



AutoVu Hardware Guide for SharpX Mobile Installation

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Document information

Document title: AutoVu Hardware Guide for SharpX Mobile Installation

Document number: EN.410.018-XS(6)

Document update date: October 6, 2016

You can send your comments, corrections, and suggestions about this guide to documentation@genetec.com.

About this guide

This guide provides information about installing AutoVu hardware in mobile systems. It includes topics to guide you through the installation of SharpX cameras as well as all other required hardware for an AutoVu system.

For a list of all Security Center and AutoVu documentation, go to the GTAP [Documents](#) page.

This guide is written for installers that have experience with automobile mechanics and electronics as well as electrical wiring.

WARNING: Only AutoVu-certified personnel should setup and install AutoVu systems. Read all of the procedures in this guide before installing an AutoVu fixed or mobile system. Failure to follow the supplied instructions or information may result in loss of data or damage to hardware and will void warranty.

Notes and notices

The following notes and notices might appear in this guide:

- **Tip.** Suggests how to apply the information in a topic or step.
- **Note.** Explains a special case, or expands on an important point.
- **Important.** Points out critical information concerning a topic or step.
- **Caution.** Indicates that an action or step can cause loss of data, security problems, or performance issues.
- **Warning.** Indicates that an action or step can result in physical harm, or cause damage to hardware.

IMPORTANT: Topics appearing in this guide that reference information found on third-party websites were accurate at the time of publication, however, this information is subject to change without prior notice to Genetec™.

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AutoVu SharpX mobile installation

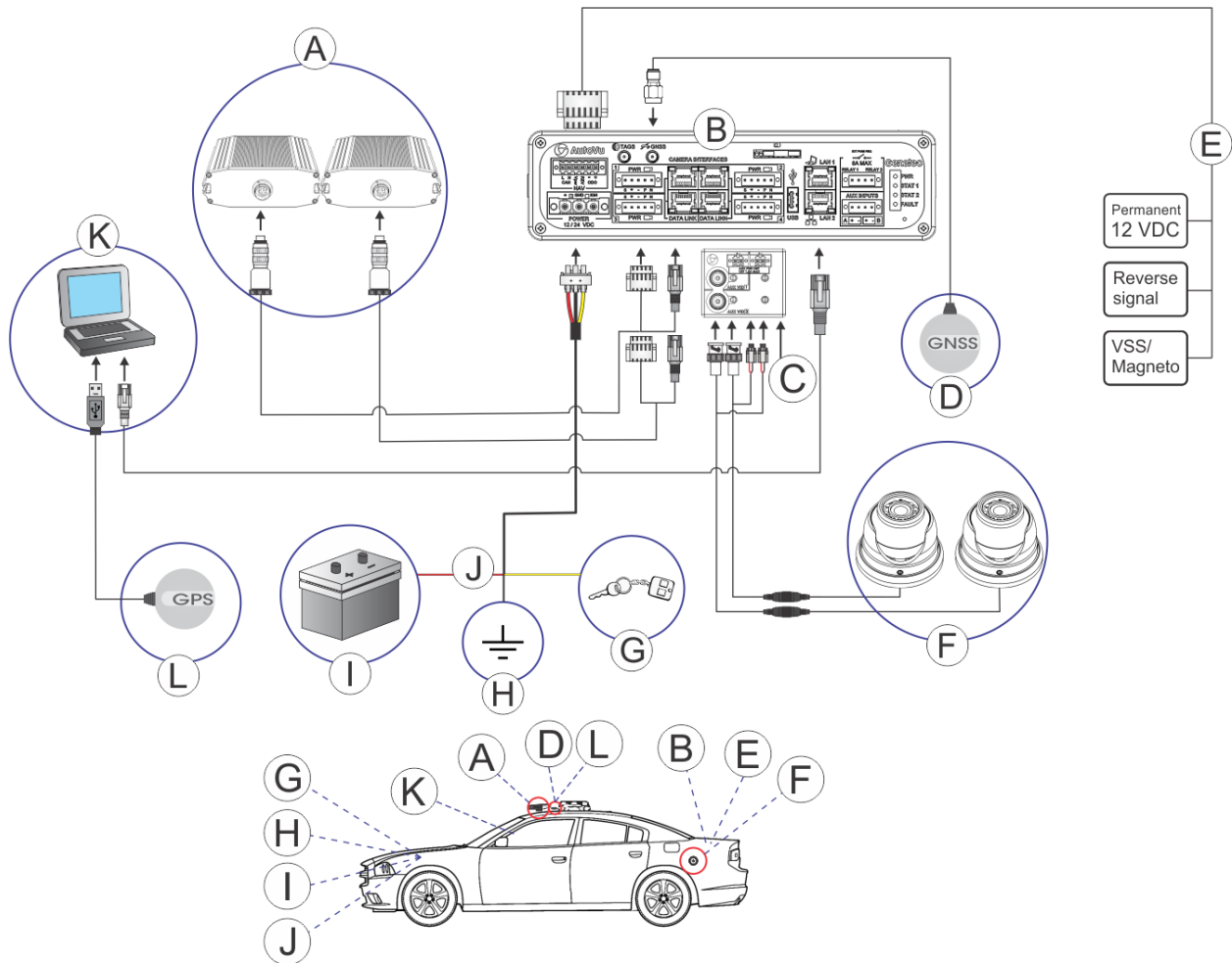
This section includes the following topics:

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- ["Hardware components for SharpX mobile installation with external Navigator box"](#) on page 5
- ["Preparing to install SharpX mobile hardware "](#) on page 7
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- ["Overview of aligning SharpX cameras"](#) on page 67
- ["Sealing the camera cable holes "](#) on page 71
- ["Completing the SharpX mobile installation"](#) on page 72

Hardware components for SharpX mobile installation

A SharpX mobile installation is comprised of many hardware components. Before installing these components, it is recommended to familiarize yourself with the hardware components used in a typical installation.

If you are installing a SharpX system where the LPR Processing Unit includes the AutoVu Navigation Option, all of the components of the AutoVu system connect directly to the LPR Processing unit. If your LPR Processing Unit does not include the AutoVu Navigation Option, see [Hardware components for SharpX mobile installation with external Navigator box](#) on page 5.



Component	What you should know
A SharpX cameras	SharpX cameras can be attached to the vehicle using a hardmount or magmount. For more information, see About mounting the SharpX camera for a mobile installation on page 18.

Component	What you should know
B LPR Processing Unit	This is the main processing component of the SharpX system. The LPR Processing Unit is sometimes referred to as the “trunk unit” because it is typically installed in a vehicle's trunk. This is the main processing component of the SharpX system. The LPR Processing Unit is sometimes referred to as the “trunk unit” because it is typically installed in a vehicle's trunk. For more information, see About mounting the LPR Processing Unit on page 11.
C Tire/Aux Imaging Adapter Module	If the installation includes wheel imaging cameras that require a BNC connection, you will need to install the Tire/Aux Imaging Adapter Module. For more information, see Connecting a wheel imaging camera on a SharpX system on page 48.
D Satellite navigation antenna	The GNSS satellite navigation antenna is connected to the LPR Processing Unit and works in conjunctions with the NAV inputs to provide precise geocoding for the vehicles associated with the plate reads. For more information on which satellite navigation hardware to install, see Navigation hardware options on page 52.
E Navigation inputs	LPR Processing Unit's NAV inputs can provide odometry readings to Patroller. The Patroller software uses this information to provide precise geocoding for the vehicles associated with the plate reads. For more information on the NAV connections, see Installing the AutoVu Navigation Option on the LPR Processing Unit on page 61
F Wheel imaging cameras (optional)	Wheel imaging cameras are used for virtual tire-chalking technology that takes images of the wheels of vehicles to prove whether they have moved between two license plate reads. For information, see About installing wheel imaging cameras in a mobile AutoVu system on page 43.
G Vehicle's ignition	Yellow wire is connected to vehicle's ignition. For more information, see Connecting the LPR Processing Unit to the ignition signal on page 40.
H Ground	Black wire is grounded to vehicle's frame or chassis. For more information, see Connecting power to the LPR Processing Unit on page 39.
I Vehicle's battery	Red wire is connected from the power cable through a 15A ATO/ATC in-line fuse to vehicle's battery. For more information, see Connecting power to the LPR Processing Unit on page 39.
J Power cable in-line fuse	Red wire is connected to vehicle's battery. The fuse is installed as close to the battery as possible. For more information, see Connecting power to the LPR Processing Unit on page 39.
K Mobile data computer (MDC)	For instructions on how to install the in-vehicle MDC mount, refer to your mount manufacturer's documentation.
L Satellite navigation receiver	The USB GPS satellite navigation receiver is connected to the in-vehicle computer for systems that do not include the external Navigator box or the LPR Processing Unit with AutoVu Navigation Option. For more information on which satellite navigation hardware to install, see Navigation hardware options on page 52.

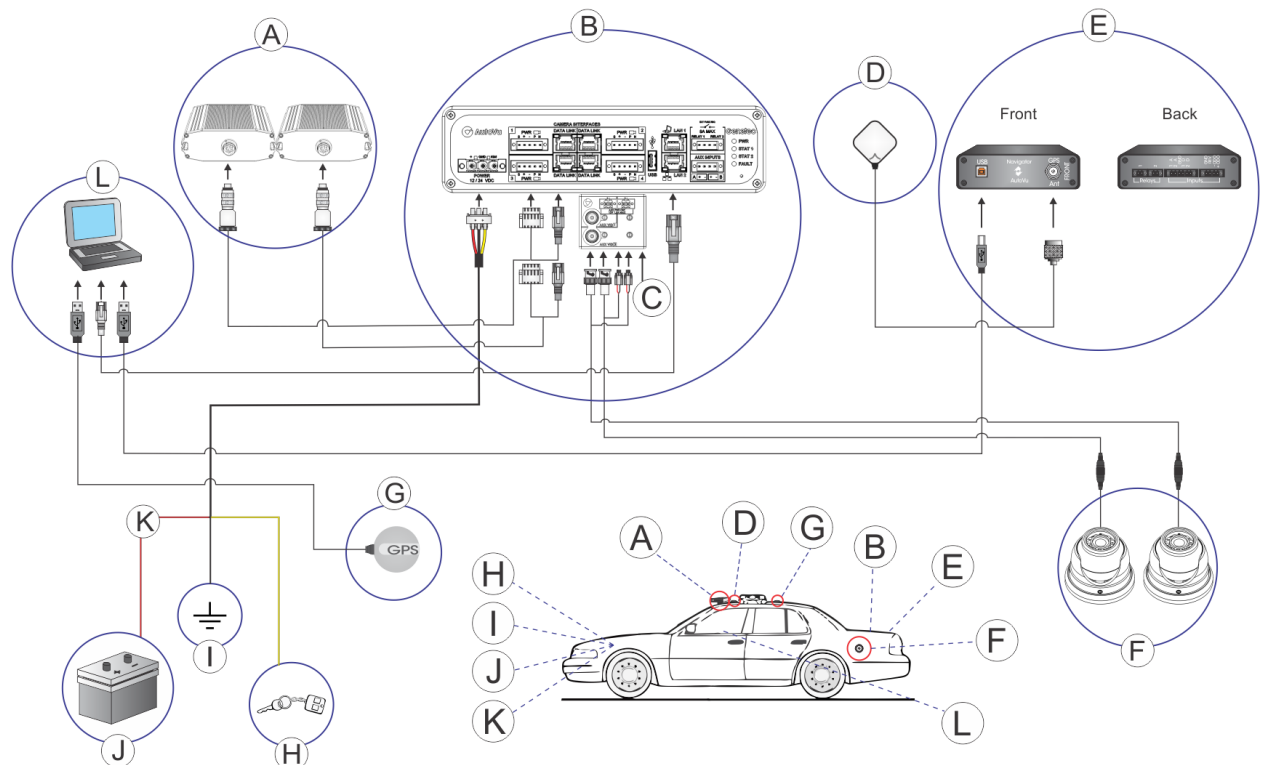
NOTE: Depending on the hardware being used, the following connections may be present on the LPR Processing Unit and are not currently use in AutoVu installations:

- Tire TAGS port
- SIM card
- USB port
- WLAN (back)
- CELL DATA (back)

Hardware components for SharpX mobile installation with external Navigator box

A SharpX mobile installation is comprised of many hardware components. Before installing these components, it is recommended to familiarize yourself with the hardware components used in a typical installation.

If you are installing an X1S or X2S SharpX system where the LPR Processing Unit does not include the AutoVu Navigation Option, you can include an external Navigator box in the installation. If your LPR Processing Unit includes the AutoVu Navigation Option, see [Hardware components for SharpX mobile installation](#) on page 2.



Component	What you should know
A SharpX cameras	SharpX cameras can be attached to the vehicle using a hardmount or magmount. For more information, see About mounting the SharpX camera for a mobile installation on page 18.
B LPR Processing Unit	This is the main processing component of the SharpX system. The LPR Processing Unit is sometimes referred to as the “trunk unit” because it is typically installed in a vehicle’s trunk. For more information, see About mounting the LPR Processing Unit on page 11.
C Tire/Aux Imaging Adapter Module	If the installation includes wheel imaging cameras that require a BNC connection, you will need to install the Tire/Aux Imaging Adapter Module. For more information, see Connecting a wheel imaging camera on a SharpX system on page 48.

Component	What you should know
D Satellite navigation antenna	The satellite navigation antenna provides precise geocoding for the vehicles associated with the plate reads, and is connected for systems that include the Navigator box. For more information on which satellite navigation hardware to install, see Navigation hardware options on page 52.
E External Navigator box	The Navigator box is Genetec's proprietary in-vehicle device that provides GPS coordinates and odometry readings to Patroller. The Patroller software uses this information to provide precise geocoding for the vehicles associated with the plate reads. For more information, see Installing the external Navigator box on page 62.
F Wheel imaging cameras (optional)	Wheel imaging cameras are used for virtual tire-chalking technology that takes images of the wheels of vehicles to prove whether they have moved between two license plate reads. For information, see About installing wheel imaging cameras in a mobile AutoVu system on page 43.
G GPS receiver	The USB GPS satellite navigation receiver is connected to the in-vehicle computer for systems that do not include the external Navigator box or the LPR Processing Unit with AutoVu Navigation Option. For more information on which satellite navigation hardware to install, see Navigation hardware options on page 52.
H Vehicle's ignition	Yellow wire is connected to vehicle's ignition. For more information, see Connecting the LPR Processing Unit to the ignition signal on page 40.
I Ground	Black wire is grounded to vehicle's frame or chassis. For more information, see Connecting power to the LPR Processing Unit on page 39.
J Vehicle's battery	Red wire is connected from the power cable through a 15A ATO/ATC in-line fuse to vehicle's battery. For more information, see Connecting power to the LPR Processing Unit on page 39.
K Power cable in-line fuse	Red wire is connected to vehicle's battery. The fuse is installed as close to the battery as possible. For more information, see Connecting power to the LPR Processing Unit on page 39.
L Mobile data computer (MDC)	For instructions on how to install the in-vehicle MDC mount, refer to your mount manufacturer's documentation.

NOTE: The USB port on the LPR Processing Unit is not currently use in AutoVu installations.

Preparing to install SharpX mobile hardware

There are many aspects to an AutoVu hardware installation. Before installing the hardware, familiarize yourself with the relevant documentation and make sure that you have all of the required components.

What you should know

For software installation and configuration instructions, refer to the *Sharp Administrator Guide* and *Patroller Administrator Guide*.

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To prepare for SharpX mobile hardware installation:

- 1 Read the *AutoVu SharpOS Release Notes*, available on the [GTAP Documents page](#), and the [AutoVu SharpX spec sheet](#).
- 2 Read deployment documentation (*Deployment Questionnaire* and *Scope of Work*) from your initial site evaluation.
Consult your vehicle's owner manual if you have any questions about your vehicle's wiring or operation.
- 3 Inspect the vehicle before beginning the installation, checking its functionality (lights, engine light, etc.) and verifying that it is in good working condition.
- 4 Ensure that you have all of the [required tools and parts](#) for the installation.
- 5 Inspect all the AutoVu components delivered to site for the installation. Ensure that there are no missing or defective components.

If any components are missing, please notify your Genetec representative within 30 days.

After you finish

[Install SharpX mobile hardware.](#)

Required tools and parts for a SharpX mobile installation

Before installing SharpX mobile hardware, make sure that you have the tools and parts required to successfully complete the installation process.

There are a number of additional required tools and parts that are not included with the AutoVu installation kit.

- **AutoVu Alignment Kit (AU-K-ALIGNKIT):** Includes several tools that are required for AutoVu installations.
- **Depth-controlled cable jacket stripper:** Recommended for stripping the cable jacket to avoid damage to the internal conductors. The Cyclops stripping tool is included with the AutoVu Alignment Kit.
- **RJ45 crimp tool:** Use a professional quality tool for proper crimping. The EZ-RJPRO® HD Crimp Tool is included with the AutoVu Alignment Kit.

- **Wire stripper:** Required to strip copper wire insulation.
- **Wire ferrule crimping tool:** Ferrules are included for all SharpX wires and are recommended, but not mandatory. A crimping tool is included with the AutoVu Alignment Kit.
- **Three stranded copper wires:**
 - 14 AWG (red) for 12V power on the LPR Processing Unit
 - 14 AWG (black) for GND on the LPR Processing Unit
 - 20 to 14 AWG (yellow) for IGN on the LPR Processing Unit

NOTE:

- For LPR Processing Units that include the AutoVu Navigation Option, 24 to 16 AWG wire is required for the REV connection, and 16 AWG wire is required for the Vper connection.
- For installations that include the Navigator box, 24 to 16 AWG wire is required for the REV, and IGN connections.
- For installations that require pulse odometry, 24 to 16 AWG shielded, twisted pair wiring is required for the ODO +/- connection to the Magneto kit or VSS.
- **2.5 mm flat-tip screwdriver:** Used for pushing in tension clamps and securing screws.
- **15A ATO/ATC in-line fuse:** Required at the source of the vehicle's 12/24V system tapping point.
- **0.5A fuse:** In-line or in the OEM fuse box using a tap fuse adapter.
- **Cable gland:** Required to seal wire holes drilled in the vehicle's roof. Choose an appropriate gland to seal the 9.5mm camera cable.
- **Panel removal tool:** Use the correct panel removal tools to ensure that the vehicle panels are not damaged during the installation.
- **Bolts/nuts (for wheel imaging cameras installation) :** Use 6-32 x 3/4" bolts with nylon nuts (or star washers and standard 6-32 nuts).
- **Grease pencil:** Used to mark support locations on the roof of the vehicle.
- **Center punch:** Used to mark drilling locations on the roof of the vehicle

Installing SharpX mobile hardware

Installing a mobile AutoVu system will allow you to read the license plates of passing vehicles.

Before you begin

Complete [the pre-installation steps](#).

What you should know

WARNING: Only AutoVu-certified personnel should setup and install AutoVu systems. Read all of the procedures in this guide before installing an AutoVu fixed or mobile system. Failure to follow the supplied instructions or information may result in loss of data or damage to hardware and will void warranty.

To install SharpX mobile hardware:

- 1 Remove the required headliner and panels for wiring.
To ensure all parts are replaced correctly, label (for example, "front passenger side") and safely store all panels and screws.
- 2 [Install the hardmount](#) or [the magmount](#) for the SharpX camera.
- 3 [Drill holes for the camera cable](#).
- 4 If using a hardmount, [attach the SharpX to the hardmount using the Universal Mounting Bracket and pan/tilt mount](#).
- 5 [Mount the LPR Processing Unit](#).
- 6 Install camera wiring.
Run the SharpX cable to the required locations for power and data.
- 7 Test the SharpX camera cables:
 - a) [Perform a passive test](#).
 - b) [Perform an active test](#).
- 8 [Connect the SharpX camera for a mobile installation](#).
- 9 Install the PC docking station.
Refer to manufacturer's installation instructions.
- 10 Install and configure [AutoVu satellite hardware](#). This is required in order to provide precise odometry information for AutoVu systems that include wheel imaging cameras.
- 11 Test the camera's live feed view to ensure that the camera is wired properly and that the hardware is functional. For more information, refer to the *Sharp Administrator Guide*.
- 12 [Seal the camera cable holes](#).
- 13 Replace the vehicle paneling that was removed during the installation.
- 14 [Align the SharpX camera](#) using the live feed in the Sharp Portal.
- 15 [Complete the field report](#) with the required information from the installation.

Related Topics

[Camera cabling do's and dont's](#) on page 26

Connecting SharpX systems in a test environment

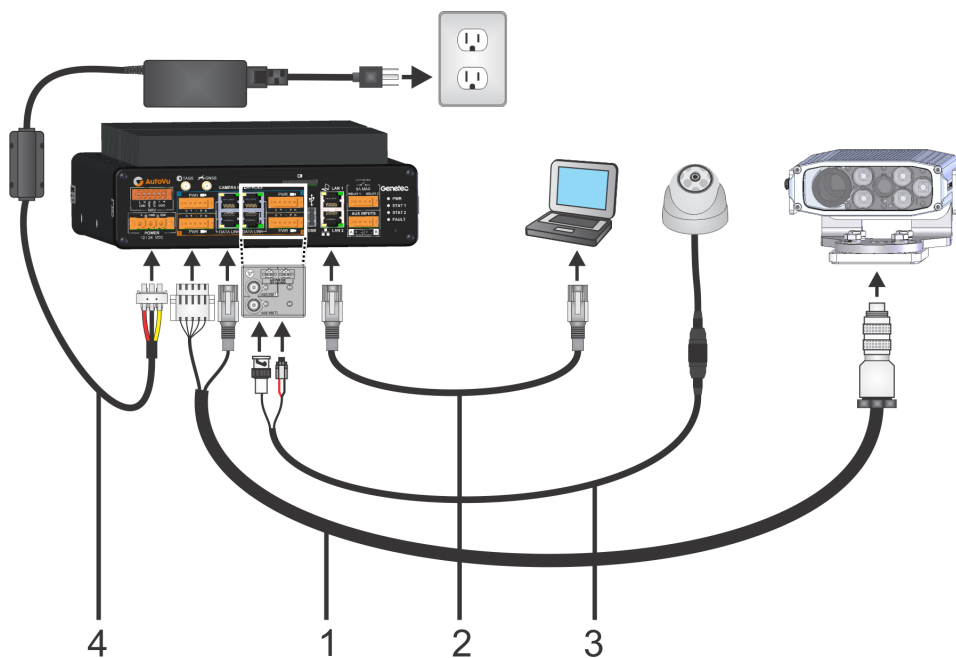
To verify that everything is working properly before installing your SharpX system in the field, you can power up and connect the system in a lab or similar test environment.

What you should know

Cables and a power supply are provided.

The image below depicts a SharpX mobile setup using the Genetec lab cable (part number AU-KLABPWRKIT for Sharp or AU-K-LABPWRKITX for SharpX). For more information on the available lab cables, contact your Genetec Sales Representative.

To connect the SharpX, refer to the illustration below, and the steps that follow:



- 1 Connect the SharpX cable to the SharpX and connect the **power** and **network** cables to the LPR Processing Unit.
- 2 Plug the network cable from the LAN1 port of the LPR Processing unit to the computer.
- 3 (Optional) Connect the wheel imaging camera's BNC and power to the LPR Processing Unit via the Tire/Aux Imaging Adapter Module.
- 4 Connect the 24 VDC power supply to the LPR Processing Unit's power port and supply power.

You are ready to test the SharpX camera. If you have a wheel imaging camera, you can test that too.

About mounting the LPR Processing Unit

The LPR Processing Unit is the processing component of the SharpX system. It is sometimes referred to as the *trunk unit* because it is typically installed in the vehicle's trunk. The best mounting location will vary depending on the type of vehicle you are using and the location of any other hardware installed in the vehicle.

You can mount the LPR Processing Unit anywhere inside the vehicle where it is safe, secure, and has good airflow, such as in the trunk area or under the passenger seat. When planning an installation, you must decide the best location and orientation for the LPR Processing Unit. The vertical and horizontal mounting brackets are included with the LPR Processing Unit kit.

The following examples show the LPR Processing Unit mounted vertically and horizontally in the trunk of the vehicle:



The following examples show the LPR Processing Unit mounted under the front seat of the vehicle:



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Best practices for mounting the LPR Processing Unit

The procedure for mounting the LPR Processing Unit in a vehicle depends on many factors. You must consider space restrictions and protecting the unit from impact. You must also have the correct mounting hardware to account for installations on carpet, metal, or plywood.

Consider the following best practices when planning the LPR Processing Unit installation.

General recommendations:

- The LPR Processing Unit must have adequate ventilation around the heat dissipation fins.
- Make sure that there is nothing vital (for example, break lines or the fuel tank) that could be damaged when screwing the mounting bracket to the vehicle.

- A cable rack is included with the mounting bracket. Installing the cable rack and securing cables with tie wraps will help to protect the cable connections from damage.
- Attach the bracket to the vehicle using screws that are at least a #10 pan head. The screws must be long enough to secure the hardware, but short enough not to damage any vehicle components under the mounting location.
- Attach the wire rack and mounting brackets to the LPR Processing Unit using the supplied flat washers, Belleville washers, and hexagonal head cap screws as shown in the documentation that is included with the mounting bracket.

Hardware orientation:

- If the LPR Processing Unit includes the Navigation option, do not mount the hardware with the face plate pointing up or down.
- Do not mount the LPR Processing Unit upside-down as this will affect heat dissipation.



Horizontal mount:

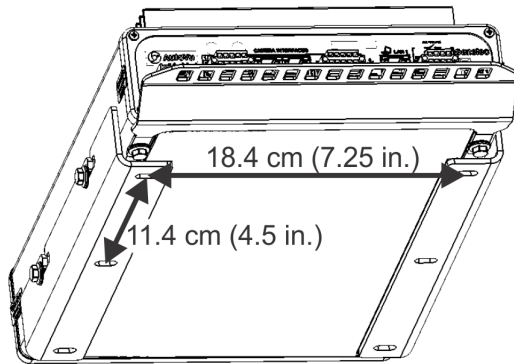
- If you are mounting the LPR Processing Unit under a seat, remove the seat to gain access to the mounting location.
- If you are mounting the LPR Processing Unit under a seat, mounting the unit with the cable connections pointing to the side will help to protect the connections.

Horizontal mount (flanges in):

- The standard horizontal mounting brackets can be installed with the mounting flanges pointing outward. This is the easier method, but depending upon your installation needs, the flanges can also be tucked under the LPR Processing Unit. If you are installing the bracket this way, keep in mind that you will need to install the brackets first. This is because the mounting holes will not be accessible if the LPR Processing Unit is connected to the bracket.



- To install the LPR Processing Unit with the flanges pointing in, you will need a template so that you can accurately mark the mounting holes. Create a template with the following measurements:



Vertical mount:

- When selecting an installation location, take into account that you must leave enough space to easily access the mounting screws with a wrench.
- Install the vertical bracket before you attach the LPR Processing Unit to the bracket.

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.

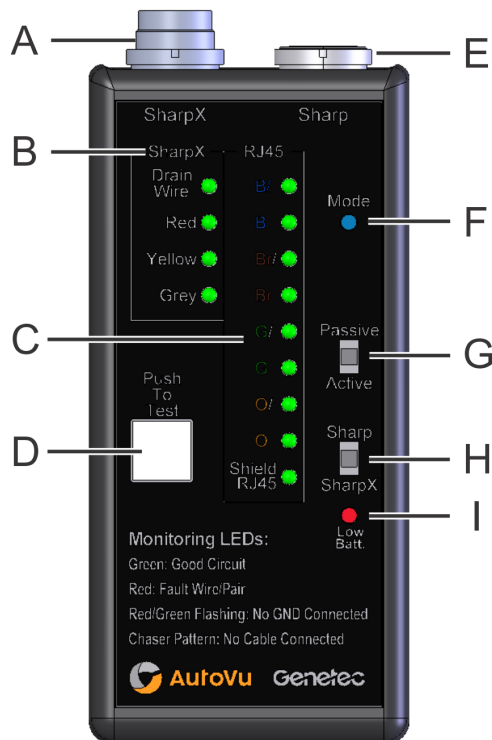


Cable Tester overview

The cable tester is included in the AutoVu Alignment Kit and is used to verify if Sharp or SharpX camera cables are wired correctly and are not defective.

The following tests can be performed with the Cable Tester:

- **Passive test:** Used to verify that the Sharp or SharpX camera cable is not defective.
- **Active test:** Used only for SharpX systems and is used to verify that the camera ports on the LPR Processing Unit are not defective.



Description	Additional information
A SharpX cable connection	
B Test feedback - SharpX camera cable	Green solid: Good circuit Red solid: Faulty connection
C Test feedback - Sharp/ SharpX RJ45	Green solid: Good circuit Red solid: Faulty connection Red/green flashing: No ground connected (black wire on SharpX 5-pos camera connector) Red/amber flashing: Intermittent connection Chaser pattern: No passive board connected or no cable connected

	Description	Additional information
D	Test button	
E	Sharp cable connection	
F	Testing mode	Blue solid: Passive mode Blue flashing: Active mode
G	Passive/active toggle	Passive mode: Tests cables and cable terminations (requires Passive Boards) Active mode: Tests LPR Processing Unit connectors (SharpX only)
H	Sharp/SharpX toggle	
I	Low battery	Off: Battery normal One red fast flash: Battery normal Red solid: Low battery

Testing SharpX cables by performing a passive test

You can use the SharpX Cable Tester in conjunction with the SharpX Passive Board to perform a passive test and verify that a SharpX camera cable is wired correctly and is not defective.

Before you begin

- Read about [the AutoVu Cable Tester](#).
- Check the battery on the Cable Tester by pressing the **Test** button (with no cable attached). The LEDs should flash in the chaser pattern, and the **Low Batt.** LED should be off.
- Run the cable you want to test to the enclosure.
- If you are shortening the SharpX camera cable, terminate the RJ45 connector.

What you should know

- The Cable Tester powers up automatically when you push the **Test** button. The unit powers down when you toggle any switch, remove the camera cable, or when it has been idle for 60 seconds.

NOTE: (For Sharp systems) You cannot test Sharp breakout cables using the Cable Tester.

To test the camera cable by performing a passive test:

- 1 Connect the SharpX cable to the appropriate port on the Cable Tester.
- 2 Connect the RJ45 connector of the camera cable to the SharpX Passive Board.
- 3 Set the Cable Tester to Passive mode.
- 4 Set the Cable Tester to SharpX mode.

NOTE: Using the wrong Mode will result in incorrect test results.

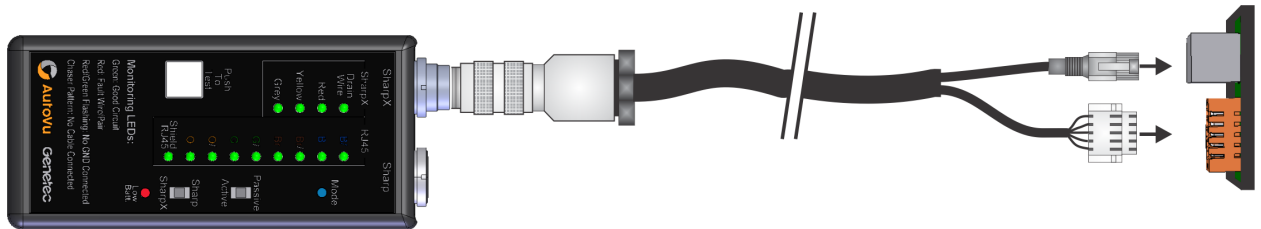
- 5 Press and release the **Push To Test** button.

- 6 Verify that all wire indicator LEDs are solid green. If they are not solid green you must recrimp using a new RJ45 connector and perform the passive test again.
- 7 If all wire indicator LEDs are solid green, “exercise” the cable by bending it in all directions near the cable termination to ensure that all connections are solid.
If an LED turns from solid green to flashing red/amber due to an intermittent wire connection, the Cable Tester locks in the error state even if the wire connection is restored. The LED remains locked for the duration of the Cable Tester’s 60 second power-up period.

If all wire LEDs are solid green, the cable has passed the passive test.

Example

The following example shows a passive test.



After you finish

(SharpX cameras only) [Perform an active test](#) to complete testing.

Testing SharpX cables by performing an active test

You can use the AutoVu Cable Tester to perform an active test on a SharpX cable and verify that the camera ports on the LPR Processing Unit are not defective.

Before you begin

- Read about [the AutoVu Cable Tester](#).
- [Perform a passive test](#) on the SharpX camera cable.

What you should know

- The unit powers up automatically when you push the **Test** button on the Cable Tester. The unit powers down when you toggle any switch, remove the camera cable, or when it has been idle for 60 seconds
- The active test can only be performed on a SharpX cable. If you attempt to run an Active test on a Sharp cable, the Cable Tester will power off.
- This test only verifies the physical properties (continuity, voltage, termination) of the LPR Processing Unit ports. Other problems, such as firmware/software issues can make a camera port inoperative. The Cable Tester will not be able to signal such issues via an Active test. If the cable passes the passive and active test, but you still have LPR camera problems, contact Genetec Technical Support.

To test the camera cable by performing an active test:

- 1 Connect the SharpX cable to the appropriate port on the Cable Tester.

- 2 Power up the LPR Processing Unit and wait 1 minute to ensure that the LPR camera ports are powered-up.
- 3 Connect the SharpX camera and CAT5e cables to the LPR Processing Unit.
The status lights on the DATA LINK port do not light up during cable testing.
- 4 Set the Cable Tester to Active mode.
- 5 Set the Cable Tester to SharpXmode.

NOTE: Using the wrong Mode will result in incorrect test results.

- 6 Press and release the **Push To Test** button.
- 7 Verify that all wire indicator LEDs are solid green. If they are not solid green, redo both the Passive test and the Active test to confirm that the source of the error is the LPR Processing Unit.

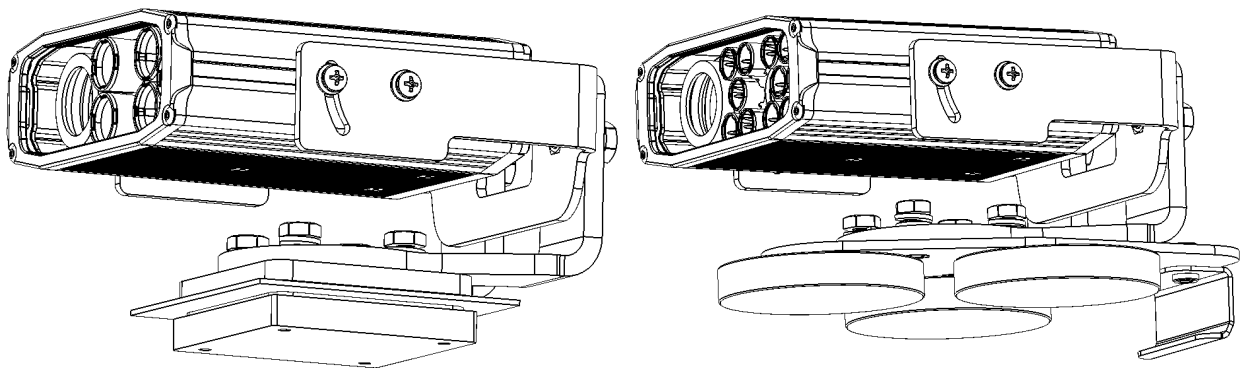
If all wire LEDs are solid green, the cable and LPR Processing Unit ports have passed the active test.

About mounting the SharpX camera for a mobile installation

In a mobile installation, SharpX cameras can be attached to the roof of the vehicle using the Genetec pan/tilt/roll bracket in conjunction with either the Genetec hardmount or magmount. In addition, a variety of mounting brackets are available to attach the camera directly to the vehicle's light bar.

IMPORTANT: The warranty is void if you open or drill holes in the AutoVu equipment, or if you add decals and other adhesive materials, or paint SharpX cameras.

IMPORTANT: Do not bring the camera unit through a contact car wash with brushes that scrub the vehicle. The brush cords can get stuck in mechanical parts and on the cable connector. Use only non-contact car washes with water jets.



Installing the SharpX using the hardmount bracket

In a mobile installation, SharpX cameras can be attached to the roof of the vehicle using the SharpX Universal Mounting Bracket and pan/tilt mount in conjunction with the Genetec hardmount.

Before you begin

Read about [mounting the SharpX for mobile installations](#).

To install the SharpX using the hardmount bracket:

- 1 [Prepare the vehicle for a hardmount installation](#).
- 2 [Install the hardmount on the vehicle](#).
- 3 [Attach the SharpX camera to the hardmount](#).

Preparing the vehicle for a SharpX hardmount installation

Before installing the SharpX camera units on the roof, you must perform some pre-installation steps to prepare the vehicle.

Before you begin

Hard mounting the camera involves drilling holes into your vehicle. Make sure you know exactly where you want the camera units to be located (front-left, front-right, and so on). After installation, you can adjust the pan and tilt angles. Contact your Genetec representative if you are not sure where to install the camera units.

What you should know

- The SharpX mounting base is comprised of four parts, the threaded base block, two rubber gaskets, and the upper mounting block. The upper and lower mounting blocks are placed above and below the roof with the rubber gasket in between to prevent water leaks and reduce vibration.
- If you are using a magnetic mount, you do not need to perform these steps because you can remove the camera and reposition it as needed.

IMPORTANT: Before drilling any holes in the vehicles floor or other parts of the body always check for the electrical wires or fuel lines.

IMPORTANT: Cameras are usually mounted near the tops of the “A pillars” or on the top corners of the windshield. However, you must be careful to avoid drilling through any support bracing that supports the roof.

IMPORTANT: Ensure that the roof is stable enough and will not vibrate (if not, support will need to be installed).

IMPORTANT: We recommend weatherproof cable glands or weatherproof, non-corrosive sealant to seal holes drilled into the vehicle's roof (for the camera cables). Use only one cable per cable gland.

To prepare the vehicle for a SharpX hardmount installation:

- 1 Disconnect the negative (typically black) cable from the vehicle's battery. This is important for your safety and to prevent accidental deployment of the airbags.

- Lower the vehicle's headliner to gain access to the underside of the mounting location. The headliner does not have to be completely removed, but you must gain access to the underside of the mounting location and to the area and locations where you will route the camera cables. Depending on the vehicle, you may also need to remove trim panels, sun visors, handles, and door gaskets to access the mounting location.

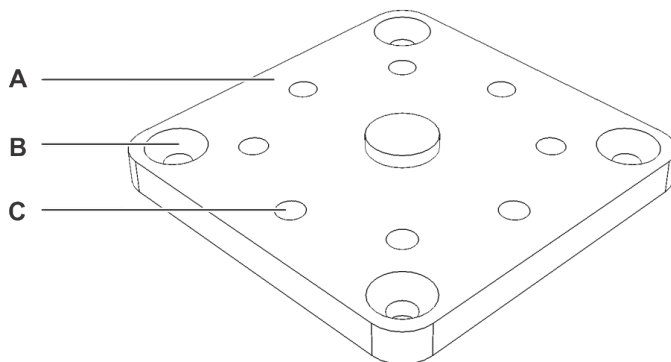
Using a panel removal tool can help in releasing the clips for the plastic body panels. You may also need a Philips screw drivers, Torx bits and a flat blade screw driver.

- Identify any supports, braces, airbags, or wiring that may interfere with the mounting plate installation and mark their locations on the top of the vehicle roof.

As it is difficult to know what is directly under the mounting location, we suggest using the "tapping method" to identify obstructions. With one hand on the roof, and your other hand on the under-side of the roof, tap the roof and feel for a solid tap on the under-side. Using this method, you will be able to locate any obstructions and mark their location on the roof using a grease pencil.

- Place the upper mounting block on the vehicle's roof where you intend to install the camera.
- Measure approximately 15 cm (6 in.) back from the corner of the upper mounting block and make a mark for the camera cable hole. Use the tapping method to verify that there are no roof supports that will interfere with the location.
- Using a center punch, mark the upper mounting block (A) mounting holes (B).

IMPORTANT: Do not drill for the holes (C) that secure the camera to the mount.



- Drill the mounting holes using a 3.175 cm (1/8") drill bit.

NOTE: Although the final hole size is 6.35 cm (1/4"), its recommended that you drill with a smaller drill bit – for example a 1/8" bit first. Drilling with a smaller bit allows you to make sure that the placement of the lower block is not impacted by the roof bracing and is easily sealed if the location is incorrect.

- Using the drill bit a guide, place the threaded base block in place and verify the location is not impacted by the roof bracing.
- If the mounting block location is good with no obstructions, switch to the 6.35 cm (1/4") drill bit and re-drill all the holes for the mounting block.
- Deburr the holes to remove any metal shards or remnants.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



After you finish

[Install the Genetec hardmount on the vehicle.](#)

Installing the Genetec hardmount on the vehicle for SharpX cameras

You use the Genetec hardmount when you want to permanently install the SharpX cameras on your vehicle. The hardmount is the base for the SharpX pan/tilt mount.

Before you begin

[Prepare your vehicle for a hardmount installation.](#)

To install the Genetec hardmount on the vehicle:

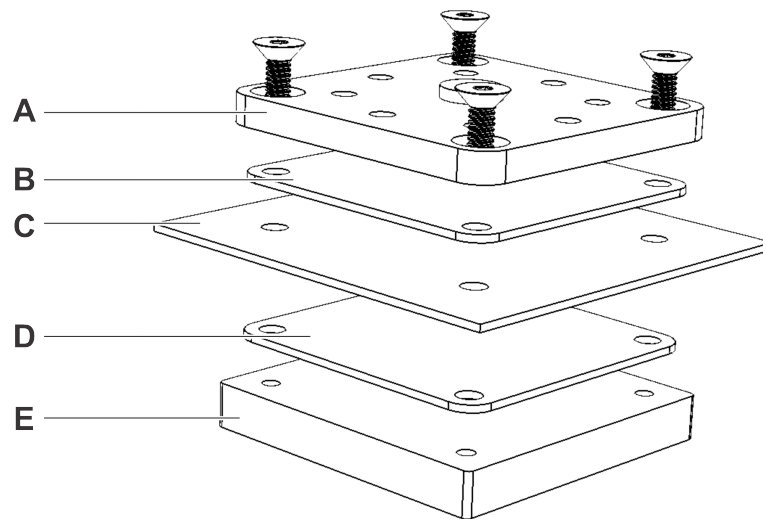
- 1 Place one of the rubber mounting gaskets on the threaded base block and hold the assembly underneath the mounting location.

TIP: After you align the gasket and base block, hold them in together using a piece of electrical tape.

- 2 On the roof of the vehicle, align the second gasket on the mounting location, followed by the upper block.
- 3 Use the hex key wrench to help align the screw holes.
- 4 Insert the four flat-head socket-cap screws into the mounting holes and tighten them using a diagonal pattern.

Example

Here is an example of how to install the mount:



- **A:** Hardmount top plate
- **B:** Rubber bumper
- **C:** Vehicle roof
- **D:** Rubber bumper
- **E:** Hardmount bottom plate

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



After you finish

- If applicable, repeat this process for your other cameras.
- [Attach the SharpX to the hardmount.](#)

Attaching the SharpX pan/tilt/roll bracket to the hardmount

After you have attached the Genetec hardmount to your vehicle, you must attach the SharpX camera using the pan/tilt/roll bracket.

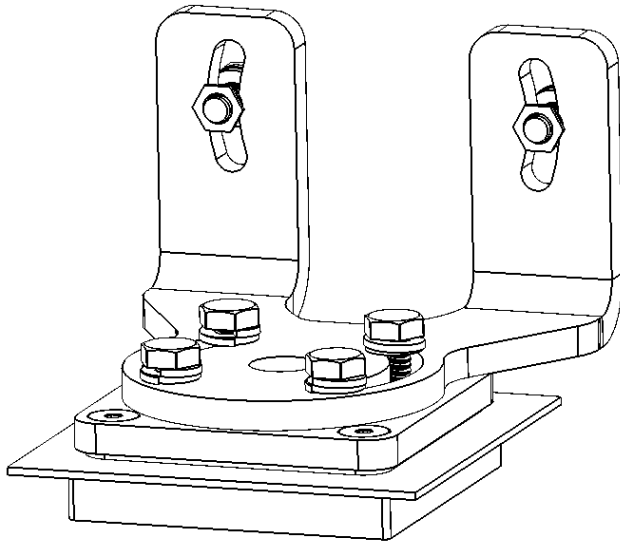
Before you begin

[Install the SharpX hardmount on the vehicle.](#)

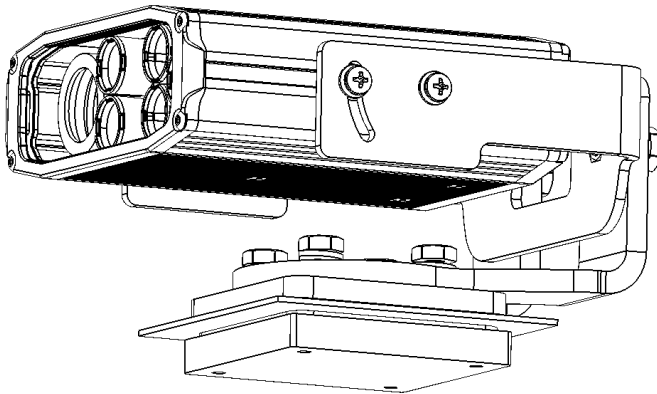
To attach the SharpX using the pan/tilt/roll bracket:

- 1 Assemble the pan/roll bracket hardware using the included documentation.
- 2 Attach the pan/roll bracket to the hardmount using four hex-head cap screws, flat washers, and split washers as shown in the documentation included with the hardmount. Set the alignment for the bracket to allow the bracket to pivot from forward to 90 degrees to the side.

TIP: Don't over tighten as you will still need to aim the SharpX camera later.



- 3 Slide the SharpX camera on to the tilt bracket, with the bracket's open notch to the top. Leave about a 2.5 cm (1 in.) gap between the back of the bracket and the camera.
- 4 Attach the camera to the bracket using the phillips pan head screws, serrated washers, and flat washers.
- 5 Attach the assembled SharpX camera and tilt bracket to the pan/roll bracket using hex-head cap screws, flat washers, and split washers.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Installing the SharpX using the magmount

In a mobile installation, cameras can be attached to the roof of the vehicle using the Universal Mounting Bracket and pan/tilt mount in conjunction with the Genetec magmount.

Before you begin

Read [about mounting the SharpX for mobile installations](#).

What you should know

WARNING: Do not remove the silicone boots covering the magnets. Genetec is not responsible for scratches to the vehicle's paint caused by contact with bare magnets.

NOTE: The mount's magnets are extremely strong, and may be difficult to remove once attached to your vehicle's roof. If you need to adjust your camera's position after it is attached, you may find it easier to loosen the bolts rather than attempt to move the entire mount.

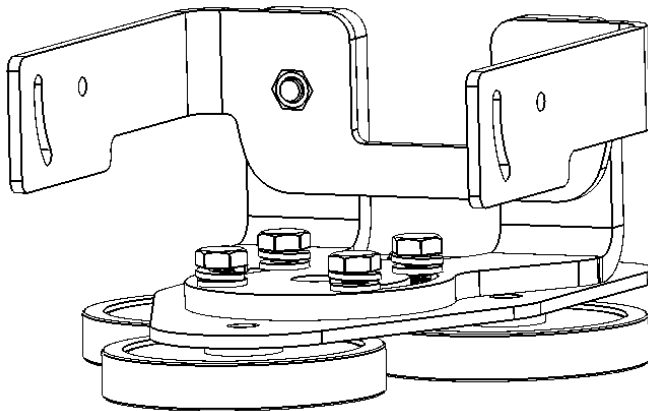
NOTE: The holding power of the magnetic mounting systems is dependent on surface finish, surface flatness, and thickness of the steel mounting surface. Keep your mounting surface and magnets clean, dry, and free of foreign particles that would prevent good surface contact.

To install the SharpX using the magmount:

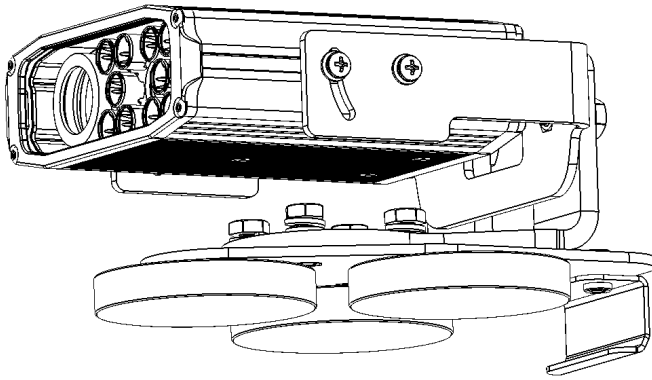
- 1 Assemble the magmount base using the instructions included with the magmount kit.

TIP: Don't tighten the bolts until after you have properly positioned the camera.

- 2 Attach the SharpX pan/tilt/roll bracket to the magmount base using four hex bolts.



- 3 Attach the SharpX camera to the pan/tilt/roll bracket.



- 4 Verify that the roof of your vehicle is clean, dry, and free of debris, and then place the magmounted SharpX in the desired position on your roof.
- 5 Attach the grooved end of the universal window seal to your vehicle's passenger window. You can cut the seal as needed to fit your window.

Camera cabling do's and dont's

Read all the limits and best practices before you begin the installation. Failure to follow the supplied instructions or information may result in loss of data or damage to hardware and will void the warranty.

WARNING:

- Do not install this product or route any wires in the deployment area of your air bag. Equipment mounted or located in the air bag deployment area will damage or reduce the effectiveness of the air bag, or become a projectile that could cause serious personal injury or death. Refer to your vehicle's owner manual for the air bag deployment area. The user and installer assumes full responsibility for determining proper mounting location, based on providing ultimate safety to all passengers inside the vehicle.
- Do not route wires where they will be exposed to high temperatures (above 85°C/185°F), for example, near the engine manifold. If the insulation heats up, wires may become damaged, resulting in a short circuit or malfunction, and permanent damage to the product.
- When using screws, do not allow them to come into contact with any electrical lead.

Vibration may damage wires or insulation, leading to a short circuit or other damage to the vehicle.

Recommendations:

- Make sure cables and wires are routed and secured so they will not interfere with or become caught in any of the vehicle's moving parts, especially the steering wheel, shift lever, parking brake, sliding seat tracks, doors, or any of the vehicle's controls.
- Secure all wiring with cable clamps or electrical tape. Do not allow any bare wiring to remain exposed.
- Cables connected to the computer docking station need to allow enough slack so that the user can adjust the laptop without pulling the cables.
- Route power wires from the battery through the vehicle firewall and away from abrasion, preferably routed through existing wire channels under the door sills where they remain protected.
- Use rubber cable glands to prevent damage to wires that pass through the vehicle body or firewall. Seal the holes to prevent water from entering the vehicle.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Drilling the camera cable holes

For installations using a hardmounted camera, you can drill the camera cable hole in the roof of the vehicle after you have decided the location for the camera hardmount.

Before you begin

- [Install the camera's hardmount bracket.](#)
- You should already have marked the location for the camera cable hole when you [prepared the vehicle for the hardmount installation.](#)

To drill the camera cable holes in the vehicle:

- 1 Place a cable gland (outer diameter 1.9 cm (.75 in.), inner diameter .95 cm (.37 in.)) on the section of your vehicle's roof where you intend to pass the camera cables and satellite navigation hardware cable, if applicable. Use a pencil or other marker to trace the outline of the cable glands.

IMPORTANT: Ensure that the holes you drill for the camera cables are slightly smaller than the outline of the cable glands, otherwise the cable gland collars won't grip your vehicle's roof.

- 2 Verify that both sides of the roof are clear of anything that could be damaged, and then drill a hole into the areas that you marked in the previous steps.

IMPORTANT: Use a fine-toothed hole saw that is designed for vehicle body panels (should be depth-regulated and include a pilot drill bit). Do not use a stepping bit because it will deform the panel.

- 3 Deburr the holes to remove any metal shards or remnants.
- 4 Install the cable gland in the camera cable hole.
- 5 Pass the camera cable through the cable gland.

Leave approximately 20 cm (8 in.) of cable to allow the connection to the camera. A simple distance check is to lay the cable across the hardmount plate. The tip of the connector should reach to the far side of the plate. This will ensure that you have a proper loop for connecting to the camera.

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Selecting the camera ports for the LPR Processing Unit

To ensure that your SharpX cameras achieve the highest frame rate, you must connect them to the correct camera ports on the LPR Processing Unit.

What you should know

The best camera ports to use depends on the model of the cameras and the LPR Processing Unit used in the installation.

To select the correct LPR Processing Unit camera ports:

- 1 Identify the camera and LPR Processing Unit model information.
- 2 Choose the correct **X1S** LPR Processing Unit ports or **X2S** LPR Processing Unit ports for the camera connections.

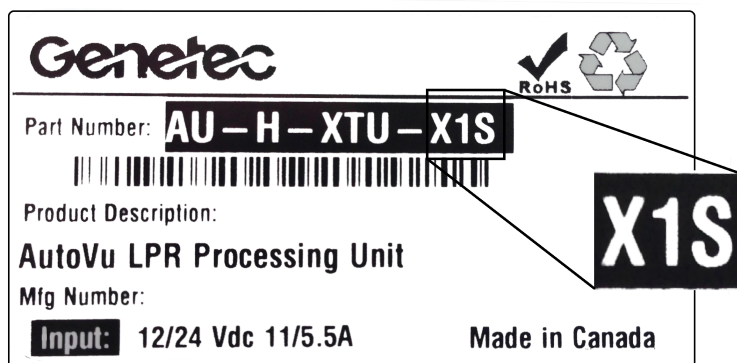
SharpX hardware identification

You can find hardware model information for SharpX cameras and the LPR Processing Unit on the product label.

- The SharpX model number is on the product label on the unit. The following sticker example shows a SharpX XGA model:



- The LPR Processing Unit model number is on the product label on the unit. The following sticker example shows a LPR Processing Unit X1S model:



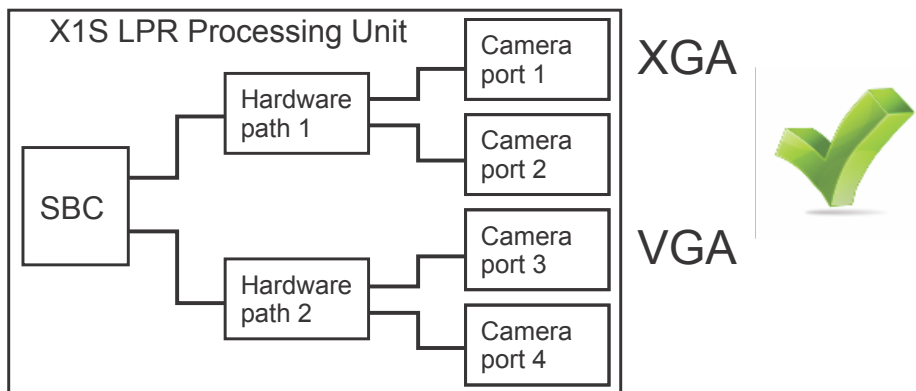
Camera connections for the X1S LPR Processing Unit

The recommended camera port assignments depend on the model of LPR Processing Unit and SharpX cameras being used.

On the X1S LPR Processing Unit, each hardware path is shared by two camera ports. This does not affect VGA SharpX cameras, but it causes a limitation when connecting XGA SharpX cameras. In order for XGA cameras to achieve a frame rate of 30 fps, they cannot share a hardware path with any other cameras.

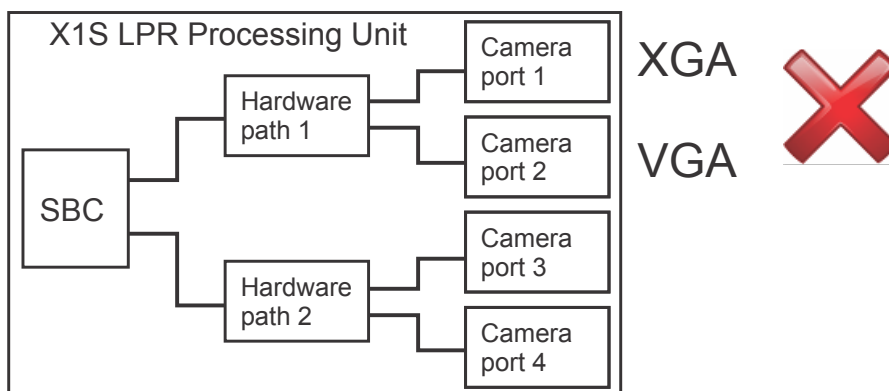
Example

If you are using one XGA cameras and one VGA camera on an X1S LPR Processing unit, connect one camera to each hardware path to balance the load and maintain a higher frame rate for the XGA camera (30 fps).



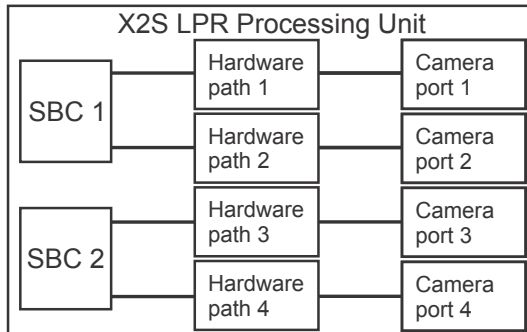
Example

If an XGA camera shares a hardware path with another camera, it will result in a frame rate drop to 10 fps for the XGA camera.



Camera connections for the X2S LPR Processing Unit

Each camera port on an X2S LPR Processing Unit has its own dedicated hardware path. You can connect XGA or VGA SharpX cameras to any port without a loss of frame rate.



Securing wires using tension clamp connectors

The various connectors used with the SharpX LPR Processing Unit and the optional external Navigator box are equipped with built-in tension clamps to secure the wires. The tension clamps are orientated differently depending on which connection you are making.

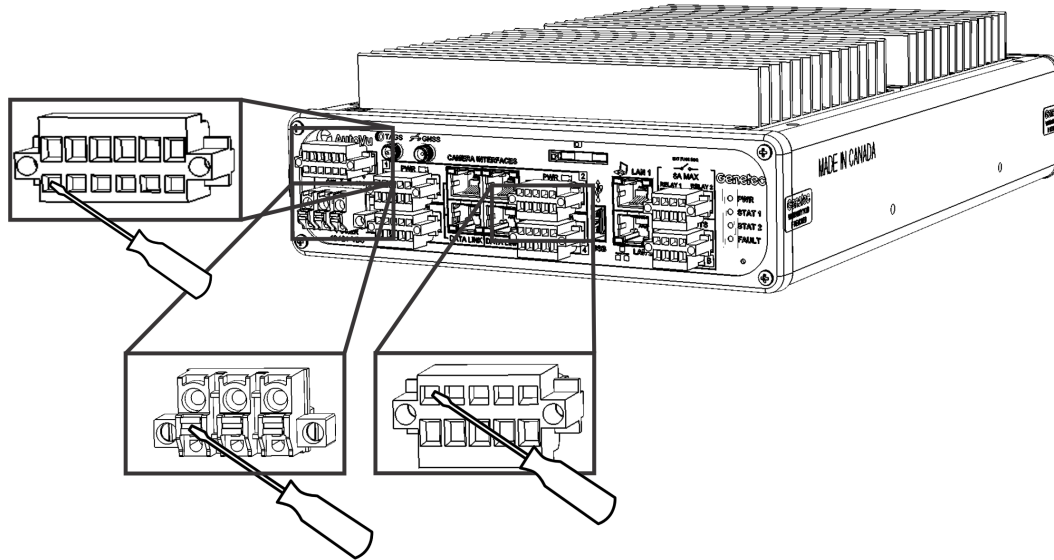
Before you begin

- You will need a 2.5 mm, flat-head screwdriver to push in the clamps.
- If the LPR Processing Unit installation does not include a wire rack, you must [provide extra support for the wire connections](#) by using the provided strain relief clips.

What you should know

- The SharpX connectors are made by Weidmüller. For more information about the connectors, go to <http://www.weidmueller.com>, and search for part numbers 1043920000 (3-pole connector), 1690900000 (4-pole connector), 1690910000 (5-pole connector), and 1690920000 (6-pole connector if your system includes the AutoVu Navigation Option).
- You must connect the wires for the LPR Processing Unit power, navigation, and camera connections using tension clamp connectors. The tension clamps have different shapes and orientations depending on the port.

To secure wires using tension clamp connectors, refer to the illustration and the steps that follow:



- 1 Strip 10 mm (3/8 in.) of insulation from the camera wires (the drain wire has no insulation).
- 2 Plug the connector into the required port on the LPR Processing Unit.

This makes it easier to push in the tension clamps.

- 3 Use a 2.5mm flat head screwdriver to push in the tension clamps, insert the required wires into the poles, and then release the tension clamps.
- 4 Gently tug the wires to make sure they are secure.

Related Topics

[Installing the external Navigator box](#) on page 62

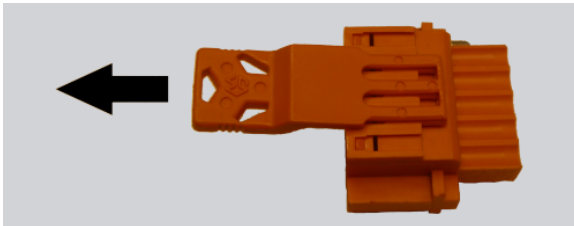
[Connecting SharpX cameras for a mobile installation](#) on page 33

Attaching strain relief clips

Use the provided strain relief clips to give extra support to the wires connected to the LPR Processing Unit's wire plugs.

To attach the strain relief clip:

- 1 Hook a strain relief clip (included) in the middle of the wire plug.
- 2 Slide the connector backwards until it clicks into position on the wire plug.



- 3 After you have connected the wire plug to the LPR Processing Unit and pushed the wire ferrules into the wire plug, insert a small cable tie through two of the holes in the strain relief clip and secure the wires.

TIP: Depending on which of the three available holes you use for the cable tie, you can direct the wires to the left, right, or center when they leave the wire plug.



Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Connecting SharpX cameras for a mobile installation

To use SharpX cameras for a mobile installation, there are multiple steps you must perform to connect the camera.

Before you begin

Do the following:

- Ensure that you have [the required tools and parts](#).
- Some of the connections require tension clamps. Make sure you know how to [use tension clamps with cable connectors](#).
- Position and install the horizontal or vertical bracket in the vehicle trunk, and then attach the LPR Processing Unit to the bracket. Remember to consider the size of the LPR Processing Unit for proper clearance and spacing. If you do not have the proper [bracket](#) required for your installation, contact your Genetec representative.

What you should know

IMPORTANT:

When connecting the camera cable, follow these guidelines:

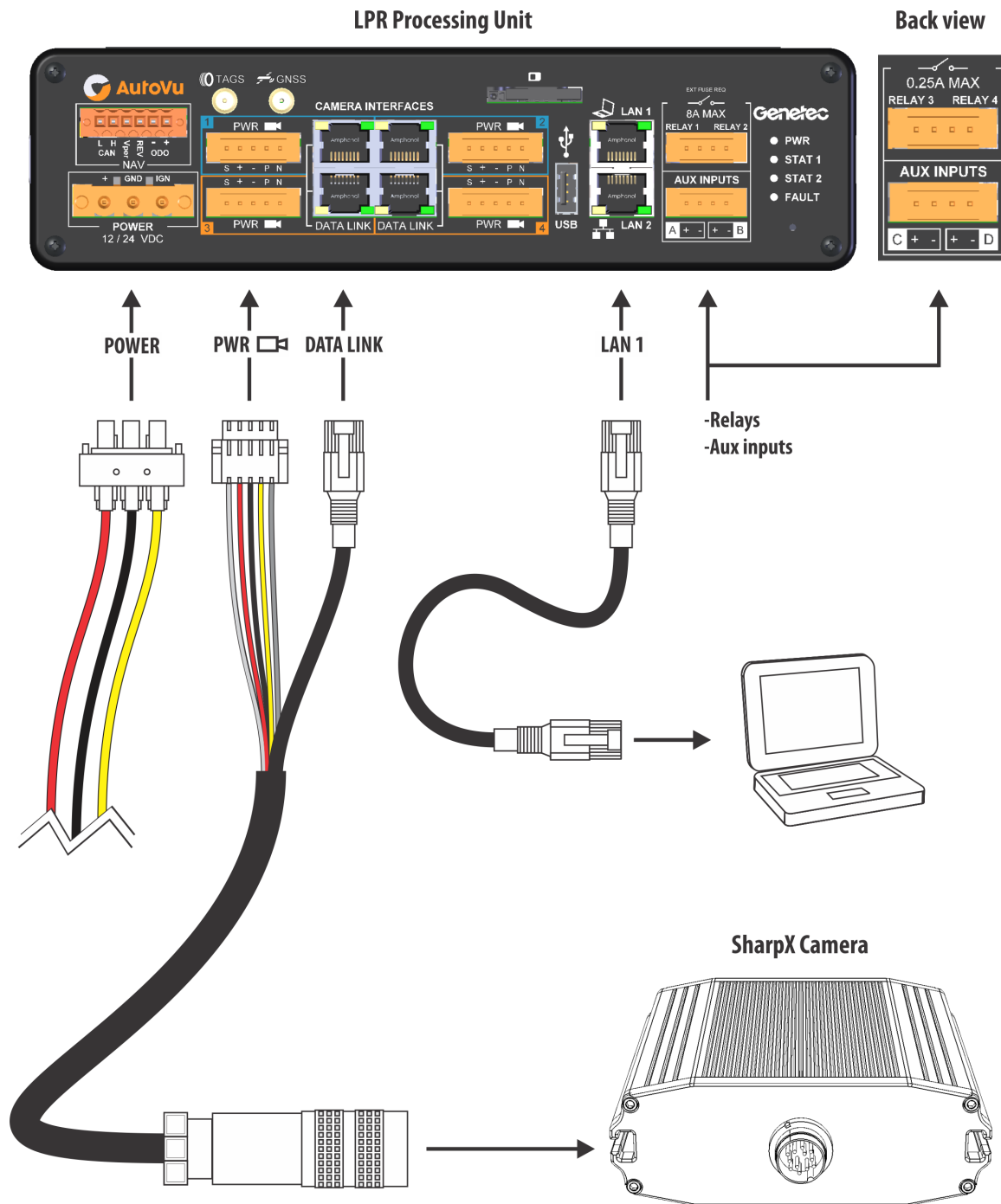
- Do not tighten the connector by turning the camera cable.
- Do not turn the connector from behind the outer ring.
- Do not use any tools to tighten the connector.

CAUTION: A loose connector may cause water to leak into the SharpX camera. AutoVu SharpX cameras are IP67 compliant only when the plastic protector cap is on, or when the cable is connected to the camera according to the instructions.

IMPORTANT: Ensure that all electrical connections are insulated. This protects against accidental electrical short-circuiting, both during and after the wiring installation process.

IMPORTANT: Do not use any "wire splice" type connectors (such as self-stripping electrical tap connectors). Vehicle vibrations will cause these connectors to fail. Connections should be soldered and shrink wrapped.

To connect the SharpX, refer to the illustration below, and the steps that follow:



- 1 Connect the power port to the LPR Processing Unit.
- 2 Connect the camera cable to the LPR Processing Unit.
- 3 Shorten and terminate the CAT5e cable.

The SharpX cable does not come with a pre-terminated CAT5e connection.

NOTE: SharpX cameras require the CAT5e T568B conductor arrangement.

- 4 Connect the camera unit's CAT5e cable to the LPR Processing Unit.
- 5 Connect your network cable to the **LAN 1** port on the LPR Processing Unit, and the other end to your in-vehicle computer.

- 6 Connect the LPR Processing Unit to the vehicle's power and ignition signals.
- 7 Connect the camera cable to the SharpX camera unit.
- 8 (Optional) If the installation includes wheel imaging cameras that require a BNC connection, you will need to install the Tire/Aux Imaging Adapter Module.

The SharpX is connected and ready to be configured.

NOTE:

Related Topics

[Hardware components for SharpX mobile installation](#) on page 2

Connecting the power port to the LPR Processing Unit

To power the SharpX cameras, you must connect the power port to the LPR Processing Unit.

What you should know

As a best practice, use a red wire for power (+) and a black wire for ground (GND) to be consistent with similar Genetec installations.

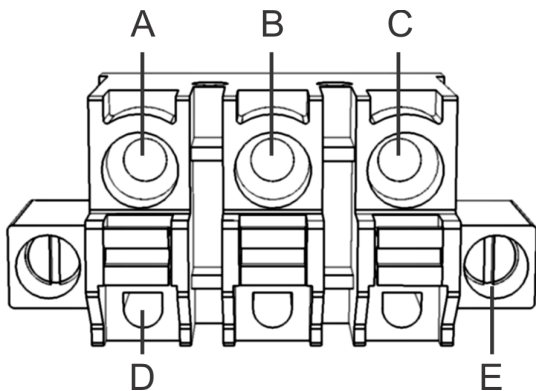
To connect the power port:

- 1 Plug the 3-pole connector into the power port, and then tighten the securing screws.
- 2 Strip 10 mm (3/8 in.) of insulation from your stranded copper wires.

BEST PRACTICE: For a more secure connection, crimp a ferrule to the tip of each stripped wire. Ensure that you use the [appropriate ferrule for the wire gauge](#).

WARNING: Do not lengthen any power or signal wires. If the wire you are installing is too short, replace with a new longer wire. Splices are a point of possible failure, causing the system to malfunction.

- 3 Insert the wires into the connector poles.



- **A:** Permanent 12V (+). Use 14 AWG (red).
- **B:** Negative/Return/GND. Use 14 AWG (black).
- **C:** 12V Ignition (IGN). Use 20 AWG to 14 AWG (yellow). Include a 0.5A fuse (in-line or in the OEM fuse box using a tap fuse adapter).
- **D:** Tension clamps

- **E:** Securing screws

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Related Topics

[System status LEDs on the LPR Processing Unit](#) on page 74

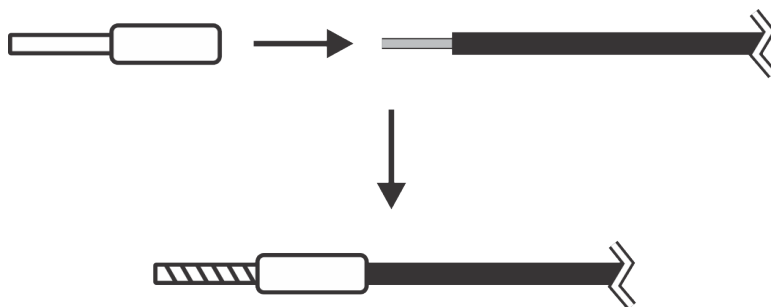
[Securing wires using tension clamp connectors](#) on page 31

Wire ferrules for a SharpX installation

When connecting the power port to the LPR Processing Unit in a SharpX installation, you can use the ferrule crimping tool that is included with the AutoVu Alignment Kit to crimp a ferrule to the end of each stripped wire for a more secure connection.

The following table shows the appropriate ferrules for each wire gauge:

Wire AWG	Ferrule color
14	Blue
16	Black
18	Red
20	Grey
24	Violet



Connecting the camera cable to the LPR Processing Unit

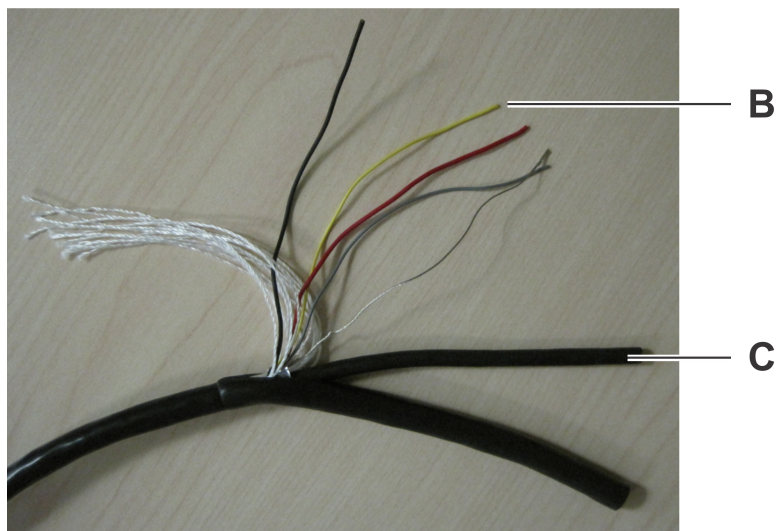
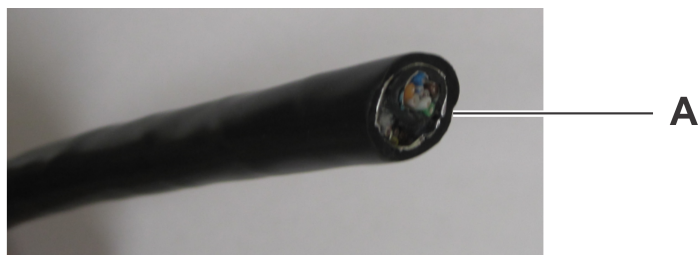
When connecting SharpX cameras, you need to connect the camera cable to the LPR Processing Unit. The power, data, and video wires for the camera cable are contained inside the SharpX all-in-one cable.

Before you begin

- Run the camera cable from the camera location to the LPR Processing Unit.
- Shorten the cable as required (make sure to leave some slack for maintenance purposes).

To connect the camera cable to the LPR Processing Unit:

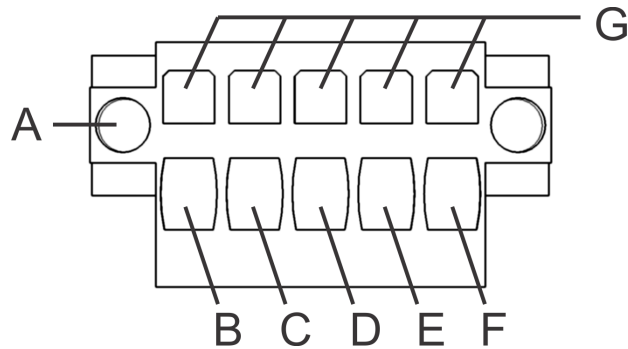
- 1 Connect the 5-pole connector to the camera port, and then tighten the securing screws.
- 2 Strip 20 cm (8 in.) of the all-in-one cable's jacket to expose the wires inside.



- **A:** All-in-one cable
- **B:** Camera wires
- **C:** CAT5e cable

- 3 Trim the polyester fill threads and aluminum foil as needed.
- 4 Shorten the camera cable by about 5 cm (2 in.). This is needed because the CAT5e cable will also be shortened by about 5 cm (2 in.) when you crimp the RJ45 connector.
- 5 Strip 10 mm (3/8 in.) of insulation from the camera wires (the drain wire has no insulation).

- 6 Crimp ferrules (provided) to the camera wires.
Ensure that you use the [appropriate ferrule for the wire gauge](#).
- 7 Twist the grey and yellow wires together until 1 cm (3/8 in.) from the connector.
TIP: For a cleaner installation, you can also twist the red, black and shield wires together.
- 8 Insert the wires into the connector poles as indicated below.



- **A:** Securing screws
- **B:** Drain wire -tinned copper (S)
- **C:** Red wire (+)
- **D:** Black wire (-)
- **E:** Yellow wire (P)
- **F:** Grey wire (N)
- **G:** Tension clamps

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



After you finish

Repeat these steps for your other SharpX camera(s) as needed.

Related Topics

[LED statuses on the SharpX camera unit](#) on page 78

[Securing wires using tension clamp connectors](#) on page 31

Connecting the camera's CAT5e cable to the LPR Processing Unit

When connecting SharpX cameras, you need to connect the CAT5e cable to the LPR Processing Unit. The CAT5e wires are contained in the all-in-one cable.

To connect the CAT5e cable:

- 1 Strip the CAT5e cable you exposed when you [connected the camera cable to the LPR Processing Unit](#).

Make sure not to nick or cut the insulation of the interior wires.

- 2 [Terminate the CAT5e connection](#) using the [T568B conductor arrangement](#).

IMPORTANT: The SharpX CAT5e connection requires the T568B CAT5e wire pattern.

- 3 Connect the CAT5e cable to the Data Link port on the LPR Processing Unit.

Connecting power to the LPR Processing Unit

To power the LPR Processing Unit, you must connect it to the vehicle's power. The LPR Processing Unit requires a constant power source of 12 VDC protected with a 15A fuse.

Before you begin

- Have your 15A fuse ready (ATO/ATC in-line).

IMPORTANT:

- These instructions do not replace your vehicle's owner manual. If you are unsure about your vehicle's internal wiring, see your owner manual before continuing.
- Solder your connections and protect them with heat shrink tubing.

What you should know

- The system requires an [ignition signal](#) to turn on and off the LPR Processing Unit gracefully. Simply shutting off the main power to the LPR Processing Unit can corrupt the LPR Processing Unit and make the system inoperable.
- The LPR Processing Unit can be used to switch power for auxiliary devices, such as [power for the laptop](#), a modem, optional Navigator box, and wheel imaging cameras.

To connect the LPR Processing Unit to the vehicle's 12V power source:

- 1 Connect the wire from the LPR Processing Unit's (+) terminal, through the 15A in-line fuse, to the vehicle's 12V power source (permanent +12V).

NOTE:

- Install the fuse at the source of your vehicle's 12V system tapping point. The LPR Processing Unit is already protected internally by an electronic circuit breaker.
 - If you are connecting the primary power lead from the battery, it must be fused within 2 inches of the battery.
- 2 Label the primary wire at the fuse to help identify the circuit for future service.
 - 3 Run the wire to the LPR Processing Unit location.

IMPORTANT: Protect the wire with a convolute wire loom and secure the loom from potential damage from heat or abrasion.

- 4 Connect the wire from your LPR Processing Unit's GND pole to your vehicle's chassis for grounding.

NOTE: Ensure that the ground connection is clean and secure and that there is no paint impeding the connection. Ground connections should also be located away from weld points. Use ring terminals with incorporated, internal locking teeth at all grounding screw locations. This ensures a positive ground connection. For a reliable connection, select ring terminals that are compatible with the size of the stud, screw or bolt that will be used to attach them to the vehicle.

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Connecting the LPR Processing Unit to the ignition signal

To power the LPR Processing Unit, you must connect it to the vehicle's power and ignition signal. When properly connected, the system will be supplied with the vehicle's 12 VDC power when the ignition is on.

Before you begin

- Have your 0.5A fuse ready (in-line or in the OEM fuse box using a fuse tap adapter).

IMPORTANT: These instructions do not replace your vehicle's owner manual. If you are unsure about your vehicle's internal wiring, see your owner manual before continuing.

What you should know

- You can obtain the ignition signal from the fuse box using a fuse tap adapter. This adapter allows you to tap into the fused circuit and give a fused connection to the LPR Processing Unit.

To connect the LPR Processing Unit to the vehicle's ignition signal:

- 1 Identify the ignition signal from the fuse box. This should be a circuit that supplies 12V when the key is switched to the RUN position, and is off when the key is in the OFF position.
 - a) With the key in the OFF position, use either a circuit tester or a volt meter to identify the fuses that are 10A or less and that do not have power.

WARNING: Do not tap fuses that are related to the automatic braking system (ABS) or the airbags.
 - b) Switch the key to the RUN position and identify which of those fuses now have power.
 - c) When you have identified a suitable fuse, cycle the power to ensure that the power is on when the key is in the RUN position and off when the key is in the OFF position.

- 2 Remove the ignition signal fuse and insert it into the fuse tap adapter. Install a 0.5A fuse in the added circuit holder. Install the fuse tap adapter into the removed fuse position.
- 3 Connect the wire from your LPR Processing Unit's IGN pole to the fuse tap adapter.
Only negligible current is drawn by the IGN pole. It is simply used to sense the ignition signal.
- 4 Label the connections for future service.

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Power management in an AutoVu system

To protect the vehicle's battery, the AutoVu system shuts down if battery voltage falls below 11V (auto shutdown). The AutoVu system does not restart due to a voltage dip caused by engine startup (cranking event protection).

Auto shutdown

To protect the vehicle's battery, AutoVu systems include an auto shutdown feature.

If the vehicle engine is off and the AutoVu system is running solely on vehicle battery power, the system will shut down if battery voltage falls below 11V (10.4V detected by the SharpX camera).

Following auto shutdown, the AutoVu system does not start up until it detects a voltage greater than 12V. When the vehicle engine is running again, the voltage typically increases immediately to >12.6V, which allows the AutoVu system to power up again.

Cranking event protection

The AutoVu system does not reboot due to a voltage dip caused by engine startup.

Many law enforcement vehicles include external timers that maintain power to the equipment (radio, etc.) even when the engine is off. If the AutoVu system is being powered with an external timer, and the engine is then turned on, the resulting dip in voltage does not cause the AutoVu system to restart. The system can withstand a temporary voltage dip down to 7V.

Connecting the camera cable to the SharpX camera unit

When connecting SharpX cameras, you must secure the cable connector to the camera to prevent water leakage.

To connect the camera cable to the SharpX camera unit:

- 1 Remove the plastic protector cap from the camera, and put a small amount of dielectric compound (included) on the cable connector threads.

IMPORTANT: Do not let the dielectric compound touch the contacts inside the cable connector.

- 2 Align the notch on the cable connector with the notch on the camera port.

- 3 Attach the cable to the camera, and then tighten the outer connector ring clockwise.

IMPORTANT:

When connecting the camera cable, follow these guidelines:

- Do not tighten the connector by turning the camera cable.
 - Do not turn the connector from behind the outer ring.
 - Do not use any tools to tighten the connector.
- 4 As you turn the connector ring clockwise, move the connector up and down to make sure that the cable connection is tight enough.

About installing wheel imaging cameras in a mobile AutoVu system

Wheel imaging cameras are required for digital tire chalking in City Parking Enforcement installations that include *wheel imaging*.

When comparing wheel images from Patroller's first pass and second pass, you can use the wheel's valve stem (or other reference point) to see whether the wheel has moved a short distance.

To accurately record the wheel images, the system requires the use of either the Navigator box or an LPR Processing Unit with the AutoVu Navigation Option. This will allow the system to interface into the vehicle's odometer signal to know the distances traveled.

Camera specifications

- 6 mm lens
- Built-in IR LEDs
- Automatic heating when the temperature is below +10°C (50°F)
- Waterproof housing (IP67)

Required tools and parts

The following tools and parts are required for wheel imaging camera installation:

- Allen wrench (included)
- Phillips screwdriver
- 7 mm socket/key wrench
- Drill
 - 4.7 mm (3/16") drill bit
 - 19 mm (3/4") hole saw

NOTE: Use a fine-toothed hole saw that is designed for vehicle body panels (should be depth-regulated and include a pilot drill bit). Do not use a stepping bit because it will deform the panel.

- Tie wraps for securing cable
- Additional cable glands (grommets)

Example

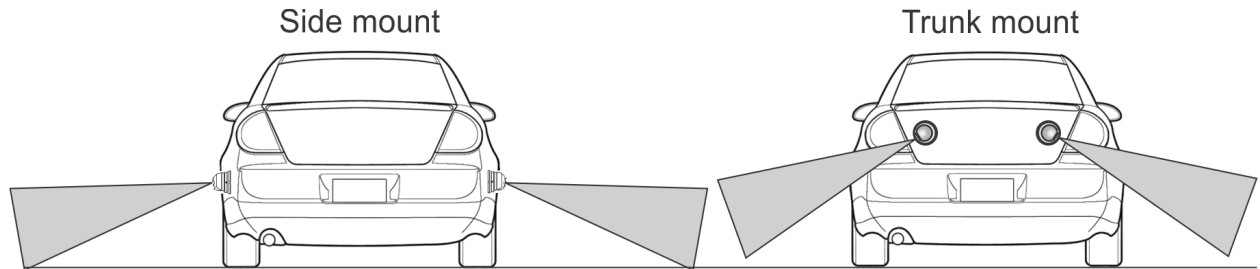
Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Wheel imaging camera location

Wheel imaging cameras are either side-mounted on the rear quarter panel or trunk-mounted.

NOTE: If you are installing two wheel imaging cameras, ensure that they are mounted symmetrically on both sides of the vehicle.



The best choice of installation location generally depends on the vehicle make and model. When selecting a location, it is important to consider ease of installation, aesthetics, and the long-term survivability of the camera. Use the following information when deciding the best installation location.

Side mount

- This is the preferred location because the wheel imaging cameras will be closer to the parked vehicle's wheels and they will appear larger in the image.
- You will need to attach the camera to the vehicle using the provided bolts. Ensure that you can access the back of the vehicle panel (usually done by removing the tail light assembly or trunk liner).
- To avoid road grime and rocks kicked up by the tires, select a location that is at or above the top of the wheel well.
- Ensure that the cameras can be mounted symmetrically. Note the location of the vehicle's fuel port and the range of motion of any sliding doors.

Trunk mount

- Mounting may be easier because you do not need to access the side panel through the tail light assembly or trunk liner.
- Repeated opening and closing of the trunk puts stress on the camera cables.
- Slamming the trunk may affect camera alignment.
- This installation type may not be suitable for vehicles with swinging rear doors.
- To avoid damage in a collision, cameras should not extend past the vehicle bumper. Do not install cameras on the vehicle bumper.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Drilling the mounting and cabling holes for your wheel imaging camera

When you have selected the location for the wheel imaging cameras, drill the required holes using the camera base as a template.

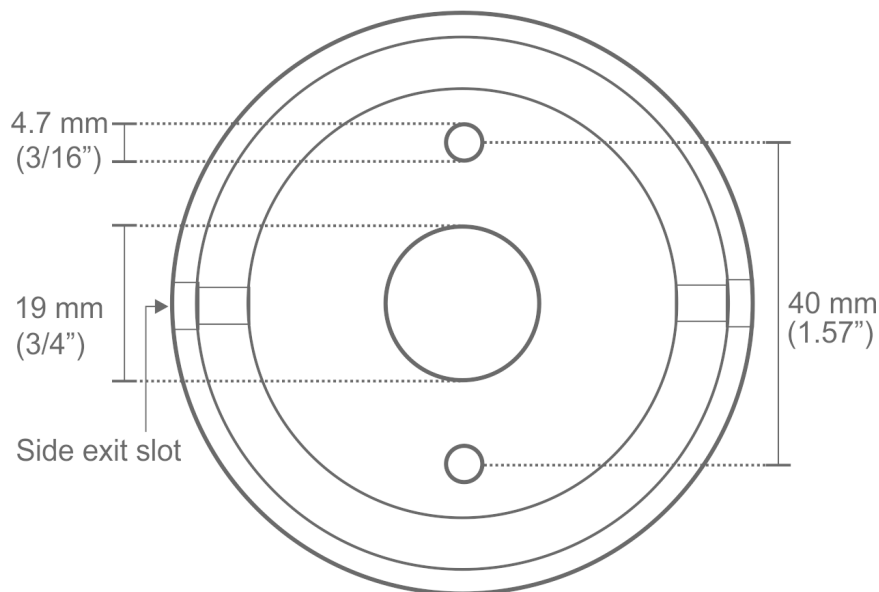
Before you begin

- For side-mount installations, remove the tail light assembly so that you can access the inside of the panel. Ensure that nothing will be damaged when you drill the mounting holes. You may also need to remove the liners from inside the trunk and drill an additional 19 mm (3/4") hole in the liner in order to pass the camera cable.
- For trunk-mount installations, remove any liners inside the trunk lid. Ensure that nothing will be damaged when you drill the mounting holes.

What you should know

- Two 4.7 mm (3/16") holes are required for mounting the camera.
- One 19 mm (3/4") hole is required to pass the camera cable.

IMPORTANT: If you plan to pass the cable through the side exit slot of the camera body, you do not need to drill a hole for the camera cable.



(Side-mount) To drill the mounting holes:

- 1 Using the camera base as a template, mark and drill the mounting holes.

TIP:

- Use a grease pencil to mark the center location of the mounting location.
- If required, use your tape measure as a straight edge and mark a vertical line to help align the mounting holes.

- 2 Use a center punch to mark the center of the mounting screw holes as well as the cable hole.

IMPORTANT: Before drilling any holes, ensure that there are no obstacles, wires, or braces that will prevent the installation of the camera.

(Trunk-mount) To drill the mounting holes:

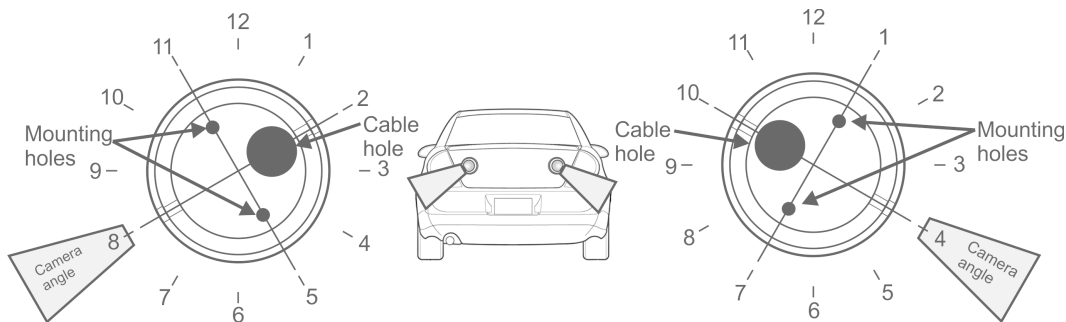
- NOTE:** For trunk-mounted cameras, the camera ball must be rotated to an extreme angle within the camera housing. Mounting the camera base as follows will help to reduce stress on the camera cable.

Drill the mounting holes using the following suggested camera angles (shown as clock positions).

NOTE: These angles are only as starting point. The camera alignment will be fine-tuned after the camera is mounted.

- For left-side cameras, drill the mounting holes at 11 o'clock and 5 o'clock.
- For right-side cameras, drill the mounting holes at 1 o'clock and 7 o'clock.

- To further reduce stress on the camera cable, drill the cable hole off-center as shown.

**Example**

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.

**Running a wheel imaging camera cable for a SharpX**

You must run the camera cable to the LPR Processing Unit location (SharpX) or the breakout box location (SharpX).

Before you begin

- The camera cable extension divides the cable into a separate camera cable and power cable. You must **terminate the power cable** before running the camera cable.
- The camera must be assembled with the cable running through the camera base. You will not be able to separate the camera ball from the base after the wire is run.

What you should know

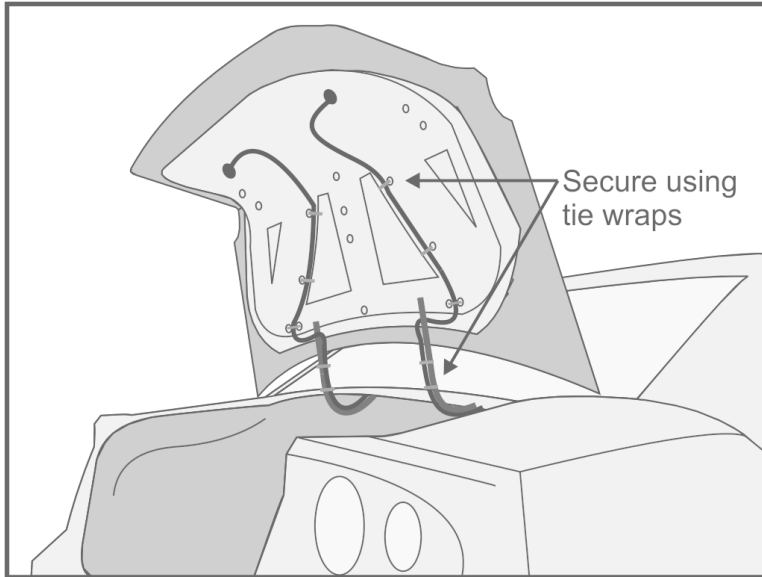
- The wheel imaging camera is shipped with a 4.5 m (15') camera cable extension. The cable is IP67 rated and is suitable for all-weather installations.

(Side-mount) To run the cable:

- 1 Install the provided cable gland (grommet) in the camera cable hole.
- 2 Install additional cable glands (not provided) in the hole drilled in the trunk and any other camera cable holes.
- 3 Run the camera cable to the LPR Processing Unit location.

(Trunk-mount) To run the cable:

- 1 Install the provided cable gland (grommet) in the camera cable hole.
- 2 Run the camera cable to the LPR Processing Unit location.
- 3 Secure the camera cable to the trunk lid and trunk hinge using tie wraps.

**Example**

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.

**Mounting a wheel imaging camera**

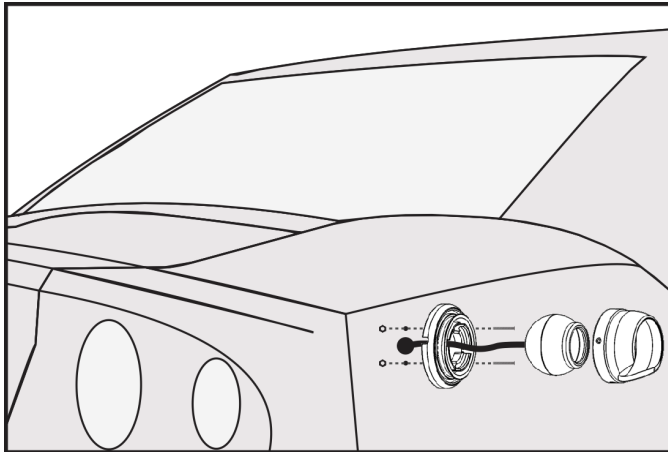
After you have drilled the mounting holes and run the wheel imaging camera cable, you can mount the wheel imaging camera using the supplied hardware.

To mount the wheel imaging camera:

- 1 Insert the two M4 x 25 mm bolts through the camera base and vehicle body panel/trunk lid.
- 2 Attach the nuts using a 7 mm socket or key wrench and secure the camera base to the vehicle.

NOTE: (Side mount) Depending on the vehicle, you may need to access the inside of the body panel either through the tail light assembly or by removing the trunk liner.

NOTE: If it is impossible to access the inside of the body panel, consider using rivet nuts (not provided).



- 3 Attach the camera housing to the camera base and secure the housing by tightening the set screws with the provided Allen wrench.

NOTE: You will have to loosen the set screws later to align the camera.

- 4 Replace any tail light assemblies or trunk liners that were removed for the installation.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Connecting a wheel imaging camera on a SharpX system

To check whether a parked vehicle has moved through the use of digital tire chalking, you can connect a wheel imaging camera to the LPR Processing Unit via the Tire/Aux Imaging Adapter Module.

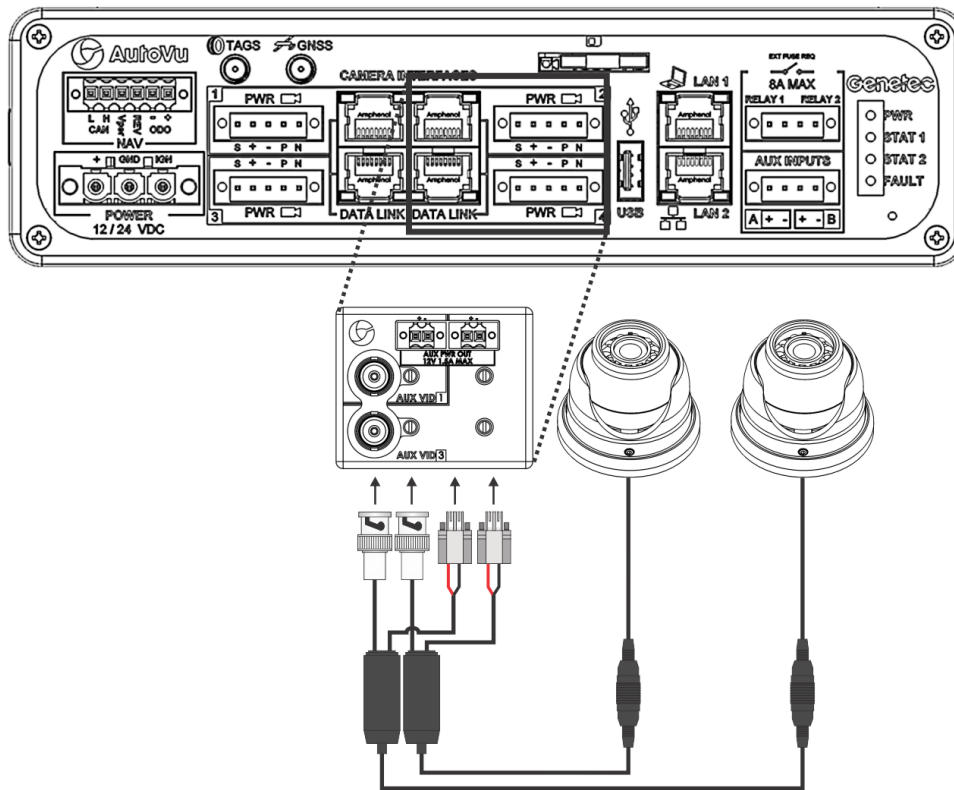
To connect a wheel imaging camera on a SharpX system

- 1 The camera cable extension divides the cable into a separate camera cable and power cable. Terminate the power cable with the 2-pin connector that is included with the Tire/Aux Imaging Adapter Module.

NOTE: If you are adding wheel imaging cameras to an older LPR Processing Unit (X1, X2), connect the camera cable to the AUX VID 1/2 ports, and power the wheel imaging cameras using the AUX PWR OUT 12V 0.5A MAX port.

- 2 Attach the Tire/Aux Imaging Adapter Module to camera ports 2 and 4 of the LPR Processing Unit and tighten the four screws to secure the module.
- 3 Connect the BNC from the wheel imaging camera to the port with corresponding SharpX camera.

NOTE: As indicated on the adapter module, the wheel imaging camera on port 2 will be associated with the on port 1, and the wheel imaging camera on port 4 will be associated with the on port 3.



Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



Aligning a wheel imaging camera

You must align the wheel imaging camera so that the wheel image appears correctly in Patroller.

To align a wheel imaging camera:

- 1 Position the AutoVu vehicle beside a “target” vehicle so that it is at the expected distance for tire imaging (between 1.2 - 1.8 meters / 4 - 6 feet).
- 2 Acquire the live feed from the wheel imaging camera. For more information on using the live feed, refer to the *Sharp Administrator Guide*.
- 3 Using the provided Allen wrench, loosen the set screws on the camera housing.
- 4 There is an “Up” sticker on the camera ball which shows the camera’s vertical orientation. Rotate the camera ball so that the “Up” sticker is at the top.
- 5 In the live feed, confirm that the horizon is not tilted in the image.

- 6 Adjust the wheel imaging camera alignment so that the vehicle's wheel is centered in the live feed image.
- 7 Tighten the set screws to secure the camera.

About AutoVu satellite hardware

If an AutoVu system needs to provide basic satellite positioning, or if more precise odometry information is required in order to georeference license plate reads, you must install a satellite antenna on the Patroller vehicle. The required antenna depends on whether the system includes an LPR Processing Unit with the AutoVu Navigation Option, an external Navigator box, or an external USB GPS.

Satellite hardware configurations

Depending on the LPR Processing Unit you are installing and the requirements of the AutoVu system, the following three satellite hardware configurations are available:

- **LPR Processing Unit with the AutoVu Navigation Option:** If the LPR Processing Unit includes the AutoVu Navigation option, you can connect the satellite antenna directly to the unit. When combined with pulse odometry from a Magneto kit or the vehicle's VSS, the AutoVu system can accurately track the vehicle's route and can georeference license plate reads and track the vehicle's route..

For more information, see [Installing navigation hardware for LPR Processing units that include AutoVu Navigation](#) on page 52.

- **LPR Processing Unit with an external Navigator box:** If you are installing an older version of the LPR Processing Unit, the navigation hardware is not included on the unit. If you require precise odometry to accurately georeference license plate reads, you must install an external Navigator box in the vehicle. When combined with pulse odometry from a Magneto kit or the vehicle's VSS, the AutoVu system can accurately georeference license plate reads and track the vehicle's route.

For more information, see [Installing navigation hardware when using the Navigator box](#) on page 53.

- **LPR Processing unit with an external USB GPS only:** For Patroller vehicles that do not include wheel imaging cameras, if a GPS source is not already available in the vehicle, you can install the basic USB GPS antenna.

For more information, see [Installing navigation hardware when using an external USB GPS](#) on page 53.

About precise odometry

City parking enforcement often requires the use of wheel imaging cameras. The Patroller vehicle takes photos of parked vehicles' wheels, and multiple passes can determine if the vehicle has moved even a small distance. Wheel imaging replaces the traditional tire chalking.

How precise odometry is obtained

If you are using an LPR Processing Unit with the AutoVu Navigation option or an external Navigator box, the hardware comes with a satellite receiver that obtains satellite positioning information. In addition, the system has an internal gyroscope and receives odometry information from the vehicle (VSS or magneto). This provides greater reliability than satellite positioning alone. For example, if you drive through a long tunnel you will lose the satellite signal, but the AutoVu system still knows how far and how fast you are driving (odometry signal), and if you change direction (gyroscope and accelerometers).

Navigation hardware options

The navigation hardware that is installed with the AutoVu system depends on the installation type as well as the hardware that is included with the order.

Satellite navigation hardware

The required satellite navigation hardware depends on whether the system includes an LPR Processing Unit with the AutoVu Navigation Option or an external Navigator box. Alternatively, if the installation does not include wheel imaging cameras and does not require precise odometry, the system may only use a USB GPS receiver.

Installation type	Required satellite navigation hardware	Connector type	Connection location	Required drivers
LPR Processing Unit with AutoVu Navigation Option	Tallysman TW2410 GPS/GLONASS Antenna	SMA	LPR Processing Unit - GNSS port (front)	None
External Navigator box	Wi-Sys WS3910 GPS Antenna	TNC	Navigator box - GPS Ant port	Install drivers on in-vehicle computer (Patroller installation DVD: Drivers \AutovuNavigator\u-blox GPS Receiver)
Installation does not include wheel imaging cameras (GPS only)	GlobalSat BU-353S4 USB GPS Receiver	USB	In-vehicle computer USB port	Install drivers on in-vehicle computer (obtain drivers from manufacturer's installation CD)

Installing navigation hardware for LPR Processing units that include AutoVu Navigation

If the LPR Processing Unit includes the AutoVu Navigation option, you can connect the satellite antenna directly to the unit. When combined with pulse odometry from a Magneto kit or the vehicle's VSS, the AutoVu system can accurately track the vehicle's route and can georeference license plate reads and track the vehicle's route..

To install navigation hardware for LPR Processing units that include AutoVu Navigation:

- 1 Install Patroller on the in-vehicle computer.
For information about installing Patroller, see the *Patroller Administrator Guide*.
- 2 [Install the satellite navigation hardware.](#)
- 3 [Install the magneto kit](#) or connect to the vehicle's VSS signal.
- 4 [Install wheel imaging cameras](#) (optional).
- 5 [Connect the LPR Processing Unit NAV connection.](#)
- 6 Configure AutoVu Navigation settings in Patroller. For more information, refer to the *Patroller Administrator Guide*.

Installing navigation hardware when using the Navigator box

If you are installing an older version of the LPR Processing Unit, the navigation hardware is not included on the unit. If you require precise odometry to accurately georeference license plate reads, you must install an external Navigator box in the vehicle. When combined with pulse odometry from a Magneto kit or the vehicle's VSS, the AutoVu system can accurately georeference license plate reads and track the vehicle's route.

To install navigation hardware when using the Navigator box:

- 1 Install Patroller on the in-vehicle computer.
For information about installing Patroller, see the *Patroller Administrator Guide*.
- 2 [Install the satellite navigation hardware](#).
- 3 [Install the magneto kit](#) or connect to the vehicle's VSS signal.
- 4 [Install wheel imaging cameras](#) (optional).
- 5 [Install the external Navigator box](#).
- 6 Configure external Navigator box GPS settings in Patroller. For more information, refer to the *Patroller Administrator Guide*.

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Installing navigation hardware when using an external USB GPS

For Patroller vehicles that do not include wheel imaging cameras, if a GPS source is not already available in the vehicle, you can install the basic USB GPS antenna.

To install navigation hardware when using an external USB GPS:

- 1 Install Patroller on the in-vehicle computer.
For information about installing Patroller, see the *Patroller Administrator Guide*.
- 2 [Install the satellite navigation hardware](#).
- 3 Configure Patroller GPS settings for an external USB GPS. For information, see the *Patroller Administrator Guide*.

Installing the satellite navigation hardware for SharpX

To provide satellite coordinates for plate reads, you must install the required satellite navigation hardware.

What you should know

- If the installation includes wheel imaging cameras, you will need to install a satellite navigation antenna. The satellite antenna is connected to either the external Navigator box or the LPR Processing Unit, depending on the hardware you are installing. Both the Navigator box and the LPR Processing unit have a built in GPS receiver that works in conjunction with the antenna, internal gyroscope, and odometer pulses to track the location of the vehicle and captured plate reads.
- For Patroller vehicles that do not include wheel imaging cameras, if a GPS source is not already available in the vehicle, you can install the basic USB GPS antenna.

The following steps apply to all supported receivers and antennas and the general term "satellite hardware" will be used.

To install the satellite hardware:

- 1 Install the satellite hardware on the vehicle's roof.

NOTE: The satellite hardware must have an unobstructed view of the sky. This includes any objects near the hardware (for example, a light bar) that may block the signal coming from satellites near the horizon. In addition, the satellite navigation hardware must not be installed near any other antennas on the vehicle's roof.

- a) Make sure that the vehicle's roof is clean, dry, and free of debris.
- b) Place the magnetized side of the satellite hardware on the vehicle's roof, and consider the following:
 - The satellite hardware must be installed at least 30 cm (12 in.) from any other antennas.
 - The satellite hardware must be installed at least 100 cm (40 in.) from the camera cables.
 - Position the satellite hardware so that it has the largest possible view of the sky. Ensure that objects near the satellite hardware (for example, a light bar) do not block the signal coming from satellites near the horizon.

- c) Create a cable penetration in the vehicle's roof and pass the satellite hardware cable through the hole using an appropriate cable gland. For more information on drilling cable holes, see [Drilling the camera cable holes](#). For information on sealing the cable penetration, see [Sealing the camera holes](#).

- 2 Run the cable to the connection location.

- **Tallysman TW2410 GPS/GLONASS Antenna:** Run the cable to the LPR Processing Unit.
- **Wi-Sys WS3910 GPS Antenna:** Run the cable to the Navigator box.
- **GlobalSat BU-353S4 USB GPS Receiver:** Run the cable to the in-vehicle computer.

IMPORTANT:

- Avoid bending the cable sharply. Try to make all bends with a smooth radius.
- Coil excess cable length, do not bunch the cable as this will affect the performance of the system.

- Use the Genetec supplied USB cable for the installation. Do not substitute the USB cable for another type or length as the USB cable supplied is specifically approved for this application.
- 3 With the satellite hardware installed and the cable secured, connect the satellite hardware to the AutoVu system.

NOTE: The SMA or TNC connection only needs to be finger-tight. Do not use any tools to tighten the connection.

- **Tallysman TW2410 GPS/GLONASS Antenna:** Connects to the GNSS port on the front of the LPR Processing Unit (SMA connector).
- **Wi-Sys WS3910 GPS Antenna:** Connects to the GPS Ant port on the Navigator box (TNC connector).
- **GlobalSat BU-353S4 USB GPS Receiver:** Connects to the in-vehicle computer's USB port.

Example

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.



Related Topics

[Installing the AutoVu Navigation Option on the LPR Processing Unit](#) on page 61

Installing the GPS driver

If you are installing a GlobalSat BU-353S4 USB GPS Receiver or a Wi-Sys WS3910 GPS Antenna, you must install the required drivers on the in-vehicle computer.

Before you begin

- If the in-vehicle computer does not have a CD-ROM drive, you will need to copy all of the CD files to a USB memory stick on a PC with a CD-ROM drive.

What you should know

If the AutoVu system includes wheel imaging cameras that are connected to the LPR Processing unit's NAV port, you do not need to install any drivers.

To install the GlobalSat BU-353S4 driver:

- 1 Turn on the in-vehicle computer and sign in to Windows using an Administrator account.
- 2 Place the installation CD into your CD-ROM drive. Auto-run should detect the CD and bring up the driver installation screen.

NOTE: If auto-run is disabled, navigate to the CD-ROM drive and select *auto.exe*.

- 3 Click **WINDOWS USB Driver** from the main screen.
- 4 Follow the on-screen instruction to complete the installation process.

- When installing the USB GPS, you also need to change the baud rate of the device to 4800. For more information, refer to the Patroller Config Tool instructions in the *Patroller Administrator Guide*.

To install the u-blox driver required to use the Wi-Sys WS3910 GPS antenna:

- Turn on the in-vehicle computer and sign in to Windows using an Administrator account.
- On the Patroller installation DVD, navigate to *Drivers\AutovuNavigator\u-blox GPS Receiver*, and double-click the driver file.
- Follow the on-screen instruction to complete the installation process.

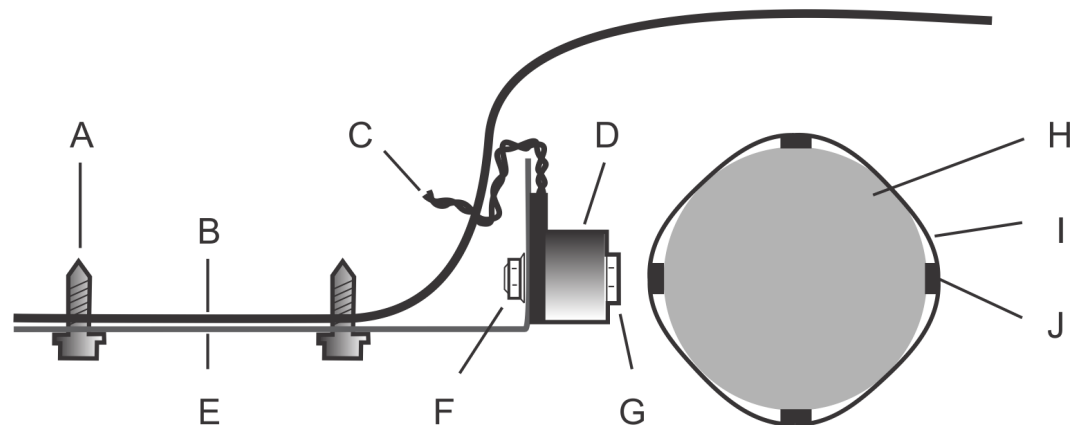
Installing the magneto coil for rear wheel drive vehicles

The magneto coil is the recommended method for providing odometry information to Patroller. You must install a magneto coil for AutoVu installations that include wheel imaging cameras.

What you should know

- In addition to the contents of the magneto coil kit, you will require epoxy to secure the magnets. This step is recommended as tie straps can break over time.
- As an alternative to installing the magneto kit, you can connect to the vehicles VSS signal.

For rear wheel drive vehicles, you must install the magneto coil on the drive shaft, behind the universal joint.



- A:** Tapping screw
- B:** Vehicle floor pan
- C:** Blue and gray wires
- D:** Magneto coil
- E:** Mounting bracket
- F:** Stamped nut
- G:** Bolt
- H:** Drive shaft
- I:** Tie strap
- J:** Magnet

To install the magneto coil for rear wheel drive vehicles:

- 1 Raise and safely support the vehicle so that you can work behind the transmission.

WARNING: Read the following warnings:

- Never get under any vehicle held up by a jack only. Use jack stands or ramps.
- Do not use concrete blocks to support a vehicle.
- Always chock the wheels of the vehicle and set the parking brake. Failure to follow safe jacking procedures will endanger your life.

- 2 Bolt the magneto coil to the mounting bracket (or drive shaft guard) using the supplied 1-1/2" (3.8 cm) bolt and stamped nut. Use silicon or other adhesive to lock the nut on the coil in place. Tighten to 20-30 in-lbs torque. If you have to setup your own bracketing to hold the sensor, use anti-corrosion material (preferably stainless steel brackets and screws).

IMPORTANT: Read the following important notices:

- Too much torque will damage the magneto coil.
- The wire end of the coil should be against the mounting bracket.

- 3 Find a location to mount the bracket so that the coil will be no closer than 6" (15 cm) from the converter and no farther than 12" (30 cm) from the universal joint. The distance between the coil bolt head and the magnet that will be attached to the drive shaft will need to be no more than 1/4" (0.6 cm).

TIP: Installing the magneto coil before the CV joint and close to the output of the transmission is ideal because this location is less prone to movement.

- 4 Bend the bracket as needed to make the pick-up coil point at a spot on the middle of the drive shaft, and mark that spot for magnet location.
- 5 While holding the bracket in that position, mark the floor pan through two of the bracket holes. Use holes that are as far apart as possible. Also mark the magnet position on the drive shaft.
- 6 Cut out the space between two holes on the mounting bracket to create a slot. This will help to adjust the space between the bracket and the magnets
- 7 Fold the carpet out of the way to make sure that it is not damaged when drilling through the floor pan.
- 8 Drill or punch two 3/16" (0.48 cm) holes in the floor pan.
- 9 Fasten the bracket to the floor pan with the two 1/4" x 3/4" (0.64 x 1.9 cm) tapping screws.
- 10 Place the four magnets on the spot you marked on the drive shaft. The magnets should be spaced evenly every 90 degrees and the flat side of the magnet should be in contact with the drive shaft.

IMPORTANT: Use all four magnets. Do not reduce the number of magnets.

- 11 Secure the magnets using epoxy and the tie strap. Make sure that the magnets are rotated so that the tie strap sits between the raised ribs of the magnet.
- 12 Tighten the tie strap by placing the blade of a screwdriver against tie strap lock and use pliers to pull on strap end. Use about 15 pounds (7 kg) of force to tighten the strap. Cut excess strap flush and ensure that the tie strap lock will not contact the coil sensor. Ensure that the magnets are solidly attached and will not move.
- 13 Re-check that the gap between the coil bolt and the magnet does not exceed 1/4" (0.64 cm).

14 Cut off the provided twisted pair wiring 6 inches from coil and splice a 2-conductor twisted pair shielded cable with drain wire (24-20 AWG). Keep the wires tightly twisted to reduce induced noise from the vehicle.

IMPORTANT: All the connection points need to be carefully soldered and protected from the elements.

15 Drill a hole through the floor pan to pass the cable and insert a cable gland to protect the cable.

16 Run the cable to the LPR Processing Unit or the external Navigator box (if equipped) using a wire loom to protect the wires.

CAUTION: Be sure wires are routed away from exhaust pipes, shift rods, or any other hot or moving parts.

17 Connect the cable wires to the -ODO and +ODO connections (polarity not important) on the external Navigator box, or to the NAV port of the LPR Processing Unit, depending on the hardware you are installing.

The wires must remain twisted for noise immunity.

The magneto coil is now installed. You can lower the vehicle.

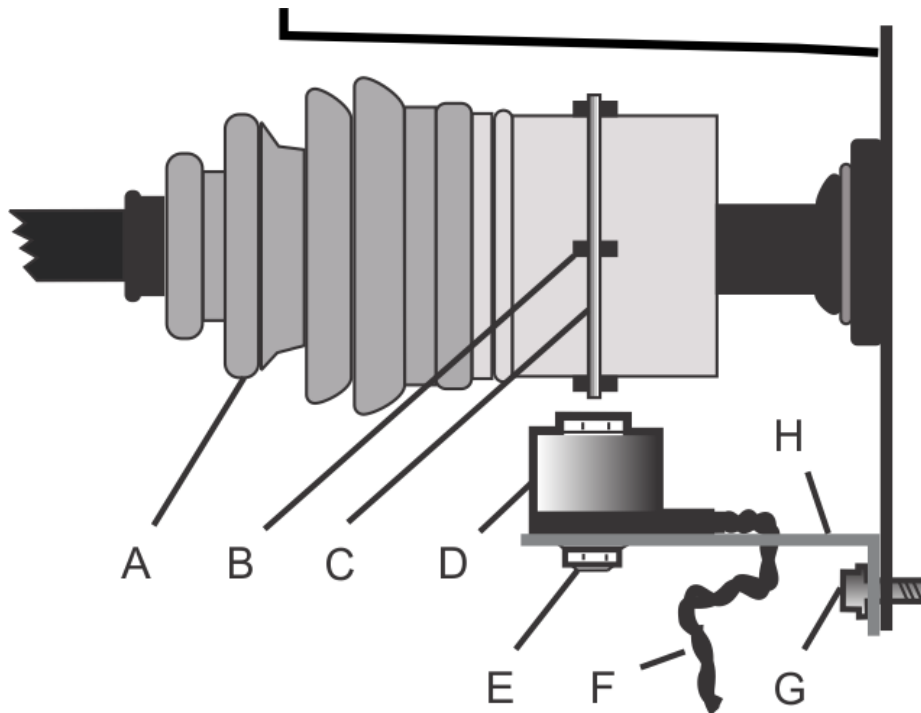
Installing the magneto coil for front wheel drive vehicles

The magneto coil is the recommended method for providing odometry information to Patroller. You must install a magneto coil for AutoVu installations that include wheel imaging cameras.

What you should know

- In addition to the contents of the magneto coil kit, you will require epoxy to secure the magnets. This step is recommended as tie straps can break over time.
- As an alternative to installing the magneto kit, you can connect to the vehicles VSS signal.

For front wheel drive vehicles, you must install the magneto coil in front of the CV joint.



- **A:** CV joint
- **B:** Magnet
- **C:** Tie strap
- **D:** Magneto coil
- **E:** Stamped nut
- **F:** Blue and gray wires
- **G:** Transmission housing bolt
- **H:** Mounting bracket

To install the magneto coil for rear wheel drive vehicles:

- 1 Raise and safely support the vehicle so that you can work behind the front axle.

WARNING: Read the following warnings:

- Never get under any vehicle held up by a jack only. Use jack stands or ramps.
- Do not use concrete blocks to support a vehicle.
- Always chock the wheels of the vehicle and set the parking brake. Failure to follow safe jacking procedures will endanger your life.

- 2 Bolt the magneto coil to the mounting bracket (or drive shaft guard) using the supplied 1-1/2" (3.8 cm) bolt and stamped nut. Use silicon or other adhesive to lock the nut on the coil in place. Tighten to 20-30 in-lbs torque.

IMPORTANT: Read the following important notices:

- Too much torque will damage the magneto coil.
- The wire end of the coil should be against the mounting bracket.

- 3 Find the best location to install the magneto coil. The distance between the coil bolt head and the magnet that will be attached to the axle housing will need to be no more than 1/4" (0.64 cm).

Magnets will need to be installed in front of the CV joint (covered by a rubber boot). Choose a transmissions housing bolt (or a nearby member that can be drilled) for mounting the pick-up coil bracket.

- 4 Bend and modify the bracket as needed to make the pick-up coil point at a spot on the middle of the axel housing.
- 5 While holding the bracket in that position, mark the magnet position on the axle housing.
- 6 Cut out the space between two holes on the mounting bracket to create a slot. This will help to adjust the space between the bracket and the magnets
- 7 Mount the coil bracket in the chosen position.
 - If a cross member is used, drill 3/16" (0.48 cm) holes and attach with 1/4" (0.64 cm) tapping screws.
 - If a transmission bolt is used, drill the bracket as required and tighten the bolt to 25 ft-lbs torque. Bend the bracket over the edge of the case to prevent turning.
- 8 Place the four magnets on the spot you marked on the drive shaft. The magnets should be spaced evenly every 90 degrees and the flat side of the magnet should be in contact with the axle housing.

IMPORTANT: Use all four magnets. Do not reduce the number of magnets.

- 9 Secure the magnets using epoxy and the tie strap. Make sure that the magnets are rotated so that the tie strap sits between the raised ribs of the magnet.
- 10 Tighten the tie strap by placing the blade of a screwdriver against tie strap lock and use pliers to pull on strap end. Use about 15 pounds (7 kg) of force to tighten the strap. Cut excess strap flush and ensure that the tie strap lock will not contact the coil sensor. Ensure that the magnets are solidly attached and will not move.
- 11 Re-check that the gap between the coil bolt and the magnet does not exceed 1/4" (0.64 cm).
- 12 Cut off the provided twisted pair wiring 6 inches from coil and splice a 2-conductor twisted pair shielded cable with drain wire (24-20 AWG). Keep the wires tightly twisted to reduce induced noise from the vehicle.

IMPORTANT: All the connection points need to be carefully soldered and protected from the elements.

- 13 Drill a hole through the floor pan to pass the cable and insert a cable gland to protect the cable.
- 14 Run the cable to the LPR Processing Unit or the external Navigator box (if equipped) using a wire loom to protect the wires.

CAUTION: Be sure wires are routed away from exhaust pipes, shift rods. or any other hot or moving parts.

- 15 Connect the cable wires to the -ODO and +ODO connections (polarity not important) on the external Navigator box, or to the NAV port of the LPR Processing Unit, depending on the hardware you are installing.

The wires must remain twisted for noise immunity.

The magneto coil is now installed. You can lower the vehicle.

Installing the AutoVu Navigation Option on the LPR Processing Unit

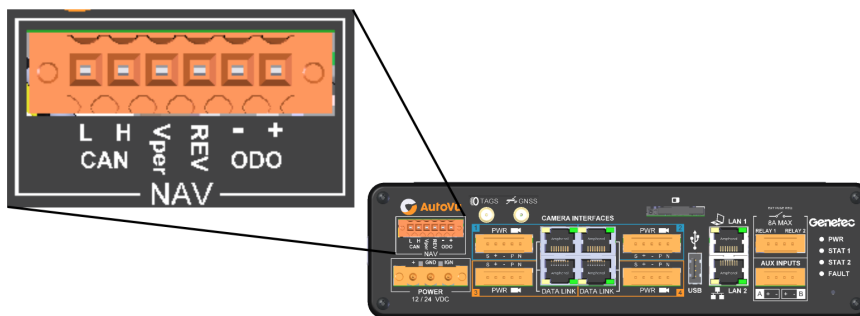
To provide Patroller with more reliable geographic coordinates than a standard GPS device, you can connect the vehicle's odometry to an LPR Processing Unit that includes the AutoVu Navigation Option. Note that if the LPR Processing unit does not include the AutoVu Navigation Option, you must install the external Navigator box to provide precise coordinates.

Before you begin

- Wires to connect the LPR Processing Unit to the vehicle's odometry signal, reverse signal, and for the Vper connection are not included. You will need the following:
 - Vper: 16 AWG stranded conductor copper wire
 - REV: 24 AWG to 16 AWG stranded conductor copper wire
 - ODO: 24 AWG to 16 AWG shielded, twisted pair (from VSS or Magneto)

To install the Navigator option:

- Connect the vehicle's odometry signal, reverse signal, and Vper to the LPR Processing Unit as follows:



- CAN L and CAN H:** Not supported. Do not connect.
- Vper (optional):** The LPR Processing Unit includes an internal coin battery that maintains the time and almanac memory of the GNSS receiver when the LPR Processing Unit is powered off. The battery has an expected life of 5 years. Adding permanent 12V power to the Vper port of the LPR Processing Unit greatly extends the battery life. Use an insulation displacement connector (IDC) to connect a 16 AWG wire from the Vper port to the permanent 12V (+) power input.

NOTE:

- If the coin battery is drained, the time required for the AutoVu Navigation system to get a position fix at startup increases from 5 seconds to about 2 minutes.
- The Vper port draws a very small current (a few microamperes).
- REV:** Reverse input. Connect to vehicle's reverse signal (required for inertial navigation). You can tap into the vehicle's reverse lights to get this signal.

NOTE: The Reverse input supports active low/ground and active high/battery polarities.

- ODO and + ODO:** Pulse odometry. Connect the signal from the Magneto coil or VSS.

Related Topics

[Installing the satellite navigation hardware for SharpX on page 54](#)

Installing the external Navigator box

To provide Patroller with more accurate geographic coordinates than a standard GPS device, you can install the external Navigator box along with the other AutoVu components. Note that if the LPR Processing Unit includes the AutoVu Navigation Option, you do not need to install the external Navigator box to provide precise coordinates.

Before you begin

- Wires to connect the Navigator box to the vehicle's odometry, reverse, and ignition signals are not included. You will need the following:
 - ODO: 24 AWG to 16 AWG shielded, twisted pair (from VSS or Magneto)
 - REV: 24 AWG to 16 AWG stranded conductor copper wire
 - IGN : 24 AWG to 16 AWG stranded conductor copper wire
- Make sure the you have a flat, level surface to install the Navigator box on.

IMPORTANT: The Navigator box must be installed with the mounting ears down. It cannot be mounted upside down (ears up) or on its side.

- Do not install the Navigator box where it will be in direct sunlight for an extended period of time.
- The connectors use tension clamps similar to the LPR Processing Unit connectors. Make sure you know how to use the [tension clamps](#).

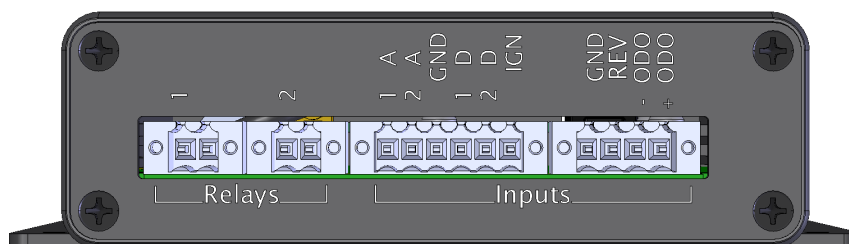
What you should know

- The Navigator box is a hardware component that interfaces to the vehicles odometer, backup lamps and ignition signal. It also incorporates a GPS receiver and gyroscope for tracking the vehicles position and location.
- As the vehicle moves, the Navigator box monitors the distance traveled by counting the odometer pulses, and tracks its location using the GPS receiver. The built in gyroscope tracks the vehicles location in case the vehicle enters a tunnel or parking garage which will block the satellite signal.
- The Navigator box must be secure and protected from other equipment or moving parts. For example, if you install it in the trunk, you should place it in an enclosure or elevated tray to protect it from being damaged by other items in the trunk, or from water that may leak into the trunk floor.

To install the Navigator box:

- 1 Connect the cables and wires at the rear of the Navigator box to your vehicle's power, ignition, and reverse signals as follows:

CAUTION: Do not connect the Navigator box directly to the vehicle's battery. It should only receive power when your vehicle's engine is running.



- **Relays 1 and 2:** Not supported. Do not connect.

- **Inputs 1A and 2A:** Not supported. Do not connect.
- **GND:** Grounding.
- **Inputs 1D and 2D:** Not supported. Do not connect.
- **IGN:** Ignition input. State of the vehicle's power system.
- **GND:** Grounding.
- **REV:** Reverse input. Connect to vehicle's reverse signal (required for inertial navigation). You can tap into the vehicle's reverse lights to get this signal.
- **- ODO and + ODO:** Pulse odometry. Connect the signal from the Magneto coil or VSS.

NOTE:

- To find the location of the vehicle speed sensor (VSS), consult the vehicle's electrical schematic regarding the transmission signals. The schematic will show the location of the vehicle speed sensor (sometimes referred to as the output speed sensor (OSS)).
 - Another location that the vehicle speed signal can be obtained is from the power control module (PCM).
 - Some new model cars, such as hybrids, do not have a output speed sensor and rely on signals from the automatic breaking system sensors (ABS) to calculate the speed and distance a vehicle travels. Do NOT connect to the ABS sensors to obtain a speed signal.
 - If the vehicle does not have a speed sensor, you must install a magneto coil for a [front wheel drive](#) or [rear wheel drive](#).
- 2 On the front of the Navigator box, connect the USB port to the in-vehicle computer's USB port.
- IMPORTANT:** You cannot use a standard USB cable for this connection. Use only the Genetec USB cable (part number: AU-H-USBCBL15).

**Example**

Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.

**After you finish****Related Topics**

[Securing wires using tension clamp connectors](#) on page 31

Guidelines for installing the in-vehicle computer

You must install an in-vehicle computer in order to view the license plate reads that are generated by the AutoVu system.

The laptop's power supply comes with cigarette wiring cabling which should be hard wired to the LPR Processing Unit's auxiliary 8A Max relay. This should be sufficient for one laptop connection. The power supply is already fused; no additional fuse is required.

For instructions on how to install the mount for the in-vehicle computer, refer to your mount manufacturer's documentation.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.

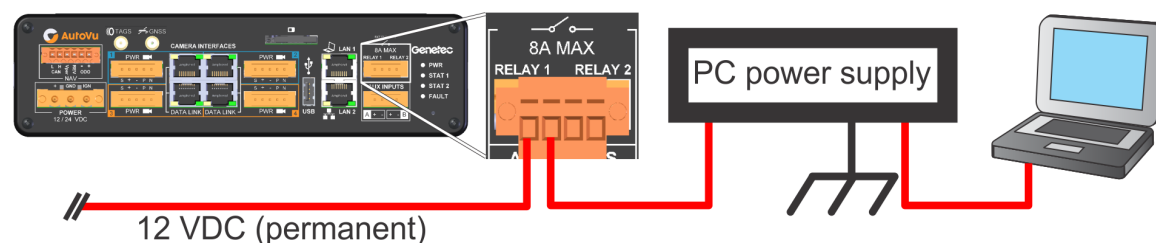


About powering the in-vehicle computer

Use the 8A MAX relay on the LPR Processing Unit to control the power to the in-vehicle computer. This way, the computer will receive power only when the ignition is on.

You must power the in-vehicle computer through the LPR Processing Unit's auxiliary 8A MAX relay. The laptop and the LPR Processing Unit will both react to the vehicle's ignition signal (after a programmable delay). The laptop will then run on its own battery (duration configurable in Windows).

The following diagram shows a typical installation where power for the in-vehicle computer is controlled by the LPR Processing Unit relay:



Alignment scenarios for Sharp and SharpX cameras

There are multiple scenarios for aligning your Sharp and SharpX cameras, depending on your AutoVu deployment type, and the type of vehicle you use for Patroller duty.

The following table lists the most common alignment scenarios. To align your cameras, use the X, Y and D measurements in the following table in conjunction with the [instructions for setting up the tripod](#).

If the provided alignment scenarios do not apply to your installation, contact your Genetec representative for more information.

Type of deployment	Your camera configuration	Car Approximate height: 58.8" or 1.49m	Truck/SUV Approximate height: 68.4" or 1.73m
Law enforcement	Front cameras		
	Left and right cameras		
	<ul style="list-style-type: none"> Sharp/SharpX XGA (16mm) 	<ul style="list-style-type: none"> X = 73" (1.86m) Y = 130" (3.30m) D = 149" (3.79m) 	<ul style="list-style-type: none"> X = 87.5" (2.22m) Y = 161.5" (4.11m) D = 183.5" (4.67m)
	Left and right cameras		
	<ul style="list-style-type: none"> Sharp/SharpX VGA (16mm) 	<ul style="list-style-type: none"> X = 68.5" (1.74m) Y = 126.5" (3.21m) D = 144" (3.66m) 	<ul style="list-style-type: none"> X = 79" (2.00m) Y = 140" (3.56m) D = 160.5" (4.08m)
	Rear cameras		
Left and right cameras			
<ul style="list-style-type: none"> Sharp/SharpX VGA (12mm) 	<ul style="list-style-type: none"> X = 71.5" (1.81m) Y = 62.5" (1.59m) D = 95" (2.41m) 	<ul style="list-style-type: none"> X = 80" (2.03m) Y = 68.5" (1.74m) D = 105.5" (2.67m) 	
On-street Parking (city streets)	Front cameras only (no rear cameras in this configuration)		
	Left and right cameras		
<ul style="list-style-type: none"> Sharp/SharpX XGA (12mm) 	<ul style="list-style-type: none"> X = 68.5" (1.74m) Y = 74.5" (1.90m) D = 101" (2.57m) 	<ul style="list-style-type: none"> X = 80.5" (2.04m) Y = 87" (2.21m) D = 118.5" (3.01m) 	

Type of deployment	Your camera configuration	Car Approximate height: 58.8" or 1.49m	Truck/SUV Approximate height: 68.4" or 1.73m
Off-street Parking (parking lots)	Wide row lots (two-way traffic) Patroller tendency to drive closer to the right (for right-hand traffic flow)		
	Left camera <ul style="list-style-type: none"> • Sharp/SharpX XGA (12mm) 	<ul style="list-style-type: none"> • X = 69" (1.76m) • Y = 69" (1.76m) • D = 98" (2.49m) 	<ul style="list-style-type: none"> • X = 81.5" (2.07m) • Y = 81.5" (2.07m) • D = 115" (2.93m)
	Right camera <ul style="list-style-type: none"> • Sharp/SharpX XGA (12mm) 	<ul style="list-style-type: none"> • X = 62.5" (1.58m) • Y = 62.5" (1.58m) • D = 88" (2.24m) 	<ul style="list-style-type: none"> • X = 71.5" (1.81m) • Y = 71.5" (1.81m) • D = 101" (2.56m)

Related Topics

[Field of view specifications for SharpX camera lenses](#) on page 83

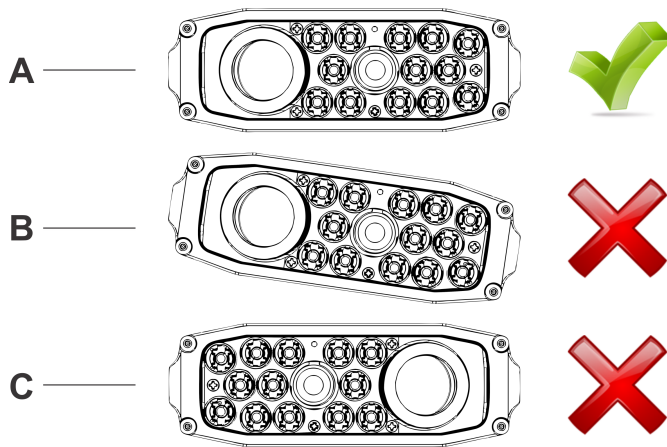
Overview of aligning SharpX cameras

To ensure that your SharpX camera reads plates accurately, you must properly align it for your specific deployment type.

Before you begin

Do the following:

- Determine which [alignment scenario](#) applies to your situation.
- Make sure you have a SharpX Alignment Kit (AU-K-ALIGNKIT), with the following tools: tape measure, plumb-bob weight, chalk, and a vertically adjustable target.
- [Install and secure the SharpX](#).
- Make sure the camera is installed so that the camera roll is parallel to the ground:



A	Level to ground (lens on the left).
B	Not level to ground (body roll).
C	Upside down (lens on the right).

- Have a laptop available to connect to the Sharp Portal, which displays the camera video feed that you will use to validate alignment.

To align the SharpX:

- 1 [Set up the tripod](#).
- 2 [Attach the target to the tripod](#).
- 3 [Align the SharpX with the target](#).

NOTE: Do not tighten the securing screws for the pan/tilt. You will need to fine-tune the pan/tilt angles to properly align the camera.

Setting up the tripod

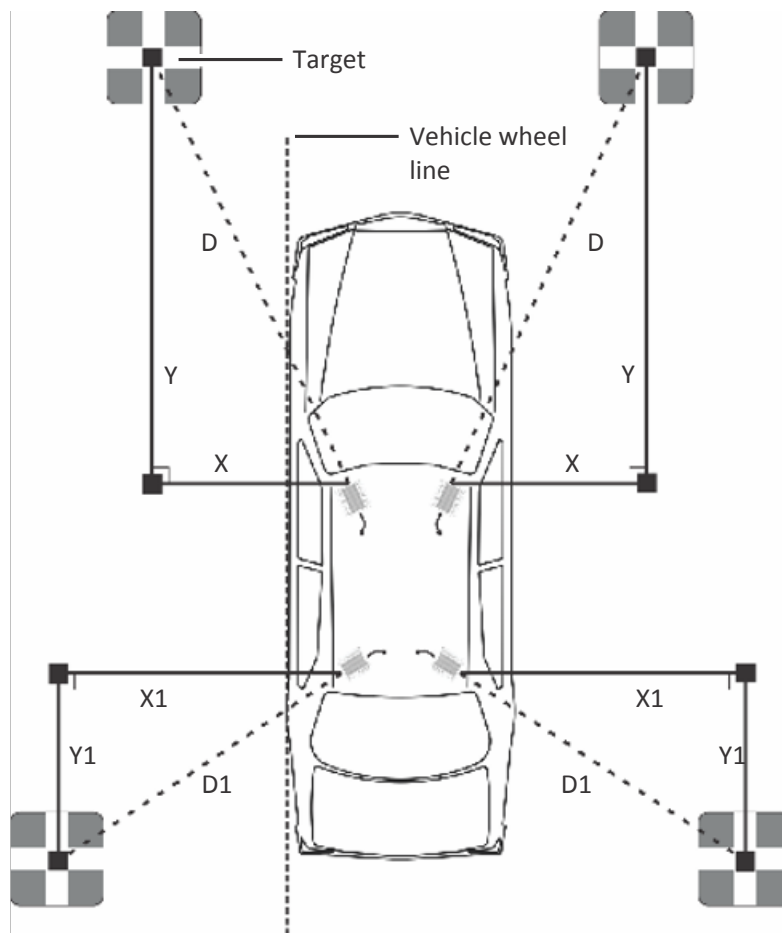
When aligning your camera, you must determine where to set up the tripod that holds the alignment target.

Before you begin

Use the [alignment scenarios](#) to find the X, Y, and D values that apply to your situation.

What you should know

Use the following illustration to help you measure X, Y, and D relative to your vehicle:



TIP: Using the vehicle's wheels (Vehicle wheel line) as a reference can help you ensure the X and Y measurements are perpendicular and parallel as required.

NOTE: The values X, Y, and D refer to alignment distances only, not your camera's plate reading distances.

To set up the tripod:

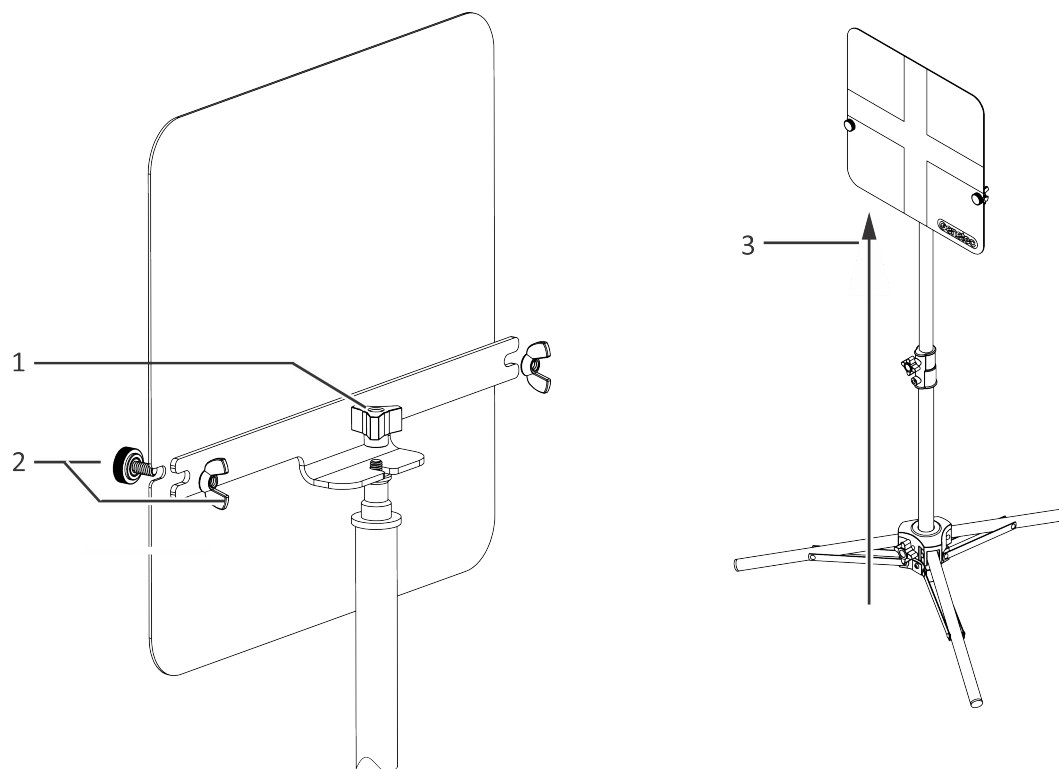
- 1 Secure the end of the measuring tape to the camera using one of the hook and loop clips.

- 2 From the height of the camera lens, measure the X distance.
Measure parallel to the ground and perpendicular to the vehicle's wheel line. Use the plumb-bob weight and chalk to mark the ground where X falls.
- 3 From the X point you marked on the ground, measure the Y distance.
Measure on the ground, and parallel to the vehicle wheel line. Use the chalk to mark Y on the ground.
- 4 To validate D, measure the D distance from the height of the camera lens.
Measure parallel to the ground. Use the provided plumb-bob weight to see where D falls on the ground. If you are more than three inches off from the Y point, you will need to re-measure X and Y.
- 5 Set up the tripod on the Y point you marked, raise the target so that its center is 36 in. (0.9 m) from the ground, and orient the target so it's facing the camera.

Attaching the target to the tripod

After you determine where to set up the tripod, you must attach the target to it, and raise it to the proper height for camera alignment.

To attach the target, refer to the illustration below and the steps that follow:



- 1 Attach the three-arm knob to the tripod base using the provided wing nut.
- 2 Attach the plastic thumb-head screw to the wing nut (both sides).
- 3 Raise the tripod to its full length. The center of the target should be 36 in. (0.9 m) from the ground.

Aligning the SharpX with the target

After you set up and properly position the tripod, use the live feed in the Sharp Portal (advanced mode) to align the camera with the target.

What you should know

If the system includes an X2S LPR Processing Unit, you will need to open a separate Sharp Portal for each of the SBCs. For more information, see [Sharp Portal](#) instructions.

To align the camera with the target:

1 [Log on to the Sharp Portal.](#)

After entering the password and selecting your language, press Ctrl + Enter to log on in *Advanced mode*, which gives you access to additional settings not found in regular mode.

2 In the **Live Feed** tab, select the *LPR Camera* feed in the **Camera selection** drop-down list.

Because you logged on in *Advanced mode*, crosshairs are displayed on the LPR camera feed.

3 Adjust the pan/tilt angles of the camera as needed to align the crosshairs with the target.

The camera is aligned.

After you finish

Repeat the procedure for your other cameras, as needed.

Sealing the camera cable holes

To ensure a watertight installation, you must seal all camera cable holes drilled in the body of the vehicle. Because one of the camera cable holes will also be used for running the cable for the satellite navigation hardware, you must wait until all hardware is installed before you seal the holes.

Before you begin

- Install the cameras on the vehicle and test their operation.
- Install the satellite navigation hardware and pass the cable through the hole drilled for the camera cable.

To seal the camera cable holes:

- 1 Clean the area around the camera cable hole using isopropyl alcohol or rubbing alcohol.
- 2 When the area is dry, use about a 8 cm (3 in.) section of butyl tape to wrap the cable and the area around the base of the cable gland.
- 3 Press the butyl tape into place to ensure a tight seal.

Example



Watch this video to learn more. Click the **Captions** icon (**CC**) to turn on video captions in one of the available languages.

Completing the SharpX mobile installation

Before you replace the body liners and other paneling in the vehicle, ensure that the installation does not affect the vehicle's operation or mandated safety functions or circuits.

What you should know

For software installation and configuration instructions, refer to the *Sharp Administrator Guide* and *Patroller Administrator Guide*.

To complete the installation:

- 1 Test the system to ensure that the hardware is functional and the wiring is correct and solid.
- 2 Test network communication.
- 3 Test the following vehicle functions:
 - GPS signal
 - Odometry
 - Reverse signal
 - Ignition

After you finish

When the AutoVu installation is finished, include the following information in the field report that is submitted to Genetec:

- Power connection locations
- Signal connection locations (ignition, odometer, GPS, etc.)
- Diagram the how the wires are routed in the vehicle
- IP addresses of all installed equipment
- Serial number and part numbers of all installed equipment
- Point of contact information for the customer:
 - Name
 - Title
 - Phone number and/or email
- A read report to evaluate the performance.

Troubleshooting for SharpX mobile installation

This section includes the following topics:

- ["System status LEDs on the LPR Processing Unit"](#) on page 74
- ["Camera data-link status LEDs on the LPR Processing Unit"](#) on page 77
- ["LED statuses on the SharpX camera unit"](#) on page 78
- ["Troubleshooting SharpX network communication and Patroller ports"](#) on page 80

System status LEDs on the LPR Processing Unit

The LPR Processing Unit displays system status LEDs.

The following table describes how the LEDs behave in response to the SharpX system’s status. The headings PWR, STAT 1, STAT 2, AND FAULT correspond to the LEDs on the LPR Processing Unit.

State	Description	PWR	STAT 1	STAT 2	FAULT
Off	Unit powered off	Off	Off	Off	Off
Reflash	The unit has failed an integrity test on the contents of the control board flash memory. It is waiting for a reflash to be performed over the network.	On	On	Off	Off
POST	Power-on self-test. All LEDs flash in sequence and then together for approximately three seconds at power-up, if the control board flash memory has passed validation.	See description	See description	See description	See description
Get DHCP	The unit is waiting for a DHCP lease over the network (it is configured in “external DHCP mode”).	On	5 quick flashes then pause, every 3 seconds	Off	Off
Thermal Shutdown	The internal temperature is outside the operational limits. Power is no longer supplied to most components. No Ethernet network connectivity is possible.	Toggles once per second	Off	Off	Toggles once per second
Power Fault	A fault was detected on the main power source.	Toggles once per second	Off	Off	On

State	Description	PWR	STAT 1	STAT 2	FAULT
Ethernet Fault	Could not configure an internal Ethernet switch.	On	Off	Off	Blinks on every three seconds
Firmware Fault	A critical fault was detected in the control board microcontroller.	On	Off	Off	On
SBC 1 On-line	First SBC is operational.	On	Blinks off every three seconds	N/A	Off
SBC 1 Off-line	First SBC is not operational.	On	Blinks on every three seconds	N/A	Off
SBC 2 On-line	Second SBC is operational.	On	N/A	Blinks off every three seconds	Off
SBC 2 Off-line	Second SBC is not operational.	On	N/A	Blinks on every three seconds	Off
Ignition Cut	The ignition was cut. Unit is in a preshutdown grace period (default 10 seconds). If ignition is restored within this period, the shutdown is cancelled.	Blinks off every three seconds	Off	Off	Off
Platereader/SBC shutdown	The unit will shutdown shortly (default 20 seconds) in response to an external event.	Toggles once per second	Off	Off	Off
Firmware update request	The LPR Processing Unit firmware update is beginning shortly. The unit will restart after completion (5 minutes max).	On	On	Off	Blinks three times then off

State	Description	PWR	STAT 1	STAT 2	FAULT
Ongoing Firmware Update	The LPR Processing Unit is being updated and it will reset after completion (normally 10~20 seconds, max 5 min).	On	Fast blinking	Off	Off
IPConfig Factory Reset	Immediately after power up with the config reset button pressed, the IP configuration is reset to factory values. All LEDs flash 5 times in one second.	See description	See description	See description	See description

Camera data-link status LEDs on the LPR Processing Unit

The LPR Processing Unit displays data-link status LEDs.

The following table describes how the Data-Link LEDs behave in response to the SharpX system's status.

State	Description	Data (amber)	Link (green)
Data idle	No Ethernet data is being received/ transmitted between the camera and the trunk unit.	Off	N/A
Data transmit	Ethernet data is being received/ transmitted between the camera and the trunk unit.	Blink	N/A
Not registered	The camera is not registered with the trunk unit yet. It may take up to 30 seconds for a camera to be registered.	N/A	Off
Registered	The camera is registered with the trunk unit, and can exchange control messages with the LPR engine.	N/A	On

LED statuses on the SharpX camera unit

The LED on the SharpX camera unit responds differently, depending on the status of the system.

The following table describes how the SharpX camera unit's LED behaves in response to the SharpX system's status:

State	Description	LED (red/green)
Off	Unit is powered off	Off
Reflash	The unit has failed an integrity test on the contents of the control board flash memory. It waits for a reflash to be performed over the network.	Green (steady)
Get DHCP	The unit is waiting for a DHCP lease over the network (either from the LPR Processing Unit or an external server, depending on configuration).	Blinks green rapidly (e.g. twice per second).
Normal	The camera is running normally.	Flashes green briefly every second.
Covert	The camera is configured in covert mode. It will still blink green a couple of times at power-up.	Off
Thermal Shutdown	The internal temperature is outside the operational limits. Power is no longer supplied to most components. No Ethernet network connectivity is possible.	Red blink every second.
Illuminator Fault	An abnormal condition was detected with the illumination. Depending on the fault, the unit may run in degraded mode (some LEDs shut off), or the illuminator may be completely disabled.	Blinks red rapidly (e.g. twice per second).
Firmware Fault	A critical fault was detected in the control board microcontroller.	Red (steady)

State	Description	LED (red/green)
Firmware update request	The camera unit firmware update is beginning shortly. The unit will restart after completion (five minutes max).	Green steady On Toggles Red three times
Ongoing Firmware Update	The camera unit is being updated and it will reset after completion (normally 10~20 seconds, max 5 min).	Blinks green rapidly (e.g., 10 per second)

Troubleshooting SharpX network communication and Patroller ports

If the unit fails to communicate with the server, you can troubleshoot the issue.

What you should know

Starting with Security Center 5.2, the SharpX can be configured using the "Security Center - Auto" extension. For more information, refer to the *Sharp Administrator Guide*.

To troubleshoot the network communication:

- Check the IP settings (address, subnet, gateway).
- Ensure that you can ping the SharpX from the Patroller's laptop/workstation.

To troubleshoot Patroller ports:

- Consult the *Patroller Administrator Guide* for a complete list of ports. Patroller's InstallShield takes care of opening the required firewall ports.

Appendices

Additional resources

This section includes the following topics:

- ["Camera lenses"](#) on page 82
- ["Network settings"](#) on page 86
- ["Restarting SharpX cameras"](#) on page 88
- ["Sharp and SharpX CAT5E cables"](#) on page 90
- ["Sharp portal"](#) on page 96
- ["Hardware compliance"](#) on page 98



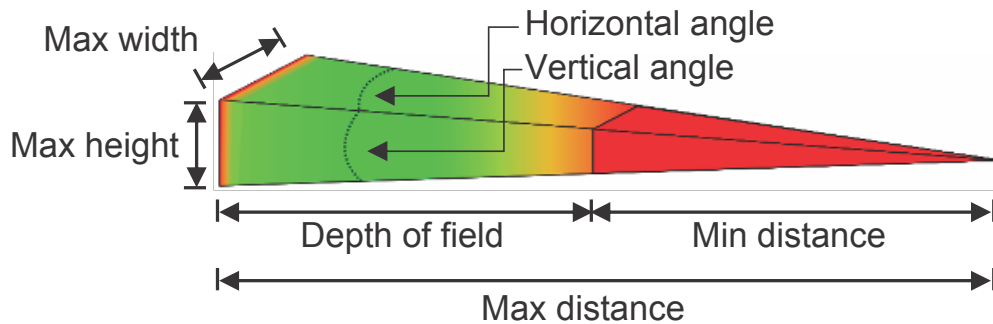
Camera lenses

This section includes the following topics:

- ["Field of view specifications for SharpX camera lenses"](#) on page 83

Field of view specifications for SharpX camera lenses

Each of the lens options for SharpX cameras have different field of view specifications.



Field of view specifications for SharpX VGA camera lenses

To capture license plate reads, a camera with a VGA camera lens uses a progressive scan sensor with 640 x 480 resolution.

Lens type	Horizontal angle	Vertical angle	Max width	Max height	Min distance	Max distance	Depth of field
50 mm	4.40°	3.30°	5.6 ft (1.7 m)	4.2 ft (1.3 m)	30.4 ft (9.3 m)	72.9 ft (22.2 m)	42.6 ft (13.0 m)
35 mm	6.28°	4.71°	5.6 ft (1.7 m)	4.2 ft (1.3 m)	21.3 ft (6.5 m)	51.1 ft (15.6 m)	29.8 ft (9.1 m)
25 mm	8.79°	6.60°	5.6 ft (1.7 m)	4.2 ft (1.3 m)	15.2 ft (4.6 m)	36.5 ft (11.1 m)	21.3 ft (6.5 m)
16 mm	13.69°	10.29°	5.7 ft (1.7 m)	4.2 ft (1.3 m)	9.7 ft (3.0 m)	23.3 ft (7.1 m)	13.6 ft (4.1 m)
12 mm	18.19°	13.69°	5.8 ft (1.8 m)	4.3 ft (1.3 m)	7.3 ft (2.2 m)	17.5 ft (5.3 m)	10.2 ft (3.1 m)
8 mm	27.0°	20.4°	5.9 ft (1.8 m)	4.3 ft (1.3 m)	4.9 ft (1.5 m)	11.7 ft (3.6 m)	6.8 ft (2.1 m)

Field of view specifications for SharpX XGA (Standard) camera lenses

To capture license plate reads, a SharpX with XGA (Standard mode) camera lens uses a progressive scan sensor with 1024 x 768 resolution.

Lens type	Horizontal angle	Vertical angle	Max width	Max height	Min distance	Max distance	Depth of field
50 mm	4.40°	3.30°	9.0 ft (2.7 m)	6.7 ft (2.0 m)	48.6 ft (14.8 m)	116.7 ft (35.6 m)	68.1 ft (20.8 m)
35 mm	6.28°	4.71°	9.0 ft (2.7 m)	6.7 ft (2.0 m)	34.0 ft (10.4 m)	81.7 ft (24.9 m)	47.7 ft (14.5 m)
25 mm	8.79°	6.60°	9.0 ft (2.7 m)	6.7 ft (2.0 m)	24.3 ft (7.4 m)	58.4 ft (17.8 m)	34.0 ft (10.4 m)
16 mm	13.69°	10.29°	9.1 ft (2.8 m)	6.8 ft (2.1 m)	15.6 ft (4.8 m)	37.4 ft (11.4 m)	21.8 ft (6.6 m)
12 mm	18.19°	13.69°	9.2 ft (2.8 m)	6.8 ft (2.1 m)	11.7 ft (3.6 m)	28.0 ft (8.5 m)	16.3 ft (5.0 m)

Field of view specifications for SharpX XGA (Tall) camera lenses

To capture license plate reads, a SharpX with XGA (Tall mode) camera lens uses a progressive scan sensor with 1024 x 946 resolution.

Lens type	Horizontal angle	Vertical angle	Max width	Max height	Min distance	Max distance	Depth of field
50 mm	4.40	4.07°	9.0 ft (2.7 m)	8.3 ft (2.5 m)	48.6 ft (14.8 m)	116.7 ft (35.6 m)	68.1 ft (20.8 m)
35 mm	6.28°	5.81°	9.0 ft (2.7 m)	8.3 ft (2.5 m)	34.0 ft (10.4 m)	81.7 ft (24.9 m)	47.7 ft (14.5 m)
25 mm	8.79°	8.12°	9.0 ft (2.7 m)	8.3 ft (2.5 m)	24.3 ft (7.4 m)	58.4 ft (17.8 m)	34.0 ft (10.4 m)
16 mm	13.69°	12.66°	9.1 ft (2.8 m)	8.4 ft (2.6 m)	15.6 ft (4.8 m)	37.4 ft (11.4 m)	21.8 ft (6.6 m)

Lens type	Horizontal angle	Vertical angle	Max width	Max height	Min distance	Max distance	Depth of field
12 mm	18.19°	16.82°	9.2 ft (2.8 m)	8.5 ft (2.6 m)	11.7 ft (3.6 m)	28.0 ft (8.5 m)	16.3 ft (5.0 m)
8 mm	27.01°	25.02°	9.5 ft (2.9 m)	8.7 ft (2.7 m)	7.8 ft (2.4 m)	18.7 ft (5.7 m)	10.9 ft (3.3 m)

Field of view specifications for SharpX XGA (Wide) camera lenses

To capture license plate reads, a SharpX with XGA (Wide mode) camera lens uses a progressive scan sensor with 1280 x 808 resolution.

Lens type	Horizontal angle	Vertical angle	Max width	Max height	Min distance	Max distance	Depth of field
50 mm	5.50°	3.47°	11.2 ft (3.4 m)	7.1 ft (2.2 m)	48.6 ft (14.8 m)	116.7 ft (35.6 m)	68.1 ft (20.8 m)
35 mm	7.85°	4.96°	11.3 ft (3.4 m)	7.1 ft (2.2 m)	34.0 ft (10.4 m)	81.7 ft (24.9 m)	47.7 ft (14.5 m)
25 mm	10.97°	6.94°	11.3 ft (3.4 m)	7.1 ft (2.2 m)	24.3 ft (7.4 m)	58.4 ft (17.8 m)	34.0 ft (10.4 m)
16 mm	17.07°	10.82°	11.5 ft (3.5 m)	7.1 ft (2.2 m)	15.6 ft (4.8 m)	37.4 ft (11.4 m)	21.8 ft (6.6 m)
12 mm	22.63°	14.40°	11.7 ft (3.6 m)	7.2 ft (2.2 m)	11.7 ft (3.6 m)	28.0 ft (8.5 m)	16.3 ft (5.0 m)
8 mm	33.42°	21.46°	12.3 ft (3.7 m)	7.3 ft (2.2 m)	7.8 ft (2.4 m)	18.7 ft (5.7 m)	10.9 ft (3.3 m)

Network settings

This section includes the following topics:

- ["Default IP addresses of LPR Processing Units"](#) on page 87

Default IP addresses of LPR Processing Units

All SharpX LPR Processing Units have several internal components. Each component has a factory-assigned static IP address.

The following table shows the default IP addresses of each of these components.

Component	Default IP address
Single Board Computer 1 (SBC1)	192.168.10.1
Single Board Computer 2 (SBC2)	192.168.10.2
Genetec Video Processor 1 (GVP1)	Reserved
Genetec Video Processor 2 (GVP2)	Reserved
Camera Unit 1 (CAMU1)	192.168.10.5
Camera Unit 2 (CAMU2)	192.168.10.6
Processing Unit Management Controller (MPU)	192.168.10.7
Camera Unit 3 (CAMU3) ¹	192.168.10.8
Camera Unit 4 (CAMU4) ¹	192.168.10.9
Navigation (NAV) ²	192.168.10.10

¹ For SharpX X2S with four camera ports.

² The "NAV" IP address only applies to LPR Processing Units that include the AutoVu Navigation Option.



Restarting SharpX cameras

This section includes the following topics:

- ["Restarting SharpX cameras"](#) on page 89

Restarting SharpX cameras

Certain configuration procedures require you to restart the SharpX camera. You can do this from the Sharp Portal.

To restart the SharpX:

- 1 Log on to the Sharp Portal.
- 2 Go to the *Status* page.
- 3 Click **Reboot unit**, and then click **OK** to confirm.
The connection to the Sharp Portal is momentarily lost.
- 4 Wait a few minutes to allow the SharpX to restart, then refresh the browser window to log on again.

Sharp and SharpX CAT5E cables

This section includes the following topics:

- ["Shortening CAT5e cables using the EZ-RJPRO™ HD crimp tool"](#) on page 91

Shortening CAT5e cables using the EZ-RJPRO™ HD crimp tool

Depending on the installation type, you may need to terminate the Sharp and SharpX CAT5e cables or shorten an existing terminated cable with the EZ-RJPRO™ HD crimp tool.

What you should know

- The Sharp “all-in-one” cable includes 1x CAT5e, 4x 20AWG for power, micro-coax for video, 1x 24AWG drain wire.
- The SharpX “all-in-one” cable includes 1x CAT5e, 2x 20AWG for power, 2x 24AWG for video, 1x 24AWG drain wire.
- You cannot reuse the same RJ45 connector you cut off the Sharp cable. New RJ45 connectors are included with the hardware in every AutoVu system.

To terminate or shorten the CAT5e cables:

- 1 If needed, [expose the wires in the all-in-one cable](#).
- 2 [Create the CAT5e connection](#) for the exposed CAT5e cable using the EZ-RJPRO™ HD.

Exposing the wires of the CAT5e cable

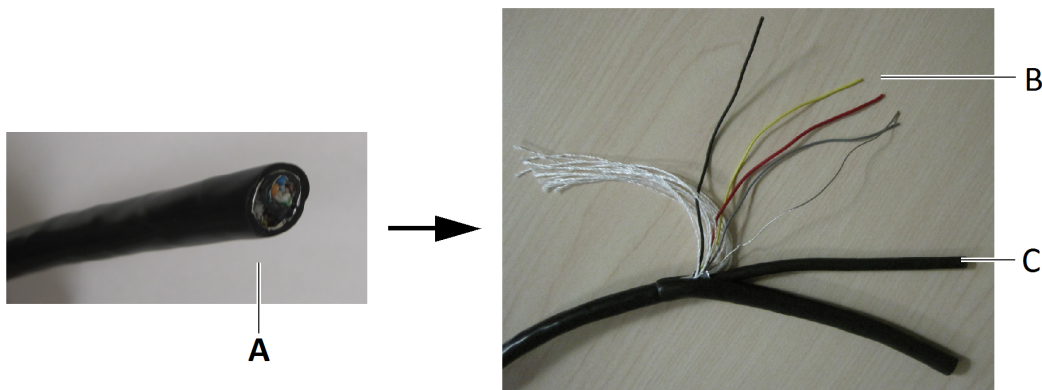
If you need to terminate or shorten an existing terminated CAT5e camera cable, you may first need to expose the CAT5e cable from the “all-in-one” cable by removing the cable jacket and exposing all wires.

What you should know

One end of the “all-in-one” cable is terminated with a camera connector for either a Sharp or a SharpX camera. The other end of the cable is either cut clean or ends with a pigtail, depending on the system you are installing.

To expose the all-in-one cable wires:

- 1 Strip 20 cm (8 in.) of the all-in-one cable’s jacket to expose the wires inside.



- **A:** All-in-one cable
- **B:** Camera wires (SharpX wire shown)

- **C:** CAT5e cable
- 2 Trim the polyester fill threads and aluminum foil as needed.

After you finish

Create the [CAT5e connection](#) for the exposed CAT5e cable using the EZ-RJPRO™ HD.

Creating the CAT5e cable connection

To terminate or shorten an existing terminated CAT5E camera cable, you must create a CAT5e cable connection using the EZ-RJPRO™ HD crimp tool.

Before you begin

If needed, [expose the CAT5E cable contained in the “all-in-one” cable](#).

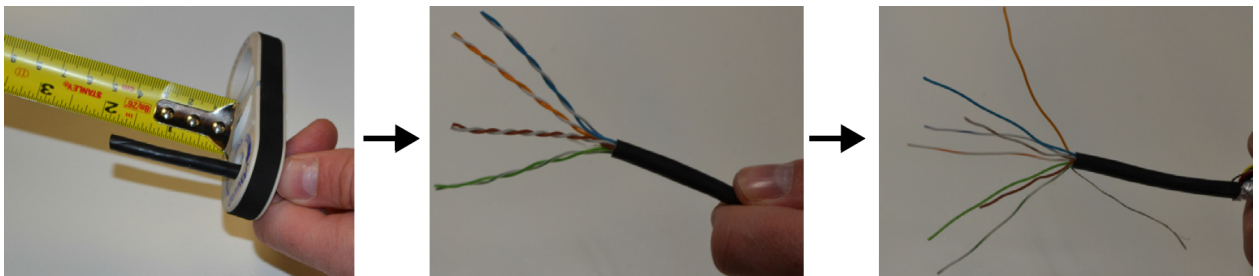
To create the CAT5e connection:

- 1 Slide the strain relief boot over the unstripped CAT5e cable.
You can do this after you strip the cable, but it is easier to do it first.

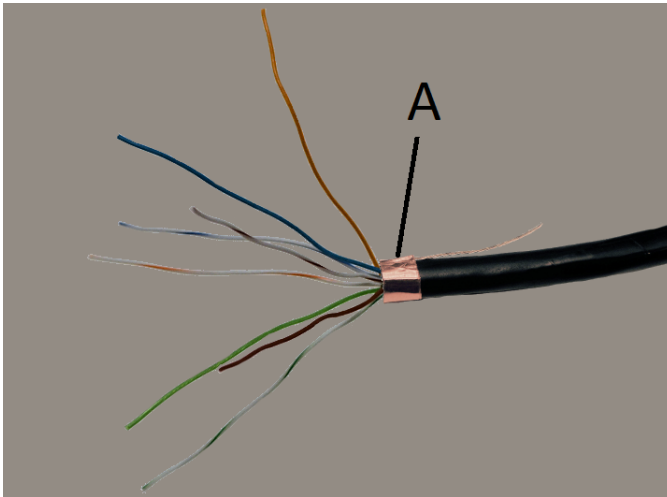


- 2 Using the cable stripper, strip approximately 5 cm (2 in.) from the CAT5e cable to expose the wires inside.

Be careful not to nick or cut the interior wires. Separate the wire pairs and straighten them out as much as possible.



- 3 The cable and connector are shielded. To ensure that the drain wire makes solid contact to the connector when crimped, fold back the drain wire and wrap it with the provided copper tape (A).



- 4 Insert the wires into the EZ-RJ45 connector according to TIA/EIA-568-B.1-2001 specification, using the appropriate [conductor arrangement for Sharp \(T568A\) or SharpX \(T568B\)](#).

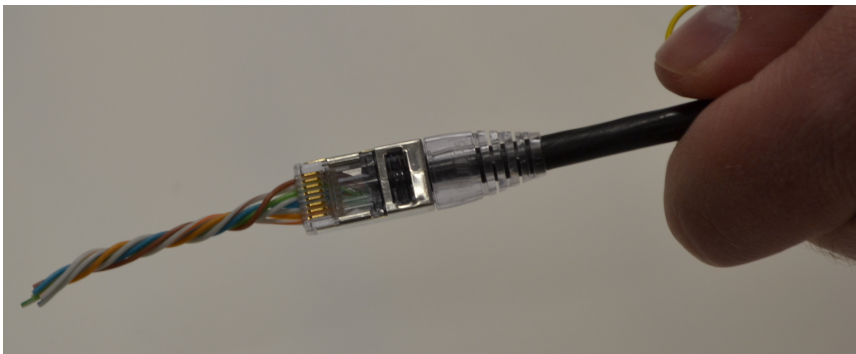
TIP: The EZ-RJ45 allows the conductor wires to pass all the way through the connector for easy field crimping. You can insert the wires all at once if you choose, but you may find it easier to insert them one at a time.

- 5 Make sure the wire ends on the connector's pin side are in the correct order before you continue.

NOTE: If you crimp the cable with the wires in the wrong order, you will need to cut the connector off and begin the process again.

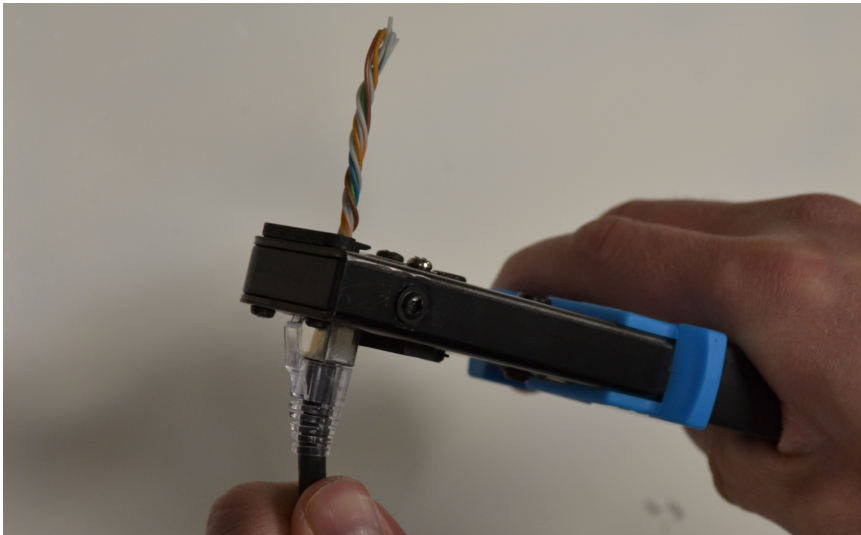
- 6 After you have inserted the wires into the EZ-RJ45 connector, twist the CAT5e wires together, and then pull them through the connector until the copper tape is inside the connector as well.

Make sure to adjust the strain relief boot so it is in the proper position.

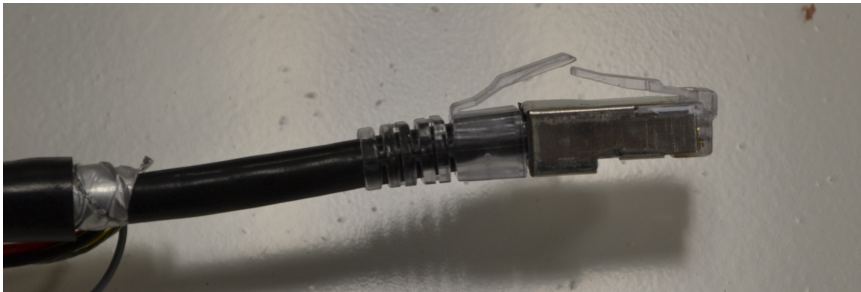


- 7 Insert the EZ-RJ45 connector into the corresponding slot on your EZ-RJ45 crimp tool, and then firmly squeeze the handles together.

The crimp tool should trim the wire ends, but you can trim them further to make sure they are flush with the connector's surface.



After you have crimped the connector, your CAT5e cable should look like this:



NOTE: Because the CAT5e cable was shortened when it was crimped, you will need to shorten the camera cable by about 5 cm (2 in.) so that the camera cable and CAT5e cable are the same length.

Example

Watch this video to learn more. Click the **Captions** icon (CC) to turn on video captions in one of the available languages.



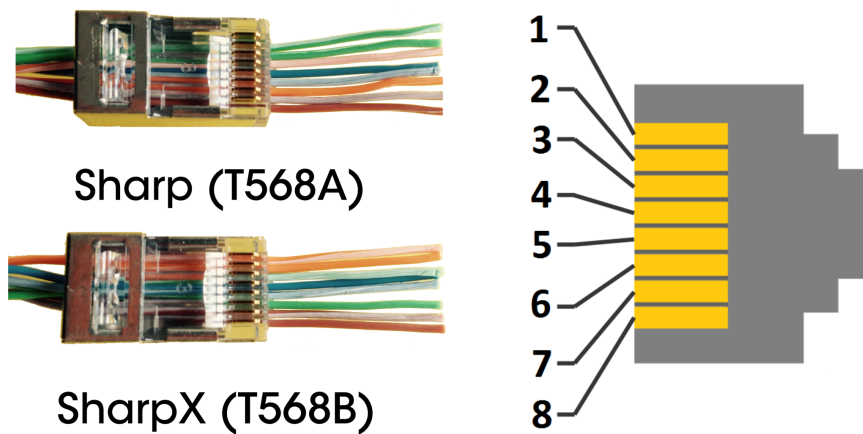
Conductor arrangements for Sharp and SharpX

The following table lists the conductor arrangements for Sharp (T568A) and SharpX (T568B).

Pin #	Sharp (T568A)	Pin #	SharpX (T568B)
1	White/Green	1	White/Orange
2	Green	2	Orange
3	White/Orange	3	White/Green
4	Blue	4	Blue

Pin #	Sharp (T568A)	Pin #	SharpX (T568B)
5	White/Blue	5	White/Blue
6	Orange	6	Green
7	White/Brown	7	White/Brown
8	Brown	8	Brown

Refer to the following illustrations to properly identify pin # and wire color of your Sharp and SharpX conductors.





Sharp portal

This section includes the following topics:

- ["Logging on to the Sharp Portal"](#) on page 97

Logging on to the Sharp Portal

To configure Sharp cameras for fixed or mobile AutoVu systems, you must first log on to the Sharp Portal.

Before you begin

You need to know the IP address or name of the Sharp camera you want to connect to:

- **Sharp IP address:** The default IP address is 192.168.10.100.
- **SharpX IP addresses:** The default IP addresses are 192.168.10.1 for SBC1, and 192.168.10.2 for SBC2 (if applicable).

NOTE: SBC2 only applies if you have a *SharpX* system that includes an X2S LPR Processing unit.

- **Sharp name:** The Sharp name (e.g. Sharp1234) is on the label under the Sharp's visor.
- **SharpX name:** The SharpX name (e.g. SharpX1234) is on the LPR Processing Unit.

What you should know

There is an important difference between connecting to a Sharp and connecting to a SharpX. For SharpX units, the Sharp Portal does not connect to the SharpX itself, but rather to the single board computer (SBC) inside the LPR Processing Unit that controls the SharpX camera. This is a crucial distinction if you are using an X2S LPR Processing Unit, because it has two internal SBCs (one SBC can control two SharpX cameras). This means that you will need to open a separate Sharp Portal web page for each SBC.

Example: You have an AutoVu mobile configuration that includes three SharpX cameras connected to an X2S LPR Processing Unit. Two of the cameras are controlled by one of the SBCs, and the third camera is controlled by the other SBC. On the back of an X2S LPR Processing Unit, there is a printed label that has two Sharp names (e.g. SharpXS1000 and SharpXS1001). These are the names that correspond to the SBCs inside the unit. Therefore, to configure the SharpX cameras connected to ports 1 and 2, you must log on to *http://SharpXS1000/portal/*, and to configure the SharpX camera connected to port 3, you must log on to *http://SharpXS1001/portal/*.

To log on to the Sharp Portal:

- 1 Open your Web browser, and go to *http://<Sharp name or IP address>/portal*.

Example:

- If the Sharp camera's IP address is 192.168.10.1, enter *http://192.168.10.1/portal/*.
 - If the Sharp camera's name is Sharp1234, enter *http://Sharp1234/portal/*.
- 2 Enter the default password "Genetec" (case-sensitive).

BEST PRACTICE: After you log on, change the default password.

- 3 Select your language, then do one of the following:
 - Click **OK** or press **Enter** on your keyboard to log on in regular mode.
 - Press **Ctrl + Enter** on your keyboard to log on in *Advanced* mode, which gives you access to additional settings not found in regular mode.
- 4 To log off, save your changes, and then close your web browser.

The Sharp Portal opens to the *Status* page.

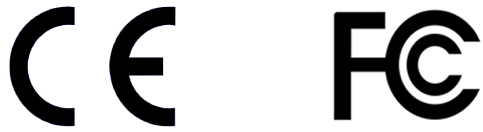
Hardware compliance

This section includes the following topics:

- ["Hardware compliance information"](#) on page 99

Hardware compliance information

AutoVu Sharp and SharpX products are certified based on the power supplies provided by Genetec. If you use a different power supply, you do so at your own risk, and you are responsible for the EMC compliance of the new system formed by the Sharp/SharpX and the new power supply.



AutoVu Sharp system

This device complies with Part 15 of the FCC rules.

Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modification to the product not expressly approved by Genetec could void the user's authority to operate this device.

This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC rules and CISPR 22/EN 55022. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and receiver.
- Connect the equipment into an output on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain electromagnetic compliance in an end user installation, follow these conditions:

- Ensure that the drain wire (shield) of the approved camera cable is connected to earth ground, either via the chassis/frame of the installation site, or via a dedicated conductor following recognized good grounding practice. Do not use any cable other than the one approved by and supplied by Genetec for connecting the device.
- Any changes or modifications to the product or installation practice not expressly approved by Genetec, may result in interference to radio or television reception, and could void the user's right to operate the equipment.

Where to find product information

You can find our product documentation in the following locations:

- **Genetec™ Technical Information Site:** The latest documentation is available on the Technical Information Site. To access the Technical Information Site, log on to [Genetec™ Portal](#) and click [Technical Information](#). Can't find what you're looking for? Contact documentation@genetec.com.
- **Installation package:** The Installation Guide and Release Notes are available in the Documentation folder of the installation package. These documents also have a direct download link to the latest version of the document.
- **Help:** Security Center client and web-based applications include help, which explain how the product works and provide instructions on how to use the product features. Patroller and the Sharp Portal also include context-sensitive help for each screen. To access the help, click **Help**, press F1, or tap the ? (question mark) in the different client applications.

Technical support

Genetec™ Technical Assistance Center (GTAC) is committed to providing its worldwide clientele with the best technical support services available. As a Genetec™ customer, you have access to the Genetec™ Technical Information Site, where you can find information and search for answers to your product questions.

- **Genetec™ Technical Information Site:** Find articles, manuals, and videos that answer your questions or help you solve technical issues.

Before contacting GTAC or opening a support case, it is recommended to search the Technical Information Site for potential fixes, workarounds, or known issues.

To access the Technical Information Site, log on to [Genetec™ Portal](#) and click [Technical Information](#). Can't find what you're looking for? Contact documentation@genetec.com.

- **Genetec™ Technical Assistance Center (GTAC):** Contacting GTAC is described in the Genetec™ Lifecycle Management (GLM) documents: [EN_GLM_ASSURANCE](#) and [EN_GLM_ADVANTAGE](#).

Additional resources

If you require additional resources other than the Genetec™ Technical Assistance Center, the following is available to you:

- **Forum:** The Forum is an easy-to-use message board that allows clients and Genetec™ staff to communicate with each other and discuss a variety of topics, ranging from technical questions to technology tips. You can log in or sign up at <https://gtapforum.genetec.com>.
- **Technical training:** In a professional classroom environment or from the convenience of your own office, our qualified trainers can guide you through system design, installation, operation, and troubleshooting. Technical training services are offered for all products and for customers with a varied level of technical experience, and can be customized to meet your specific needs and objectives. For more information, go to <http://www.genetec.com/support/training/training-calendar>.

Licensing

- For license activations or resets, please contact GTAC at <https://gtap.genetec.com>.
- For issues with license content or part numbers, or concerns about an order, please contact Genetec™ Customer Service at customerservice@genetec.com, or call 1-866-684-8006 (option #3).
- If you require a demo license or have questions regarding pricing, please contact Genetec™ Sales at sales@genetec.com, or call 1-866-684-8006 (option #2).

Hardware product issues and defects

Please contact GTAC at <https://gtap.genetec.com> to address any issue regarding Genetec™ appliances or any hardware purchased through Genetec Inc.

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