CF & HD
Installation and Users Guide

2-CHANNEL MOBILE DIGITAL VIDEO RECORDER

2.5" REMOVABLE HARD DRIVE / COMPACT FLASH STORAGE

April 2008
Version 1.0

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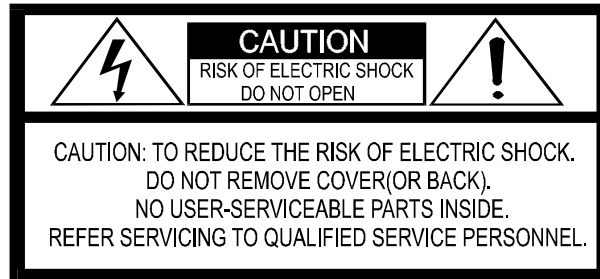THE INTERFERENCE AT HIS OWN EXPENSE.

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TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. DO NOT INSERT ANY METALLIC OBJECTS THROUGH THE VENTILATION GRILLS OR OTHER OPENINGS ON THE EQUIPMENT.

CAUTION

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK.
DO NOT REMOVE COVER(OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

EXPLANATION OF GRAPHICAL SYMBOLS

 The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

 The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instruction in the literature accompanying the product.

Contents

IMPORTANT SAFEGUARDS

1. **READ AND RETAIN INSTRUCTIONS**
Read the instruction manual before operating the equipment. Retain the manual for future reference.

2. **CLEANING**
Turn the unit off and unplug from the power outlet before cleaning. Use a damp cloth for cleaning. Do not use harsh cleansers or aerosol cleaners.

3. **ATTACHMENTS**
Do not use attachments unless recommended by manufactured as they may affect the functionality of the unit and result in the risk of fire, electric shock or injury.

4. **MOISTURE**
Do not use equipment near water or other liquids.

5. **ACCESSORIES**
Equipment should be installed in a safe, stable location. Any wall or shelf mounting accessory equipment should be installed using the manufacture's instructions. Care should be used when moving heavy equipment. Quick stops, excessive force, and uneven surfaces may cause the equipment to fall causing serious injury to persons and objects.

6. **VENTILATION**
Openings in the equipment, if any, are provided for ventilation to ensure reliable operation of the unit and to protect if from overheating. These openings must not be blocked or covered

7. **POWER SOURCES**
The equipment should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied at the installation location, contact your dealer. For equipment designed to operate from battery power, refer to the operating instructions.

8. **GROUNDING OR POLARIZATION**
Equipment that is powered through a polarized plug (a plug with one blade wider than the other) will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. Do not defeat the safety purpose of the polarized plug.

Alternate Warning: If the equipment is powered through a three-way grounding-type plug, a plug having a third (grounding) pin, the plug will only fit into a grounding-type power outlet. This is a safety feature. Do not defeat the safety purpose of the grounding-type plug. If your outlet does not have the grounding plug receptacle, contact your local electrician.

9. **CORD AND CABLE PROTECTION**
Route power cords and cables in a manner to protect them from damage by being walked on or pinched by items places upon or against them.

10. **LIGHTNING**
For protection of the equipment during a lightning storm or when it is left unattended and unused for long periods of time, unplug the unit from the wall outlet. Disconnect any antennas or cable systems that may be connected to the equipment. This will prevent damage to the equipment due to lightning or power-line surges.

11. **OVERLOADING**
Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

12. **SERVICING**
Do not attempt to service the video monitor or equipment yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

13. **DAMAGE REQUIRING SERVICE**
    Unplug the equipment from the wall
    outlet and refer servicing to qualified
    service personnel under the following
    conditions:

    A. When the power supply cord or
        the plug has been damaged.
    B. If liquid has spilled or objects
        have fallen into the unit.
    C. If the equipment has been
        exposed to water or other liquids.
    D. If the equipment does not
        operate normally by following the
        operating instructions, adjust only
        those controls that are covered
        by the operating instructions.
        Improper adjustment of other
        controls may result in damage to
        the unit.
    E. If the equipment has been
        dropped or the casing damaged.
    F. When the equipment exhibits a
        distinct change in performance.

14. **REPLACEMENT PARTS**
    When replacement parts are required,
    be sure the service technician uses
    replacement parts specified by the
    manufacturer or that have the same
    characteristics as the original part.
    Unauthorized substitutions may result
    in fire, electric shock, or other
    hazards.

15. **SAFETY CHECK**
    Upon completion of any service or
    repairs to the equipment, ask the
    service technician to perform safety
    checks to verify that the equipment is
    in proper operating condition.

16. **FIELD INSTALLATION**
    The installation of equipment should
    be made by a qualified service person
    and should conform to all local codes.

17. **IGNITION TRIGGER CONNECTION**
    For correct operation, it is very
    important to connect the main power
    to a constant 12V supply (not
    switched) and the Ignition Trigger to
    the Ignition power supply (switched).

MOBILE DIGITAL RECORDER FEATURES

The Mobile Digital Recorder is a true VCR replacement with advanced features that take it beyond the standard lockbox-mounted VCR. The digital recorder features two video/audio inputs and one video /audio output. The DVR operates as a simplex recorder offering dual video channel recording up to 640 x 240 resolution recording at 30 frames/sec and simultaneous dual channel audio recording. The recorder may also be used in a time-lapse mode for recording frame rate up to 1 frame every 8 seconds.

The MDVR is offered in a public transportation model and a model suited for law enforcement. The public transportation model has timer features that support automatic recording over long periods of time, as would be appropriate for a school bus camera. The law enforcement version adds a GPS, mic trigger, zoom camera, event recording via triggers and radar interface. In addition, since law enforcement applications prefer shorter recordings of events, this model has "pre-event" recording to capture video before the trigger event.

Multiple trigger inputs are available that can be connected so the recorder can be used as an event recorder. The triggered events are also logged along with the video and audio. The unit features a LED recorder status output as well as an Open Collector trigger output.

The unit has low power consumption while recording and milliamp power consumption when powered off. The embedded operating system allows for instant power up less than 1 second. With selectable video quality and frame rates, the unit automatically calculates the amount of recording time available.

Conditioned power is provided to supply 12VDC to external cameras and other accessories such as a wireless Ethernet access point. The unit features an Ethernet port with a built-in web server and ftp server for archiving video, audio, and logged data.

Hard Drive MDVRs

A front panel Removable Hard Drive Bay is available for easy video archiving. The Removable Hard Drive allows storage of audio/video AVI files requiring no special GUI to review audio/video on a PC or the recorder. Integrity of the archived video files is maintained with authentication software. A simple GUI verifies the content of the archived files.

Compact Flash MDVRs

A key locking compact flash card is available on CF models and is also used for video archiving with similar features of the hard drive models.

The small mechanical size allows several recorders to fit in the space of an existing VCR or allow the unit to be mounted in a standard automotive DIN format.

- True low cost VCR replacement.
- Unparalleled Search capability with up to 90x Fast Forward/Rewind Review.
- Optional integrated GPS position and speed tracking and recording.
- Recording of the GPS speed, position and time attached to a video frame.
- Synchronization of the unit's time with the GPS satellite system.
- Recording to 2.5" mobile removable hard drive or compact flash media for unmatched reliability.
- Selectable record resolution: 640 x 240 or 320 x 240.
- Two video input ports for either single, switched or multiplexed recording options.
- 12V tolerant six channel configurable multi-event triggered inputs.
- Output trigger to control other devices and an external LED record output.
- Ethernet port for wired or wireless web browser and FTP interface.
- Mobile power supply protection to allow direct connection of the unit to a vehicles 12V power supply without the use of any filtering.
- Mobile specific embedded operating system for unmatched reliability, security and fast power up times in less than 1 second.
- Serial interface for Radar (Kustom Signal and Eagleye Adapter to connect to many other brands)
- Serial interface to Sony VISCA or Costar Camera Zoom Control.
- Rugged Aluminum Extrusion construction designed for standard 1 DIN automotive installation.

Important: MDVR Multiplexing Notes

This MDVR features a "Multiplexing" mode to record two audio and video channels simultaneously by multiplexing the two input videos into one video frame with one camera view stacked on top of the other.

During multiplexing while recording, the output video switches between the two cameras at a 30 fps rate. This causes the output video to roll and switch between the two cameras as shown in the image below:
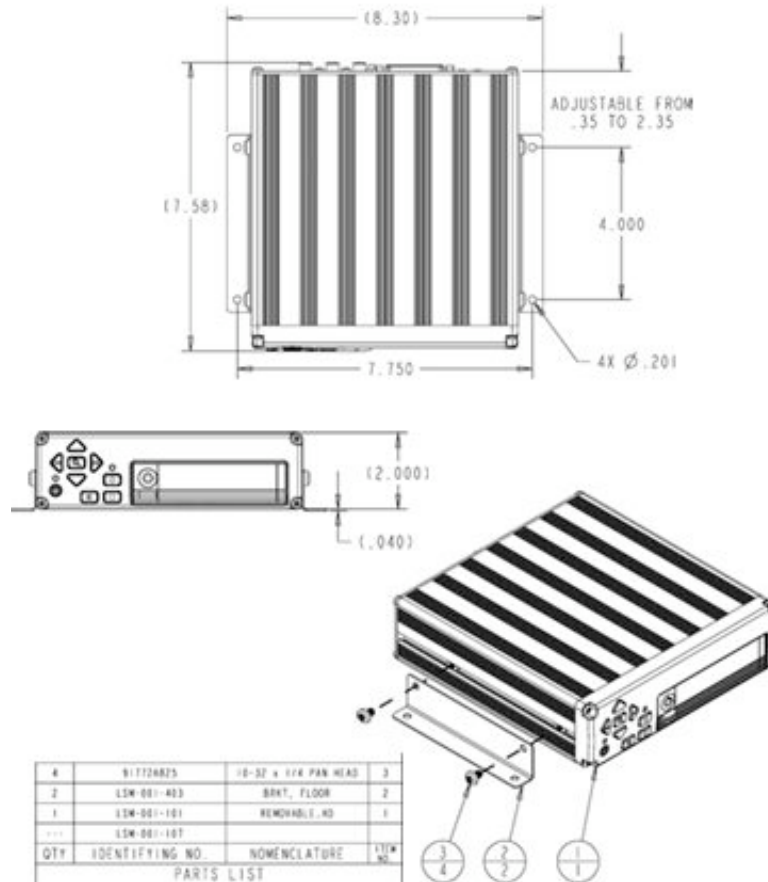

Figure 1: MDVR Multiplexed Video Output

This is **normal operation** and signifies that the DVR is recording in multiplexing mode.

The MDVR features dual captured nuts in both sides of the unit allowing for multiple installation options. Utilizing standard brackets, the MDVR can be installed as a bottom mount as shown in Figure 2 and as a DIN mount as shown in Figure 3. Care must be taken to not obstruct the ventilation holes in the bottom of the unit to ensure proper operation over the specified temperature range.

Figure 2: MDVR Bottom Mounting Drawing (Hard Drive model shown)

4	90273A825	10-32 x 1/4 FLAT HEAD	3
2	LSM-001-404	BRKT, PANEL	2
1	LSM-001-101	REMOVABLE, HD	1
---	LSM-001-108		
QTY	IDENTIFYING NO.	NOMENCLATURE	ITEM NO.

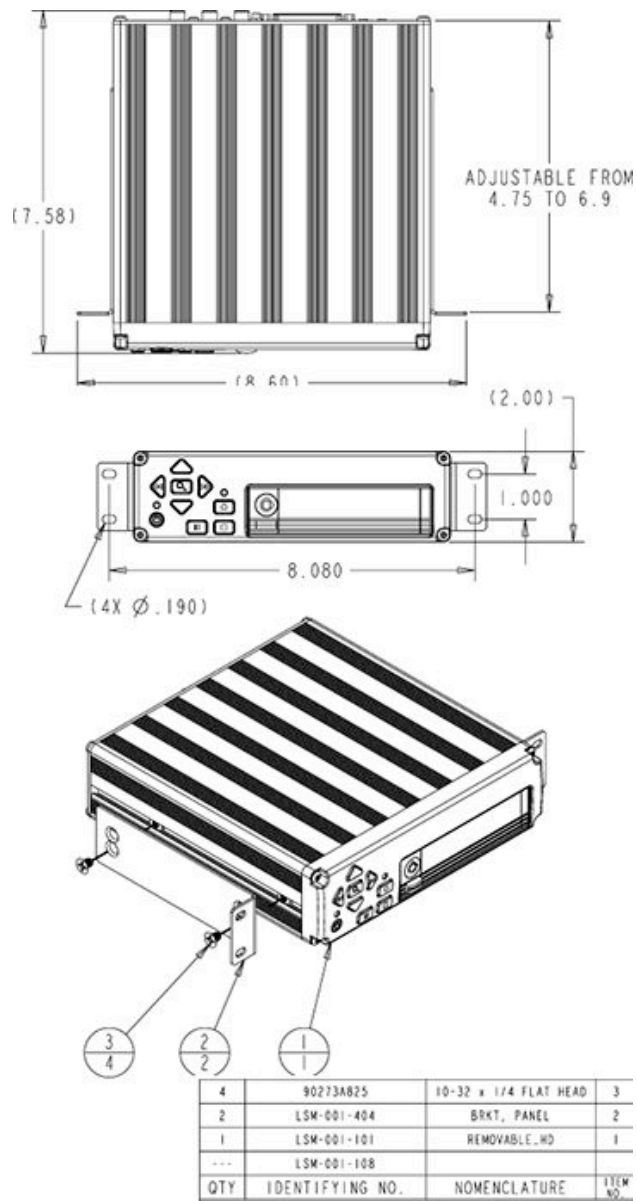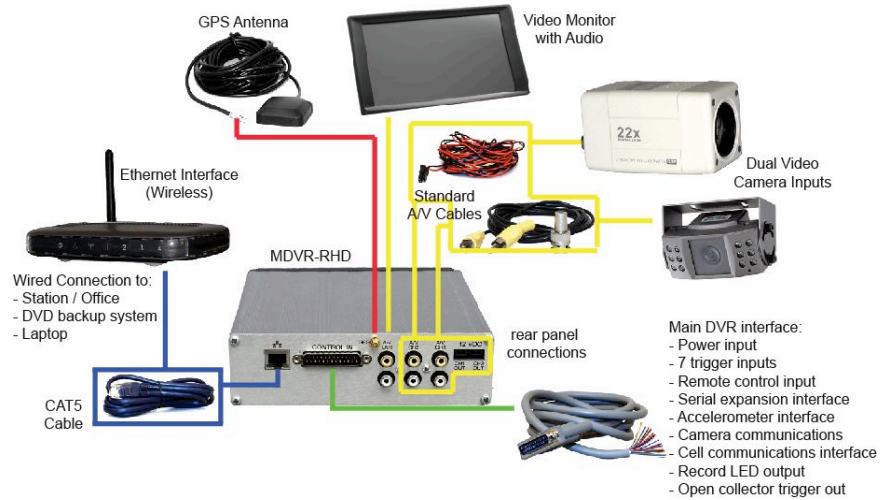**Figure 3: MDVR Front Mounting Drawing**

The MDVR features a variety of connection points for various accessories as shown in Figure 4 below:

Figure 4: MDVR Connection Guide

The external connections feature:

- Dual camera audio and video input
- Dual camera 12V power output
- Video / Audio monitor output
- External magnetic attachment GPS Antenna
- Dual Audio inputs / Wireless audio compatible w/ triggers
- Standard TCP/IP Ethernet connection featuring:
  - Built-in HTTP Web server for video streaming.
  - Built-in File Transfer Protocol (FTP) server.
- Main DB-25 Connector featuring:
  - Direct automotive power connection. The MDVR features an internal resetable fuse.
  - 6 trigger inputs.
  - 1 record status LED output.
  - 1 Open Collector trigger output.

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SOFTWARE

The MDVR Player is an application that provides an interactive viewer for the recorded audio and video. It has features to play, clip and map recorded information. Please refer to the Player Instruction Manual for detailed information regarding the MDVR Player software.

SYSTEM STARTUP FEATURES

At power up and any media insertion the MDVR searches the hard drive first, then the SD card(s), if present for a folder named "SYSTEM". The first SYSTEM folder found will be used as the startup folder and its contents processed. The following features are available via the SYSTEM folder.

INSTALLING SYSTEM UPGRADES

Software / Firmware updates are distributed in files with a *.dvr extension. Mount either the removable hard drive or optional SD card to a PC. Find or create at the root of that media a SYSTEM folder. Copy the *.dvr file into the SYSTEM folder. Remove this media from the PC and install it into the MDVR and then power cycle the MDVR. The MDVR will automatically install the *.dvr file.

Placing multiple *.dvr files in a SYSTEM folder will have unpredictable results and is not advised. The system will not re-install the same upgrade so there is not a problem to leave the *.dvr file on the media until the next upgrade opportunity. During upgrade the Power switch is disabled. Do not remove power during this time.

DIGITAL RECORDER FRONT PANEL OPERATION

The DVR features an illuminated keypad for easy operation in dark environments. Below is a description of the functions of the Digital Recorder front panel buttons. Some buttons will have different functions depending upon if the recorder is recording, stopped, or playing back video.

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⊚	**Power Button:** The unit is typically powered on by the **Ignition trigger**, but may alternately be powered on by pressing the **Power Button**. If manually powered on, the unit will remain powered on until the **Power Button** is pressed again or 10 minutes of inactivity. Holding the **Power Button** in for 10 seconds will perform a hardware reset of the entire MDVR unit.
🔍	**Search/Menu Button**: Accesses the recorded video search menu. Pressing this button once brings up the search menu. Holding this **Search / Menu Button** for greater than 3 seconds brings up the main system configuration menu where all DVR functions can be changed and titles can be entered.
◁◁	**Left Arrow Key (mode dependant):** During Playback Mode: **Left Arrow Key** adjusts fast reverse playback speed from 0.5X to 90x From Pause mode **Left Arrow Key** is a frame step From Record Mode: Press and hold will manually control zoom out.
▷▷	**Right Arrow Key (mode dependant):** During Playback Mode: **Right Arrow Key** adjusts fast forward playback speed from 0.5X to 90x. From Pause Mode: **Right Arrow Key** steps one frame at a time From Record Mode: **Right Arrow Key** enables One Touch Zoom feature. Press and release will zoom to predefined setting and hold for 15 sec. Press and hold will manually control zoom in.
△	**Up Arrow Key (mode dependant):** Playback Mode: During standard 1x playback, **Up Arrow Key** Cycles forward through the channels Live & Record Modes: In Live Video / Record mode, the **Up Arrow Key** cycles among channel views 1-4 and quad view. Quad view only appears when the resolution on all 4 channels is the same.
▽	**Down Arrow Key (mode dependant):** Playback Mode: During standard 1x playback, **Down Arrow**

		Key cycles backward through the channels. Live & Record Modes: In Live Video / Record mode, the **Down Arrow Key** cycles among channel views 1-4 and quad view. Quad view only appears when the resolution on all 4 channels is the same.
	⏸	**Pause Button:** The Pause Button allows pausing of playback video and resume play of video.
	⏹	**Stop Button:** The Stop Button stops the currently operation as displayed on the video output. If all playback features are operating the first press stops the Movie or recording Playback, the second stops Recording.
	⏺	**Record Button:** The Record Button begins recording on all enabled channels

BASIC ON SCREEN DISPLAY

The Display shown in Figure 6 below is the basic Display for the Record, Live View and Playback Modes of operation. The video is recorded without these overlays, but the data shown is attached to each video frame as meta data for extraction by the video player software.

Time & Date:
This time and date is either entered manually and kept current with by the MDVR or is acquired and synchronized by the GPS unit if the option is selected.

Trigger Inputs:
There are 6 user selectable trigger inputs with a 1 character symbol.

MDVR Status:
Determines the status of the MDVR; includes stop, record, playback and playback speed, and pause.

MDVR Name:
This is the 14 character field to identify car, officer and MDVR unit.

GPS Information:
This included Latitude, Longitude and current vehicle speed.

Remaining Record Time:
This is the remaining storage time left on the removable storage in units of hours: minutes.
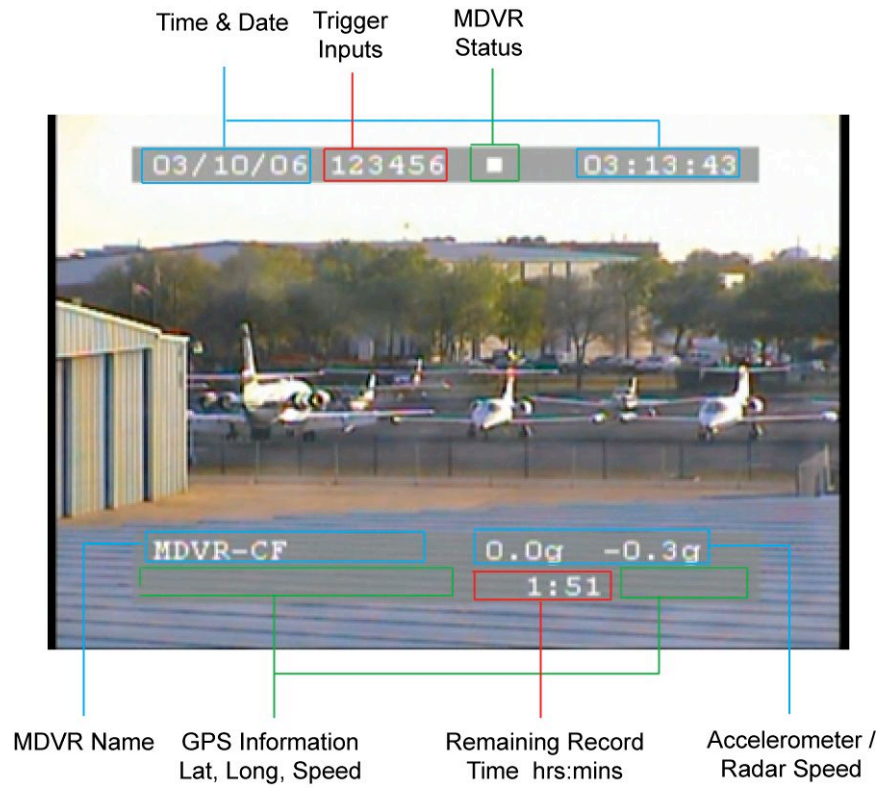
Figure 6: Basic On Screen Display

MDVR Video Search Menu

The Display shown in Figure 7 below is the video search menu used for searching recorded video files on the Hard Drive. The column on the left shows the days with the column on the right showing time in that day. A pound symbol in the right column signals that record was triggered by an event.

Figure 7: Recording Search Menu

MDVR Main Menu

TO ACCESS MAIN MENU:

1) MDVR must not be in RECORD mode.

2) Hold the SEARCH button for three to four seconds.

3) To scroll menu use UP and DOWN ARROW buttons.

4) To make menu selections use the RIGHT ARROW as "Enter".

5) To return to a previous screen use the SEARCH button as

"Back".

The Display shown in Figure 8 below is the main unit menu. From this menu access to all other setup screens is possible.

Figure 8: Main Menu

Setup Menu (Figure 9)		
Field	**Action**	**Default**
Video In Select	Selects how the 2 channels are recorded. MANUAL records the selected camera (use up/down arrows to switch), SWITCHED records both channels onto one channel by switching from one camera to the other periodically (see Video Dwell Time) MULTIPLEXED records cam 1 & 2 simultaneously onto 2 separate channels. TRIGGER camera to record is selected by the trigger in SWITCH CAMERA mode	Trigger
Video Dwell Time	Selects the time between video switch in SWITCHED or TRIGGER/SWITCH CAMERA modes. 0 seconds disables switching. If in TRIGGER mode the trigger position determines camera input selected.	0 sec
Units	Selection of English or Metric units.	English
Time Setup	Brings up the Time Setup menu.	
Attenuate Audio	Sellects one of two recorded audio levels. YES = low volume, NO = high volume.	YES
Password Setup	Brings up the Password Setup Menu	
Advanced Setup	Brings up the Advanced Setup menu	

Figure 9: Setup Menu

Time Setup Menu (Figure 10)		
Field	**Action**	**Default**
Date	System date (assuming GPS date is OFF)	Today's Date
Time	System time (assuming GPS time is OFF)	Today's Time
Daylight Savings	Automatic adjustment for daylight savings time change.	ON

Figure 10:   **Time Setup Menu**

Advanced Setup Menu (Figure 11)		
Field	**Action**	**Default**
Restore Defaults	Restores the factory default settings.	
Erase Media	Permanently deletes all recorded data from the selected media.	
Network Setup	Opens the Network Setup menu.	
FTP / HTTP Setup	Sets up the password for the web server access and the FTP server access.	

Figure 11:   **Advanced Setup Menu**

Network Setup (Figure 12)		
Field	**Action**	**Default**
IP Config	Selects manual or DHCP setup.	
IP Address	Manually entered IP address.	
Subnet Mask	Manually entered subnet mask.	
Gateway	Manually entered gateway address.	
Primary DNS	Manually entered Primary DNS server address.	
Secondary DNS	Manually entered Secondary DNS server address.	
Pwr Off Cmd	Not available.	
Save	After configuration, the save option must be selected.	

Figure 12:   **Network Setup Menu**

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HTTP Setup		
(Figure 13)		
Field	**Action**	**Default**
Username	Users Name for web and FTP access.	dvrStart
Password	Password for web and FTP access.	myPass40
HTTP Port	HTTP Port	80
Save	After configuration, the save option must be selected	

Figure 13: **HTTP Setup Menu**

Title Setup		
(Figure 14)		
Field	**Action**	**Default**
System Name	14 character name (ie. Car # / Officer / Other)	MDVR-CF
Trigger x	1 character trigger name	1 - 6

Figure 14: **Titles Setup Menu**

Trigger Setup (Figure 15)		
Field	**Action**	**Default**
Trigger 1-6	Enter a name for the trigger event / Enter if the trigger is active high or low / Select the action for the trigger event (MARK EVENT, START RECORD, STOP RECORD, RECORD while active, SWITCH CAMERA, DISPLAY ONLY)	Trigger-x / Active H / No Action

All 6 triggers can be configured to one of seven actions. All triggers are recorded in the meta-data. These actions are defined below:
- o SWITCH CAMERA: Switches the camera input to the unit based on the settings in the *Setup Menu*.

  The law enforcement version of the product adds these options to permit event recording enabled by triggers:

- o MARK EVENT: Starts a recording if not already recording and labels the recording as an event in the file name.
- o START RECORD: Starts a recording and will record until the stop button is pushed on the front of the unit or the storage media is full.
- o STOP RECORD: Stops a recording if the unit is recording.
- o RECORD: Starts a recording and records while the trigger is active. Stops recording when the trigger is not active.
- o DISPLAY ONLY: Will display the trigger event on the OSD and will record the trigger in the file meta-data.

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Figure 15: **Trigger Setup Menu**

MDVR IGNITTION / POWER ON CONNECTION

MDVR Ignition Trigger Power ON Control
The MDVR features an auto power on and begin record function on the "ignition trigger". When this trigger goes high, the DVR will turn on and begin recording after the user selectable power on delay.

If the **Power Button** on the front of the unit is hit, the unit will turn off, but then read the "ignition trigger" and turn back on. This is an "ignition trigger" priority unit.

MDVR Ignition Trigger Power OFF Control
After the ignition trigger goes low (car turned off), the DVR will stop recording and turn off after the user selectable power off delay.

MDVR Power Button Control (Ignition Trigger OFF)
If the ignition trigger is low (car off), the power is controlled only by the **Power Button**. When the button is pressed, the unit will turn on until the button is pressed again or 10 minutes of inactivity has passed to eliminate any chance of draining the vehicle battery.

Record Setup (Figure 16)		
Field	**Action**	**Default**
Power-on Delay	The delay of recording start after the ignition trigger goes high.	1 min
Power-off Delay	The power off / stop recording delay after the ignition trigger goes low.	5 min
Record Mode	STOP IF FULL or CONTINUOUS RECORD	STOP IF FULL
Image Size	Selects the image resolution 640 x 240 (available in all single channel recording modes, not MULTIPLEXED) 320 x 240	320 x 240
Image Quality	Image quality selection of HIGH, MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW. Lower image quality provides longer record time at lower video quality.	MEDIUM
Frame Rate	Selects the frame rate from 30 FPS down to 1/8 FPS.	30 FPS
Audio Recording	Selects whether to record 2 channels of audio (ON), one channel associated with the video being recorded (SWITCHED) or no audio (OFF).	ON
Total Time	Displays the recording time capacity based on the Hard Drive size and record settings above.	

Figure 16:   **Record Setup Menu**

GPS Setup		
(Figure 17)		
Field	**Action**	**Default**
Use GPS	Selects whether to utilize the GPS positioning data.	YES
Use GPS Time	Selects whether to utilize the GPS time and date settings.	YES
UTC / Local Time	Selects the difference between universal time and local time (in hours – 6 for Central Time).	- 6
GPS Data Format	Selects GPS display format: DDD:MM:SS, DDD:MM.mm, DDD.dddd	DDD:MM:SS

Figure 17: **GPS Setup Menu**

Camera Setup		
(Police Mode only)		
Field	**Action**	**Default**
Camera Protocol	COSTAR or VISCA (Sony)	COSTAR
One Touch Zoom	Percentage of zoom to activate when ▷▷ pressed briefly	25%
If COSTAR camera is selected the following Costar features are available		
Iris	Aperture (light sensitivity)	f/8

Shutter	Speed of capture (affects motion sharpness and light sensitivity)	1/60
Gain	Higher gain increases sensitivity but also graininess	11 dB
One Touch	Uses the left and right arrows: ▷▷ zooms to preset position momentarily ◁◁ toggles from camera Auto to the Iris, Gain, Shutter set above	ENABLED

If VISCA camera is selected the following Visca features are available

Focus	INFINITY or AUTO	
Sensitivity	HIGH or LOW	
Slow Shutter	ON or OFF	

The Camera setup menu controls the optional serial (RS232) protocol to supported cameras. This provides some manual control for cameras that support remote control of features like focus, aperture, etc.

System Info (Figure 18)		
Field	**Action**	**Default**
Disk Capacity	Storage capacity of the record media.	
Percent Used	Percentage of used space on the record media.	
Percent Free	Percentage of free space on the record media.	
Firmware Version	Version of the installed components: Firmware application version / Altera version / Freescale version / Board rev, Disk Type / Mode, Channels	
MAC Address	Ethernet MAC address of the unit. Unique for each unit.	

Figure 18: **System Info Menu**

MDVR Password Menus

The menus shown in Figure 19 below allow for configuration of the units password access. All buttons on the front of the unit may be used for password access **EXCEPT THE POWER BUTTON**. The password field consists of 6 characters with a default password of: "Left Arrow", "Right Arrow", "Left Arrow", "Right Arrow", "Left Arrow", "Right Arrow". After this sequence is entered, the system allows access for 30 minutes (or after cycle power) before the password is enabled again.

The unit supports 4 levels of password protection with the ability to enable any or all levels. These are defined below:
   o All Keys: Any key press required a password.
   o Power-off: The Power button requires a password.
   o Playback: Video playback requires a password.
   o Menu: Access to the menus requires a password.

Figure 19:   **Password Menus**

HTTP WEB SERVER

The DVR features a built in web server allowing a user to connect to the DVR, wired or wirelessly with a wireless bridge, using Windows Internet Explorer. Simply type in the IP address of the DVR under listed in the **NETWORK MENU** into the address bar in Internet Explorer.

The DVR supports video streaming using a JAVA applet. When connected, the user name and password, listed in the **HTTP / FTP MENU**, must be entered twice, once for the HTTP and once for JAVA.

Figure 20:   Web Interface

The update rate for viewing live streams is only as fast as the Java applet can receive data (about 5 frames/sec). The MDVR Player software is a full rate live streamer with many advanced features, but this simple web access is useful if access is desired from a PC where the MDVR Player software is not installed.

REMOVABLE MEDIA FILE STRUCTURE

In the root directory of the Hard Drive, the DVR will create a new subdirectory for each day of recording. The subdirectory is named as follows:

Mmm.dd.yyyy

Mmm = 3 letter month abbreviation, e.g. Jan, Feb, Mar, …
          Dec
dd   = day (01 – 31)
yyyy = 4 digit year, e.g. 2006

Each subdirectory will contain one or more AVI files named as follows:

sssssssssssss_Mmm.dd.yyyy_hh.mm.ss.avi

sss.. = User defined system name. This name can be from 0
          to 14 characters in length. This field is free-form for
          the end user to define car number, officer name,
          whatever within the 14 character limitation. The user
          is free to put spaces within this name, but these are
          replaced with underscores ('_') in the filename.

Mmm.dd.yyyy = same as directory name
hh.mm.ss   = 24 hour time in hours, minutes, and seconds
.avi   = AVI file extension

NOTES:
  . If the system name is 14 characters in length, then there
    is no trailing underscore after the ystem name.
  . File names can contain a 'suffix' which indicates that the
    file is a continuation of a recording (every 10 minutes, the
    DVR starts a new file). Also, an event can be marked with
    a suffix. The suffixes are:

    '+' : this is a continuation file
    '#' : this file contains an 'event' of interest

    The suffix is placed just prior to the file extension, e.g:

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Jan.01.2006_01.00.00.avi   /* First file   */
Jan.01.2006_01.10.00+.avi   /* Continuation file */
Jan.01.2006_01.12.15*.avi   /* Event file   */

FTP COMMANDS

The DVR supports one FTP session at a time. It supports both Passive and Active FTP. The following FTP commands are supported:

- o cd: Changes directory.
- o dir: Directory listing.
- o ls: List directory.
- o get: Gets a file from the DVR.
- o delete: Deletes a file from the DVR.
- o rmdir : Removed a directory from the DVR.

FTP works with Internet Explorer. Type in the address bar ftp://name:pass@ip. A drive (CF or HD) must already be present or the ftp connection attempt will fail. It also works with the DOS command-line FTP.

'rmdir' must be used with caution. The DVR does not ensure that the directory is empty prior to deleting the directory. The application (or user) of FTP must ensure that the directory is empty prior to removing a directory, or else space on the Hard Drive will become unavailable for use.

The public transportation model and the law enforcement model have slightly different back panels. The law enforcement panel is on the bottom.
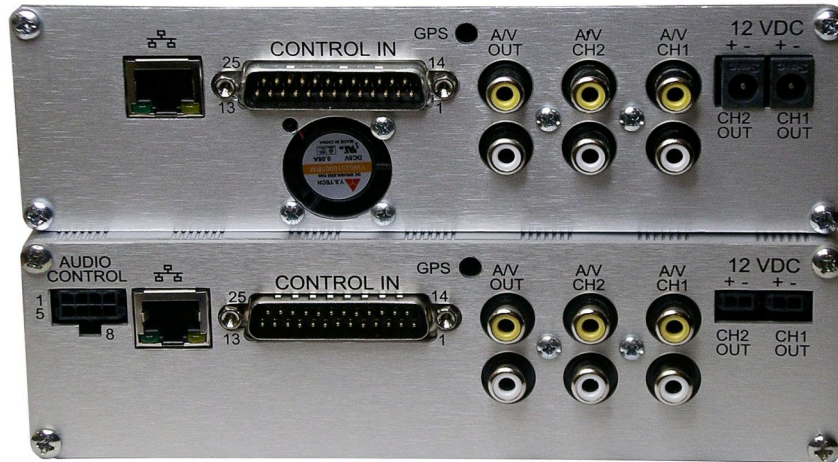
The RCA camera jacks are tied together on 1 channel MDVRs so either can be used for the camera input.

The Main interface connector pin out was changed with rev 2 of the main board. You can find the rev of the main board by looking at the version numbers in the System Info menu. The firmware version is broken into several sections. Section 4 shows a number and a letter. The letter indicates H for hard drive systems and C for Compact flash. The number is the main board revision. Example, 2.1/2.0.1.2/2C/PM shows a 2C which is main board rev 2.

Main interface connector V2 pin out is used for main board rev 2 or later. Main board rev 0 and rev 1 follow the V1 pin out.

Main Interface Connector V2	
25-pin DSUB	
Pin #	**Function**
1	Record LED Out; 3.3V with a 1k series resistor.
2	12V Camera Output
3	RS232-TX Zoom

Pin	Function
5	Trigger In 2
6	Ignition Trigger
7	Trigger In 4
8	Trigger In 5
9	Trigger In 6
10	AUX 12V Output w/ 100ohm series resistor (e.g. remote power LED)
11	RS232-RX Zoom.
14	Spike protected Automotive Power Output.
15-16	Automotive Power Input
4, 12, 13, 17,18, 25	Automotive Ground
19	RS232- RX Radar IF
20	Trigger In 1
21	Trigger In 7
22	RS232- TX Radar IF
23	RS232-RX internal use
24	RS232-TX internal use

Notes: 1. Pin 9, Trigger 6 is tied to pin 4 of the 8-pin Molex. Use only one or the other.
2. Pin 14 is protected automotive output power which could range from 10V to 26V.

Main Interface Connector V1	
25-pin DSUB	
Pin #	**Function**
1	Record LED Out; 3.3V with a 1k series resistor.
2	12V Camera Output
3	Trigger In 1
5	Trigger In 2
6	Remote power on / Ignition
7	Trigger In 3
8	Trigger In 4
9	Trigger 5
10	AUX 12V Output w/ 100ohm series resistor.
11	Trigger 6 / Mic Trigger In on 8-pin Molex.

14	Spike protected Automotive Power Output.
15-16	Automotive Power Input
4, 12, 13, 17,18, 25	Automotive Ground
19	RS232-RX Radar
20	RS232-TX Radar
21	RS232-RX Zoom
22	RS232-TX Zoom
23	RS232-RX internal use
24	RS232-TX internal use
25	Ground

Notes: 1. Pin 11, Trigger 6 / Mic Trigger Input are also connected to pin 4 of the 8-pin Molex. Use only one or the other.
2. Pin 14 is protected automotive output power which could range from 10V to 26V.

Camera Power Connector (School Bus)
2-pin Molex 43650-0200

EQUIPMENT SPECIFICATIONS

Specifications	
Recording Capabilities	Dual NTSC video camera input up to 30 fps with synchronized audio and meta-data.
Meta-Data Capture for Each Frame	Input voltage, unit temperature, 14 character unit name, panic button events, all triggers status and names, operating mode & version numbers, time & date, optional GPS lat/long/speed.
Compression	Motion JPEG compression w/ 5 selectable compression ratios.
Resolution:	Selectable 640 x 240 or 320 x 240.
Frame Rate:	Selectable 30 FPS to 1/8 FPS.
Video File Format	Standard AVI playable in MDVR Player application.
Archive Media Type:	2.5" EIDE Mobile Hard Drive support up to 120GB. Or SecureDigital Card Support.
Typical Record Time	40 GB Hard Drive: 46 hrs typ up to 66 hrs. 80 GB Hard Drive: 92 hrs typ up to 132 hrs. 120 GB Hard Drive: 130 hrs typ up to 200 hrs.
Power Supply Input Rating	Standard automotive power range; 8 – 24 Volts.
On Power Consumption w/o Cameras	< 470 mA
Off Power Consumption	< 10 mA
12V Camera Power Output Max	12V @ 1 Amp regulated switched power outputs.
External Trigger inputs:	6 input triggers plus the ignition trigger.
External signal outputs:	1 LED driver, 1 Open Collector output.
Transient Protection	2500 Watts for 10ms
Operating Temperature:	5 C ~ 55 C (41 F ~ 131 F) ambient temperature.
Operating Vibration:	Linear 5-300 Hz, 1.0G (0 to peak)
Unit Weight:	2 kg (4.5 lbs)
Unit Size:	7 in (178 mm) x 2 in (51 mm) x 8 in (203 mm); 1DIN Mountable

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