

**G3**<sup>™</sup>



User's Manual & Installation Guide Rev 8/7/19





# User's Manual & Installation Guide

Over 60 Years of Doppler Radar Experience

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# Welcome to Decatur Electronics, Inc.

Thank you for choosing the Decatur Electronics G3<sup>™</sup> — A highly advanced traffic radar unit that will reward your department with years of dependable service. The G3 design incorporates high performance and long range, with many leading features. We urge you to study this manual before using the G3, so you can optimize the benefits of this sophisticated radar device. We believe you will be pleasantly surprised by the features and advantages.

The G3<sup>™</sup> is small, dependable and features instant target acquisition. If you are as pleased with its performance as we think you will be, ask your Decatur sales representative about other Decatur products.

Traffic officers told us exactly what they wanted in a radar device and we built it. Try any one of our products and see if you don't agree that it is the best-in-class!

> -The Management and Staff at Decatur Electronics, The Nation's Oldest Radar Company

# G3<sup>™</sup> Features

The G3<sup>™</sup> is a highly advanced traffic radar device offering many advanced capabilities. It includes 32-bit floating point digital signal processing (DSP), a versatile detachable computer/display unit, a Ka band directional antenna, and an easy-to-use Infrared (IR remote) control. It also features Faster Mode for detecting the next strongest target going faster than the strongest in multiple target situations.

The G3 DSP provides instant target acquisition and speed lock as well as more precise tracking and speed measurement. If space in your vehicle is at a premium, you will appreciate the detachable computer/display unit. For more safety conscious installation options, you can separate the pieces and mount them wherever best meets your specific needs.

The IR remote controls all of the functions of the radar unit. The remote features convenient "eyes-off" raised buttons for use without taking your eyes off the road and fits comfortably in the palm of your hand, positioning all controls at your fingertips.

# **About This Manual**

This manual contains valuable information to help you set up, use and maintain your G3<sup>™</sup>, so you can extend its life and keep it at peak performance. Please take a moment to read through it, and keep it handy for future reference.

#### Note the following symbols in this manual:



Indicates a warning message about safety precautions. Please read it carefully.

Indicates a helpful tip or precaution to note.

[OPT] Indicates section refers to optional equipment.



Your G3<sup>™</sup> radar unit includes selections from the following

**Tuning Forks** 

#### 1. Quick Start

Use the following instructions to quick start your G3<sup>™</sup>:

- With all cables and antennas attached, plug the cigar plug of the radar into a powered 12VDC cigarette lighter receptacle in the patrol vehicle.
- Press the PWR button on the front display to power up the radar unit. The radar will run through a brief self-test which includes illuminating all display segments.
- 3. Press the ANT FRONT or REAR button to select the antenna from which you want the radar to transmit. Press the same ANT button when you wish to place the radar back into standby mode.
- 4. Press and release the MODE button to quickly toggle between Moving Mode Opposite Direction and Moving Mode Same Direction. Press and hold the MODE button for two seconds to activate Stationary Mode.
- 5. Press and hold the FAST button to select Faster Mode when you want to track the next strongest target going faster than the strongest.
- 6. In Moving Mode Same Direction setting G3 and its directional antenna will automatically perform addition or subtraction relative to the patrol speed to properly calculate the target speeds.
- 7. To lock a target speed, press the LOCK button. The target speed and its direction information will transfer to the LOCKED window and locked direction indicators. The radar will continue to process speeds and display them in the TARGET window.
- 8. To clear a locked speed, press the LOCK button when an antenna is transmitting, and no target is present.

# 2. Installation

Use the following instructions to mount your G3<sup>™</sup>:

## 2.1 Separating the Computer/Display Unit (optional)

If the space in your vehicle is at a premium, you will appreciate the  $G3^{TM}$  compact size and versatile components. You can separate and remotely mount the computer unit from the display unit. Common places to mount it are behind the dash, under the driver's seat, or on the console.

To separate the combined unit, locate and remove the two display retaining screws (Green Arrows) using a (add size) hex tool.



Figure 2.1a Separating the computer/display unit.



Using a hex tool, remove the retaining screws.

Pull the display from the computer and Note the 9-pin connectors on each half of the unit. Screw two standoffs (included with the radar) into the holes next to each connector on the display unit. These standoffs are used to attach the two pieces with the 9-pin connector cable.



Figure 2.1c To connect the separated unit, first insert the standoffs to secure the cable connectors.

**G3**<sup>TM</sup> User & Installation Manual

Then attach and secure the connectors with the thumbscrews on the sides of each cable connector.



Secure the connecting cable by tightening the thumbscrews into the standoffs.

To return the unit to a one-piece configuration, remove the cables and standoffs, line up the 9-pin connectors, push the two pieces together and secure with the two retaining screws.

#### 2.2 Mounting and Connecting the Computer/Display.



You can mount the computer/display unit behind and to the side of the steering wheel or on the dashboard. The computer unit easily withstands and remains accurate in temperature extremes. Dashmounting the unit promotes safety; you can read the display without taking your eyes off the road.

To mount the unit, use the Velcro<sup>™</sup> fastening material or the mounting bracket. Before applying the Velcro<sup>™</sup>, use a clean cloth to remove any foreign material from the dashboard and bracket face. Position the Velcro<sup>™</sup> lightly on the computer/display unit and mounting surface.

After the unit is in the correct position, press it firmly to affix it to the surface. For the bracket mount, simply place and tighten the screws on the mounting bracket into the holes in the unit. Then adhere the suction cups to a clean glass surface. For maximum adhesion, moisten the suction cups before affixing them to the surface.

There are four locations where cables connect to the rear panel of the computer unit. Two are quick-disconnect Ethernet connectors for the antennas, a third is a nine pin DB-9 connector and the last is a quick disconnect power connector.



Figure 2.2a The antenna quick-disconnect connectors plug into the computer unit in the above locations.

1. Align the antenna Ethernet connector with the receptacle.

2. Push the connector into the receptacle until you hear a click.

3. To remove the connector, press down on the top cable plug latch and pull apart.



Figure 2.2b Align the latch on the top of the Ethernet plug with the notch on the computer Ethernet receptacle.

#### Power connector

#### WARNING

Be sure to plug the power connector into the computer unit first before plugging the power plug into the auxiliary power source. If the power source is on, it can damage the unit. The power cable has a larger 12-volt power plug (cigar plug) on one end. Make sure the plug fits securely in the vehicle's auxiliary power (cigarette lighter) receptacle.



Figure 2.2c The cigar plug for the auxiliary power receptacle.

#### Antenna connector

The antennas are connected to the computer unit with a standard CAT 7 shielded Ethernet cable. Either end of the cable can be used to connect to the antenna and computer unit.



Figure 2.2d Cable connector that plugs into the antenna or computer unit.

To remove a cable, depress the latch at the top of the connector and pull.

#### Serial connector

On the back of the computer unit there is a female DB-9 connector marked "serial" that allows you to connect the G3 ™ to other devices (i.e. display signs, in-car video, PCs). To use this RS232 serial connector, you will need a communications cable. (A communications cable for video and PC is not included. You can order it from Decatur Electronics by calling 800.428.4315).

#### 2.3 Mounting and Connecting the Antennas

A variety of brackets are available. To attach the antennas to the standard brackets, align the threaded mounting hole on the antenna with the threaded post of the front antenna bracket and on the rear antenna bracket the threaded knob with the slot on the L-brace. Then screw the post or knob into the threaded mounting hole.



Figure 2.3a A front mount antenna (Ka-band) using the P773-237 bracket

Figure 2.3b A rear mount antenna (Ka-and) using the S758-34-0 bracket

#### Front Antenna Mounting

When mounting the front antenna bracket to the windshield use the following bullet points to help in determining the proper location.

- Make sure that you **Do Not** mount the antenna in the deployment path of the air bag or where it will obstruct the driver's vision.
- Choose a location so that the antenna will be completely below the tinted area of the windshield.
- Test the antenna location for good performance and for any fan interference.

Once the considerations listed above have been observed, make sure that the windshield glass is properly cleaned and prepared. Make sure the suction cup is placed on the windshield so that the release button is easy to get to if you should need to release the suction cup.

## <u>Antenna Alignment</u>

After you affix the bracket to the windshield, adjust the position of the antenna. ANY SIGNIFICANT DEVIATION FROM A PARALLEL ORIENTATION CAN AFFECT THE RADAR'S ACCURACY.



Figure 2.3c Correct Orientation The antenna is parallel to the target vehicle's direction.

Figure 2.3d Incorrect Orientation The antenna and target vehicle's direction are not parallel.

Point the antenna so it is parallel with the patrol vehicle, (the direction the patrol vehicle is facing) and parallel with the ground.

#### **Rear Antenna Mounting**

Mount the rear-facing antenna near the center brake light where it is not obstructing a clear view of traffic. The bracket is easily affixed to the rear deck using the Velcro<sup>™</sup> strips supplied with the bracket. Follow the same orientation instructions as for the front antenna.

Use only the mounting hardware provided. Damage to the antenna housing can occur if you use incorrect fasteners.
Do not modify the brackets. Most brackets incorporate an isolator that prevents the metal housing of the antenna from coming into contact with the frame of the car. Removal of the isolator can cause interference to be easily picked up diminishing performance.
To reduce interference, position the antenna away from the patrol vehicle's display, fans, engine, and the G3<sup>TM</sup> computer unit.
When removing other optional brackets that have suction cups, use the tabs on the suction cups to break the vacuum seal.

After you have mounted the antenna, plug one cable end into the antenna and the other end into the antenna receptacle on the computer/display unit.

If you are using only one antenna, you must connect it to the FRONT antenna receptacle. Either the FRONT or REAR button on the remote can activate a single antenna system.

#### 2.4 Installation Check

After you install the components, for safety, double-check to ensure all components are secure. Then check for potential interference from sources such as the air conditioner/heater fan.

- 1. With all other vehicle accessories off, turn on the heater/air conditioner fan.
- Power up the radar by pressing the PWR button on the front display and select the front antenna by pressing the FRONT button.
- 3. Cycle through the fan's low to high settings.

- If the unit displays a reading, reposition the antenna to eliminate it. Often, the far-left corner of the front windshield is an interference-free zone where you can place an antenna.
- 5. Repeat this process for the rear antenna.

# 2.5 VIP Installation (Option)

If your G3 has come with the optional Vehicle Interface Portal<sup>™</sup> (VIP<sup>™</sup>) then use the following installation instructions.



# WARNING

Before connecting the VIP<sup>™</sup>, ensure all devices, including the vehicle and radar are powered off.

# 2.5.1 Connecting to the Radar

Connect the VIP's<sup>™</sup> communications cable to the G3<sup>™</sup> communication port located on the back panel of the radar unit. This port is a DB-9 female connector labeled "SERIAL". Refer to the picture in Figure 2.5.1.



Figure 2.5.1a VIP connection to Radar

#### 2.5.2 Connecting to The On-Board Diagnostic Port

Connect the VIP<sup>™</sup> to the vehicle's On Board Diagnostics port. (Refer to your owner's manual for the location of your vehicle's OBD-II port.)

In some vehicles the clearance between where the diagnostics port is located and the bottom of the dash is very close and can cause the port and VIP<sup>™</sup> to be bumped by the officer's leg when getting into the vehicle . In those cases Decatur offers a two-foot right angle extension cable (S769-15) to allow the VIP<sup>™</sup> to be relocated away from the port so as not to be damaged. Contact Decatur Electronics' Customer Service Department at 800.428.4315 for ordering information.

#### 2.5.3 VIP<sup>™</sup> Activation

Before activating the VIP<sup>™</sup> it is recommended that you read Section 3 on Operating the G3<sup>™</sup>.

The car must be running, simply having the key turned to auxiliary is not enough to fully activate the VIP<sup>™</sup>.

Make sure the LED light on the VIP<sup>™</sup> is constantly on.



The VIP<sup>m</sup> does not have to be plugged into the G3<sup>m</sup> for you to note the LED status.

- It may take up to 4 minutes for the VIP<sup>™</sup> to start communicating with certain vehicles, although most only take a few seconds.
- If the LED is flashing, there are errors in the data being sent from the car.
- Do not expose the VIP<sup>™</sup> to excessive moisture or submerge the VIP<sup>™</sup>.
- If the LED is mostly off but flickers only occasionally there is an issue with the power being supplied to the VIP<sup>™</sup>. The VIP<sup>™</sup> is in hibernation mode to conserve the vehicle's battery.

If the LED is on and the VIP<sup>™</sup> is connected to a radar unit, then when the radar is turned on and it runs through its diagnostics routine it will show the message "VIP" as the last message on power up.

Once the power-up routine has run correctly and the VIP<sup>™</sup> message has been displayed, the next step is to make sure the G3 computer is configured properly. To do this have the vehicle running but stopped. With the VIP<sup>™</sup> properly installed try to put the radar into moving mode. The VIP<sup>™</sup> should note that the vehicle is stopped and automatically switch the radar to stationary mode.

 If your radar does not automatically switch to stationary mode when stopped, please check the menu feature setup on the radar and make sure the VIP<sup>™</sup> has been activated.

The next step will walk you through setting up the VIP<sup>™</sup> if it is not being recognized by the radar. You can also refer to the menu feature set up in the radar's operator manual.

#### 2.5.4 Configuring the VIP™

To get the G3<sup>TM</sup> to recognize that the VIP<sup>TM</sup> has been connected it may be necessary to go into the radar's menu feature and select the VIP<sup>TM</sup>.

1. With the radar turned on and all power-up routines having been ran, press the MENU button on the IR remote.

2. Next, press the OPTION button several times until  $\mathsf{VIP}^\mathsf{IM}$  is displayed in the locked/fast window.

- Press the UP arrow (front antenna) or down arrow (rear antenna) button and make sure the word AUT is showing in the patrol display.
- 4. Press the MENU button again to exit the menu and save the setting.

The VIP<sup>™</sup> is now be configured to the radar.

### 2.5.5 How The VIP<sup>™</sup> Helps Performance Eliminates Shadowing

In Moving mode, the radar processes two speeds - patrol and closing (target). The stronger of the two, the patrol speed, is created when the radar beam reflects from passing stationary objects, such as the pavement or terrain the vehicle is traveling on. However, some situations cause return signals to be larger than the reflection from the ground, such as when the patrol vehicle is rapidly overtaking a slow-moving 18-wheeler. Given a choice between reading passing ground clutter or the large return signal generated by the vertical expanse of the truck's trailer, the radar might ignore the ground speed and lock onto the stronger return signal.

Rather than receiving a true patrol speed, the radar would then read the differential speed between the vehicle and the 18-wheeler. The computer would then subtract this artificially low speed from the closing speed and assign a higher speed to the target. The VIP<sup>™</sup> eliminates this problem by monitoring the speed information being sent to the OBD II diagnostics port and using that information to ensure that the patrol speed that the radar has acquired is actually the ground and not the 18-wheeler.

#### Automatic Moving/Stationary Mode Switching

When activated the VIP<sup>™</sup> will automatically switch between moving and stationary modes based on the movement of the patrol vehicle. Since the VIP<sup>™</sup> uses the vehicle's computer to tell it when the vehicle is moving the radar will automatically switch to stationary mode any time the patrol vehicle comes to a stop. Once the vehicle starts moving again the VIP<sup>™</sup> will switch the radar back to moving mode.

# 3. Operating the G3™

After you test and confirm that the unit is properly installed, it is ready for use.

#### 3.1 Power

The PWR button on the display turns the G3<sup>™</sup> on and off whereas the PWR button on the IR remote only turns the G3<sup>™</sup> off. After you press the PWR button, the display illuminates with a display segment check and internal circuitry verification. If the power-up checks pass, the radar will set itself to the last operational mode prior to being powdered off. If the power-up checks fail, a system error message (SYSTEM ERR) will display in the windows and the unit will not respond to any control except the PWR button to power down. Turn the unit off then back on. If the error message persists, remove the unit from service and contact Decatur Electronics.

 When the G3<sup>™</sup> is powered down, it stores the current settings. These settings are restored the next time you power up the unit.

# 3.2 Front and RearAntenna

At power up, the G3<sup>™</sup> antennas are in standby mode. (Standby mode is when the antenna is not transmitting.) If no antenna is connected to the unit, the FRONT and REAR lights cycle on and off and ANT? displays in the locked and patrol windows.



Figure 3.2a If no antenna is connected, ANT? Displays

The radar unit will not begin transmitting until you press an antenna button. The antenna (ANT) buttons, up arrow (FRONT) and down arrow (REAR), on the IR remote activate and deactivate the antennas. The FRONT or REAR icons will illuminate when that particular antenna is transmitting.



Figure 3.2b The FRONT or REAR light illuminates when that antenna is transmitting.

To discontinue transmitting (to place the radar back into standby mode), press the same (ANT) button.

The G3<sup>™</sup> has three main operating modes: Stationary, Moving Mode Opposite Direction, and Moving Mode Same Direction.

#### 3.3 Stationary Mode

You can use Stationary Mode to monitor traffic that is moving toward or away from the parked patrol vehicle.



Figure 3.3a Tracking a target vehicle with a parked patrol vehicle and the radar in Stationary Mode.

#### 3.3.1 Using Directional Antennas

When using directional antennas, you can use Stationary Mode to also select a specific direction of traffic (Approach or Recede) to monitor.



Figure 3.3.1a Tracking a vehicle RECEDING away from a stationary patrol vehicle with the radar in Stationary Mode using the FRONT antenna.

There are three selections for stationary mode:

#### <u>Stationary Both</u>

Tracks vehicles approaching or receding away from the patrol vehicle.

#### Stationary Approach

Only tracks vehicles approaching the patrol vehicle.

#### Stationary Recede

Only tracks vehicles receding away from the patrol vehicle.

To select a Stationary Mode of operation, press and hold the MODE button for two seconds. The "Stationary Both" mode will be represented by two arrows on the right of the TARGET WINDOW (one pointing up, one pointing down). When targets are measured, the direction of travel will be represented by the arrows. For example, if a target is receding from the front antenna, the top arrow (pointing up) will illuminate.



Figure 3.3.1b Stationary Both Mode.

 In order to select the "Stationary Approach" or "Stationary Recede" modes, one of the antennas must be activated. After the "Stationary Both" mode has been selected, briefly press and release the MODE button a second time to select the "Stationary Approach" mode. Pressing and releasing the MODE button a third time will select the "Stationary Recede" mode. Pressing and releasing the MODE button a fourth time will cycle to the moving opposite mode of operation.

When the radar is toggled into the "Stationary Approach" mode, the down pointing or up pointing arrow to the right of the TARGET window will illuminate. (When using the FRONT antenna, targets approaching the patrol will be represented by the arrow pointing down. An arrow will be pointing up when the REAR antenna is selected.)



Figure 3.3.1c While the FRONT antenna is selected, the down pointing arrow is illuminated while tracking an approaching vehicle.



Figure 3.3.1d While the REAR antenna is selected, the up pointing arrow is illuminated while tracking an approaching vehicle.

When the radar is toggled into the "Stationary Recede" mode, the down pointing or up pointing arrow to the right of the TARGET window will illuminate. (When using the FRONT antenna, targets receding from the patrol will be represented by the arrow pointing up. An arrow will be pointing down when the REAR antenna is selected.)



Figure 3.3.1e While the FRONT antenna is selected, the up pointing arrow is illuminated while tracking a receding vehicle.



Figure 3.3.1f

While the REAR antenna is selected, the down pointing arrow is illuminated while tracking a receding vehicle.

Detected target speeds will display in the TARGET window. The PATROL window will always remain blank while in all of the stationary modes.



Use the  $G3^{\text{TM}}$  in the Moving Mode Opposite Direction setting to display the speed of a target moving in the opposite direction from the moving patrol vehicle. These targets will be moving towards the patrol (using the front antenna) or away from the patrol (using the rear antenna).



**Figure 3.4a** A patrol vehicle that is tracking a target vehicle with the rear antenna while traveling with the radar unit in Moving Mode Opposite Direction.

To select Moving Mode Opposite Direction, press the MODE button until the OPP icon is illuminated.



Figure 3.4b While the FRONT antenna is selected, the down pointing arrow is illuminated while tracking an approaching vehicle in moving opposite mode.



Figure 3.4c While the REAR antenna is selected, the down pointing arrow is illuminated while tracking a receding vehicle in moving opposite mode.

In moving opposite mode, the G3<sup>™</sup> simultaneously processes and displays the patrol and target vehicle speeds. Detected target speeds will appear in the TARGET window. When no targets are present, the TARGET window will show three dashes. Patrol speeds will display in the PATROL window while the patrol vehicle is moving.

#### 3.5 Moving Mode Same Direction

To display the speed of targets traveling the same direction as the patrol vehicle, use the Moving Mode Same Direction setting.



**Figure 3.5a** A patrol car tracking a target using Moving Mode Same Direction.

To select this mode, press and release the MODE button until the SAME icon is illuminated.



#### Figure 3.5b

While the FRONT antenna is selected, the down or up pointing arrow will be illuminated depending on whether the target vehicle is approaching or receding the patrol vehicle in same direction mode.



#### Figure 3.5c While the REAR antenna is selected, the down or up pointing arrow will be illuminated depending on whether the target vehicle is receding or approaching the patrol vehicle in same direction mode.

The G3 uses directional antennas so there is no need to manually select faster or slower modes in same direction. The G3 does this automatically for you. For example, if the patrol car is traveling 55 MPH, and the same lane target vehicle is moving away from the patrol vehicle at a relative speed of 10 MPH - the same lane target car's speed will display as 65 MPH.

Patrol Car Speed	55 MPH
Difference of Speeds	+10 MPH
(Target car is faster so the difference is added)	
Same Lane Target Speed	65 MPH

#### 3.6 Faster Mode

The FAST button activates the Faster Mode, modifying the operation of the Stationary, Moving Mode Opposite Direction and Same Direction modes.

The Fast light illuminates when you press the FAST button on the IR remote. When activated, the radar will process faster or fastest targets (depending on what method is configured into the radar) and display these in the fast/lock window. In FAST mode, the radar processes the speed of the next strongest target signal going faster than the strongest reference signal. In fastest mode, the radar will process and display the highest valid speed in the fast/lock window. For example, in the figure below, the 77-mph vehicle is the target vehicle that the TARGET window will display if the radar is on faster mode whereas 85-mph will be displayed if fastest mode has been selected.



**Figure 3.6a** Evaluating multiple targets in Faster Mode.



### 3.7 Lock a Speed

Pressing the LOCK button transfers the target speed and direction information related to that target from the TARGET window to the LOCKED window. After locking the speed, the radar unit continues to process speeds and display target speeds in the TARGET window. This lets you continue to track the history of the target.

To clear a locked speed do one of the followingays:

- Press the LOCK button when an antenna is transmitting and no target is present.
- Change the operating mode.
- Turn the antenna off then on again.
- The locked speed will remain as tracking history when you change a dual-antenna transmission status from front to rear or rear to front.
  - You may use the lock feature even when the radar is in Faster mode.

# 3.8 Range Setting

You can adjust the range (sensitivity) of the  $G3^{\text{TM}}$  in each of the three operating modes independently:

- Moving Opposite Mode
- Moving Same Lane Mode
- Stationary Modes

The G3<sup>™</sup> can track the speed of targets that exceed 3000 ft. when the unit is set at maximum range. The range setting is available in the main menu location. To change the range setting for a particular mode, press the MENU button on the IR remote. Radar will display:



Figure 3.8a The G3™ front display showing range or sensitivity setting.

Press the FRONT antenna (+) or REAR antenna (-) to increase or decrease the range setting. The range value on the far right PATROL display will change. The maximum range setting is 5 while the minimum is 1. Initially, you will want to start with maximum range, then decrease the range setting until you obtain a desired performance level. For example, an officer would usually reduce range when operating within a city environment. Pressing the MENU button again will exit the main menu and save the range setting. The range setting for each operating mode will be permanently saved when the radar is powered off.


**Figure 4a** The G3<sup>™</sup> front display.

The G3<sup>™</sup> display faceplate contains a photocell that automatically dims the display at night for less glare and makes the display brighter in daylight conditions, so you can easily read the display windows.



**Figure 4b** The G3<sup>™</sup> rear interface

#### 4.1 Display Windows

**TARGET:** Displays target speeds and is blank when no target is present.

**LOCKED:** When you press the LOCK button, the LOCKED window holds and displays the target speed that was in the TARGET window.

**PATROL:** Displays the patrol speed. The window is blank when the radar unit is in Stationary Mode or when the vehicle is traveling below the minimum patrol speed.

**ERROR DISPLAY:** When an error occurs, one of the following appears in the display windows:



**Figure 4.1a** The G3<sup>™</sup> front display showing LOW VOLT error display.

RFI radio frequency interference



**Figure 4.1b** The G3<sup>™</sup> front display showing RFI error display.

SYSTEM ERR system failure



Figure 4.1c The G3<sup>™</sup> front display showing SYSTEM error display.

#### 4.2 Indicator Lights

#### 4.2.1 FAST:

The FAST icon light is used to indicate when the radar is in faster or fastest mode. (This indicator will also illuminate when the fast button is pressed during the same direction fork test.) Pressing the FASTER button again will return the unit to normal operation and the FASTER light will shut off.



Figure 4.2.1a The Fast light

**ANT FRONT and REAR:** Indicates which antenna is transmitting. In standby mode (not transmitting), neither light is on.



Figure 4.2.1b Antenna lights

**LOCK:** Indicates when a target speed has been locked into the locked window.



Figure 4.2.1c LOCK indicator

**OPP and SAME:** Indicates what moving mode the radar is in. In opposite moving mode, OPP is illuminated while in same direction mode, SAME is illuminated.



Figure 4.2.1d OPP and SAME indicator lights

**TARGET DIRECTION INDICATORS:** Indicates what direction of travel the target is moving relative to the patrol vehicle. The active FRONT or REAR antenna will determine which up or down pointing arrow is illuminated.



Figure 4.2.1e TARGET Direction indicator lights

**LOCKED/FAST DIRECTION INDICATORS:** Depending on the current radar state, these indicators will report:

- (1) In fast or fastest operation: Indicates what direction of travel the faster/fastest target is moving relative to the patrol vehicle. The active FRONT or REAR antenna will determine which up or down pointing arrow is illuminated.
- (2) When a speed has been locked: Indicates what direction the target was traveling when locked.



Figure 4.2.1f LOCKED/FAST Direction indicator lights

## 5. Antenna

The G3<sup>™</sup> Ka-band Directional antennas are incredibly strong, yet compact and lightweight. The cables and connectors are also interchangeable between the antenna and computer unit.



Figure 5a Front view of the G3™ Ka directional antenna.



Figure 5b

Rear view of the G3<sup>™</sup> Ka directional antenna.

### 6. IR Remote Controls



Figure 6a The S795-41-0 IR remote-control unit.

• The IR remote control needs to be aimed in the general direction of the radar display to properly receive the IR signals. To help increase IR signal levels, the IR remote as a total of three transmitting devices. A transmitting device is located on the front near the FAST button while the other two are located on the front edge.

#### 6.1 Control Buttons

**POWER (PWR):** powers the G3<sup>™</sup> off. The G3<sup>™</sup> will save all user settings on power down.

**OPTION (OPTN):** Depending on the state of the radar.

- (1) If not in MENU mode, pressing OPTION allows the radar to be set to City/Highway mode which helps reduce shadowing (See Section 8.2.9) by setting a different minimum patrol speed for city and highway speed conditions. This option works only while the unit is set in a moving mode of operation. (The optional VIP interface will override this setting) When you press the OPTN button, CTY will briefly appear in the center (LOCKED WINDOW). While in this mode, the radar can track patrol speeds down to 5 mph. Pressing OPTION again will place the radar into HIGHWAY mode where HWY will be briefly displayed. While in this mode, the patrol will be limited to tracking below 20 mph. The radar will power up with the settings you select.
- (2) If in MENU mode, pressing the OPTION cycles through a list of changeable settings in the primary menu. See section MENU below for the complete list.

**TEST (TEST):** Pressing the TEST button starts an extensive self-test of the radar unit's circuitry. During self-test, the system will not power down until the test is complete. If the self-test fails, the SYSTEM ERR message will appear in the radar windows. For more information on tests, see Section 9: Field Tests.

Pressing and holding the test button while in same direction mode, activates the special FORK TEST mode. This feature allows the operator to test the directional radar antenna with a tuning fork.

**VOLUME:** The 8-step volume control regulates the Doppler audio and system status tone (beep) volume. Every press of the button increments the positive (+) side of the volume. When the maximum volume level has been reached, the next button press will reset the level back to minimum.

**FAST (FAST):** Controls the Faster/Fastest Mode feature when you are evaluating multiple targets or use the FAST button when testing the antenna is same direction mode with a FORK.

**MODE (MODE):** Switches between the three operating modes: Stationary Mode, Moving Mode Opposite Direction, and Moving Mode Same Direction.

**LOCK (LOCK):** Transfers the target speed and direction indicators in the TARGET window to the LOCKED window. After locking the speed, the system continues to process and display target speeds in the TARGET window, so you can continue to track the history of the target speed. If you have the Patrol Speed Lock, Recall, and Blanking option, pressing the LOCK button locks both the target and patrol speed.

**ANTENNA (ANT) FRONT and REAR:** Activates and deactivates the front and rear antenna. An antenna must be activated to track a

target speed.

**MENU:** Activates the primary menu on the G3. Used in conjunction with the OPTION button to cycle through the available options that are changeable. Pressing the MENU button again will exit the primary menu.

#### **MENU ITEMS:**

(a) SENS OR RANGE

Sets the maximum range for the radar. Allowable settings are 1 through 5. Press the Front antenna button to increment through the settings or press the Rear antenna button to decrement through the settings.



Figure 6.1a The G3™ front display showing radar menu range or sensitivity display.

#### (b) SQELCH

Sets squelch mode. Selects the type of Doppler audio you hear. In squelch mode, the sound heard is only from the Doppler tone for the currently displayed target. In unsquelched mode, the unit passes all Doppler tones, interference and noise received from the antenna. You typically use unsquelched audio when you listen for interference. Press the front or rear antenna button to toggle between off and on.



Figure 6.1b The G3™ front display showing menu SQUELCH display.

(c) HWY CTY

Sets the radar into HIGWAY or CITY mode. Press the front or rear antenna button to toggle between CITY and HIGHWAY.



Figure 6.1c The G3™ front display showing menu Highway/City selection display.

(d) LOW SPD

Sets the radar to display target speeds down to 2 mph. Press the front or rear antenna button to toggle between 2 mph and 12 mph.



#### Figure 6.1d

The G3<sup>™</sup> front display showing menu target low speed selection display.

(e) BEEP

Turns on or off the beep. Press the front or rear antenna button to toggle between off and on.



Figure 6.1e The G3™ front display showing menu Beep option selection display.

#### (f) UNITS

Toggles between MPH and KPH. Press the front or rear antenna button to toggle between units.



Figure 6.1f The G3<sup>™</sup> front display showing menu speed units option selection display.

(g) COM serial setting

Selects serial output protocol. Press the front or rear antenna button to toggle between the selections.



#### Figure 6.1g

The G3<sup>™</sup> front display showing serial communication protocol selection display.

#### (h) FSTLCK - FAST LOCK

Add description. Press the front or rear antenna button to toggle between off and on.



Figure 6.1h The G3™ front display showing menu Fast lock option selection display.

#### (i) HARMNC - HARMONIC DISPLAY

Allows radar to be set to display "H" in LOCKED window during a harmonic event. Press the front or rear antenna button to toggle between off and on.



Figure 6.1i The G3<sup>™</sup> front display showing menu Harmonic option selection display.

(j) SDSS – SAME DIRECTION SPEED SEPERATION SETTING Allows radar to be set to the minimum speed separation for same direction. Allowable selections are 3, 5 and 8 mph separation. Press the front or rear antenna button to toggle between the selections. The default value is 3.



Figure 6.1j The G3™ front display showing menu SDSS option selection display.

**PATROL SPEED LOCK, RECALL and BLANKING [OPT]:** This option locks the patrol speed at the time you lock the target speed.

- 1. In either moving mode, press the LOCK button to lock both the target or patrol speeds.
- 2. Turn the antenna off. The locked patrol speed will appear in the PATROL window.

3. To blank the patrol speed, press the OPTN button. Then press the OPTN button again to recall it.

4. To permanently remove the locked patrol speed, reactivate the antenna by turning it on.

### 7. Communication System Controls

You can configure the G3<sup>™</sup> through the serial communications (COM) port on the rear panel to communicate with PCs, speed signs, and in-car video systems, such as the Decatur Electronics Responder 1000<sup>™</sup> in-car video system . The communications cable does not come with your order and can be purchased separately from Decatur Electronics. See Appendix A for the more details on the serial communications port configuration.

### 8. Performance Tips

Understanding potential radar interference and what to do when it occurs can greatly improve your results.

#### 8.1 How Radar Works

Determining a vehicle's speed begins with the radar antenna transmitting and directing a beam of microwave energy (radio waves) at an approaching (or receding) target vehicle. When energy from this beam strikes a moving vehicle, a small amount of the beam is reflected back to the antenna.

The reflected signal frequency shifts by an amount proportional to the speed of the target vehicle. This is known as the Doppler Effect. The radar device then determines the target vehicle speed from the difference in frequency between the reflected and transmitted signal.

#### 8.2 Interference Sources and Remedies

When properly installed and operated, Doppler radar technology is extremely accurate and reliable. However, variations in the environment can cause situations and circumstances, which can cause spurious (erratic and unusually low or high) speeds to display. Signs that a speed is spurious can include the following characteristics:

- A reading appears when no target vehicle is in the operational range of the antenna.
- · A target vehicle entering the operational range overrides the

interference signal, causing the display speed to change suddenly to the vehicle's speed.

- The Doppler tone is corrupted with noise.
- Speeds are irregular and do not provide valid tracking history.
- Erroneous speeds appear to track with the engine speeds.

#### 8.2.1 Angular Interference (Cosine Effect)

When operating in the Stationary Mode, the cosine effect causes the radar unit to display a speed, which is lower than the actual vehicle speed. This condition exists when the target vehicle's path is not parallel to the antenna, including conditions such as the vehicle traveling on a curve or a hill.

As the angle between the beam of the antenna and the target vehicle increases, the displayed speed decreases. Ideally, an angle of zero (0) degrees is preferable, because the displayed speed is the actual target vehicle speed. However, in all uses of police radar, the radar device is always at a slight angle to the target vehicle to avoid collisions.



Figure 8.2.1a An angle between the antenna and the target vehicle causes the cosine effect.

The following table shows the effect that an increasing angle has on a displayed speed.

Actual	0°	1°	3°	5°	10°	15°	20°	30°	45°	60°	90°
Speed					Disp	layed	l spee	d:			
30 mph	30	29	29	29	29	28	28	26	21	15	0
40 mph	40	39	39	39	39	38	37	34	28	20	0
50 mph	50	49	49	49	49	48	46	43	35	25	0
60 mph	60	59	59	59	59	57	56	51	31	30	0
70 mph	70	69	69	69	68	67	65	60	49	35	0
80 mph	80	79	79	79	78	77	75	69	57	40	0

Horizontal Angle Degrees

#### Table 8.2.1b

Actual and displayed speeds at different antenna-to-target angles.

Small angles (less than 10°) have little effect on accuracy. As the angle increases, the displayed speed decreases. At 90°, the displayed target speed is 0 mph.

#### 8.2.2 Fan Interference

Fan interference is the most common form of interference that you are likely to experience. It is caused when the radar measures the speed of the vehicle blower fan. Changing the fan speed causes a proportional change in the display speed. To correct this, relocate the radar antenna so it does not display spurious speeds or turn off the fan motor.

Fan interference can be problematic in Same Direction Mode and should be checked carefully.

#### 8.2.3 Batching

In past years, some radar devices occasionally could not correctly process speeds when the patrol vehicle was accelerating or decelerating at unusually high rates. In these cases, radar devices used an earlier speed to calculate the target speed, rather than the current speed. The radar will display an incorrect target speed, because it is using an incorrect patrol speed. With the DSP algorithms the G3<sup>™</sup> uses, this error will not occur.

#### 8.2.4 Electromagnetic Interference (EMI)

Operating electric motors can produce EMI. EMI from power seats or windshield wipers can also produce spurious target speeds. To correct this type of interference, simply turn off its source.

#### 8.2.5 Feedback Interference

When radar is directed at computer screens, streetlights, and other electronic devices, it can display spurious speeds. To correct this type of interference, relocate the radar antenna.



INCORRECT: Full Feedback

Figure 8.2.5a Correcting feedback interference.

#### 8.2.6 Multi-Path Beam Cancellation

If multi-path beam cancellation occurs, the target vehicle speed sporadically blinks and reappears at semi-random intervals. This type of interference occurs when the radar loses track of a target vehicle, because the target is reflecting two or more signals, which are interfering with each other. The G3<sup>™</sup> is immune to multi-path cancellation.

#### 8.2.7 Patrol Harmonics

In all police radar, when a patrol vehicle passes a large, stationary object such as a road sign, building, or overpass, the return signal can briefly overload the processing circuitry. The G3<sup>™</sup> detects this condition and will not display speeds which are generated by this overloading.

Targets traveling at speeds which are close to the patrol speed can also mimic this condition and will be rejected. The target window will show an "\_H\_" indicating that it is a patrol harmonic. To process this type of target, simply increase or decrease your patrol speed by at least 2 mph (3 km/h).

#### 8.2.8 Radio Frequency Interference (RFI)

The system can inadvertently process radio energy as Doppler speeds, including that from police radios, airport radar, microwave transmission towers, CB radio transmitters, and AM/ FM transmission towers . For this type of interference to occur, the radar unit must be operating very close to the radio transmitter. The G3<sup>™</sup> contains an RFI detection circuit that detects excess radio frequency energy. When stray radio frequency energy reaches an excessive level, the system displays the RFI message and stops processing and displaying speeds. The system resumes normal operation when the RFI condition no longer exists. At that time, any locked speeds will display again.

#### 8.2.9 Shadowing

In Moving mode, the radar processes two speeds-patrol and closing (target). The stronger of the two, the patrol speed, is created when the radar beam reflects from approaching stationary objects, such as the pavement or terrain the vehicle is traveling on. However, some situations cause return signals to be larger than the reflection from the ground, such as when the patrol vehicle is rapidly overtaking a slow-moving 18-wheeler. Given a choice between reading passing ground clutter or the large return signal generated by the vertical expanse of the truck's trailer, the radar might ignore the ground speed and lock onto the stronger return signal. Rather than receiving a true patrol speed, the radar reads the differential speed between the vehicle and the 18-wheeler. The computer then subtracts this artificially low speed from the closing speed and assigns a higher speed to the target.

The shadowing error is easy to recognize, because the radar patrol speed and the speedometer reading will vary significantly. The target speed in this instance also will vary considerably from your visual estimation. The correct City/Highway setting helps to minimize this effect.  The G3<sup>™</sup> usually recognizes and ignores shadowing. On the rare occasion that it appears, turning the antenna on and off usually quickly remedies shadowing.

#### 8.2.10 Vehicle Ignition Interference

The G3<sup>™</sup> has been designed to operate from the vehicle's cigarette lighter receptacle. However, some vehicles exhibit excessive alternator noise at the lighter receptacle. In these rare cases, the radar can exhibit erratic readings, especially when the vehicle's electrical system is operated under heavy load. Wiring an accessory outlet directly to the battery minimizes the effect.

If you suspect your vehicle's electrical system, contact Decatur Electronics' Customer Service Department for more information.

### 9. Field Tests

You can do the following tests to verify the operation and accuracy of the G3<sup>™</sup>.

#### 9.1 Operator-Requested Self-Test

Pressing the TEST button initiates a comprehensive system self-test, which checks the numeric displays and runs a target and patrol speed simulation.

The G3<sup>™</sup> will not power down during a self-test and checks the following:

**DISPLAY TEST:** Verifies that the digit segments and status LED lights are working correctly and that none of the pixels in the number segments are missing.

**CIRCUITRY TEST:** Checks the internal circuitry. If the unit passes all internal checks, the message TEST PASS displays in the display windows.

**SPEED SIMULATION TEST:** The G3<sup>™</sup> verifies the speed accuracy using synthesized Doppler frequencies corresponding to a series of simulated speeds: A patrol speed of 50 and a target speed of 65 (when in mph mode) and 80 and 104 (when in km/h mode).

#### 9.2 Tuning Fork Test

In addition to the system test, you can verify signal processing accuracy with a tuning fork. Test your G3<sup>™</sup> with two tuning forks—a high and low speed fork. Each fork is labeled with which antenna to test with it.

**Figure 9.2a** Place the vibrating tuning fork about three inches in front of the antenna.

#### 9.3 Tuning Fork Test Using a VIP™

If you are using the optional VIP then for vehicles using a 12 VDC cigar plug wired directly to the battery, turn off the vehicle (key in the OFF position) and perform the standard tuning fork test. (With the vehicle turned off, the VIP<sup>™</sup> is not receiving information from the vehicle's Diagnostic Port and therefore the VIP<sup>™</sup> will not interfere with the tuning fork test.)

For vehicles using a 12 VDC cigar plug activated through the ignition, unplug the VIP<sup>™</sup> from the radar unit before performing the tuning fork test.



#### 9.4 Stationary Mode Test

- Place the radar unit in Stationary Mode. (If you are using directional antennas, be sure to select the Both Directions Stationary mode. There are no directional properties to a ringing tuning fork. If a stationary tuning fork test is done in either the approach or recede modes, the radar will generally ignore the tuning fork.)
- 2. Select maximum range and activate the antenna to be tested.
- Grasp the low speed tuning fork (the longer fork) by the handle. Then tap the tines against a firm, non-metallic surface, and hold the vibrating fork approximately three inches in front of the antenna.
- Verify that the TARGET display and speed marked on the tuning fork are within ± 1 display unit of each other.
- 5. If desired, repeat the test with the high-speed tuning fork (the shorter fork).

#### 9.5 Moving Mode Opposite Direction Test

- 1. Place the system in Moving Mode Opposite Direction.
- 2. Select maximum range and activate the antenna that you want to test.
- Grasp the low speed tuning fork (the longer fork) by the handle.
   Tap the tines of the fork against a firm surface and hold it approximately three inches in front of the antenna.
- 4. Before the low speed fork stops vibrating, tap the high-speed fork (the shorter fork) against a firm surface, and hold it approximately three inches away from and slightly above the low speed fork. The speed produced from the high-speed fork (shorter fork) will appear in the TARGET window, while the speed from the low speed fork (longer fork) will appear in the PATROL window.<sup>2</sup>



Figure 9.5a Hold the low speed fork approximately three inches in front of the antenna and hold the high-speed fork approximately three inches and slightly above the low speed fork.

5. The speed should match those in figures 9.5b.

<sup>&</sup>lt;sup>2</sup>The speed displayed will be the difference between the speed stamped on the high speed and low speed tuning forks.



#### Figure 9.5b

When testing the Ka-band antenna with the high and low tuning forks in Moving Mode Opposite Direction, the speeds in the display window should look like this.

#### 9.6 Moving Mode Same Direction Test

#### 9.6.1 Directional Antennas

A tuning fork does not properly simulate the direction of a vehicle. When using directional antennas, the radar must be placed in a special tuning fork mode to perform the same direction tuning fork test. To activate this mode:

- 1. Place system in Moving Mode Same Direction Mode.
- 2. Activate the directional antenna.
- 3. Press and hold the *TEST* button for about three seconds, until FORK is displayed in the MODE window.
- 4. Release the *TEST* button. Notice that a tuning fork symbol is shown in the locked/fast window.



**Figure 9.6.1a** When the Test Fork function is activated.

5. Select maximum range, an adequate squelch volume, and the antenna you want to test.

- 6. Then grasp the high-speed tuning fork (the shorter fork) by the handle. Tap the tines of the fork against a firm surface and hold it approximately three inches in front of the antenna.
- 7. Then before the high-speed fork stops vibrating, tap the low speed fork (the longer fork) against a firm surface, and hold it approximately three inches away from and slightly above the first fork. The speed produced from the high-speed fork (shorter fork) will appear in the PATROL window, while the calculated TARGET speed will appear in the TARGET window.
- Press and release the FAST button to toggle between the FASTER or SLOWER settings. When the FASTER setting is active, the TARGET speed should be the sum of the two tuning fork speeds.

When the SLOWER setting is active, the TARGET speed will be calculated by subtracting the speed from the low speed fork from the speed from the high-speed fork.

9. The speeds should match those in Figure 9.6.2b and 9.6.2c.



10. Press the test button to exit tuning fork mode.

#### Figure 9.6.1b

When testing the Ka-band directional antenna with the high and low tuning forks with slower setting enabled (FAST button NOT lit), the speeds in the display windows should look like this. (The FAST light is off because the target speed is lower than the patrol speed.)



Figure 9.6.1c

When testing the Ka-band directional antenna with the high and low tuning forks with FASTER setting, the readings should match this.

#### 9.7 Road Test

After the radar unit passes the self-test and tuning fork tests, you may want to conduct a road test during each shift to confirm that the patrol vehicle's speedometer matches the unit's patrol speed. The road test verifies that the radar unit's patrol speed and the vehicle speedometer are within  $\pm 1$  display unit of each other. You need to conduct the road test on a level road.

- 1. Verify that the antenna is aimed correctly and parallel to the direction of travel.
- Drive the patrol vehicle at a constant, legal speed to verify that the speedometer reading, and the patrol speed are within ± 1 display unit of each other.
- If the difference is greater than ± 1 display unit, verify that the antenna is aligned correctly. If the antenna is aligned correctly, this reading can indicate a speedometer inaccuracy.
  - An incorrectly aimed antenna will cause the radar unit's patrol speed to be lower than the speedometer's speed.
    - The IACP, through the Highway Safety Committee, recommends, as a minimum, that each speedmeasuring device be tested for measurement accuracy within a period of three (3) years prior to an alleged violation in which the device was used to collect evidence for presentation in court and whenever the device undergoes repair.

#### 10. Care, Cleaning, and Storage

- Avoid spilling food, beverages, and other liquids and substances on the radar device.
- When you are not using or transporting the device, store it in its original packaging.
- To clean the radar device, dust it with a soft clean cloth, which is free of cleaning solutions.
- The G3<sup>™</sup> can withstand temperature variations, however, only the antenna is weather resistant.
- Insert and remove the connectors by following the correct connect and disconnect procedures.



#### WARNING

In case your unit has a blown fuse, please replace the fuse with another fuse rated at the same capacity.
 DO NOT replace the fuse with a higher rated fuse since this may cause damage to the equipment and/or the vehicle. Higher rated fuses will cause internal damage unit and may result in voiding the warranty. In case the replacement fuse blows please send the unit in for the repairs.

# 11. Specifications

 Display Unit
 5.25 in x 1.45 in x .94 in

 Dimensions
 5.25 in x 1.45 in x .94 in

 Weight
 3.90 oz

 (0.11 kg)

**Computer Unit** 

Dimensions

Weight

IR Remote

Dimensions

Weight

Ka-Band Antenna

Dimensions

Weight

5.25 in x 1.45 in x 2.5 in (13.33 cm x 3.68 cm x 6.35 cm) 9.8 oz (0.45 kg)

4.56 in x 1.56 in x 1.12 in (11.58 cm x 4.00 cm x 2.84 cm) 2.40 oz (0.068 kg)

2.82 in x 3.5 in (7.16 cm x 8.9 cm) 8.75 oz (0.25 kg)

#### 11.2 Antenna

#### Ka-Band

IACP type	VI
Nominal transmission frequency	35 000 GHz
Nominal horizontal beamwidth	12°
Polarization	Circular
Nominal microwave power output	15mW
Maximum aperture power density	< 2 mW/cm2

#### 11.3 Environment

Ambient operating temperatures	-22°F to 158°F
	-30°C to +70°C
Maximum humidity	90% relative humidity
	at 98 6°F (37°C)

#### 11.4 Power Consumption

Supply vo	oltage range
-----------	--------------

Low voltage threshold

10.8 to 16.5VDC with internal, resettable fuse 10.8VDC with visual indicator

#### Current draw with 13.6VDC applied in various modes:

Standby (antenna OFF)	0.17 amperes
Ant.ON, no targets displayed	0.33 amperes
Ant ON, 55 target displayed	0.36 amperes
Ant.ON, 20 target, 35 patrol	0.40 amperes
Ant OFF, segment check 888 888 888	0.45 amperes
Ant ON, segment check 888 888 888	0.60 amperes

11.5 Speed Range Stationary Mode Target

12 mph - 210 mph (19 km/h - 337 km/h)

#### **Moving Mode Opposite Direction**

Patrol	5 mph - 100 mph
	(8 km/h - 161 km/h)
Patrol with High-Speed Option	10 mph - 110 mph
	(16 km/h - 180 km/h)
Target	(12 mph - Closure of 210 mph)
	(19 km/h - Closure of 337 km/h)

# Moving Mode Same Direction Patrol 20 mph\*\* - 100 mph (32 km/h - 160 km/h) Slower Target 12 mph - 75 mph (19 km/h - 120 km/h) Faster Target 25 mph - 175 mph (40 km/h - 281 km/h)

The Moving Mode Same Direction target speed is computed as follows:

when tracking a slower target TS = PS – SS when tracking a faster target TS = PS + SS

Where TS = Target Speed, PS = Patrol Speed and SS = Separation Speed, which must be at least 3 mph (4 km/h)\*, but no greater than 75% of the patrol speed.

\*See AppendixB \*\*15 mph (24 km/h) when in city mode

# **ISED Information**

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Industry Canada Regulatory Information CAN ICES-3 (A)/NMB-3 (A)

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes:

(1) Cet appareil ne doit pas causer d'interférences.

(2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Attention: Tout changement ou modification non expressément approuvé par la partie responsable de la conformité peut annuler le droit de l'utilisateur de faire fonctionner cet appareil.

Avis d'Industrie Canada CAN ICES-3 (A)/NMB-3 (A)

## **FCC Radiation Exposure Statement**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

## **Radiation Exposure Statement**

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

## Déclaration d'exposition aux radiations

Cet équipement est conforme aux limites d'exposition au rayonnement ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps.

# Replace with FCC part 90 grant letter

FEDERAL COMMUNICATIONS COMMISSION WASHINGTON, D.C. 20554

> GRANTOF EQUIPMENT AUTHORIZATION Type Acceptance

#### 12.2 Radar Case Law

Judicial notice is an elementary principal of law. The principal applies to facts that are common knowledge and states that it is not necessary to introduce evidence to prove what is common knowledge. The following landmark rulings have made it simpler to introduce radar speed measurements as evidence.

- State v . Dantonio, June 1995, State of New Jersey. The New Jersey Supreme Court took judicial notice of the Doppler Principle. Other states quickly followed.
- 2. State v . Tomanelli, 1966

The court pointed out that while the tuning fork testing method is acceptable, the result of the test is only as good as the tuning fork used.

3. Honeycutt v. Commonwealth, 1966

The court ruled that it is sufficient for an officer to have enough knowledge and training to properly setup radar, test its accuracy and read the instrument to obtain the speed measurement.

4. State v. Hanson, 1978

The court decreed that the officer must be able to testify:

- To having had adequate training and experience in the operation of moving radar
- That the moving radar instrument was in proper working order and that its testing had followed suggested methods
- That the instrument was used in an area where road conditions presented only the minimum possibility of distortion
- That the patrol car's speed was verified
- That the instrument was expertly tested soon after the arrest and that the testing did not rely on the instrument's own internal circuit testing.

### 13. Frequently Asked Questions (FAQ)

#### Q. My radar device will not power up. What should I do?

A. Make sure the radar device is plugged into the power source and that the power source has power. Also, check to see if the LED light on the power plug is on and that the fuse in the power plug is working. If the unit still does not power up, contact Decatur Electronics.

#### Q. My radar device has poor range. How can I remedy this?

A. Make sure the range control is adjusted properly and verify that no obstructions are in front of the antenna. If the antenna still has poor range, increase the range (sensitivity) level. If this problem continues, contact Decatur Electronics.

# Q. Do the Decatur Electronics traffic safety radar devices interface with in-car video systems?

A. Yes. Decatur's traffic safety radar devices will interface with various in-car video systems with an active communications (COM) port, including the Decatur Electronics Responder 1000<sup>™</sup> in-car video system. Please call the Decatur Electronics sales staff to see which video systems will work with your Decatur radar device.

#### Q. How often do I need to recertify my radar unit?

A. In the past, the Federal Communications Commission (FCC) required that you check all devices with transmitters once a year to guarantee that they are transmitting within the allowed band. The FCC has since dropped this requirement. Now, most states have set up their own standards to regulate the timing of radar certification. Because each state has different requirements, Decatur Electronics recommends that you check with your local department policy.

# Q. Does Decatur Electronics carry other law enforcement products?

A. Yes, Decatur offers handheld radar units and a full line of OnSite<sup>™</sup> radar speed and message trailers.

#### Q. Does Decatur Electronics have a sports radar gun?

A. Decatur Electronics has developed a radar gun specifically for use in sports applications such as baseball and softball. Decatur's HP-2<sup>™</sup> model sports radar also works well for boat, personal watercraft and snowmobile racing. Contact Decatur Electronics for more information on this product.

#### Q. Does Decatur Electronics make speed trailers or speed signs?

A. Yes, Decatur has a variety of speed signs and radar/message trailers—the OnSite<sup>™</sup> series. Contact your Decatur sales representative for more information on these products.

#### Q. What upgrades are available now for my $G3^{\text{TM}}$ ?

A. Contact Decatur Electronics Sales Department 800.428.4315 for upgrade information.

# **Q. SYSTEM ERR appears in the display windows and nothing else** works?

A. If your unit has a system error, turn the unit off and on. If it still says SYSTEM ERR, contact Decatur Electronics.
#### FIVE-YEAR RADAR WARRANTY

Decatur Electronics, Inc. guarantees the G3<sup>™</sup> to be free from defects in workmanship and material and to operate within specifications for a period of five\* years. During this period, Decatur Electronics will repair or replace, at its option, any component, found to be defective, without cost to the owner providing you return the unit to a Decatur authorized service provider.

The full warranty on parts and workmanship does not include normal wear and tear, crushing, dropping, fire, impact, immersion, damage from attempted repair, modifications by unauthorized service agents, or improper voltage and fusing (including removal of the power plug.)

### FIVE-YEAR WARRANTY EXCEPTION

If you purchased the radar unit under a special buying program, such as a state purchase contract, etc. ., the above warranty may not apply. Please refer to the buying program contract for the appropriate warranty terms or contact Decatur Electronics.

#### 14.2 Service Return Procedure

If you have questions, want a quick problem diagnosis, or need to return your unit or a component from your unit:

- Call Decatur Electronics by phoning 800.428.4315 and ask to speak with a Customer Service Representative.
- Explain to the Customer Service Representative the problem you are experiencing.
- Based on the information that you provide, the Customer Service Representative may be able to assist you or you may need to be referred to one of our Service Providers.

On warranty items Decatur Electronics will pay the freight (up to \$10 US) for shipping the system from the Service Provider to the customer. Please note that for any shipping charges above the initial \$10 (if you want the package shipped express or next day air) there will be an additional charge.

If you are referred to a Service Provider and your product is under warranty then once your product has been received, the Service Provider will investigate the problem. Once they have diagnosed the problem, they will repair the product and return it to you.

If you are referred to a Service Provider and your unit is not under warranty, then we recommend that you discuss the problem you are experiencing with the Service Provider and determine if an estimate is needed.Once your product has been received, the Service Provider will investigate the problem and you will be sent an estimate of cost, prior to any repair work being performed. After receiving the estimate, you can choose from the following options:

- 1. Approve the estimate and proceed with repair.
- 2. Decline the estimate and pay an estimate fee and return shipping.
- 3. Discuss other options with the Service Provider.

If your product is under warranty it will automatically be repaired and sent back to you.

### 15. How to Order Additional Products

You can order upgrades (when available) to the G3<sup>™</sup> from Decatur Electronics as well as tuning forks, different cable lengths and mounting brackets . Contact the Decatur Electronics sales office at 800 .428.4315.

Antennas (for both front and rear mounts)	
Ka-band Directional antenna	\$795-45-0
Antenna cables	
3-ft. antenna cable	P769-79503R
7-ft. antenna cable	P769-79507R
10-ft. antenna cable	P769-79510R
14-ft. antenna cable	P769-79514R
25-ft. antenna cable	P769-79525R
Brackets	
Glue-on windshield mounting bracket	S773-235A-0
Deck mount (mounts on flat surface)	S758-34-0
Detachable display bracket	S758-51-0
Communication cable [OPT] (connects	
radar to an external device)	
24-ft.cable	P769-10
(connects to IBM format PC and some video systems)	
Test forks (for testing the accuracy of your radar)	)
35.2/56.6 mph (Ka-band)	S706-35-2
50.6/81.4 kph (Ka-band)	\$706-50-6
Carrying Case	
Hard case with cutout foam	P801-20
Interconnect cable for use in separating display fro	om computer
or for connecting communications port to other e	quipment
10- ft. interconnect cable	S769-116-0

### Appendix A: Communications Port

The RS232 communications port (COM) is located on the rear panel of the computer unit. The serial communication has the following characteristics (8: n: 1) and is transmit only:

- One (1) start bit
- Eight (8) data bits
- No parity
- One (1) stop bit
- Transmission at 1200 baud

The G3<sup>™</sup> transmits data as ASCII symbols in the following digit sequence:

Target

Patrol [hundreds][tens][ones] ASCII [hundreds][tens][ones] carriage return<CR> (<CR> = ASCII decimal value 13)

The G3<sup>™</sup> sends the data in this sequence when the TARGET or PATROL speed display changes, or when the MODE or antenna (ANT) selection changes. During the test sequence the target and patrol speeds transmit, but the display segment check data do not.

When you press the LOCK button, the G3<sup>™</sup> transmits the following digital sequence

> [hundreds][tens][ones]<CR> (<CR> = ASCII decimal value 13)

## Appendix B Menu Feature

The menu feature allows the operator to fine tune some of the settings of the radar. To activate the menu feature, press and hold the TEST button down until MENU is displayed in the mode window. Pressing OPTN steps through the menu items and the antenna  $\checkmark/\checkmark$  buttons change the settings. Pressing the TEST button again exits the menu feature and saves the settings.

Feature	Setting	Function
LOSP (km/h)	2, 15 (mph) radar will proce	Low Speed - Minimum speed that the 4, 25 ess in stationary mode. Default is 15 mph (25 km/h).
BEEP	ON, OFF	Beep - Beeps when button is pushed on the hand remote. Default is ON.
UNTS	МРН, КРН	Display units - Measure speeds in mph or km/h . Factory set based on order.
СОМХ	0 through 5	Serial Port Communication Protocol - Selects protocol for interfacing to MDT, signs, etc 0 - no output 1 - Decatur format 2, 3, 4, 5 - Reserved (no output) Default is 1.
FSTL	ON, OFF	Fast Lock - Allows the locking of a target if FAST mode is active . Default is ON.
HAR	ON, OFF	Harmonic Indicator - The radar displays "_H_" in the target window in the presence of a patrol harmonic. If turned off, the target window is blank. Default is ON.
SDSS	3, 5, 8 (mph) 4, 8, 12 (km/h)	Same Directions Separation Speed - Sets the minimum separation speed that the radar will process in Same Direction.



# www.DecaturElectronics.com

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Over 60 Years of Doppler Radar Experience