Appendix J: Manual

Please refer to the following pages.

Operation and Reference Manual
Axsis™ SC-300H Digital Radar Speed Camera
-Single Camera System

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This manual provides operational a nd technical reference information for the Axsis ™ SC-300H Digital Speed Camera System and covers the following sections:

1. Introduction
2. Capture System Components
3. Operating the Self Charging Battery Box
4. Component Interconnections
5. Technical Reference Material
6. Occupational Exposure of Personnel
7. Camera Fields of View and Radar Beam Pattern Diagrams
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15. System Operation
16. Labeling the CD/DVD
17. SC-300H Upload Process
18. Sample Tracking Sheet

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1. INTRODUCTION

American Traffic Solutions, Inc. has developed a radar speed camera system utilizing the latest state-of-the-art digital camera imaging technology. The Axsis™ SC-300H digital radar speed camera system uses a digital camera and high-speed camera technology in conjunction with advanced software logic to capture and photograph vehicles exceeding the speed limit.

1.1 CAPTURE SYSTEM OVERVIEW

The Image Capture System monitors vehicle speeds in up to four lanes of traffic and captures vehicle images and speed statistics for display on the operator's Laptop PC. The system digitally photographs vehicles traveling over a designated "trigger" speed limit and saves the following:

- The speed data from the Radar Unit.
- Date, time and location data.
- Rear image of "receding" vehicles in up to four lanes taken when the Radar Unit detects an offending vehicle.

The system produces images that allow the review operator to uniquely identify an offending vehicle by its visible identifiers, such as the vehicle make, model, color, and license plate number under normal weather conditions, night and day.

1.2 CAPTURE SYSTEM COMPONENTS OUTLINE

The Axsis™ SC-300H system consists of the following components:

- Radar Base Assembly – (antenna, controller and camera interface)
- System Mount (Tilt and Swivel Head and System Interface Cabling)
- Digital Camera with Lens
- Laptop PC with special mount
- Strobe and Heavy Duty Power Inverter
- System Battery Box, Inverter and Power Distribution

2. CAPTURE SYSTEM COMPONENTS

2.1 RADAR UNIT

For ease of connection and physical setup, the radar antenna, radar controller and the digital camera (USB) interface circuit boards are all housed in a single protective enclosure that mounts in the deployment vehicle on a post / Tilt and Swivel Head configuration.

Axsis SC-300H Speed Camera System

2.2 RADAR BASE MOUNT ASSEMBLY

The mounting system for the Radar Base Unit consists of two parts: a mounting base and a tilt/swivel adjustment head.

Radar Base Mount Assembly

2.3 Digital Camera Mounted And Radar Base Unit

This camera will be taking single sho ts of the rear of vehicles as they are driving away from the deployment vehicle to capture their license plate.

Camera and Radar Unit From Inside the Deployment Vehicle

2.4 System Laptop on Special Mount

System Laptop on Special Mount

2.5 Strobe and Heavy Duty Power Inverter

The system strobe light is powered via a dedicated heavy duty power inverter and uses a handy magnetic mount mechanism.

Strobe and Heavy Duty Power Inverter

2.6 Strobe Location

Strobe placement

2.7 POWER PAK

Make sure that the strobe power pack switch is set to the appropriate position: the furthest to the right, clockwise, that the knob will go.

Power Pak

2.8 BATTERY BOX AND CHARGER

The SC-300H system uses a Battery Box to house two 12 V DC batteries and is mounted in the rear of the deployment vehicle. DC system power and AC strobe power is then distributed where required to the individual components via a power distribution box located on the floor of the vehicle near the Battery Box.

Self Charging Battery Box

3. OPERATING THE SELF CHARGING BATTERY BOX

3.1 EXPLANATION

This is the introduction to the self charging battery box. The benefit to this battery box is that as long as the vehicle is running, the strobe battery should not deplete beyond use. It also keeps the strobe battery compl etely separate from the radar battery. This is very importa nt because the strobe battery can inject 'noise' into the radar and can cause problems.

3.2 PURPOSE OF THE SWITCH SETTINGS

The battery box breaks down into two sections.

3.2.1 Charging Side

These are the two switches on the left side of th e battery box. Whichever settings the switches are turned to is which batteries will be charging.

1) When the two switches are on set to '1' you will be charging the LEFT battery.
2) When those switches are set to '2' you will be charging the RIGHT battery.
3) When those switches are set to '1+2' you will be charging both batteries.
4) When those switches are set to 'OFF' neither of the batteries will be charging.

3.2.2 Static Auxiliary Side

These are the two switches on th e right side of the battery box. T hese determine which batteries will be used to power the radar and the camera.

1) When the two switches are on set to '1' you will be using the LEFT battery.
2) When those switches are set to '2' you will be using the RIGHT battery.
3) When those switches are set to '1+2' you will be using both batteries.
4) When those switches are set to 'OFF' neither of the batteries will be used.

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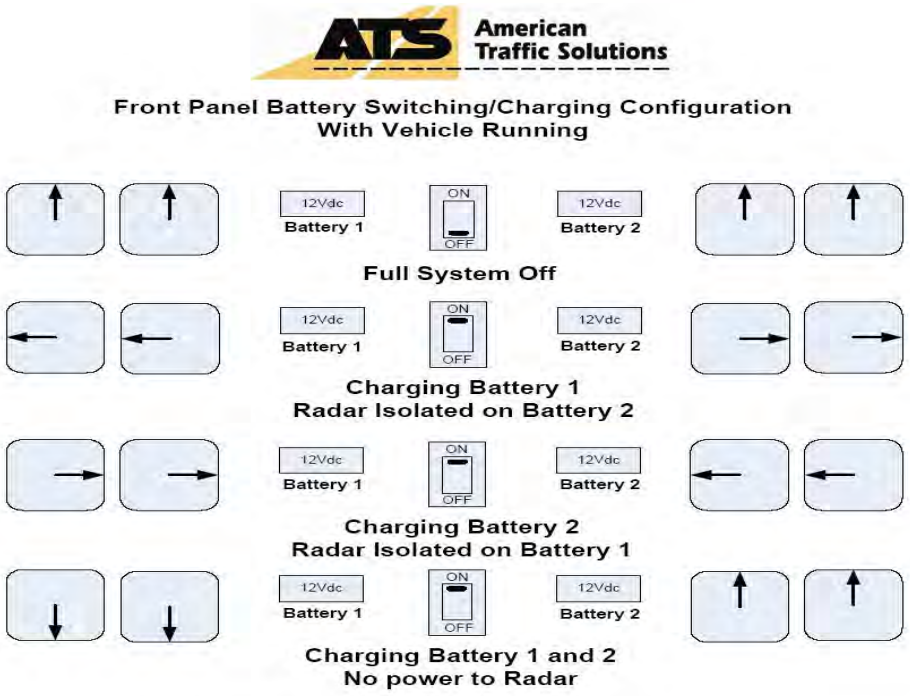
3.3 PROPER SWITCH SETTINGS



Battery Switching/ Charging Configuration

3.3.1 Morning Shift

Before starting the tuning fork test set the charging switches (left switches) to position '1.' And set the Auxiliary Switches to position '2.'

3.3.2 Afternoon Shift

Before starting the tuning fork test set the charging switches (left switches) to position '2.' And set the Auxiliary Switches to position '1.'

3.3.3 While vehicle is not in use and plugged in

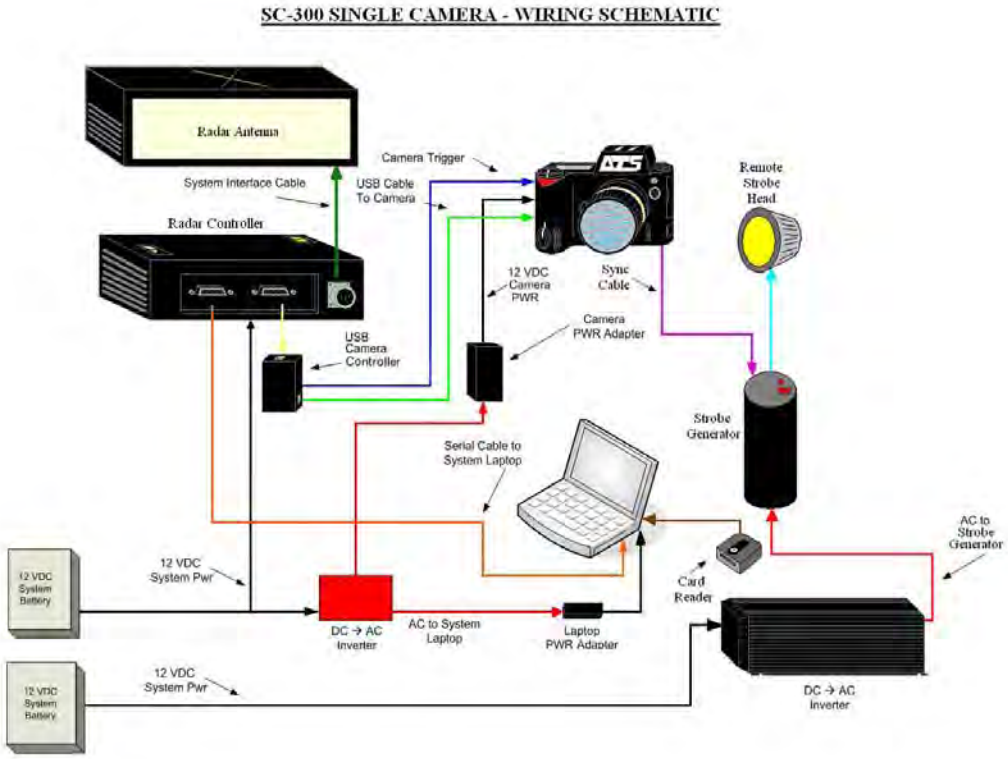
Make sure the following equipment is off.

1) Radar
2) Camera
3) Strobe Generator
4) Laptop
5) Excel Tech 1100W inverter

Once equipment is off, set the left switches to position '1+2' and the right switches to 'OFF.'

4. COMPONENT INTERCONNECTIONS

4.1 SINGLE CAMERA – WIRING SCHEMATIC



SC-300H Single Camera – Wiring Schematic

5. TECHNICAL REFERENCE MATERIAL

5.1 AIMING THE RADAR UNIT

After the eq uipment is installed and the cables properly connected, the radar cabinet must be aimed properly.

5.2 SIDE-TO-SIDE (X AXSIS) LEVEL ADJUSTMENT

The unit must be level side-to-side for the radar beam to project across the road properly. A level indicator is affixed to the moun t assembly to insure tha t unit is mounted level with respect to the surface of the road.

5.3 VERTICAL (Y AXSIS) LEVEL ADJUSTMENT

This adjustment is important for two reasons:

1) Insure the radar beam is projected correctly across the road.
2) Insure that the vehicles are visible in the photo graph regardless of t he lane in which vehicles are traveling.

5.4 ESTABLISHING CORRECT RADAR BEAM ANGLE

The radar beam must b e angled across the roa d at 22.5 degrees from parallel. Th e correct (Z Axsis) orientation is normally set by a trained Radar technician.

5.5 TUNING RADAR CONTROLLER TO THE RADAR ANTENNA

To insure a ccurate rad ar vehicle speed detect ion, the rad ar controller must be tu ned to th e Radar Antenna. When required, the “Tuning Procedure” will be carried out by a Radar trained technician.

5.6 MANUFACTURER PROVIDED INFORMATION

5.6.1 Nomenclature

Axsis™ SC-300H Speed Camera System

5.6.2 Power Supply

Optima +12vdc Battery

5.6.3 Tx Frequency

Ka

34.6Ghz +/- 100Mhz

5.6.4 Microwave Output Power

Frequency (MHz)	Antenna Gain (dBi)	Conducted Power (W)	Separation Distance (cm)	Power Density (mW/cm^2)
34600 30		0.089	85	1.0

5.6.5 Standard Supply voltage (Optima Battery)

Lowest +10.2vdc

Highest +15vdc

5.6.6 Microware Power Density

1mW/cm^2

5.6.7 Horizontal Beam width

Horizontal 3 dB full angle beam width: 4.7º

5.6.8 Vertical Beam width

Vertical 3 dB full angle beam width: 14º

5.6.9 Design Angle

22.5º

5.6.10 Polarization

Horizontal

5.6.11 Laboratory (simulated Tested Speeds

Minimum 11mph (17.7 km/h)

Maximum 225mph (362.1 km/h)

5.6.12 Operating Road Speeds

Minimum 15mph (24.1 km/h)

Maximum 185mph (297.7 km/h)

5.6.13 Temperature

Highest +140 ºF (60 ºC)

Lowest -10 ºF (-23.3 ºC)

5.6.14 Roadway Displacement Distance

12ft nominal +/- 2 ft to center of nearest lane of traffic being measured

(3.6576 m nominal +/- 0.6096 m to center of nearest lane of traffic being measured)

5.6.15 Temperature and Humidity

120 ºF non-condensing (48.9º C non-condensing)

5.6.16 External Tuning Fork

22.5º Cosine Corrected to read 36mph +/- 1mph (58 km/h +/- 2 km/h)

Nominal Fork Frequency 3430Hz +/- 45hz

Frequency Band Ka 34.6Ghz

Speed specification MPH

The Axsis™ SC-300H Speed Camera System has been designed to be fully cosine corrected provided the operator complies with the standard ATS recommended parking and setup procedure.

6. OCCUPATIONAL EXPOSURE OF PERSONNEL

Occupational Exposure of Personnel to Microwave Radiation From Traffic Radar Devices

http://www.osha.gov/SLTC/radiofrequencyradiation/fnradpub.html#references

6.1 POLICE TRAFFIC RADAR CHARACTERISTICS

Traffic radar devices have been manufactured using one of three microwave frequencies, either the X (10.525 GHz), K (24.15 GHz), or Ka-Band (33.40-36. 00 GHz). **All of the devices emit less than 100 milliwatts of microwave power, an amount considered by nearly all concerned to be rather low.** Most radar units manufactured in the last twenty years have had emitted power in the range of 15 to 50 milliwatts. Compared to any other type of radar, e.g., military, commercial aviation, marine, etc., the power levels of police traffic radar devices are orders of magnitude lower. The emitted power of traffic radar devices is lower than or comparable to other microwave or radiofrequency (RF) radiation-emitting devices used in close proximity to persons in the general public, such as garage door openers, cellular telephones, and infant monitors.

Speed control radars are used by police in many countries. The average output power of the SC-300H radar system is very low and so the units are not considered hazardous to health, even when used in very close proximity to the body.

1. When using two-piece radar units, the antenna should be mounted so that the radar beam is not directed toward the vehicle occupants. Although this may not be practical. The preferred mounting location would be outside the vehicle altogether, other options, e.g., mounting on the dashboard of the vehicle, are acceptable if the antenna is at all times directed away from the operator or other vehicle occupants.
2. Radar antennas should be tested periodically, e.g. annually, or after exceptional mechanical trauma to the device.

3. Each operator should receive training in the proper use of traffic radar before operating the device. *This training should include a discussion of the health risks of exposure to microwave radiation and information on how to minimize operator exposure*

6.2 ELECTROMAGNETIC FIELDS AND PUBLIC HEALTH: RADARS AND HUMAN HEALTH

- To produce any adverse health effect, RF exposure above a threshold level must occur. The known threshold level is the exposure needed to increase tissue temperature by at least 1oC. *The very low RF environmental field levels from Speed Measuring Police Traffic Radar systems cannot cause any significant temperature rise.*
- To date, researchers have not found evidence that multiple exposures to RF fields below threshold levels cause any adverse health effects. No accumulation of damage occurs to tissues from repeated low level RF exposure.
- At present, there is no substantive evidence that adverse health effects, including cancer, can occur in people exposed to RF levels at or below the limits set by international standards
- Always point the device away from the operator's body, or any other persons, while it is turned on.
- Mount fixed radar antennas so that the beam is not pointed at any occupant of the speed van.
- When it is on, try to avoid pointing the device toward metal surfaces inside the speed van, such as the floor or a door, to avoid microwave reflection.

6.3 FCC RF RADIATION EXPOSURE STATEMENT

FCC RF RADIATION EXPOSURE STATEMENT

This equip ment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

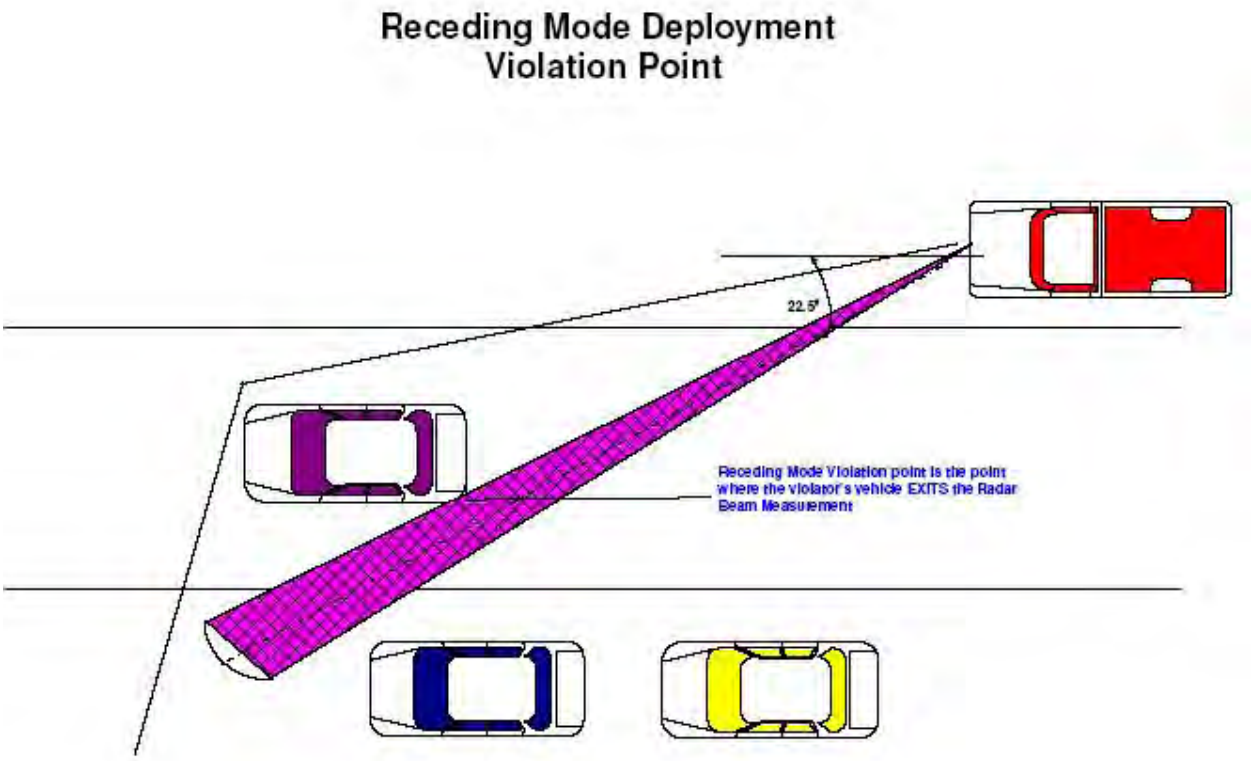
The minimum safe separation d istance to the general public is 85 cm. For operators appropriately trained as to the RF exposure risks, the occu pational exposure categ ory applies and the safe distance is 38 cm.

This transmitter must not be co-loca ted or operated in conjunction with any other antenna or transmitter.

Changes or modifications not expressly approved by ATS could void the user's authority to operate this equipment.

7. CAMERA FIELD OF VIEW AND RADAR BEAM PATTERN DIAGRAM

7.1 RECEDING MODE FOV AND RADAR BEAM PATTERN



Receding Mode Deployment - Violation Point

- 22.5 degree radar beam angle offset from 0 degrees
- 4.7 degree horizontal beam width
- 14 degree vertical beam width
- Camera FOV overlays radar beam to put plate in center of camera lens FOV
- Receding mode violation point is th e point where the violator's vehicle exits the rada r beam measurement.

8. PRE-DEPLOYMENT CHECK

Before beginning your deployment, please follow these steps to ensure optimal picture quality.

8.1 360 WALK AROUND

Perform a 360 walk around the outside of the deployment vehicle to inspect the following:

- Make sure the deployment vehicle is parked parallel to the flow of traffic you are monitoring. Not parking parallel to the flow of traffic will throw off the radar readings.
- Check your environment. Are there any tree branches, bushes or other objects blocking the camera FOV or the strobe?
- Inspect strobe positioning. Make sure the strobe is pointed in the same direction as your camera lens.
- Make sure your windows are extremely clean. This will make focusing much easier and your images clearer.
- Make sure your camera is level and pointed inline with the radar unit.
- Check for extreme or unusual lighting. If the camera is pointed directly into the sun, you may want to ask your dispatcher or supervisor if you can try another location.
- Make sure your camera lens is clean.

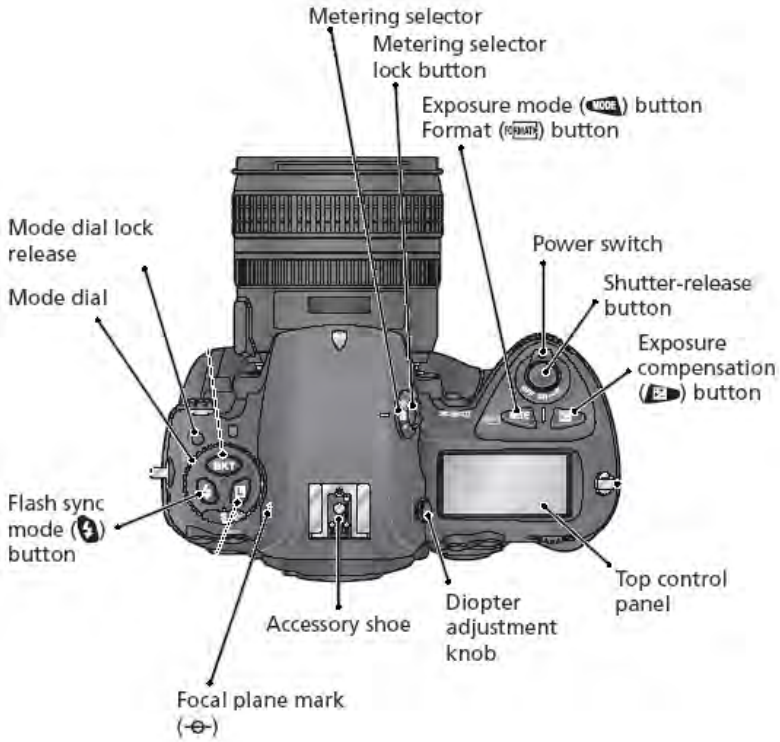
Deployment Vehicle Parked Parallel to the Flow of Traffic

9. DIGITAL CAMERA- NIKON MODEL D2X

The digital camera used in the SC-300H System is the Nikon model D2x.

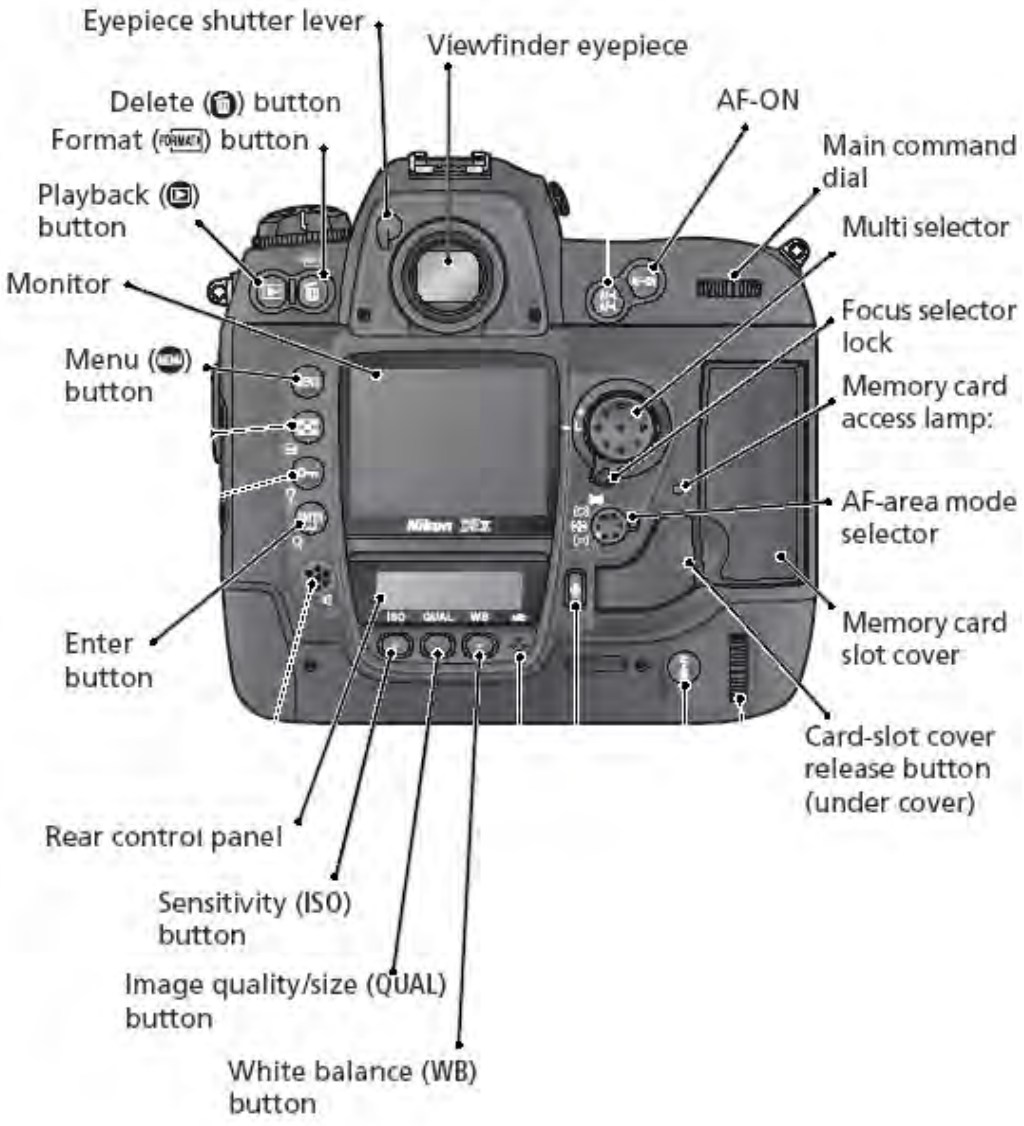
Nikon model D2x

Nikon model D2x, Functions: Front and Side



Nikon model D2x, Functions: Top

Nikon model D2x, Metering selector



Nikon model D2x, Functions: Back

10. DIGITAL CAMERA SETUP

The followin g is a very basic explanation of t he camera setup. For more detailed camera information, please ref erence “Th e Nikon Gu ide to Dig ital Photogra phy with th e D2x Digital Camera”.

10.1 CAMERA ON / OFF AND SHUTTER RELEASE

Rotate the power switch to the desired ON or OFF setting.

Further switch rotation past ON, to the light bulb setting, will illumi nate the top and rear control panels.

The round button in the center of the power switch is the shutter- release button.

Camera ON/ OFF and Shutter Release

10.2 MEMORY CARD INSERTION / REMOVAL

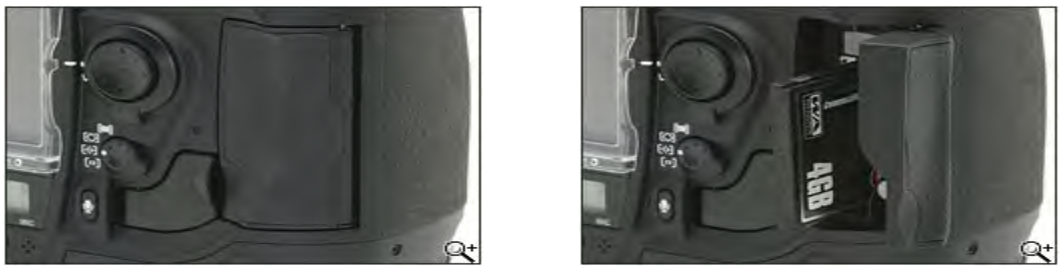
The camera power should be OFF before inserting or removing the memory card.

The Compact Flash (CF) memory card slot is located behind a protective door.

To open the CF protective door, pivot the latch, press the release button and open the door.

When inserting a memory card make sure it is oriented correctly before insertion or you could damage the card.

To eject a memory card, press the gray eject button located above the memory card.



Memory Card Insertion / Removal

10.3 MEMORY CARD FORMATTING

To format the memory card, turn the camera “ON”.

Now, simultaneously pr ess and ho ld down th e “Format / Mode” and the “Format / Trash” Buttons for approximately two seconds.

A blinking “For” will appear in the top control panel and the frame count will blink.

Now, simult aneously press both bu ttons a second time to start the formatting process. The “Memory Ca rd Access L amp” (by th e memory card door lat ch) will illuminate. Once formatting is complete, the green active indicator light will turn off and the frame count display will show the number of photos that can be recorded at the current settings.

Format Memory Card

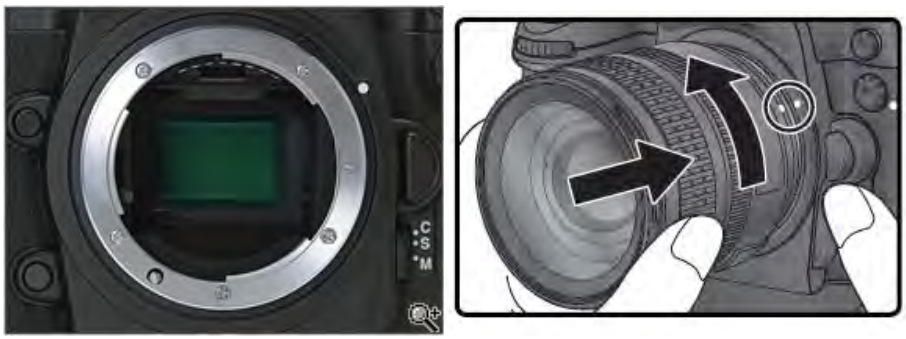
***Note* Formatting memory cards permanently deletes any data they may contain. Be sure you are ready to completely clear the card of all data before formatting.**

10.4 LENS INSERTION

Make sure the camera is turned OFF before inserting a lens.

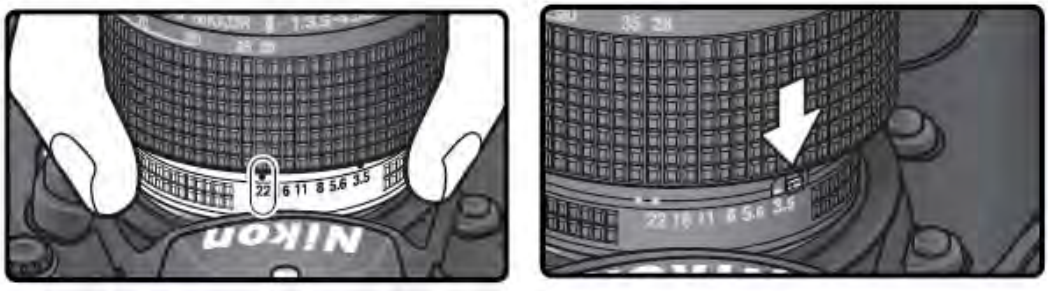
Align the mounting mark on the lens with the mounting mark on the camera body. Position the lens into the camera's bayonet mount.

Being careful not to press the lens release button, rotate the lens counter-clockwise until it clicks into place.



Nikon Lens Insertion

NOTE:
When installed, make certain the lens aperture setting is at the minimum setting (highest F/stop number). If the initial lens "F/Stop" setup is ignored, a blinking "FEE" error message will be displayed and the camera will not function.



Lens Aperture Setting

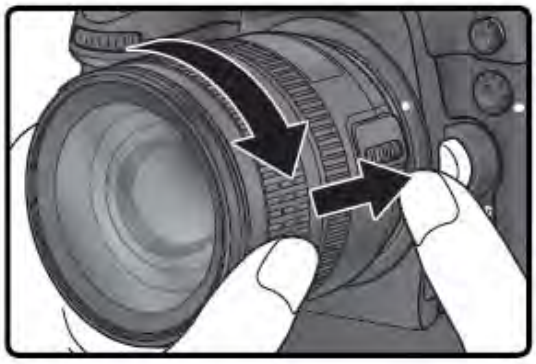
10.5 Lens Removal

Make sure the camera is turned OFF before removing a lens.

Place one hand under the lens to keep it from falling when it is released from the camera body.

Press the lens release button located on the front of the camera, to the right of the lens, on the camera housing just above the focus mode selector.

Rotate the lens clockwise until it unlatches from the camera's bayonet mount.



Lens Release Button

10.6 Lens Settings

Some lenses have additional settings for focus mode and vibration reduction right on the lens.

If your lens features these settings they should be set as follows:

A/M button- should always be set to **A** so that the camera can control the auto focus. If for some reason you must manually focus, then set this button to **M**.

VR ON/OFF button- should always be set to **OFF**. This is for vibration reduction. There is not enough vibration in the deployment vehicles for this to be needed. If it is turned on it can slow the auto focus and make it very difficult to get sharp focus.

A/M and VR ON/OFF Buttons

10.7 Shooting Mode

Press the “Mode Dial Lock Release” button (located on the top left of the camera) and rotate the mode dial to the “S” (Single Frame) position.

This will allow you to take one picture each time you press the shutter release button all the way down.

Shooting Mode

11. CAMERA MATRIX SETTINGS

11.1 PLATE ID CAMERA MATRIX

*Open up t he Nikon Capture Camera Control Software a nd select t he appropriate camera settings based on the light falling on your subject (on license plates).

	Daytime Direct sun on Plates	Daytime Indirect sun on Plates	Daytime (Poor Weather) Indirect sun on Plates	Night Strobe light on Plates
Exposure Mode	Manual Manual		Manual	Manual
Shutter Speed	1250 1000		1000	800
Aperture	F/ 7.1	F/ 6.3	F/ 6.3	F/ 5.6
Focus Area	Single Area Center	Single Area Center	Single Area Center	Single Area Center
Sensitivity	640 640		640	640
White Balance	Flash Flash		Flash	Flash
Data Format	Jpeg (8-bit)	Jpeg (8-bit)	Jpeg (8-bit)	Jpeg (8-bit)
Jpeg Quality	Fine Fine		Fine	Fine
Jpeg Compression	Fixed size	Fixed size	Fixed size	Fixed size
Image Size	Large Large		Large	Large

Note:
-If plates have too much direct sun and are too bright, you may turn off the plate strobe.
-Use black cloth on dashboard of deployment vehicle to cut window glare.

12. CHANGING CAMERA SETTINGS

Basic camera settings can be changed on the camera following the steps below. They can also be changed using the Nikon Capture Camera Control software once the camera is plugged into the USB port.

Changing camera settings on the camera commonly requires you to use the main command dial or the sub command dial pictured below.

Main Command Dial
Located on the back right corner of the camera

Main Command Dial

Sub Command Dial
Located on the front of the camera below the shutter release

Sub Command Dial

12.1 EXPOSURE MODE

To change the exposure mode press the " Exposure Mode Button" and rotate the "Main Command Dial".

The Selected Mode will display in the top control panel.

There are four Modes to choose from – **P**, **S**, **A** or **M**.

This should normally be set to **M** (manual mode) so that you have full control over your exposure.

Top Control Panel, Main Command Dial and Mode Button

12.2 Shutter Speeds and Apertures

12.2.1 Changing Shutter Speed

In the Manual Exposure Mode the Shutter Speed (the larger number in the middle of the display) can be selected by rotating the “Main Command Dial”.

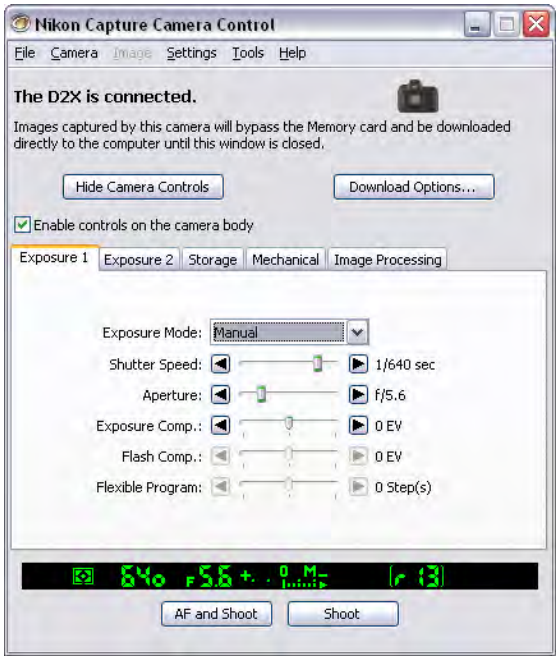
12.2.2 Changing Aperture

The Aperture (F# on the right) is selected by rotating the “Sub Command Dial”.

Shutter Speed and Aperture on Top Control Panel

12.2.3 Changing Exposure Mode, Shutter Speed and Aperture in Nikon Capture Camera Control

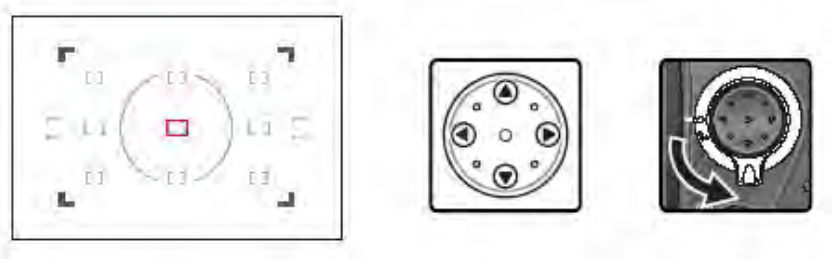
In Nikon Capture Camera Control the exposure mode, shutter speed and aperture settings can also be changed under the **Exposure 1** tab.



Exposure Mode, Shutter Speed and Aperture

12.3 Focus Area Selection

To select or change the area you would like the camera to auto focus on (the area that illuminates red when looking through the viewfinder) use the multi selector. The multi selector is located on the back of the camera to the right of the monitor. If you are unable to move the focus area, rotate the focus selector lock located outside the multi selector.

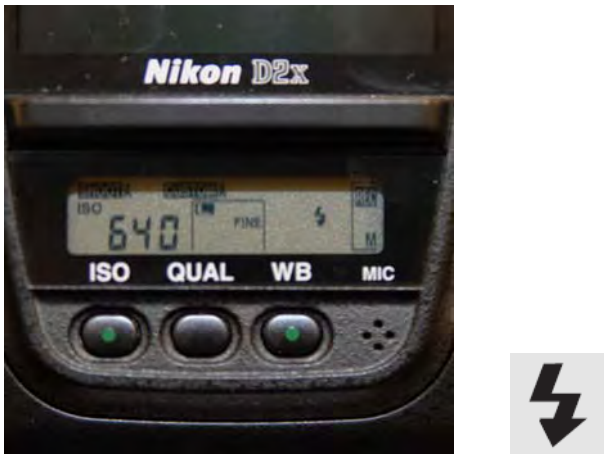


Focus Areas, Multi Selector and Focus Selector Lock

You will typically want to use the middle or bottom middle focus area.

12.4 Sensitivity (Equivalent to ISO Film Speed)

To set or change the sensitivity, press the "sensitivity (ISO) button" and rotate the "Main Command Dial" to the applicable ISO setting – normally set to **640**.



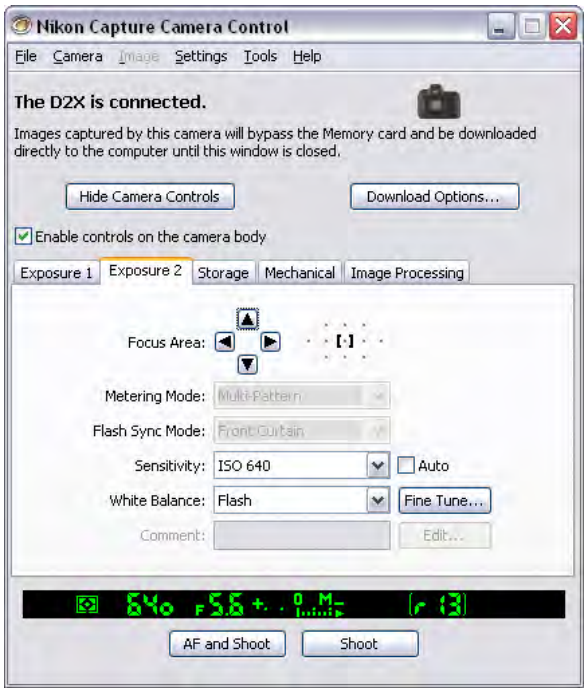
Sensitivity (ISO) Button and White Balance (WB) Button

12.5 White Balance

Press the "White Balance (WB) Button" and rotate the "Main Command Dial" to the applicable WB setting – normally set to flash which is indicated by the lightning bolt icon.

12.5.1 Changing Focus Area, Sensitivity (ISO) and White Balance (WB) in Nikon Capture Camera Control

In Nikon Capture Camera Control the Focus Area, Sensitivity (ISO) and White Balance (WB) settings can also be changed under the **Exposure 2** tab.



Focus Area, Sensitivity and White Balance

12.6 JPEG QUALITY

The Jpeg quality settings are **Fine**, **Normal** or **Basic**. To set or change, press the "Image quality/ size (QUAL) button" and rotate the "Main Command Dial"- normally be set to **Fine**.

Image quality/ size (QUAL) button

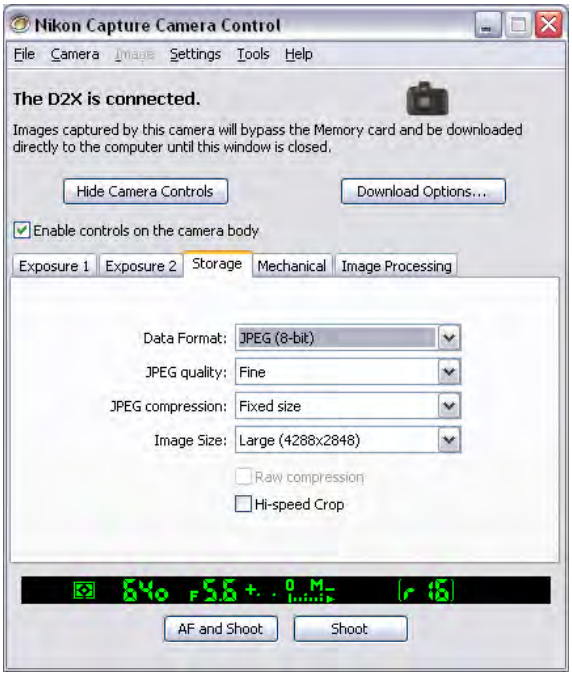
12.7 IMAGE SIZE

The Image Size settin gs are **Large**, **Medium** or **Small**. T o set or change, press the "Image quality/ size (QUAL) button" and rotate the "Sub-Command Dial"- normally set to **Large**.

Image quality/ size (QUAL) button

12.7.1 Changing Jpeg Quality and Image Size in Nikon Capture Camera Control

In Nikon Capture Camera Control the Jpeg Quality and Image Size settings can also be changed under the **Storage** tab.



Jpeg Quality and Image Size

13. Camera Lens Use and Field of View

13.1 Camera Lens

The lens used with the camera has a wide range of focal lengths which allows you to precisely control the field of view (FOV). The FOV is determined by the focal length of the lens. The focal length is measured in millimeters.

55mm FOV – License Plate Camera

13.2 Adjusting Field of View/ Zooming

The FOV can be set by twisting the large rubber ring, on the lens, back and forth while looking through the viewfinder. This zooms your lens in and out. The focal length is determined by the number that appears on the top of the large rubber ring, in the middle, by the white line.

Lens Rubber Ring - 50mm

13.3 VERTICAL AXSIS ADJUSTMENT

Not only wil l you need to zoom the lens in and out but yo u may also need to use the tripod mount arms and/ or the tripod mount knobs to adjust the camera or radar unit. Th is will a llow you to tilt upwards or downwards vertically.

Vertical Adjustment Tripod Handle and Tripod Mount Knobs

13.4 HORIZONTAL AXSIS ADJUSTMENT

You may also need to use the tripod mount arms and/ or t he tripod mount knobs to adjust the camera or radar unit. This will giv e you a straight horizo n line no matter how uneven you r deployment location may be. Use the attached levels to aid you.

Horizontal Adjustment Tripod Handle and Tripod Mount Knobs

13.5 Select Field of View for Receding Only Traffic Plate Camera

Select the FOV that is most appropriate for the number of lanes in your deployment. The idea here is to zoom in as much as possible for better plate identification, without losing details of the vehicle's make and model and some of the environment in the background.

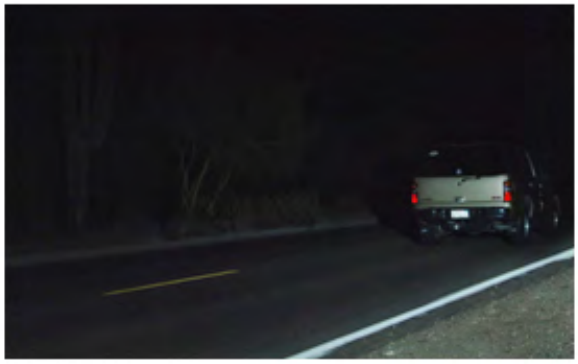
Vehicle Lane 1

Vehicle Lane 2

13.6 Flash Sync Timing at Night

It is very important that the vehicles plates are fairly close to the center of the field of vie w (vertically) or lower.

At night, when using a strobe, the camera shutter will cause the top 1/3 of the frame to darken. If the rear plate is in this top 1/3 it will be very difficult or impossible to get a clear plate shot.



Correct FOV

Incorrect FOV

14. FOCUSING THE LENS

Once you have chosen your FOV it is time to focus your image.

14.1 SETTING THE FOCUS MODE

The "Focus Mode selector" switch is located on the front of the camera body to the right of the lens.

Focus Mode Selector

There are three focus settings available:

C - Continuous Mode - The camera will continuously refocus the lens on moving objects as long as the shutter release is pressed halfway down.

S - Single Servo Auto Focus - The camera will auto focus once when the shutter release is pressed halfway down.

M - Manual Mode – The camera will not auto focus when the shutter release is pressed halfway down. The lens must be manually focused by turning the rubber ring on the lens.

14.2 USING MANUAL FOCUS

To manually focus the lens, make sure that the "focus mode selector" switch is set to **M** then rotate the smaller rubber ring on the lens from side to side.

Manual Focus Ring

Note: *NEVER rotate this rubber ring when in auto focus as it will cause permanent damage to the lens.*

14.3 Using Auto Focus

First make sure that the “focus mode selector” switch on the front of the camera is set to **C** or **S,** to turn on the camera’s auto focus.

Focus Mode Selector

Next, set the “AF-area mode selector” to the bottom square.

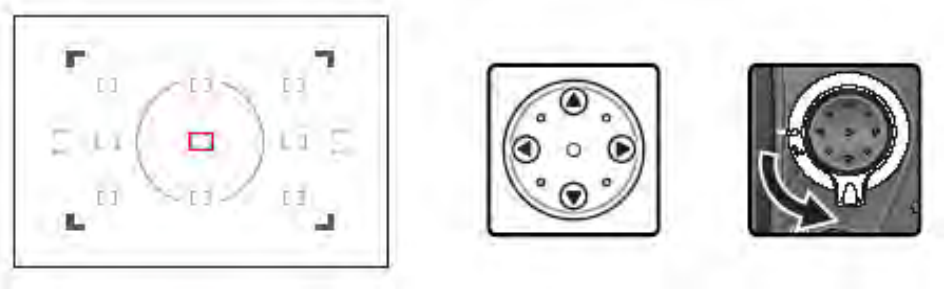
AF-Area Mode Selector

Now, to use the camera ’s auto focu s, press half way down on the shutter release button, or press the “AF-ON” button on the back right corner of the camera.

Auto Focusing the Lens

14.4 Selecting the Appropriate Focus Square

When you look through the viewfinder and press half way down on the shutter release button one of the focus squares will illuminate. This shows you the area that the camera is going to auto focus on.



Focus Areas, Multi Selector and Focus Selector Lock

To select or change this area, use the "Multi Selector" located on the back of the camera to the right of the monitor. If you are unable to move the focus area, rotate the focus selector lock located outside the multi selector.

You can also change this setting in Nikon Capture Camera Control under the Exposure 2 tab.

14.5 Where You Should Be Focusing

The lane that you should be focusing on will always be the furthest lane away from you, that you are monitoring, on that deployment.

For a three-lane deployment you need to focus on Lane 1 (furthest lane away) vehicles.

For a two-lane deployment you need to focus on Lane 1 (furthest lane away) vehicles.

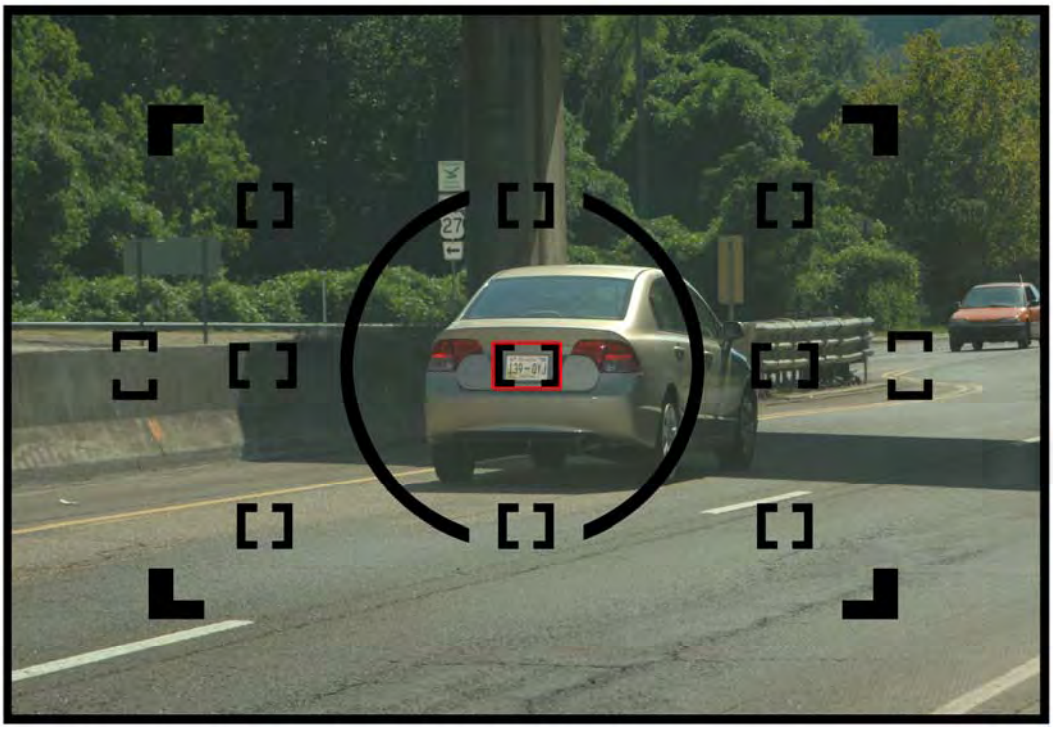
For a one-lane deployment you need to focus on Lane 1 (furthest lane away) vehicles.

Note: See the "Always Focus on the Furthest Lane Away From You" section in this manual for examples and more information.

14.6 Taking Your Test Shot

Look through the viewfinder and wait for a vehicle in the appropriate lane to enter the FOV. When you see the vehicle you wish to focus on, press the "shutter release button" half way down to auto focus and all the way down to take a picture.

You should be pressing the button only when the plate is directly in the focus square you selected. This takes some practice to get the exact timing down so be patient.



Vehicle in Furthest Lane Away Focused for Plate

14.7 Always Focus on the Furthest Lane Away From You

When we focus on the far lane we still get very good focus on the near lane because the plate is nearly twice the size. So, even though the focus is not as sharp on the near lane we still get a very readable plate.

Vehicle in Furthest Lane Away Focused for Plate

If we had focused on the near lane it would have been nearly impossible to read the plate in the far lane because it would be out of focus and half the size of the plate in the near lane.

Vehicle in Near Lane When Furthest Lane Was Focused

14.8 Reviewing Test Shots

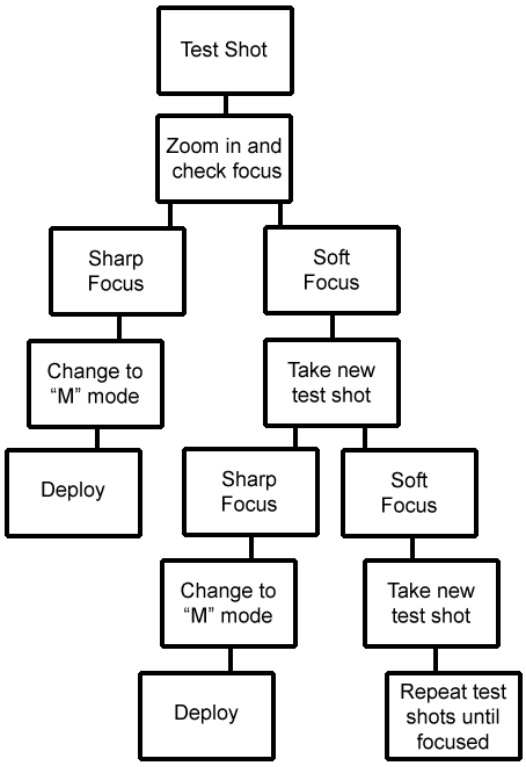
Once you think you have captured a sharp image with a vehicle in the appropriate lane, review the image on the laptop using Nikon Browser.

Use the zoom tool to zoom in on the driver or license plate to ensure that they are in sharp focus. Then, zoom into any signage or objects in your background. The driver's faces (or plate) should be the sharpest thing in the photo. Anything in the background should be softer focus.

If the plate is not the sharpest thing in the photo, take another test shot, and review on the laptop. Repeat this until the photo is in proper focus.

Once you are satisfied with your focus, set the "Focus Mode Selector" switch to **M**. This locks in the current camera focus.

After you have set the "Focus Mode Selector" switch to **M** it is a very good idea to capture a vehicle in all lanes you will be monitoring just to make sure they look good as well.



Reviewing Test Shots Work Flow

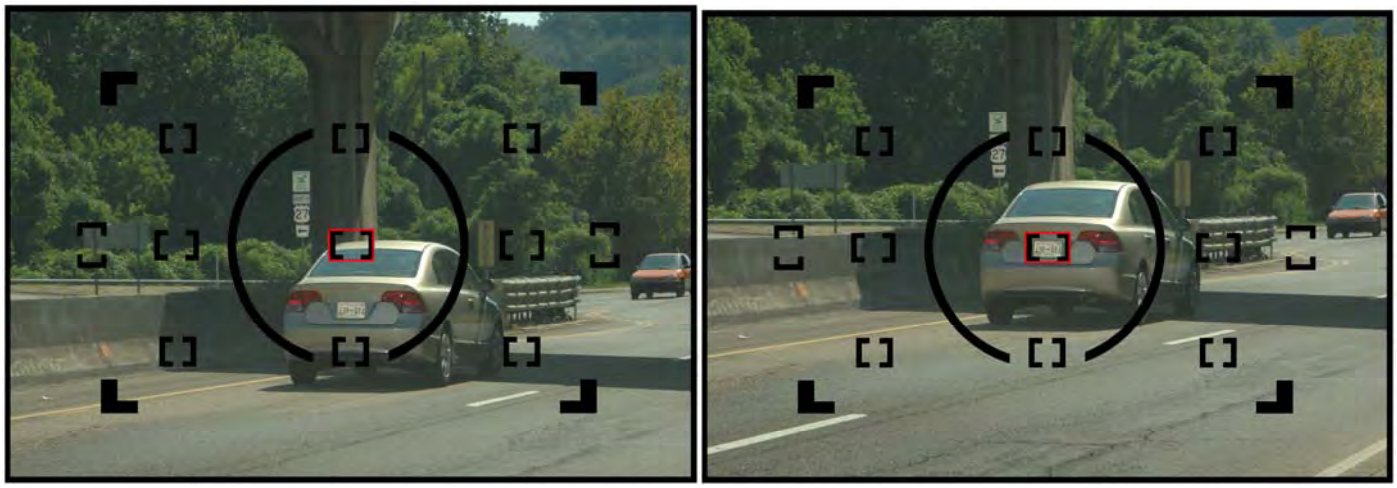
Note: Sharp focus is crucial because once the images are compressed, and loaded for processing, they degrade slightly.

14.9 Better Focus Using Vertical Axsis Adjustment

If you are fi nding it difficult to posit ion one of t he focus sq uares direct ly over the plate, the vertical axsis adjustment can help you.

Vertical Adjustment Tripod Handle and Tripod Mount Knobs

You can use this adju stment to mo ve the FOV up or down to better position your f ocus square for precise focusing.



Positioning Your Focus Square for Optimum Auto Focus Performance

Once you are satisfied with your focus, set the “Focus Mode Selector” switch to **M**. This locks in the current camera fo cus. Now, you can r eposition your FOV using the vertical axsis adjustment tripod handle or mount knob.

15. SYSTEM OPERATION

The following covers the basic operation of the SC-300H system.

Turn on the system laptop PC. Verify that a ll system plugs and cables are properly connected and then turn on the Axsis™ SC-300H Radar Base Unit.

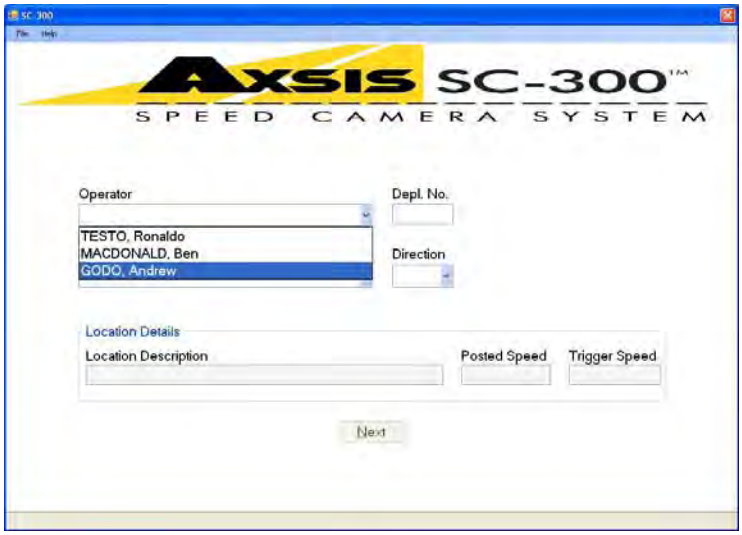
Make sure a Data Card i s inserted into each camera's data card slot (refer to section 8.2). Turn on both Digital Cameras.

Double click the "SC-300 Icon" on t he laptop d esktop. Th e following SC-300H initial startup screen should display.

Initial Startup Screen

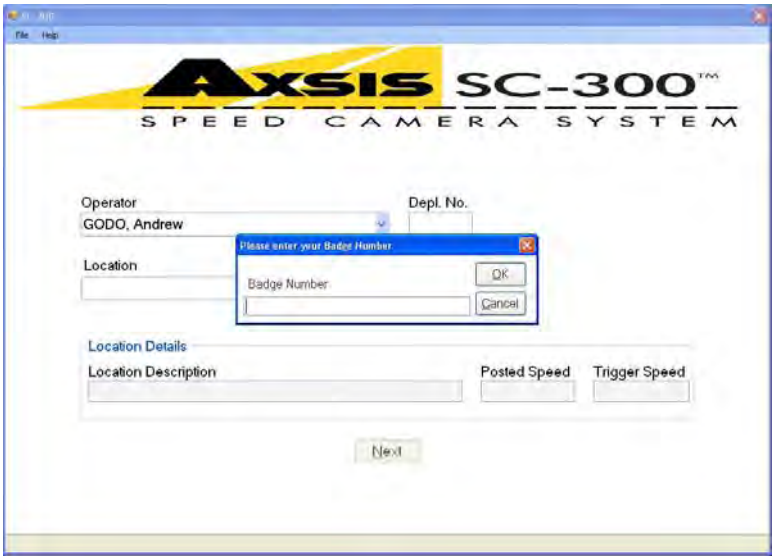
15.1 INITIAL STARTUP SCREEN - OPERATOR SELECTION

Select the "Operator" fi eld (down arrow) to o pen and display the current list of (previousl y approved) system operators. From this list, select (highlight) an operator.



Initial Startup Screen – Operator Selection

Upon operator selection the system will immediately open a second window and request entry of a “Badge Number.”



Initial Startup Screen – Badge Number

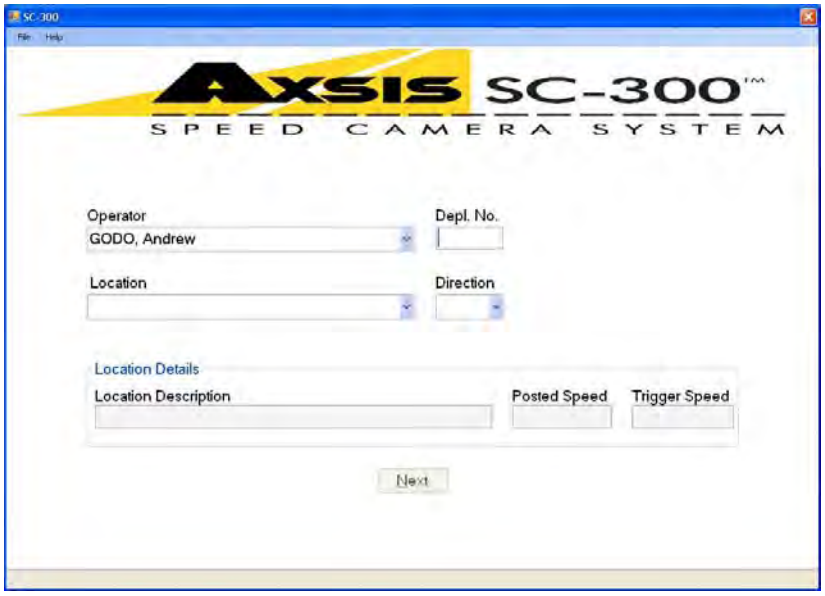
The correct badge number must be entered to proceed to the deployment number selection. If a number is entered that the system does not recognize as valid you will see the box below.

Initial Startup Screen – Invalid Badge Number

Click the OK button and try your entry again.

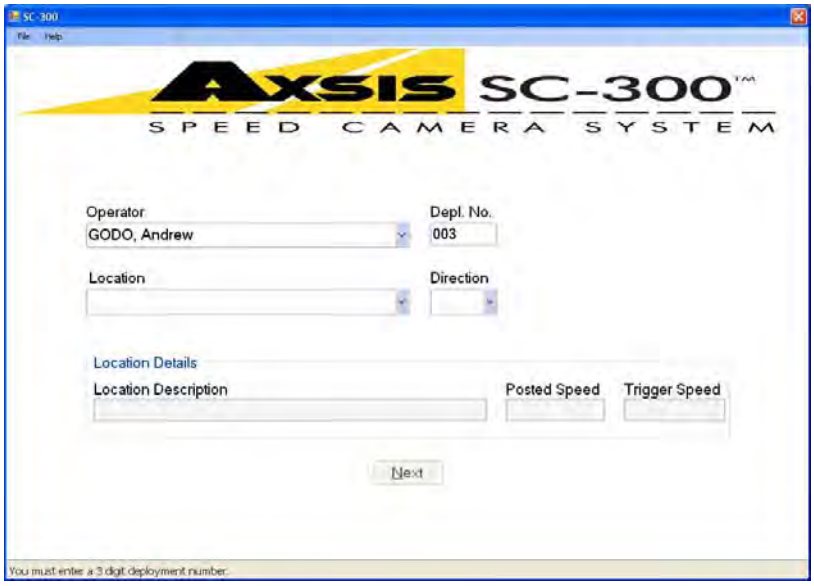
15.2 DEPLOYMENT NUMBER

Complete the "Deployment Number" by filling in the "Depl No." field. This will be a three dig it number that is assigned to a deployment location.



Deployment Number Screen

Enter the appropriate deployment number into the "Depl No." field.

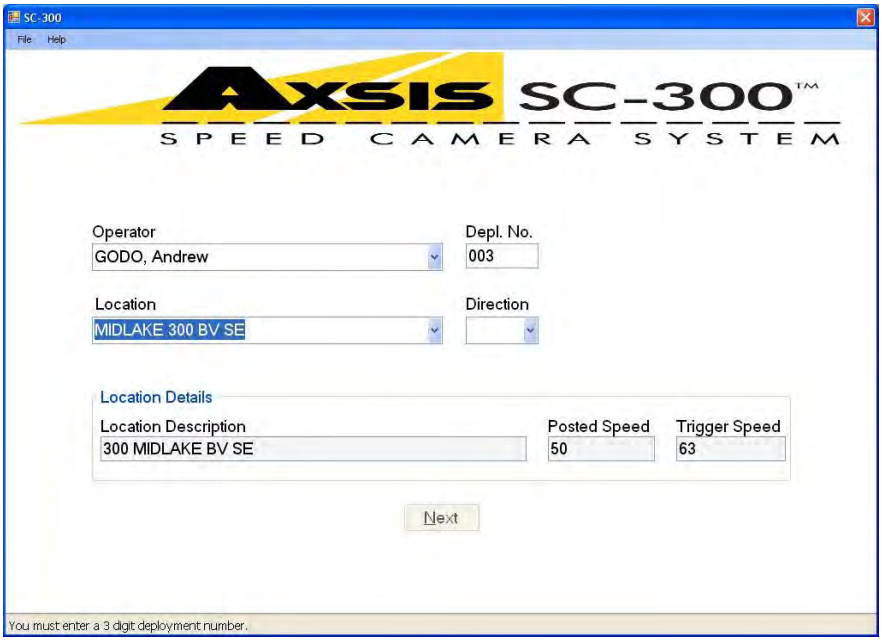


Deployment Number Screen Entry

15.3 INITIAL STARTUP SCREEN - LOCATION SELECTION

Select the " Location" field (down arrow) to open and display the current list of previously-approved system locations.

From this list, select (highlight) the appropriate location. The system will automatically fill in the Location Description, Posted Speed and Trigger Speed for the selected location.



Initial Startup Screen – Location Selection

Note that adding or editing an operator and/or location can only be performed by authorized personnel.

15.4 DIRECTION

Select the “Direction” field (down arrow) to ope n and display the curren t list of direction options. Select the option that is appropriate to your deployment.

Direction

Once all of the “Location Details” have been entered click the “Next” button at the bottom.

A “Confirm Settings” screen will appear.

Confirm Settings

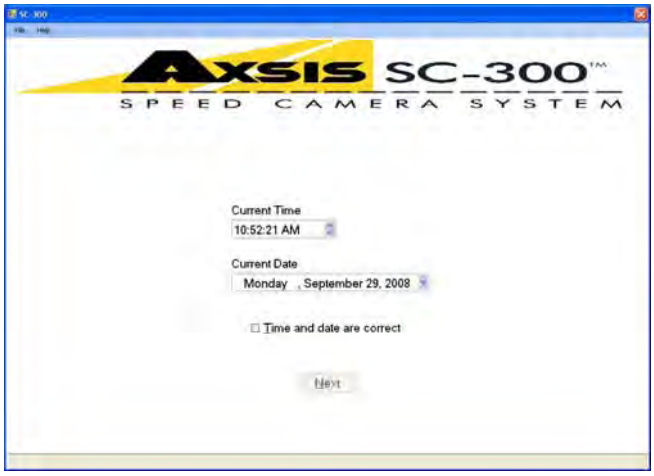
Double check all displayed information and click the appropriate “Yes” or “No”.

15.5 TIME AND DATE ENTRY AND CONFIRMATION

Proceed to the Time and Date Verification window. The displayed time and date are taken from the system's laptop.

Verify the time with a cell phone as the laptop time may be incorrect.

Make any changes necessary and then click th e time and date confirmation box. Note that any changes made to the time and/or date will also update the laptop to maintain synchronization.



Time and Date Entry and Confirmation

Checking the box next to "Time and date are co rrect", will confirm the "Current Time and Date" by graying them out. T he "Next" b utton w ill now be highlighted to enable advancing to th e operational screen.

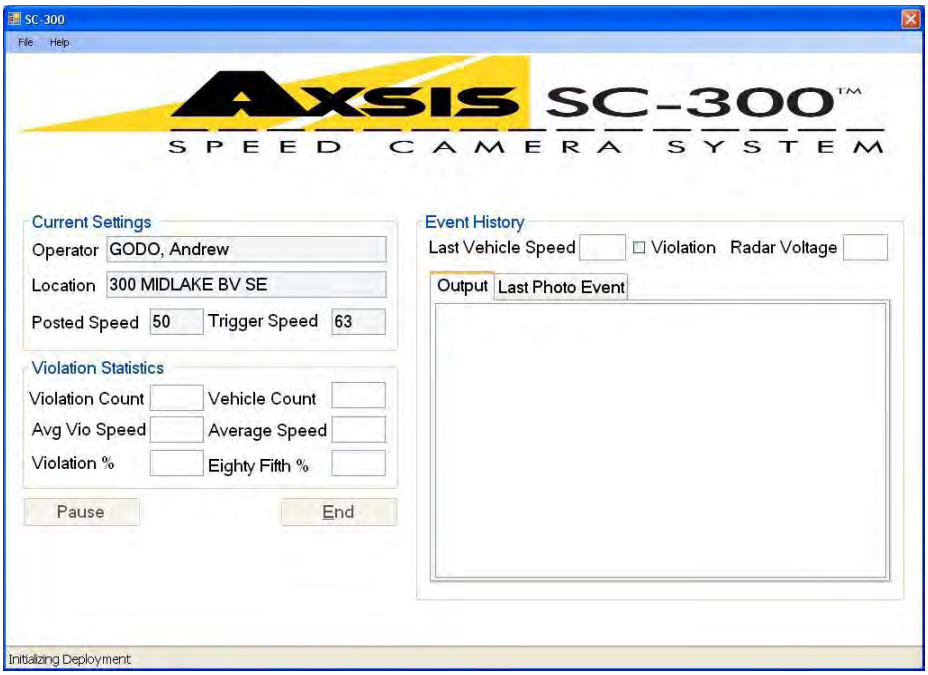
Time and Date Entry are Correct

Note: *Please be sure that the correct time, date, month and year is selected. Any incorrect selections will result in erroneous data being applied to all violation images captured for the subsequent deployment.*

15.6 SC-300H Speed Camera System – Operational Screen

Once the previous steps are complete, the system will do a "Radar Calibration Test" and then the following operational screens will be presented.

- Current Settings
- Violation Statistics
- Event History
- Pause Button
- End Deployment Button

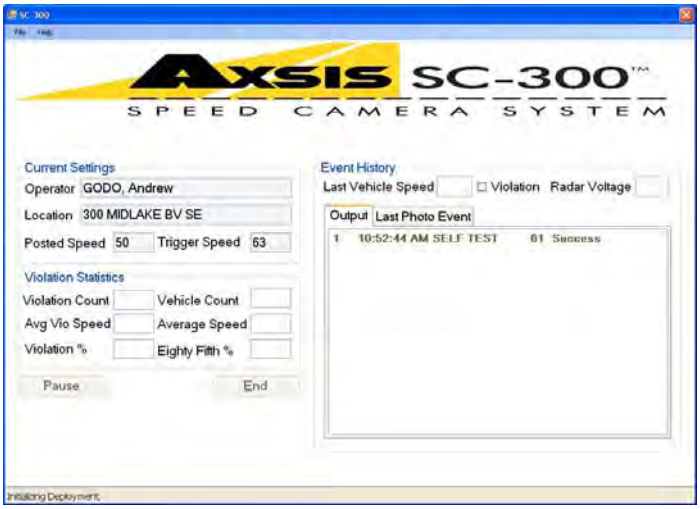


SC-300H Speed Camera System – Operational Screen

Note: *The operational screen also displays the current operational status in the bottom left corner. The above example shows that the deployment is initializing. At this point the system will reach out to the camera and take test shots and fire the strobe. Once the initial startup diagnostics have been performed and have passed, including a "Self Test", the radar will be "Armed" and operational.*

15.7 CURRENT SETTINGS

The disp layed setting s relate to t he sele cted and saved setting s d uring the initial startup sequence and may not be changed on the operational screen.

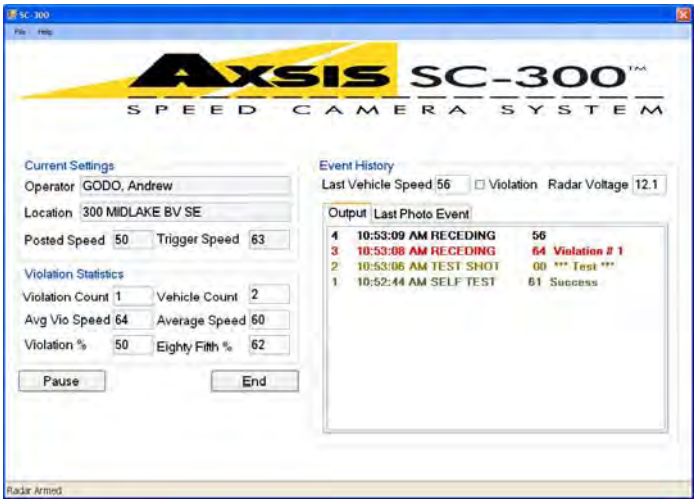


Current Settings

At the very beginning of the deploy ment, when the r adar first start s re cording vehicles o n this screen, **it is very important that you verify the information displayed is correct**. Make sure that the location, poste d speed and trigger speed are accurate. This information will show on the data bar of all violations recorded. **If it is inaccurate, the violations are not useable.**

15.8 VIOLATION STATISTICS

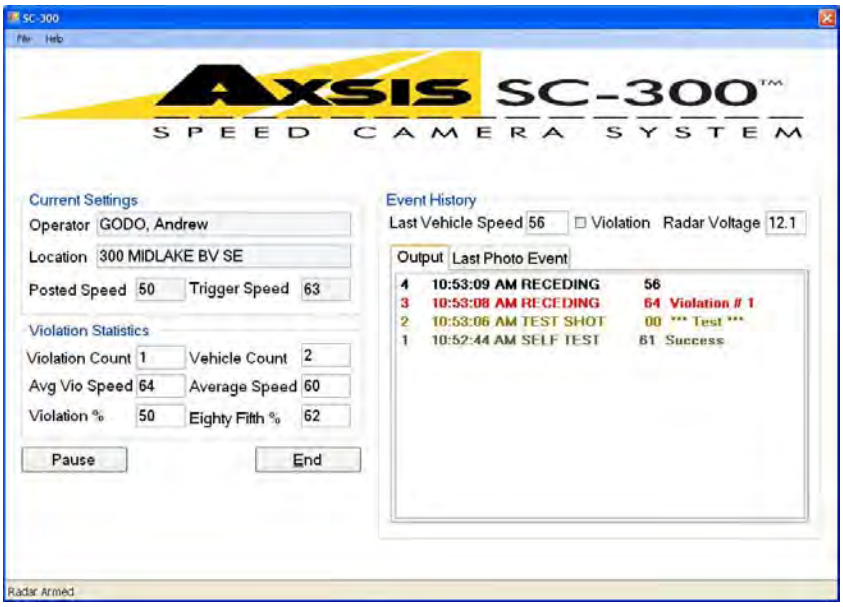
The "Violation Statistics" disp lay data related to the dep loyment. The data fields are not changeable. The data includes Violation Count, Vehicle Count, Average Violatio n Speed, Average Speed, Violation Percentage and the Eighty Fifth Percentile.



Violation Statistics

15.9 EVENT HISTORY

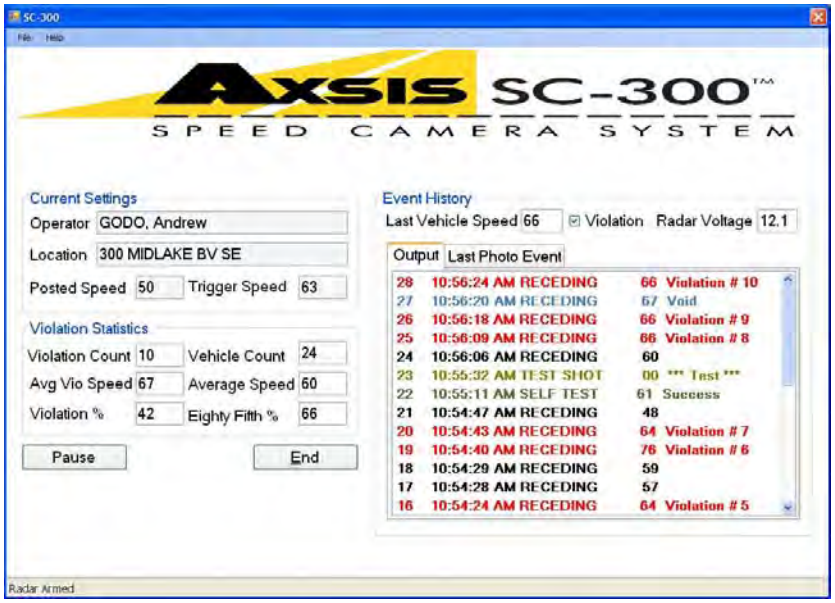
The Event History shows the last vehicle speed, an indication of whether or not t he vehicle was a violator and the Radar Voltage. Also displaye d are the Output Tab a nd the Last Photo Event Tab.



Event History

15.9.1 Output Tab

The Output tab displays a “Stack” list of the newest-to-oldest vehicles’ speeds as they were passing the radar and what their status was.



Output Tab

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During the deployment, sequential events will be displayed in the “stack” to provide an ongoing report of vehicle detection.

The events are color coded as follows:

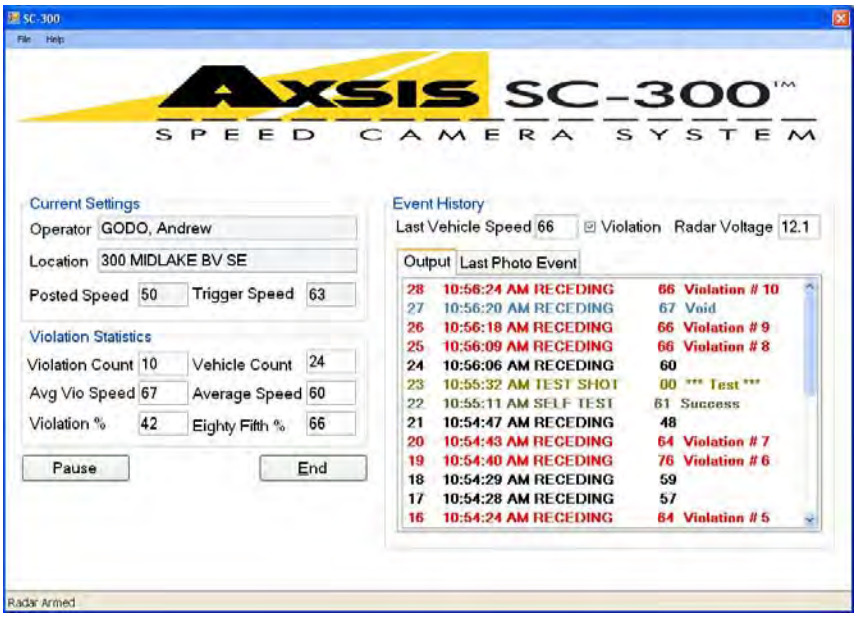
violations (displayed in red)

voids (displayed in blue)

non-violations (displayed in black)

tests (displayed in olive)

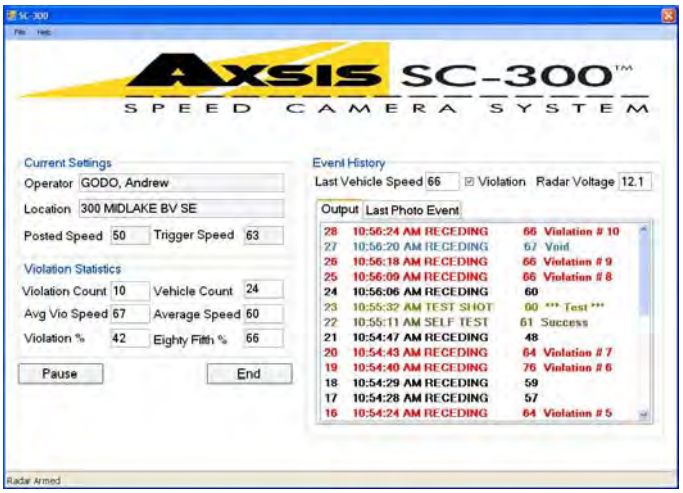
success (displayed in green).



Stack Event Colors

15.9.2 Voids

A void will display when the system recognizes a problem with the radar reading. This may be because of multiple vehicles in the beam, changes in the speed of the vehicle as it passes through the beam or other physical reasons that cause the reflected signal to be inconsistent.



Void Tab

An excessive amount of voids could suggest that there is a problem with the radar or the deployment location.

15.9.3 Last Photo Event Tab

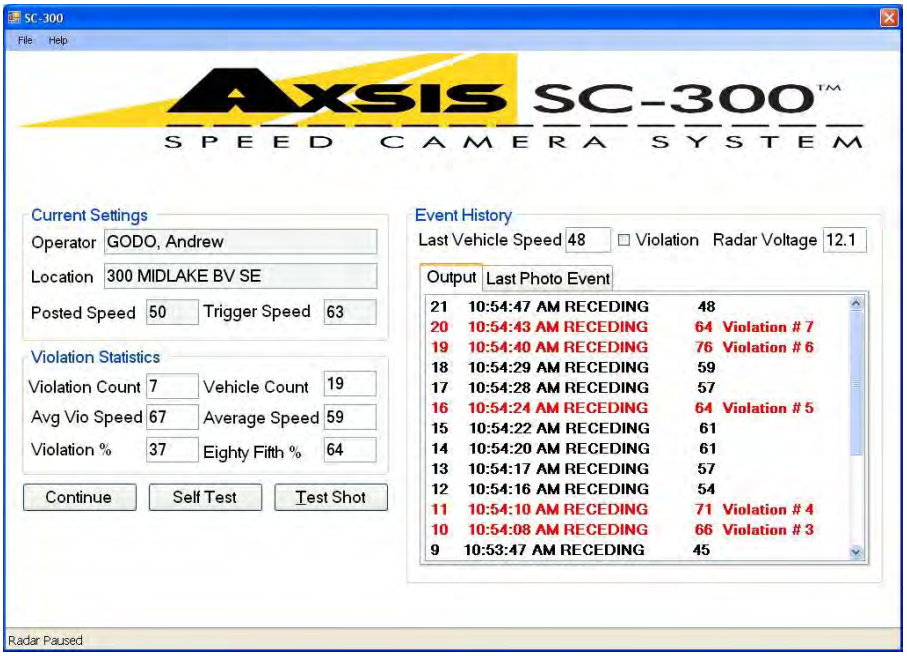
This is a new tab within the Axsis™ SC-300H Speed Camera System. It allows the user to view the images immediately as they happen. There is a small delay; however, the operator will be able to see the violation picture right from the "Operational Screen" rather than having to stop the system to review it.

While in the "Operational Screen" you can access the "Last Photo Event" by either clicking on the tab titled "Last Photo Event", or by clicking on one of the last ten violations.

Last Photo Event Tab

15.10 Pause Button

If an Opera tor wishes to temporarily suspend the deployment for conditions su ch as traffic congestion, adverse weather, etc. or to temporarily distract attention away from the deployment, activate the “Pause button”. “Radar Paused” will then displa y at the bottom left hand corner of the screen.

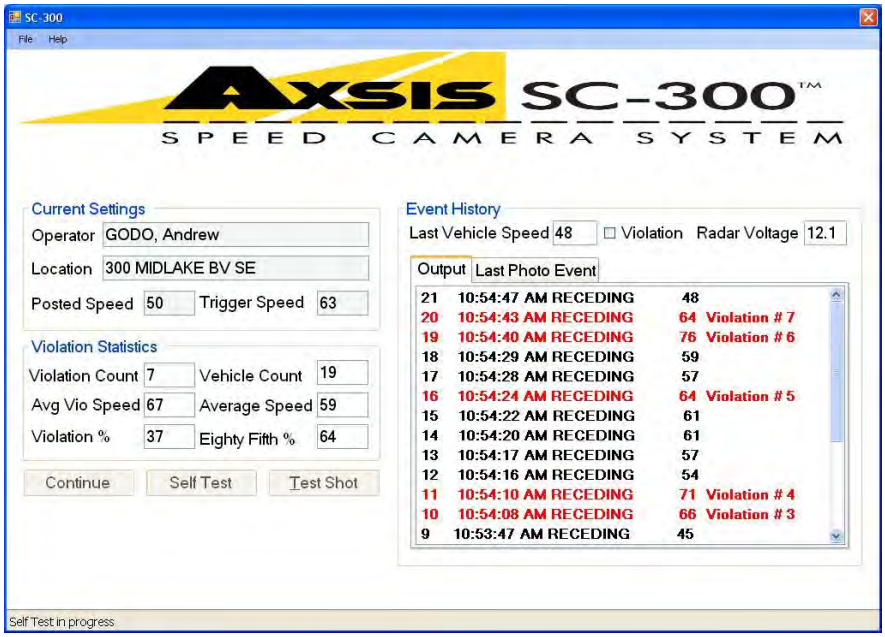


Pause

When full attention will be back on the deployment, activate the “Continue Button”.

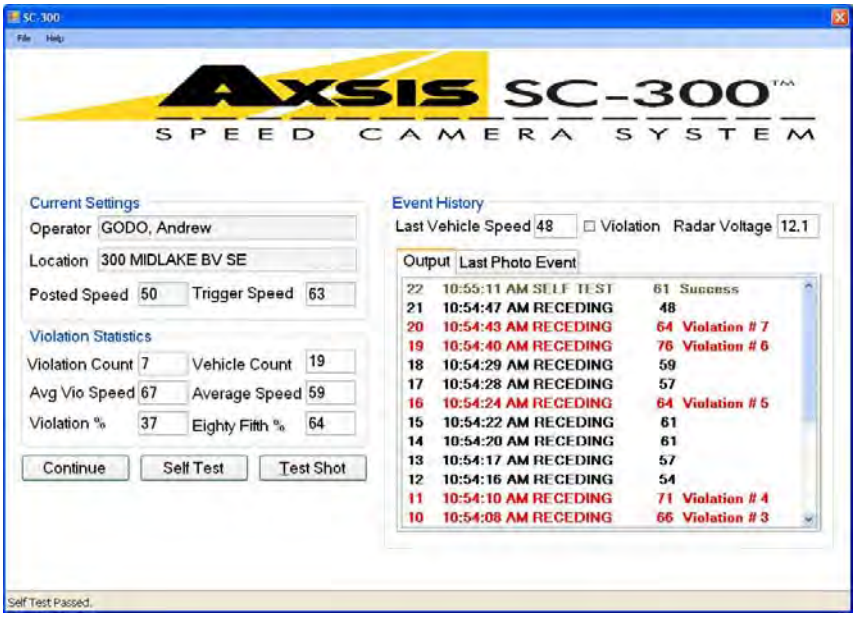
15.11 Self Test

While the system is paused, when you click the "Self Test" button it will send a command to the radar to engage a self test. During the Self Test, a "Self Test in progress" or "Self Test Passed" message will display in the lower left hand corner of the screen.



Self Test in Progress

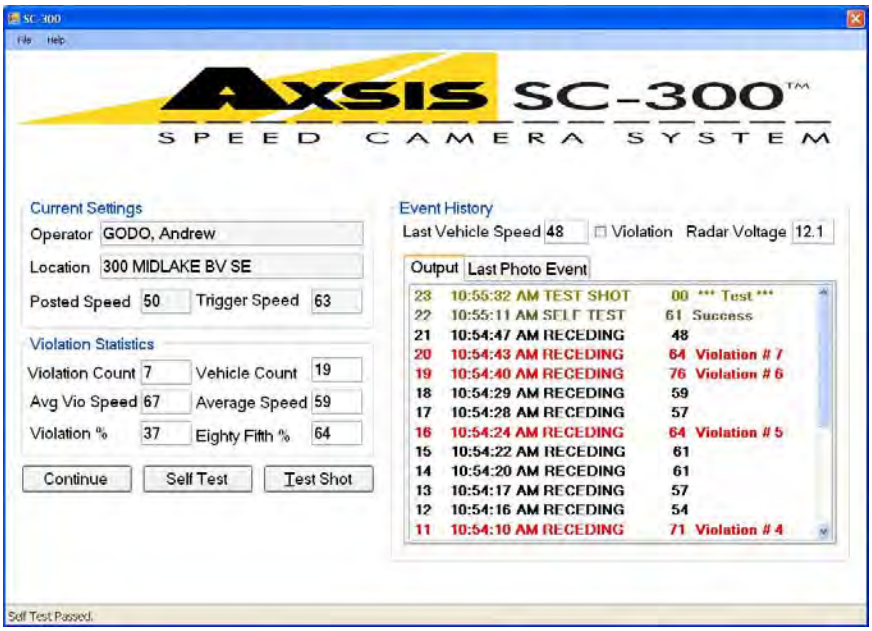
Once the self test is complete it will display as an event in your stack in the Output Tab.



Self Test Passed

15.12 TEST SHOT

While the system is paused, when the “Test Shot” button is clicked it triggers the camera to take a test picture. It is not necessary for a vehicle to be in the radar beam for this to trigger.

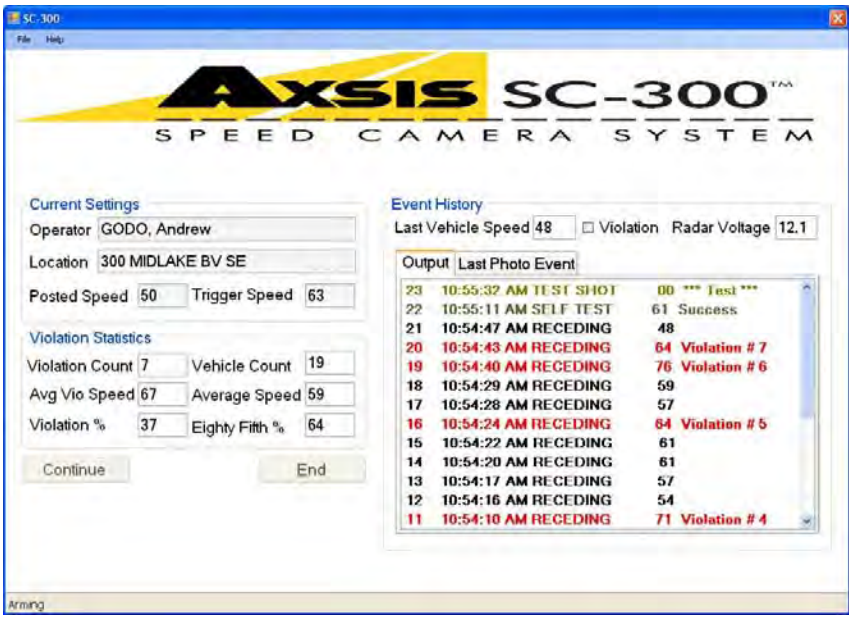


Test Shot

Once the Test Shot is complete it will display as an event in your stack.

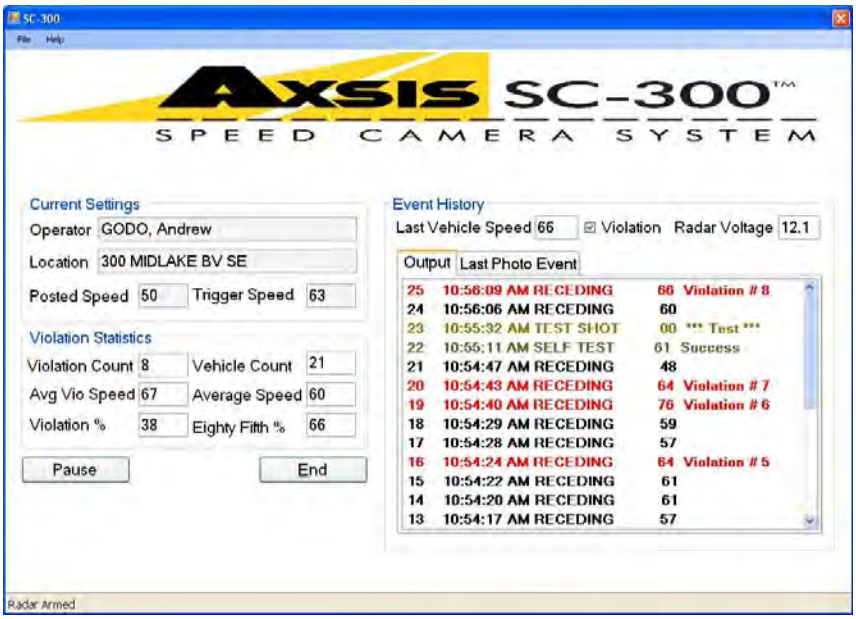
15.13 CONTINUE

While the system is paused, when the “Continue” bu tton is clicked it triggers the system to arm the radar. Notice that “Arming” will display in the lower left hand corner of the screen.



Continue - Arming

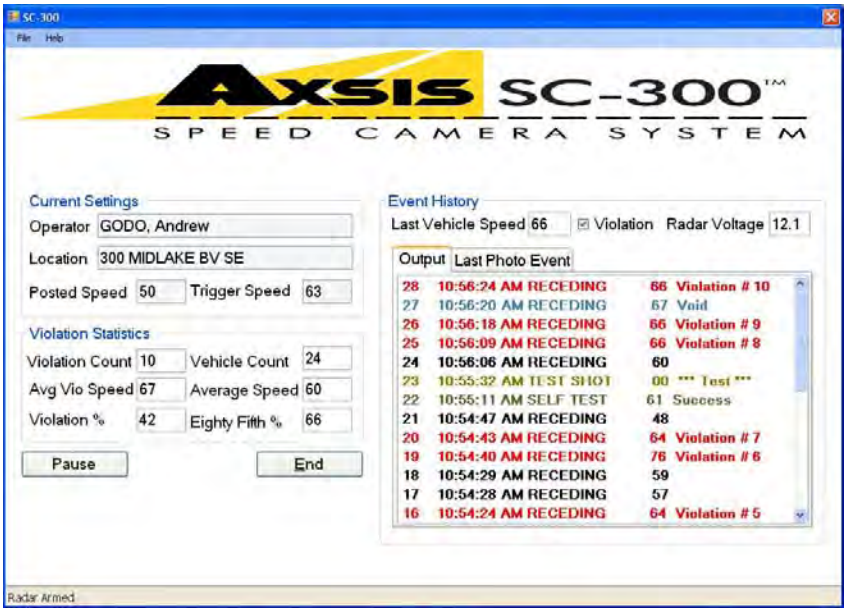
Once the arming of the radar is complete it will then display “Radar Armed”. The “Pause” button now returns for use in the event you need to pause again.



Continue – Radar Armed

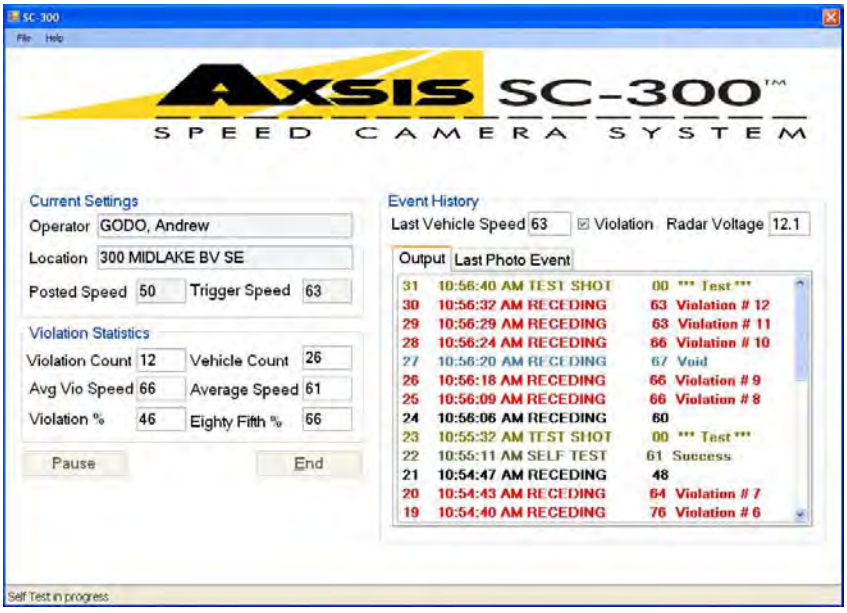
15.14 End Deployment

When you are ready to end your deployment, click the "End" button. This will display the following screen and then initiate an "End Deployment Test Shot sequence" as well as an "End Deployment Calibration Test".

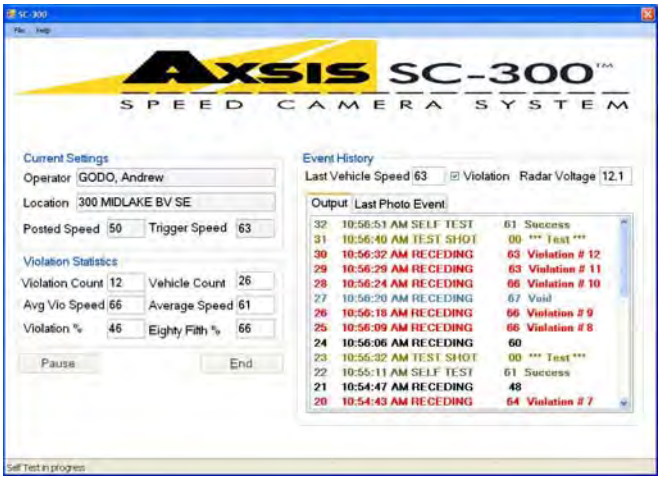


End Deployment Button

At this point quickly write down your violation statistics for your paperwork. (They do not stay posted on the screen very long)



Self Test in Progress



Self Test Success

Once the self test is complete the system will prompt to start the image download

Transfer Button

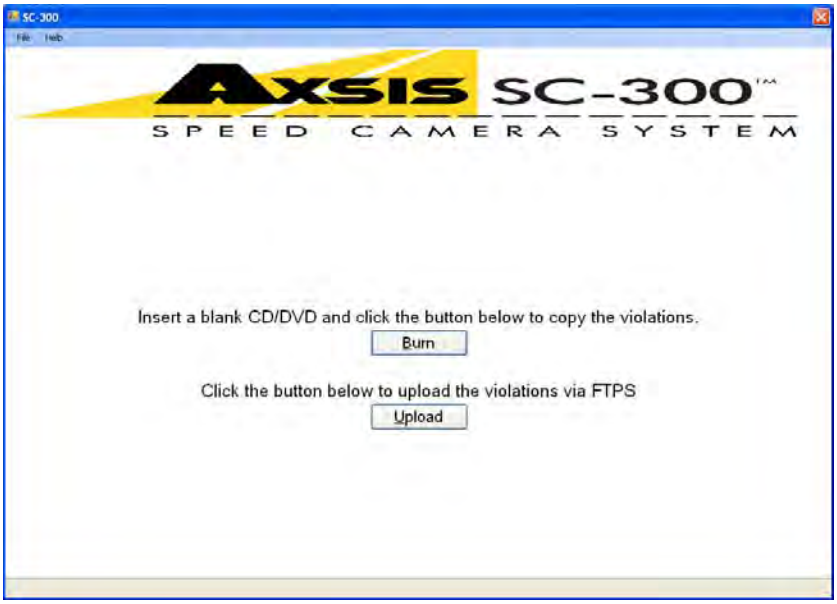
Click the Transfer Button to start downloading the images from your data card. Insert the card as the system prompts.

Do not remove the last data card from the card reader until the following message appears on the laptop screen.

Deployment Ended

15.15 CD Burn Process - End of Day or After the Last Deployment

Load a new blank DVD +R CD in the DVD/CD drive and press the “Burn” button.



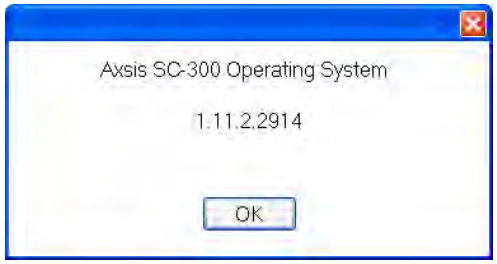
CD Burn Process

When the CD/DVD burning is complete, the CD/DVD will automatically eject.

Label the CD/DVD and return to be processed.

15.16 Help About

The “Help About” menu allows the user to see what version they are currently using.



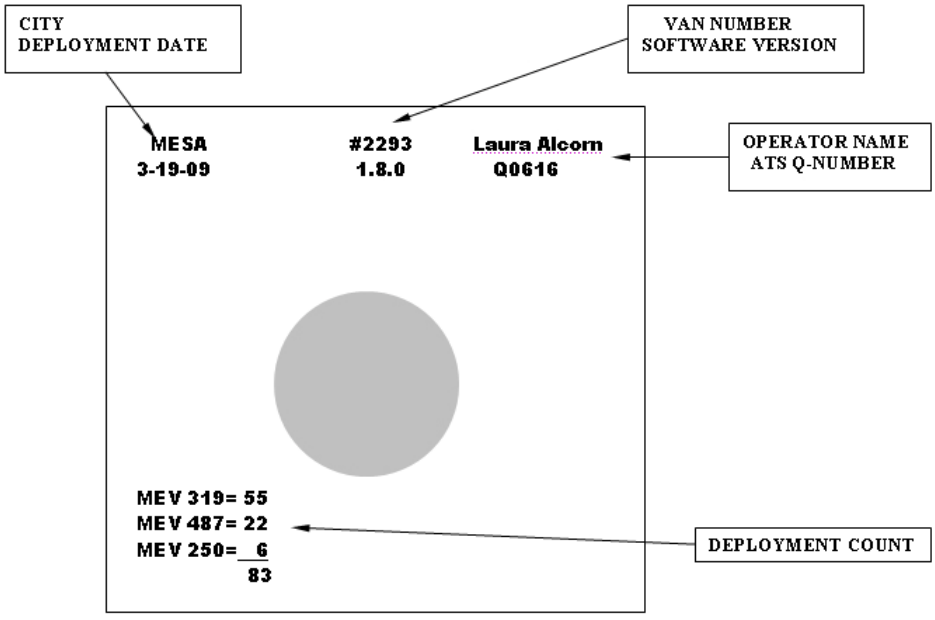
Help About

16. LABELING THE CD/DVD

It is recommended that you fill out your CD/DVD and envelope as follows.

Please make sure your deploymen t discs and sleeves follow the proper identificat ion forma t below and are done neatly. **Make sure your writing is legible.**

Labeling Guide for the CD/DVD



Labeling Guide for the CD/DVD Envelope

17. SC-300 Upload Process - End of Day or After the Last Deployment

17.1 Overview

The SC-300H Upload is a process which connects to an FTP server from the local computer. Access to the internet is required and there may be additional configuration issues to be discussed with your network administrator. These issues are typically resolved by the implementation team and should not affect the operator.

The SC-300H Upload process may be used in conjunction with 1.11.1.2888 and later. There are specific configuration keys which must be activated in order for the SC-300H software to make use of this feature.

When prompted, the operator may be able to select 'Upload' instead of 'Burn to CD/DVD'. If 'Upload' is selected, then the deployment files on the operator's laptop will be moved to a target location monitored by the SC-300H Upload service.

After SC-300H operations are completed and the operator is connected to the internet, they can enter the SC-300H Upload GUI to upload data.

The operator will have the ability to initiate an FTP session, to cancel it, to retry it or to skip it, depending on the current conditions. Likely, these conditions will be dictated by the operator's supervisor, such as burning data rather than FTP-ing in certain situations.

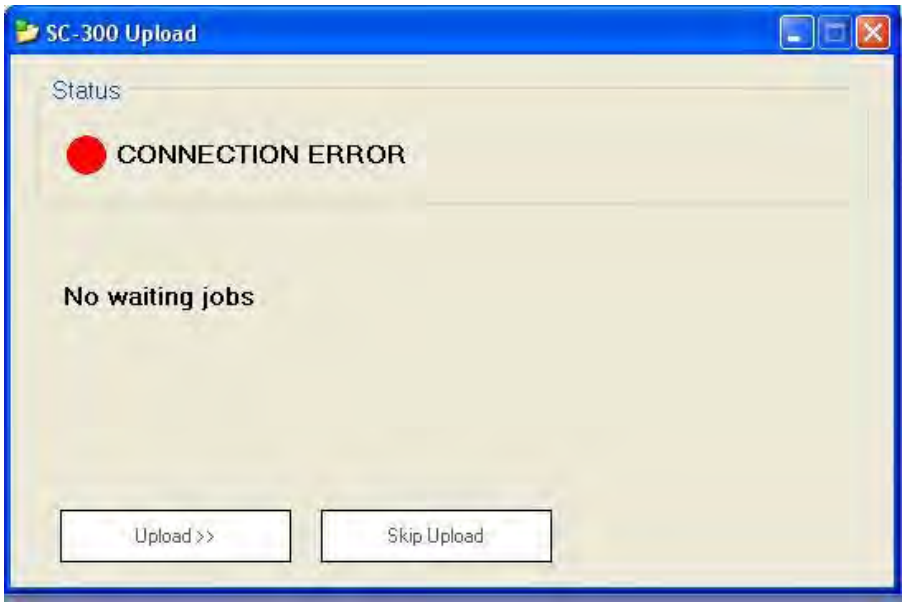
Upon completion, the operator should be able to recognize when data has been uploaded to the FTP server and be confident that their day's deployment is being processed.

17.2 Screenshot Walkthrough

To begin the FTP upload process click Start > Programs > SC-300 Upload.

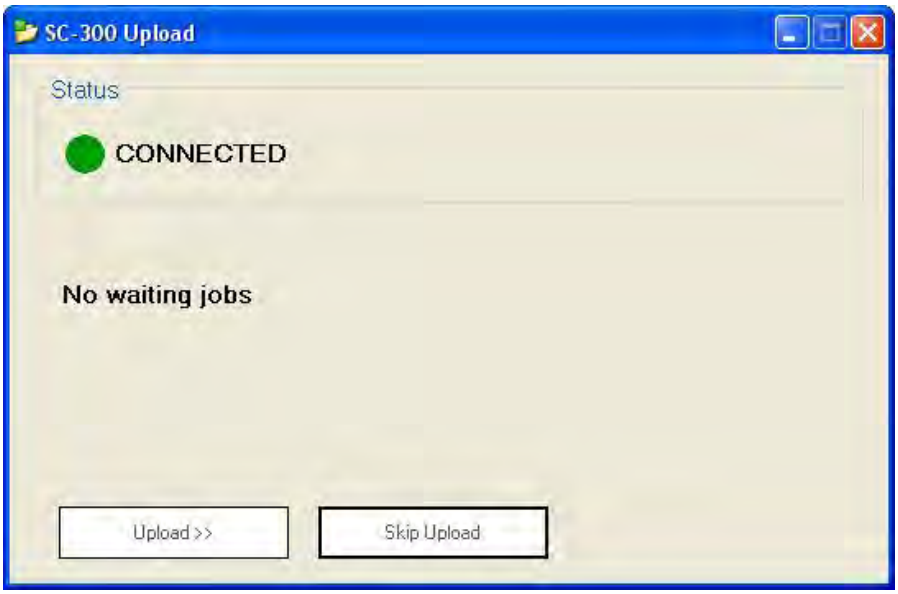
Programs – SC-300 Upload Files Residence

The Status will indicate whether the laptop is able to connect to the FTP server. It will be one of "Connected", "Not Connected" or "Connection Error". If it isn't "Connected", contact your supervisor.



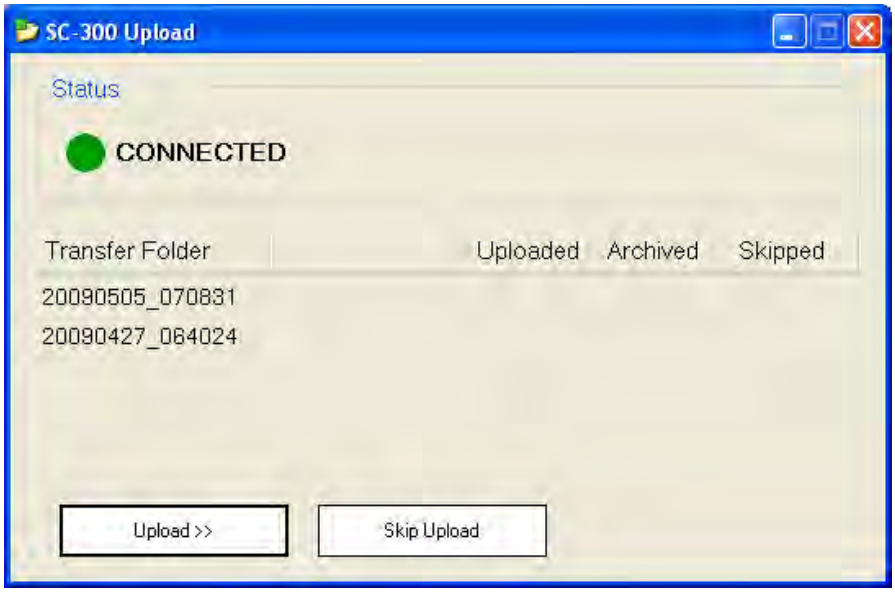
Connection Error Dialog

At the start of a shift, the message "No waiting jobs" should be displayed. If there are any folders waiting upload, note the names of the folder and follow standard operating procedures (these may vary between notifying your supervisor to attempting to upload).



SC-300 Upload GUI – Connected and No Waiting Jobs

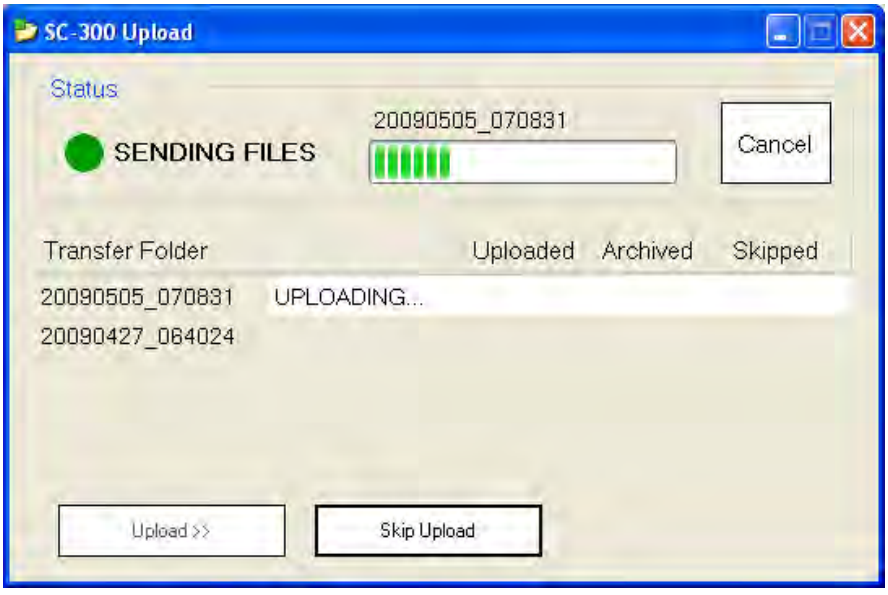
After conducting deployments, deployment folders should appear under “Transfer Folder”.



Status- After Transfer and Marked for “Upload”

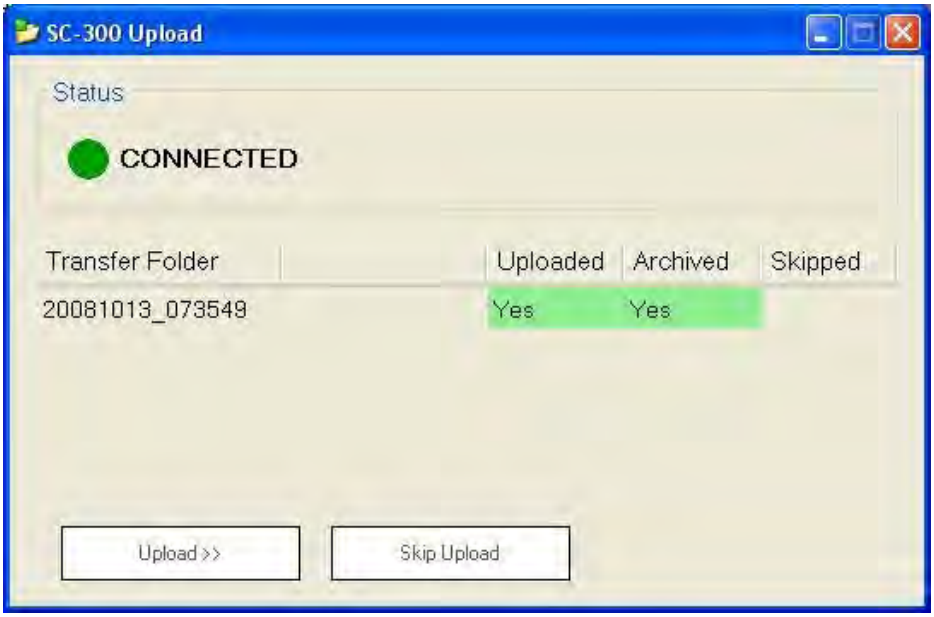
17.2.1 The “Upload” button

Clicking on the “Upload” button will start the upload process.



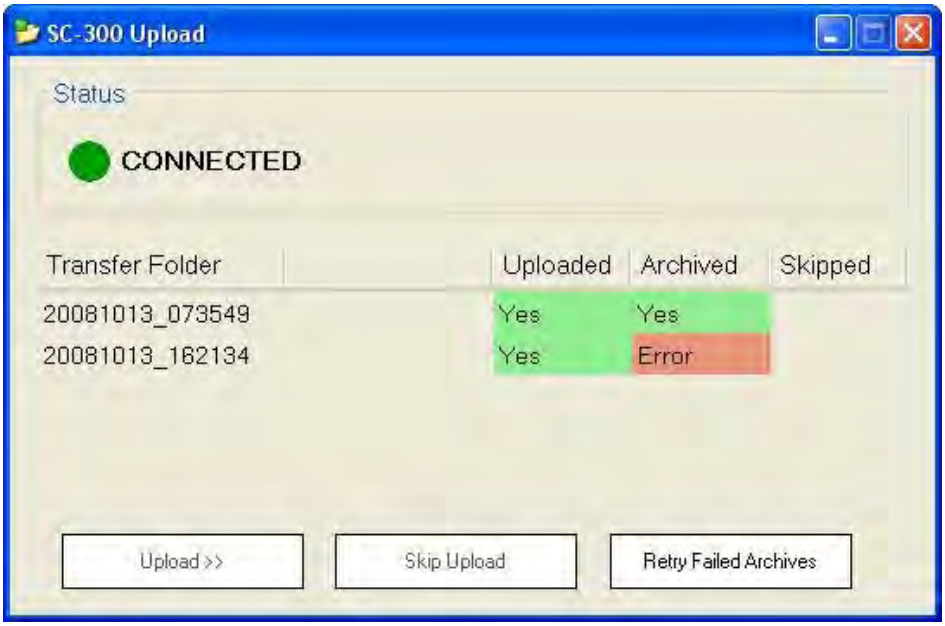
Files- Being Uploaded

Once the files are successfully uploaded your dialogue box will look like the one below showing that the folder was uploaded and archived.



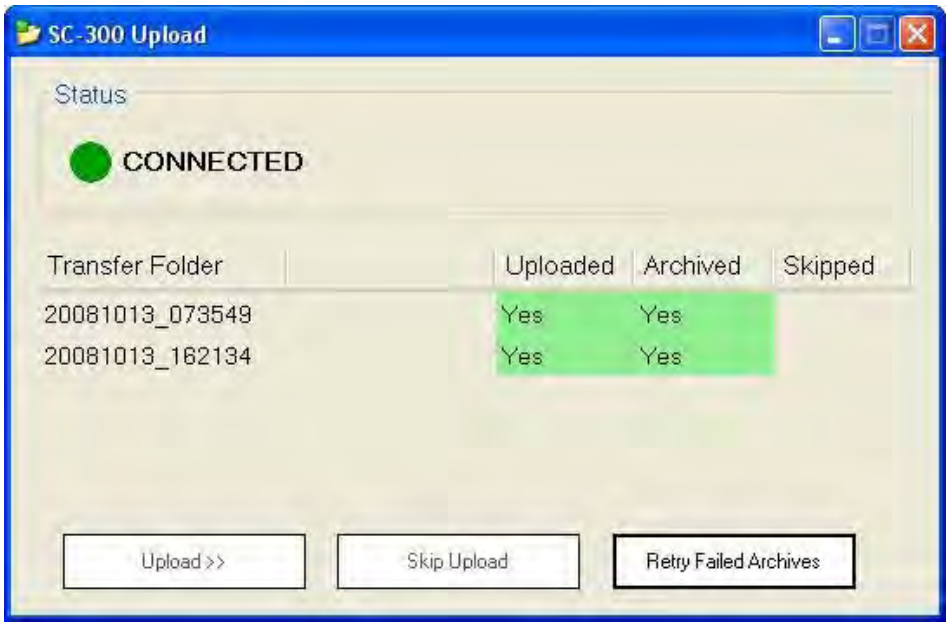
Files- Successfully Uploaded and Archived

If an error occurs while the information is archiving you will see the “Error” message under “Archived”.



Error – Failed to Archive

If this error occurs, click the “Retry Failed Archives” button to try again.

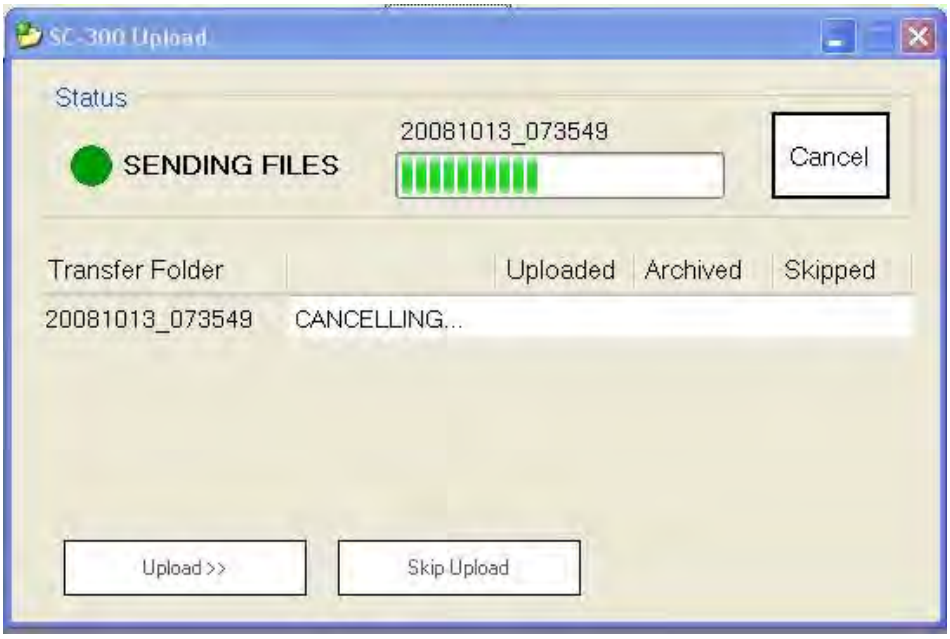


Archive – Process Retried and Successful

At anytime during the upload process the operator can hit the Cancel Button and will be prompted to confirm.

Confirmation – Cancel Upload

Upon confirmation the upload will be cancelled.



Cancelation Status Dialog

If you cancel an upload but it had already completed uploading you may see this dialog screen.

Unable to Cancel Uploads Dialogue Screen

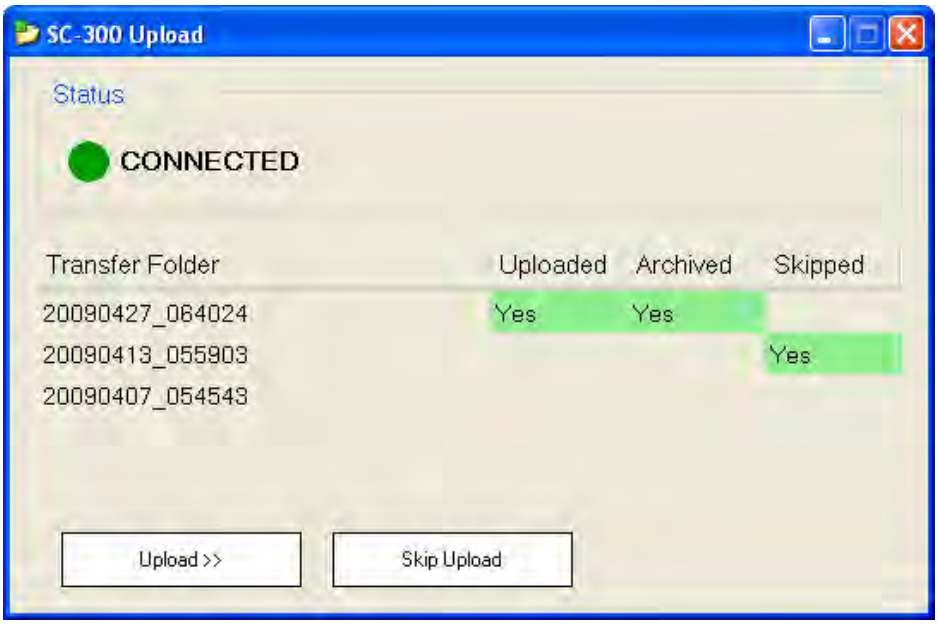
17.2.2 The "Skip Upload" button

If the operator has been instructed to skip upload by a supervisor, the operator will be prompted to confirm and will be instructed what to do in this event.

Clicking on the skip upload button will skip the upload process and you will need to burn a DVD.

Confirmation Screen – Skip Uploading

This dialog box demonstrates the different states for successfully processed deployments.



GUI State- Uploaded, Archived and Skipped

The operator should notify their supervisor of both successfully completed uploads as well as failed, skipped or other problems. For example, the above folder 20090427_064024 was uploaded successfully and the folder 20090413_055903 was skipped and 20090407_054543 has not been processed. 20090407_054543 could still be burned to DVD or it could be uploaded.

The SC-300H Upload does not always refresh, so if ever the text is garbled, right click the icon in the task tray and select 'Exit'. This will close down the SC-300H Upload interface. Start the interface again by selecting the desktop icon and the interface dialog will appear refreshed with the most current information.

18. SAMPLE TRACKING SHEET

PHOTO RADAR
TRACKING SHEET
PD 276E(R2005-07)

DATE (YYYY/MM/DD)	REGIMENTAL NUMBER	FILM NUMBER	UNIT NUMBER
LOCATION			LOCATION CODE
CHARGE ☐ 115 (2)(p) ☐ 115 (2)(r)	SPEED LIMIT	SIGN LOCATION	DIRECTION OF TRAVEL ☐ NORTH ☐ EAST ☐ SOUTH ☐ WEST

ARRIVAL TIME	DEPARTURE TIME
ROAD CONDITIONS	WEATHER CONDITIONS
FILM USED / TRIGGER SPEED / NUMBER OF VEHICLES	
RADAR SERIAL NUMBER	CAMERA
NOTES	

FILM PHOTO NO	LANE	VEHICLE DESCRIPTION	SPEED (km/h)	TIME	FILM PHOTO NO.	LANE	VEHICLE DESCRIPTION	SPEED (km/h)	TIME
1		Test Photo			18				
2					19				
3					20				
4					21				
5					22				
6					23				
7					24				
8					25				
9					26				
10					27				
11					28				
12					29				
13					30				
14					31				
15					32				
16					33				
17					34				

SCANNED BY REGIMENTAL NUMBER	INITIALIZED BY REGIMENTAL NUMBER	ANALYZED BY REGIMENTAL NUMBER

Sample Tracking Sheet

19. ADDITIONAL NOTES