complete.

***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.

DN-200 RS-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

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 CMD1 byte represents the command group. The least significant nibble represents the number of Data bytes to follow the CMD2 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 a three byte acknowledgement (ACK) if the Checksum is valid. If the Checksum is not valid, the DN-200 will ignore the command. Most commands will be responded to within 8 msec. However, a PLAY command from an idle state will result in response delay of up to 700 msec. During this busy time, all commands will be ignored.

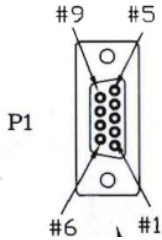
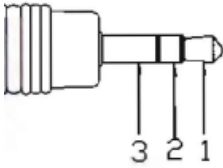
Summary List of Commands

Command	Name	Response	Name
	System Control		
00h, 11h, 11h	Device Type Request	12h, 11h, 00h, 00h, 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

Connector Pin Assignment

Interface : 9 pin D-Sub female to 3.5mm Jack

The pin assignment of the Controller and DN-200 is shown in the following table:

9 Pin D-Sub	Controller (P1)	DN-200 (P2)	3.5mm Jack
	Pin 2 (Rx)	2 Jack Ring	
	Pin 3 (Tx)	1 Jack Tip	
	Pin 5 (GND)	3 Jack Sleeve	

System Control

00h, 11h Device Type request

The response is 00, 00 indicating Quick Capture

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.

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 holds 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.

Command	Name	Response	Name
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	61h, 00h, nn, csum	Bin Number

24h, F1h, nn Play Offset nn

Frame Offset number nn is played. The number nn is made up of 4 binary encoded bytes and sent out with the least significant byte first. This command may be issued from the idle state or any other Play state. **Note:** Frame Offset are represented in absolute frame numbers where the first frame of the bin is 0.

24h, F2h, nn Play from Offset nn

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

24h, F3h, bb, nn Select Bin and Play Offset

Bin number bb is selected and Frame Offset number nn is played. This command may be issued from the idle state or any other Play state.

24h, F4h, bb, nn Select Bin and Play from Offset

Content of the bin number bb is played at 1x speed starting at Frame Offset nn. This command may be issued from the idle state or any other Play state.

24h, F5h, nn Play to Offset nn

Content of the present bin is played at 1x speed starting from present Frame Offset until Frame Offset nn at which point it pauses. Frame Offset nn is 4 bytes and starts with the LSB. This command may be issued from the idle state or any other Play state.

25h, F5h, bb, nn Select Bin and Play to Offset

Content of the bin number bb is played at 1x speed starting at Frame Offset 0 to Frame Offset nn then pause. Frame Offset nn is 4 bytes and starts with the LSB. This command may be issued from the idle state or any other Play state.

29h, F5h, bb, nn, ee Select Bin and Play from Offset to Offset

Content of the bin number bb is played at 1x speed starting at Frame Offset nn to Frame Offset ee then pause. Frame Offsets nn and ee are 4 bytes and start with the LSB. This

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:

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

Command	Name	Response	Name
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
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
24h, F1h, nn (4 x), csum	Play Offset	10h, 01h, 11h	ACK
24h, F2h, nn (4 x), csum	Play from Offset	10h, 01h, 11h	ACK
24h, F3h, bb, nn (4 x), csum	Select Bin and Play Offset	10h, 01h, 11h	ACK
24h, F4h, bb, nn (4 x), csum	Select Bin and Play from Offset	10h, 01h, 11h	ACK
24h, F5h, nn (4 x), csum	Play to Offset	10h, 01h, 11h	ACK
25h, F5h, XXh, YYh, YYh, YYh, YYh, csum	Select Bin and Play to Offset	10h, 01h, 11h	ACK
29h, F6h, XXh, YYh, YYh, YYh, YYh, ZZh, ZZh, ZZh, ZZh, csum	Select Bin and Play from Offset Y to Offset Z	10h, 01h, 11h	ACK
	Sense Request		
61h, 0Ch, 04h, 71h	Current Time Sense	74h, 00h, TC(3:0), csum	Time Code

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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