

NH16v2 NVR Hybrid



Installation and Configuration Guide

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Introduction

This Guide provides information for Installers, System Technicians, and Vehicle Operators working with the NH16v2 NVR Hybrid. **The NH16v2 system package also requires installation of the network switch** (for more information, see the *16-Port Network Switch Installation Guide*, part #700-1156).

IMPORTANT: Third-party switch gear is not supported

The Safe Fleet NS18POE16 switch is designed to enable extended IP camera features on the NH16v2. Third-party switch gear is not supported and may inhibit proper operation.

Installers

Explore NH16v2 NVR system components, physical and electrical installation, and system-level settings, including camera and NVR configuration. You'll also learn to test system functionality and interoperability with other equipment, how to clone NVR configuration, and perform firmware updates.

NOTE: Professional installation required

NVR systems must be installed by a professional installer with the appropriate experience and equipment.

System Technicians

Configure, troubleshoot and maintain the mobile surveillance system using a monitor plugged into the NVR front panel, remove and replace hard drives, access video, and set up cameras and recording options.

Note: on-screen configuration and video playback requires a portable video monitor and a USB mouse.

Vehicle Operators

Learn how to flag an event so incident video can be easily located, and understand the system status indicator, so you'll know when the NVR is recording.

Need Help?

The **Safe Fleet Community** provides more information about our products and services, including videos, tutorials, user guides, installation guides and specification sheets.

<https://community.safefleet.net>

Contact Safe Fleet Technical Support

- Phone: 1.844.899.7366
- Email: PTsupport@safefleet.net

System Components

The typical installation components are listed below.

- NH16v2 video recorder with hard drive, locking front cover, cable cover, fasteners, and mounting plate
- 16-channel PoE Ethernet switch (NS18POE16)
- Power harness (PH1X3UM20)
- Keypad for hard drive and front door locks (KS)

Camera Options

- Analog High Definition cameras (HD3Q, HD3W, HD3U, HD3S, HD2Q, HD1W, HD1Q, or HD1S)
- IP Cameras (API: C3Q9PD, C3W9PD, CHW8PD / RTSP: C12F2PD, C8Q2PD)
- Analog Standard Definition cameras (CA10, CJ, CQ, or RVC)
- Camera harness (HEHDxx or HExHD)

Standard Accessories

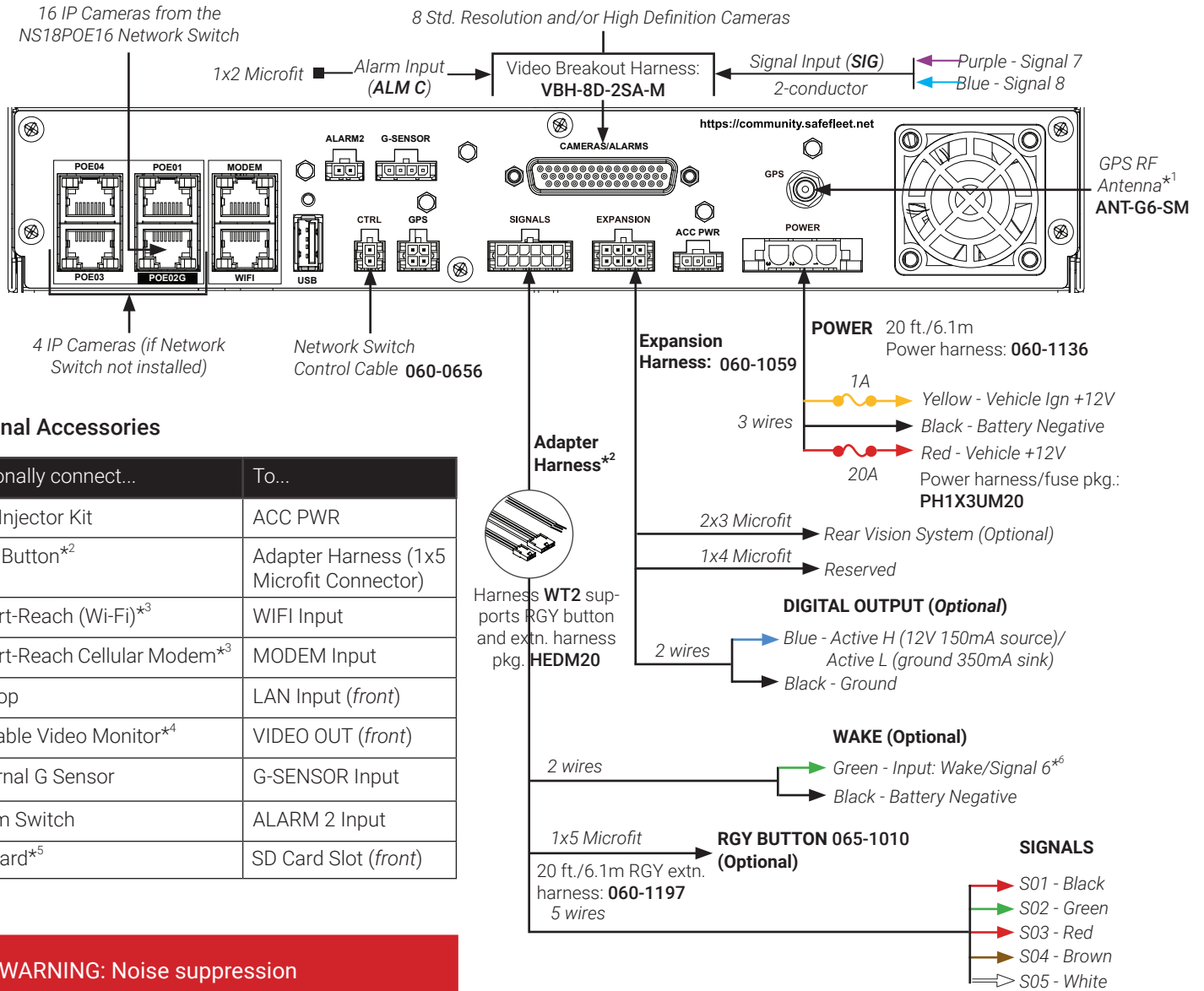
- GPS Module, Built-in
- GPS Antenna (ANT-G6-SM)

Accessory Options

- Adaptor harness (WT2)
- 8-channel video breakout harness (VBH-8D-2SA-M)
- G Sensor (G-SENSOR-EXT)
- PoE Injector Kit (NVRPOEKIT12)
- Expansion harness (060-1059)
- RGY button with extension cable (HEDM20)
- Smart-Reach WIFI bridge (various models)
- Smart-Reach cellular router (various models)
- Portable video monitor (LMK)
- Driver assist monitor (DAM-1-07-X)
- SD card (various sizes)
- Wake motion wake kit (MSS-MISC-SPY-TH-KIT)
- Media cartridge dock (HDD-DOCK3)
- Snap-in fan filter replacement kit (TH8-FMK)

System Diagram

Typical System Setup – The NH16v2 supports a maximum of 16 channels (12 channels without the network switch):



Optional Accessories

Optionally connect...	To...
PoE Injector Kit	ACC PWR
RGY Button* ²	Adapter Harness (1x5 Microfit Connector)
Smart-Reach (Wi-Fi)* ³	WIFI Input
Smart-Reach Cellular Modem* ³	MODEM Input
Laptop	LAN Input (front)
Portable Video Monitor* ⁴	VIDEO OUT (front)
External G Sensor	G-SENSOR Input
Alarm Switch	ALARM 2 Input
SD Card* ⁵	SD Card Slot (front)

⚠ WARNING: Noise suppression

Do not use the output of a noise suppression solenoid as a recorder ignition or power source. If no true ignition or power source can be readily found, consult the bus schematic bus or manufacturer to locate a proper source.

⚠ WARNING: Automatic drive formatting

Storage media might not be recognized on recorders running different firmware. By design, unrecognized media automatically formats when inserted into a recorder, so recording can commence. Customers who swap cartridges between recorders should ensure each recorder has the same firmware version.

Notes (*)

- Vehicle speed and location tracking require the GPS antenna (part # ANT-G6-SM, 19.6ft/6m cable).
- The RGY Button is optional, and requires the WT2 adapter harness and the RGY extension harness (part# 060-1197).
- An optional Smart-Reach Wi-Fi bridge or Smart-Reach Cellular modem can be connected to the rear panel WIFI/ MODEM ports.
- An optional Video Monitor can be used from the video output located on the front panel.
- Use Safe Fleet-approved cards only.
- Wake/Signal 6 input, active high (5-32V edge-triggered).

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Installing the NVR

Tools and Equipment

The NVR system must be installed by a professional installer. A professional installer has the experience and equipment to install and configure this NVR system to run properly.

Check that you have all the system components and inspect the units for damage before installing.

Keys (included in package contents):

- NVR keys for securing the removable hard drive
- Front cover keys for securing the removable front cover

Configuration equipment:

- Local on-screen configuration requires a portable video monitor and a mouse (contact Customer Service for more information)
- Configuration from a browser requires a laptop and an Ethernet cable

Physical Location

The NVR is secured with a security front cover and a cable cover. The cable cover allows wiring to enter from the underside of the back of the unit.

The NVR is designed for horizontal installation, on top of the mounting plate (see the diagram on page 10). **Do NOT install the NVR upside down or vertically.**

WARNING: Risk of heat or moisture damage

Do not install the NVR in a location where the unit is exposed to excessive heat or moisture.

Installation close to extreme heat or moisture voids the product warranty.

Route wiring and cables away from sharp edges that might damage the insulation. Avoid sharp bends in the cable.

Contact Technical Support before attaching the NVR to other equipment in the vehicle.

Before installing the NVR, keep in mind that a well-ventilated location and sufficient clearance around the unit are key factors for performance and maintainability. The following table provides information on installation requirements.

Installation Requirements

⚠ WARNING: Safety and electrical systems

It is your responsibility to avoid damaging safety or electrical systems.

Ventilated Location	Install the NVR away from any sort of heat outlet, heater, or AC blower. Do not operate the NVR in a closed-in area or restrict ventilation in any way. The NVR requires air circulation to maintain optimum operation temperature and provide best performance. Do not expose the NVR to moisture.
Mount to secure surfaces only	Do not mount the NVR to a plastic panel or other surface that is subject to constant vibration.
Mounting orientation	We strongly recommend mounting the NVR in a horizontal orientation (on top of the mounting tray). Do NOT install the NVR upside-down or vertically.
Clearance around the NVR	Allow sufficient clearance of at least six (6) inches in front of the NVR and two (2) inches to each side for removal of the security front cover and easy access to the hard drive and USB ports. Allow sufficient clearance behind the NVR for camera cables, mounting cables, Ethernet cables, and power cables.
Mounting cables	The radius for the mounting cables will be dictated by the cable cover. The rearmost surface of the cable cover will be about 3 inches from the back of the NVR to allow camera cables to bend over each other.
Ethernet cables	Avoid right angle bends in the Ethernet cables.

⚠ WARNING: Cable and harness slack

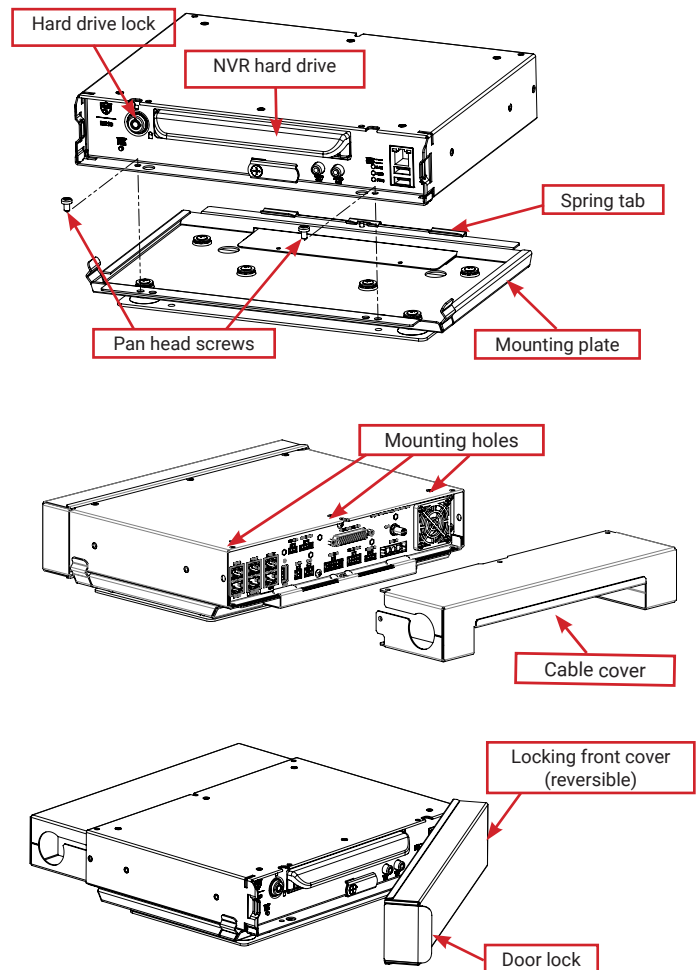
Cables and harnesses **MUST** have slack and move freely with the recorder without being pulled to the side or away from the connector. A 4-inch diameter loop is normally sufficient.

Physical Installation

The NVR typically ships with the locking front cover, mounting plate, and cable cover off, but in the shipping box. The hard disk drive is in a separate box in the system shipping kit.

To install the NVR:

1. Select an appropriate mounting location.
2. Insert a hard drive in the NVR.
3. Insert the key into the hard drive lock and rotate a quarter turn to lock the drive.
4. Use the mounting plate to mark the desired position of the NVR and drill the four mounting holes.
5. Fasten the mounting plate to the mounting surface with the four self-drilling screws.
6. Slide the rear bottom edge of the NVR into the spring tab on the back edge of the mounting tray.
7. Attach the front bottom edge to the front of the NVR using the two pan-head Phillips screws.
8. Connect the necessary cables and components. For more information, see "NVR Front Panel Features" on page 24 and "NVR Back Panel Features" on page 25.
9. Attach the cable cover to the NVR using the thumb screws provided.
10. When NVR installation is complete, attach the front door by hooking the door along the top edge and turning the key to the locked position.



Installing the Video Breakout Harness (optional)

About

The Video Breakout Harness (part # VBH-8D-2SA-M) connects 8 standard resolution and/or high definition cameras, 2 Signal inputs (Signals 7 and 8) and an Alarm input (Alarm C).

- "Signals" on page 51
- "Alarms" on page 53

Before you begin...

It is your responsibility to avoid damaging safety or electrical systems.

Ensure you read and understand "Installation Requirements" on page 9.

To install the Video Breakout Harness

1. Plug the harness' D-Sub connector into the NVR rear panel **CAMERAS/ALARMS** socket.

The D-Sub connector uses retaining screws to ensure it does not disconnect during operation. Ensure the retaining screws are fully engaged, or unwanted disconnection may occur.

2. Connect the 2x3 Microfit connector from each camera extension harness to its corresponding input on the Video Breakout Harness.

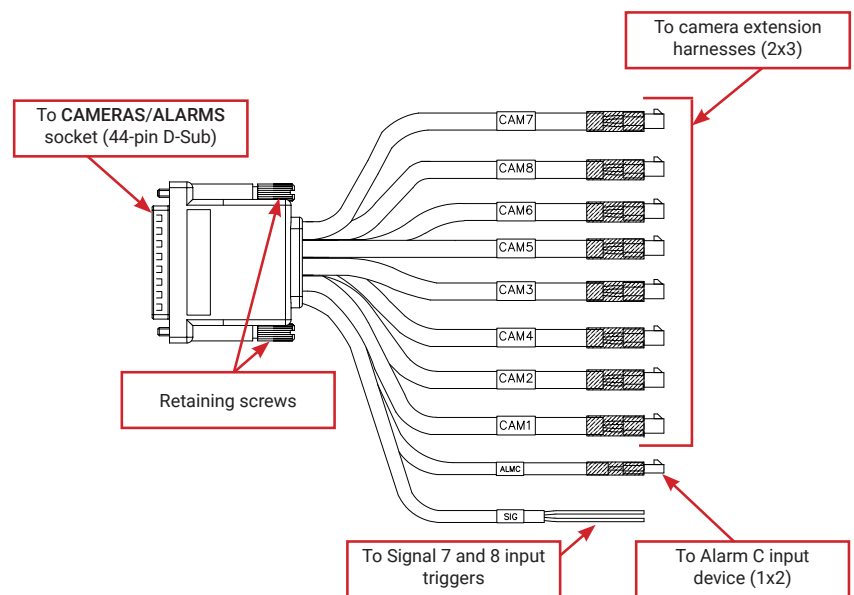
Camera inputs are labeled:
CAM1-CAM8

3. Connect flying leads from the **SIG** cable to Signal trigger inputs (*optional*).

The purple lead triggers Signal 7, and the blue lead triggers Signal 8.

4. Connect the **ALMC** 1x2 Microfit to an Alarm input device such as an operator button or covert trigger (*optional*).

For additional wiring details, see the "System Diagram" on page 6.



Installing the Signals Harness

About

This topic describes installing the Signals Harness, which connects the NVR to Signal inputs, and to the optional RGY Button and Wake/Signal 6 trigger: for more information on each of these features see:

- "Signals" on page 51
- "Tagging Video for Review" on page 28
- "Wake On Input, Digital Output" on page 84

Before you begin...

It is your responsibility to avoid damaging safety or electrical systems.

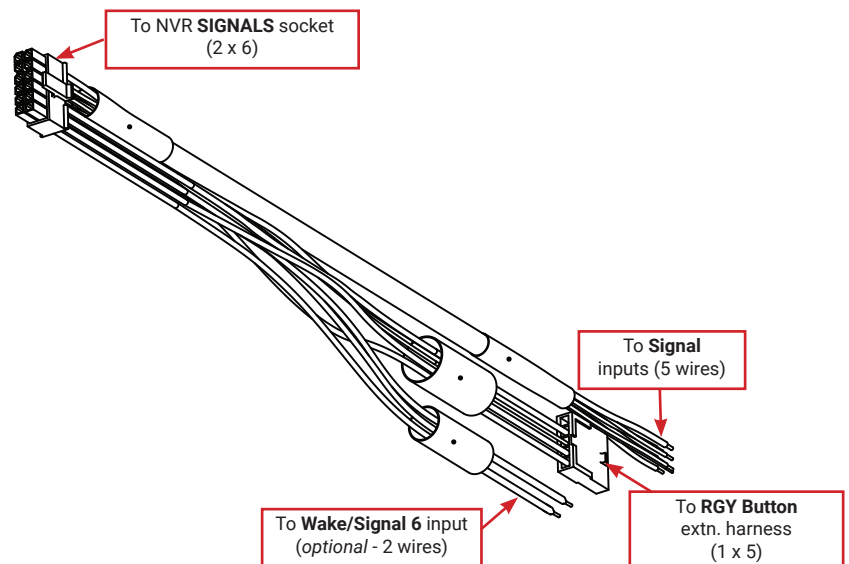
Ensure you read and understand "Installation Requirements" on page 9.

To install the Signals Harness

Connect the 2x6 Microfit to the SIGNALS socket on the NVR.

- Connect the 5 signal input wires, as shown in the "System Diagram" on page 6.
- Connect the 1x5 Microfit to the RGY button extension harness (*optional*).
- Connect the 2 Wake/Signal 6 input (*optional*) green and black flying leads, as shown in the "System Diagram" on page 6.

The Signals harness is **Part # WT2**.



Installing the Expansion Harness (optional)

About

This topic describes installing the optional Expansion Harness, which can connect the NVR to a Rear Vision System, and provides a digital output to trigger other devices when an Alarm is detected (for more information, see "Alarms" on page 53).

Before you begin...

It is your responsibility to avoid damaging safety or electrical systems.

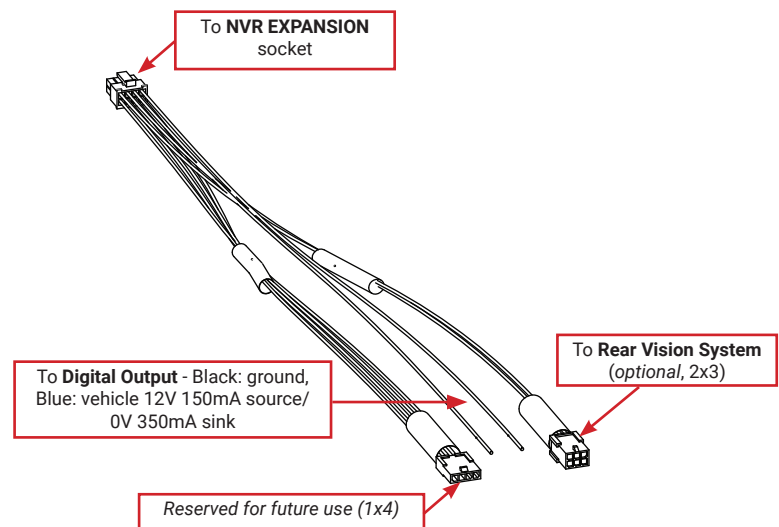
Ensure you read and understand "Installation Requirements" on page 9.

To install the Expansion Harness

Connect the 2x4 Microfit connector to the EXPANSION socket on the NVR.

- Connect the 2x3 Microfit to the Rear Vision System harness (optional).
- Connect the Digital Out black and blue wires (optional) as shown in the "System Diagram" on page 6.
- The 1x4 Microfit is reserved. Do not use unless directed by Safe Fleet Technical Support or after specialized instruction.

The Expansion Harness is **Part #060-1059**



Installing the SD Card (optional)

About

This topic describes installing the optional SD card, a secondary storage device used to record the NVR's low resolution (and low frame rate) stream, providing backup storage for the NVR's internal media. The amount of backup storage available from the card is determined by the card's capacity.

💡 TIP: Repeat Record setting controls "looping"

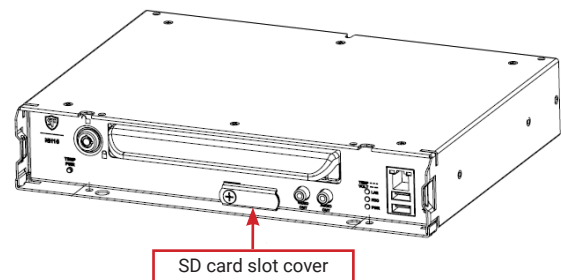
The **Configuration → Record → Repeat Record** setting determines what happens when storage media (including the SD card and internal drives) become full. The default is to loop (record over the oldest video).

For more information, see "Recording Settings - Menu Options" on page 58.

Only the lower resolution "Record 2" video stream is stored on the SD card. Access to the recording on the SD card is only possible through video review software since the card is intended for backup purposes. For more information, see the *Evidence Manager User Guide* on the Safe Fleet Community.

To install the SD card:

1. On the front of the NVR, remove the screw holding the SD card cover plate, and remove the plate.
2. Remove the adhesive plastic shipping strip covering the SD card slot.
3. Insert a Seon-approved SD card into the slot until it clicks.
4. Replace the SD card slot cover plate.



To remove the SD card:

1. On the front of the NVR, remove the screw holding the SD card cover plate, and remove the plate.
2. Remove the SD card from its slot.
3. Replace the SD card slot cover plate.

Post-installation Checklist

After installing the NVR, double-check the following items:

✓	Harnesses (camera, recorder, and accessories)
	Ensure cables and harnesses are properly secured.
	Ensure the Video Breakout Harness is fully seated, and retaining screws securely tightened.
	Check that sharp metal edges are not touching cables or harnesses.
	Ensure connections are solid (no shorts).

✓	Cameras
	Ensure tight mounting.
	Examine the internal harness connections and ensure they are solid.
	Ensure the lid is properly seated on the gasket and secured tightly.
	Check camera(s) field of view.

✓	NVR
	Ensure tight mounting.
	Check that all connections are tight.

✓	Network Switch
	If applicable, ensure the network switch is properly installed - for more information, see the <i>16-port Network Switch Installation Guide</i> (part #700-1156) on the Safe Fleet Community.

Post-installation Checklist (continued)

✓	System
	Install fuses.
	Plug portable video monitor into NVR, and power up the NVR from the vehicle ignition.
	Configure the NVR to required specifications locally using the mouse and monitor, or remotely over a network via WiFi or Ethernet using a PC. For more information, see "Basic Configuration" on page 35.
	Confirm that Network → Port Functions and IP Addresses are configured for the network switch (if applicable) and any optional Smart-Reach WiFi bridge, cellular modem/router, or RTSP/IP video sources. For more information, see "Network Settings" on page 62.
	Confirm the PWR and HDD status indicators on the NVR front panel work properly.
	Confirm that all cameras and audio sources operate properly.
	Test audio/video record and playback.
	Reformat the hard drives by navigating to Main Menu → Configuration → System → Program Update → Format . A warning message tells you all data will be erased. Click Yes . When the process completes and a message appears, click OK . Exit the Configuration setting menu, and system setup is complete.
	Fasten and lock the front cover. Secure the cable cover on the NVR using the screws provided.

Firmware Updates

About

NVR firmware controls how features operate, including Playback and Configuration menu displays. You can also update firmware on IP cameras directly from the recorder.

⚠ IMPORTANT: Only install firmware updates as directed by Technical Support

Technical Support may direct you to install a firmware update when new features are added or specific issues are addressed.

This topic describes how to use the On-screen Display to install firmware updates from a thumb drive in the USB port on the NVR's front panel.

💡 TIP: Using the Web interface to install firmware

You can also connect to the NVR with a Web Browser to install NVR firmware updates from a file stored on another device. For more information, see "Web Browser access:" on page 38.

Before you begin...

Contact Technical Support to obtain the latest firmware updates. Copy the update file to a USB storage device formatted by a Windows-based computer using the FAT file format.

⚠ IMPORTANT: Firmware update files

Firmware update files must be stored in the thumb drive's root directory (not in sub-folders).

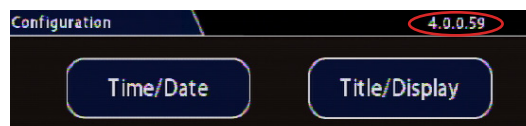
💡 TIP: IP camera firmware update file names

For IP camera firmware updates, make a note of the update file name - you will need it to perform the update.

NVR Firmware Version

The current firmware version appears in the top-right corner of every Configuration menu.

For instructions on opening the Configuration menus, see "Accessing the On-screen Display" on page 29.



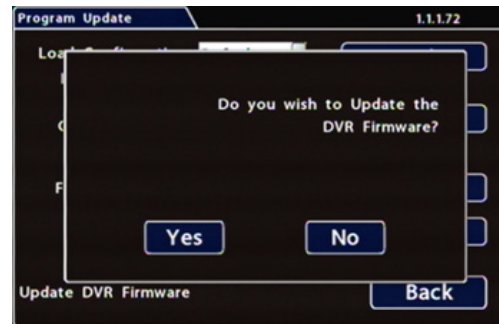
To install an NVR firmware update:

1. Power-up the NVR using the vehicle ignition.
2. Insert the USB memory device with the new recorder firmware version into the USB port on the NVR.
3. After the NVR starts up, right-click in the On-screen Display and select **Configuration → System → Program Update**.
4. In the Program Update tab, click **Update**. A confirmation window appears.
5. Click **Yes** to proceed or **No** to cancel. **Yes** starts the firmware update, and a progress bar displays the percentage complete.
6. Once the update is finished, the NVR automatically restarts to allow verification of a successful update.
7. Remove the USB memory device.

⚠ WARNING: Do not crank the vehicle

Do not crank the vehicle power or remove power while updating NVR firmware.

Equipment damage may result.

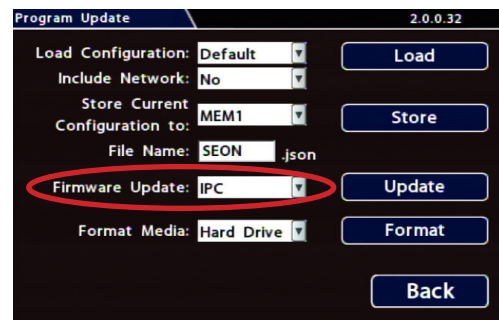


ℹ NOTE: Wait until the NVR finishes loading

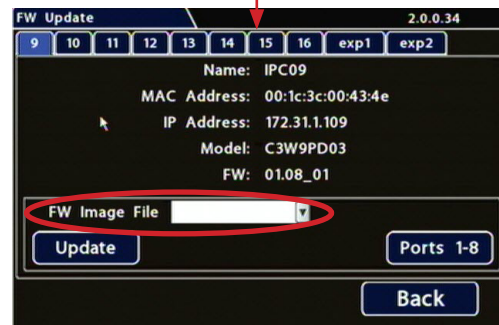
After restarting, the NVR may take up to 3 minutes to load and complete the update.

To install an IP camera firmware update:

1. Power-up the NVR using the vehicle ignition.
2. Insert the USB memory device with the new IP camera firmware version into the USB port on the NVR.
3. After the NVR starts up, right-click in the On-screen Display and select **Configuration → System → Program Update**.
4. In the Program Update tab's **Firmware Update** dropdown menu, select **IPC**.
5. Click **Update**.
6. Use the tabs across the top of the screen to select the physical port connected to the IP camera.
7. Use the **FW Image File** dropdown menu to select the IP camera firmware update file on the thumb drive.
8. Click **Update**. The firmware update initiates, and a progress bar displays the percentage complete.
9. Once the update is finished, the IP camera automatically restarts.
10. Remove the USB memory device.



Select the port number the IP camera is connected to (1-16 for the network switch or exp1/2 for POE IP Cam ports)



Copying NVR Configuration

About

Copying NVR configuration saves a lot of time and effort, and ensures consistent configuration when installing and maintaining NVRs in a fleet.

This topic explains how to use the On-screen Display to copy setup details from a thumb drive in the USB port on the NVR's front panel and apply them to other NVRs.

 TIP: Using the Web interface to copy configuration

You can also connect to the NVR with a Web Browser to copy configuration files stored on another device.

For more information, see "Web Browser access:" on page 38.

What are Configuration Files?

A configuration file preserves a particular NVR setup, so you can apply the settings to other NVRs in a single operation. You create a named configuration file, which contains all an NVR's current Configuration menu settings. If you need more than one system setup for your fleet (for example, a specific number of cameras and viewpoints for different vehicle configurations), build a separate configuration file for each situation.

You can load a configuration file onto NVRs during installation or when changes are required, and all settings are applied automatically.

Before you begin...

Ensure the NVR you're copying configuration from is set up for any specific vehicle type and mobile surveillance requirements:

- Camera names/channels
- Recording parameters
- Alarm and Signal assignments
- System preferences
- Networking details

For more information, see "Setting up the NVR" on page 38.

This procedure requires physical access to the NVR you want to copy settings from, a portable video monitor, a USB mouse, and a USB storage device formatted by a Windows computer using the FAT. You should have a general understanding of mobile surveillance system components, and experience with Windows-based computers and storage media.

Copying NVR Settings

To create a configuration file:

1. Insert the USB storage device in the USB port on the NVR's front panel. For more information, see "NVR Front Panel Features" on page 24.
2. Access the OSD (On-Screen Display). For details, see "Accessing the On-screen Display" on page 29.
3. Right-click anywhere in the OSD view to access the **Main Menu**.
4. Select **Configuration** → **System** → **Program Update**.
5. In the **Store Current Configuration to:** pull-down menu, select **USB Device**.
6. Click the **File Name** field and use the on-screen keyboard to change the configuration file name (maximum 4 characters). Best practice is to choose a name that references the fleet and/or configuration type (e.g. "TB8C" for a transit bus with 8 cameras).
7. Click **Store**. In the confirmation that appears, click **Yes**.
8. Click **OK**. The configuration file is created on the USB device.



Applying NVR Settings

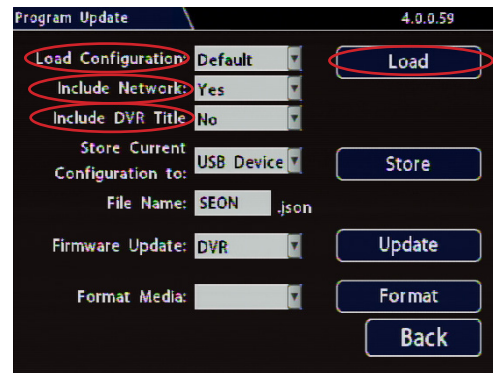
For new NVR installations, apply predefined settings from a configuration file on a USB memory stick.

Once an NVR is set up, you can also upload a new configuration file by connecting to the NVR over a network (see "Web Browser access:" on page 38), or via a video management application if the NVR is equipped with wireless capabilities. Video management applications can also perform batch updates on multiple NVRs.

We offer two video management applications: Commander and Depot Manager. Commander provides these capabilities using a cloud-based architecture designed to simplify total deployment management and upkeep, while Depot Manager provides the same features in a non-cloud or local deployment. For more information, see the Commander and Depot Manager guides on the Safe Fleet Community.

To copy configuration to an NVR from a USB storage device:

1. Power up the NVR using the vehicle ignition.
2. Connect the portable video monitor and USB mouse.
3. Insert a USB storage device containing a configuration file into the USB port on the NVR.
4. From the On-Screen Display, right-click anywhere in Live view to display the **Main Menu**.
5. Select **Configuration → System → Program Update**.
6. Use the **Load Configuration** menu to select the desired file.
Note: only the 10 most recent configuration files in the root folder of the USB drive are available from the drop-down menu.
7. From the **Include Network** pull-down menu, select whether or not to overwrite NVR network settings:
 - **No** keeps existing NVR network settings
 - **Yes** overwrites NVR network settings with configuration from the file.
8. If you want to overwrite the existing NVR Title, set **Include DVR Title** to **Yes**.
9. Click **Load**, then select **Yes** in the confirmation dialog to proceed.
10. Click **Back** in the **Program Update** and **System Settings** tabs to return to the Configuration Menu.
11. Remove the USB memory device.
12. Confirm that the new configuration settings have been applied.



NOTE: Include Network setting

If default **Network Settings → Port Functions** have been changed in the configuration file, ensure **Include Network** is enabled, or the new settings will not be applied.

If you have questions about whether to overwrite NVR network settings, please contact Technical Support.

⚠ IMPORTANT: Time/Date and vehicle-specific configuration

Open the Configuration menu and verify all Time/Date settings.

Also be sure to update vehicle-specific configuration, including:

- **Title/Display → Main Title** - generally contains the bus #/vehicle ID where the NVR is installed
- **Network** configuration (if the NVR is equipped with wireless capabilities)
- **Alarms & I/O → Sensor → G Sensor** calibration (if the external G-Sensor is installed)

For more information, see "Setting up the NVR" on page 38.

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Operation

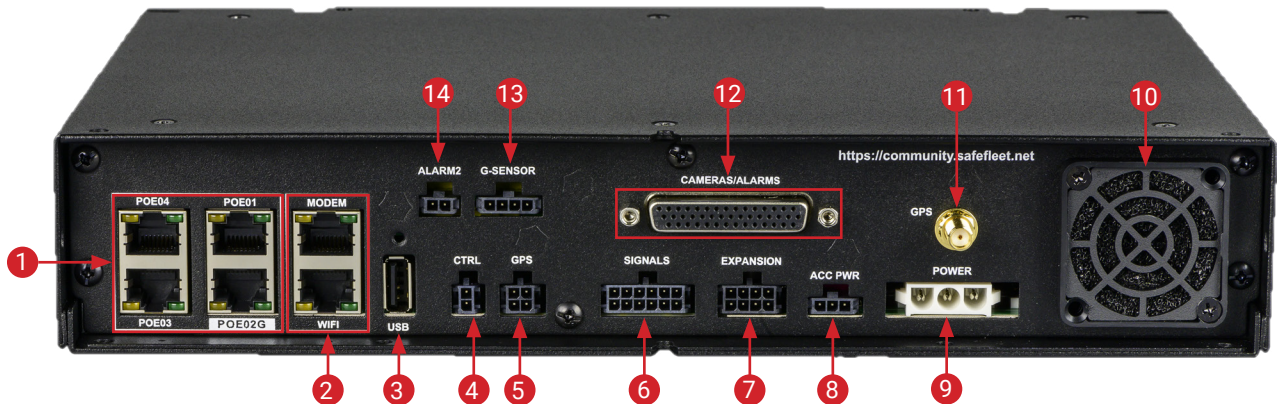
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NVR Front Panel Features



1. NVR Drive lock - requires the NVR drive key to unlock and remove the NVR drive
2. NVR Drive - for playback, remove the drive and use the HDD Dock connected to a PC
3. Status Lights:
 - POWER - illuminates when the NVR is powered on
 - *flashes quickly* when the NVR cannot power up due to temperature limitations
 - *flashes slowly* when the NVR cannot power up due to voltage limitations
 - HDD - illuminates when the NVR is accessing the drive
 - ERR - illuminates solid red when one of the following faults occurs:
 - Video loss
 - Drive unlocked
 - Fan error
 - PoE overload
4. LAN Port - RJ-45 Ethernet connector for a laptop to perform installation and maintenance tasks
5. Mouse Port - connection for USB mouse
6. USB Port - supports USB devices used to:
 - export video and audio clips
 - update firmware for the NVR, network switch, and IP cameras
 - import/export configuration data and archives
7. AUDIO - RCA jack for audio output.
8. VIDEO - RCA jack for video output (playback and live viewing with a portable monitor)
9. SD Card Slot Cover - SD card for recording low resolution ("R2") backup video stream
10. TEMP POWER
 - powers on the NVR for five minutes if held for more than 5 seconds
 - powers down the NVR if held for more than 5 seconds in temporary power mode or in shutdown sequence with ignition off

NVR Back Panel Features



1. 4x 48V POE switch:
Ports POE 01, 03, & 04 - RJ-45 Ethernet LAN connectors (10/100 Mbps) for IP cameras
Port POE02G - RJ-45 Ethernet LAN connector (1 Gbps) for the 16--port network switch or an IP camera
2. MODEM & WIFI - dedicated RJ-45 Ethernet LAN connectors (1 Gbps, unpowered) for Smart-Reach wireless equipment
3. USB - port reserved for future use
4. CTRL - control connector for accessories such as the 16-port network switch
5. GPS - 2x2 input connector for serial GPS receiver
6. SIGNALS - connector for signal harness, with an optional adapter for the RGY button
7. EXPANSION - connector for communicating with other devices
8. ACC PWR - output connector for powering accessories
9. POWER - input for power harness
10. Fan - intake fan with filter
11. GPS - SMA connector for RF antenna
12. CAMERAS/ALARMS - video breakout harness: 8 standard resolution and/or high definition cameras, 2 signal connections (signals 7 and 8) and an alarm input (alarm C)
13. G-SENSOR - input for optional G-force sensor unit
14. ALARM 2 - additional alarm input

TIP: POE switch ports are 48-volt

In addition to the data transmitted, the 4 POE RJ-45 LAN ports can supply 48 volts to power IP cameras.

TIP: Dual GPS connection

If both a serial GPS receiver (item 5) and GPS RF antenna (item 11) are connected at the same time, only serial will be used.

Video System Status

About

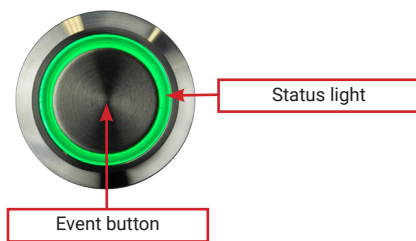
This topic describes the optional system status indicator, which tells you if the system is recording and operating normally, or whether the system requires attention.

Before you begin...

In order for the operator to easily check video system status, an **RGY Button** must be installed in the vehicle, and the **RGY Button** option must be selected in the **System Settings** → **Diagnostic Indicator** menu (see "System Settings" on page 78). For more information, see the *RGY Button Quick Start Guide* (part # 700-1233) on the Safe Fleet Community, or contact Technical Support.

RGY Button

If your system is equipped with an optional RGY Button, the colored light ring provides recording status details:



💡 TIP: Status light colors

- **Vehicle operators should check that the NVR status light turns solid green approximately two minutes after vehicle ignition is on.**
A solid green status light indicates the video system is operating normally.
- **A yellow or red status light should be reported to a supervisor, and indicates the system requires attention** (see the next section for details).

💡 TIP: Event button - tagging video

For information about using the Event button to flag an event, see "Tagging Video for Review" on page 28.

RGY Button - Status Light Indicators *(for Installers and Technicians)*

Color	Recorder Status	Examples
Green	Recording/normal – no video loss from any camera; no problems with recording operation.	Recording during: <ul style="list-style-type: none"> • normal system operation • system warm-up or initiation (boot up) • Record-On, Record-Off, or Power-Off delay
Yellow	Recording/video loss – recording, but experiencing video loss from one or more cameras	Video loss on any or all channels*¹
Red	Not recording – unable to record due to system problems.* ³	Not recording due to: <ul style="list-style-type: none"> • overheating • drive unlocked • drive failure*² • other abnormal conditions

¹ If the system is experiencing video loss *and* not recording, the red light displays.

² On systems with primary storage consisting of dual media, both media must fail.

³ Red light indicates recording status only, and does not indicate other fault conditions.

Tagging Video for Review

About

This topic explains how to flag an event, so the video footage can be located easily at a later time.

Before you begin...

In order for an operator to tag video, an RGY Button must be installed in the vehicle. For more information, see the *RGY Button Quick Start Guide* (part # 700-1233) on the Safe Fleet Community, or contact Technical Support.

💡 TIP: Automatic alarm triggers

Alarms can also tag video automatically when applied to a G Sensor threshold, excessive speed, or a GPS fence. For more information, see "Alarms" on page 53.

To tag an event so the video is available later:

💡 TIP: NVR is always recording!

Under normal conditions, the NVR is continuously recording when the vehicle ignition is on.

If something happens that should be flagged for review, press the Event Button to ensure the event is easy-to-find later.



Each time an event is flagged, the system places a special Alarm tag on the video, as well as the date and time. Upon playback, any triggered Alarms are displayed, and the reviewer can jump directly to the tagged sections and see the associated video (details depend on how the NVR is configured).

For full-featured video review, searching, and archiving, we recommend Evidence Manager. The software is supported on a Windows-based computer. For more information, see the *Evidence Manager User Guide* on the Safe Fleet Community.

If your organization uses one of our video management applications (Commander or Depot Manager), tagged video can be automatically downloaded and made available to reviewers when your vehicle returns to the depot. Commander provides these capabilities using a cloud-based architecture designed to simplify total deployment management and upkeep, while Depot Manager provides the same capabilities in a non-cloud or local deployment. For more information, see the Commander and Depot Manager guides on the Safe Fleet Community.

Accessing the On-screen Display

About

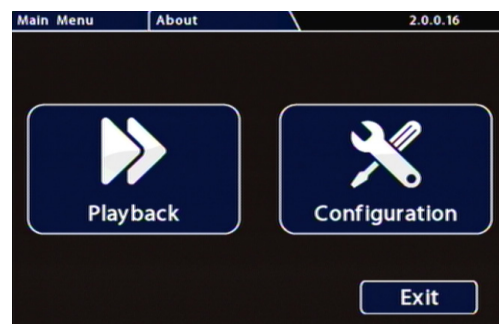
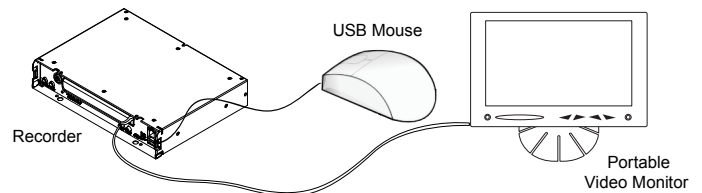
This topic explains how to connect a local monitor to the NVR and access configuration menus, view live camera feeds, or search, play back, and archive video.

Video Configuration, Playback, and Archiving

Installers and System Technicians can access NVR configuration, playback and archiving features locally from the NVR, via the On-screen Display (OSD) and a portable video monitor. For full-featured video review, searching, and archiving, we recommend Evidence Manager. The software is supported on a Windows-based computer. For more information, see the *Evidence Manager User Guide* on the Safe Fleet Community.

Using the On-screen Display

1. Connect a portable video monitor to VIDEO OUT on the NVR front panel.
2. Plug a USB mouse in a USB socket on the front of the NVR.
3. Power up the NVR.
The NVR splash screen appears briefly; the system displays live camera feeds, as described below in **Live View**.
4. Right-click anywhere in the OSD screen to view the **Main Menu**:
 - **Configuration** - access NVR menus to set up the system. For more information, see "Setting up the NVR" on page 38.
 - **Playback** - search, play back, and archive video directly from the NVR. For more information, see "Working with Video" on page 32.



Live View

Live view uses a grid format, with each camera feed displayed in its own tile. When live viewing and recording, you can control:

- **Camera feeds** - including the sequence of tiles: see "Ch (logical channel)" in "Camera Settings - Menu Options" on page 50.
- **Camera titles** (see "Camera Settings" on page 47).
- **Text overlays and item descriptions** - including NVR status and various system detail (see "Title/Display Menu" on page 43).

💡 TIP: Camera feeds

Live camera feeds appear in a 16-up (4x4) grid. Tiles display according to assigned logical channel number (sequentially, from top-left to bottom-right).



Using On-screen Keyboards

About

This topic describes entering text and numbers in OSD (On-screen Display) fields when accessing the NVR locally with a mouse and monitor.

Before you begin...

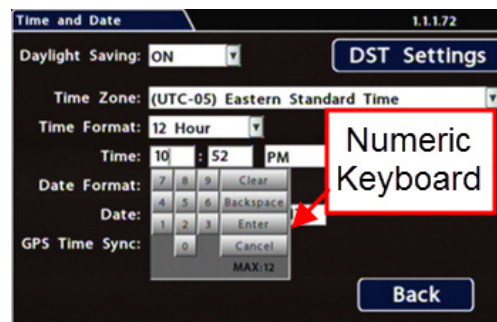
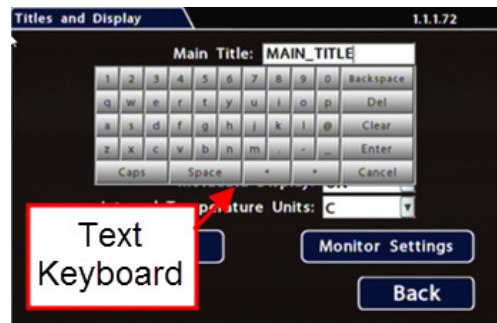
A portable video monitor and a USB mouse must be connected to the NVR.

For more information, see "Accessing the On-screen Display" on page 29.

Entering Data

To enter text and numbers in OSD fields using a mouse:

1. Click in an OSD field that accepts text or numbers as input.
The on-screen keyboard (text or numeric, as shown below) pops up on the screen.
2. Click text or numbers to enter values, and use the virtual keys as required.
Cancel closes the keyboard without saving changes.
3. When you're done, click **Enter** to save changes and close the keyboard.



Working with Video

About

This tutorial explains how to use the Playback menu to search, play back, and copy video directly from the NVR hard drive.

These procedures are intended for installers and system technicians to test and confirm mobile surveillance system functionality. For full-featured video review, searching, and archiving, we recommend Evidence Manager. The software is supported on a Windows-based computer. For more information, see the *Evidence Manager User Guide* on the Safe Fleet Community.

Playing Back and Copying Video

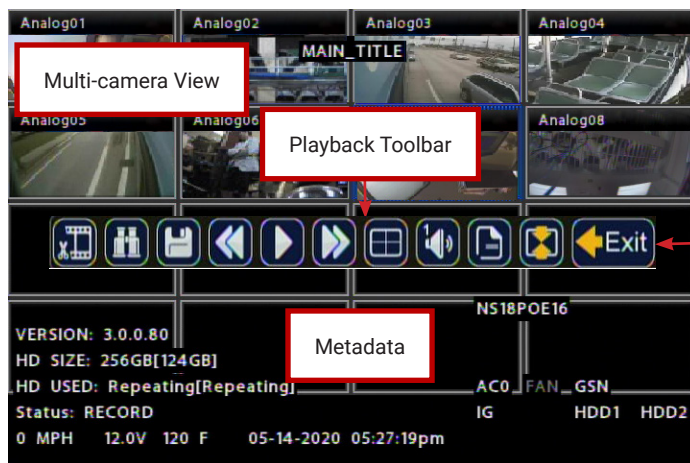
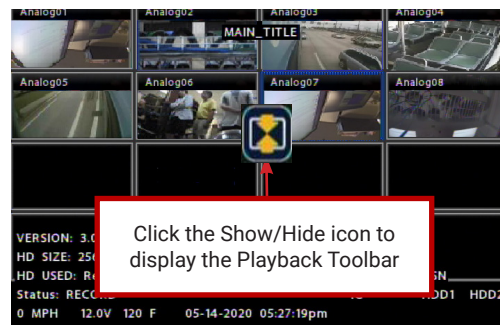
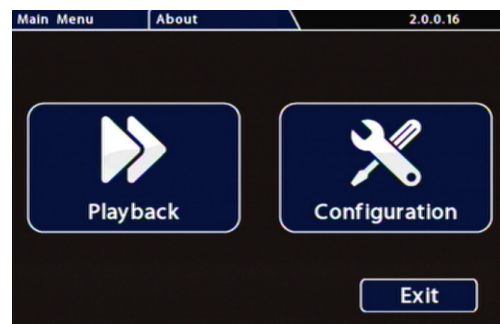
To search, play back, and archive video from the OSD (On-Screen Display) menus:

1. Connect a portable monitor and USB mouse, and power up the NVR. For more information, see "Accessing the On-screen Display" on page 29.
2. Right-click anywhere in the OSD view to access the **Main Menu** tab.
3. Click **Playback**.
4. In the center of the playback view, click the **Show/Hide** icon:



The **Playback Toolbar** appears.

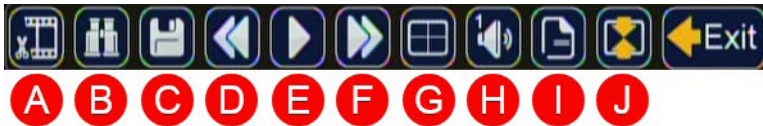
5. Click icons to browse video and archive clips. For icon descriptions, please see "Playback Toolbar Icons" in the next section.



For a description of these tools, see "Playback Toolbar Icons" on page 33

Playback Toolbar Icons

To display the Playback Toolbar, follow steps 1 through 4 in the previous section.



	Icon Name	Function
A	Start of clip/End of clip	Sets the start of clip and the end of clip points for archiving.
B	Search	Searches by Date, Time, Alarm, Signals, or System Event.
C	Archive	Displays the Archive window to save a video clip to USB memory device.
D	Fast Rewind	Reverses playback. With playback paused, each click reverses the video by one frame.
E	Play/Pause	Starts/pauses playback.
F	Fast Forward	Fast forwards playback. With playback paused, each click advances the video by one frame.
G	Individual Camera/Multi-view	Displays a single camera feed, or multi-view.
H	Audio	Cycles through audio for each channel.
I	Metadata Text Overlay	Turns on text overlay: temperature, system voltage, GPS data (if recorded), speed, date, and time. For more information, see "Metadata Details" on page 45.
J	Show/Hide Playback Tool Bar	Shows/hides the playback tool bar.
	Exit	Closes the On-Screen Display.

Searching Video

The NVR includes a simple, powerful search feature that quickly finds recorded information by Date and Time, Alarm, Signals, or System Events.

To view the Search menu:

1. From the **Playback Toolbar**, click the Search icon:



The **Search** tab appears (options displayed

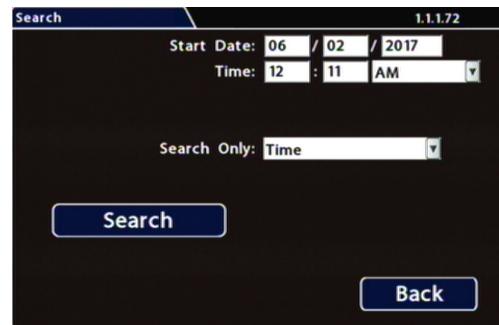
depend on the **Search Only** pull-down menu selection).

2. Use the **Start/End Date** and **Time** fields to set the desired period to search.

For instructions on how to enter numbers into the Date and Time fields, see "About" on page 31.

3. If desired, use the **Search Only** pull-down and sub-menus to specify **Alarms**, **Signals**, or **System Events** to search.
4. Click **Search**.
 - If **Search Only** is set to **Time**: Playback starts from the specified time and date (if the video exists on the hard drive).
 - If you selected **Alarms**, **Signals**, or **System Events**:

The NVR retrieves a list of recorded video segments containing the specified event type. Select an item from the list, then click **Play** to view the video captured when the event occurred.



Event No.	Start Date/Time	Event Type
1	01-12-2017 11:50:33am	S1
2	01-12-2017 11:42:21am	S1
3	01-12-2017 11:37:42am	S1
4	01-12-2017 11:37:07am	S1
5	01-12-2017 11:34:02am	S1
6	01-12-2017 11:29:10am	S1
7	01-12-2017 11:26:31am	S1
8	01-12-2017 11:19:39am	S1
9	01-12-2017 11:13:07am	S1
10	01-12-2017 11:09:32am	S1

0001/0084

Prev Pg Next Pg Play Exit

Health Check

About

The **Health Check** tab provides information on hard drive temperature, hard drive operational hours, Ethernet connections, per-port PoE power consumption, and general NVR health. The **Switch Health** tab shows whether valid network connections are detected between the NVR and ports on the network switch (if applicable).

Before you begin...

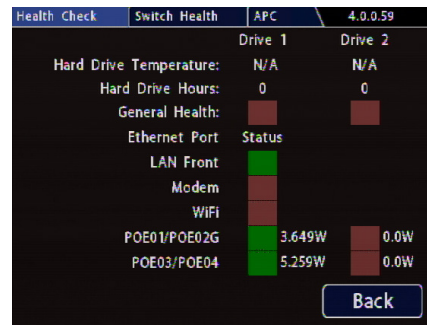
Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select **Configuration**.

For more information, see "Accessing the On-screen Display" on page 29.

To display NVR health check information:

Select **Title/Display** → **Health Check**.

For details, see "Information Display" on page 36.

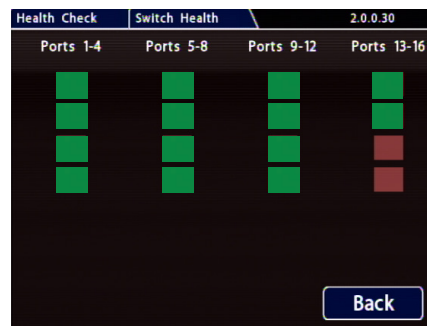


To display network switch health check information:

Select **Title/Display** → **Health Check** and click the **Switch Health** tab.

Green indicates a valid network connection between the NVR and the relevant switch port.

Red indicates a connection is not detected.



Information Display

Menu Item	Description
Hard Drive Temperature (drives 1 & 2)	Current temperature inside the drive. To choose whether this value displays in fahrenheit (USA) or celsius (Canada), use the Titles and Display → Internal Temperature Units setting.
Hard Drive Hours (drives 1 & 2)	The number of hours the drive has been powered on since it was manufactured.
General Health (drives 1 & 2)	Result of the drive subsystem self-check: green indicates normal operating status, while red means a drive failure was detected.
LAN Front*	Connectivity indicator: green when a cable is connected from the NVR's front LAN port to an operational network device; otherwise red.
Modem*	Connectivity indicator: green when a cable is connected from the NVR's rear MODEM port to an operational network device; otherwise red.
WiFi*	Connectivity indicator: green when a cable is connected from the NVR's rear WIFI port to an operational network device; otherwise red.
POE01/POE02G POE03/POE04	Connectivity indicators: green indicates a valid connection to a device from the referenced NVR rear POE switch port/s; otherwise red.

*Per-port PoE power consumption is displayed beside port connectivity indicator

Basic Configuration

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 - Basic NVR Configuration 37
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Setting up the NVR

About

This topic describes procedures for configuring the NVR, including system settings, cameras/recording, alarms, and network details (if applicable).

Before you begin...

The unit should be installed, including power and cabling - for details, see "Installation" on page 7. If applicable, the network switch must also be installed and connected - for more information, see the *16-Port Network Switch Installation Guide* (part #700-1156).

NVR Menu Access

You can configure the NVR with its local on-screen menus using a monitor and mouse, or through a Web Browser on a connected laptop. These settings can also be accessed remotely over a wireless network.

Local access with On-screen Display (OSD) menus:

Connect a portable monitor to the **VIDEO OUT** RCA jack on the NVR front panel and plug a mouse into the USB port to work with configuration settings.

For more information, see "Accessing the On-screen Display" on page 29.

To set or change a password, right-click in Live view, then choose the **Configuration** → **System** Password options.

Web Browser access:

The NVR's built-in Web Server provides the same configuration options as the On-screen Display menus (with small interface differences).

TIP: Web interface and network configuration

Logging in to the NVR with a Web Browser requires the proper network configuration to establish a connection to the NVR's IP address.

Plug an RJ-45 Ethernet cable into the front panel LAN port, or connect remotely over a network if you have Smart Reach wireless access.

Contact the Technical Support team for more information.

For information about passwords and permission levels, see "User Levels" on page 76.

Basic NVR Configuration

The NVR menu defaults cover most operational settings, but some basic customer and region-specific settings need to be configured for the NVR to operate optimally:

Menu Names	Required Settings	For more information:
Time and Date, DST Settings	Select display formats. Enter the current time and date, including Daylight Saving if applicable. Select the Time Zone. If GPS is installed, set GPS Time Sync ON to detect time and vehicle location.	see page 41
Title/Display	Enter the vehicle number in Main Title, and choose the information that displays as text when video appears.	see page 43
Title/Display → Monitor Settings	If a Rear Vision Camera is installed, select monitor output settings.	see page 82
Record	Set the Record Delay Off to 15-20 minutes for post trip check. If Wi-Fi is used, set the Power Delay Off to 2 hours for archive download.	see page 57
Record → Camera	Configure cameras. Turn off any unused camera channels, to avoid VLOSS events.	see page 47
Alarms & I/O → Alarms	Configure each alarm depending on source (Signals, Speed, G Sensor, GPS Fence, Wake).	see page 53
Alarms & I/O → Signals	Configure which signals will trigger alarms. Excessive speed and G Sensor readings can be set as signal outputs.	see page 51
Alarms & I/O → Speed	If the NVR is used in Canadian fleets, select KPH speed units.	see page 73
Alarms & I/O → Sensor → G Sensor	If a G Sensor is installed, Calibrate.	see page 70
Network	If Wi-Fi network is used, set addresses as instructed by a network administrator. Configure Network → Port Functions for any connected Smart-Reach wireless equipment, IP devices, or RTSP video sources.	see page 62
System	Select the audio channel to output from the NVR audio RCA socket. If an RGY Button is installed, select it here.	see page 78
System → Program Update	Upload NVR configuration if necessary. Format the hard drive after all settings have been made.	see page 80

Setting up the Network Switch and Video Sources

1. Ensure the switch and cameras are installed and connected to the NVR:
 - Connect the network switch to the recorder rear panel port **POE02G**.
 - Connect IP cameras to the network switch (for more information, see the *16-Port Network Switch Installation Guide* (part #700-1156).
 - Connect optional analog cameras to the NVR's Video Breakout Harness.
 - Connect optional IP devices to NVR rear Ethernet ports (for more information, see "Network Settings" on page 62).

For port references, see "NVR Back Panel Features" on page 25.

2. If optional IP devices are connected: in the NVR configuration menu, navigate to **Network** and configure **Port Functions** and **IP Addresses** as required. For more information, see "Network Settings" on page 62.
3. Use the NVR health diagnostics to confirm the switch is detected and operational. For more information, see "Health Check" on page 35.
4. Set up recording parameters for connected video sources. For instructions, see "Camera Settings" on page 47 and "Configuring Video Sources" on page 48.

Time/Date Menu

About

This topic describes the Time and Date configuration tab settings, including time zone, daylight savings (if required), and optionally synchronizing the NVR date and time with GPS satellites.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select **Configuration**. For more information, see "Accessing the On-screen Display" on page 29.

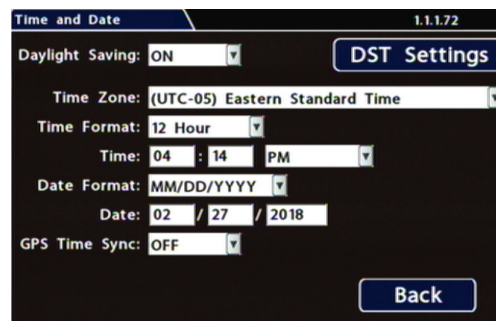
Time/Date Tab

i NOTE: Time Zone

Ensure these settings are correct for the customer location/time zone – the NVR date and time are used as an index for searching, archiving, and downloading video, and appear during playback.

To update settings:

1. Select **Time/Date** to display the tab.
2. Select fields and/or use menus to make your changes (menu options are described later in this topic).
For details on entering data with the mouse, see "Using On-screen Keyboards" on page 31.
3. Click **Back** to save the settings and return to the Configuration menu.



Time and Date Menu Options

Menu Item	Description	Value [Default]
Daylight Saving	<p>Leave ON and at default dates unless in an area that does not use daylight savings (e.g. Arizona, Saskatchewan).</p> <p>Click DST Settings and ensure the Start/End dates and times apply to your location.</p>	[ON]
Time Zone	Select your local time zone.	[UTC-05 Eastern Standard Time]
Time Format	Choose 12 or 24-hour display.	[12 hour]: 12:00 am to 11:59 pm 24 hour: 00:00 to 23:59
Time	Enter the correct time.	
Date Format	Select the preferred date format.	[MM/DD/YYYY] YYYY/MM/DD DD/MM/YYYY
Date	Set the date for the NVR.	
GPS Time Sync	If GPS is installed, set this ON to have the system time automatically updated when satellites are detected.	[OFF]

Title/Display Menu

About

This topic describes setting up information to display as text when viewing live or recorded video, including the Main Title (generally a vehicle/bus number to identify the video source), as well as the time/date and various system status details.

Before you begin...

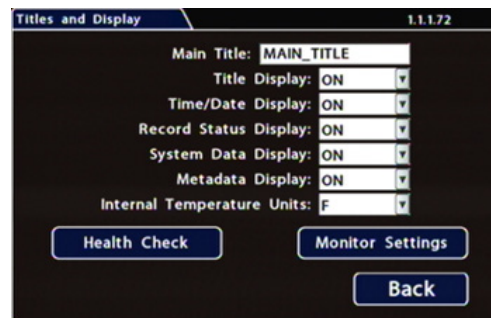
Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select **Configuration**. For more information, see "Accessing the On-screen Display" on page 29.

Titles and Display Tab

 TIP: Changing the default display

All options are set to display by default. You can turn OFF items that are not of interest so the related text will not appear.

1. Select **Title/Display** to open the tab.
2. Enter the bus number in the **Main Title** field (if it is not already there). For more information about using the On-screen keyboard, see "Using On-screen Keyboards" on page 31.
3. Choose the desired display settings, as described in "Menu Options", below. For information about display items, see "Metadata Details" on page 45.

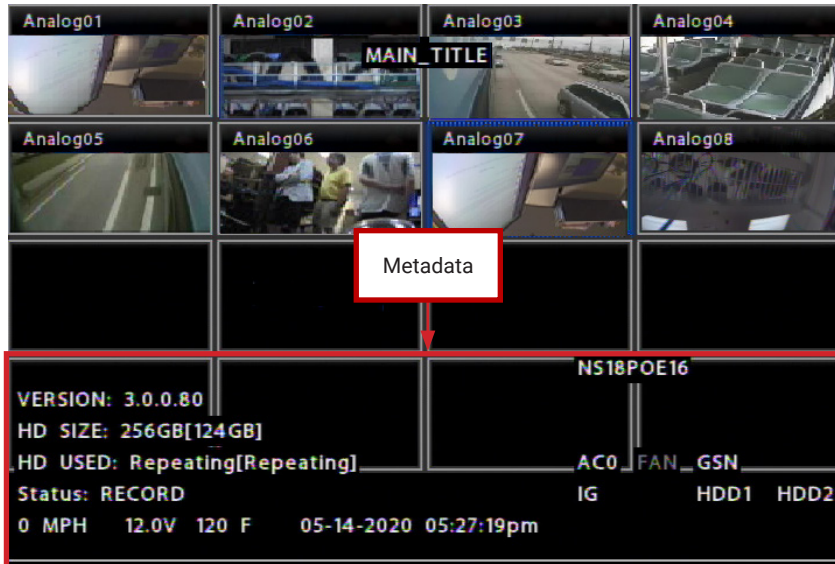


Title/Display Menu Options

Menu Item	Description	Value [Default]
Main Title	Enter the bus number.	MAIN_TITLE
Titles Display	Display/hide Main Title and Camera Titles	[ON], OFF
Time/Date Display	Display/hide time and date	[ON], OFF
Record Status Display	Display/hide NVR recording status (LIVE=showing camera feeds, RECORD=storing video, V.LOSS=video loss).	[ON], OFF
System Data Display	Display/hide NVR system metadata: Network switch (NS18POE16) detected, HDD Size, % Full HDD, Voltage, Firmware Version, Fan Failure, and Internal Temperature. For more information, see "Metadata Details" on page 45.	[ON], OFF
Metadata Display	Display/hide NVR metadata: Signals, GPS, Speed, Ignition State, G Sensor, and Alarm Count. For more information, see "Metadata Details" on page 45.	[ON], OFF
Internal Temperature Units	If Metadata Display is ON, display the ambient temperature inside the NVR in degrees. Select F (Fahrenheit) in the USA or C (Celsius) in Canada.	[F], C

Metadata Details

Status information about the NVR and accessories appears as text overlays in NVR Live view (for instructions on how to display Live view, see "Accessing the On-screen Display" on page 29).



Data Item	Description
HD Size	Internal storage (GB). The second value in square brackets displays SD card size in GB. "OFF" appears when storage media is not present.
HD Used	Percentage of internal drive space used. The second value in square brackets displays percentage of drive spaced used on the SD card. "OFF" appears when storage media is not present. If the Record → Repeat Record setting is ON, displays "Repeating". For more information, see "Recording Settings" on page 57.
Version	Firmware version.
Status	NVR status: (LIVE=NVR on but not recording, RECORD=recording, V.LOSS=recording with one or more channels missing video, ALARM=Alarm recording).
Speed	Vehicle speed.
Voltage	System input voltage.
Temperature	Ambient temperature inside the NVR (F=Fahrenheit, C=Celsius).
Signals	When a signal activates, the Label is displayed. For more information, see "Signals" on page 51.
GPS Coordinates	Latitude/longitude, and elevation. If GPS is connected but satellite signals are not being received, zeros appear.
Alarm Count (AC#)	The current number (1-9) of triggered Alarms. The value resets to 0 when the NVR restarts. For more information, see "Alarms" on page 53.

Metadata Details (*continued*)

Data Item	Description
Ignition (IG)	Vehicle ignition state (highlighted=ignition on, dimmed=off).
Drive Status (HDD1, HDD2)	Highlighted when the drive (HDD1 or HDD2) is detected and recording; grey if the drive is not detected, and red to indicate a fault.
G Sensor (GSN)	G Sensor threshold incident (highlighted=threshold exceeded). For more information, see "G Sensor" on page 70.
Fan	Fan failure notification (highlighted=failure, dimmed=normal)
Network Switch (NS18POE16)	Displays when the NVR detects the 16-port network switch

Camera Settings

About

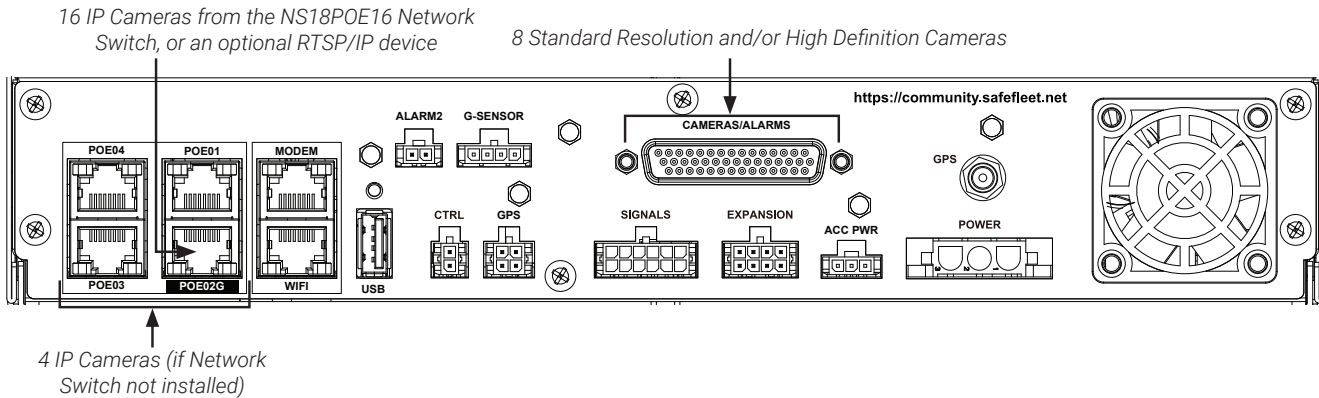
This topic describes how to set up camera recording parameters.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select **Configuration**. For more information, see "Accessing the On-screen Display" on page 29.

TIP: Port configuration

The network switch and optional RTSP/IP device configuration for the NVR rear panel Ethernet ports can affect the available IP camera and RTSP settings described in this section. For instructions, see **Port Functions** in "Network Settings" on page 62.



Summary Tab

Select **Record** → **Camera** to display **Camera Settings**. The **Summary** tab displays information about the cameras detected by the NVR:

Ch - channel number (see "Camera Settings - Menu Options" on page 50)

Source - the video signal detected:

- SD/AHD: standard or high definition analog camera
- C3W9PD, C3Q9PD or CHW8PD: IP camera
- RTSP: generic RTSP video source
- Unknown: channel is disabled

Title - the assigned camera name (see "Camera Settings - Menu Options" on page 50)

Camera Settings 2.0.0.32					
Summary Analog IPC RTSP					
Ch	Source	Title	Ch	Source	Title
1	SD/AHD	Analog01	9	C3W9PD	IPC09
2	SD/AHD	Analog02	10	C3W9PD	IPC10
3	SD/AHD	Analog03	11	C3W9PD	IPC11
4	SD/AHD	Analog04	12	C3W9PD	IPC12
5	SD/AHD	Analog05	13	C3W9PD	IPC13
6	SD/AHD	Analog06	14	C3W9PD	IPC14
7	SD/AHD	Analog07	15	C3Q9PD	IPC15
8	SD/AHD	Analog08	16	C3Q9PD	IPC16

TIP: Configuration conflict

Red font indicates no camera is connected to the port, or the detected video source does not match the channel's selected camera configuration (for more information, see "Configuring Video Sources" on page 48).

Configuring Video Sources

Select **Record** → **Camera** to display **Camera Settings**.

To configure analog cameras:

1. Click the **Analog** tab.
2. If an entry in the **Source** column is red, select the appropriate camera resolution from the dropdown menu.
3. Use the **Ch** dropdown menu to select a logical channel for each camera (defines the display location in live and playback grid views).
4. Set up cameras as required (for details, see "Camera Settings - Menu Options" on page 50).
5. Click **Back** to save Camera settings.

⚠ IMPORTANT: Logical channel assignment

Camera feeds with unassigned logical channels (**Ch** set to NA) are not recorded by the NVR, and will not appear in live or playback views.

⚠ IMPORTANT: Max. system resources: Encode Performance

The NVR shares system resources among enabled channels, based on FPS, Quality, and Resolution settings. The **Encode Perf.** value indicates the amount of resources available for the current configuration. The value counts down as you make changes that consume resources.

When the Encode Perf. value is below 0, you cannot save the configuration, and the value displays in red font. If this happens, adjust FPS, Quality, or Resolution settings until the Encode Perf. value is at or above 0.

To configure supported IP cameras:

1. Click the **IPC** tab.
 Note: To enable the IPC configuration tab, at least one rear-panel PoE port must have either the network switch (**NS18POE16**) or **IP Camera** selected in the **Network** → **Port Functions** screen dropdown menu.
2. If an entry in the **Type** column is red, select the proper camera model in the dropdown menu.
3. Use the **Ch** dropdown menu to select a logical channel for each camera (defines the display location in live and playback grid views).
4. Set up cameras as required (for details, see "Camera Settings - Menu Options" on page 50).
5. Click **Back** to save Camera settings.

Red font indicates a conflict between this setting and the IP camera detected by the NVR. Select the appropriate camera from the dropdown menu.

Ch	Type	Title	FPS	Qlty	Resolution	Audio
1	C3Q9PD	IPC01	30	4	1920x1080	ON
2	C3Q9PD	IPC02	30	4	1920x1080	ON
3	CHW8PD	IPC03	30	4	1920x1080	ON
4	CHW8PD	IPC04	30	4	1920x1080	ON

💡 TIP: Unsupported IP cameras

If your IP camera is not listed in the **Type** menu, you may be able to configure it as an RTSP device. Refer to the camera documentation, or contact Technical Support.

⚠ IMPORTANT: Turn off unused analog camera channels

If any analog camera inputs (Video Breakout Harness CAM 1 - CAM 8) are unused, disable their associated camera input settings to prevent the NVR from generating Video Loss (VLoss) events for those camera inputs.

In the NVR Configuration menus, disable settings for unused camera inputs as follows:

- **Record → Camera → Analog → FPS → OFF**

💡 TIP: Turn off unused audio

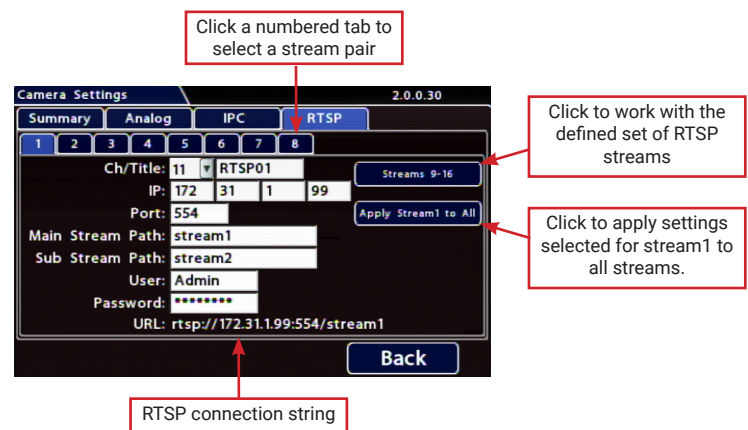
Set **Audio → OFF** for inputs where audio feeds are not required, such as exterior cameras.

To configure an RTSP device:

1. Click the **RTSP** tab.

Note: To enable the RTSP configuration tab, at least one rear-panel PoE port must have either the network switch (**NS18POE16**) or **IP Camera** selected in the **Network → Port Functions** screen dropdown menu.

2. Use the **Ch** dropdown menu to select a logical channel (defines the display location in live and playback grid views).
3. *<optional>* Click the **Title** field and enter a name for the stream pair.
4. Enter the remaining fields, as per camera RTSP setup instructions.
5. Click a numbered tab to select other stream pairs and repeat steps 2 through 4 as required.
6. Click **Back** to save RTSP settings.



💡 TIP: RTSP connection strings

The IP, port, and path data you enter in the **Camera Settings → RTSP** screen define a connection to the camera's RTSP server (the NVR acts as the client).

Check the Safe Fleet Community (see "Need Help?" on page 86) to find RTSP connection string details for supported cameras, or contact Technical Support for more information.

Note: the system does not build the connection string until you exit the Camera Settings page. The next time you open the RTSP tab, the connection string appears at the bottom of the screen.

Camera Settings - Menu Options

Menu Item	Description	Value [Default]
Ch (logical channel)	<p>For all video inputs (analog, IP, RTSP): sets the logical channel assigned to the input. The channel number determines the camera display location in live and playback views (for more information, see "Live View" on page 30).</p> <p>For analog cameras: leave at default settings unless you need to customize camera display locations.</p>	[NA], 1-16
Source (analog)	User-selected analog camera source (<i>displays red if detected source is different from selected</i>).	[2MP], 1MP, SD
Type (IP cam)	User-selected IP camera source (<i>displays red if detected source is different from selected</i>).	[CHW8PD], C3W9PD, C3Q9PD
Title	<p>For each camera, enter a name that describes the view it is recording. For example: "Front", "Step", "Mid", "Rear", "Stop Arm".</p> <p>For instructions on how to enter text with the mouse, see "Using On-screen Keyboards" on page 31.</p> <p>Camera titles display in live views and during playback. For more information, see "Metadata Details" on page 45.</p>	[Channel01]... [Channel08]
FPS (channel speed)	<p>Leave channel speed at the default setting unless you have special requirements.</p> <p>This sets the recorded frame rate, per second.</p>	[15 fps.], OFF, 1 fps, 5 fps, 7 fps, 10 fps, 15 fps, 20 fps, 30 fps
Qlty (quality)	<p>Leave channel quality at the default setting unless you have special requirements.</p> <p>Setting 1 is the lowest quality, and 4 is the highest. Increased quality involves greater storage requirements. The NVR uses compression technology to extend the amount of video (recording time) that can be stored.</p>	[3], 1, 2, 3, 4
Resolution	<p>Leave channel resolution at the default setting unless you have special requirements.</p> <p>This sets the recording resolution (in pixels). Higher resolution reduces the amount of video (recording time) that can be stored.</p> <p>Available analog camera resolutions are shown in the cell to the right. Available IP camera resolutions vary depending on selected camera model. By default, the highest resolution will be selected.</p>	SD source: [720x480], 720x240 1MP source: [1280x720], 640x360 2MP source: [1920x1080] 1280x720
Audio	<p>Leave ON unless the camera is mounted on the exterior of the vehicle, or if you have special requirements.</p> <p>Setting Audio ON enables audio recording for the input channel.</p> <p>Turn OFF for channels where audio feeds are not required, such as exterior cameras.</p>	[ON], OFF

Signals

About

This topic describes how to configure signals and the actions they generate. The NVR supports 10 independent signals. The first five are dedicated input wire (signal harness) connections: LT (left turn signal), STP (stop), BRK (brake), WRN (warning lights), and RT (right turn signal). The last five can be set for other functions, such as an excessive speed event or when the installed G-sensor exceeds a threshold.

i NOTE: Signals 6–8

- Signal 6 may be triggered as a hardwired input via the Wake input. For more information, see "Wake On Input, Digital Output" on page 84.
- Signals 7 and 8 may also be triggered as hardwired inputs via the Video Breakout Harness. For more information, see "System Diagram" on page 6.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select **Configuration**.

Signals Tab

💡 TIP: Signal labels and searching for events

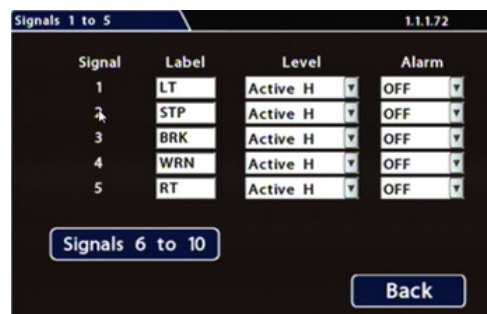
When a signal is activated, the associated 3-character label appears on-screen during video playback.

For example, "BRK" appears when the brake pedal is applied. For more information, see "Metadata Details" on page 45.

It is important to understand that you can also search video for signal events. For example, you can find every instance when the warning lights were activated.

For more information, see the *Evidence Manager User Guide* on the Safe Fleet Community and "Working with Video" on page 32.

1. Select **Alarms & I/O → Signals** to open the tab.
2. Configure signals as required. Each signal displays its status (label) when active, and can also trigger an Alarm. For details, see *Menu Options*, below.
3. Click **Back** to save settings, then click **Back** again to return to the Configuration menu.



Signals Tab - Menu Options

Menu Item	Description	Value [Default]
Signal	<p>Signals 1 through 5 are hardwired inputs, received through the signal harness (LT/left turn signal - black wire, STP/stop - green wire, BRK/brake - red wire, WRN/warning lights - brown wire, and RT/right turn signal - white wire). When these triggers are active, they generate signals and display associated labels during video playback.</p> <p>Signals 6 through 10 can be user-defined.</p> <p>Notes</p> <ul style="list-style-type: none"> Signals 7 and 8 may also be triggered as hardwired inputs via the video breakout harness. For more information, see "System Diagram" on page 6. Signal 6 can be activated through an input on the Adapter harness (WT2), via configuration of the Wake on Input feature. For details see "Wake On Input, Digital Output" on page 84. 	n/a
Label	<p>You can edit the on-screen display text label (maximum 3 characters) to describe each signal as desired.</p> <p>For instructions on using the mouse to enter data, see "Using On-screen Keyboards" on page 31.</p>	<p>Labels 1 through 5: [LT], [STP], [BRK], [WRN], [RT].</p> <p>Labels 6 through 10: [S06], [S07], [S08], [S09], [S10]</p>
Level	<p>Control how the signal senses activation:</p> <ul style="list-style-type: none"> Choose Active H (high) if the circuit rests at 0 VDC and goes to 12 VDC when active. Choose Active L (low) if the circuit rests at 12 VDC and drops to 0 when active. High to Open activates the signal when high voltage drops (open circuit or low voltage). The signal is not active when the input is held at a high voltage level. 	[Active H], Active L, High to Open
Alarm	<p>Select the alarm number if the signal is also used to trigger an alarm. The alarm's input must also be set up in the Alarms menu. For more information, see "Alarms" on page 53.</p> <p>Notes:</p> <ul style="list-style-type: none"> Assigning alarms to the default signals 1 through 5 is generally not recommended, since these would be continually triggered by normal vehicle operation. The Shutdown Value is only available on Signal 2. When selected, activation of Signal 2 causes the recorder to bypass all shutdown delays and shut down immediately. 	[OFF], ALM1, ALM2, ALMC, ALM3, ALM4, Shutdown

Alarms

Triggered alarms create searchable flags in the recorded video, making it easy to locate alarm events and associated metadata later (for details, see the *Evidence Manager User Guide* on the Safe Fleet Community).

You can also tell the system to switch to higher recording quality settings when an alarm is triggered - for example, to help identify people or license plates when reviewing video of the event.

TIP: Higher recording quality settings for Alarm events

Select higher **Speed** (FPS), **Quality**, and **Resolution** in **Alarm Settings** to increase video quality for a short duration to record an alarm event.

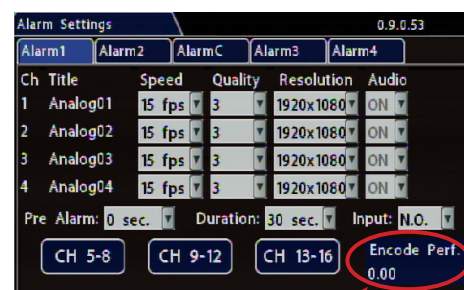
Higher quality video involves greater storage requirements, which reduces the amount of video you can store before it is overwritten. Therefore, an NVR usually records in a mode that conserves storage space.

If the system is wirelessly enabled with our video management software, flagged video can be automatically downloaded to your network (for more information, see the *Commander User Guide* or the *Depot Manager User Guide* on the Safe Fleet Community). **The NVR supports 5 independent alarms:**

- By default, **Alarm 1** is connected to the optional RGY Button installed in the vehicle for use by the operator (for more information, see "Tagging Video for Review" on page 28).
- **Alarm 2** can be activated by an operator button or covert trigger connected to the ALARM 2 port on the NVR rear panel.
- **Alarm C** is activated by a hardware trigger connected to the alarm input (ALM C) on the video breakout harness (for more information, see "System Diagram" on page 6). This provides easy integration with third-party devices such as operator buttons or covert triggers
- **All 5 Alarms can also be triggered automatically by vehicle speed** (see page 73), **a G Sensor threshold** (see page 70), **GPS fencing** (see page 74), **or when a Signal is activated** (see page 51).

To configure Alarms:

1. Select **Alarms & I/O** → **Alarms** to open the tab.
2. Configure alarm settings as required. For details, see *Menu Options*, below.
3. Click **Back** to save settings, then click **Back** again to return to the Configuration menu.



⚠ IMPORTANT: Max. system resources: Encode Performance

For each alarm, the NVR shares system resources among enabled channels, based on FPS, Quality, and Resolution settings. The **Encode Perf.** value indicates the amount of resources available for the current configuration. The value counts down as you make changes that consume resources.

When the Encode Perf. value is below 0, you cannot save the alarm configuration, and the value displays in red font. If this happens, adjust FPS, Quality, or Resolution settings until the Encode Perf. value is at or above 0.

i NOTE: Higher quality settings for supported cameras only

Speed, Quality, and Resolution fields are blank/unavailable in **Alarm Settings** screens for unsupported cameras or RTSP streams.

Alarm Settings - Menu Options

Menu Item	Description	Value [Default]
Alarm	<p>Click to display settings for the selected Alarm.</p> <p>Alarm1 can be triggered by the optional NVR RGY Button through the Signals/Adaptor harness, and Alarm 2 is triggered by the optional Alarm Button through the ALARM 2 port on the NVR rear panel. Alarm C is activated by a hardware trigger connected to the alarm input (ALM C) on the video breakout harness.</p> <p>All 5 Alarms can also be triggered automatically by vehicle speed, a G-sensor threshold, GPS fencing, or when a Signal is activated.</p>	[Alarm1], Alarm2, AlarmC, Alarm3, Alarm4
Speed [†]	<p>For each channel, the recording speed in FPS (Frames Per Second) used when the alarm is triggered.</p> <p>If the NVR normally records at a mid-range or low FPS to conserve storage space, set a higher FPS value to increase video quality for a short duration to record an alarm event.</p>	OFF, 1, 5, 7, 10, 12, 15, 20, [30] FPS
Quality [†]	<p>For each channel, the recording quality used when the alarm is triggered.</p> <p>The NVR offers a range of quality settings, from 1 (low) to 4 (high).</p>	1, 2, [3], 4
Resolution [†]	<p>For each channel, the recording resolution (in pixels) used when the alarm is triggered. The higher the recording resolution, the better the picture looks, but the shorter the recording time on a hard drive.</p> <p><i>Note:</i> Options vary based on camera source (analog) or type (IP Cam), with the highest resolution as default.</p>	Variable per camera (see <i>Note to the left</i>)
Audio	<p>Expressly confirm the Audio setting is as expected:</p> <p>OFF: Audio disabled during Alarm Duration ON : Audio enabled during Alarm Duration</p> <p><i>Note:</i> Audio option may change only if audio is disabled on the camera configuration page; otherwise the option is ON and grayed out.</p>	[OFF], ON

[†] These alarm settings are not available for unsupported IP cameras and RTSP streams.

Alarm Settings - Menu Options *(continued)*

Menu Item	Description	Value [Default]
Pre Alarm	<p>Optionally, select a time period prior to an alarm being triggered where recorded video and metadata are included with protected alarm data, which won't be overwritten.</p> <p>For more information, see "Protected Alarm Allowance" in "Advanced Recording Settings - Menu Options" on page 59.</p>	[0], 5, 10, 15, 30 sec., 1, 3, 5 min.
Duration	<p>The length of time after the alarm has been triggered that flagged video is recorded at the alarm speed (FPS), quality, and resolution settings described below.</p>	0, 5, 10, [30] sec., 1, 3, 5, 10, 15, 20, 30, 45 min.
Input	<p><i>Applies to Alarm 1, Alarm 2, and Alarm C only.</i> When triggered with the RGY Button or the Alarm Button, use the default setting.</p> <p>Control how the alarm input senses activation:</p> <ul style="list-style-type: none"> • N.O. (Normally Open): the circuit input normally floats (no connection) and goes active when the input transitions to 0V (electrical return). • N.C. (Normally Closed): the circuit input is normally connected to 0V (electrical return) and goes active when the input transitions to float (no connection) or 12V. • N.H. (Normally High): the circuit input is normally connected to 12V and goes active when the input transitions to float (no connection) or 0V (electrical return). 	[N.O.], N.C., N.H.
CH 5-8/ CH 1-4 CH 13-16/ CH 9-12	Click to work with alarms for the defined set of channels.	n/a

Advanced Configuration

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Recording Settings

About

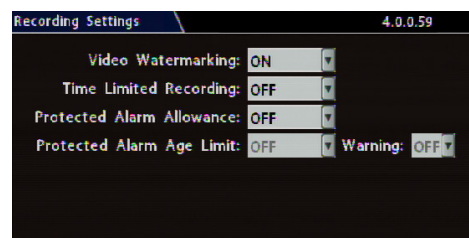
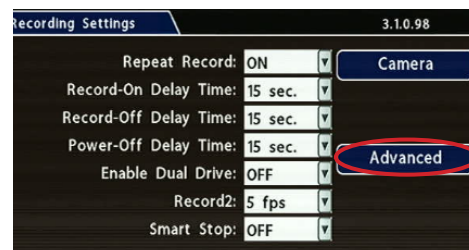
This topic describes recording and power settings, including, video storage management, and options for NVR behavior when the vehicle ignition is turned on or off.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration. For more information, see "Accessing the On-screen Display" on page 29.

Record Tab

1. Select **Record** to open the tab.
2. Set the record and power delay timers.
For details, see "Recording Settings - Menu Options", below.
3. To configure **Video Watermarking**, **Time Limited Recording**, or **Protected Alarm** settings, click **Advanced** (see "Advanced Recording Settings - Menu Options" on page 59).
4. Click **Back** to save the settings, or click **Camera** to configure resolution, recording speed/quality, and other camera options (for details, see "Camera Settings" on page 47).



Recording Settings - Menu Options

Menu Item	Description	Value [Default]
Repeat Record	<p>Leave this setting at the default [ON] for the storage media to loop, and record over the oldest video when it becomes full (the "HD Used" metadata item displays "Repeating" - for more information see "Metadata Details" on page 45).</p> <p>When set to OFF, the NVR stops recording when storage is full ("HD Used" displays 100%).</p>	[ON], OFF
Record-On Delay Time	<p>Leave at default to let the voltage settle after the vehicle starts up to prevent voltage drops affecting the NVR.</p> <p>Enables a time delay after the vehicle ignition is turned on until the NVR starts.</p>	[15 sec.], 30 sec., 1 min., 5 min., 10 min., 20 min., 30 min.
Record-Off Delay Time	<p>To keep the NVR on and recording video after the ignition turns off (e.g. to record the post-trip check), set this to 10 or 20 min.</p> <p>Enables a time delay to continue recording after the ignition signal to the NVR is turned off.</p>	[15 sec.], 30 sec., 1 min., 5 min., 10 min., 20 min., 30 min.
Power-Off Delay Time	<p>If the system is not using Wi-Fi, use the default setting. If Wi-Fi is used, set to 2 hours or more. For more information, see the <i>Commander User Guide</i> and the <i>Depot Manager User Guide</i> on the Safe Fleet Community.</p> <p>Enables a time delay to keep the recorder powered on after the Record Off Delay time has ended. During this time, PoE and analog camera power outputs are turned OFF. Video recording is also turned off. Other operations such as download and maintenance activities continue normally. Upon time expiration, the recorder shuts down.</p> <p><i>Note:</i> If connected, a command to turn off PoE power is also sent to the NS18POE16 network switch.</p>	[15 sec.], 0 sec., 30 sec., 1 min., 5 min., 10 min., 20 min., 30 min., 45 min., 1 hr., 2 hr., 4 hr.
Enable Dual Drive	<p>Leave at the default setting unless dual drive reporting is desired.</p> <p>When enabled, the NVR checks and reports if 2 drives exist. When disabled, the NVR only checks and reports if at least one drive exists.</p>	[OFF], ON
Record2	<p>Leave at the default setting unless instructed otherwise.</p> <p>Unless set to OFF, the NVR records a low resolution second video stream at the selected frame rate. The NVR can record video in two streams: one at high resolution for full, detailed event information, and the other (Record2) at lower resolution for fast downloading or real-time viewing over a low bandwidth network such as a cellular link. In the event of an emergency, if the system is configured with Smart-Reach cellular hardware and a cellular plan, Record2 allows quick access to video online. Use the Record2 setting to specify a lower per second recording (frame rate) for the second video stream.</p>	[5 fps], OFF, 1 fps, 2 fps, 3 fps, 4 fps, 5 fps
Smart Stop	<p>Enable Smart Stop to power down the recorder after vehicle ignition is turned off, as soon as automatic or user-requested download, maintenance, or diagnostic tasks are completed. This reduces battery drain and required maintenance, while extending the recorder's service life. For details, see "Setting up Smart Stop" on page 60.</p>	[OFF], 10 min., 20 min., 30 min., 45 min., 1 hr.

Advanced Recording Settings - Menu Options

Menu Item	Description	Value [Default]
Video Water-marking	<p>Embeds a cryptographic marker with video at the time of recording which software can use to detect subsequent alteration.</p> <p>The watermark process can affect recording performance on fully-loaded systems. Disable watermarking if needed to improve performance.</p>	OFF, [ON]
Time Limited Recording	<p>Automatically deletes video aged longer than the specified time period.</p> <p>This setting applies to audio and video only - it does not affect other data types such as telemetry, logs, or diagnostic records.</p>	[OFF], 24 Hr, 48 Hr, 72 Hr, 7 Day, 14 Day, 21 Day, 30 Day, 45 Day, 60 Day, 97 Day
Protected Alarm Allowance	<p>Enables a portion of storage media to be reserved for protected Alarm data (the video, audio, and associated telemetry flagged by an Alarm).</p> <p>Option sets a maximum storage allocation for Protected Video. If saving new protected video requires more storage than allowed, the oldest protected video is unprotected and may be overwritten. This happens even if the Alarm Age Limit has not expired.</p>	[OFF], 10%, 20%, 30%, 40%
Protected Alarm Age Limit	<p>Specifies the period of time protected Alarm data should remain protected and not overwritten.</p> <p>Recordings aged beyond the Alarm Age Limit setting become unprotected, and can be overwritten by any new data.</p>	[OFF], 24 Hr, 48 Hr, 72 Hr, 7 Day, 14 Day, 21 Day, 30 Day, 45 Day, 60 Day, 97 Day
Warning	<p>When enabled, the NVR flags if protected Alarm data is overwritten before the Alarm Age Limit has expired.</p> <p>This can occur if the portion of storage media allocated for protected Alarm data becomes full (see "Protected Alarm Allowance", above). In that case, new protected Alarm data overwrites existing protected data, starting with the oldest recordings.</p>	[OFF], ON

Setting up Smart Stop

After a vehicle’s ignition is turned off, Smart-Stop reduces the recorder’s draw on the vehicle battery by shutting down the recorder as soon as it is no longer needed for video or data downloads by the network.

This section describes how Smart-Stop works and how to set it up on the NVR.

TIP: VMS (Video Management System) Compatibility

To perform its functions, the Smart Stop feature receives "Stay on" and "Power Off" requests from the VMS. Consult your VMS (Commander or Depot Manager) User Guide for compatibility details.

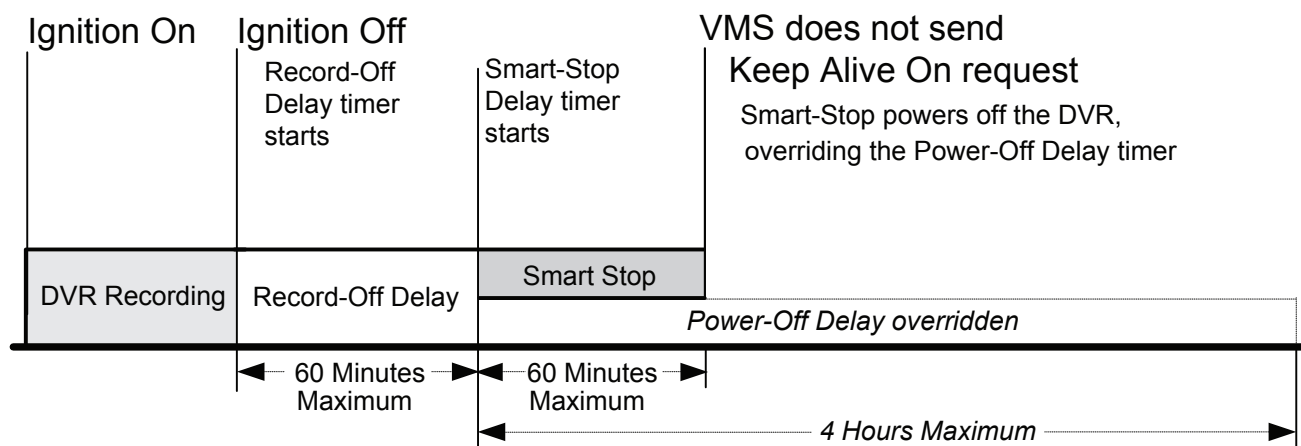
Understanding Smart Stop Workflow

The Smart Stop timer enables control of when the recorder should stay on or power off, based on receipt of a “Keep Alive On” or “Keep Alive Off” request from the VMS.

Upon expiration of the Record Off Delay timer, both Smart Stop and Power Off Delay timers function simultaneously.

If VMS Does not Send Requests to the Recorder...

If the VMS does not send a “Keep Alive On” request to the recorder before expiration of the Smart Stop timer, the recorder overrides remaining Power Off Delay time and shuts down.

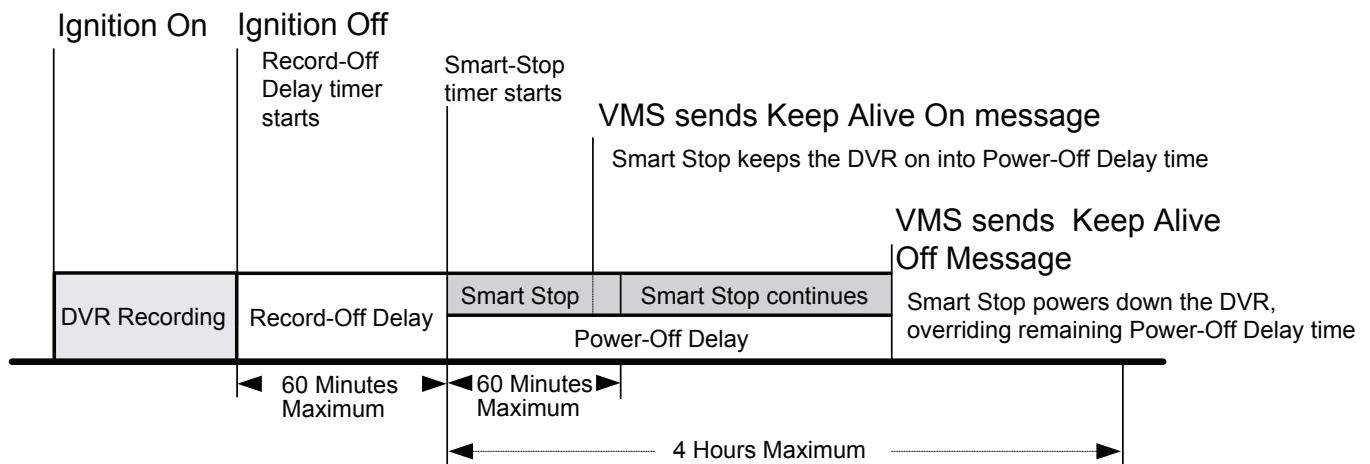


Setting up Smart Stop *(continued)*

If VMS Sends Requests to the Recorder...

If the VMS sends a “Keep Alive On” request to the recorder before expiration of the Smart Stop timer, the recorder remains on until expiration of the Power Off Delay time, after which it shuts down.

If the VMS sends a “Keep Alive Off” request to the recorder any time after expiration of the Smart Stop timer, the recorder overrides remaining Power Off Delay time and shuts down.



Recording Settings for Smart Stop

In the **Recording Settings** menu, select suitable Record-Off Delay, Smart-Stop, and Power-Off Delay timer durations, depending on your system requirements.

To ensure enough time for network communication and downloads, Safe Fleet recommends the following settings:

- **Record Off Delay** – 10 min.
- **Power Off Delay** – 3 hours
- **Smart Stop** – 30 min.

For instructions on how to enable the Smart Stop feature, and more information about Record Off Delay and Power Off Delay settings, see "Recording Settings" on page 57.

Network Settings

About

This topic describes the Ethernet port configuration and communication parameters required to connect the NVR with the 16-port network switch, computers/IP devices, and Smart-Reach wireless equipment (WiFi bridge/router or a cellular modem).

More information on related products and features is available from the Safe Fleet Community in the *Commander User Guide*, the *Depot Manager User Guide*, and the *Evidence Manager User Guide*.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

i NOTE: Configuring network settings and advanced network settings

A qualified IT administrator is required to provide information and configure Network Settings and Advanced Network settings.

These tasks should only be performed by engineering services or the fleet system administrator.

- Each host (computer) connected to the network must have a unique IP address.
- If the NVR is attached to a WiFi bridge, change these settings to those supplied by the system administrator.
- If the IP information is changed and saved in a configuration file for upload to other NVRs, their settings must also be updated.

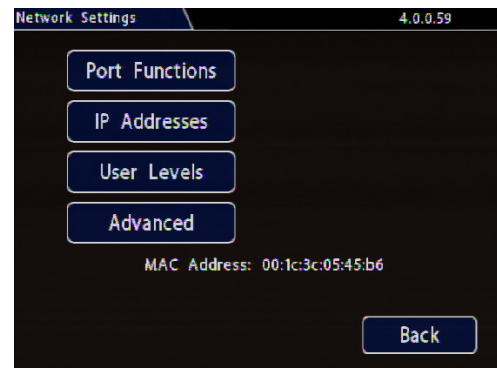
For more information, see "Copying NVR Configuration" on page 19.

Contact Technical Support to assign an IP address or reset the Smart-Reach Mobile wireless bridge, or for more information.

Network Tab

To configure Network Settings:

1. Select **Network** to open the tab.
2. To set up the rear-panel POE and front-panel Ethernet ports for connected devices, click **Port Functions** and follow the instructions below.
3. To configure network parameters for a laptop, IP cameras, or Smart-Reach wireless equipment (external WiFi bridge/router or a cellular modem), click **IP Addresses** and follow the instructions on page 64.
4. To create NVR user logon profiles and assign passwords for Web browser access to the NVR:
 - Select **User Levels** (see "User Levels" on page 76).
5. To set up communications parameters for vMax Live Plus (Automatic Vehicle Location and telemetry):
 - Select **Advanced** (see "Advanced Network Settings" on page 66).
6. Click **Back** to save changes and return to the Configuration menu.

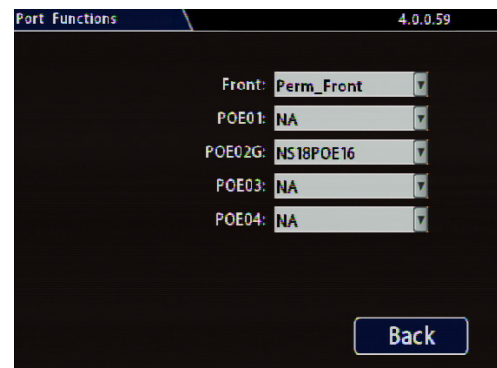


Port Functions

Configuring NVR Ethernet ports for connected devices:

1. Select **Network** → **Port Functions** to open the tab.
Each menu corresponds to an Ethernet port:

- a. Configure the front-panel LAN port by selecting an option from the **Front** drop-down menu:
 - **Perm_Front**: sets the Front port to its own IP address (default 192.168.0.100).
 - **Temp_IPC**: Temporarily merges the front port with the IP camera network (fixed at 172.31.1.200). *Reverts to Perm_Front at next system boot.*
 - **Temp_WiFi/Modem**: Temporarily merges the front port with the WiFi/Modem network (default DHCP). *Reverts to Perm_Front at next system boot.*
 - **Perm_WiFi/Modem**: Merges front port with WiFi/Modem network (default DHCP). *Does not revert.*

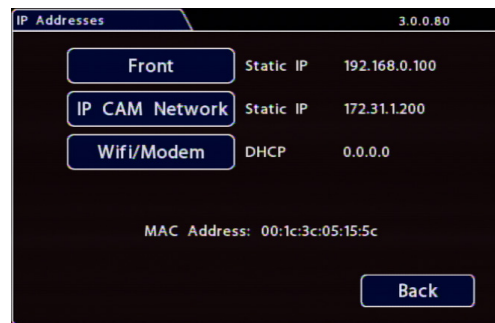


- b. Configure PoE ports based on connected device:
 - Set ports to **NA** if not used.
 - Set port **POE02G** to **NS18POE16** if the network switch is attached to the NVR (for details, see the *16-Port Network Switch Installation Guide*, part #700-1156). When port is configured for network switch, IP Camera is unavailable on other ports.
2. Click **Back** to save settings.

IP Addresses Tab

The **Network**→**IP Addresses** tab provides access to communications parameter settings of each network:

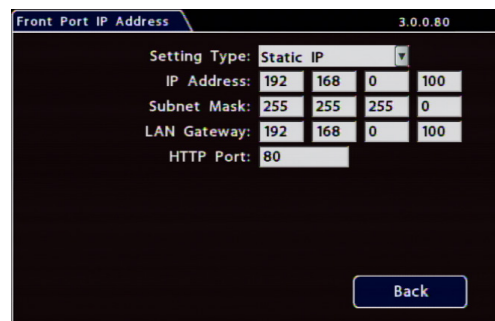
- **Front:** Front network
 - *Note:* Button text changes if Front port is merged with another network (i.e. Front/WiFi/Modem). Selecting configures the merged network. To configure front network, unmerge the Front port.
- **IP CAM Network:** as stated
- **WIFI/Modem:** wireless network



To configure the front panel Ethernet port:

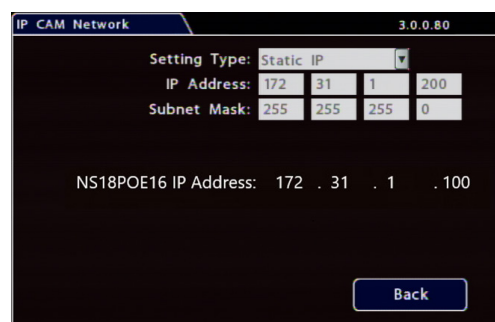
If you need to connect a laptop to the front Ethernet port for installation or maintenance purposes:

1. Select **Network**→**IP Addresses**→**Front** to open the tab.
2. Update configuration details (see "Network Settings - Menu Options" on page 65).
3. Click **Back** to save settings.



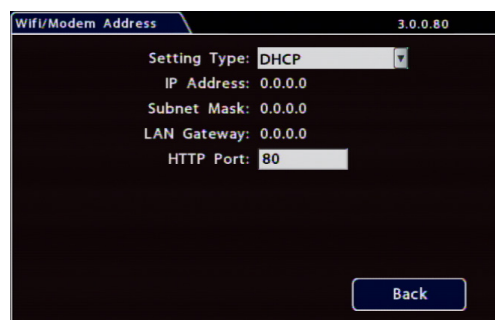
To configure the IP camera network:

1. Select **Network**→**IP Addresses**→**IP CAM Network** to open the tab.
2. Update configuration details (see "Network Settings - Menu Options" on page 65).
3. Click **Back** to save settings.



To configure a WIFI bridge or cell modem:

1. Select **Network**→**IP Addresses**→**Wifi/Modem** to open the tab.
2. Update configuration details (see "Network Settings - Menu Options" on page 65).
3. Click **Back** to save settings.



Network Settings - Menu Options

Menu Item	Description	Value [Default]
Setting Type	<p>Contact your administrator to configure the setting type and IP address.</p> <p>OFF disables all Ethernet capability.</p> <p>Static IP is a permanent address on the network, assigned by the network administrator. DHCP (Dynamic Host Configuration Protocol) automates the assignment of IP addresses in a network.</p> <p>If DHCP is used, the subnet mask, default gateway, and DNS server are configured automatically, and only the HTTP Port field is editable.</p>	<p><i>Front:</i> [Static IP], OFF, DHCP</p> <p><i>IP CAM:</i> [Static]</p> <p><i>Wifi/Modem:</i> [DHCP], Static IP, OFF</p>
IP Address	<p>Enter an IP Address, as determined by a qualified network expert.</p> <p>The IP CAM network is display-only.</p>	<p><i>Front:</i> [192.168.0.100]</p> <p><i>IP CAM:</i> [172.31.1.200]</p> <p><i>Wifi/Modem:</i> [0.0.0.0]</p>
Subnet Mask	Enter the Subnet Mask, as determined by a qualified network expert.	[255.255.0.0]
LAN Gateway	Gateway address uniquely identifies a host or computer on the LAN, which connects the subnet to other networks. Enter the LAN Gateway, as determined by a qualified network expert.	[DHCP]
HTTP Port	Typically, leave the HTTP Port set to 80, unless otherwise instructed by IT personnel.	80

Advanced Network Settings

About

This topic describes the communication parameters required to enable the NVR for vMax Live Plus, a Web-based solution providing GPS for Automatic Vehicle Location and telemetry data for monitoring vehicle sensors.

For more information, see the *Evidence Manager User Guide* on the Safe Fleet Community.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

Advanced Settings Tab (vMax Live Plus)

Use this tab to set up the NVR to connect with vMax Live Plus via a Smart-Reach cellular modem. For more information, see the vMax Live Plus documentation on the Safe Fleet Community.

NOTE: Qualified IT administrator required

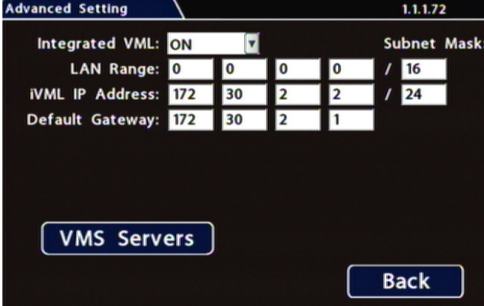
A qualified IT administrator is required to perform network configuration, including assignment of IP addresses.

A cellular modem or gateway must also be installed and configured.

Contact Technical Support for more information.

To configure Advanced Network Settings:

1. Select **Network** → **Advanced** to open the tab.
2. Configure settings as required.
For details, see *Menu Options*, below.
3. Click **Back** to save changes, then click **Back** again to return to the Configuration menu.



The screenshot shows the 'Advanced Setting' configuration screen with the following fields and values:

Field	Value
Integrated VML:	ON
LAN Range:	0 0 0 0 / 16
IVML IP Address:	172 30 2 2 / 24
Default Gateway:	172 30 2 1

Buttons: VMS Servers, Back

Advanced Network Settings - Menu Options

Menu Item	Description	Value [Default]
Integrated VML (vMax Live)	Set ON to enable the integrated VML feature. OFF disables the integrated VML feature.	[OFF], ON
LAN Range	If the customer network is outside of the NVR network: set the customer network's LAN range as determined by a qualified network expert. Note: There must be a value in this field. If not used, enter a dummy IP address such as 10.10.0.0.	[0.0.0.0]
LAN Subnet Mask	Set the LAN subnet mask used for the LAN Gateway Destination range as determined by a qualified network expert. Use a value between 0 and 32.	[16]
iVML IP Address	Enter the iVML IP Address as determined by a qualified network expert.	[172.30.2.2]
iVML Subnet Mask	Set the subnet mask for the iVML IP Address as determined by a qualified network expert. Use a value between 0 and 32.	[24]
Default Gateway	Enter the Default Gateway IP address for communicating with the cellular modem, as determined by a qualified network expert.	[172.30.2.1]

VMS Servers

About

This topic describes setting up communication parameters required to enable the NVR for Commander software. Commander remotely schedules and displays downloaded alarm video archives, tracks vehicles, and runs reports on fleet activity.

For more information, see the *Commander User Guide* on the Safe Fleet Community.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

VMS Servers Tab (Commander Settings)

NOTE: Qualified IT administrator required

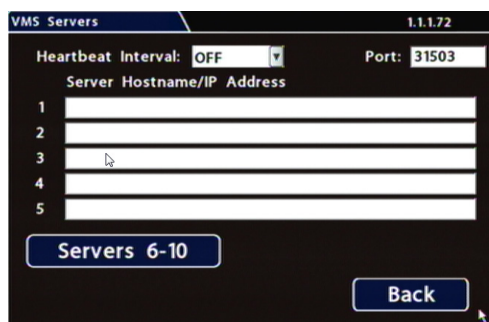
A qualified IT administrator is required to perform network configuration, including assignment of IP addresses.

A wireless bridge and an access point must also be installed and configured.

Contact Technical Support for more information.

To configure VMS Servers:

1. Select **Network** → **Advanced** → **VMS Servers** to open the tab.
2. Configure settings as required.
For details, see *Menu Options*, below.
3. Click **Back** to save changes, then click **Back** on successive screens to return to the Configuration menu.



VMS Servers - Menu Options

i NOTE: Qualified network expert

A qualified network expert should determine the following VMS Server settings.

Contact Technical Support for more information.

Menu Item	Description	Value [Default]
Heartbeat Interval	Select an interval to transmit NVR status messages to all available VMS Servers. We recommend a Heartbeat Interval setting of one minute.	[OFF], 1 min, 2 min, 3 min, 4 min, 5 min
Port	Enter a Port for VMS Heartbeat communication. We recommend the default Port setting.	[31503]
Servers 1 to 10		
Hostname/ IP Address	Up to 10 server hostnames or IP addresses that can receive VMS heartbeat messages from the NVR.	Maximum 64 characters.

G Sensor

About

This topic describes calibrating and configuring the optional G Sensor (inertia sensor), which records vehicle acceleration, deceleration, and lateral motion data. The information can be used to provide information about driver behavior and vehicle accidents.

Before you begin...

The G Sensor must be properly installed and connected, as described in "G Sensor Mounting and Calibration" on page 71. For more information see the "System Diagram" on page 6.

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration. For more information, see "Accessing the On-screen Display" on page 29.

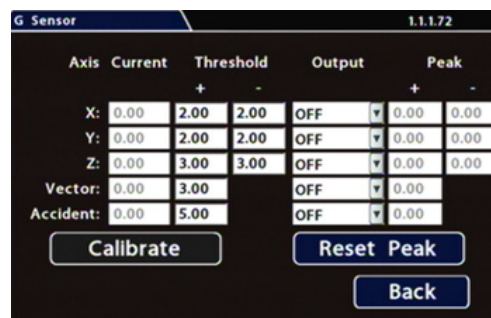
G Sensor Tab

i NOTE: Calibration

The G Sensor must be calibrated when initially installed or if the unit is relocated, and the procedure must be performed on the vehicle (i.e. not by connecting to the NVR from a remote location).

G Sensor settings can be adjusted to fit specific requirements. Note that if thresholds are set too low and alarms are enabled, many alarms may be generated. Details are provided below.

1. Select **Alarms & I/O** → **Sensor** → **G Sensor** to open the tab.
2. If this is a new system installation, or the G Sensor unit has been relocated:
 - Skip to the next page, and follow the G Sensor Mounting and Calibration procedure.
3. If required, adjust G Sensor settings. For details, see *Menu Options*, below.
4. Click **Back** to save settings, then click **Back** again to return to the Configuration menu.



💡 TIP: Default G Sensor settings

We recommend the default G Sensor settings for large bus movement detection.

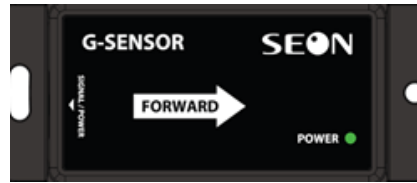
Smaller vehicles may require lower thresholds - some experimentation may be necessary to define the optimal configuration for each vehicle type. If thresholds are set too low, they may generate many alarms.

G Sensor Mounting and Calibration

1. Ensure the G Sensor unit is mounted securely, with the arrow toward the front of the vehicle.

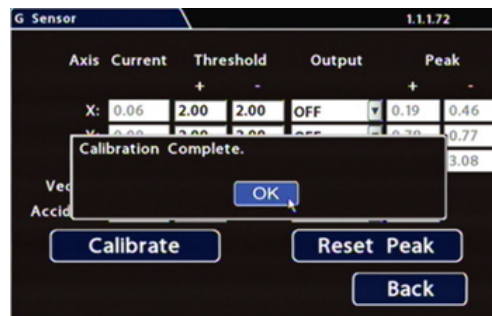
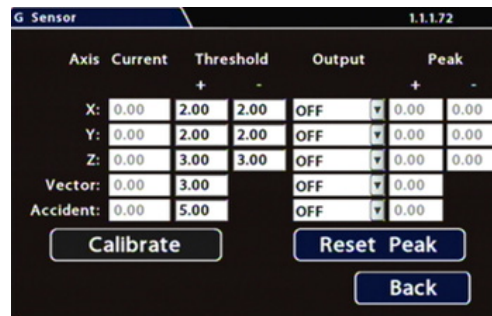
💡 TIP: G Sensor mounting orientation

The G Sensor can be mounted sideways, on an angle, or upside-down, as long as the arrow points toward the front of the vehicle.



The unit connects to the G SENSOR port on the NVR rear panel. For more information see the "System Diagram" on page 6.

2. Open **Configuration** → **Alarms & I/O** → **Sensor** → **G Sensor**, and click **Calibrate**.
The X, Y, and Z axis planes are set, based on the mounting surface.
3. When the process is complete, click **OK** in the confirmation dialog.
4. If required, adjust G Sensor settings. For details, see *Menu Options*, below.
5. Click **Back** to save settings, then click **Back** again to return to the Configuration menu.



G Sensor - Menu Options

Menu Item	Description	Value [Default]
Axis	X - forward/back axis Y - left/Right axis Z - vertical axis Vector - combination of X and Y axes (to capture driver behavior incidents) Accident - combination of X and Y axes (higher threshold settings, to capture vehicle accidents)	n/a
Current	The current (live) values measured by the G Sensor (display only)	n/a
Threshold	Set from 0G to 6.0G. This value configures the threshold level. Any value beyond the threshold triggers the output, as configured in the Output field.	X = [+/- 2.00] Y = [+/- 2.00] Z = [+/- 3.00] V = [+ 3.00] A = [+ 5.00]
Output	If the specified G Sensor threshold value is exceeded, the NVR triggers the selected output (NVR log entry, Signal, or Alarm).	[OFF], Log, S01-S10, ALM1, ALM2, ALMC, ALM3, ALM4
Peak	Use the observed peak values to refine threshold settings. Peak values reflect detected G Sensor levels for axis, Vector, and Accident activity.	n/a

Speed Settings

About

This topic describes how to set options for recording vehicle speed data and triggering notifications for excessive speed.

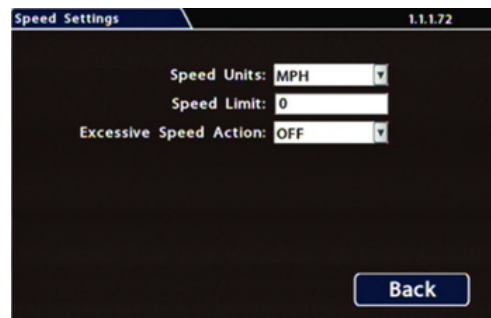
Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

Speed Tab

1. Select **Alarms & I/O** → **Speed** to open the tab.
2. Configure speed settings as desired.
For details, see Menu Options, below.
3. Click **Back** to save settings, then click **Back** again to return to the Configuration menu.



Menu Options

Menu Item	Description	Value [Default]
Speed Units	Choose MPH in the US, or KPH in Canada. The speed display units; the GPS signal is converted to display speed in the selected units.	[MPH] - Miles per hour, KPH - Kilometers per hour, KTS - Knots
Speed Limit	Enter a speed limit to trigger notifications. If an Excessive Speed Action is selected, this value triggers a notification if exceeded by vehicle speed.	[0]
Excessive Speed Action	When the vehicle exceeds the specified Speed Limit, settings other than OFF trigger the selected action (S1-S10=Signal, ALM1-ALM4 & ALMC=Alarm, Log=NVR log entry).	[OFF], Log, S1 - S10, ALM1, ALM2, ALMC, ALM3, ALM4

GPS Fencing

About

This topic describes how to set GPS fencing (geofence) options. A geofence defines a designated circular or rectangular geographic area, based on GPS coordinates (latitude/longitude). If the vehicle leaves the geofenced area, the NVR can trigger an Alarm.

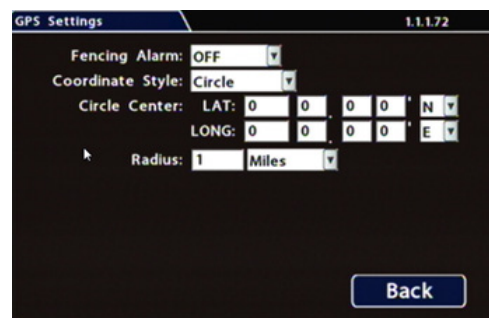
Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

GPS Tab

1. Select **Alarms & I/O** → **GPS** to open the tab
2. Configure **Fencing Alarm** settings as required. For details, see *Menu Options*, below.
3. Click **Back** to save settings, then click **Back** again to return to the Configuration menu.



GPS Fencing - Menu Options

Menu Item	Description	Value [Default]
Fencing Alarm	ALM settings trigger the selected Alarm when the vehicle crosses the fencing boundary, as defined by the selected coordinate style.	[OFF], ALM1, ALM2, ALMC, ALM3, ALM4
Coordinate Style	Circle - sets the area for GPS fencing by identifying the center point and radius. This option only displays "Circle center" and radius "Distance" data entry fields. Rectangle - Sets the area for GPS fencing by upper left and lower right rectangular coordinates. This option only displays the "Top Left" and "Bottom Right" data entry fields.	[Circle], Rectangle
Circle Center	Enter latitude and longitude of the fencing center point.	[000.00.00]
Distance	Define the size of the fencing area diameter, in miles or kilometers.	[1 Mile]
Top Left	Enter the latitude and longitude of the top left point of the fencing area.	[000.00.00]
Bottom Right	Enter the latitude and longitude of the bottom right point of the fencing area.	[000.00.00]

User Levels

About

This topic describes creating NVR user logon profiles and assigning passwords to enable Web browser access to the NVR with various permission levels.

Logging in to the NVR with a browser requires the proper network configuration to establish a connection to the NVR's IP address. Contact the Technical Support team for more information.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

User Levels Tab

i NOTE: Password control

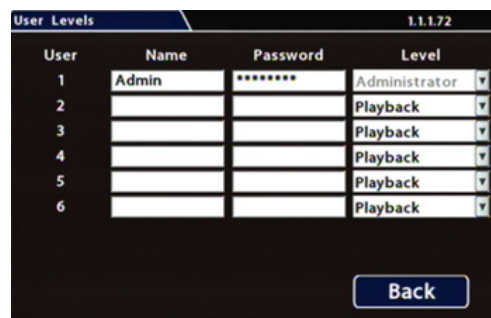
Users logging on to the NVR should have password control to protect the NVR from being accidentally reconfigured. The default password is 11111111.

For security purposes, we recommend changing default login and system settings passwords.

Keep a copy of your password in a secure place, in case it is lost or forgotten.

To configure User Levels:

1. Select **Network** → **User Levels** to open the tab.
 - Add or modify information for up to 6 users.
 - Name and Password fields for User 1 may be updated, but Level cannot be changed and user cannot be deleted.
 - Add other users with access levels as required: enter user names, passwords, and assign levels. For details, see *Menu Options*, below.
2. Click **Back** to save changes, then click **Back** again to return to the Configuration menu.



User Levels - Menu Options

Menu Item	Description	Value [Default]
Name	User names for logging in to the NVR with a Web Browser. Names are case-sensitive, maximum 8 characters.	[Administrator] for User 1 [Blank] for other Users
Password	Set a password for each user - maximum 8 characters.	[11111111]
Level	Assign each user a specific access level: Administrator - complete NVR control; only Administrators can change User Levels Configure - view live camera feeds, and perform general NVR configuration (<i>cannot edit User Levels, or reset the NVR to default configuration</i>) Viewer - only live camera feeds	[Administrator] for User 1 Configure Viewer

System Settings

About

This topic describes how to configure various system-level settings, including a password for local access to the NVR.

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

System Tab

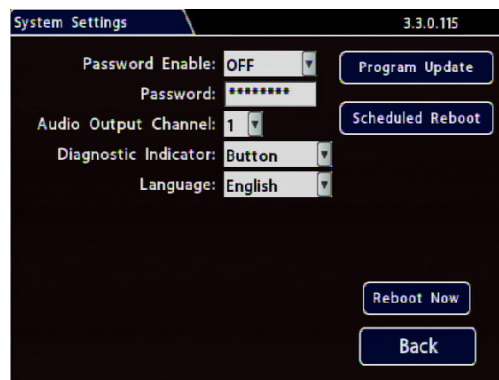
i NOTE: Authorized individuals

This tab allows control of system-level settings and functions that should only be changed by authorized individuals.

The Password applies to local NVR access, and generates a prompt when the unit powers up, before any other features become available. The default password is 11111111. For security purposes, we recommend changing the default password. Keep a copy of your password in a secure place.

To configure System Settings:

1. Select **System** to open the tab.
2. Adjust system settings as required.
For details, see *Menu Options*, below.
3. Click **Back** to save changes.



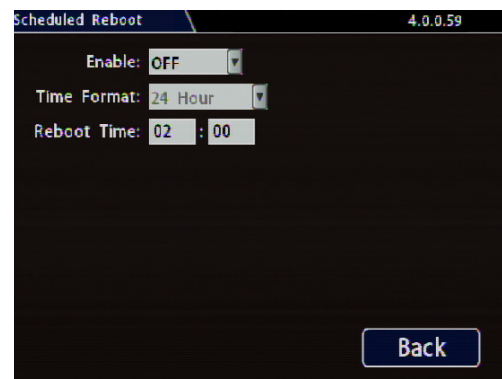
System Settings - Menu Options

Menu Item	Description	Value [Default]
Password Enable	When set to ON, local access to the NVR On-screen Display (including all NVR control, configuration, and playback features) requires the System Settings password.	[OFF], ON
Password	Maximum 8 digits.	[11111111]
Audio Output Channel	Select the audio channel to output through the AUDIO RCA (red connector) on the front panel. Channel must be configured and enabled for video and audio.	[1], 2-16
Diagnostic Indicator	Select the type of diagnostic indicator installed on the vehicle: <ul style="list-style-type: none"> Button: Button and diagnostic indicator with a single green LED. RGY Illum: Diagnostic indicator with a tricolor red, green, and yellow light. RGY Button: Button and diagnostic indicator with a tricolor red, green and yellow LED (for more information, see "Video System Status" on page 26). Button Op2: Special green LED display mode for Button and RGY Button indicators. Not compatible with RGY Illum. 	[Button], RGY Illum, RGY Button
Language	Select a language for the NVR On-screen Display and Web user interface.	[English], Spanish, French, Dutch, German
Scheduled Reboot	Configure a recurring time-of-day for the recorder to reboot (see below for details).	n/a
Reboot Now	Reboot the recorder immediately.	n/a

Scheduled Reboot

To automatically reboot the recorder at a scheduled time of-day (Reboot Time) every 24 hours:

1. Select **System** → **Scheduled Reboot**.
2. Set **Enable** to **ON**.
3. Set the **Reboot Time** (hour/minute). For details, see "Using On-screen Keyboards" on page 31.



Program Update

About

This topic describes options on the **System Settings** → **Program Update** tab, which are used to:

- Install firmware updates to the recorder and IP cameras
- Copy NVR setup details to a configuration file
- Apply settings from a configuration file to the recorder
- Format recorder storage media (hard drive or SD card)

For complete firmware update procedures: see "Firmware Updates" on page 17.

For instructions on copying settings and applying them to other NVRs: see "Copying NVR Configuration" on page 19.

Before you begin...

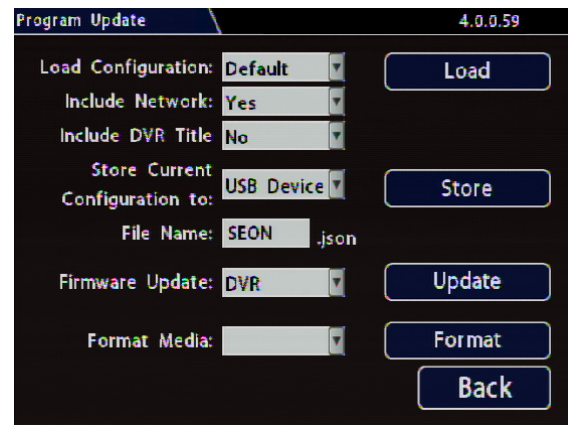
Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

Program Update Tab

To perform program updates:

1. Select **System** → **Program Update** to open the tab.
2. Choose options as required.
For details, see *Menu Options*, below.
3. Click **Back** to save changes.



Program Update - Menu Options

For full instructions on loading NVR settings, see "Copying NVR Configuration" on page 19.

For firmware installation procedures, see "About" on page 17.

Menu Item/Button	Description	Value [Default]
Load Configuration	Load configuration from target: <ul style="list-style-type: none"> • Default: Loads the NVR default settings • USB: Loads from a file on USB root directory (displays first 10 files only) • MEM1: Loads from the NVR location MEM1 <i>Note: MEM1 option not available on the Web browser.</i> 	[Default], MEM1
Load	Click to load NVR configuration settings,	n/a
Include Network	When loading the configuration, select if current network settings (see "Port Functions" on page 63 & "IP Addresses Tab" on page 64) are overwritten. No keeps existing settings. Yes overwrites with settings from the selected configuration. Caution: If set to Yes, network connections may be lost when new settings are applied. Adjust networking setup on attached devices to regain network connection.	[No], Yes
Include DVR Title	When loading the configuration, select if current NVR Title (see "Title/Display Menu" on page 43) is overwritten. No keeps existing Title. Yes overwrites with settings from the selected configuration.	[No], Yes
Store Current Configuration to	Store NVR configuration settings to a USB device or NVR memory location (MEM1). <i>Note: MEM1 option is not available on the Web browser.</i>	[USB Device], MEM1
Store	Click to store the NVR's current configuration to a USB device.	n/a
File Name	Set a file name for the configuration you are saving.	[SEON] Max. 4 characters
<Firmware> Update	Click Update to update recorder firmware from a USB device. Select the IPC option to update firmware on a connected IP camera. For complete firmware update procedures, see "Firmware Updates" on page 17.	[DVR], IPC
Format Media	Select storage media to format.	[Hard Drive], SD Card, Both
Format	Click to Format the selected storage media.	n/a

Monitor Settings

About

This topic describes the Monitor Settings tab. It provides options to control the camera feed displayed in the NVR's On-screen Display "Live View". Monitor Settings also apply to the Rear Vision System (RVS) for vehicles. For more information, see the RVS documentation on the Safe Fleet Community (Product Documents → Current Documents → Hardware Accessories → Rear Vision System).

Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

Monitor Settings

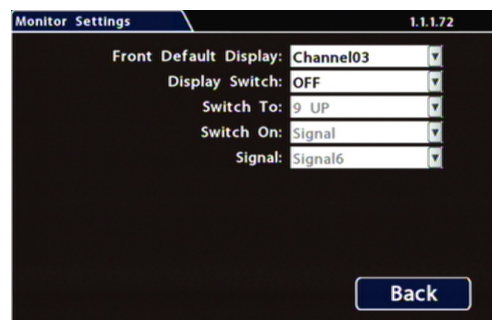
Monitor Settings control camera feeds sent to both the Video Out RCA jack on the NVR front panel and the Expansion socket on the rear panel. For more information, see "NVR Front Panel Features" on page 24 and "NVR Back Panel Features" on page 25.

💡 TIP: Custom monitor displays

In addition to Rear Vision Systems (backup cameras), Monitor Settings can support custom implementations such as an entry/exit bus door camera with a dedicated monitor to advertise the fact that riders are under surveillance.

To configure Monitor Settings:

1. Select **Title/Display** → **Monitor Settings** to open the tab.
2. Configure options as required.
For details, see *Menu Options*, below.
3. Click **Back** to save settings, then click **Back** again to return to the Configuration menu.



Monitor Settings - Menu Options

Menu Item	Description	Value [Default]
Front Default Display	Select the default monitor display setting: all cameras (9 or 16 UP) or a single camera as chosen from the list.	[9 or 16 UP], Camera Name
Display Switch	Enable or disable switched display. Select ON if you want to switch the monitor display from the "Default Setting" to the "Switch To" upon activation of the "Switch On" trigger. Leave OFF if display switching is not desired.	[OFF], ON
Switch To	Select an alternate display setting when the "Switch On" trigger activates: all cameras (9 or 16 UP), a single camera, or sequence as chosen from the list. The Sequence setting displays each active camera which is not in VLOSS, one after the other - in order from lowest to highest - after a short delay. The delay is set per the value of Timer (see last menu item in this table).	[9 or 16 UP], Camera Name, Sequence
Switch On	Select the Switch On trigger that activates the Switch To display configuration. <ul style="list-style-type: none"> Alarm: trigger when alarm activates (<i>remains triggered for the Alarm Duration</i>) Signal: trigger when signal activates (<i>remains triggered while signal is active</i>) Timer: trigger is always active <p>When triggered, the display switches from the Default Setting to the "Switch To" display configuration.</p> <p>Notes:</p> <ol style="list-style-type: none"> When "Switch To" is set to Sequence and "Switch On" is set to Timer, the display will ignore the Default Setting and continuously sequence each active camera. When "Switch To" is not set to Sequence and "Switch On" is set to Timer, the display switches between Default Setting and "Switch To" display configurations after a delay duration. 	Alarm, [Signal], Timer
Alarm (Signal or Timer)	Select the Alarm, Signal, or Timer value associated with the Switch On trigger selection. Available options will adjust based on the value of "Switch On". <ul style="list-style-type: none"> Alarm: select the alarm Signal: select the signal Timer: set the delay duration <p>Note: The timer value controls delay duration (time) when sequencing between cameras. It also controls the delay duration when switching between Default Setting and "Switch To" display configurations.</p>	[ALM 1]... [Signal 1]... [3 sec.], 5 sec, 10 sec. 30 sec.

Wake On Input, Digital Output

About

This topic describes setting the optional features available in the **Alarms & I/O → Others** tab:

- Wake On Input:
 - triggers the NVR to automatically power up and start recording
 - or –
 - activates Signal 6 (for more information, see "Signals" on page 51)
- Digital Output - sends a signal to an external device upon an Alarm or Video Loss event

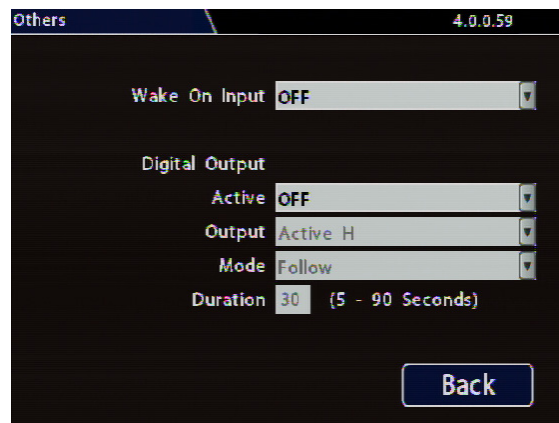
Before you begin...

Power up the NVR with a monitor and USB mouse connected, then right-click in Live view and select Configuration.

For more information, see "Accessing the On-screen Display" on page 29.

The "Others" Tab

1. Select **Alarms & I/O → Others** to open the tab.
2. Configure settings as desired.
For details, see *Menu Options*, below.
3. Click **Back** to save settings, then click **Back** again to return to the Configuration menu.



💡 TIP: Expansion and adaptor ports

- **Wake Input** utilizes a connection to the NVR through the Signals port, via the Signals Harness.
- **Digital Output** sends a signal to an external device through the NVR Expansion port.

For more information, see "System Diagram" on page 6.

Wake Input, Digital Output - Menu Options

Menu Item	Description	Value [Default]
Wake On Input	<p>Select the desired action when the Wake Input signal is activated:</p> <p>OFF: the NVR ignores the Wake Input signal.</p> <p>Wake: when the NVR is powered off, triggers the recorder to power-up and start recording in "Record-Off Delay Time" mode (see "Recording Settings" on page 57). Each time the Wake Input signal is detected, "Record Off Delay Time" is reset to its full value.</p> <p>Signal 06: when the recorder is powered on, triggers Signal 6 (for more information see "Signals" on page 51).</p>	[OFF], Wake, Signal 06
Digital Output (Active)	<p>Select the type of system events which, if detected, generate an NVR output signal to an external device through the Expansion port.</p> <p>Alarms: the NVR generates an output whenever an alarm is detected.</p> <p>Video Loss: the NVR generates an output whenever a video loss event is detected.</p> <p>ALM1...ALM4: generates an output when the selected Alarm is detected.</p> <p>S1-S10: generates an output when the selected Signal is activated.</p> <p>Error: generates an output when the ERR LED is illuminated (for details, see "NVR Front Panel Features" on page 24).</p>	[OFF], Alarms, Video Loss, ALM1, ALM2, ALMC, ALM3, ALM4, S1-S10, Error
Digital Output (Output)	<p>Select the type of signal generated when Digital Output is triggered:</p> <p>Active H: the Digital Output circuit floats at rest and goes to 12 VDC (150 mA source) when active.</p> <p>Active L: circuit floats at rest and drops to ground (350mA sink) when active.</p>	[Active H], Active L
Digital Output (Mode)	<p>Follow: output is active while the associated input condition is active (minimum duration = 1 second).</p> <p>Timed: output is active while the associated input condition is active (Follow) <i>plus a defined duration thereafter.</i></p>	[Follow], Timed+Duration
Digital Output (Duration)	<p>The time in seconds (values between 5 and 90) that the (Timed) output is active after the associated input condition is no longer active. Trying to save a value lower than 5 or above 90 will set and save the last compliant value.</p> <p>For instructions on how to enter a value, "Using On-screen Keyboards" on page 31.</p>	[30]

Need Help?

For full product details and access to our Document Library, please visit the Safe Fleet Community:

<https://community.safefleet.net>

Contact Safe Fleet Technical Support

- Phone: 1.844.899.7366
- Email: PTsupport@safefleet.net

Returns

If your NVR is to be returned, please contact Technical Support, and provide the model and/or serial number of your unit. Ask for a Return Merchandise Authorization (RMA) number. An RMA number allows the Service Technicians to better track your product when it comes in for service. Please show the RMA number on the outside of the package. ANY RETURNED PRODUCT WITHOUT AN RMA NUMBER MAY BE REFUSED.

Warranty

Complete warranty details are available at:

<https://www.seon.com/documents/Seon-Warranty.pdf>