



Inuktun Digital Video Recorder (DVR) Start Guide and Manual

Version 1.6 June 2012

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INTRODUCTION

Congratulations on your purchase of the Inuktun Digital Video Recorder (DVR). This DVR is a rugged, industrial quality video processing device.

The DVR allows you to record video, images and audio, view live feeds and play back recorded feeds while in the field. While it is specifically designed to work with Inuktun cameras, crawlers and controllers, it uses standard protocols and can be used with any standard video equipment. With it, you can perform and produce a record of real-time inspection, stored on a convenient, miniature USB flash drive (included). It includes the cables and processing software to get you started immediately.

Please carefully read this guide before using your new DVR.

What's Included

Please take a moment to ensure that the following is included:

- DVR Device
- "OUT" Cable – DB15 for Video Out (black RCA male) and Audio Out (white RCA female)
- "IN" Cable – DB15 for Video In (black RCA male) and Power (4-pin Microfit female)
- Inuktun USB flash drive
- This manual

Depending on the application, the following may also be included:

- Powered microphone headset
- Power supply and cable
- RCA female-female adapter

Supported Devices and Protocols

MPEG 4 with Audio

H264 Video Compression

USB flash storage

Self-powered third party USB drives

Composite Video:

RCA connector input and output

NTSC video format (Max 720 × 480i @ 60Hz)

PAL video format (Max 720 × 576i @ 50Hz)

Monaural AES3 Audio:

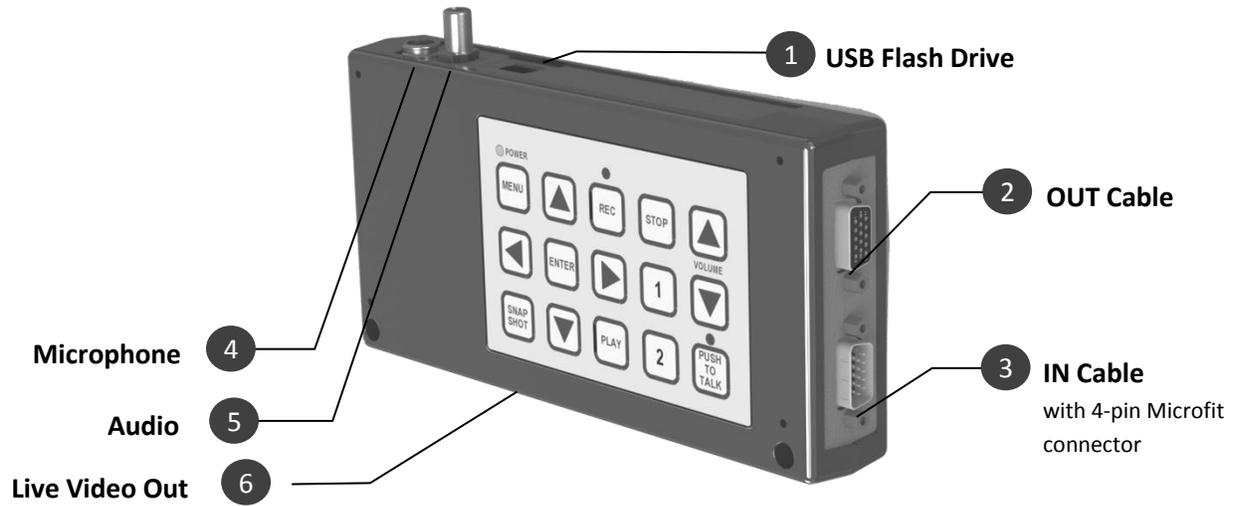
RCA connector input (Line In)

Tiny XLR connector input (Microphone)

Processing:

Open source VLC Player (included)

Connecting your DVR



On the DVR:

1. Insert a USB Flash Drive (included) into the port labeled *USB*
2. Connect OUT Cable into the DB15 port labeled *OUT*
3. Connect IN Cable into the DB15 port labeled *IN*
4. Connect microphone into the tiny XLR jack labeled *MIC IN* (optional)
5. Connect any external audio source into the RCA jack labeled *LINE IN* (optional)
6. An RCA jack provides the ability to view the input video without any processing delay (optional)

i If you are using an Inuktun controller with a DVR distribution box, jump to step 10.

From your video source:

7. Connect the RCA plug labeled *Video In* to your video source such as your camera

On your monitoring equipment:

8. Connect the RCA plug labeled *Video Out* to the appropriate video input on your monitor
9. Connect the RCA jack labeled *Audio Out* to the appropriate audio input (optional)

Power:

10. Connect your power supply to the 4-pin Microfit connector, power cable into the power supply and power supply into an AC power source.
11. Turn on the power switch on the bottom of the DVR. When the DVR is switched off, input video is routed directly to the output.

Special Instructions

Only if you are using an Inuktun controller with a DVR distribution box, skip steps 6-9, and then:

On your distribution box:

12. Connect the RCA plug labeled *Video In* to the jack labeled *INPUT TO DVR*
13. Connect the RCA plug labeled *Video Out* to the jack labeled *OUTPUT FROM DVR*
14. Connect the RCA jack labeled *Audio Out* to the audio RCA plug on the LCD harness
15. Connect the 4-pin Microfit connector to the jack labeled *DVR POWER*

Installation on a PC

The video and audio files generated by your Inuktun DVR can be played back and manipulated on any PC. Before doing so, software is required for playback and, if audio is used, to merge separate audio and video files.

The Inuktun USB Flash Drive (included) comes pre-loaded with complete installation files for:

1. **VLC Media Player for Windows** – permits playback of files from the DVR
2. **DVR Convert** – combines video and audio files generated by the DVR

It is recommended that both be installed to your PC.

Installation Instructions

Simply plug the USB Flash Drive into your computer, find and double-click the installation file for VLC Media Player. Follow the on-screen instructions. When complete, double-click the installation file for DVR Convert. It is recommended to use the default installation options for each.



vlc-1.1.11-win32.exe



DVRConverter
_SETUP.exe

If you do not have the installation files because the Inuktun USB Flash Drive is unavailable or has been formatted, please contact Inuktun for copies.

VLC Media Player is also available online. To replace a missing copy, or if you prefer to download the most current version, you can follow the instructions in *Other Operating Systems* below.

Other Operating Systems for VLC Media Player

The included installation is for Win32, which includes all 32-bit versions of Windows up to Windows 7 (and possibly beyond). If you have a 64-bit version of Windows, or a different operating system, visit Video LAN Organization online at www.videolan.org/vlc, where free versions are also available for Mac OS X, GNU/Linux, BSD, OS/2, Solaris, QNX, Syllable and Android.

ⓘ It recommended to operate the DVR using a clean Inuktun USB Flash Drive. Following installation, first copy the installation files to your computer for backup, and use your computer to format the drive. For more information on formatting options, see the Advanced section. Formatting is also recommended if you are using any other external drive.

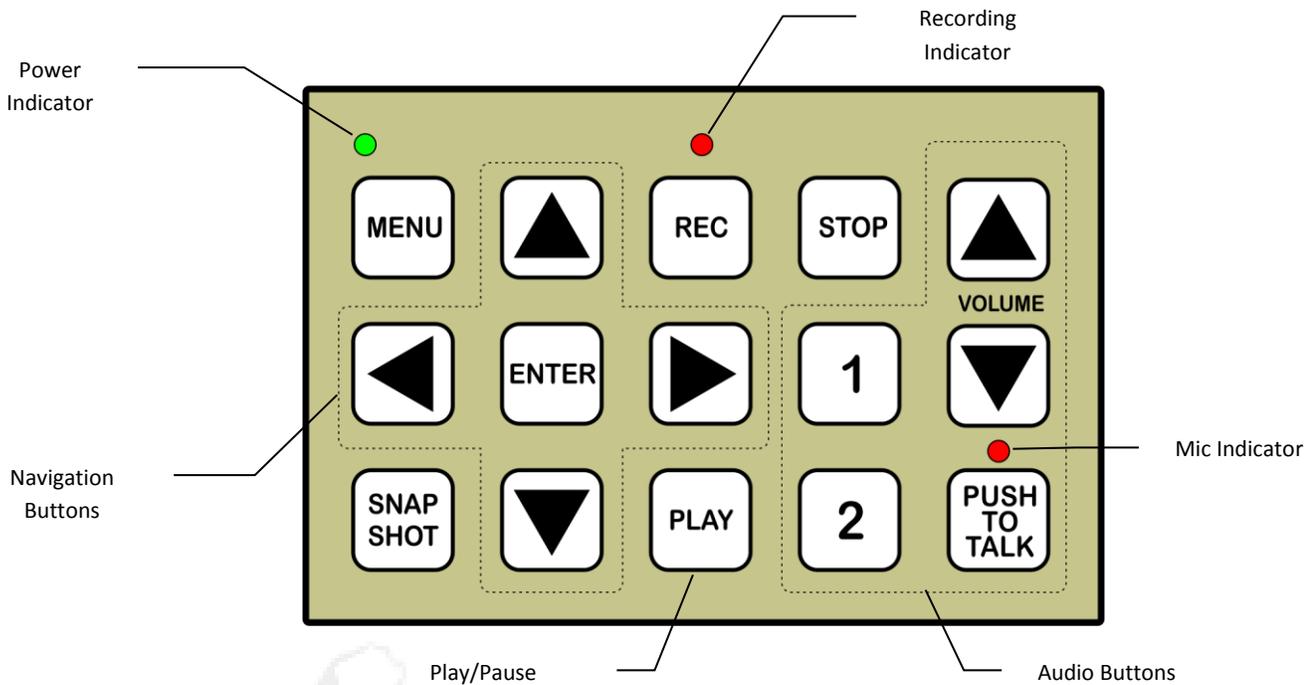
Powering On and Off

To turn on your Inuktun DVR, simply ensure the power cable (and adapter, if included) is plugged in and the power switch is on. A red light on the power switch indicates that the DVR is powered on. A green light above the 'Menu' button indicates that the DVR is powered on and ready to record. It takes approximately 45 seconds to initialize and be ready to use.

To turn off your Inuktun DVR, simply turn off the power switch.

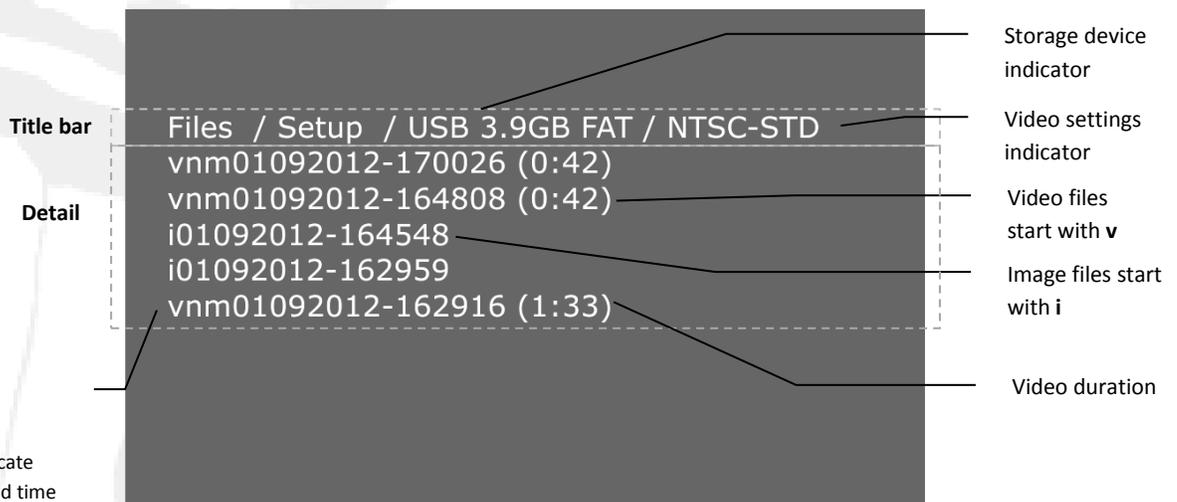
BASICS

Keypad Overview



Menu and Navigation

Menu operation is very straightforward. The menu display, which can be seen on your monitoring equipment as soon as the DVR has powered up, is composed of a title bar and a detail section.



Example of the menu display.

Navigating the Menu

The current menu selection flashes. To navigate the menu, use the direction arrows     on the keypad.

There are four menu options in the title bar. Press  to make a menu selection. At any time, press  to go back to the title bar.

Files

The **Files** option displays a list of recorded videos and snapshot images. Files are sorted by most recent on top.

A maximum of five files are shown at once. To view additional files, scroll up and down using the keypad.  

Setup

The **Setup** option gives the user control over three global settings: the recording quality, the date/time, and the video mode. It also shows the DVR's firmware version.

 ***It is a good idea to use the Setup option before using your DVR to confirm the date/time and ensure the correct video mode is set for your equipment.***

1. Set the recording quality:

Navigate down  using the direction arrow. **Quality** will flash.

Available settings are Low, Medium and High. Using the direction arrows   navigate to the desired resolution. Select it by pressing  when it flashes.

The **video settings indicator** in the title bar displays your selection as follows: HQ (high quality), STD (medium quality), or LQ (low quality).

2. Set the date/time:

The date and time are shown in the format MM/DD/YYYY – HH:MM.

Navigate down  using the direction arrow until **Time/Date** flashes.

Using the direction arrows   navigate to a time unit and use the direction arrows   to change it. To change another time unit, simply navigate to it. Each change is saved immediately.

3. Set the Video Mode:

NTSC and PAL are worldwide analog video standards that vary by country. Your camera and

other video equipment will only support one of them. For proper operation, the video mode must be set correctly.

Navigate down  using the direction arrow until **Video Mode** flashes.

Using the direction arrows   navigate to the desired video mode. Select it by pressing  when it flashes.

The **video settings indicator** in the title bar displays your selection.

4. Firmware Version

This is for information only.

Storage Device indicator

The **Storage Device indicator** in the title bar is for information only. Using the direction arrows   navigate to it.

In the title bar, the indicator displays whether a storage device is attached, followed by the remaining storage space in parentheses. For example: **USB 3.9GB FAT**. If no storage device is attached, it displays **No USB MEDIA**.

Storage is displayed in gigabytes (GB) and is followed by **NTFS** or **FAT**. These specify the file system of the storage device, described in more detail in the **Advanced** section.

When USB media is attached, the detail section displays an estimated remaining recording time. For example: **521 mins 36 secs remaining**. Changing to a lower video quality increases the recording time. The time is an estimate only.

 *To record and play files, a storage device must be attached. To attach a storage device, simply plug it into the port labeled USB.*

 *The USB port does not provide power. If you are using an external hard disk drive (HDD) it must have its own power supply. See the Troubleshooting section of this guide for more information.*

Video Settings indicator

The **Video Settings indicator** in the title bar is for information only. It is not possible to navigate to it.

The indicator displays the Video Mode (NTSC or PAL), followed by the recording quality. For example: **NTSC-HQ**. These settings can be changed using the **Setup** Option.

If no input signal is detected, the indicator will display **NO CAMERA**.

Basic Recording

To record files:

To begin recording at any time, press **REC**.

The **recording indicator** will flash during recording. Your monitoring equipment displays what is being recorded. For two seconds, the display shows the name of the file being recorded, its current duration, and the estimated remaining recording time. To stop recording at any time, press **STOP** or **REC**.

Basic Playback

To play back files:

Playback can be used to view both video and image files.

Press **MENU** to navigate to the home menu. Navigate to any file listed in the detail section using the direction arrows **▼** **▲**.

To begin playing the selected file, press either **PLAY** or **ENTER**.

To stop playing the file and return to the menu, at any time press **STOP**.

To pause playback at any time, press **PLAY**; and press **PLAY** again to resume playback.

i *If no file is selected when **PLAY** is pressed, the most recently played file is played.*

ADVANCED

Audio

Sound Sources

During recording, sound can be supplied to the DVR from two sources.

1. **Line audio** from the field (*LINE IN jack*). For example, sound originating from a diver who is wearing a camera and a microphone.
2. **Microphone audio** from the DVR operator (*MIC IN jack*).

The line audio, if connected, is recorded by default. However, the operator can override it with the microphone audio anytime during recording; for example, to narrate or to make an observation.

To override audio recording with sound from the microphone:

During recording, press and hold .

The **Mic Indicator** will light. Begin speaking into the microphone. Sound originating from the line audio will be ignored and the microphone audio will be recorded.

To switch back to line audio, release .

 **Audio is stored in a file separately from video. For more information, see File Management and Merging Audio and Video (in the next section).**

Volume

The line audio and microphone audio volume can be adjusted. Each has a volume level ranging from 0% (mute) to 100% (full).

To adjust the microphone audio volume during recording:

Press and hold  while using the direction arrows  .

The screen will display **Mic Vol** followed by the current volume level.

To adjust the line audio volume during recording:

Press and hold  while using the direction arrows  .

The screen will display **Line Vol** followed by the current volume level.

 **During recording, audio does not “pass through” to your monitoring equipment and cannot be heard. However, your monitoring equipment will play audio during playback.**

Snapshot

An image snapshot can be taken of the current video feed. A snapshot can be taken at any time, including while video is being recorded, but is not available during playback.

To take an image snapshot:

At any time, press .

The screen will pause for about two seconds to display the image taken. The image is automatically stored and can be viewed later in list on the **Files** option menu. (Files starting with **i** are images.)

 **Video recording is not interrupted while taking a snapshot.**

Freeze

During recording, it is possible to freeze a video frame on the screen and pause recording.

To freeze a video frame:

During recording, press .

The screen displays a still image, and video is no longer being recorded to the file.

To resume, press  again. The screen resumes displaying the currently recording video feed.

Zoom and Pan

During playback and recording, it is possible to zoom into the video for a closer look, as well as pan in all directions.

To zoom:

During playback, press and hold  and press .

The screen shows the image at 2X zoom.

There are three zoom levels: regular, 2X and 4X. To cycle through them in order, press and hold  and repeatedly press .

To pan:

While zoomed in, use the direction arrows     to navigate the image. Pressing  resets to the center of the image.

Pausing during zoom:

- Playback continues while panning and zooming, but it is possible to pause while zoomed in.
- Panning or zooming features cannot be operated during pause.

Coordinates:

- To display the zoom level, and the pan X and Y coordinates, press **MENU** while zoomed in. Press **MENU** again to hide the text display.

i *Zoom and pan also works on screenshot images.*

i *Zoom and pan also works during recording. Any zoom and pan actions performed during recording will become a permanent part of the recorded file.*

Display File Information

At the start of recording, for about two seconds the display shows the file name, current recording time of the file and estimated remaining time. This information can be shown at any time during recording.

During playback, similar file information can also be shown: the file name and the current playback time.

To display file information:

At any time during recording or playback, press **MENU**.

The information text will display. To hide the text, press **MENU** again.

(The information text displayed will not become part of the recorded file.)

File Management

New or Formatted Drive

If a storage drive is empty, not been used before or has been formatted, the DVR automatically creates a file structure on the drive. This consists of:

1. A folder called Image
2. A folder called Video

Note that the DVR does not replace the installation file for VLC Media Player.

Deleting a File

A file can be deleted using the DVR menu. **To permanently delete a file:**

In the File options menu, use the direction arrows     to select the file to be deleted, and navigate to the right  to where the Delete option appears. Press  to delete the file.

Formatting for NTFS or FAT

The Inuktun USB Flash Drive is preformatted using the FAT file system. Using a computer, it is possible to format your storage device for either the NTFS or FAT systems.

- **FAT** operates faster but limits file size to 4.0GB, equivalent to about one hour of typical footage at High Quality.
- **NTFS** is a newer standard which permits files beyond this limit, allowing continuous recording of footage until the drive is full.

 **Formatting permanently deletes the entire contents of a drive, so be sure to back up your drive's data when doing so.**

PC PROCESSING

Overview

File Types

When recording or taking snapshots, your Inuktun DVR creates on its attached storage drive four types of files:

- **Raw video files** using the H.264 compression format (files with the extension .H264)
- **Raw audio files** using the G.711 format (files with the extension .G711)
- **Raw bitmap image files** (files with the extension .BMP)
- **Image color space files** (files with the extension .YUV)

Videos folder and Images Folder

When it boots, the DVR automatically checks for and (if they are not already present) creates two folders on the attached storage drive: **Videos** and **Images**. The video and audio files (.H264 and .G711) files are always stored in the **Videos folder** and the image files (.BMP and .YUV) files are always stored in the **Image folder**.

File Protocols in Depth

This section explains how files are created and illustrates how each file name gives detailed information about the file, such as when it was recorded.

File Pairs

Files are always created in pairs. Each file pair has the same file name, with an extension to indicate what type of file it is. For example, a video and audio file pair:

- **VNM01092012-165124.H264** and **VNM01092012-165124.G711**

It is possible to play back a video file or an audio file on its own, but it may be preferable to merge the two into an MPEG 4 movie (see Merging Audio and Video below). Unmerged video files do not have time stamp information encoded into the file which may make navigation through the video difficult.

Image file pairs do not need to be merged. The bitmap (.BMP) file can be viewed using the image viewer on any computer. Color space files (.YUV) are beyond the scope of this guide.

File Naming Conventions - Video

Files are created with strict naming conventions to indicate information about the file's quality and when it was recorded. The following table illustrates how video files are named.

Example of video file: **VNM01092012-165124.H264**

V		N		M		01092012 -	165124	.H264	
Type		Mode		Quality		Date	Time	Extension	
V	Video	N	NTSC	H	High	MMDDYYYY	HHMMSS	.H264	Video
		P	PAL	L	Medium			.G711	Audio
				M	Low				

The above is a (V)ideo file, in (N)TSC format, (M)edium quality, recorded on January 9, 2012 at 4:51:24 PM.

Since file pairs have the same file name, the associated audio file would be identical except for the extension: **VNM01092012-165124.G711**

File Naming Conventions - Images

Image files use some of the same time conventions as video but begin with "i". While they retain the date and time, they do not contain Mode or Quality indicators. Here is an example of an image file:

Example of file: **i01092012-165124.BMP**

i		01092012 -	165124	.BMP	
Type		Date	Time	Extension	
i	Image	MMDDYYYY	HHMMSS	.BMP	Bitmap
				.YUV	Color space

Merging Audio and Video

If desired, audio and video files can be merged into a standard MPEG 4 movie using the **DVR Convert** merge utility provided by Inuktun. Once installed (see Introduction), DVR Convert can be accessed via a shortcut in your PC's Start Menu.

Moving Files

DVR Convert can merge files directly from and to your storage drive, or you can choose to first move the unmerged files to a location on your PC. Merging files that are located on your PC is faster, and is recommended if you are merging substantially large files, or a large number of files.

To move files:

Connect your storage drive to your PC and manually move files from its **Videos folder** to a location of your choice.

To Merge Audio and Video files:

If you are merging files on an external storage drive, ensure the drive is connected to your PC. Start DVR Convert.

In DVR Convert, set the existing location of your unmerged files, such as the **Videos folder** on your storage drive, by pressing to the right of **Input Directory** and browsing to the desired folder.

Set the location you wish converted movies to go, by pressing to the right of **Output Directory** and browsing to the desired folder.

In the file selection screen, check the name of each file you would like to convert.

Click **Convert**.

For each file selected, DVR Convert will create an MPEG 4 movie in the Output Directory you specified.

VLC Media Player

VLC Media Player for Windows is an open-source player that is capable of playing the file types created by your DVR, as well as the MPEG 4 movies created by DVR Convert. An installer for it is included on your USB Drive and it is available free online for download (see Introduction).

While other players may work, we recommend use of the VLC Media Player because of its reliability, easy availability, compatibility, strong feature set and the inclusion of all necessary audio and video *codecs*. The absence of the required *codecs* is one of the most common reasons why digital players may fail to play files.

Once installed, VLC Media Player can be accessed via a shortcut in your PC's Start Menu. For more information about VLC Media Player, including help and features, visit www.videolan.org.

TROUBLESHOOTING

Reboot

The power switch on the bottom of the DVR can be used to reset the DVR in the event that it is not performing optimally.

Simply turn the switch off for approximately ten seconds, then back on.

Battery

Inside your DVR is a small *CMOS* battery which ensures that user settings and the clock time are maintained while the DVR is disconnected from power. This battery should last many years, but will eventually need replacement.

If you notice that DVR settings are not retained while power to the unit is off, contact Inuktun for troubleshooting and a replacement battery if required.

Storage Devices

External hard disk drives (HDD) are available as either self-powered or USB-powered. The Inuktun DVR supports external HDD which are self-powered only. If you are using such a drive, please ensure that it has its own power supply.



USB-powered external HDD



Self-powered external HDD

The above does not apply to USB flash drives such as the one provided with your Inuktun DVR.

The DVR requires that drives be formatted and use the USB 2.0 standard.