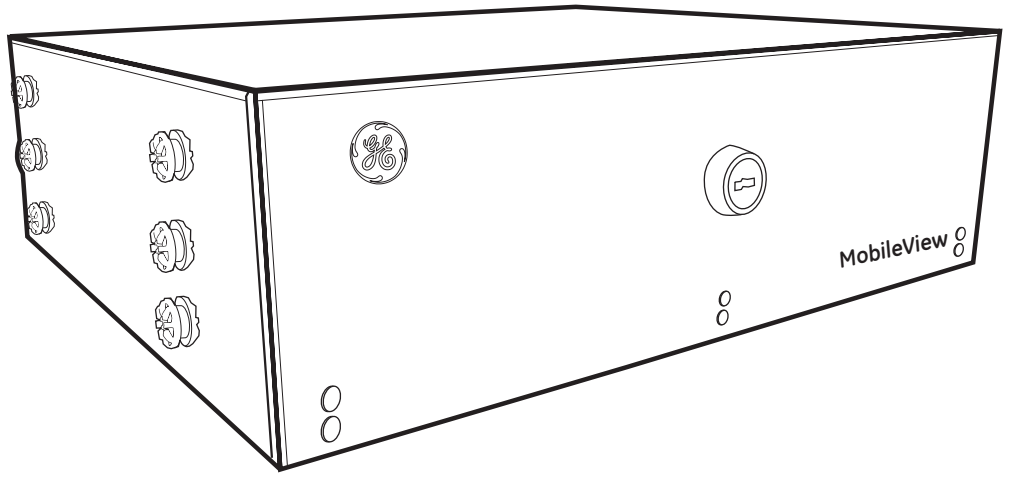
MobileView 4

Installation Manual



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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

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Preface

This is the GE *MobileView 4 Installation Manual.* This document includes an overview of the product and detailed instructions explaining:

- How to wire your MobileView system.
- How to configure and commission the system.
- How to test the system.

There is also information describing how to contact technical support if you have questions or concerns.

To use this document effectively, you should have a basic knowledge of the following:

- CCTV systems and components
- Electrical wiring
- Windows XP operating system
- TCP/IP networking
- Windows Remote Desktop protocol and file sharing

Read these instructions and all ancillary documentation entirely before installing or operating this product. The most current versions of this and related documentation may be found on our website. Refer to *Online resources* on page 83 for instructions on accessing our online publication library.

Note: A qualified service person, complying with all applicable codes, should perform all required hardware installation.

Conventions used in this document

The following conventions are used in this document:

Bold	Menu items and buttons.
Italic	Emphasis of an instruction or point; special terms.
	File names, path names, windows, panes, tabs, fields, variables, and other GUI elements.
	Titles of books and various documents.
Blue italic	(Electronic version.) Hyperlinks to cross-references, related topics, and URL addresses.
`Monospace`	Text that displays on the computer screen.
	Programming or coding sequences.

Safety terms and symbols

These terms may appear in this manual:

CAUTION: *Cautions* identify conditions or practices that may result in damage to the equipment or other property.

WARNING: *Warnings* identify conditions or practices that could result in equipment damage or serious personal injury.

Chapter 1 Introduction

This chapter provides an overview of your MobileView 4 product, including minimum hardware/software requirements and steps you need to perform before you begin installing, configuring, and using your MobileView 4 system.

In this chapter:

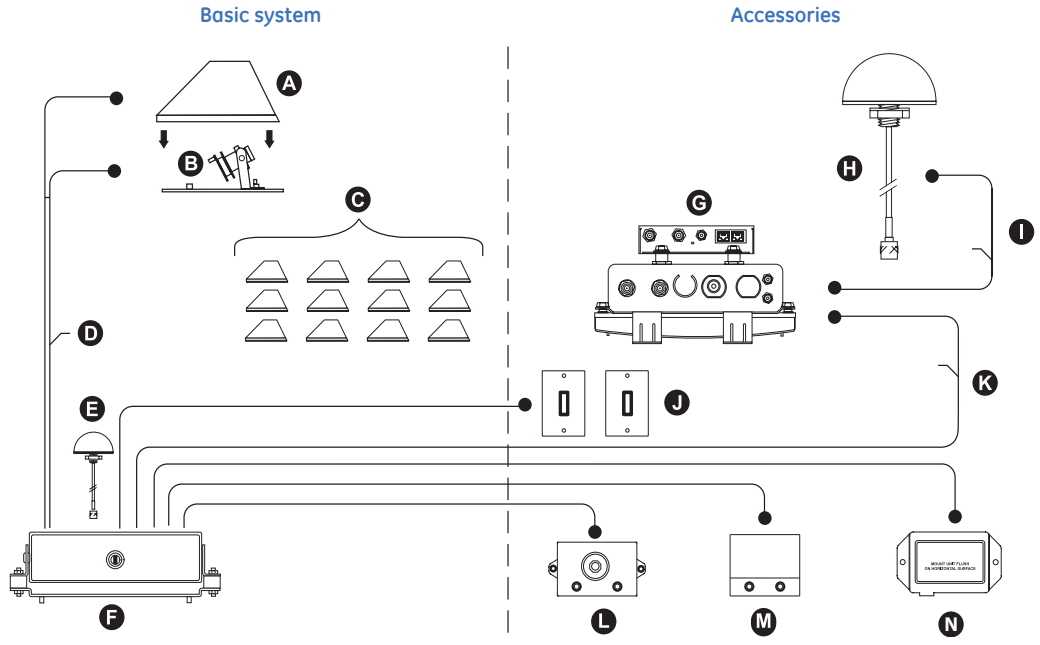
Product overview 2
Product contents 4
System requirements 4
Other requirements 5
References and related documents 5

Product overview

The MobileView digital video recording system supports up to twelve cameras, a DVR, dual-channel audio, and optional equipment such as an impact sensor, status/tag indicator, GPS, and wireless networking devices.

A MobileView system consists of software applications and the required equipment and the accessories shown in *Figure 1*.

Figure 1. A typical MobileView 4 system layout



Ⓐ Aluminum housing
Ⓑ Camera
Ⓒ Up to 12 cameras per system
Ⓓ RG179 Siamese coaxial cable
Ⓔ GPS antenna
Ⓕ DVR assembly
Ⓖ Wireless bridge
Ⓗ Wireless antenna
Ⓘ Wireless antenna cable
Ⓙ Microphones
Ⓚ Ethernet cable
Ⓛ Panic button
Ⓜ Accelerometer
Ⓝ Impact sensor

The central component of the MobileView system is a high-quality DVR, which records images from up to twelve cameras (monochrome or color) with dual-channel audio and information such as the time, date, and vehicle number. You may adjust image storage capacity by changing your recording speed, selected resolution, and drive size.

The DVR begins capturing video within 90 seconds of receiving the vehicle's ignition signal. It continues to capture data while that signal is present and for a programmable shutdown delay period after the vehicle ignition signal expires. Surveillance and event-based video data is stored on a mobile-rated, removable hard disk drive caddy. When available storage capacity is full, the DVR automatically overwrites the oldest data with new data in a FIFO (first-in, first-out) fashion.

Note: Most MobileView products are not supplied with mounting hardware. Exceptions are noted in the appropriate sections of the manual.

On the software side, the MobileView solution uses a Video Manager software application for the review of surveillance and event-based video stored on the DVR. Video Manager is also used to configure MobileView operating parameters. The Fleet Manager application adds remote management tools to automate video download, device health checking, e-mail notifications, and more.

Viewing and retrieving images

The DVR stores the captured digital images as monochrome or color files, which you can download to a computer using the MobileView Video Manager software. The DVR connects to a viewing station through a wired or wireless Ethernet connection. The viewing station is generally a laptop or desktop PC running the Windows XP Professional operating system. When you are connected to the viewing station, you can view or observe live video and log data stored on the DVR. You can also transfer recorded data to long-term storage media such as DAT tapes or recordable CDs.

Note: An Ethernet crossover cable is required to connect the DVR to the viewing station via a wired Ethernet connection.

Product contents

The MobileView 4 system includes:

- Digital video recorder (DVR) assembly
  - DVR main assembly
  - Removable HDD caddy
  - Removable wiring back box
  - Mounting plate
- Housing access keys

A MobileView system may contain one or more of these accessories:

- Camera (12 maximum)
- Panic button
- Impact sensor
- Microphones (two maximum)
- Accelerometer
- GPS antenna
- Wireless bridge

Inspect the package and contents for visible damage. If any components are damaged or missing, do not use the unit; contact the supplier immediately. If you need to return the unit, you must ship it in the original box.

System requirements

You need a computer to view the images and to interact with the system. The minimum computer requirements are:

- Windows XP OS with SP2 and all current updates
- .NET Framework SP1.1
- Pentium 500 MHz processor (1.2 GHz recommended)
- 512 MB RAM (1 GB recommended)
- SVGA monitor (1024 x 768 pixel resolution)
- 20 GB hard disk space (60 GB recommended)
- CD-RW drive (DVD-RW drive recommended)
- Ethernet crossover cable

Other requirements

Make sure you have access to the tools you will need to complete the installation:

- BNC crimper
- CAT 5 Ethernet crossover cable
- CAT 5 Ethernet patch cable
- Drill and bits, up to 5/8 in.
- Electrical connections (ends, lugs,etc.)
- Electrical tape
- Electrical voltmeter
- Extension cords
- General tools
- Heat shrink
- Hole saws, up to 1–1/8 in.
- Laptop/viewing station
- Thread-locking compound
- Molex pin crimper
- Phillips and flathead screwdrivers
- Riv-nut gun
- Socket set, up to 5/8 in.
- Solder gun with solder
- Spare BNCs
- Wrenches, up to 5/8 in.
- Spare Molex pins
- Spare terminal blocks
- Tie wraps (8 in.)
- Torx bit, secured #10
- Wire snake
- Wire strippers

References and related documents

For information related to MobileView 4 and its operation, consult the following documents:

- *MobileView 4 Fleet Manager User Manual* (1056729)
- *MobileView 4 Video Manager User Manual* (1056730)
- *MobileView Sideye Camera Installation Instructions* (1032731
- *MSS-7007-00-FF Camera Installation Instructions* (1038137)

You may also want to refer to the documentation for your cameras and other products for installation and setup information.

Chapter 2 Camera installation

This chapter provides information on determining a system layout and installing the hardware components.

In this chapter:

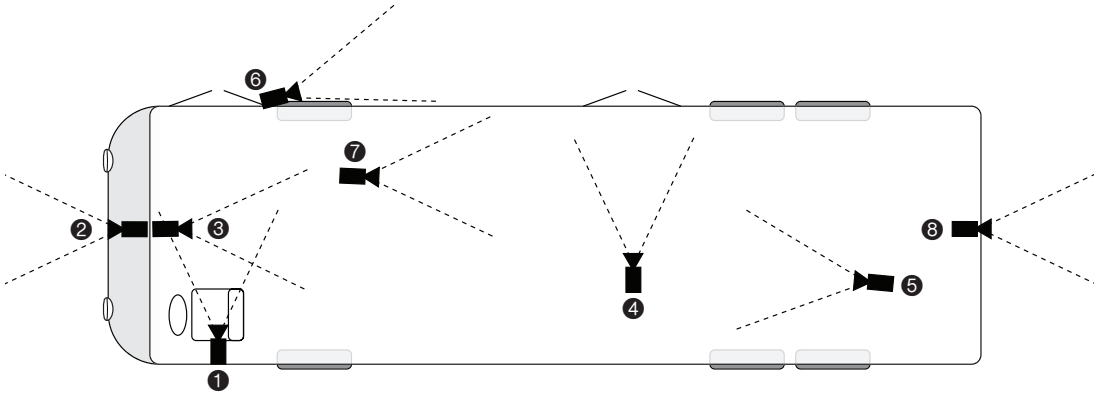
System layout 8
Camera cable guidelines 9
Camera assemblies 11
Surface-mount 11
Flush-mount 13
Field of view 14
Mounting location adjustments 16

System layout

Camera layout and fields of view vary based on several factors. Vehicle seating arrangements, partition walls, door location, and customer guidelines are but a few of these factors. It is the responsibility of the installer to ensure these factors are adequately considered *before* installation begins.

Figure 2 shows a typical, eight-camera layout. While most areas of the vehicle are covered when cameras are located in this manner, this illustration is provided as a guide and not a rule for actual camera placement. In all new installations, you should obtain customer acceptance of camera location and fields of view as part of installation planning.

Figure 2. Typical eight-camera setup with fields of view shown



❶ Front door camera. Front of the bus over the driver's head, looking at the front passenger entry.

❷ Forward-facing camera. Front of the bus, looking in front of the bus.

❸ Front-to-rear camera. Front of the bus, looking down the center aisle to the back.

❹ Rear exit camera. Across from the back door, looking at the back doorway.

❺ Rear-to-front camera. Back of the bus, looking up the aisle to the front of the bus.

❻ SideEye side camera. Exterior of the bus by the front door, looking toward the back of the bus.

❼ Center-to-rear camera. Between the front and back door, looking down the center aisle to the back of the bus.

❽ SideEye rear camera. Back of the bus, looking behind the bus.

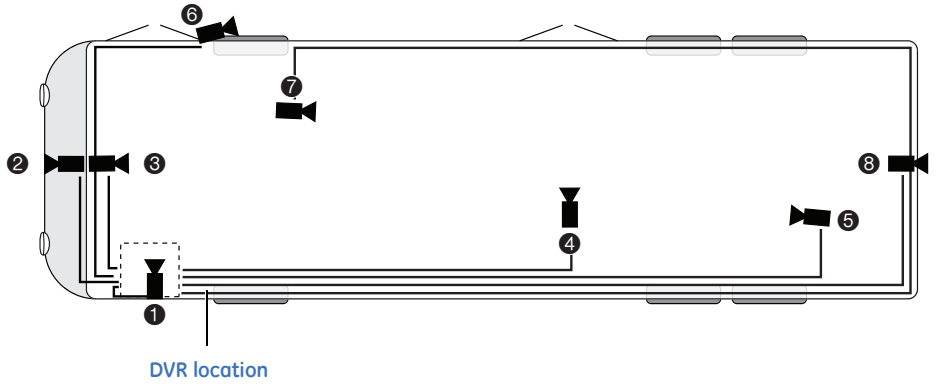
Note: Cameras 6 and 8 in *Figure 2* are MobileView SideEye cameras; camera 2 is a MobileView forward-facing camera. For installation of these cameras, see their respective manuals, shown in *References and related documents* on page 5.

Camera cable guidelines

When installing camera cable, follow these guidelines:

- Avoid excessive lengths of cable at the control and device end. Pull back excess cable to a duct area where it can be folded and secured. Leave a service loop as directed for specific devices.
- Cables should not come into contact with bare metal edges, light ballasts, or magnetic speaker coils. If ballasts and speaker coils cannot be avoided, cross them perpendicularly.
- Do not tighten cables that are secured with cable-ties to the extent that the cable is compressed or damaged. Do not crimp, crush, or severely bend the cables.
- When passing cables through tapping plates or metal sidewalls of the vehicle, if possible, insert grommets in the holes to protect the cables. If it is not possible, make sure that the protective outer CL2 jacket is maintained when passing the cables through the holes.
- When pulling cable through the conduit, do not jerk or overpull the cables. These actions will stretch and damage the cable. If you must pull cables through vehicle walls with limited access or conduit, attach a pull line to the cable jacket, not to the connector, and gently pull the cable through the appropriate routing paths.
- Route cables from each camera location to the DVR location as determined by your specific system layout. *Figure 3* on page 10 shows an example of cabling layout.
- After reaching camera locations, leave enough cable for a 6 in. (152 mm) service loop at each location.

Figure 3. Typical eight-camera cabling layout



❶ Front door camera.
❷ Forward-facing camera.
❸ Front-to-rear camera.
❹ Rear exit camera.
❺ Rear-to-front camera.
❻ SideEye side camera.
❼ Center-to-rear camera.
❽ SideEye rear camera.

Camera assemblies

The MobileView system supports up to twelve cameras (color and monochrome). Cameras supported by the MobileView system provide a 1.0 Vp-p composite analog video signal, at 75 ohm (CCTV standard).

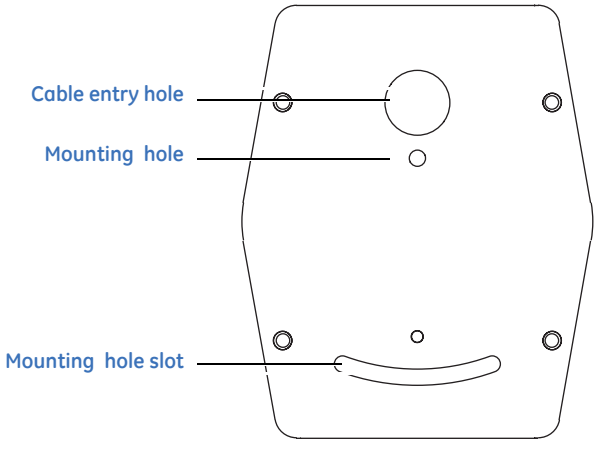
Note: In some installations, it is necessary to use a metal tapping plate behind the mounting surface. If you are using a tapping plate, prepare it the same way as the mounting surface. Drill a cable entry hole and mounting holes in the appropriate locations.

Surface-mount

It is typical to install surface-mount camera housings on the ceiling, but you may also mount the housings to any flat vehicle surface.

1. Use the template in *Camera mounting plate template* on page 93 to mark the location of the cable-entry hole and two mounting holes (*Figure 4*).

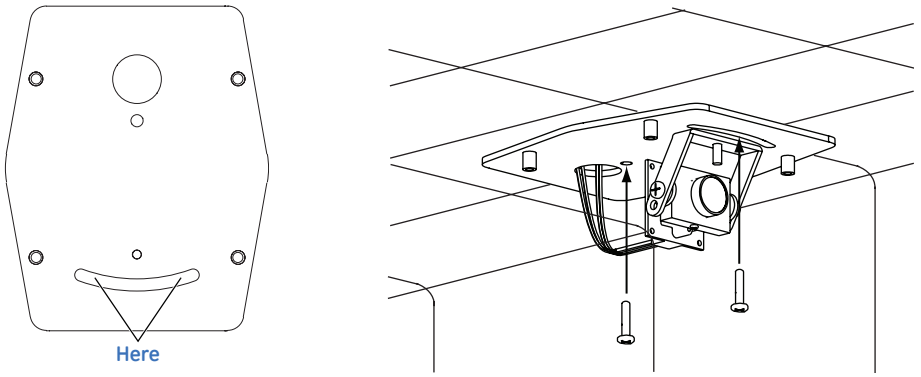
Figure 4. Mounting hole locations



2. Using a 3/16 in. (5 mm) drill bit, drill the two mounting holes.
3. Using a 1 in. (25 mm) drill bit, drill the cable entry hole.
4. Install a 3/4 in. (20 mm) (interior diameter) grommet on the cable entry hole, or where feasible.

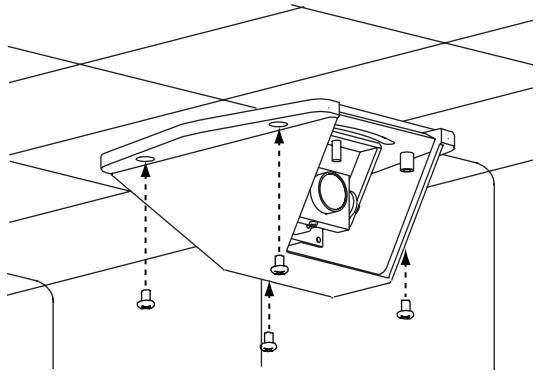
5. Connect the video and power cables to the camera, and feed the excess cable into the vehicle's duct area.
6. Mount the camera and mounting plate to the vehicle surface and tapping plate, if used. Do not put the screw in the center of the mounting hole slot (*Figure 5*).

Figure 5. Mounting plate installation



7. See *Field of view* on page 14 to align the camera's field of view.
8. Use a thread-locking compound, which prevents screws from vibrating, to secure the surface-mount housing to the mounting plate with the four 3/8 in. tamper-resistant tamper-torque machine screws (*Figure 6*).

Figure 6. Surface-mount housing installation



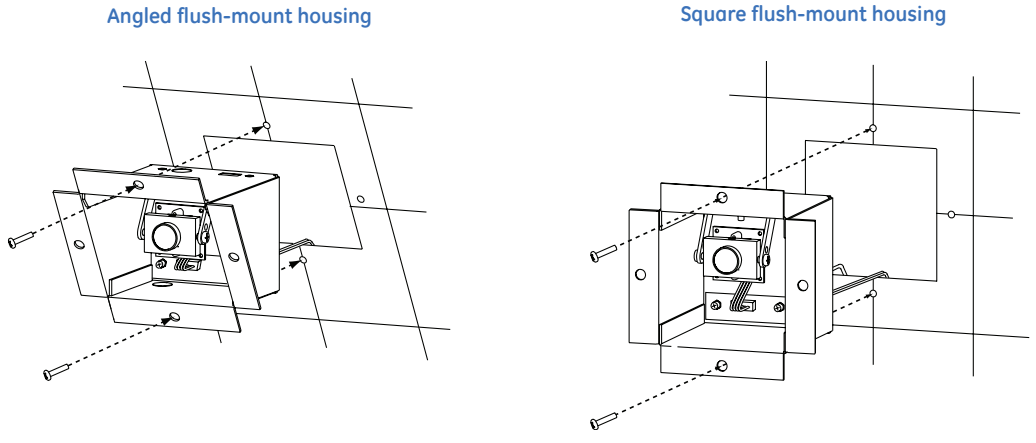
Flush-mount

There are two types of flush-mount cameras—square and angled. Flush-mount camera assemblies are mounted flush with the side panels of the vehicle.

Note: The square bezel that holds the glass camera cover has countersunk holes in the backside that cover the two housing screws. The housing and bezel screws are separate to allow access to the camera for focusing and adjusting while the housing is held firmly in place.

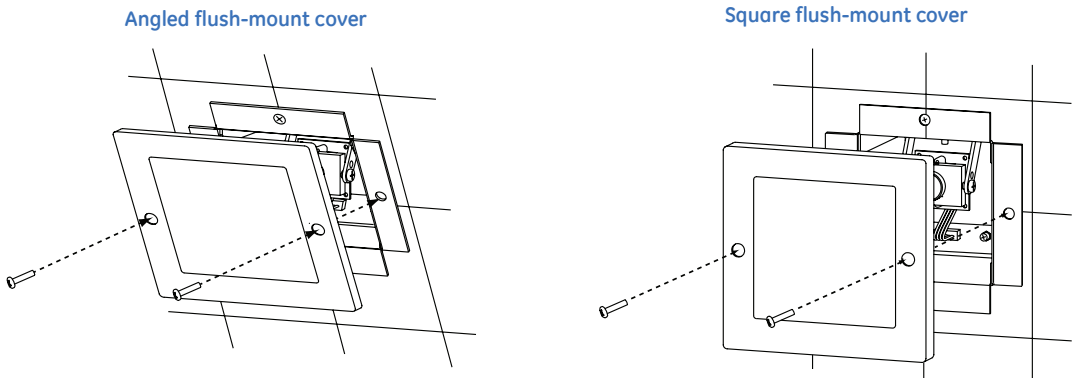
1. Leave at least 6 in. (152 mm) of clearance behind the mounting location.
2. Cut a 3.25 by 3.25 in. (83 by 83 mm) hole in the appropriate location on the mounting surface.
3. Using the housing as a template, mark the location of the mounting holes.
4. Using a 3/16 in. (5 mm) drill bit, drill the mounting holes.
5. Connect the video and power cables to the camera assembly.
6. Mount the camera assembly to the vehicle surface using two fasteners screwed into panel nuts (*Figure 7*).

Figure 7. Housing installation



7. See *Field of view* on page 14 to align the camera's field of view to the appropriate angle.
8. Attach the cover plate to the housing (*Figure 8* on page 14). If you are installing a square housing, you must drill two additional mounting holes for the cover plate.

Figure 8. Cover installation



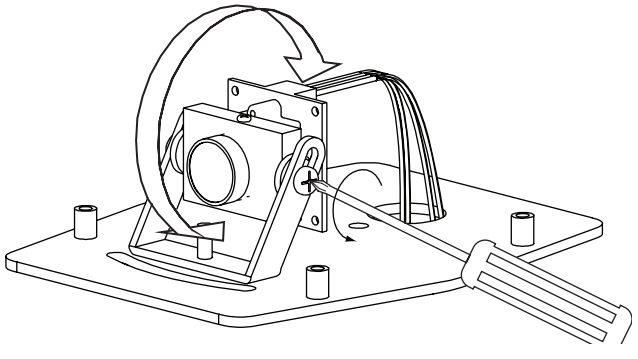
Field of view

Depending on the camera's location, you might have to adjust its position to provide the best field of view. Adjusting the camera positioning might include altering the position of the camera and, for surface-mount cameras, using a spacer.

To adjust the vertical angle of the camera, see *Figure 9* and do the following:

1. Loosen the camera's pivot screws.
2. Rotate the camera to the correct angle.
3. Retighten the pivot screws.

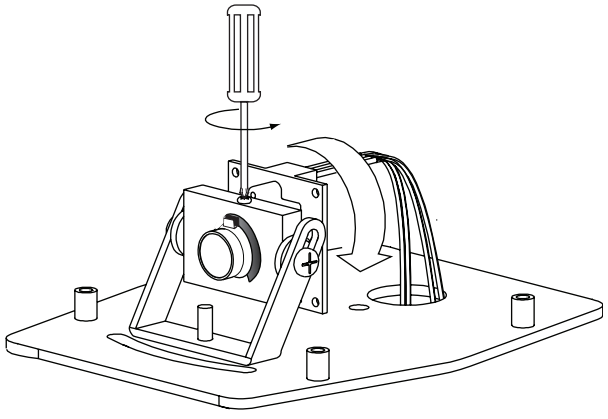
Figure 9. Adjusting the camera's vertical angle



Surface-mount cameras are configured at the factory to be installed onto the ceiling of the vehicle. You can rotate the camera lens if you are installing a surface-mount camera on the side of the vehicle. To rotate the camera lens, do the following:

1. Loosen the set screw on the top of the camera assembly.

Figure 10. Adjusting the camera's horizontal angle



2. Rotate the camera assembly 90°.
3. Retighten the set screw.

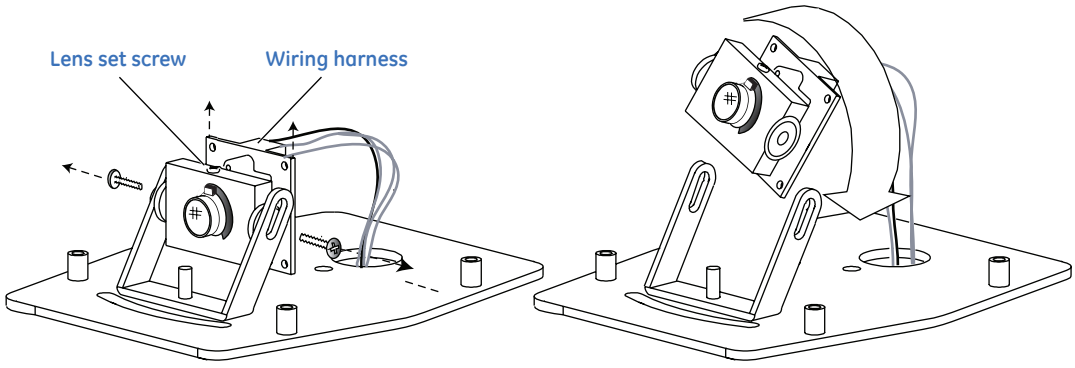
CAUTION: Overtightening the set and pivot screws can damage the camera's lens.

Mounting location adjustments

For cameras mounted on the street side of the bus or surface-mounted facing backward, you may need to invert the camera. To adjust the camera for specific mounting locations on the vehicle, do the following:

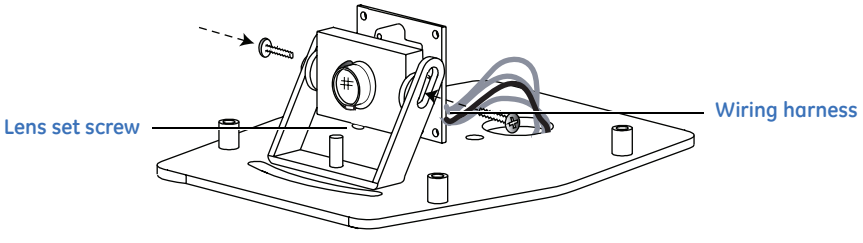
1. *Figure 11* shows (the default) orientation of a camera mounted on the curb side of the bus, the backside of the bus, or in a forward-facing position on the dashboard. (Note that the lens set screw and the wiring harness are at the top of the camera.) For cameras mounted on the street side of the bus or surface-mounted facing backward, remove the two side set screws and lift the camera out of its bracket.

Figure 11. Loosening the camera from the mounting bracket and inverting the camera



2. Rotate the entire camera assembly 180º.
3. Insert the camera into the bracket, and replace the set screws. The lens set screw and the wiring harness should be positioned at the bottom of the camera (*Figure 12*).

Figure 12. Reattaching the camera in the mounting bracket



Chapter 3 DVR installation

This chapter provides information on installing and wiring your MobileView 4 DVR.

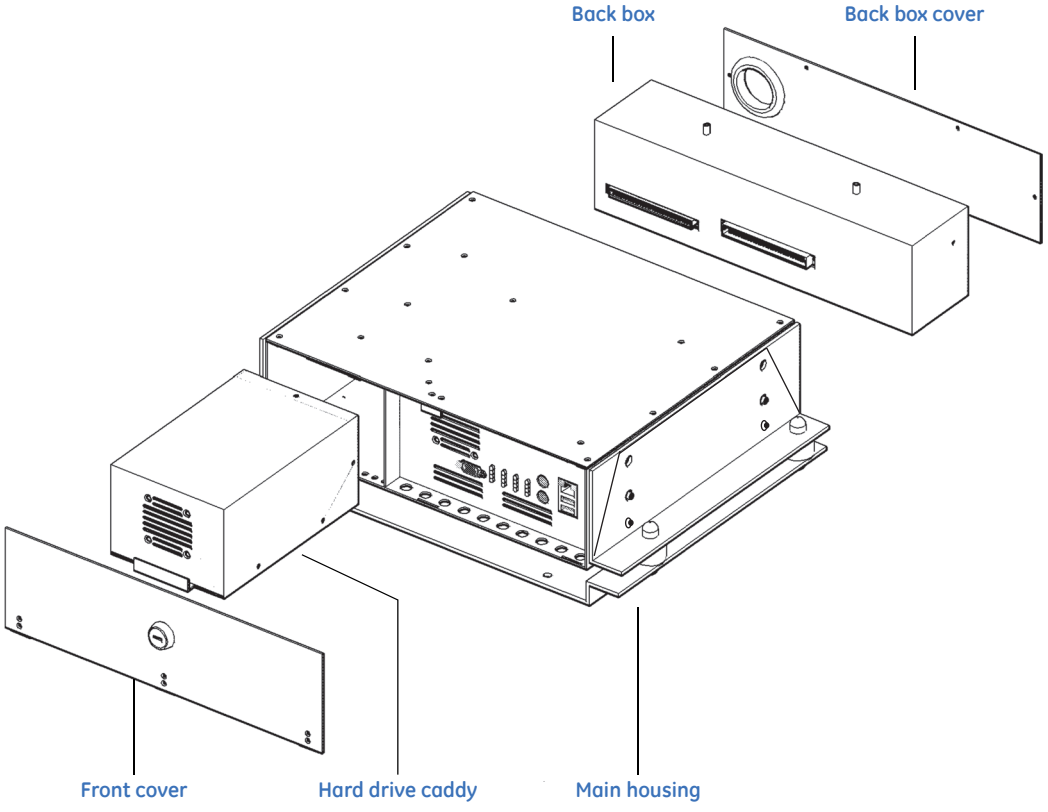
In this chapter:

Installation overview 18
Mounting 19
Wiring 20
- *Camera power connections* 20
- *BNC connections* 21
- *Analog and digital input connections* 21
- *Status output connections* 22
- *Input power connections* 23
- *Audio connections* 24
- *Relay outputs* 24
- *Reinstalling the back box* 25
- *Maintenance plug* 25

Installation overview

The DVR is housed within a protective outer housing that is mounted to the vehicle (*Figure 13*). All connections are made through the back box.

Figure 13. DVR assembly

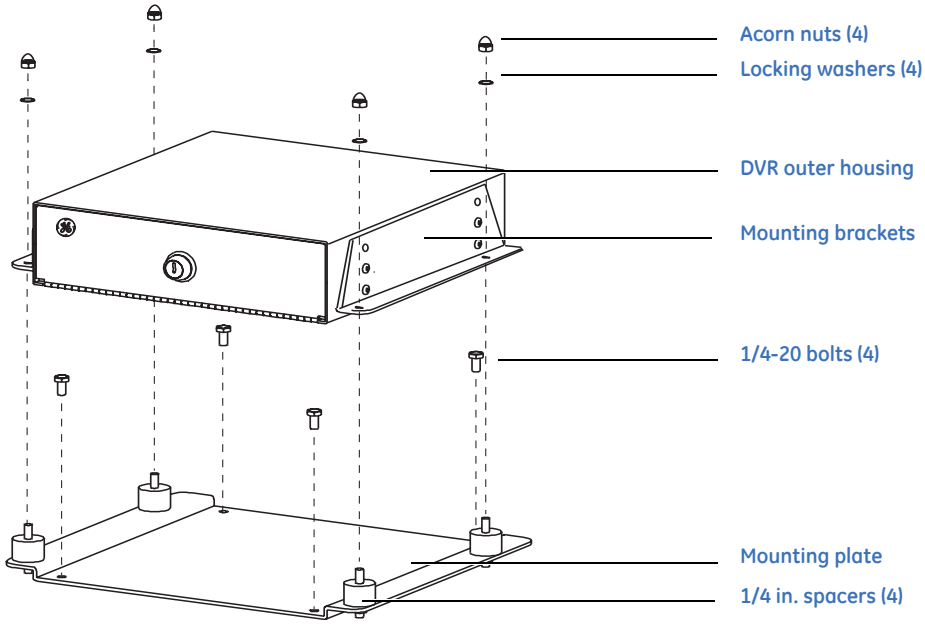


Mounting

You can mount the DVR housing in various orientations except with the DVR facing the floor. You must leave enough space to open the door and to remove the hard drive caddy. To mount the DVR housing, see *Figure 14* and do the following:

1. Remove the four nuts and locking washers from the DVR side mounting brackets.
2. Remove the DVR main housing from the mounting plate. Do not remove the vibration isolators or the nuts and bolts holding them in place.
3. Fasten the mounting plate to the vehicle using four nuts and bolts. These are not provided; we recommend 1/4-20 bolts. Ensure you have enough space available for system cabling at the rear of the housing.
4. Reattach the DVR main housing to the mounting plate and secure the side mounting brackets using the locking washers and nuts previously removed.
5. Fasten the finished assembly securely in place.

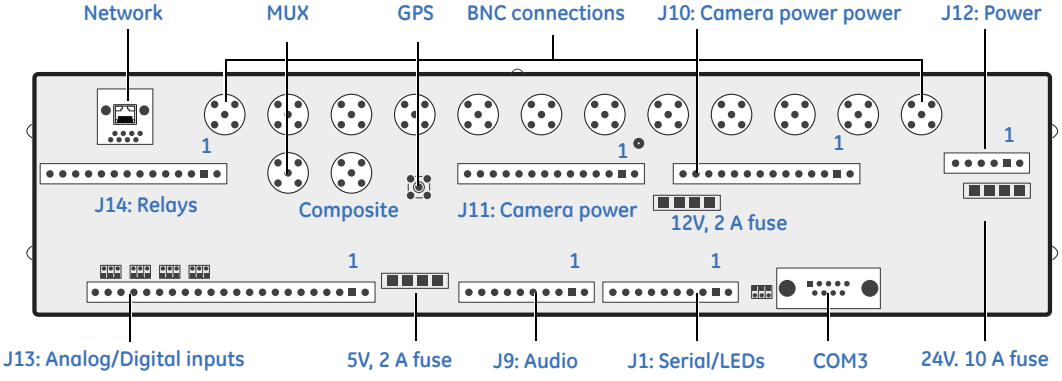
Figure 14. Mounting the DVR



Wiring

Wiring connections between the DVR and auxiliary devices are made to the DVR's back box (*Figure 15*). Wires enter through the cable-entry hole.

Figure 15. DVR back box connections

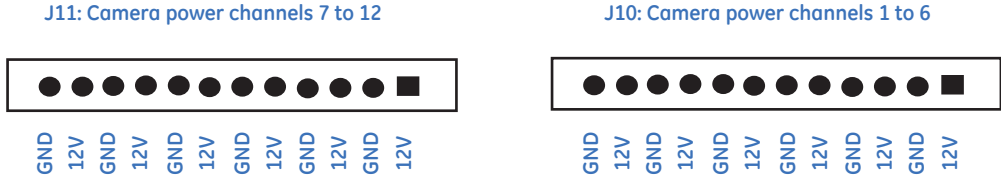


Camera power connections

The J10 and J11 camera power terminal blocks provide power to the vehicle's cameras. To wire the camera power connections, do the following:

1. Remove the camera power terminal block from the back box by loosening its mounting screws and pulling it out of its socket.
2. Make connections as shown in *Figure 16*. To make connections, strip each wire 3/8 in. (10 mm), insert it into the appropriate slot, then tighten the terminal screw.
3. Reinstall the camera power terminal block.

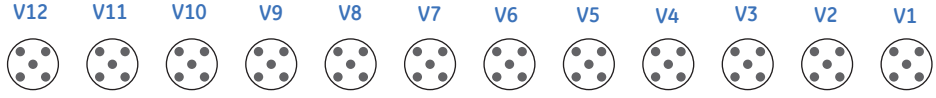
Figure 16. Camera power terminal block connections



BNC connections

Connect each camera's video output cable to its corresponding BNC connector on the back box (*Figure 17*). Camera 1 connects to V1, camera 2 to V2, etc.

Figure 17. BNC connectors

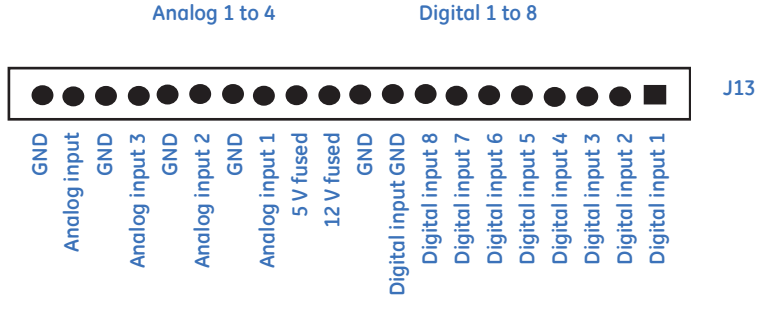


Note: Camera numbers will not always correspond one to one with the BNC connectors. Be sure to connect the appropriate BNC port, according to your specific system's design.

Analog and digital input connections

The MobileView system provides for eight digital inputs and four analog inputs on the J13 terminal block (*Figure 18*). You may program these general-purpose inputs to activate complicated system reactions based on input status, voltage levels, time of day, or day of week. See *Chapter 4 DVR configuration* on page 27 for programming details.

Figure 18. Analog and digital terminal block connections

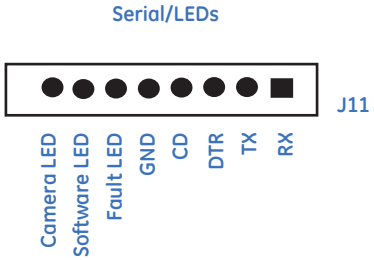


MobileView provides two specific peripheral devices for use with the digital inputs. These are the impact sensor and panic button. See *Chapter 5 Optional hardware installation* on page 59 for details on these devices.

Status output connections

The MobileView system provides two status outputs on the J1 serial/LED terminal block (*Figure 19*) for optional use.

Figure 19. Status output connections



The purpose of these outputs is to provide a quick means of determining the operating status of the MobileView DVR.

- Fault LED: This output is normally inactive and is not commonly connected to an external indicator.
- Camera LED: This output is normally inactive and is connected to the red Status LED on the panic button.
- Software LED: This output is normally active and is connected to the green Status LED on the panic button.

These open collector outputs are rated to sink 40 mA. The most common uses for these outputs are as interfaces to a vehicle monitoring system or to the status LEDs on the MobileView panic button.

Before connecting between the MobileView and a vehicle monitoring system, consult the vehicle manufacturer to determine compatibility. To connect the status lights on the panic button to the status outputs, see *Panic button* on page 68.

Input power connections

Main system power, ignition signal, and system ground are supplied through the four-pin Phoenix connector at J12 located on the DVR back box. Ensure power inputs to the DVR are fused as shown in *Figure 20*. Failure to fuse inputs could result in damage to the MobileView DVR or vehicle power system.

WARNING: Do not make any connection to J12.4. This connection is not intended for use. Failure to heed this warning could result in damage to the DVR, which is not covered by your warranty. Ensure main/ignition power is off while making any connection to DVR back box connectors, while the back box is removed, and before inserting or removing the back box. Failure to heed this warning could result in damage to the DVR, which is not covered by your warranty.

To connect power, see *Figure 20* and do the following:

1. Run a four-conductor 16 AWG wire from the vehicle power source to the DVR.

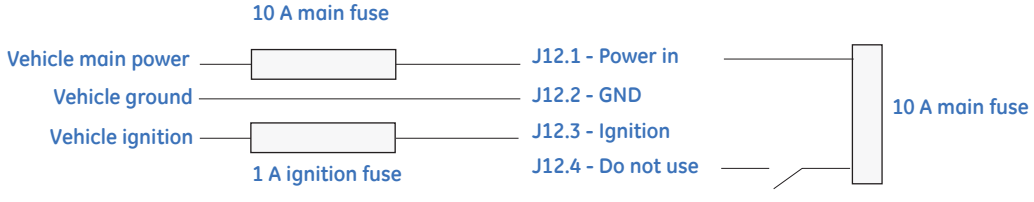
   Note: The *power in* connection must be inline-fused with a 10 A fast-blow fuse and the *ignition* connection must be inline-fused with a 1 A fast-blow fuse.

2. Make connections to the vehicle power source. (Contact the vehicle manufacturer for information on connecting to the vehicle power source.)
3. Terminate the wire into the Phoenix connector and make connections to the DVR's four-pin Phoenix connector. Before connecting the Phoenix block to the back box, test the four-pin Phoenix wire-harness for power (continuous 24 VDC and engine running/ignition).

   Note: For a working definition of engine running/ignition, contact the vehicle manufacturer.

4. Check the power connections with a voltage meter to ensure correct polarity.
5. Plug the Phoenix connector into the back board on the DVR back box.

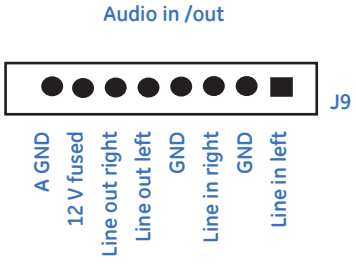
Figure 20. J12 main power connection



Audio connections

Figure 21 shows the J9 audio terminal block. See *Microphone* on page 70 for information on single- and dual-channel audio connections.

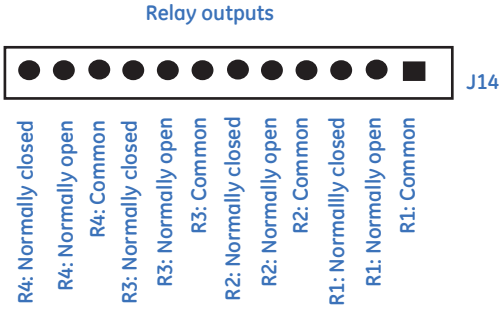
Figure 21. J9 audio terminal.



Relay outputs

The MobileView system provides for four relay outputs on the J14 terminal block (*Figure 22*). You may program these general-purpose outputs to activate on complicated system reactions based on input status, voltage levels, time of day, or day of week. See *Chapter 4 DVR configuration* on page 27 for programming details.

Figure 22. Relay outputs



Reinstalling the back box

Once all connections to the DVR back box are made, follow the steps below to reassemble the DVR.

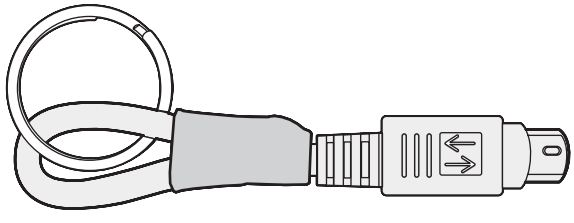
1. Check for any screws that may be loose.
2. Tighten wiring inside the back box as the cover plate is pressed into place.
3. Securely fasten the cover plate using the previously removed screws. Do not cross-thread or overtighten the screws.
4. Insert the back box into the DVR outer housing.
5. Gently rock the back box into place with an even pressure applied to opposite sides of the cover plate. It should eventually snap into place.
6. When properly aligned, the back box retaining screws easily secure the assembly.

CAUTION: The back box screws and drive caddy must be fully engaged to properly secure the DVR.

Maintenance plug

The maintenance plug (*Figure 23*) lets you start or shut down the MobileView 4 DVR manually. You might need to force a manual shutdown to remove and/or swap the hard drive caddy. It is also useful to force DVR shutdown for routine maintenance purposes.

Figure 23. Maintenance plug



Startup

To start the DVR when it is off, insert the maintenance plug into either the upper or lower PS2 port. If main power is present, the DVR will start up. Initially, software LEDs 1, 2, and 3 will blink. Once these stop blinking and go to their normal state, the DVR is up and running. Removal of the maintenance plug will have no affect on the system. If the ignition input is deactivated, the system's shutdown timer sequence will activate. Upon expiration of the shutdown dwell time, the DVR will shut down.

Shutdown

To shut down the DVR while it is running normally or during the delayed shutdown time, insert the maintenance plug into either the upper or lower PS2 port. The DVR will immediately begin an orderly shutdown. The DVR will remain off while the maintenance plug is in place. If, upon removal of the maintenance plug, the ignition input is active, the DVR will begin its startup sequence.

Chapter 4 DVR configuration

This chapter provides information on configuring your DVR.

In this chapter:

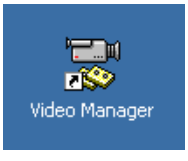
Connect to the DVR 28
Remote desktop connection 30
Date and time 32
Commit DVR changes 33
System configuration 35
Delete files after setup 56

Connect to the DVR

To configure your laptop for direct connection to the DVR, do the following:

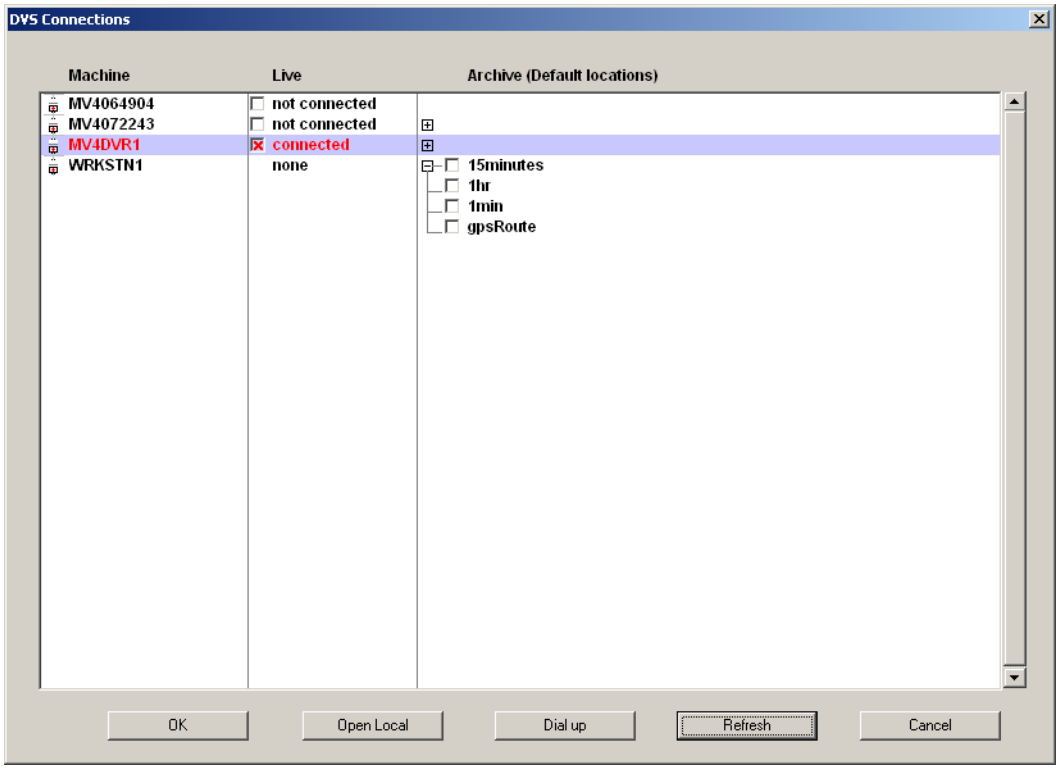
1. Connect an Ethernet crossover cable between your laptop Ethernet port and the DVR front Ethernet port. (A regular patch cable will not work.)
2. On your laptop, open Network Connections (**Start > Settings > Network Connections**).
3. Set your laptop's IP and subnet settings to the following:
   - IP address: 192.168.0.99
   - Subnet: 255.255.255.0
4. Open the Video Manager application from your laptop by double-clicking the MobileView icon (*Figure 24*).

Figure 24. MobileView icon



5. If the *DVSS connections* window (*Figure 25* on page 29) does not automatically open, click on the **Open** button to display the available DVR connections.
6. Under the column *Machine*, find the DVR name.
7. On the row with the correct *Machine* name, select the check box for LIVE and click **OK.**
8. After answering prompts for logon name and password, the software will connect to the DVR and display available live video.

Figure 25. DVSS connections



After installing the MobileView 4 DVR, you may use the Video Manager software installed on your laptop to configure the DVR.

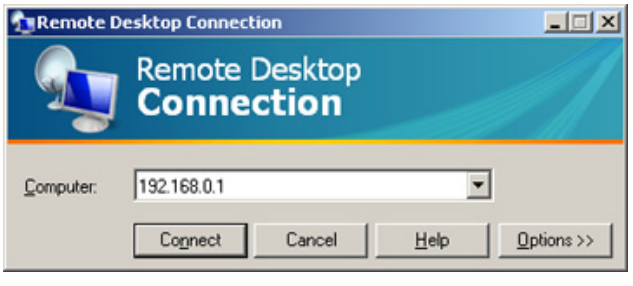
Remote desktop connection

You must perform certain configuration activities on the MobileView 4 DVR itself. Besides logging onto the DVR directly through its mouse, monitor, and keyboard ports, you may also log on using the Remote Desktop program.

To establish a remote desktop connection, do the following:

1. Connect an Ethernet crossover cable between your laptop Ethernet port and the DVR front Ethernet port. (A regular patch cable will not work.)
2. On your laptop, select **Start > Settings > Network Connections**.
3. Set your laptop's IP and subnet settings to the following:
   - IP address: 192.168.0.99
   - Subnet: 255.255.255.0
4. Open a remote desktop connection by clicking **Start > Programs > Accessories > Communications > Remote desktop connection**. You may also click **Start > Run** and type `mstsc.exe` in the run box.
5. Enter the DVR's IP address (default is 192.168.0.100) into the remote desktop connection dialog window (*Figure 26*). Click **Connect**.

Figure 26. Remote desktop connection



6. Enter DVR credential information, which is case sensitive:
   - Default login: *administrator*
   - Default password: ********
7. Once the DVR displays its desktop, you may operate as if you are directly connected to the DVR.

To disconnect from a remote desktop connection session, do the following:

1. Close all windows on the remote desktop.
2. Click on the remote desktop to ensure it has focus.
3. Use the keyboard and press **Alt+F4** to display the shutdown windows dialog.
4. Select log off from the dropdown menu and click **OK**. The remote desktop session closes.

Date and time

Before the MobileView 4 DVR will properly capture images, you must set the date, time, time zone, daylight saving adjustment, and time server.

CAUTION: Failing to properly adjust system time settings may result in difficulty retrieving desired video date. In extreme cases, you may even experience data loss.

To adjust your system time settings, do the following:

1. Establish a remote connection. (See *Remote desktop connection* on page 30.)
2. Double-click the system clock in the taskbar (*Figure 27*). The *Date and Time Properties* dialog box will open.

Figure 27. System clock

3. Select the *Date & Time* tab and adjust settings to local time.
4. Select the *Time Zone* tab and adjust settings to the correct time zone.
5. Apply the daylight savings time adjustment, if applicable.
6. Select the *Internet Time* tab and adjust time server settings.
7. Click **Apply**.
8. Since these changes are being made to write-protected drive C, be sure to commit the changes and reboot the DVR. See *Commit DVR changes* on page 33.

Note: Access to a time server from the DVR is required to use this setting. Systems with the optional GPS antenna should have automatic time server synchronization turned off. System time is set automatically when the GPS antenna is installed and a valid signal is present.

Commit DVR changes

The C-drive on the DVR is write protected. Any changes to the OS or registry, such as setting the time zone or loading an application upgrade, require permanent writing to the DVR's C-drive. The DVR provides an onboard utility to "commit" the changes to drive C.

To permanently write changes to the C-drive, do the following:

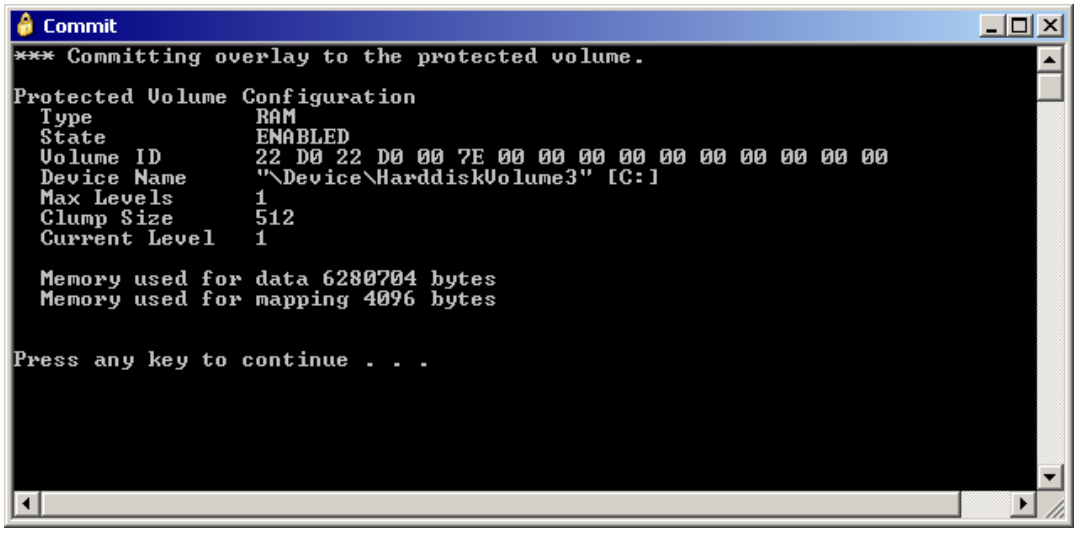
1. Establish a remote desktop connection. See *Remote desktop connection* on page 30.
2. Make changes to the system as required. Examples of changes could be registry settings or program updates.
3. When you are finished, double-click the *Commit* icon (*Figure 28*) to launch the commit application (*Figure 29* on page 34).

Figure 28. Commit icon

4. Press any key to close the commit application window.
5. Do the following to perform an orderly shutdown to finalize a commit:
   a. Close all windows on the remote desktop.
   b. Click on the remote desktop to ensure it has focus.
   c. Use the keyboard and press the **Alt+F4** to display the shutdown dialog.
   d. Select restart from the dropdown and click **OK**.

The remote desktop session closes. The changes take effect upon restart.

Figure 29. Commit application



System configuration

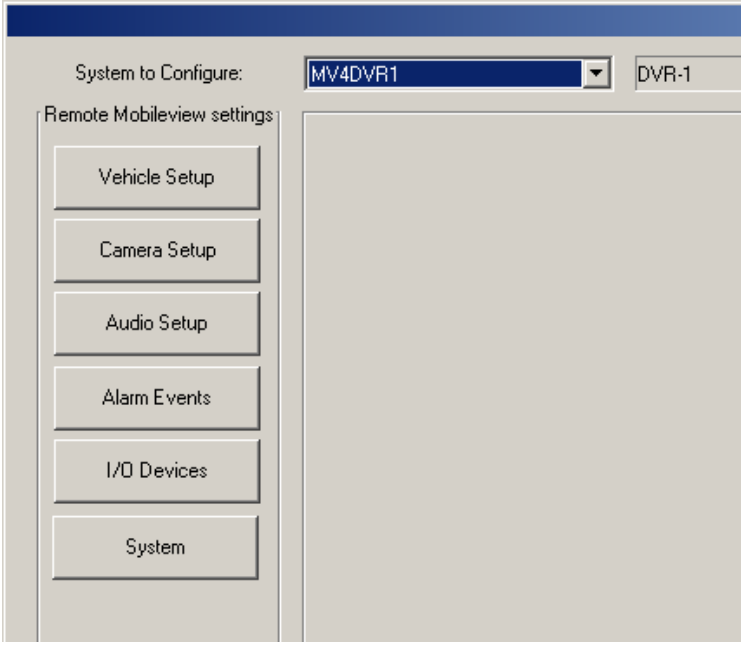
Each MobileView DVR must be configured based on system installation and use requirements. Consequently, configurations vary from install to install and site to site. If you are commissioning a new system, carefully consider how a particular property would use MobileView and adjust operating parameters accordingly.

Using Video Manager, connect to the target DVR and press the **Config** button (*Figure 30*). This will provide access to the configuration and operational settings of the DVR.

Figure 30. Config button

The buttons under the heading *Remote MobileView* settings in the configuration screen (*Figure 31*) control the DVR's operational characteristics.

Figure 31. Remote settings



The following features allow you to configure all remote settings:

- *Vehicle setup*
- *Camera setup* on page 38
- *Audio setup* on page 46
- *Alarm events* on page 47
- *I/O devices* on page 50
- *System* on page 51

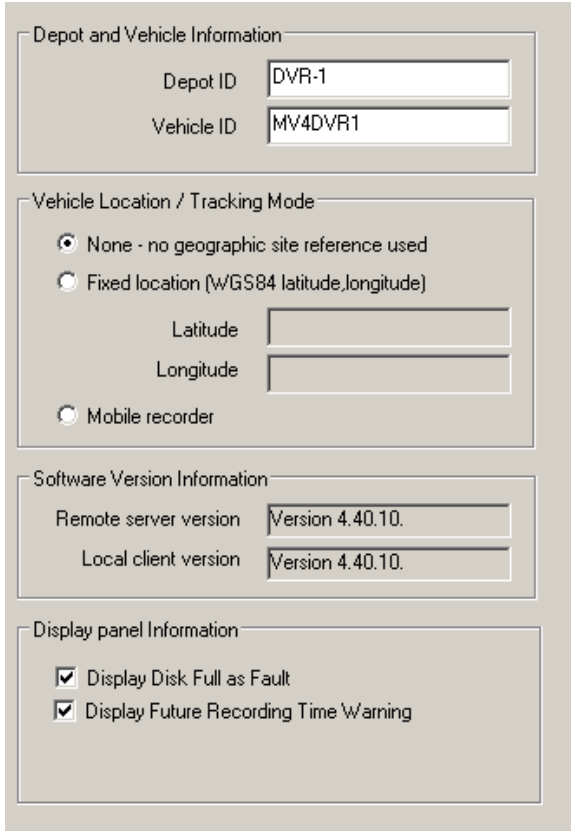
Note: This system configuration section provides limited detail required to accommodate initial DVR setup. For greater detail, refer to the *MobileView 4 Video Manager User Manual*.

Vehicle setup

To use *Vehicle setup*, do the following:

1. Press the **Vehicle setup** button on the left side of the configuration screen (*Figure 32* on page 37) to configure your vehicle setup.
2. Enter your Depot ID (DVR number) and its corresponding vehicle ID.
3. Designate how your vehicle is tracked or monitored. If it is a fixed location, check the *Fixed location* radio button and enter the location's coordinates. If using a mobile recorder, check the *Mobile recorder* radio button.
4. Note the software version information.
5. Select the `Display Disk Full as Fault` check box. The Camera status output, J11.8, turns on when the archive partition is full. (See *Status output connections* on page 22).
6. Select the `Display Future Recording Time Warning` check box. The Camera status output, J11.8, turns on when the current time precedes recorded time by more than 5-minutes. (See *Status output connections* on page 22).
7. Click **Close**.

Figure 32. Vehicle setup



Camera setup

Press the **Camera setup** button on the left side of the configuration screen to configure the attached camera channels.

Select the camera channel to be configured from the horizontal list of camera thumbnails located in the upper portion of the *Camera configuration* screen. The camera name is also listed beneath the thumbnail for further identification. You can scroll the thumbnail display left and right to reveal further cameras using the slider bar at the base of the camera selection area. Use the mouse to choose the required camera channel to configure.

The buttons located beneath the *Camera selection* area provide access to the following camera settings:

General. Setting of camera names, picture resolution, color depth, and frame rates.

Compression. Selection of compression algorithm and compression levels.

Security. Access to camera images and image identification information.

Camera control. Camera adjustments such as brightness, contrast, and color levels.

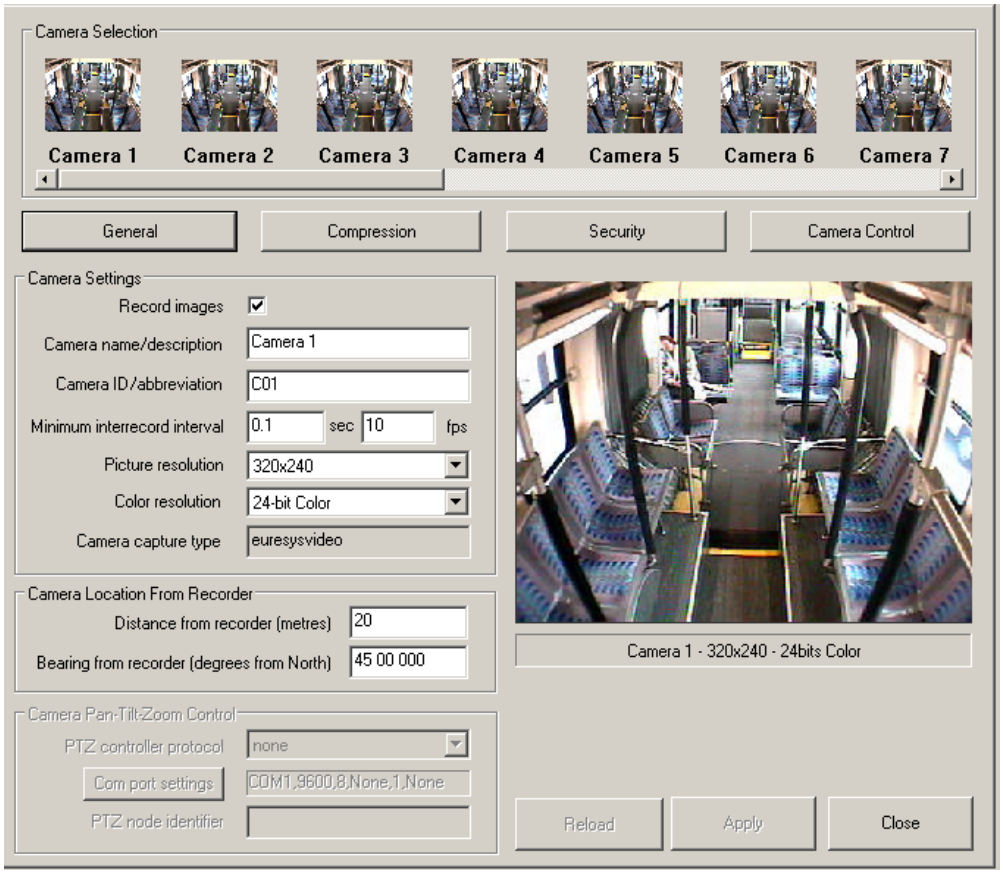
All camera settings in the camera configuration area apply to an individual camera giving the flexibility of tailoring each camera to its specific view requirements.

If you want to apply the same settings to all cameras, click **Apply Settings to All Cameras**.

General

Press the **General** button to display the *General settings* screen (*Figure 33*).

Figure 33. General settings screen



The *General settings* screen contains the following fields:

Record images. Turns the recording of images to the data file on and off for this camera.

Camera name/description. A user-entered description or name for the camera. Use this field as a reference to enable easy identification of the camera. This field will also appear on camera information text overlays and on printed images.

Camera ID/abbreviation. Similar to the camera name field above except that this is an alternative camera name or identification reference. For example, the camera name in the field above may be *Reception area front desk*, while this field may be a camera ID code such as *R024*.

Maximum recorded rate. Use this field to control the recorded frame rate for this camera. The value entered is the time interval (in milliseconds) between camera recorded camera pictures. One millisecond is one thousandth of a second, and, at 20 frames per second, the time between images is 50 milliseconds (or 1000 divided by 20).

The default value for this field is 0, which delivers the maximum camera frame rate. Entering 500 (or half a second) in this field will slow the frame rate for this camera to approximately two frames per second.

Picture resolution. Select the required camera resolution from the dropdown list. Increasing camera resolution will improve picture quality and improve identification but will increase the image size and storage space required, therefore reducing the DVR's effective recording time. *Table 1* shows camera resolutions supported.

Table 1. Supported camera resolutions

Resolution	NTSC
Low	320 x 240 (CIF)
Medium	640 x 240 (2 CIF)
High	640 x 480 (4 CIF)

Color resolution. Select the required color resolution or color depth (16-bit grayscale or 24-bit color). Color images typically require more storage space than grayscale images but have a greater depth color. *Table 2* shows the color resolutions supported.

Table 2. Supported color resolutions

Color resolution	Bytes per image	Color depth
Grayscale	1 byte	256 colors
Color	3 bytes	1.67 million colors

Camera type. The camera type field is for information only and indicates the type of model of the camera capture hardware used for this camera channel. This setting is hardware dependent and is not user configurable.

Camera locations. You must enter the camera distance from the recorder if the camera is to be specifically and individually located on the map display window. The location of the camera is specified relative to the recorder's position with the bearing angle entered with respect to geographic north. If you use camera locations, you must configure the site as either fixed-location or mobile.

Compression

Press the **Compression** button to display the *Compression* screen (*Figure 34* on page 42).

The compression algorithm refers to the mathematical method or process used to reduce the size of the original image for recording and storage. The compression level controls the extent of compression applied. The default compression algorithm used by the MobileView system is JPEG.

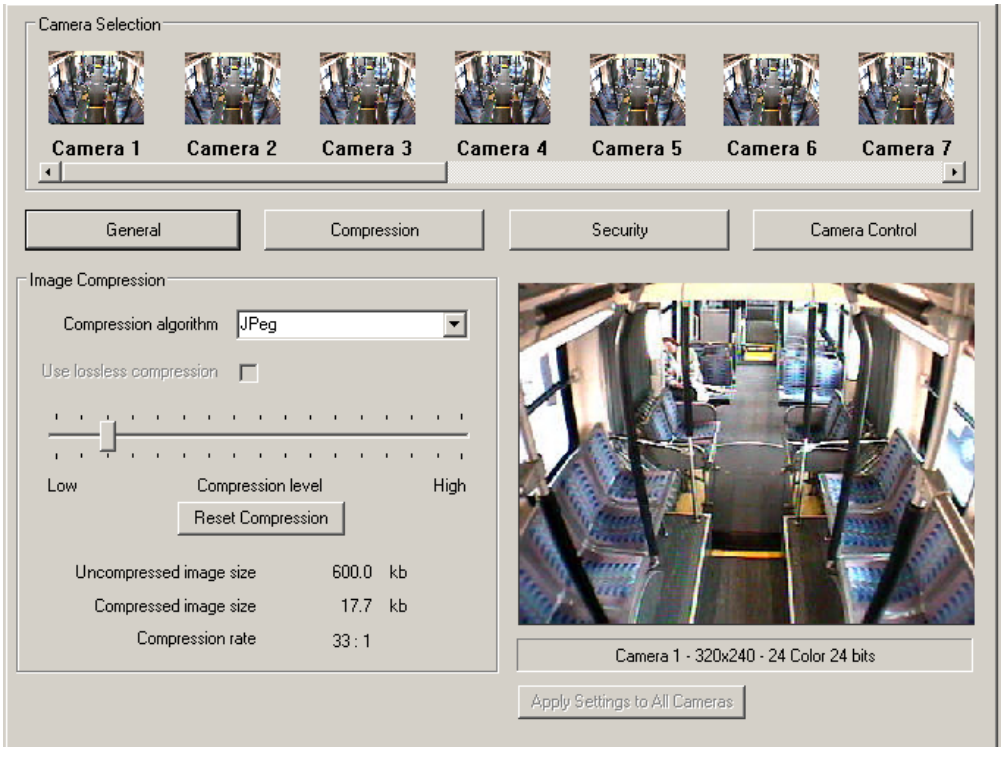
Increasing the compression level reduces the size of the resulting image and extends the storage capacity of the recording system; however a highly compressed image may suffer loss of useful image content and may adversely affect the ability to analyze, authenticate, and identify the content of the image. Reducing the compression level ensures preservation of image content and quality but increases the size of each stored image and reduces the storage capacity of the recording system.

Slide the compression slider left to decrease image compression or right to increase image compression.

You can set the compression algorithm and compression level for each camera to optimize the quality and storage capacity for each camera and to best suit the playback analysis requirements.

Image statistics are provided to show the original source image size and the resulting compressed image size.

Figure 34. Compression screen

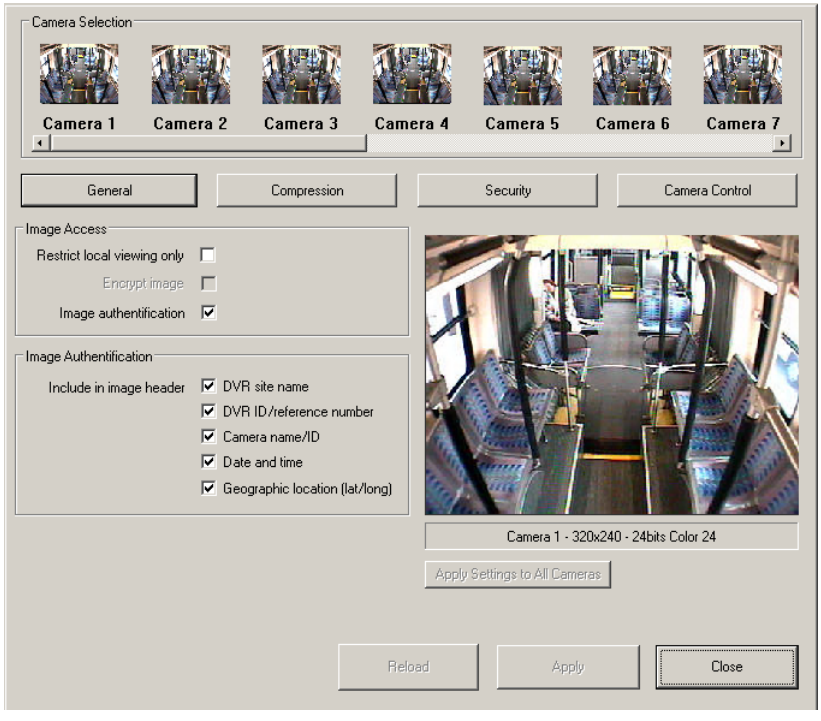


Security

For enhanced security and for image authentication purposes, you can electronically encrypt and embed recorded pictures with specific site and camera information (*Figure 35*). This information is stored in a protected region of the image and does not alter the content or structure of the picture. Similarly, alterations made to the picture do not affect the authentication information.

In the *Restrict local viewing* mode, you can only view specific camera images from your local machine (the DVR itself). Remote users connected to the DVR across a network or other remote means cannot view the images from this camera regardless of security access account and password level. The default mode for this option is disabled.

Figure 35. Security



Camera control

Use the camera control settings to adjust the appearance of images such as brightness and contrast. Most of these settings make changes at the hardware level and relate to the hardware of the image capturing device.

Press the **Camera Control** button to display the *Camera control* screen (*Figure 36*).

Figure 36. Camera control screen

The camera control screen contains the following fields:

Brightness. Lightens or darkens the image. Move the slider bar to the left to reduce the lightness or right to increase the lightness of the image.

Contrast. Adjusts the distribution of light and dark regions across the image. Move the slider bar to the left to reduce the contrast or right to increase the contrast.

Color. Adjusts the color levels within the image. Move the slider bar to the left to reduce the color levels or right to increase the color levels.

Saturation. Enhances the color within the image. Move the slider bar to the left to reduce the saturation or right to increase the saturation.

Video stabilization. The NTSC video standard employs an interlaced system. An NTSC picture consists of two separate fields offset by one display line. These pairs of offset half-pictures are called odd and even fields. When you play your MobileView system at full speed (60 fields per second), you are unable to see the offset frames and see continuous stable video. When the rate is slowed down, however, the human eye begins to detect the slight offset between the odd and even fields. This is often the case with digital video recorders and the images appear to jump up and down.

To remove this jumping effect, turn on video stabilization. Video stabilization ensures that consistent image fields (odd or even) will be recorded for the camera. The limitation of applying video stabilization is that the total effective frame rate of the recorder may be reduced.

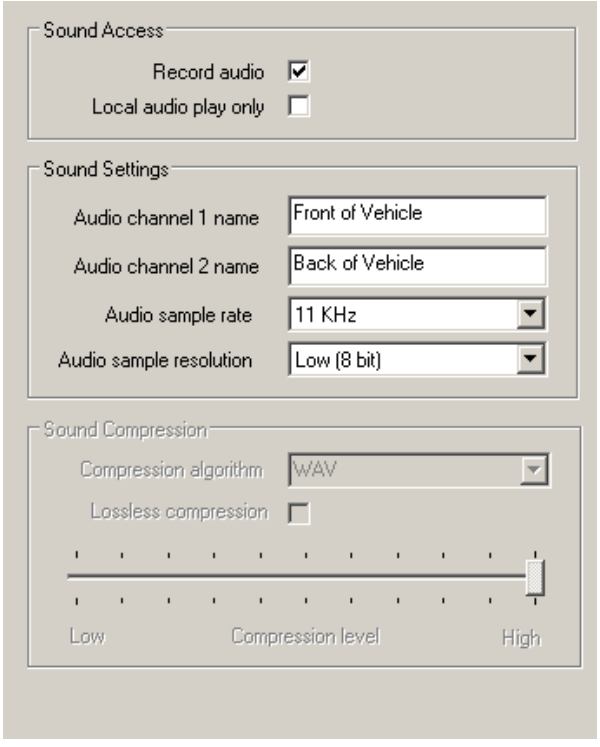
Reset settings. Returns all the camera control settings to their factory defaults.

The brightness, contrast, color, and saturation settings are commonly used to compensate for poor light conditions or other environmental characteristics affecting the quality of the recorded pictures.

Audio setup

Press the **Audio setup** button to configure sound (and voice) input channels (*Figure 37*).

Figure 37. Audio setup screen



The *Audio setup* screen contains the following fields:

Record audio. Turns the recording of audio channels to the data file on and off. Normally this would be set on for a recorder (the default mode).

Local audio play only. When turned on, the sound channels can only be played (heard) from the local machine (from the DVR making the recording). Remote users connecting to the DVR across a network or other remote means are unable to listen to audio recordings regardless of security access account and password level. When the remote users function is turned off, users who have valid account and password access can play sound recordings. The default mode for this option is disabled.

Audio channel 1 name. The name or description for the first sound channel.

Audio channel 2 name. The name or description for the second sound channel.

Audio sample rate. Increasing the audio sample rate generally improves the quality of the higher frequency component of the recorded sound. Increasing the sample rate will also increase the space required to store the recorded sound. Sample rates available are 11 KHz, 22 KHz, and 44 KHz. Typically, 11 KHz is effective in most monitoring situations (the default value).

Audio sample resolution. The sample resolution is the second audio quality parameter. Two options — 8-bit and 16-bit — are provided. While 16-bit recording provides superior audio quality, most audio surveillance applications will be satisfactory at 8-bit resolution. Increasing the resolution to 16-bit will also increase the space required to store the recorded audio channels.

The MobileView recorder uses only the WAV sound compression algorithm. The compression algorithm selection settings are disabled. The associated compression level is preset to provide the best audio standard and space efficiency.

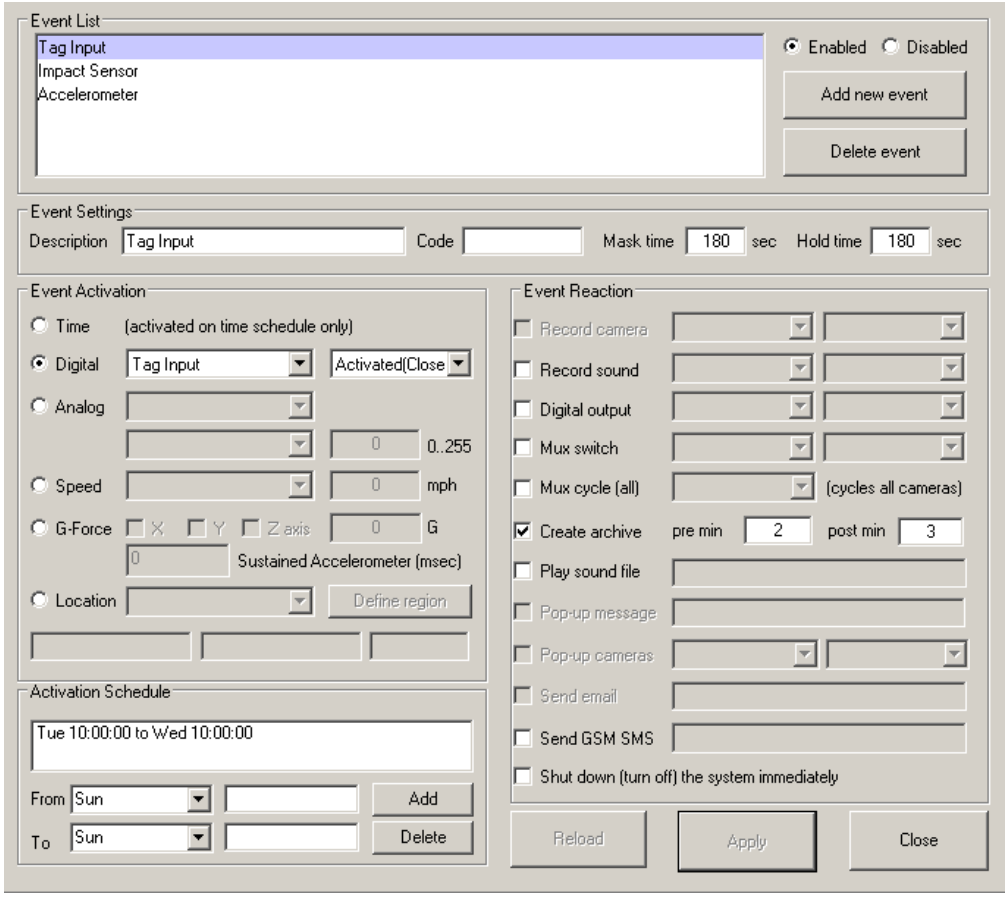
Alarm events

These instructions explain how to configure alarm events via Video Manager. (See *Figure 38* on page 49.) To add a new alarm event, do the following:

1. Click the **Add new event** button under *event list*.
2. Enter event settings:
   - Description – Enter a description of the alarm event.
   - Mask time – Mask any actions associated with the same event over the defined time period in seconds.
   - Hold time – Halts event activation for the specified time period in seconds.
3. Select the event activation:
   - Digital – Select and set the digital input channel settings to deactivated (open) or activated (closed).
   - Analog – Select and set the analog input channel settings to *falls below* or *rises above* between the ranges of 0 to 255.
   - Speed – Set the speed to *falls below* or *rises above* in mph.
   - G-force – Select and set the X- Y- and Z-axis accelerometer.

4. Select the event reaction:
    - Record sound – Option forces the DVR to start recording sound for that period defined in the *post min* section if there is space allocated for recording audio.
    - Digital output – Option triggers the specified digital output to high or low when the associated event begins.
    - Mux switch – Option triggers the specified multiplexer on a channel when an event begins.
    - Mux cycle (all) – Option triggers the specified multiplexer on all channels when an event begins.
    - Create archive – Option forces the DVR to start creating archives for that period defined in *pre min* and *post min*.
    - Send GSM SMS – Option to send a message to your GSM mobile phone (only enabled when GSM module is attached).
    - Shutdown (turn off) the system immediately – Option to turn off the DVR system immediately.
5. Optional settings: Add activation schedule. This setting is defaulted to Sun 0:00:00 to Sat 23:59:59.
    - Manually delete the default settings by highlighting default time and press **Delete.**
    - Manually enter the desired from day, from time, to day and to time - to schedule of the alarm event (weekly operation).
    - Click **Add**.
6. Click **Apply**.

Figure 38. Alarm events



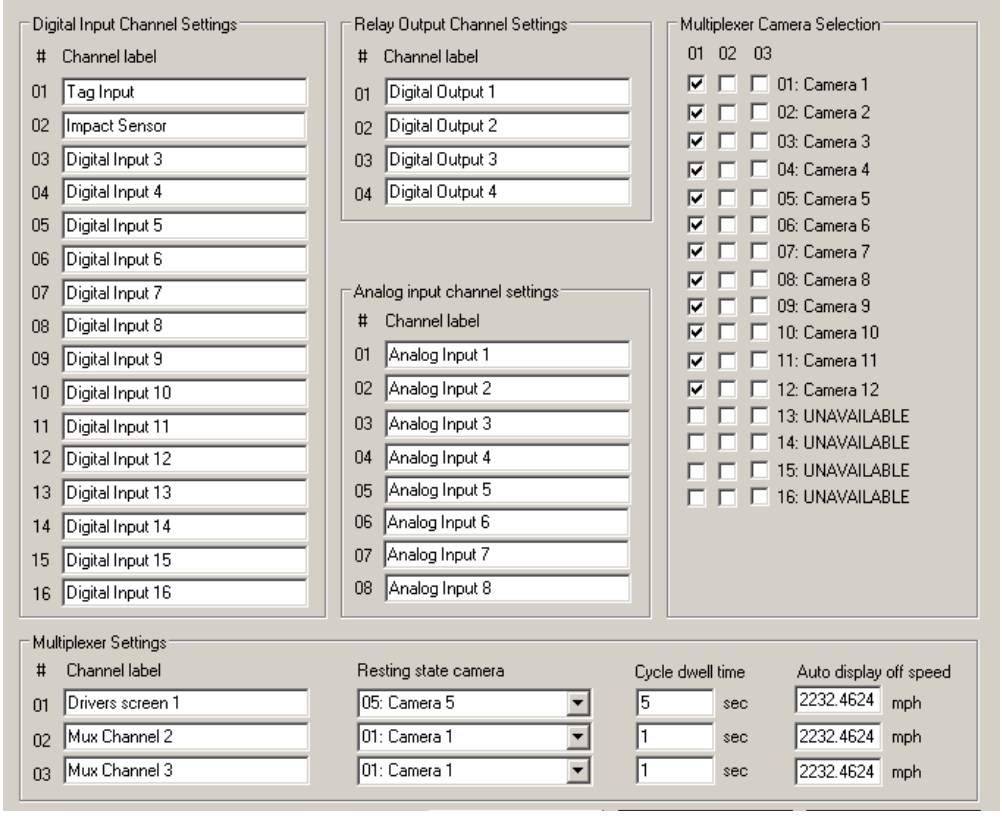
I/O devices

The I/O devices feature identifies the names of digital alarm events. This feature is helpful when you use multiple cameras.

To use I/O devices, do the following:

1. Press the **I/O Devices** button. The I/O devices screen appears (*Figure 39*).
2. Enter specific identities in the following categories: *Channel label, Relay output channel settings, Analog input channel settings, Multiplexer settings*, and *Resting state camera.*
3. Click **OK**.

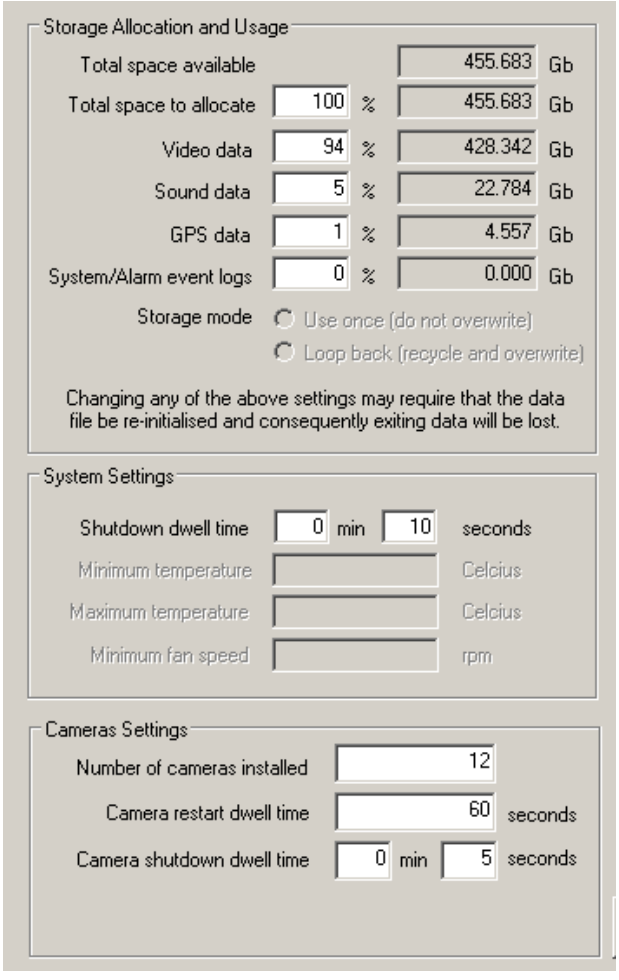
Figure 39. I/O devices



System

Press the **System** button to configure a number of low-level system settings (*Figure 40*).

Figure 40. System settings screen



Storage allocation and usage

The storage allocation settings in this system area control the core structure of the recorder's data file. This structure covers attributes such as the total amount of available disk space to allocate for the recording data file and the suballocation of space within this data file for individual components such as video and sound. Many of these parameters cannot be changed without the data file being erased and recreated. In this case, you will permanently lose all existing recorded data. Only experienced users should use the storage allocation.

Your MobileView recorder ships configured for correct operation and space allocation. Do not change these settings.

The system data file is where all recorded video, audio, GPS, and other recorded information and site details are stored. The system data file is a single data file. The following rules apply to the creation and management of the system data file:

- The system data file is a single file that contains all recorded parameters, indexes, and other necessary structures.
- Only experienced operators should manage the system data file.
- You must locate the system data file on its own private partition or drive. No other data or files should be stored on the same drive or partition.
- You cannot change the structure of the data file once it is created without deleting and recreating the file, or you will lose data.
- The space allocation for the data file structure must allow space for all parameters that are to be recorded (video, sound, GPS).

WARNING: If the system data file is tampered with or does not provide space allocation for the parameters that are to be recorded, the system will not operate correctly and will report a terminal fault.

The *System settings* screen contains the following fields:

Total space available. The total amount of disk space available on the drive where the data file resides. This should be the full size of the storage drive.

Space to allocate. The amount of disk space to allocate on the storage drive for the system data file expressed as a percentage of the total space available. As the storage drive should not be used for any other storage purpose, this setting should always be set to 100 percent for normal operation.

Video data. The amount of storage space within the system data file to allocate to the storage of video data expressed as a percentage of the whole data file size. As video pictures are generally the most storage intensive of the recorded parameters, most space should be allocated to the storage of video data.

Sound data. The amount of storage space within the system data file to allocate to the storage of sound data expressed as a percentage of the whole data file size. Space for sound recording is only required if sound recording is set up in the *Audio setup* on page 46 or if you need that sound recording at a later time.

GPS data. The amount of storage space within the system data file to allocate to the storage of recorder or site positions (GPS locations from a mobile recorder) and expressed as a percentage of the whole data file size. As site locations or GPS data have minimal space requirements, the percentage allocated to this can be small.

System/alarm events. The amount of storage space within the system data file to allocate to the storage of alarm system event logs. As the event log requires a comparatively small amount of storage space, the percentage allocated to this can be minimal.

Enter storage allocation parameters as a percentage value. The equivalent storage capacity in gigabytes is calculated by the system and displayed besides the entered percentage value.

The space allocation you enter must total 100 percent. The system will automatically adjust percentage allocation values to ensure 100 percent allocation is maintained.

Table 3 provides example values for the different recorder configurations and the estimated space allocation values to use.

Table 3. Space allocations for recorder configurations

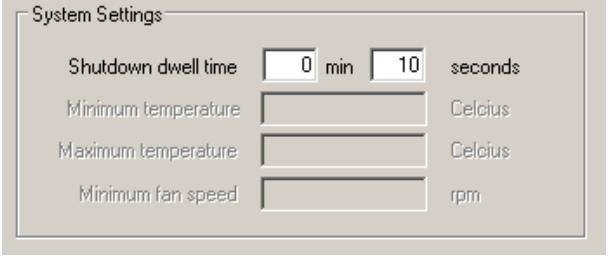
Recorder type	Resolution	Sound	Video	Sound	GPS	Event
Mobile without GPS installed	320 x 240	No	99%	0	0	1%
Mobile with GPS installed	320 x 240	No	98%	0	1%	1%
Mobile with GPS installed	320 x 240	Yes	90%	8%	1%	1%
Mobile with GPS installed	640 x 480	Yes	94%	4%	1%	1%

System settings

The *Shutdown dwell time* field (*Figure 41*) sets the length of time that the recorder will continue to operate and record after the *ignition* or *engine run* signals are removed.

This setting only applies to recorders with the shutdown dwell feature enabled. Setting the value to 0 deactivates the feature. For the setting shown, the DVR will continue recording for 10 seconds after the *ignition* or *engine run* signals are removed.

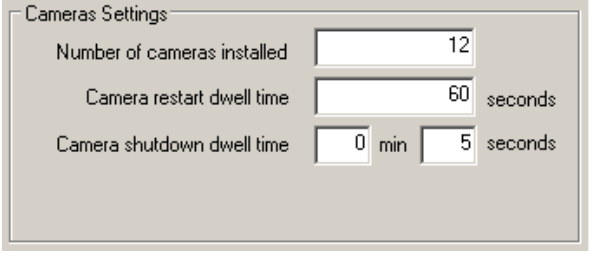
Figure 41. Shutdown dwell time



Camera settings

When you enter the number of cameras into the system that are physically attached to a recorder through the *Number of cameras installed* field (*Figure 42*), the recording system will periodically check to ensure that pictures are being received and recorded for all expected cameras.

Figure 42. Camera settings



When the number of cameras being recorded falls below the expected number of cameras, MobileView sends an error report to the system log file, and the red LED on the Status indicator will turn on.

The system will periodically check whether a lost video signal has returned. This action requires momentarily resetting the video acquisition hardware. The time between resets is controlled by the *Camera restart dwell time* system variable. Setting this value too low will negatively affect system performance. The default and recommended time period is 60 seconds.

When the *ignition* or *engine run* signals end, the DVR enters shutdown mode. The camera shutdown delay period function is controlled by the *Camera shutdown dwell time* system variable (*Figure 41* on page 54). Shutting down camera recording has the benefit of freeing processor cycles to perform other tasks such as video uploads or scheduled maintenance activities.

Delete files after setup

Your DVR (DVSS server) starts automatically, so you need to delete archived surveillance, video events, and log files created during installation and testing once DVR configuration and testing is complete. These files may have data with incompatible time codes, out of sequence cameras, bad naming conventions, etc., which may affect system performance. Deleting these files ensures final configurations work properly. Failure to perform these deletions may result in video data loss in certain circumstances.

Before beginning, it is helpful to understand the DVR's drive architecture:

- C drive: Contains the Windows OS (write protected)
- D drive: Contains DVR configuration and history files:
  - Outgoing directory: Files for transfer to Fleet Manager server
  - Workspace directory: Setup and configuration files
- E drive: Video event files and current log file
- F drive: Current surveillance file (*CAMDATA.DVS*)

Follow the steps in *Stop the DVSS server*, *Delete files* on page 57, and *Restart the DVSS server* on page 57 to properly delete files.

Stop the DVSS server

To stop the DVSS server, do the following:

1. Connect to the DVR desktop. See *Remote desktop connection* on page 30.
2. Double-click the services icon on the desktop (*Figure 43*).

Figure 43. Services icon

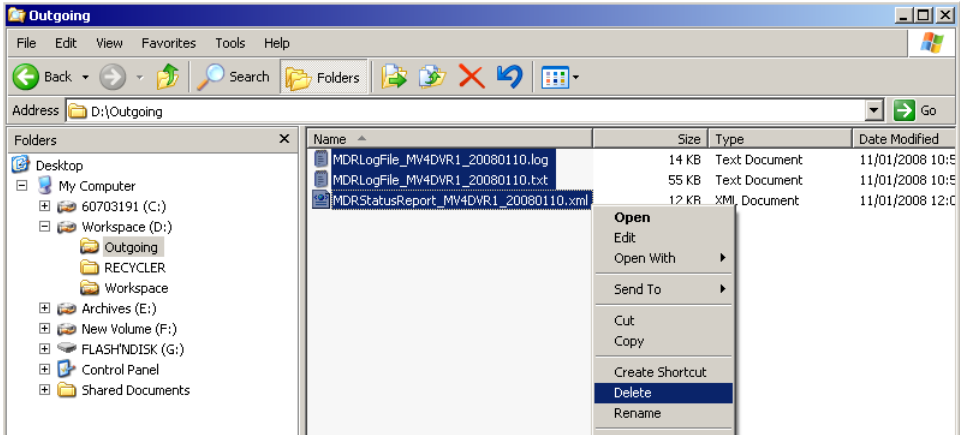
3. Navigate the right window pane to the service name *DVSS server* and double-click the service name.
4. Select **Stop** to stop the service.

Delete files

To delete files, do the following:

1. In Windows Explorer, navigate to the outgoing folder on drive D.
2. Delete all files and folders on the drive D outgoing folder. Do not delete the outgoing folder itself.
3. Navigate to drives E and F and delete all files and directories.

Figure 44. Outgoing



Restart the DVSS server

After you complete the steps in *Delete files* on page 57, restart the DVSS server. To restart the DVSS server, do the following:

1. Reopen the services control panel.
2. Double-click the *DVSS server* service.
3. Select **Start.**
4. The system will recreate new versions of the deleted files compliant with current system settings.

Upon complete of these activities, log off the remote desktop session using the **Alt+F4** procedure explained in *Remote desktop connection* on page 30.

Chapter 5 Optional hardware installation

This chapter provides information on installing optional hardware components.

In this chapter:

Accelerometer 60
Impact sensor 66
Panic button 68
Microphone 70
GPS 72

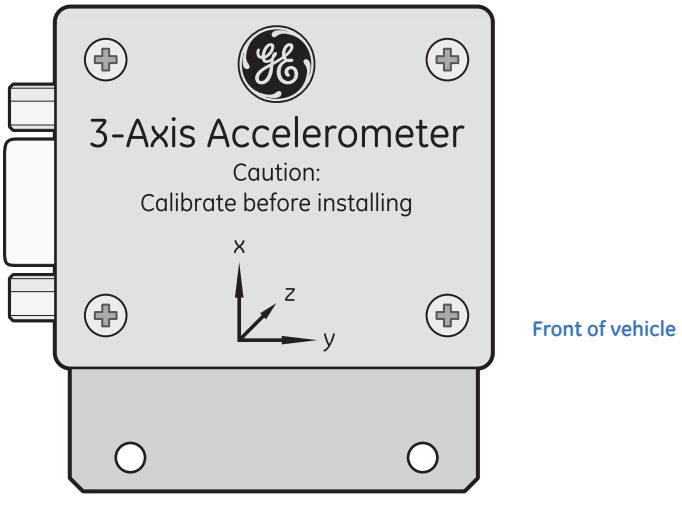
Accelerometer

Mount the accelerometer on a flat, stable surface. The selected location should not be subject to vibration exceeding that experienced by the vehicle chassis. A frame mount or reference location is preferred. Failure to consider location variables may contribute to erroneous activations. Ensure the mounting location is not subject to exposure to liquids during vehicle cleaning. Damage or corrosion of components may results if unit is sprayed down with water or other cleaning liquids.

To install the accelerometer, do the following:

1. Using the accelerometer as a template, mark the location of the mounting holes. Align the accelerometer so that it is square with the front and back of the vehicle so that the *Y* arrow points to the front of the vehicle (*Figure 45*).

Figure 45. Accelerometer



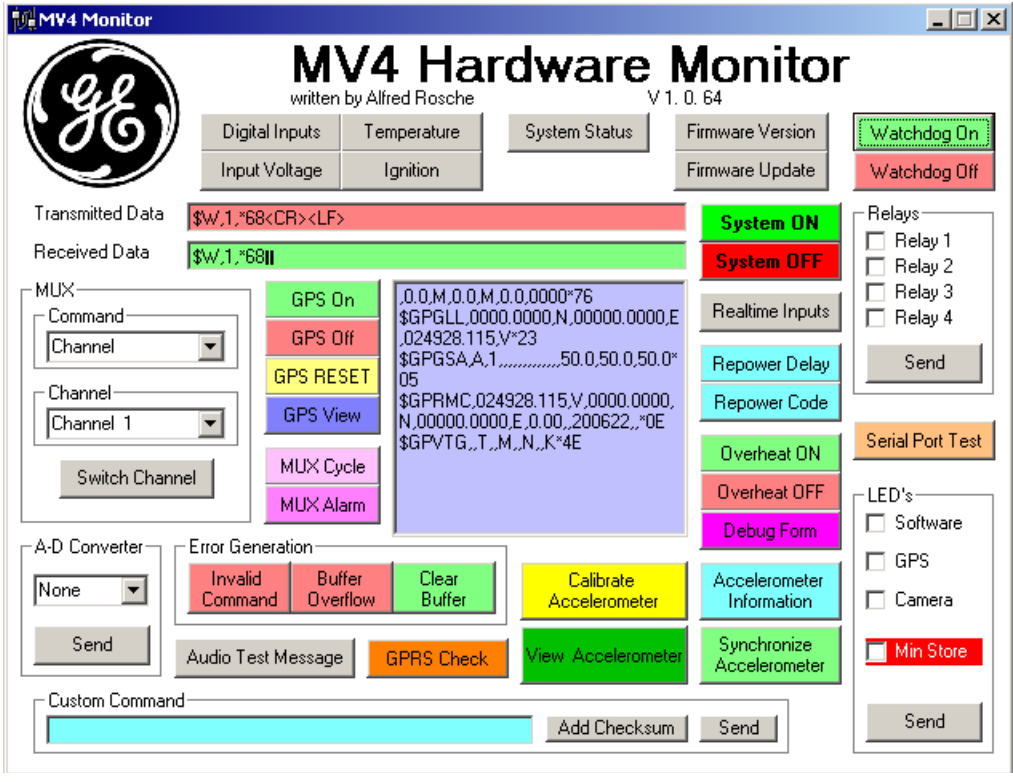
2. Drill the mounting holes with an appropriate size drill bit.
3. Connect one end of the supplied serial cable to the DVR back box DB-9 connector.
4. Route the other end of the serial cable through the back box wire hole and to the mounting location for the accelerometer.
5. Calibrate the accelerometer (see *Calibration* on page 62) and mount it.

Accelerometer configuration

To open the accelerometer configuration utility, do the following:

1. Establish a remote desktop connection to the DVR. See *Remote desktop connection* on page 30.
2. Stop the DVSS server. See *Stop the DVSS server* on page 56.
3. On the DVR desktop, locate and double-click the icon labeled *MV4 Monitor*. The configuration software will open (*Figure 46*).

Figure 46. MV4 Monitor interface



WARNING: Ensure the DVR is off when connecting or disconnecting the accelerometer device.

Synchronize the accelerometer

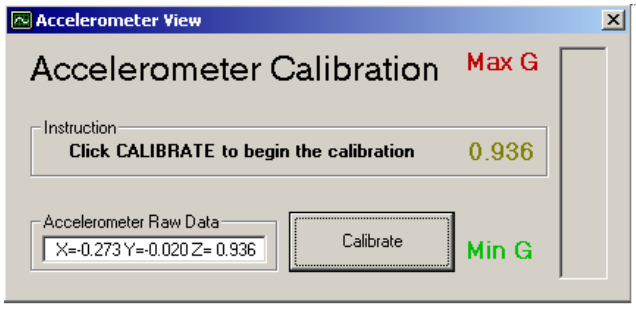
Click the light green **Synchronize accelerometer** button (*Figure 46* on page 61) to configure the accelerometer to the correct communication speed. A dialog box will indicate that the accelerometer is being synchronized.

Calibration

Calibrate the accelerometer before installation on the bus. The X, Y, and Z axes of the accelerometer are calibrated to the force of gravity to both a maximum and minimum. To calibrate the accelerometer, do the following:

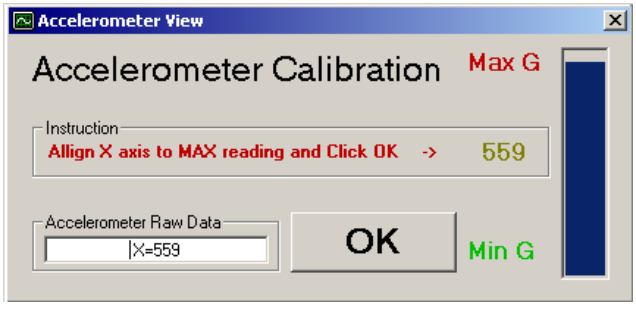
1. Click the **Calibrate Accelerometer** button on your MV4 monitor (*Figure 47*).

Figure 47. Accelerometer calibration



2. Rotate the accelerometer on each axis to comply with calibration instructions. When it reaches **max/min** (*Figure 48* on page 62), click **OK**.

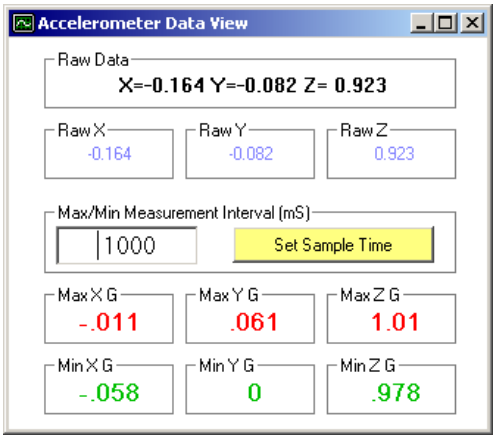
Figure 48. Calibrating the accelerometer



View accelerometer data

Once you complete the calibration procedure, you can view the accelerometer data. To view the data, click the dark green **View accelerometer** button in the MV4 monitor interface (*Figure 46* on page 61). With the accelerometer on a flat surface, the minimum and maximum on the Z axis should be close to 1, and the minimum and maximum on the X and Y axes should be close to zero (*Figure 49*).

Figure 49. Viewing the calibration

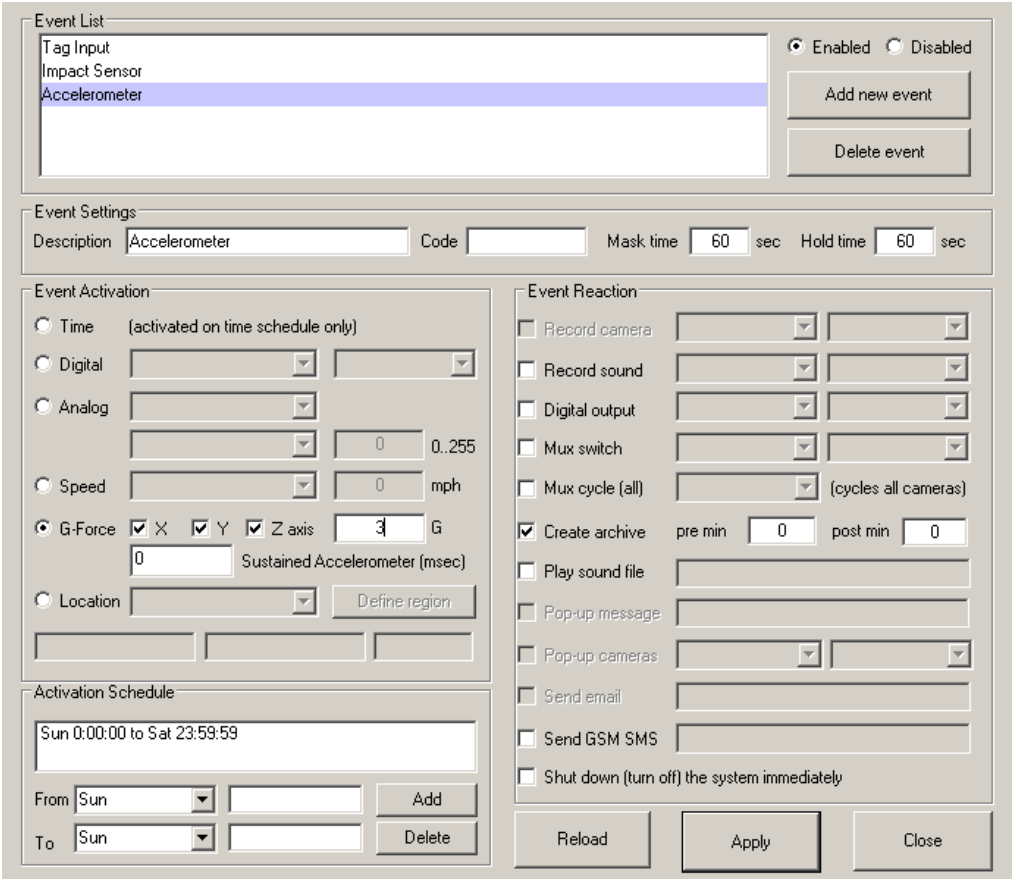


DVR accelerometer alarm event

Once you complete the calibration procedure, you can configure the DVR to perform certain functions based on the accelerometer activation setting. Refer to your *MobileView Video Manager User Manual* for detailed information regarding the access and configuration of alarm events. The instructions in this manual only refer to setting the accelerometer alarm event configuration.

Figure 50 on page 64 shows a typical alarm event configuration for the accelerometer. You can add an accelerometer event by clicking the **Add new event** button and entering a suitable explanation of the alarm such as *Accelerometer*. Click the G-force circle and select *X*, *Y*, and *Z* if all you wish to use all three axes. A typical set-point setting is between 3.0 and 4.0 G, depending on the sensitivity desired. A setting of 3.0 G will typically trigger an event if the vehicle drives over curbs or potholes on the road in a fairly rough manner.

Figure 50. Accelerometer alarm event



You can also configure the desired event reaction if the set-point is exceeded, such as creating an archive. The example in *Figure 50* shows the event reaction of creating an archive consisting of two minutes of video before the trigger and three minutes after the trigger event.

If the G-force set point is exceeded on any axis, the following entry displays in the log file:

```
EVENT: G-Force exceed [+X = 3.122000] [-X = 0.834000] [+Y = 0.434000] [-
Y = 0.544000] [+Y = 0.122000] [+Y = 0.224000]
```

Activate accelerometer in INI file

The DVR is defaulted with the accelerometer set to OFF. Activating accelerometer operation requires a direct INI file setting change. Details on this change are outlined below.

CAUTION: Using extreme caution when editing system INI files. Unspecified changes may result in unexpected system behavior or data loss.

To activate accelerometer functionality, do the following:

1. Establish a remote desktop connection to the DVR.
2. Shut down the DVSS server.
3. Using Windows Explorer on the DVR, go to the D drive.
4. Double-click the workspace directory.
5. Open the *FltSetting_GE.ini* file and scroll to the section below.

```
AccelerometerSettings]
AccelerometerType=none
AccelerometerComPort=3
AccelerometerBaudRate=57600
```

6. Change the *AccelerometerType* field to seraccel:

```
[AccelerometerSettings]
AccelerometerType=seraccel
AccelerometerComPort=3
AccelerometerBaudRate=57600
```

7. Save and close the INI file.
8. Restart the DVSS server and close the remote desktop connection.

Accelerometer functionality is now on.

Impact sensor

The MobileView system allows you to connect an optional impact sensor which is designed to sense shock impacts greater than 4 G in the horizontal plane. Shock events from the impact sensor are typically monitored on digital input 2 using a special connection configuration that provides both input to the MobileView and power to the impact sensor. The sensor, which is typically mounted near the DVR enclosure, comes with a 7 ft. (2.1 m) cable that is designed to terminate at the DVR as provided in the instructions below.

CAUTION: Failure to follow the instructions provided may result in damage to the MobileView system or the impact sensor. Do not install the impact sensor until you have tested its functionality on each vehicle. The impact sensor should be mounted on a flat, stable surface and secured to the frame of the vehicle. The mounting surface must not be subject to vibrations.

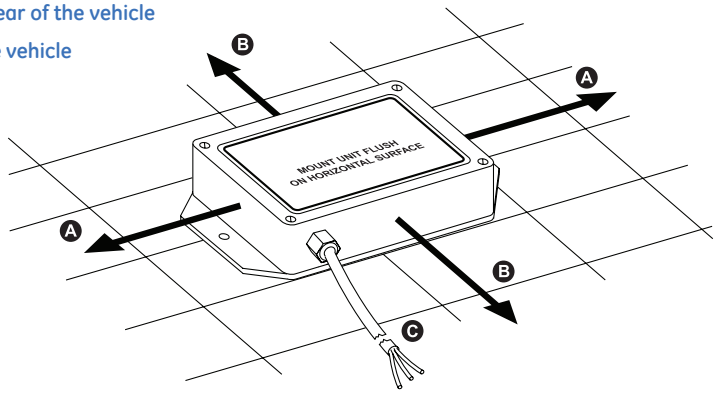
Impact sensor installation requires use of a 10 kohm, 1/4 watt resistor. To avoid possible shorts, ensure resistor leads are insulated with heat shrink (preferred) or electrical tape.

To install the impact sensor, do the following:

1. Using the impact sensor as a template, mark the location of the two mounting holes. The impact sensor should be aligned so that it is square with the front and rear of the vehicle (*Figure 51*).

Figure 51. Aligning the impact sensor

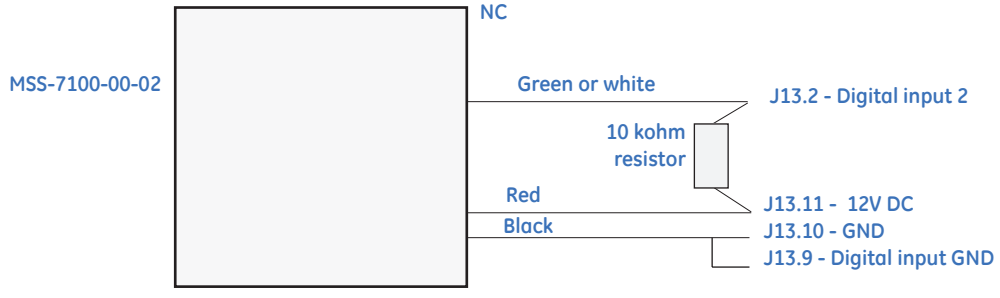
Ⓐ Align square with the front and rear of the vehicle
Ⓑ Align square with the sides of the vehicle
Ⓒ Cable to DVR back box



2. Drill the mounting holes with an appropriate size drill bit.

3. Mount the impact sensor.
4. Route the provided cable to the DVR. If you need to extend the cable, splice (solder wires and heat shrink exposed wire) a three-conductor 18 AWG cable to the impact sensor's cable. Maximum cable length is 25 ft. (7.6 m).
5. See *Figure 52* and connect the impact sensor cable to the J13 back box connector as follows:
   - Connect the red positive wire to J13.11.
   - Connect the black common wire to J13.10.
   - Connect the green or white input wire to J13.2.
   - Ensure that a jumper exists between J13.9 and J13.10.
   - Install a 10 kohm, 1/4 watt resistor between terminals J13.2 and J13.11.

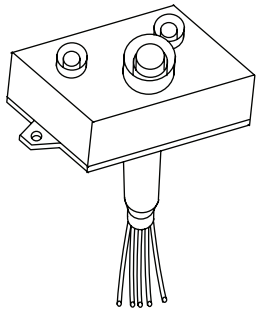
Figure 52. Impact sensor wiring



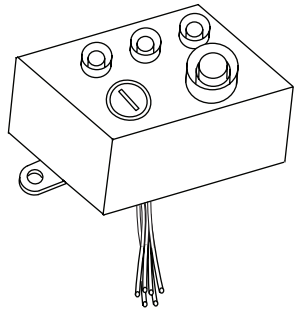
Panic button

You may choose to install an optional panic button, typically within reach of the driver. There are two versions of the panic button: one with a key reset and one without (*Figure 53*).

Figure 53. Panic buttons



Panic button



Panic button with key reset

To install the panic button, do the following:

1. Using the panic button as a template, mark the location of the mounting holes.
2. Using a 3/16 in. (5 mm) drill bit, drill the mounting holes.
3. Using a 3/4 in. (20 mm) drill bit, drill a hole for the panic button's wiring.
4. Splice (solder wires and heat shrink exposed wire) a six-conductor 18 AWG cable to the panic button's wiring.

   Note: The panic button with key reset has six wires, and the panic button without key reset has only five. The NC and common wires are both yellow and are interchangeable.

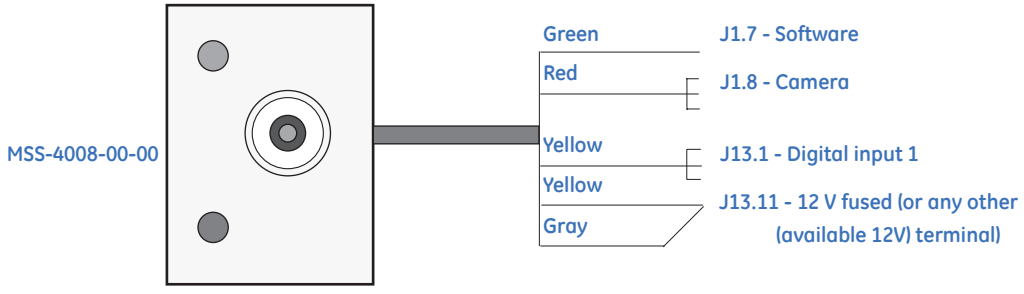
5. Route the cable to the DVR. See *Figure 54* and connect the cable to the J1 and J13 back box connectors as follows:

   - Connect the yellow NC and common wires to J13, terminals 1 and 11.
   - Connect the gray positive wire to J13, terminal 11 or any other available 12 V terminal.
   - Connect the green normal wire to J1, terminal 7.
   - Connect the red check wire to J1, terminal 8.

- Ensure that a jumper exists between terminals 9 and 10 on J13.
- Connect the white negative wire (present only on the panic button with key reset) to J13, terminal 3.

Note: Terminal 2 on J13 is generally reserved for the impact sensor input.

Figure 54. Panic button wiring



6. Mount the panic button to the previously drilled holes.

Status LEDs

Your MobileView provides LEDs for status indication. When the green LED is on and red LED is off, the system is functioning properly. When the red LED is on, it indicates the system needs service.

Microphone

You can install up to two optional microphones with the MobileView system. One microphone is typically mounted in the head sign area by the driver, and a second may be mounted toward the rear of the vehicle.

Refer to the instructions provided with the microphones for installation procedures. Route a two-conductor, shielded twisted-pair cable for audio and a shielded twisted-pair power cable (18 AWG wire is recommended) from the microphone device to the DVR location. The shielded wire is attached at the microphone end only. Leave a service loop at the microphone end.

Figure 55 shows single-channel audio wiring for one microphone.

Figure 55. Single-channel audio wiring

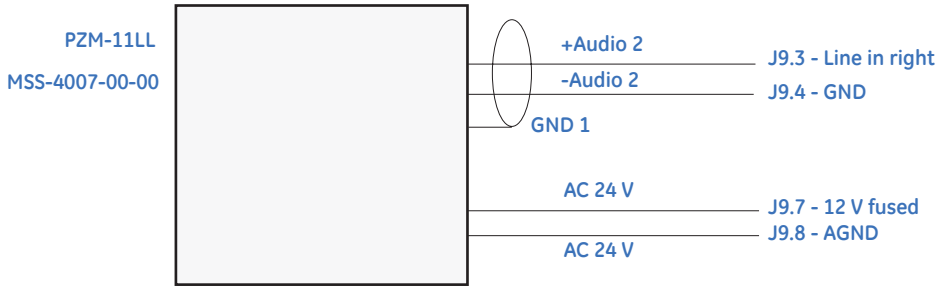
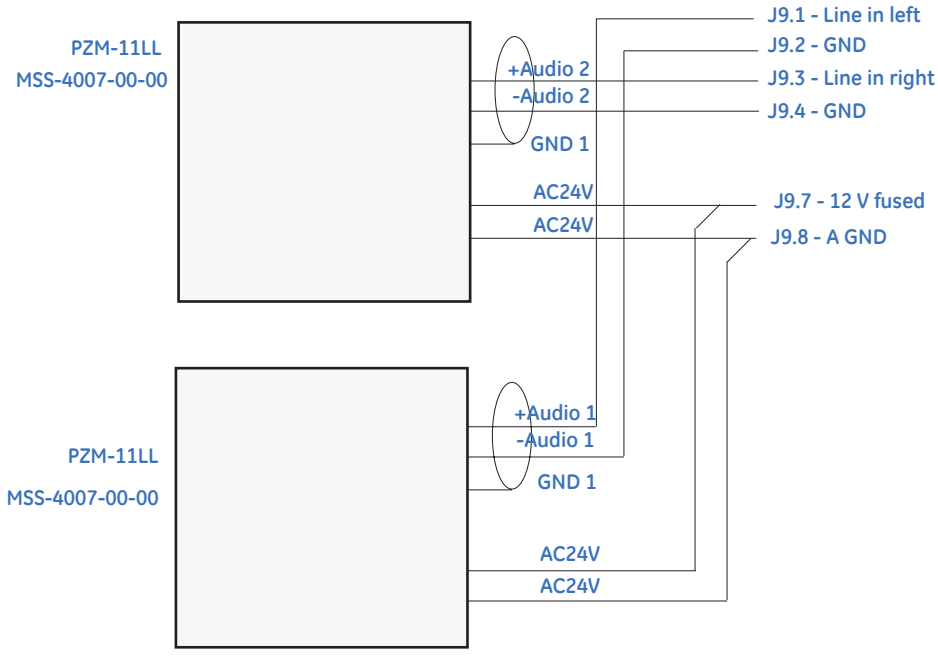


Figure 56 on page 71 shows dual-channel audio wiring for two microphones.

Figure 56. Dual-channel audio wiring



Note: For instructions on making wiring connections at the microphone end, refer to the manufacturer's instructions.

GPS

Your MobileView may be equipped with GPS technology. Systems ordered with this option require a compatible GPS antenna to activate the feature. The GPS antenna connects to the back box GPS connector (*Figure 15* on page 20). Since the GPS connector is small and space is limited, you should connect the GPS antenna before making other connections.

Ensure the DVR storage allocation and usage settings for GPS data are set to one percent. If the setting is not as expected, refer to *System settings* on page 54 for details on how to modify the setting.

The GPS antenna is usually mounted on the roof of the vehicle on a flat surface directly above the DVR. The length of antenna cable and other equipment on the vehicle roof dictate the specific location.

To install the antenna, do the following:

1. Determine a suitable mounting location on the vehicle roof for the antenna.
2. Using the antenna as a template, measure the diameter of the mounting shaft and drill a hole through the roof of the vehicle.
3. Route the antenna cable through the hole.
4. Place waterproof sealant around the bottom of the antenna and press the antenna into place. This will be the permanent mounting location of the antenna.
5. From the interior of the vehicle, thread the antenna locking nut and washer over the antenna cable and tighten the mounting shaft.
6. Route the antenna cable to the DVR assembly, through the rear wire hole and secure to the GPS connector.

When GPS signal is present and locked, the DVR software status LED #3 will turn on.

Chapter 6 Testing

This chapter explains how to test your MobileView equipment to make sure the system is operating correctly. You can configure and test the cameras, inputs, and outputs using a laptop computer.

In this chapter:

MobileView 4 testing 74
Video manager program 80

MobileView 4 testing

Your MobileView 4 system is preconfigured for 12 cameras at 10 fps per camera, dual-channel audio, and a panic button on input 1. Configuration tasks require setting numerous variables and parameters to meet customer and installation requirements. When you set and save these tasks, you may test the system.

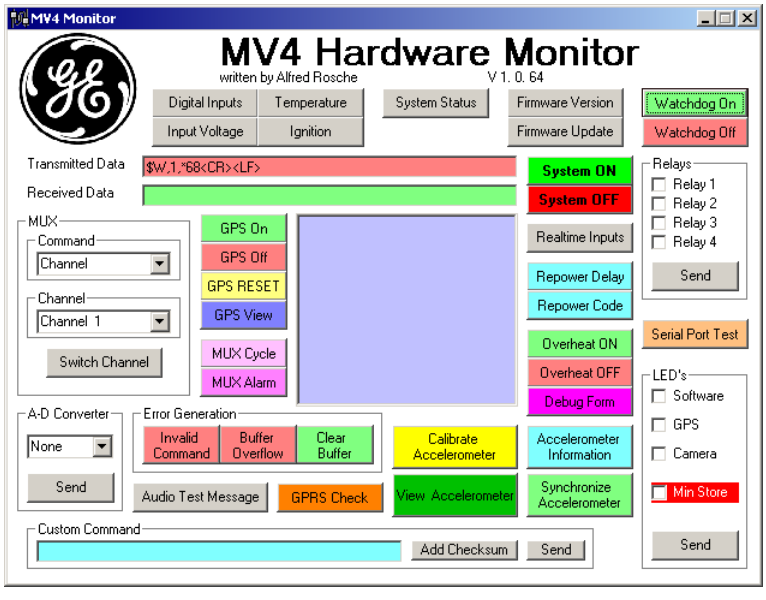
MV4 monitor program

The DVR contains the MV4 Monitor program. This useful utility has many low-level diagnostic capabilities that are beyond the scope of this manual. Others are entirely relevant and useful for testing DVR functionality.

To open the MV4 Monitor program, do the following:

1. Establish a remote desktop session.(See *Remote desktop connection* on page 30)
2. Stop the *DVSS Server* service.
3. Locate and open the *MV Monitor* program on the remote desktop (*Figure 57*).

Figure 57. MV4 Monitor



Watchdog on/off

The system watchdog monitors low-level system communication between system software and hardware. If communication is interrupted for a period of 20 minutes, the watchdog process will shut down and restart the DVR.

Opening the MV4 Monitor program requires stopping low-level communication and therefore automatically turns off the watchdog. **Watchdog On** and **Off** buttons control watchdog operation. To indicate the Watchdog is off, the front panel's software LEDs rapidly flash. There is no external indication when the watchdog is running.

When active, the watchdog communicates via COM 1. COM 1 data activity is indicated by COM LED 1 on the DVR's front panel.

LEDs and relays

You may test the software LEDs via the MV4 Monitor program. Check the appropriate box for the LED to test and press send (*Figure 58*). The LED will light up momentarily and subsequently extinguish.

You may also test the relays. Select the relay to activate and click **Send** (*Figure 59* on page 76). Relay activation is generally audible, but no external display indicates relay status.

Figure 58. LEDs

Figure 59. Relays

GPS testing

You may test the GPS subsystem using the MV4 Monitor program. Information relevant to users and installers is limited. There are four command buttons available:

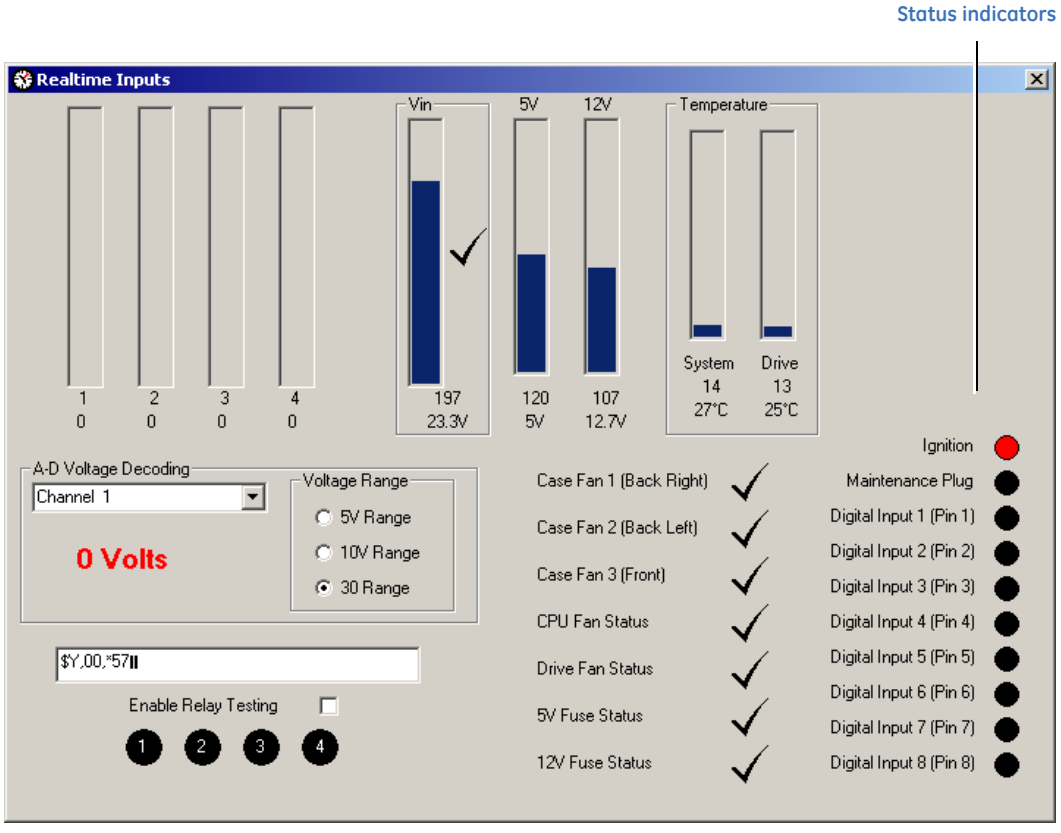
- GPS On: Turn on GPS subsystem, if present.
- GPS Off: Turn off GPS subsystem.
- GPS Reset: Reset GPS subsystem.
- GPS View: Show satellite information.

When active, the GPS subsystem communicates via COM 4. COM 4 data activity is indicated by COM 4 LED on the DVR's front panel.

Real-time inputs

The most useful part of the MV4 Monitor program is the real-time inputs screen (*Figure 60*). This screen shows the status of every user-controllable MobileView input, output, fan, fuse, and voltage level on the DVR.

Figure 60. Real-time inputs



Analog inputs

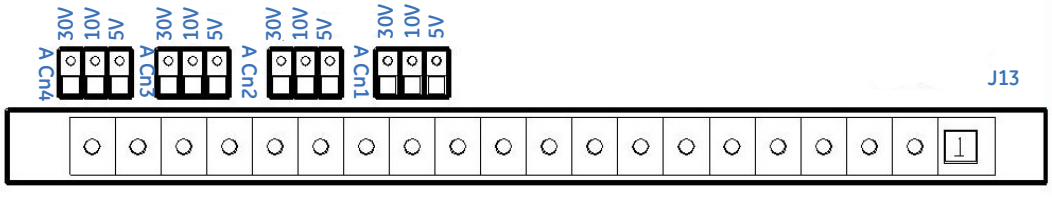
The MobileView DVR lets you monitor four analog signal inputs. Analog inputs are generally used to measure such things as pressure, temperature, and velocity. These variables are commonly available on heavy-duty vehicles. Once these variables are converted to electrical inputs in the ranges of 0 to 5 V, 0 to10 V, or 0 to 30 V, the DVR can monitor and act upon these variable signals.

The top left corner of the real-time inputs screen provides the digital value between 1 and 255 of each analog input. The digital value is necessary to create an event based on an analog input.

To determine digital values settings for analog input conditions, do the following:

1. Set the *Voltage Range* radio button to match the analog input jumper on the back box for the input under evaluation (*Figure 61*).
2. Change the state of the analog input to the condition under evaluation.
3. Record the input value at that condition.
4. Repeat steps 2 and 3 for each condition.
5. Repeat steps 1 through 4 for each input.

Figure 61. Analog and digital inputs



Analog and digital inputs

Voltages and temperatures

Key input and output voltages are shown here. One critical monitor is input VIN. This provides the input voltage to the DVR from the vehicle. The nominal voltage is 24 V. Common regulated voltage from a running vehicle is approximately 27.5 V. Common battery voltage from a stationary vehicle will vary between 22.5 and 24.5 V depending on

battery state. Observing this input will help determine why the system shuts down in over/under voltage conditions.

System temperature is also shown in this screen (*Figure 60* on page 77). This screen shows what external or internal factors create overheating conditions. Click the X (at top right of screen) to exit.

Relay testing

Each relay activates and deactivates in succession when you click the *Enable Relay Testing* checkbox.

Fan and fuse status

The DVR front status LEDs provide summary of fan and power conditions. The real-time input screen shows detail on each fan and fuse.

Status indicators

The DVR has 10 digital inputs. The circle shown on the right side of the real-time input screen (*Figure 60* on page 77) indicates the status of each input. All inputs use a black circle to indicate the **off** state. The **on** state is shown by red and green circles.

In the *Alarm events* configuration screen, an input **on** state equates to *Activated* while input **off** state equates to *Deactivated*.

Log off DVR

Once you complete the review and testing of your DVR's main features, do the following:

1. Close the *Real-time inputs* screen.
2. Close the MV4 Monitor program.
3. Restart the DVSS server.
4. Log off the remote desktop session.

Video manager program

Another way to test system operation is to use the Video Manager program to view video in the same manner as a system operator. Video Manager applications are found in the *MobileView Video Manager User Manual*.

Items to check using the Video Manager application include the following:

- Camera names and resolution settings during playback.
- Event activations based on programmed inputs.
- Archival storage and playback.
- Text overlays to ensure accuracy of information and readability.
- General system configurations such as DVR name and system date/time.

Chapter 7 Troubleshooting and support

This chapter provides information to help you troubleshoot problems and contact technical support in case you need assistance with your GE equipment.

In this chapter:

Troubleshooting 82
Contacting us 83

Troubleshooting

The system LEDs provide a substantive and instantaneous status of the MobileView DVR. See *Table 4* below for details on what each LED indicates.

Table 4. System LEDs

LED type	LED	Condition if green	Condition if red
Power	1	Main power present	Input voltage out of tolerance
	2	Main fuse good	Not applicable
	3	Ignition signal present	Not applicable
	4	Internal PSU voltage within tolerance	None
Status	1	System on	MPU heartbeat (slow pulse)
	2	Digital input change	Fan failure
	3	HDD activity	System overheating
	4	Back box network link status	Back box network activity
Software	1	Capture software active	System fault
	2	Valid GPS tracking solution	Not applicable
	3	System requires maintenance	Not applicable
	4	None	Minimum storage failure
Com	1	Data received from MPU	Data sent to MPU
	2	COM 2 data received	COM2 data sent
	3	COM 3 data received	COM 3 data sent
	4	Data received from GPS module	Data sent to GPS module

For example, software LED 3 corresponds to the red LED on the panic button. When active, a green LED indicates a fault exists that needs maintenance. Examples of common faults are video loss on one or more cameras, system overwriting old archive data, drive full, fan or fuse failure, etc. Generally these types of faults are easy to identify through use of the Video Manager client or by review of the system log file. They are also easy to fix.

Contacting us

For help installing, operating, maintaining, and troubleshooting this product, refer to this document and any other documentation provided. If you still have questions, contact us during business hours (Monday through Friday, excluding holidays, between 5 a.m. and 5 p.m. Pacific Time).

Table 5. Technical support

North America
T: 888 GE Security (888.437.3287) Toll-free in the US, Puerto Rico, and Canada. 503.885.5700 outside the toll-free area. F:888.329.0332 (Tualatin tech support) 561.998.6232 (Boca Raton tech support) E: *nstechsrv@ge.com* *gesecurity.customerservice@ge.com*
Australia, New Zealand
E:*techsupport@gesecurity.com.au*

Latin America
T: 305.593.4301 F: 305.593.4300 E: *InfraSec.TechnicalServicesLatinAmerica@ge.com* *InfraSecCustomerService.LatinAmerica@ge.com*
Europe, Middle East, and Africa
W: At *www.gesecurity.eu*, select *Customer Support*.
China, India, Singapore, Taiwan, Southeast Asia
E:*ges.asiatechservice@ge.com*

Note: Be ready at the equipment before calling.

Online resources

Here are some useful links on our website *www.gesecurity.com*:

Online library. From the *Customer Support* menu, select the *Resource Library* link. After you register and log on, you may search for the documentation you need.[1]

Training. To view any available online training for GE Security products, select the *Training* link. (Online training is not available for all products.)

Warranty and terms information. From the *Customer Support* menu, select *Return and Warranty Policy Statement* or *Terms and Conditions Policy Statement*.

Customer service and technical support. From the *Customer Support* menu, select *Customer Service* or *Technical & Application*. Select the appropriate product category for the contact information or use the menu to select a location outside the US.

1. Many GE documents are provided in English only as PDFs. To read these documents, you will need Adobe Reader, which you can download free from Adobe's website at *www.adobe.com*.

Appendix A Checklists and worksheets

This appendix provides a checklist, a worksheet, and a mounting plate template.

In this appendix:

DVR installation checklist 86
Vehicle layout diagram 92
Camera mounting plate template 93

DVR installation checklist

The MobileView DVR has numerous settings and variables that need to be addressed during an installation and checked thereafter. The DVR installation checklist on these pages provides a means of recording most system variables in one document.

The installation checklist (*Table 6*) is provided as a guide. It should be completed by the installation contractor and signed by a property representative. This checklist can be the permanent record of system configuration at the time of installation.

Table 6. Installation checklist

DVR serial number [a] [b]		Property name/address:	
Vehicle number [a] [b]		DVR date and time:	
Vehicle make/model:		Number of software licenses purchased:	
DVR front panel IP address/subnet mask:			
DVR backbox IP address/subnet mask:			
DVR commissioning checklist			
Item	Checked by installer	Inspected/ accepted property	Comments
Terminations checked and all wires labeled			Back box and all devices
Continuous power (~24 VDC protected)			Protective device used? (circle one) 10A CB 10A fuse
Ignition power (~24 VDC protected)			Protective device used? (circle one) 1A CB 1A fuse
J13.9 to J13.10 jumper installed			Install wire jumper between J13.9 and J13.10

Table 6. Installation checklist (continued)

Tag alarm button and status LEDs checked			Green LED only illuminated (otherwise problem exists, see install manual for troubleshooting). Activate alarm button and check to confirm alarm file was generated in the archives folder.
Impact sensor present			Ensure 10 kohm resistor is across J13.11 and J13.2 (see install manual)
12 to 24 VDC converter			Is a 12 to 24 VDC converter installed? Yes or No
Infrared illuminators			Camera locations
Wireless bridge, PSU, antenna, and Cat5 cable			Cat 5 cable connected from back box to ethernet port on PSU protective device: If powered at 24 VDC install inline 600 mA fuse If powered at 12 VDC install inline 1.7 A fuse
GPS antenna and cable			
Accelerometer			See install manual for calibration instructions.
Video clip saved			Document camera views to CD/DVD. Submit color print of each camera view signed by customer to GE with this inspection list.
DVR location:			
DVR software and firmware version	Software version:	Firmware version:	
Supplement diagrams attached	Cisco wiring? Y or N	Aux power supply: Y or N	Other:

Table 6. Installation checklist (continued)

DVR viewer configuration checklist			
Depot/vehicle ID	Depot ID:		Vehicle ID:
Camera 1	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 2	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 3	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 4	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 5	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 6	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 7	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):

Table 6. Installation checklist (continued)

Camera 8	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 9	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 10	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 11	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Camera 12	Yes or No (circle one)	(circle one) 320 x 240 640 x 240 640 x 480	Camera name: Capture rate (fps):
Record audio	Yes or No (circle one)	(circle one) 1-channel 2-channel	Microphone 1 location: Microphone 2 location:
Alarm Input 1	Yes or No (circle one)	(circle one) Activated [c] Deactivated [d] ____VDC input	Alarm name: _____ Tested: Y or N Prealarm (min.): _____ Postalarm (max.) _____

Table 6. Installation checklist (continued)

Alarm Input 2	(circle one) Yes or No	(circle one) Activated [c] Deactivated [d] ____ VDC input	Alarm name: _____ Tested: Y or N Prealarm (min.): _____ Postalarm (max.) _____
Alarm Input 3	(circle one) Yes or No	(circle one) Activated [c] Deactivated [d] ____ VDC input	Alarm name: _____ Tested: Y or N Prealarm (min.): _____ Postalarm (max.) _____
Alarm Input 4	(circle one) Yes or No	(circle one) Activated [c] Deactivated [d] ____ VDC input	Alarm name: _____ Tested: Y or N Prealarm (min.): _____ Postalarm (max.) _____
Alarm Input 5	(circle one) Yes or No	(circle one) Activated [c] Deactivated [d] ____ VDC input	Alarm name: _____ Tested: Y or N Prealarm (min.): _____ Postalarm (max.) _____
Alarm Input 6	(circle one) Yes or No	(circle one) Activated [c] Deactivated [d] ____ VDC input	Alarm name: _____ Tested: Y or N Prealarm (min.): _____ Postalarm (max.) _____
Alarm Input 7	(circle one) Yes or No	(circle one) Activated [c] Deactivated [d] ____ VDC input	Alarm name: _____ Tested: Y or N Prealarm (min.): _____ Postalarm (max.) _____
Alarm Input 8	(circle one) Yes or No	(circle one) Activated [c] Deactivated [d] ____ VDC input	Alarm name: _____ Tested: Y or N Prealarm (min.): _____ Postalarm (max.) _____
Confirm DVR IP and subnet mask are correct per customer needs	Generally, the DVR Ethernet IP scheme is 10.60.xx.yy with the subnet mask 255.255.0.0 (where xx.yy is the vehicle number. Example for bus 2020, the Ethernet IP would be 10.60.20.20 with a subnet mask of 255.255.0.0).		

Table 6. Installation checklist (continued)

Shutdown dwell time set	Time (hh:mm:ss)	
Customer/contractor acceptance		
Customer signature:		Print name and date:
Installer signature:		Print name and date:

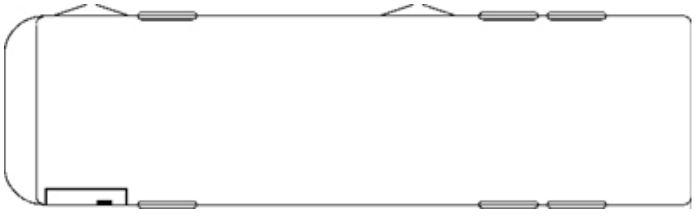
a. If you change this parameter, you must commit it to DVR memory by double-clicking the "commit" icon on the DVR desktop and rebooting the DVR.
b. Factory default front IP/subnet is 192.168.0.100/255.255.255.0 and back box IP/subnet is either DHCP or 192.168.0.200.
c. Activated is used with a normally open contact.
d. Deactivated is used with a normally closed contact

Vehicle layout diagram

Indicate each camera to be installed on the layout diagram with the correct camera symbol per the legend below.

- FL: Flush mount
- RC: Recessed
- FF: Variable focus forward-facing

Figure 62. Vehicle layout diagram



Vehicle length (ft.) _____

Articulated (circle one): Yes or no.

Camera legend:

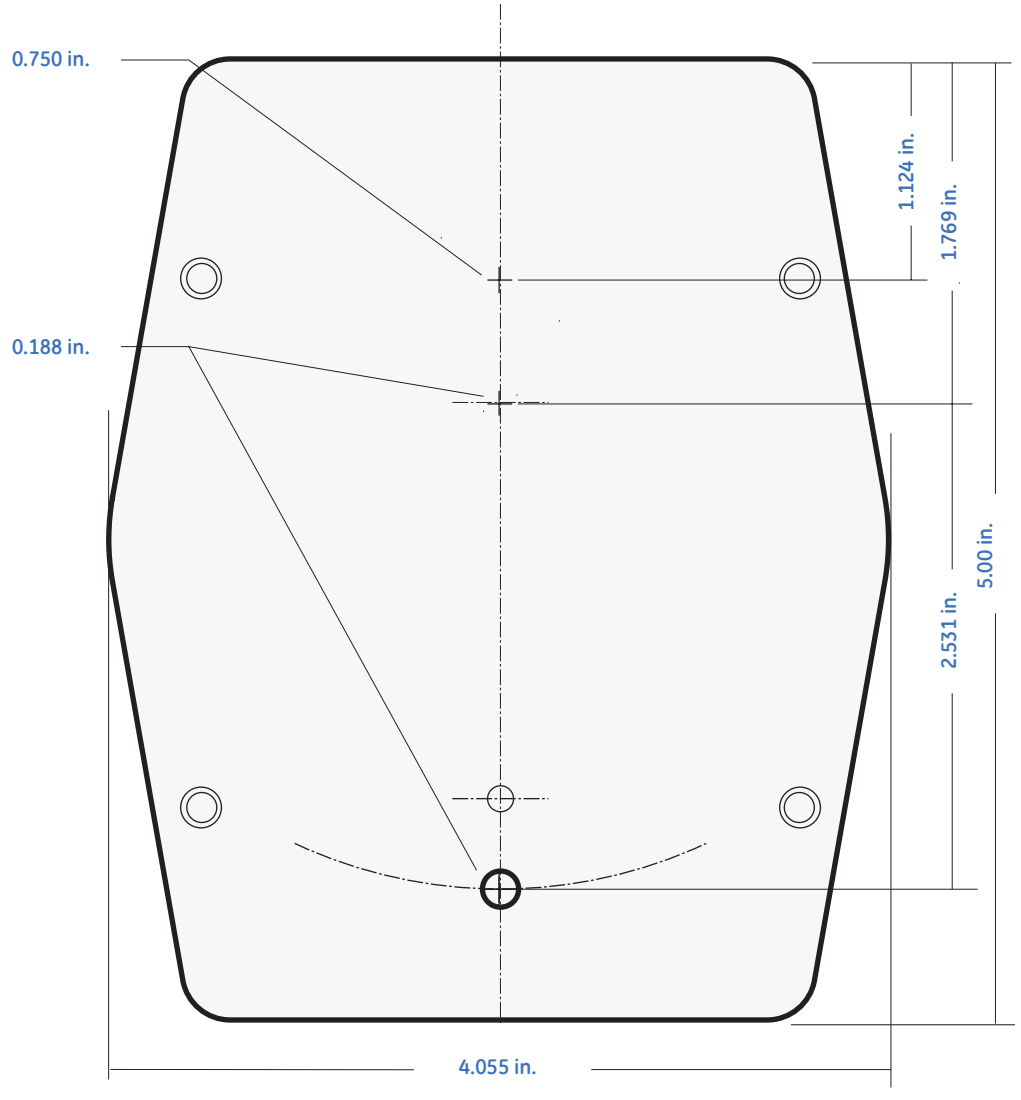
- FL camera #: _____
- RC camera #: _____
- FF camera #: _____

Notes:

Camera mounting plate template

Use this mounting template to drill the holes for the mounting plate in the correct places.

Figure 63. Mounting plate template



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