

FieldPro DVRTM
Digital Video Recorder

P/N 301-TA045-1
User's Manual
Revision 1.6
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<http://www.ffv.com>

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Overview

The **FieldPro DVR** is a standalone, pocket-sized digital video recorder with exceptional image quality, featuring scalable Motion-JPEG compression and an outstanding 720 x 486 pixel image resolution. The FieldPro DVR records up to approximately 24 hours at a 20:1 compression with readily available 80 gig IDE hard drives. The recorder is equipped for downloadable files via an on-board USB 2.0 port. It is designed to develop and evolve as the industry changes. New features are implemented regularly, most of which can be easily implemented by the DVR's firmware, downloadable via FFV's Web site, <http://www.ffv.com> (see page 9 for instructions).

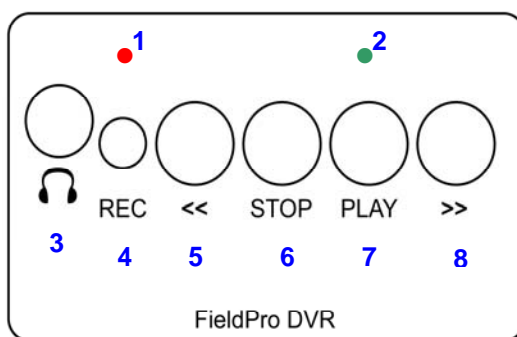
The M-JPEG compression settings on all versions of the FieldPro DVR are user selectable from 4:1 to 20:1. In practice, it is advisable to set the compression to correspond with the best quality to storage ratio. A setting of 7:1 is a good setting for general purpose Betacam images, 10:1 for S-VHS, 15:1 for VHS. The rule of thumb for minutes of storage generally available is compression ratio is roughly equivalent to minutes per gigabyte. For example : 10:1 compression ratio x 80 gigabytes = 10 x 80 = roughly 800 minutes recording time, or approximately 12 hours.

With single frame recording enabled, a frame will be recorded every time the record button is pressed. Time lapse recording is a time interval triggered recording single frame recording. The Loop record function continuously records material over the available space on the drive at the time the recording starts. The loop never overwrites video on the drive prior to the start of a record.

Standard Features

- Scalable Motion JPEG compression
- Analog Composite & Y/C Inputs & Outputs
- Time/Date Stamp & Character Overlay
- PC Viewable Files or Secure Video Files
- NTSC, NTSC Japan (0 IRE black), or PAL
- 2 Line Audio inputs (or optional 1 mic input)
- Stereo Audio Headphone Jack
- Time-Lapse Recording
- Loop Record
- RS-232 Control / Set Up
- Slow Motion Playback via External Control
- 2LED Outputs
- 2 Line Audio Channels out
- USB 2.0 Download Port

Front Bezel Buttons and Functions



1. Record mode LED indicator.
2. Play mode LED indicator.
3. Head Phone Jack – 2 channels audio
4. **RECORD** button - Press to start Record, Press **STOP** and tap **REC** to stop record.
5. **<<** Press once to go to previous clip, hold down to move to beginning.
6. **STOP** button
7. **PLAY** button
8. **>>** Press once to go to next clip, hold down to move to end.

PASS-THRU: The red LED above the record button will flash once per second indicating that it is in digital pass-thru mode, which indicates it is record ready.

Function	Req. State	Keys	Notes
Start Record	Any but Record	•	
Stop Record	Record	• + •	Hold Stop and tap Record
Change to Pass-Thru	Play or Stop		Simultaneous Stop and Record
Play forward – 1x	Stop	Play	
Pause	Play	Stop	
Step Fwd 1 frame	Play or Stop	Stop + >>	
Step Rev 1 frame	Play or Stop	Stop + <<	
Seek start next clip	Play or Stop	>>	
Seek to end	Play or Stop	>>	Hold for ½ second
Seek start previous clip	Play or Stop	<<	
Seek to beginning	Play or Stop	<<	Hold for ½ second
Scan Fwd – 5x	Play ≠ 5x	Play + >>	Simultaneous
Scan Fwd – 30x	Play = 5x	Play + >>	Simultaneous
Scan Rev – 5x	Play ≠ -5x	Play + <<	Simultaneous
Scan Rev – 30x	Play = -5x	Play + <<	Simultaneous
Clear Disk	Any but Record	<<+ >> + •	Keys pushed and held in order, and released (LED flashes Red and Green alternately for 5 sec. awaiting confirmation). Press REC and hold for ~5 seconds, Red LED should flash while formatting, then Green LEDs should flash for two seconds and return unit to Pass-Thru.

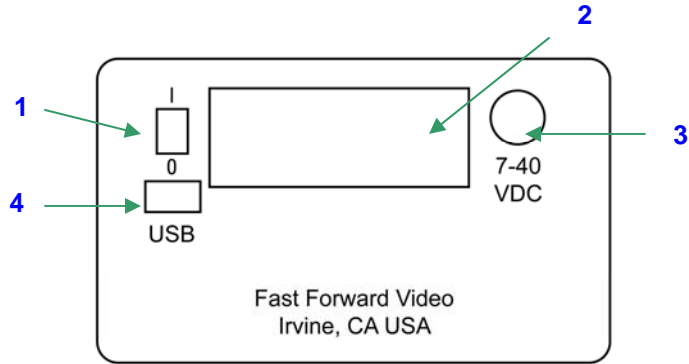
LED Operation

The action described below occurs immediately when the button is pressed.

LED Operation

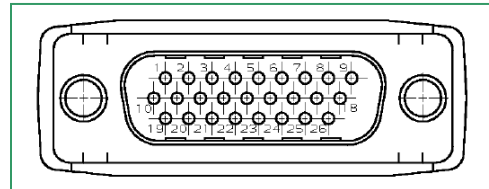
MODE	ACTION	LED	DISPLAY
Pass-Thru	Pause	Red	High - 0.1 Sec. per Sec. - Single short blink per second.
Pass-Thru	Record	Red	High Output - LED On.
Playback	Stop	Green	High - 0.1 Sec. per Sec. - Single short blink per second.
Playback	Play (1:1)	Green	High Output - LED On.
Playback	Forward - non 1:1	Green	LED high in a pattern short, short, long, short
Playback	Reverse - non 1:1	Green	LED high in a pattern short, long, short
Awaiting "Delete All" Confirmation		Red & Green	Alternate short blinks for 5 seconds or until REC button has been held to indicate confirmation.
Confirm Video Delete		Red & Green	Red LED blinks until two seconds before Delete completes, then Green blinks for last two seconds. MOE Disk format takes about 2.5 seconds. FAT32 Disk format takes approximately 30 seconds.

Rear Panel Illustration

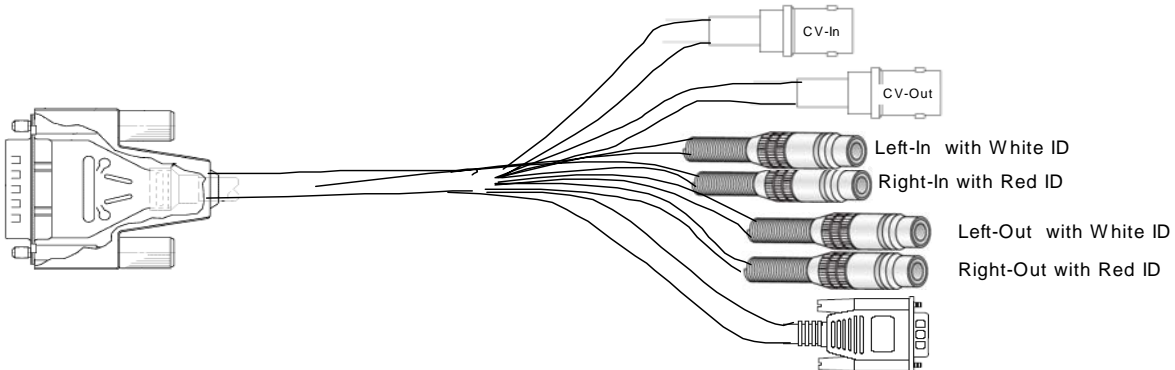


1. Power Switch
2. I/O Connector:
 - Video In / Out (Composite or Y/C – Not both)
 - Audio In / Out (2 Ch. In / 2 Ch. Out)
 - RS-232 – Configuration and Control
3. Power Connector
4. USB Port - for QuickTime file downloads

Standard Cable configuration - P/N 302-SA139-1



AMP Pin #	Signal / Ground	Signal Description	Wire Color code	Connector	Label Connector
3 / 12	Composite Video In	8" coaxial cable	BNC	CV-In	
10 / 11	Composite Video Out	9" coaxial cable	BNC	CV-Out	
18 / 16	Left - In	8" White RCA	RCA	L - In	
9 / 17	Right - In	8" Red RCA	RCA	R -In	
8 / 15	Left - Out	9" White RCA	RCA	L - Out	
7 / 14	Right - Out	9" Red RCA	RCA	R - Out	
23	TX	Red	DB9	Pin. 2	RS232
22	RX	White		Pin. 3	
24	Ground	Black		Pin. 5	



USB Operation

The USB connection is used to view recorded video using the QuickTime player on a computer. The files must be recorded using the Native Personality, FAT32 Disk format and the QT file format. To utilize these formats:

- Connect the Serial connection to a computer using a straight-through cable.
- Power on the FieldPro and start the DVR Master software on the computer.
- Go to the Settings Tab and Select Native in the Personality section.
- Go to the Disk Tab to click FAT32 Disk and QuickTime File formats, then "Delete All Video".

The Delete process will take up to a minute to complete. To monitor the Delete process, connect video to the input and monitor to the video output – the pass-thru video will be black during the Delete and format of the drive. If the video does not go black, the Delete is not progressing properly. When the format completes properly, the drive will be full of RAXxxxxx.FFV files. These files are the available space ready for video to be recorded.

The drivers are included in Windows 2000 and Windows XP for the connection. The drive should show up as an external drive when the USB cable is connected and the DVR is powered "On", unless the unit is in Record. The DVR will not allow USB access when recording since all data on the drive could be damaged / deleted by doing so. Connecting the USB cable during Play will stop the playback and send the DVR into Pass-Thru mode because the DVR and the USB cannot access the drive simultaneously.

The files containing video will be named CLIP0000 AAAABB.MOV, where the "0000" will increment per take, 'AAAA' and 'BB' are hexadecimal numbers added to differentiate files of the same clip. All other files on the drive are not video files, and therefore, are not playable. The FAT32 format limits file size to 2 GB. Long video clips will span file boundaries. The filenames will indicate sequential files in a clip by incrementing the digits 'BB' from 00 to as many files as are in one clip.

Video requires a fast computer to play smoothly in real time. If your video does not play smoothly, QuickTime Pro has a setting under the Movie tab to play all frames. This slows the video to the speed of the computer, but shows all of the frames recorded.

Audio in QuickTime files will be Mono from the Left Channel Input.

Native Mode vs BVW-75 Mode

NATIVE MODE

Native mode is the most natural state for the DVR to operate in as it utilizes the random access capabilities of the hardware most effectively. As you record material to the DVR, it stores the material in available space on the storage media. When the media is full, the DVR stops recording and will not start recording until video has been deleted.

RECORDING IN NATIVE MODE: Recording in native mode will place the recorded material in the next available free space on the disk. Native mode will not allow you to record over previously recorded or existing material.

BVW-75 MODE

Linear mode is a simulation of an existing VTR. The DVR in linear mode, is forced to adhere to strict record guidelines as if it actually were a tape deck. If you would like to operate the DVR as a VTR, make sure you have selected BVW-75 mode from the SETTINGS tab in DVR Master. You can then record over existing material as you would with a VTR.

The main feature of this mode is the ability to insert edit material over previously recorded material. The FieldPro DVR, in BVW-75 mode assumes that it has a 24 hour tape of “black” attached to itself which has time code assigned from 00:00:00:00. If you were to tell the DVR to record a 10 second clip at 00:01:00:00 for 10 seconds, it would record this and the machine would then assume it had 1 minute of black, 10 seconds of video from the 1 minute time code mark, and then 23:58:50:00 of black after this. If you want to record over this clip and add new information, it will insert the video at the same points and overwrite the data on the drive in the same way, always maintaining the 24 hours of time code as the master reference. NOTE: Play list functionality is NOT available in BVW-75 mode.

RECORDING IN BVW-75 MODE: Recording in BVW-75 mode will allow you to record anywhere on the disk regardless of whether or not it has previously recorded material. You can begin recording by cueing to the point you wish to begin and pressing stop to end the recording. NOTE: Overwriting takes place when the recording stops; therefore, space must be available for the new material to be recorded. The space from the old video will become available after the new video is processed.

QuickTime file format requires Native Personality during Recording.

IMPORTANT NOTE:

If you record material in BVW-75 mode, the DVR uses the 24-hour time code as reference, which is still visible to the machine when you switch to native mode. However, when you record material in native mode and then switch to BVW-75 mode the machine does not recognize the native source list. You should always record in BVW-75 mode *if you intend to switch between personalities.*

Firmware Updating Procedure

New features for the FieldPro DVR are posted to our website as they become available. Our customers have access to these features via firmware updates for the lifetime of the product. Please check this site regularly to implement the newest changes.

Firmware updates are located at www.ffv.com in the Support page.

Locate the latest revision of firmware for the video board (Recon Rev. 4). Download and unzip the files.

Hook up the FieldPro IDE DVR to your computer:

Hook a DB9 straight through cable to the 9 pin serial port of your computer.

Use DVR Master software to update firmware on FieldPro IDE:

Click the "Rev." button in the lower right corner of the DVR Master window. The revision date is shown for both the operation firmware and the boot firmware.

Click the "Update" button to update the firmware. A file selection window opens to select the update file. Select the file and click "Open". When the file has loaded properly, the message "Firmware Update Successful - Turn OFF power to DVR" should be displayed. Turn OFF power for about two seconds and re-apply power to the DVR.

Specifications

VIDEO INPUT

Analog Input: Composite and S-Video(Y/C).
Levels: 1.0Vp-p, 75 ohms
Standards: 525/60 (NTSC) or 625/50 (PAL)

VIDEO OUTPUT

Analog Output: Composite and S-Video (Y/C).
Horizontal Resolution: 550 TV lines (at 5:1 compression)
Levels: 1.0Vp-p, 75 ohms
Standards: 525/60 (NTSC) or 625/50 (PAL)
Connections: Multi-pin for component

VIDEO INPUT DECODER

Format: Digital 4:2:2 YCrCb
60 fields per second NTSC
50 fields per second PAL

Digital Color Space: YUV
Sampling: 13.5 MHz
Pixel Resolution: 720 x 486 pixels (525/60)
720 x 576 pixels (625/50)

S/N Ratio: 50 dB
Bandwidth: 7 MHz (-3 dB)
Differential Gain: 2%
Differential Phase: 2 deg.
ADC Differential Linearity: +/- 0.7 LSB
ADC Integral Linearity: +/- 1.0 LSB

VIDEO OUTPUT ENCODER

Digital Color Space: Digital 4:2:2 YCrCb
Analog Bandwidth: Y: 6.75 MHz
C: 1.3 MHz

Composite: 4.5 MHz (NTSC)
5.0 MHz (PAL)

DAC Resolution: 10 bits x 3
S/N Ratio: 60 dB

VIDEO COMPRESSION

Codec: Zoran
Method: JPEG (Joint Photographic Experts Group)
Compression Ratio: Variable down to 4:1

MEMORY

Multi-port Frame Buffer: 32 MB DRAM

IDE HARD DRIVE

2.5" Hitachi Travelstar or Fujitsu MHT Series

MICROPROCESSOR

Type: Intel 80386EX
Clock Speed: 40 MHz
Local ROM/EPROM: 1MB Flash EEPROM
Local SRAM: 1MB 0 wait state

COMMUNICATIONS INTERFACE

RS-232: Conforms to Sony "Remote (9 pin)" protocol. 38400 baud, 8 data bits, odd parity, 1 stop bit.

AUDIO SPECIFICATIONS

Resolution: 16 bits
Sampling Rate, FS: 8.0 KHz to 52 KHz
Channels: 2 in, 2 out
Dynamic Range: 80 dB
Total Harmonic Distortion: 022%, -73 dB
Intermodulation Distortion: 90 dB
Crosstalk: -80 dB
Interchannel Gain Mismatch: +/- 0.5dB
Input Voltage: 1 VRMS nominal, 3V p-p max

Input Impedance: 20K ohms
Input Programmable Gain Span: 22.5 dB
Full Scale Output Voltage: 0.707 VRMS, 2.0V p-p
Output Impedance: 600 ohms
Output Attenuation Range: 94.5 dB
Passband: 045 FS
Passband Ripple: +/- 0.1 dB

GENERAL

Size: 5.00" L x 3.21" W x 1.85" H
Power Consumption: 10 watts
Input Voltage – 12V DC

MAINTENANCE

Cleaning

The Housing should only require dusting with a soft cloth.

Operation and Storage Environment

Precautions

The FieldPro DVR has been built to meet the demands of a professional environment, however, the hardware is subject to the same dangers from static as any other electronic device. Use care when connecting or disconnecting cables.

IMPORTANT: Take care not to introduce any moisture into the unit. Electronic assemblies are sensitive to static electricity, due to the electrostatic sensitive devices used within the circuitry. All semiconductors, as well as some resistors and capacitors, may be damaged or degraded by exposure to static electricity. The video card must receive adequate ventilation, and be kept as cool as possible. If you experience any problems with the unit please call Fast Forward Video's service department. **DO NOT ATTEMPT to repair or modify the unit as this might cause further damage, which could void your warranty.** A technician can determine whether your problem is caused by a faulty component, and whether you need to return it for evaluation and/or repair.

PACKAGE CONTENTS (May vary depending on model)

- 1 FieldPro IDE DVR
- 1 Multi Purpose Cable Assembly
- 1 302-SA139-1
- 1 CD – contains DVR Master Software, User's Manual for DVR and Software
- 1 Mating Power Source

PLEASE RETAIN THE ORIGINAL SHIPPING CARTON AND FOAM INSERTS If you need to return the unit for service or upgrade it is **STRONGLY** recommended that you use the original carton and foam, which were specifically designed to protect it from damage while in transit. **IF RETURNED IN A REGULAR CARTON, IT WILL BE REPLACED AT A FEE FOR THE RETURN SHIPMENT.**

Limited Warranty

12 – MONTH LIMITED WARRANTY

Fast Forward Video, Inc. warrants to the original purchaser that the product (Hardware and components) shall be free from defects in material and workmanship for a period of 1 year from the date of purchase, If a defect covered by this warranty occurs during this 1 year period, Fast Forward Video, Inc. will repair or replace the defective product or component, at its option, free of charge.

WARRANTY LIMITATIONS

THIS WARRANTY SHALL NOT APPLY IF THIS PRODUCT: (a) IS DAMAGED BY NEGLIGENCE, ACCIDENT, MISUSE, OR BY OTHER CAUSES UNRELATED TO DEFECTIVE MATERIALS OR WORKMANSHIP; OR (b) HAS HAD THE SERIAL NUMBER ALTERED, DEFACED, OR REMOVED.

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