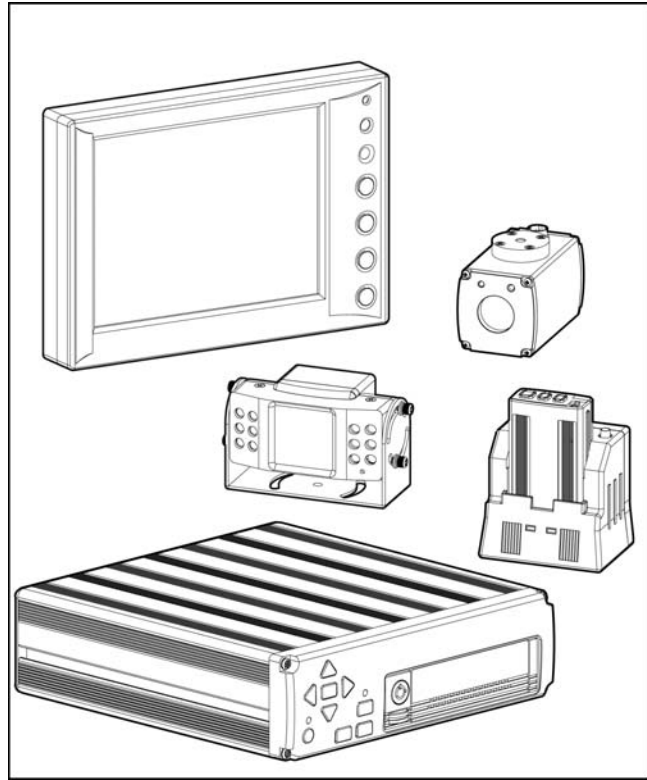


SAFETY VISION®

Safety Vision PatrolRecorder™ 4C Police In-Car Camera and MDVR System Installation Guide



Overview

The Safety Vision PatrolRecorder™ 4C Police In-Car Camera and Mobile Digital Video Recorder (MDVR) System perform mobile surveillance and evidence collection using digital recording technology. Components of the PatrolRecorder™ 4C system are designed for mobile digital video recording in rugged automotive conditions.

The PatrolRecorder™ 4C system is designed to power up automatically when the vehicle ignition is on and to record automatically when sensors are triggered for

events such as activating the light-bar or siren. It is not necessary for the driver to turn the system on or to manually initiate or stop recording. (The system can also be used for shift-based, continuous recording, rather than event-based recording.)

The PatrolRecorder™ 4C system can be installed and operated in any vehicle used for law enforcement or security. The system includes a GPS interface, and an optional radar interface is available. Programming options and on-screen display settings can be defined to meet individual requirements.

The main components of the PatrolRecorder™ 4C system are:

- MDVR, which features both manual event recording and automatic input trigger recording for 7 input triggers, plus a vehicle ignition trigger that automatically powers up the PatrolRecorder™ 4C system
- 2.5-inch removable hard drive that stores recorded data in standard PC file format.
- Color monitor with a 5.6-inch TFT LCD screen and an integrated speaker
- Forward-facing camera with speed zoom technology
- Rear camera with integrated microphone and infrared illuminators for better image quality in low light
- Ability to add 2 additional wireless camera inputs
- Wireless audio system with a line-of-sight operating range of more than 1,000 feet and a maximum talk time of 8 hours and standby time of 25 days

Supplied Hardware

The following hardware is supplied with each PatrolRecorder™ 4C system:

Part Number	Hardware Item
SV-4CHDDVR	Mobile police 4-channel MDVR
SV-40HD	40-GB removable hard drive (RHD Model only)
SV-4C-GPSCARD	GPS viewer for SV-4CHDDVR
SV-4CPHRNS	Wiring harness for SV-4CHDDVR
ADAP-4PIN/RCA	6-foot audio-video adapter cable (MDVR output to monitor input)
CAMMOUNTPAN	Swivel mount for forward-facing camera

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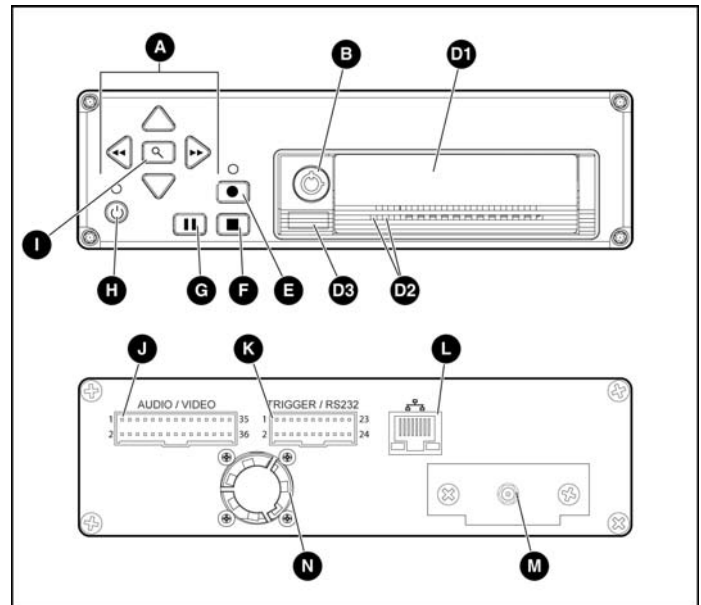
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Part Number	Hardware Item
OPV-UMOUNT	Universal visor bracket for forward-facing camera
SV-BHRNS	MDVR main wiring harness
SV-CFAC	Wireless audio system interface cable
SV-CFRC	Rear camera
SV-CFRCHRNS	Rear camera cable
SV-ILCB	Monitor/inline control box cable
SV-LCD56B-KIT	5.6-inch color monitor
SV-LCDRM1.04	Monitor bracket
SV-LS-CONSOLEMT	Flush-mount (console) bracket for MDVR
SV-PCAMCABLE	Forward-facing zoom camera power/video cable
SV-PR2.4GREC	Wireless audio system charging base/receiver
SV-PR2.4GTRANS	Wireless audio system transmitter
SV-PRSONY-10X	Forward-facing zoom camera

System Components

Components of the PatrolRecorder™ 4C system are as follows:

MDVR



↑ MDVR (Part Number SV-4CHDDVR)

- A DIRECTIONAL BUTTONS**—have the following functions, depending on the current mode:
- When video is being played back at normal speed (1X):
 - **UP**—cycles up from Channel 1 through Channel 4 and the quad view for audio/video output
 - **DOWN**—cycles down from Channel 4 through Channel 1 and the quad view for audio/video output
 - **LEFT**—adjusts fast-reverse video playback speed to a maximum of 90X
 - **RIGHT**—adjusts fast-forward video playback speed to a maximum of 90X
 - When playback video is paused:
 - **LEFT**—reverses video playback one frame at a time
 - **RIGHT**—advances video playback one frame at a time
 - When video is not being played back, these buttons move the cursor through on-screen menu selections, and the **RIGHT** button functions as an **ENTER** key by confirming menu selections.
 - When the DVR is in Record or Standby mode, the UP and DOWN directional buttons are used to cycle input between Channel 1 through Channel 4 and the quad view
- B ACCESS DOOR LOCK**—allows key access to the hard drive slot

- D1 RHD SLOT**—accepts a removable hard drive (RHD) that stores recorded audio/video files
- D2 DATA/POWER LEDs**—yellow LED (on the left) lights when data is being written to the removable hard drive; green LED (on the right) lights when the removable hard drive is powered on.
- D3 EJECT BUTTON**—ejects the removable hard drive
- E RECORD BUTTON**—starts manual recording
- F STOP BUTTON**—stops playback video and resumes the live view

***CAUTION:** To prevent corruption of the hard drive, press the STOP button BEFORE removing the hard drive.*

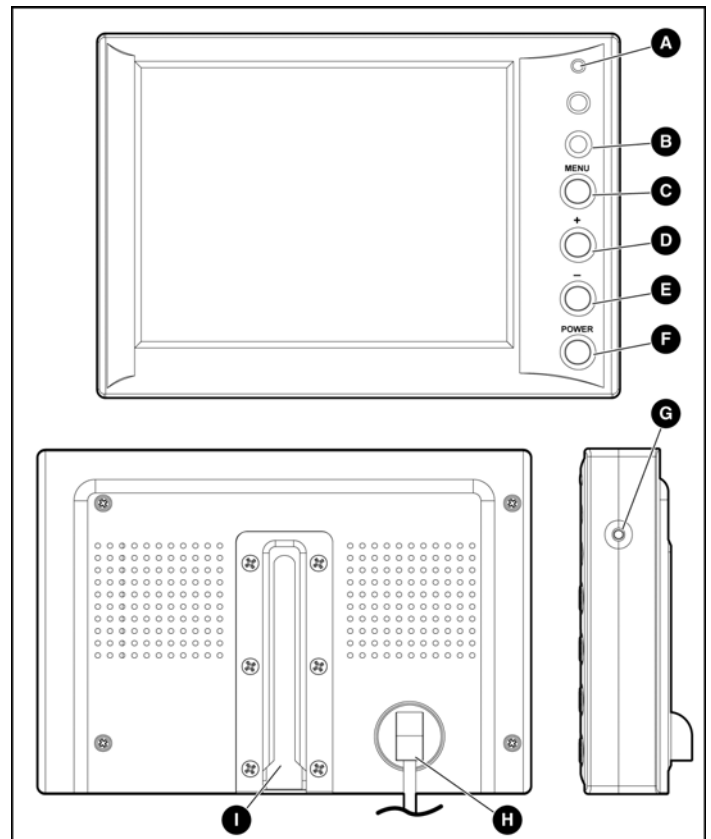
- G PAUSE BUTTON**—pauses playback video (or resumes paused video playback)
- H POWER BUTTON**—has the following functions:
 - When pressed and released, manually powers the MDVR ON or OFF

***NOTE:** In typical installations, the MDVR is powered ON and OFF automatically by the vehicle-ignition sensor. When it has been powered ON manually, the MDVR remains ON until the POWER button is pressed again.*

When the MDVR is already ON because it has been triggered by a sensor, pressing the POWER button powers the MDVR OFF, but the MDVR immediately powers ON again to continue the programmed recording.

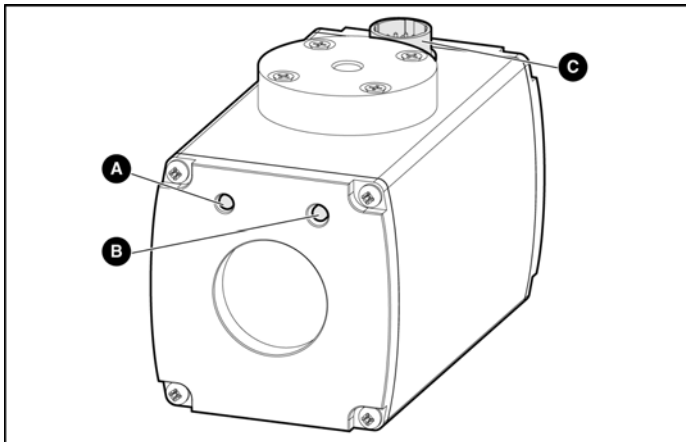
- I SEARCH/MENU BUTTON**—when pressed and released, initiates display of the Search menu for audio/video files stored on the hard drive; when pressed and held for 3 seconds, initiates display of the Main menu
- J AUDIO/VIDEO INPUT**—accepts the SV-BHRNS54CADAP wiring harness
- K TRIGGER INPUT**—accepts the SV-BHRNS54CADAP wiring harness
- L ETHERNET PORT**—accepts the RJ45 connector of an optional Ethernet cable; can be used to download files through a wired or wireless Ethernet connection
- M GPS RECEPTACLE**—accepts the connector for the GPS module
- N FAN**—cools the MDVR by maintaining air flow

Monitor with Integrated Speaker
Part Number SV-LCD56B



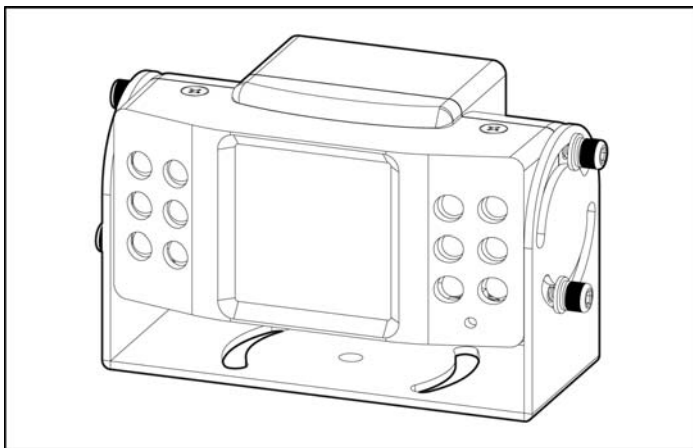
- A POWER LED**—indicates that the monitor has power
- B DAY/NIGHT SENSOR**—senses available light and adjusts monitor brightness accordingly
- C MENU BUTTON**—when pressed and held for a few seconds, initiates display of onscreen user controls for image contrast and brightness and speaker volume
- D + BUTTON**—UP button—increases the value for Setup menu items, such as Volume
- E - BUTTON**—DOWN button—decreases the value for Setup menu items, such as Volume
- F POWER BUTTON**—turns the monitor ON or OFF
- G NORMAL/MIRROR SWITCH**—switches image display to Normal or Reverse (as it would appear in a rear-view mirror)
- H MONITOR CABLE**—connects to the monitor/inline control box cable
- I BRACKET SLOT**—accepts the guide tabs on the adjustable mounting bracket

Forward-Facing Zoom Camera
Part Number SV-PRSONY-10X



- A GREEN LED**— indicates that the system power is ON and that the camera is in Standby mode
- B RED LED**— indicates that the MDVR is recording
- C POWER/VIDEO CONNECTOR**— accepts the circular connector of the SV-PCAMCABLE

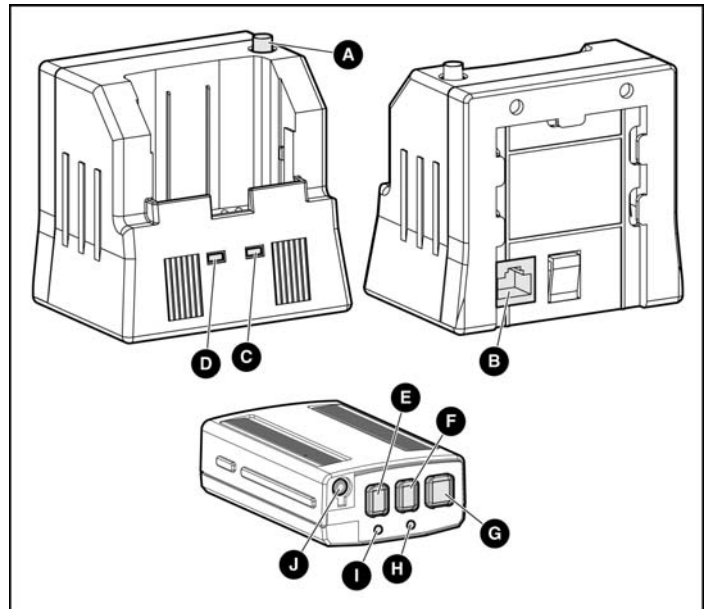
Rear Camera
Part Number SV-CFRC



The rear camera features an integrated microphone and infrared illuminators for better image quality in low light.

Wireless Audio System
Charging Base/Receiver Part Number SV PR2.4GREC
Transmitter Part Number SV PR2.4GTRANS

NOTE: At the end of its useful life, dispose of the battery pack supplied for the wireless audio system only at an appropriate collection site.



- A ANTENNA CONNECTOR**
- B RJ45 JACK**—accepts the RJ45 connector of the wireless audio system interface cable (Part Number SV-CFAC)
- C BATTERY STATUS LED:**
 - Steady red indicates that the battery is charging
 - Steady green indicates that the battery is fully charged
- D TRANSMITTER STATUS LED:**
 - Steady green indicates that the transmitter is in Record mode
 - Green off indicates that the transmitter is not in Record mode
 - Flashing green indicates that ID Matching is ON
- E MUTE ON/OFF BUTTON**—mutes audio output or resumes normal audio output
- F ALERT MODE SELECTOR BUTTON**—when the wireless audio system is in Standby mode, switches between alert modes as follows, and in the following order:
 - Beep only
 - Vibrate only
 - Beep and vibrate
 - No action
- G TALK BUTTON**—starts a recording
- H GREEN STATUS LED:**
 - Steady green indicates that the transmitter is ON and in Standby mode
 - Flashing green indicates that audio output is muted
- I RED BATTERY STATUS LED:**
 - Steady red indicates a low battery
 - Flashing red indicates that the transmitter is out of range of the base
- J MICROPHONE JACK**—for optional lapel microphone

Important Installation Precautions

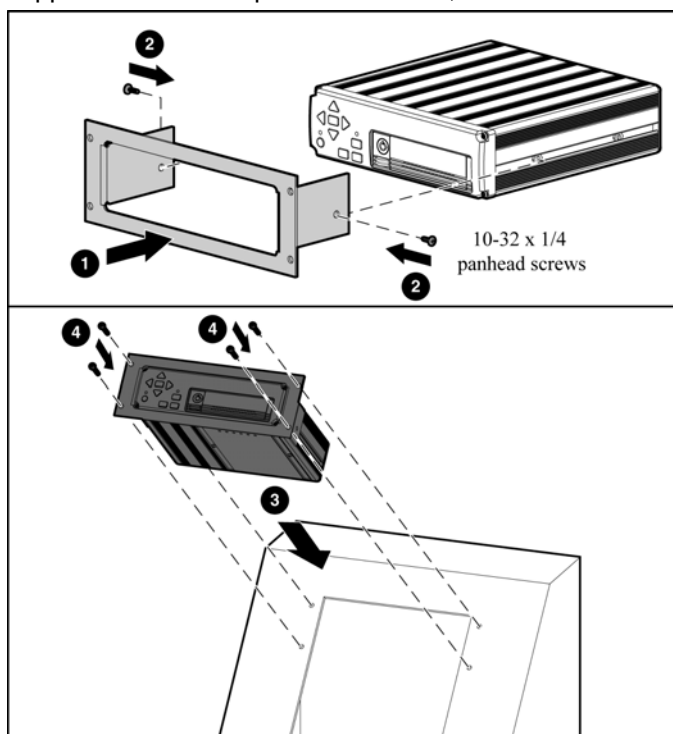
Keep the following precautions in mind when installing the PatrolRecorder™ 4C system:

- **IMPORTANT:** To reduce the risk of electrical shock, disconnect the vehicle negative battery terminal during PatrolRecorder™ 4C system installation.
- To prevent system damage, the main wiring harness (Part Number SV-BHRNS) must not be connected to the vehicle electrical system until all other components and cables are installed and connected.
- The ground wire of the main wiring harness (Part Number SV-BHRNS) must be connected directly to the vehicle chassis.
- Use care when affixing any device to a vehicle with screws. Before drilling or inserting screws, ensure that vehicle components such as the gas tank and airbags will not be damaged by the drill bit or screw.
- To prevent system damage, use only the cables supplied with the PatrolRecorder™ 4C system.
- Do not disassemble any component of the PatrolRecorder™ 4C system.

Typical Installation

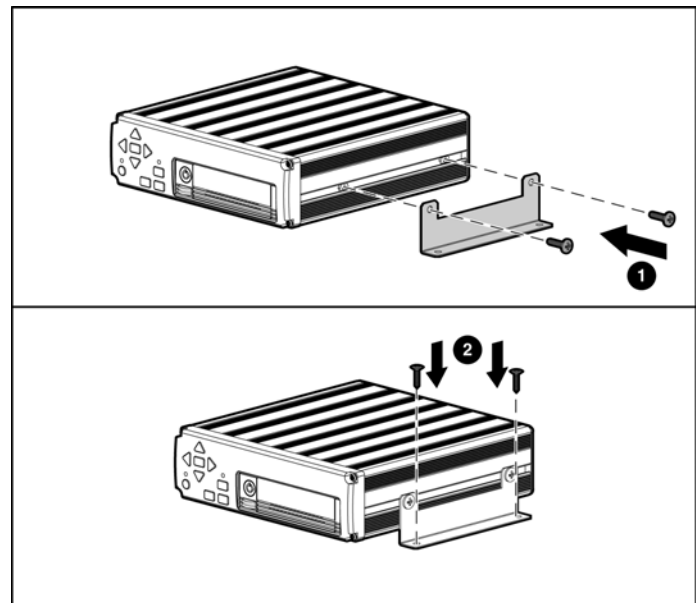
MDVR Installation

The MDVR is designed to be flush-mounted in the vehicle equipment console, using the supplied flush-mount bracket (Part Number SV-LS-CONSOLEMT) and the 2 supplied 10-32 x 1/4 panhead screws, as follows:



↑ Flush-Mount (Console) Installation

An optional surface-mount bracket (Part Number SV-LSBRKT) is available, making the MDVR mountable elsewhere in the vehicle, either vertically or horizontally (on the floor or ceiling), as follows:



↑ Surface-Mount Installation Using Optional Bracket

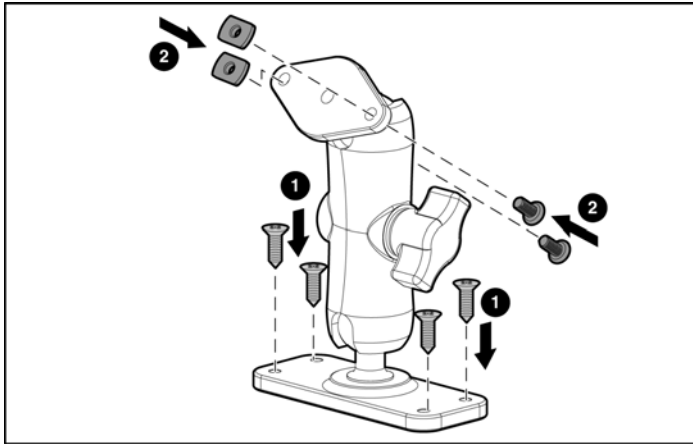
Monitor Installation

The monitor is designed to be mounted overhead or elsewhere in the vehicle cabin (including on the floor or console). The mounting surface should:

- Be level, waterproof, ventilated adequately, and capable of supporting the weight of the monitor and mounting bracket
- Not be close to a vehicle speaker (to prevent interference from the speaker's magnetic field)
- Not be extremely hot or humid

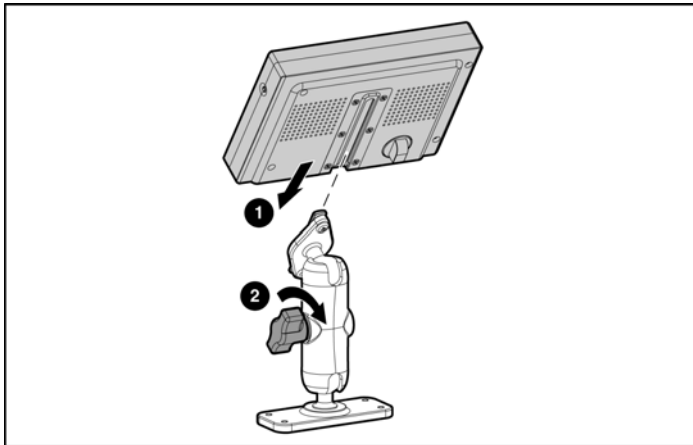
Install the monitor as follows:

- ⦿ Affix the monitor bracket (Part Number SV-LCDRM1.04) to the mounting surface, and affix the two guide tabs to the swiveling head of the monitor bracket, as follows:



↑ Installing the Monitor Bracket and Two Guide Tabs

- ⦿ Slide the monitor onto the two guide tabs on the swiveling head of the monitor bracket, adjust the angle as necessary, and tighten the handle screw, as follows:



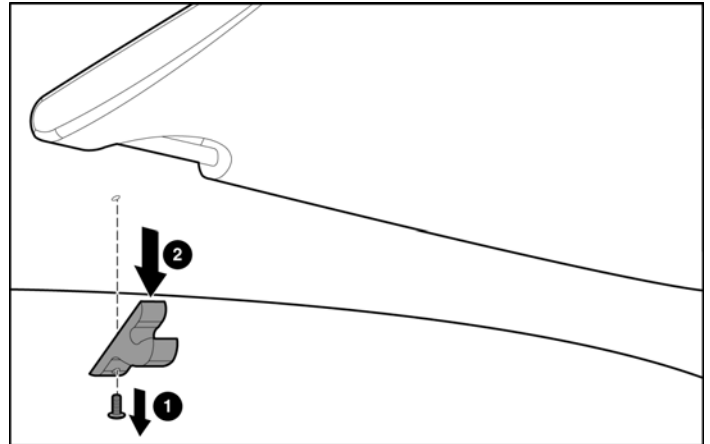
↑ Installing and Adjusting the Monitor

Forward-Facing Zoom Camera Installation

The forward-facing zoom camera is designed to be installed with the universal visor bracket (Part Number OPV-UMOUNT) (which is mounted between the vehicle headliner and the passenger-side visor clip) and a swivel mount (Part Number CAMMOUNTPAN).

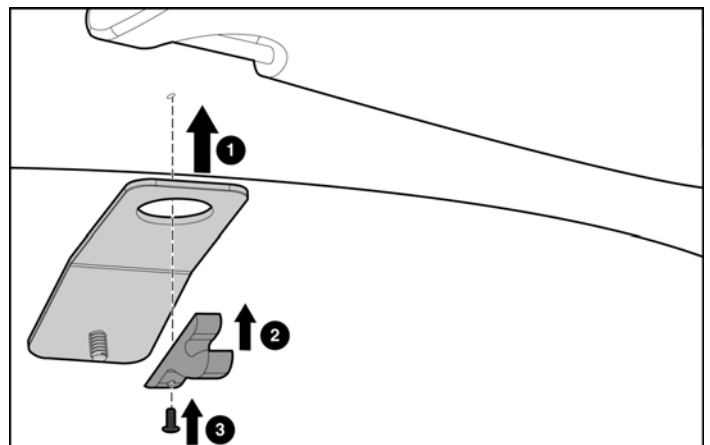
Install the forward-facing zoom camera as follows:

- ⦿ Remove the screw from the vehicle's existing passenger-side visor clip, and then remove the visor clip, as follows:



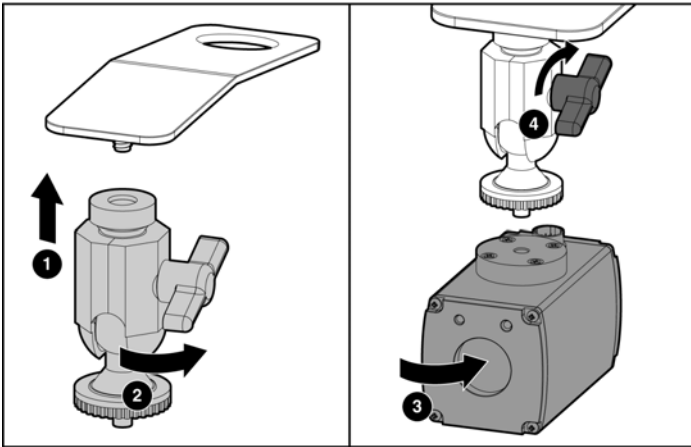
↑ Removing the Visor Clip for Camera Installation

- ⦿ Put the universal visor bracket (Part Number OPV-UMOUNT) in place, and then reattach the original visor clip with the original screw, as follows:



↑ Installing the Universal Visor Bracket

⊙ Connect the swivel mount (Part Number CAMMOUNTPAN) to the universal visor bracket, and then connect and adjust the forward-facing zoom camera (Part Number SV-PRSONY-10X), as follows:

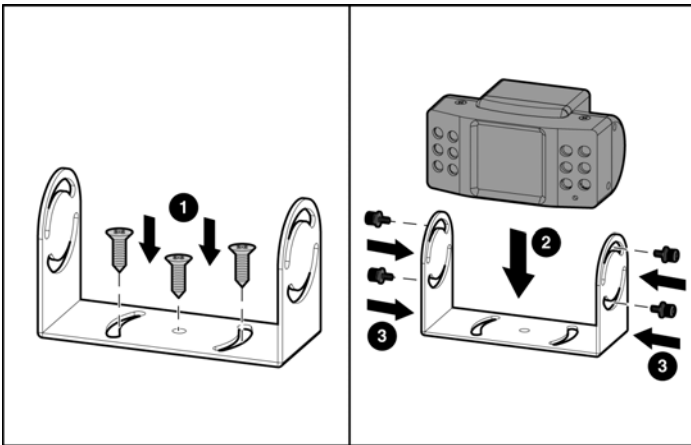


↑ Connecting the Swivel Mount and Installing the Forward-Facing Zoom Camera

Rear Camera Installation

Typically, the rear camera (Part Number SV-CFRC) is installed in a discreet location behind the vehicle partition, facing the rear seat.

Affix the mounting bracket, which rotates 360 degrees and tilts 180 degrees, and install the camera in the mounting bracket with the provided screws, as follows:

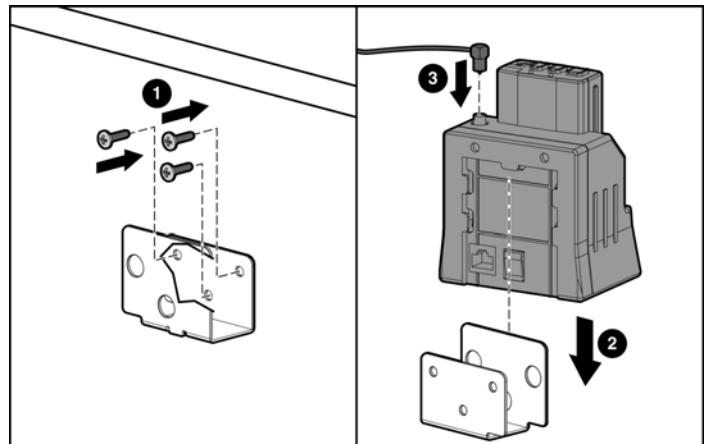


↑ Installing the Rear Camera

Wireless Audio System Installation

Typically, the bracket for the wireless audio system is mounted on the front side of the vehicle partition. For best wireless reception, mount the bracket as high as possible in the vehicle cabin. In addition, do not place wireless audio system devices near televisions, speakers, or other electronic devices.

Affix the bracket to the vehicle surface with the supplied screws, and then place the transmitter (Part Number SV-PR2.4GREC) and base (Part Number SV-PR2.4GREC) into the bracket and connect the wireless audio system antenna, as follows:



↑ Installing the Wireless Audio System

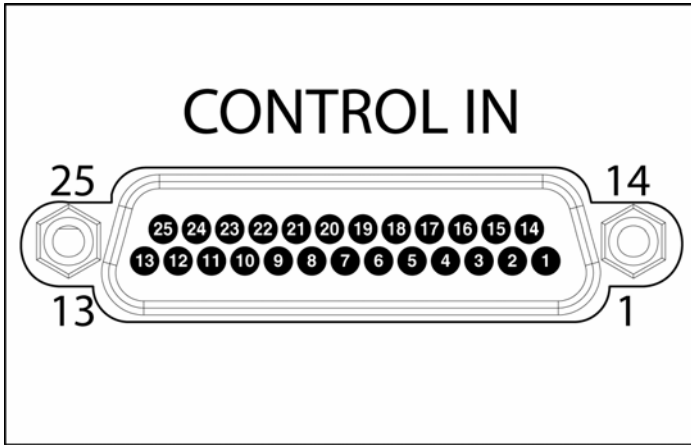
Connecting Components

When connecting components, select inconspicuous cable routes that do not interfere with driver or passenger mobility and that prevent damage to the cables

Refer to Appendix A for illustrations of typical system wiring and component connections and close-ups of the main wiring harness (Part Number SV BHRNS) and the monitor/inline control box cable (Part Number SV ILCB).

■ **Main Wiring Harness (Part Number SV BHRNS)
Connection to MDVR**

Pin configuration for the 25-pin DSUB connector of the MDVR main wiring harness (Part Number SV-BHRNS) is as follows:



Pin Number	Pin Function/Description	Wire Color	Note
6	Ignition	White	3 Cond.
16	Vehicle battery input	Red	3 Cond.
17	Automotive ground	Black	3 Cond.
20	Trigger 1	Red	9 Cond.
5	Trigger 2	Brown	9 Cond.
7	Trigger 3	White	9 Cond.
8	Trigger 4	Yellow	9 Cond.
9	Trigger 5	Green	9 Cond.
21	Trigger 6	Black	9 Cond.
N/A	Trigger 7/Mic	N/A	N/A


NOTE: Pins not listed above are not used.
All unused wires in the harness must be capped individually.


■ **Monitor/Inline Control Box Cable (Part Number SV-ILCB) Connections**


Connections for the Monitor/Inline Control Box Cable (Part Number SV-ILCB) are as follows:


- Red: switched 12-V output
- Yellow: switched 12-V output
- Black: automotive ground

Initial Setup

To initiate display of the Main menu, press and hold the  **SEARCH/MENU** button on the front panel of the MDVR for 3 seconds.

Use the **UP** and **DOWN** buttons to move the cursor through on-screen menu selections. Use the  **RIGHT** directional button as the “Enter” key.

When you have finished setting up a menu item, press the  **SEARCH/MENU** button again to save the changes.

***NOTE:** After several minutes of inactivity, the menu is no longer displayed, and the  **SEARCH/MENU** button must be pressed again to initiate display of the main menu again.*

Main Menu

The main menu includes the following menus:

- System Setup
- Title Setup
- Trigger Setup
- Communication (Comm.) Setup
- Camera 1-4 Setup
- GPS Setup
- System Info

For detailed information about these menus, refer to Appendix B.

Typical Installation Settings

These settings are valid for most typical PatrolRecorder™ 4C installations:

- System Setup Menu
 - OSD: ENABLE
 - Record Mode: STOP
 - Units: ENGLISH
 - GP Out 1 Mode: RECORD
 - GP Out 2 Mode: RECORD
 - Time Setup: Default value for Daylight Saving Time is ON
 - Password Setup: Default value for Password is **123456**; default value for the password requirement is DISABLED for all 4 levels of operation.

- Title Setup Menu
 - System Name: The patrol car or officer number
 - Triggers 1 through 7: User specified
- Trigger Setup Menu
 - T1: RECORD, HIGH
 - T2: DISPLAY, HIGH
 - T3: DISPLAY, HIGH
 - T4: DISPLAY, HIGH
 - T5: DISPLAY, HIGH
 - T6: DISPLAY, HIGH
 - T7: DISPLAY, LOW
 - Ignition Setup:
 - Record Control: DISABLE
 - Record Start Delay: 0 MIN
 - Record Stop Delay: 0 MIN
 - Power Off Delay: 1 MIN
- Communication Setup
 - Comm. 1 and 2 Setup
 - Baud Rate: 9600
 - Parity: none
 - Data Bits: 8
 - Stop Bits: 1
 - Protocol: VISCA
 - One Touch Zoom: 75 PCT
 - Focus: AUTO
 - Sensitivity: LOW
 - Slow Shutter: OFF
- Camera 1-4 Setup Menu
 - Frame Rate: 30 fps
 - Image Size: QVGA
 - Image Quality: MEDIUM
 - Audio: ON
 - Audio Volume: 6dB
- GPS Setup Menu
 - Use GPS: YES
 - Use GPS Time: YES
 - UTC/Local Time: -6
 - GPS Data Format: DDD:HH:SS

Basic Operation

The PatrolRecorder™ 4C system is designed to power up automatically when the vehicle ignition is on and to record automatically when sensors are triggered for events such as activating the light-bar or siren. (The system can also be used for shift-based, continuous recording, rather than event-based recording.) When the system is used for event-based recording, it is not necessary for the driver to turn the system on or to manually initiate or stop recording. However, an officer can start a recording manually and can control the system as follows:

Starting a Manual MDVR Recording

To start a recording manually, press the **RECORD** button on the front panel of the MDVR, or press the **TALK** button on the wireless audio system transmitter.

Switching Audio/Video Input

When the DVR is in Record or Standby mode, use the UP and DOWN directional buttons on the front panel of the MDVR to switch input between Channel 1, 2, 3, 4, or the Quad View.

Automatic Audio Input

When the DVR is in Record mode, audio input from the integrated microphone of the cabin camera is activated automatically. When the DVR is in Record mode and the wireless audio transmitter is removed from the charging base/receiver, audio input from the wireless audio transmitter is activated automatically.

MDVR Recording Capacity

The recording capacity of the MDVR depends on the following user-selectable factors:

- Frame rate (30 fps to 1 fps)
- Image quality (high, medium high, medium, medium low, or low)
- Image resolution (720 x480, 640 x480, 360 x 240, or 320 x240 pixels)
- Storage capacity of the hard drive

Activating the Speed Zoom Function of the Forward-Facing Camera

To activate the forward-facing camera's speed zoom function, press the **RIGHT** directional button on the MDVR front panel. When activated, the forward-facing camera's speed zoom function causes the camera to zoom in to a pre-set magnification (75% typical) and remain magnified for 4 seconds before returning to the wide (normal) field of view.

Searching For and Playing Back Video

To search for and play back video, press and release the **SEARCH/MENU** button to display the Video Search screen on the system monitor, as follows:



Left column displays the dates for which video files have been recorded

Right column displays the starting time for each video file recorded on the date selected

Use the directional buttons on the front panel of the MDVR to select the date in COLUMN A and the appropriate starting time in COLUMN B. Press the **RIGHT** button to play the selected video file.

During playback, use the MDVR directional buttons as follows:

- **LEFT** button adjusts fast-reverse speed to a maximum of 90X.
- **RIGHT** button adjusts fast-forward speed to a maximum of 90X.
- **UP** and **DOWN** buttons select Channel 1, 2, 3, 4, or the Quad View for audio/video output (only when video is being played back at normal speed [1X])

Archiving Video to a PC

WARNING: To prevent hard drive damage and loss of data stored on the removable hard drive, **DO NOT** use the Microsoft Windows operating system of the PC to format the removable hard drive.

Use of the Windows operating system **FORMAT** command on the removable hard drive will erase all data stored on the removable hard drive and make the removable hard drive unusable in the MDVR.

Furthermore, on some PCs, the operating system may not automatically recognize the removable hard drive, in which case the operating system will prompt the user about whether the unrecognized drive should be formatted. If appropriate, click the **NO** button in response to the following prompt:

**THE DISK IN DRIVE X IS NOT FORMATTED.
DO YOU WANT TO FORMAT IT NOW?**

① Connect the storage media to the PC, as follows:

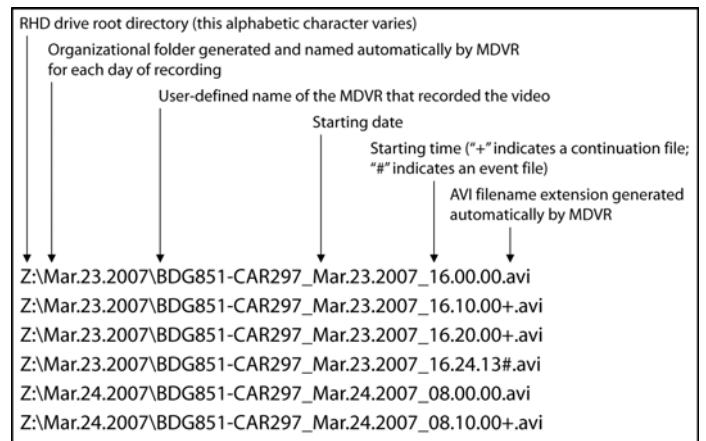
First connect the optional hard drive reader (Part Number SV-HDREADER) to a USB port on the PC. Next, plug the AC adapter into the hard drive reader. Then, insert the removable hard drive that contains recorded PatrolRecorder™ 4C system files into the hard drive reader, and turn on the key of the hard drive reader.

The storage media (the removable hard drive) will be recognized by the Microsoft Windows Operating System of the PC and assigned a drive letter in Microsoft Windows Explorer, which can be used to copy video files from the storage media to the PC.

MDVR File Format

The MDVR stores recorded audio/video files on the installed archive media (removable hard drive) in standard PC file format. The MDVR saves each 10-minute segment in a separate file and automatically assigns a filename that identifies the source MDVR and the starting date and time of the segment. In addition, the filename identifies “continuation” files (files that are a continuation of another 10-minute segment) and “event” files (files that include a user-defined event such as activation of the vehicle backup lights).

Following is an explanation of sample MDVR file names:



↑ Explanation of Sample MDVR File Names

Removing the Hard Drive from the MDVR

CAUTION: To prevent corruption of the hard drive, press the **STOP** button on the front panel of the MDVR panel **BEFORE** removing the hard drive.

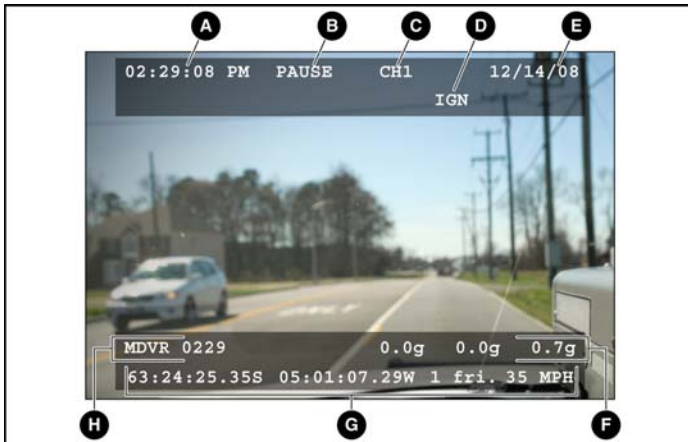
- ① Press the **STOP** button on the front panel of the MDVR.
- ② Use one of the provided keys to unlock the access door lock on the front panel of the MDVR.
- ③ Press the **EJECT** button to eject the removable hard drive.

Meta-Data

The MDVR generates system information (meta-data) for each image frame and stores it on the archive media (the removable hard drive). The meta-data describes conditions (such as the date, time, and status of input triggers) present at the time of recording.

On-Screen Display

When recorded video is being played back or live video is being displayed, meta-data is displayed on-screen as follows:



- A TIME**—displays the time in HH:MM:SS format (the time is set by the user during initial setup and then maintained by the MDVR)
- B MDVR STATUS**—displays the current mode of the MDVR (Stop, Record, Playback [and Playback Speed], or Pause)
- C CURRENT INPUT**—displays CH1-CH4 (channel 1-4), no display for the Quad View
- D ACTIVE TRIGGER**—displays the trigger that started recording activity
- E DATE**—displays the date in MM/DD/YY format (the date is set by the user during initial setup and then maintained by the MDVR)
- F ACCELEROMETER and RADAR SPEED**
- G GPS COORDINATES**
- H MDVR NAME**—displays the user-definable MDVR name
- I GPS COORDINATES**

Remote MDVR Access Through FTP

The MDVR supports FTP commands in MS-DOS as follows:

- Cd (changes directory)
- Dir (displays a directory listing)
- Ls (lists the contents of the directory)
- Get (gets a file from the MDVR)
- Delete (deletes a file from the MDVR)
- Rmdir (removes a directory from the MDVR)

WARNING: Use the **Rmdir** command with caution. The MDVR does not verify that a directory is empty before allowing the directory to be deleted. In addition, using the **Rmdir** command to delete a directory that is not empty causes space on the removable hard drive to become unavailable for use.

Specifications

MDVR Specifications

Part Number SV-4CHDDVR

Item	Specification
Power Supply Input Rating	8 ~ 24 VDC (standard automotive power range)
Power Consumption	When ON: < 470 mA (without cameras) When OFF: < 10 mA
Video System	NTSC
Video Compression	Motion JPEG compression (5 user-selectable compression ratios)
Video Resolution	User-selectable: 720 x480, 640 x480, 360 x 240, or 320 x240
Frame Rate	User-selectable: 30 fps to 1/1 fps [time-lapse]
File Format	8 channel AVI (4 video, 4 audio) (can be played with Microsoft Windows Media Player)
Archive Media Type	2.5-inch hard drive
Typical Recording Time	80-GB Hard Drive: 92 to 132 hours 120-GB Hard Drive: 130 to 200 hours
Operating Temperature	41°F ~ 131°F (0°C ~ 55°C)
Dimensions	7 x 8 x 2 inches
Width x Depth x Height	178 x 203 x 51 mm
Weight	4.5 lbs (2 kg)
External Trigger Inputs	7 trigger inputs in addition to the vehicle ignition trigger input
Operating Vibration	Linear 5-300 Hz, 1.0G (0 to peak)
Transient Protection	2500 watts for 10 m/s
Supplied Accessories	Access door lock keys (2)

Monitor Specifications

Part Number SV-LCD56B-KIT

Item	Specification
LCD Panel Size	5.6-inch (diagonal)
Video System	NTSC standard signal
Power Input	12 VDC (with control box 12/24 VDC)
Power Consumption	Maximum 5 watts
Sync System	Internal
Resolution	336,960 pixels
Power Connector	4-pin wire S-video connector
Speaker Impedance	16 ohms, 0.5 watt maximum
Impact Rating	4 G
LCD Profile Wide-Screen Ratio	4:3
Response Time	30 ms (at 25°C)
View Angle (CR>10)	40/65/65/65 (up/down/left/right)
Field of View	135° diagonal, 108° horizontal
Brightness	500 cd/m ²
Contrast Ratio	300:1
Automatic Brightness Control	Light sensor, Day/Night switch

On-Screen Display Controls	Brightness, Contrast, Volume, Color, Languages
Operating Temperature	5°F to 149°F (-15°C to 65°C)
Storage Temperature	-13°F to 185°F (-25°C to 85°C)
Weight	0.75 pounds (0.34 kg)
Dimensions	6.5 x 4.5 x 1.1 inch
Width x Height x Depth	(165 x 115 x 29 mm)
Supplied Accessories	<ul style="list-style-type: none"> ▪ Adjustable mounting bracket ▪ Extension cable ▪ Screw kit

Forward-Facing Zoom Camera Specifications

Part Number SV-PRSONY-10X

Item	Specification
Image Sensor	1/4 type Sony EXview HAD CCD
Picture Resolution	Approximately 380,000 pixels
Sync System	Internal
Zoom	10X with optical zoom
Signal-to-Noise Ratio	More than 50 dB
Light Sensitivity	1.5 lux (50 IRE)
Storage Temperature	-4 to +140 degrees F (-20 to +60 degrees C)
Operating Temperature	32 to 122 degrees F (0 to 50 degrees C)
Dimensions	1.5 x 2.6 x 1.8 inches
Width x Depth x Height	(39.3 x 65 x 44.8 mm)
Weight	0.37 pounds (0.17 kg)

Rear Camera Specifications

Part Number SV-CFRC

Item	Specification
Image Sensor	1/3-inch Sony Super HAD CCD
Number of Pixels	NTSC 270,000/410,000
Resolution	550 TV Lines/480 TV Lines/380 TV Lines
Minimum Illumination	0 Lux (with infrared LEDs)
Sync System	Internal
Supplied Voltage	10~14 VDC Recommended: 12 VDC ± 0.5 VDC
Power Consumption	Less than 280 mA
Shutter Speed	1/60 ~ 1/100,000 s
Signal to Noise Ratio	More than 48 dB (AGC off)
Dimensions	3.2 inches x 1.7 inches x 2.3 inches
(Width x Height x Depth)	(80.5 mm x 43 mm x 47.7 mm)

Wireless Audio System Specifications

Charging Base/Receiver Part Number SV-PR2.4GREC

Transmitter Part Number SV-PR2.4GTRANS

Item	Specification
Operating Voltage	Transmitter: 3.7 VDC Receiver/Base: 12 VDC

Frequency	2400 MHz
Operating Range	1000 feet, line of sight
Operating Temperature	10°F ~ 110°F (12°C ~ 43°C)
Battery	Rechargeable 3.7 VDC Lithium Ion

Warranty Information

LIMITED 1-YEAR NEW PRODUCT WARRANTY

Safety Vision, L.P. ("SV") makes the following limited warranty, which is effective at the time of the original end-user purchase.

NOTE: *Optional warranty products are available for all SV products and may be purchased at the time of the original end-user purchase or any time during the original Limited 1-Year New Product Warranty period.*

SV warrants this product against defects in materials for a period of 1 year after the date of purchase. During this period, SV will repair or replace a defective product or part without charge to the customer. The customer must send the defective product or part to SV or an authorized SV dealer. The customer must pay for all transportation and insurance charges for sending the unit to be repaired. SV's total liability is limited to the original product cost.

■ Installation Guide

The customer should thoroughly read this guide before operating this product.

■ Customer's Responsibility

The above warranty is subject to the following conditions:

- Customer must notify SV within 10 days of discovering the defective product or part and provide a description of the defect and complete information about the manner of its discovery.
- All warranty servicing of this product must be performed by SV or an authorized servicing agent.
- Warranty extends only to defects in materials as limited above. Warranty does not extend to any product or part that has been lost or discarded by the customer; to damage to products or parts caused by misuse, accident, improper installation, improper maintenance, or use in violation of instructions furnished with the product; to units that have been altered or modified without authorization of SV; to damage to products or parts thereof that have had the serial number removed, altered, defaced, or rendered

illegible; or to any failure of the product to function caused by burglary, fire, flood, war, riot, civil commotion, Acts of God, or any other condition beyond the control of SV.

■ Obtaining Warranty Service

To obtain warranty service, the customer must contact the SV Service and Warranty Manager at 713.896.6600 or 800.880.8855 to report a defective product. (The customer must report the model number and serial number if available.) The Service and Warranty Manager will assist in troubleshooting the problem and, if necessary, issue a return material authorization (RMA) number. The customer must include this number on the outside of each package shipped to SV.

■ Important Packing and Shipping Instructions

When a product requires service, only the affected component must be returned. The customer must use proper packing material to ensure against damage during shipping. Any shipping damage caused by improper packing is not covered under this warranty. In addition, the customer must include a return material authorization (RMA) number on the outside of each package shipped to SV and a letter explaining the defect with the product.

How to Reach Us

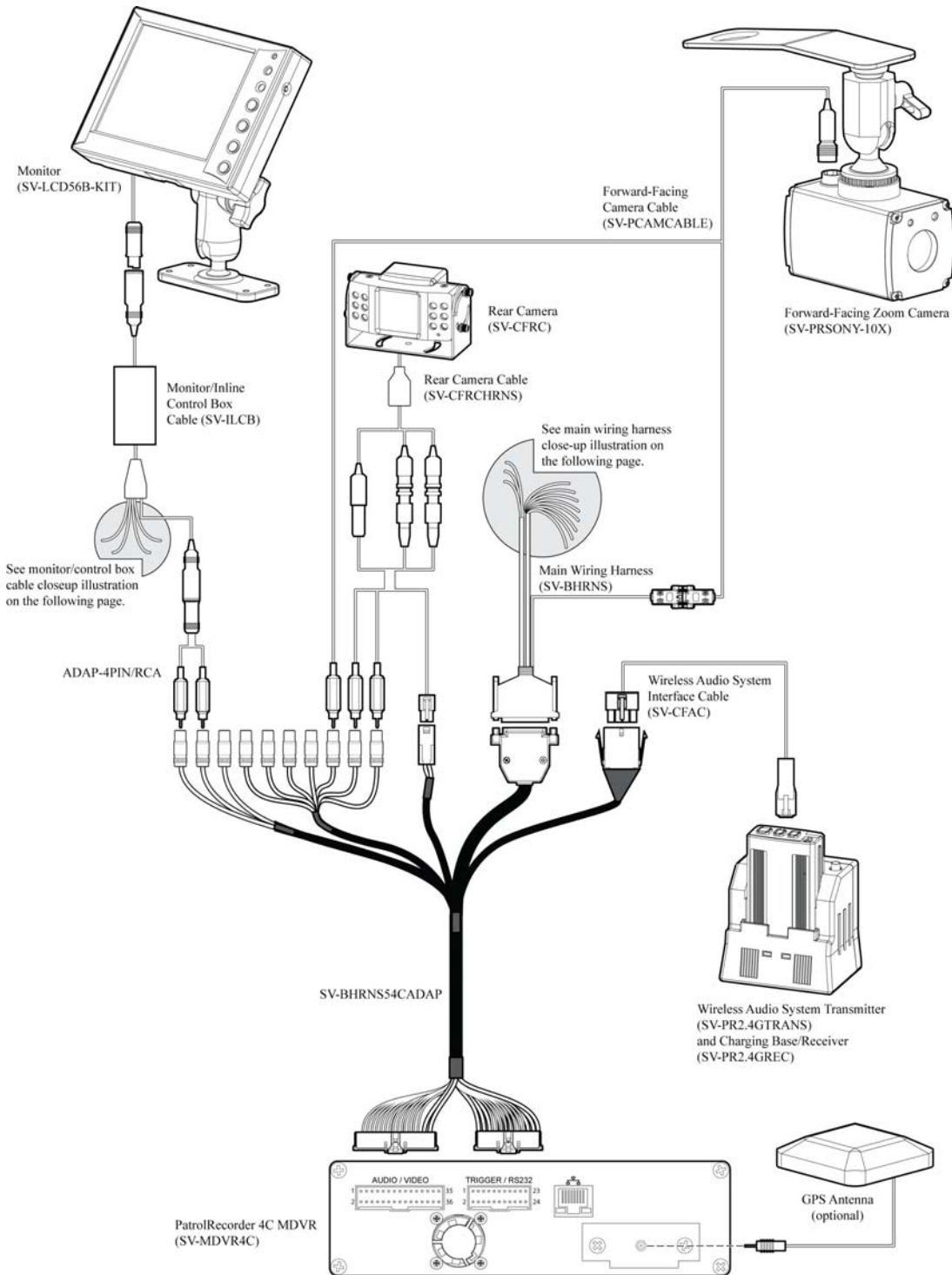
If you have exhausted the information in this document and require further assistance or information, please contact Safety Vision toll-free at 1-800-880-8855 or send an e-mail message requesting assistance to: email@safetyvision.com.

Document Change Log

Document Version	Document Filename	Date	Changes Made
1.0	PATROLRECORDER 4C IG VER 1.0	April 2008	New document
1.1	PATROLRECORDER 4C IG VER 1.10	May 2008	Engineering revisions
1.2	PATROLRECORDER 4C IG VER 1.2.DOC	August 2008	Edits, TW

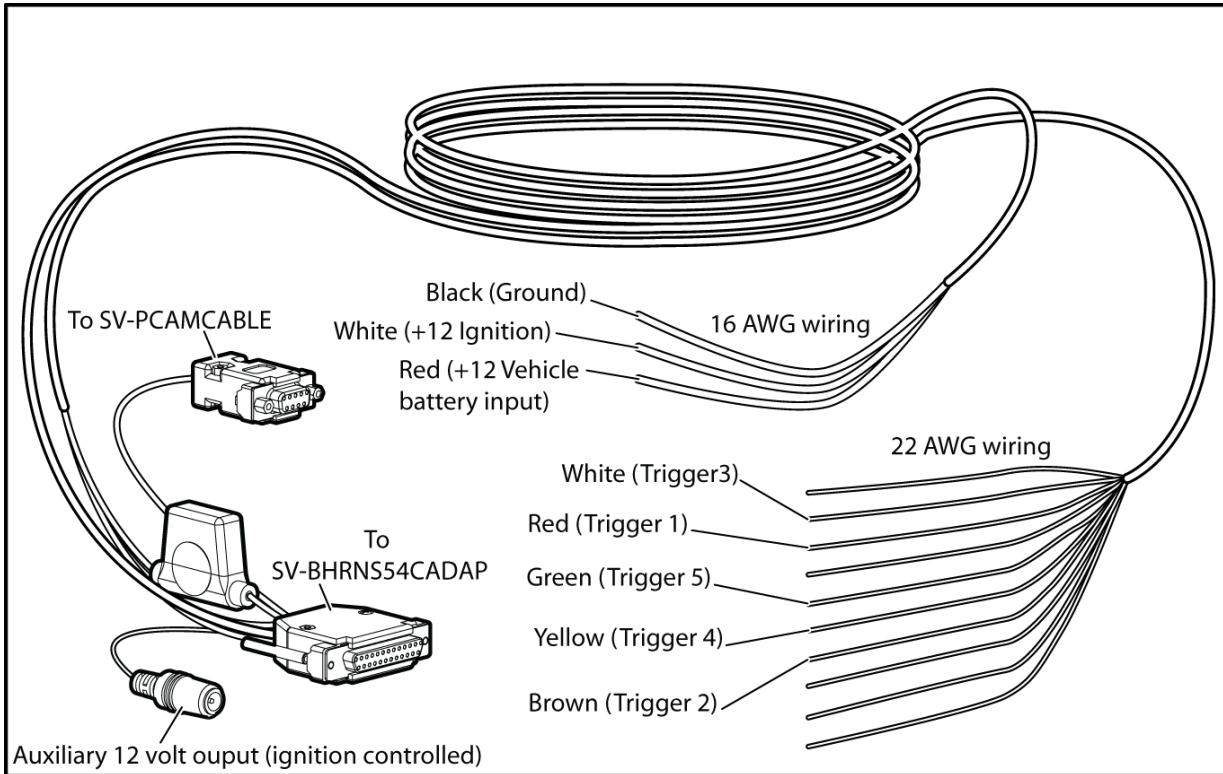
■ Appendix A: Typical System Wiring

The following wiring overview is appropriate for typical PatrolRecorder™ 4C system installations. Close-up illustrations follow for the main wiring harness (Part Number SV-BHRNS) and the monitor/inline control box cable.

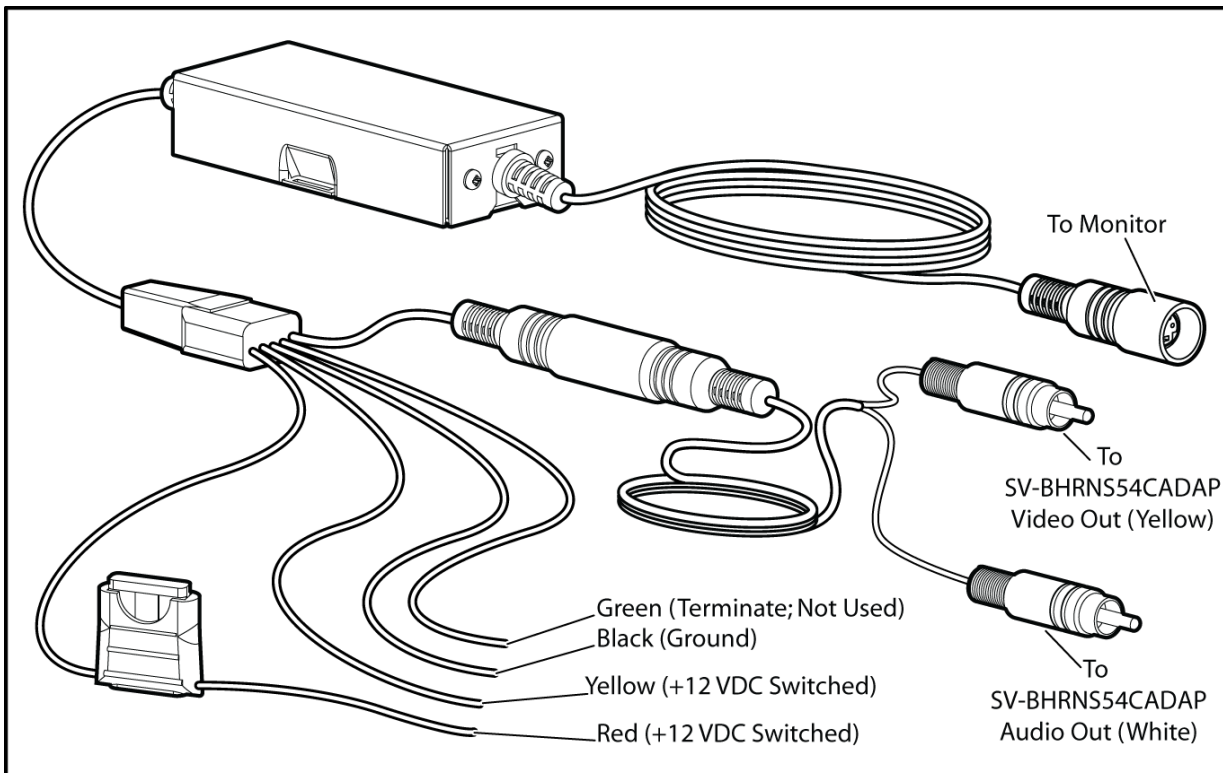


↑ Typical Wiring Overview

Following are close-up illustrations of the main wiring harness (Part Number SV-BHRNS) and the monitor/inline control box cable connections.



↑ Wiring Close-up for Main Wiring Harness (Part Number SV-BHRNS)



↑ Wiring Close-up for Monitor/Inline Control Box Cable (Part Number SV-ILCB)

■ Appendix B: Setup Menus

The main menu includes the following menus:

- System Setup
- Title Setup
- Trigger Setup
- Communication (Comm.) Setup
- Camera 1-4 Setup
- GPS Setup
- System Info

System Setup Menu

The System Setup menu allows user configuration as follows:

Menu Item	Description	Comments
OSD	Turns the On Screen Display on or off	Values: ENABLE, DISABLE Default: ENABLE
Record Mode	Selects continuous recording or trigger-based recording (Stop)	Values: CONTINUOUS, STOP Default: STOP
Units	Controls the standard of measurement	Values: ENGLISH, METRIC Default: ENGLISH
GP Out 1, 2 Mode	General Purpose trigger outputs indicate a number of MDVR events	Values: <ul style="list-style-type: none"> ▪ POWER (unit powered on) ▪ RECORD (recording) ▪ SPEED (speed exceeds limit set in GPS Setup Menu) ▪ ACCEL (acceleration exceeds limit set in GPS Setup Menu) ▪ T1-T7 (when HIGH state voltage is applied to indicated triggers) ▪ USER_CONTROL (trigger command made using telnet protocol) ▪ DISK_FULL (disk full, recording stopped), TRIGGER_ACTIVE (any trigger is activates) Default for GP Out 1 Mode: RECORD Default for GP Out Mode: POWER
Time Setup	Displays the menu that controls the system date, time, timezone, Daylight Saving Time, and 12 or 24 hour formats	Default value for Daylight Saving Time is ON
Password Setup	Allows user to set a password that is required when performing certain activities with the MDVR; password allows use of designated activity for 30 minutes or until power is cycled	The MDVR prompts for password input when it is powered up initially. The default password is 123456 . The password may contain any upper- or lowercase letters in addition to numbers and the symbols “-“ and “@”. The requirement for a password can be enabled or disabled for 4 levels of operation as follows: <ul style="list-style-type: none"> ▪ All Keys ▪ Power-off ▪ Playback ▪ Menus

Menu Item	Description	Comments
Advanced Setup	Initiates display of the Advanced Setup menu	Menu items: <ul style="list-style-type: none"> ▪ Restore Defaults (restores factory default settings) ▪ Disk to Erase (selects target for Erase Media and Format Media options) ▪ Erase Media (Permanently deletes all recorded data except for the system directory) ▪ Format Media (Permanently deletes all recorded data and installs a DVR file system – use when “No Disk” error appears despite installed disk) ▪ Network Setup (See following “Network Setup Sub-Menu” section.)

■ Network Setup Sub-Menu

Menu Item	Description	Comments
IP Address:	MDVR network address (requires power cycle to take effect)	User-selectable
Subnet Mask:	Used to determine the subnet to which MDVR IP address belongs (requires power cycle to take effect)	User-selectable
Gateway:	Address of network gateway (entrance point)	User-selectable
FTP Username	Case-sensitive user name used when connecting with a web browser	Default: USER
FTP Password	Case-sensitive password used when connecting with a web browser	Default: PASS
Save:	Saves network setup information	N/A

Title Setup Menu

The Title Setup menu allows user naming of the MDVR and input triggers (for inclusion in meta-data and on-screen display) as follows:

Menu Item	Description	Default
System Name	Allows user input of a 14-character alphanumeric MDVR name	MDVR3xx
Trigger 1 through Trigger 7	Allows user input of a 4-character alphanumeric name for Triggers 1 through 7, respectively	N/A

Trigger Setup Menu

The Trigger Setup menu allows assigning an MDVR response and a voltage state ([ACTIVE] HIGH or [ACTIVE] LOW) for each of the user-defined triggers, as follows:

MDVR Response	Description
DISPLAY	Indicates trigger activity in on-screen display and in meta-data
MARK	Starts a recording if the MDVR is not already recording and indicates an event in the filename
RECORD	Starts a recording when trigger is activated and stops it when trigger is no longer activated
START [RECORD]	Starts a recording when trigger is activated but does not stop the recording when trigger is no longer activated
STOP [RECORD]	Stops a recording when trigger is activated

Default settings for all 7 input triggers are DISPLAY and HIGH.

■ Ignition Setup Sub-Menu

Menu Item	Description	Comments
Record Control	Enables or disables the Record Start Delay, Record Stop Delay, and Power Off Delay functions	Values: ENABLE, DISABLE Default: ENABLE
Record Start Delay	Delay time from when the ignition is turned ON to when the MDVR starts recording	Values: 0 MIN to 60 MIN Default: 0 MIN
Record Stop Delay	Delay time from when the ignition is turned OFF to when the MDVR stops recording	Values: 0 MIN to 60 MIN Default: 0 MIN
Power Off Delay	Delay time from when ignition is turned OFF and recording stopped and the MDVR powers off.	Values: -1 MIN to 60 MIN (see Caution) Default: 10 MIN

CAUTION: Setting the Power Off Delay value to '-1' keeps the MDVR on indefinitely until power is removed. This will run down a vehicle's battery.

Communication (Comm.) Setup Menu

The Communication (Comm.) Setup menu allows user configuration of Comm. 1 and Comm. 2 as follows:

Menu Item	Description	Comments
Baud Rate	Selects the baud transfer rate	Values: 4800, 9600, 38400 Default: 9600
Parity	Selects none, even, or odd parity	Values: none, even, odd Default: none
Data Bits	Selects number of data bits	Values: 5, 6, 7, 8, 9 Default: 8
Stop Bits	Selects number of stop bits	Values: 1, 2 Default: 1
Protocol	Selects the protocol to be used with zoom cameras; Note that Safety Vision supplies a Sony forward-facing camera	Values: NONE, VISCA (Sony), COSTAR Default: COSTAR

Menu Item	Description	Comments
One Touch Zoom*	Selects the percentage of zoom applied	Values: Default: 100 PCT
Focus**	Selects infinite or automatic focus	Values: AUTO, INFINITY Default: AUTO
Sensitivity**	Selects how sensitive the camera is to light	Values: HIGH, LOW Default: LOW
Slow Shutter**	Turns the slow shutter feature on or off	Values: ON, OFF Default: OFF

* This option only appears when VISCA or COSTAR is selected as the Protocol.

** These options only appear when VISCA is selected as the Protocol.

Camera 1-4 Setup Menu

The Camera 1-4 Setup menu displays camera setup information as follows:

Menu Item	Description	Comments
Frame Rate	Adjusts the frame rate of the selected camera in frames per second	Values: DISABLED, 1, 5, 7.5, 10, 15, 30, CUSTOM* Default: 30 fps
Image Size	Selects the image resolution of the selected camera	Values: D1 (720 x 480), VGA (640 x 480), QD1 (360 x 204), QVGA (320 x 240) Default: QVGA
Image Quality	Adjusts the compression rate of the selected camera; Lower image quality equates to increased record times and vice versa	Values: HIGH, MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW, CUSTOM* Default: MEDIUM
Audio	Selects if audio is recorded	Values: ON, OFF Default: ON
Audio Volume	Adjusts the volume at which audio is recorded in decibels (dB)	Values: 0db, 3db, 6db, 9db, 12db, -12db, -9db, -6db, -3db Default: 12db

* CUSTOM is set via telnet command

GPS Setup Menu

The GPS Setup menu displays system information as follows:

Menu Item	Description	Comments
Use GPS	Specifies whether the DVR records GPS information	Values: Yes or No Default: Yes
Use GPS Time	Specifies whether the DVR time is set automatically by GPS module	Values: Yes or No Default: Yes
UTC/Local Time	Difference between universal time (UTC time) and local time zone (in hours)	Values: 0 to +/-12 Default: -6 (for Central time zone)
GPS Data Format	Selects the on-screen display format for GPS information	Values: <ul style="list-style-type: none"> ▪ DDD:MM:SS (degrees: minutes: seconds) ▪ DDD:MM:mm (degrees: minutes: decimal minutes) ▪ DDD.ddddd (degrees: decimal degrees)

System Info Menu

The System Info menu displays system information as follows:

Menu Item	Description
Disk Size	Storage capacity of the removable hard drive
Pct (Percent) Used	Percentage of used space on the CF card or removable hard drive
Pct (Percent) Free	Percentage of free space on the CF card or removable hard drive
Version	Firmware version level
Mac Address	MAC (media access control) address of the DVR