



Certified ISO 9001

GENESIS-II™

USER'S AND INSTALLATION MANUAL



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WELCOME TO DECATUR ELECTRONICS

Thank you for choosing another fine Decatur Electronics product—a *Genesis-II™*, a highly advanced traffic radar unit that will reward your department with years of dependable service. The *Genesis-II* design incorporates high performance and long range, with many leading features.

We urge you to study this manual before using the *Genesis-II*, so you can maximize the benefits of this sophisticated radar device. We believe you will be pleasantly surprised by the features and advantages. The *Genesis-II* is small, dependable, features instant target acquisition, and is built to ISO 9001 standards. Its digital signal processor (DSP) gives the device advanced capabilities unseen by many veteran officers. If you are as pleased with its performance as we think you will be, ask your Decatur sales representative about other Decatur products, including the *Genesis VP™* Black & Decker® VersaPak™* battery hand-held line of 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

* VersaPak is a registered trademark of the Black & Decker Company.

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Genesis-II™ Features

The *Genesis-II™* is a highly advanced traffic radar device offering many advanced capabilities. It includes 32-bit digital signal processing (DSP), a versatile detachable computer/display unit, interchangeable antennas, and an easy-to-use hand-held remote control. It also features Faster Mode for detecting the next strongest target going faster than the strongest in multiple target situations.

The *Genesis-II* 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 *Genesis-II* interchangeable antennas lets you choose a combination that is right for you. For example, you can transmit from K- and Ka-band silver ring and Ka-band patch antennas.

The hand-held remote controls all the functions. It features convenient “eyes off” raised buttons for use without taking your eyes off the road. The remote control fits comfortably in the palm of your hand, positioning all controls at your fingertips.

About This Manual

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.

The *Genesis-II* includes:



Detachable computer/display unit



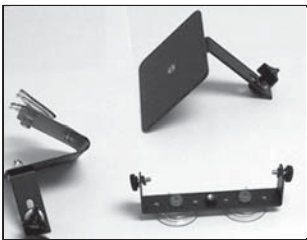
Antennas



Hand-held remote



Connector cables



Mounting brackets

1. Quick Start

1. Press the PWR button on the hand-held remote to power up the radar unit.
2. Press the ANT FRONT or REAR button to select the antenna from which you want the radar to transmit.
3. 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.
4. Press and hold the *FAST* button to select Faster Mode when you want to track the next strongest target going faster than the strongest.
5. If you are in the Moving Mode Same Direction setting and want to track a target that is traveling slower than the patrol vehicle, press and release the *FAST* button for Slower Mode.
6. To lock on a target speed, press the LOCK button. The target speed will transfer to the LOCKED window. The radar will continue to process speeds and display them in the TARGET window.
7. 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 *Genesis-II*.

2.1 Separating the Computer/Display Unit (optional)

If the space in your vehicle is at a premium, you will appreciate *Genesis-II*'s 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, firmly grasp the ends and pull them apart.

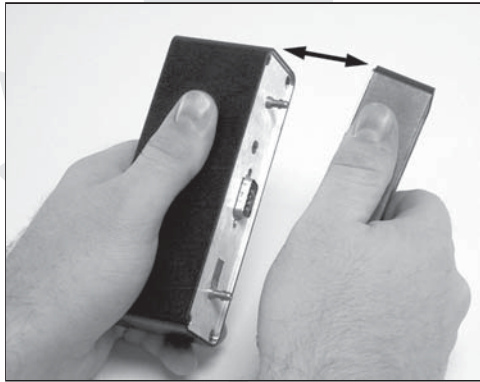


Figure 2.1a Separating the computer/display unit

Note the 9-pin connectors on each half of the unit. Screw two standoffs into the holes next to each connector to attach the two pieces with the 9-pin connector cable.

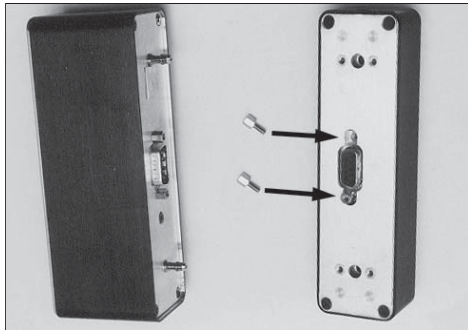


Figure 2.1b To connect the separated unit, first insert the standoffs to secure the cable connectors.

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

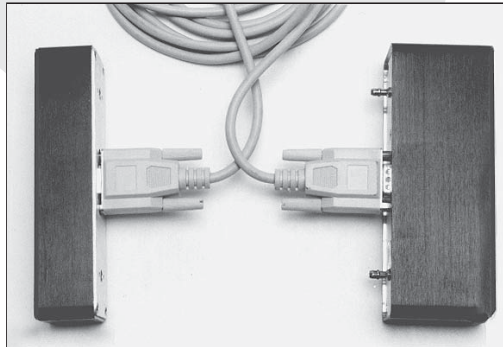


Figure 2.1c Secure the connecting cable by fastening the thumbscrews into the standoffs.

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

2.2 Mounting the Computer/Display Unit



WARNINGS

- *Do not place the Genesis-II components in locations that will obscure the driver's view of the road.*
- *Double-check each component to ensure it is securely mounted. In an accident, a loose component could strike an occupant of the vehicle.*
- *Do not place the Genesis-II computer, antennas, cables, or brackets in your vehicle's air bag deployment zones. Refer to your vehicle's owner's manual or call the vehicle manufacturer if you are unsure where the air bag deployment zones are.*

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. Dash-mounting the unit promotes safety; you can read the display without taking your eyes off the road.

To mount the unit, use the Velcro™ fastening material or the mounting bracket. Before applying the Velcro™, use a clean cloth to remove any foreign material from the dashboard and bracket face. Position the Velcro™ 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.

All cables connect to the rear panel of the computer unit with a quick-disconnect connector. (A communications cable for video and PC is not included. You can order it from Decatur Electronics by calling 800.428.4315.)

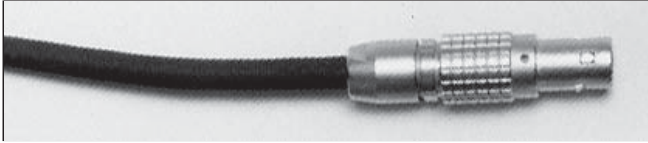


Figure 2.2a The quick-disconnect connector plugs into the computer unit.

1. Align the red dot on the connector with the red dot at the top of the receptacle.
2. Push the connector into the receptacle until you hear a click.



Figure 2.2b Align the red dot on the connector with the red dot on the computer receptacle.



Power connector

WARNING

Be sure to plug the 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 (cigarette lighter) receptacle

Antenna connector

The connector that plugs into the antenna has a more smooth finish than the connectors that plug into the unit.



Figure 2.2d Cable connector that plugs into the antenna

To remove a cable, grasp and pull the connector.

2.3 Mounting and Connecting the Antenna

To install the antenna in the patrol vehicle, align the threaded mounting hole on the antenna with the slot on the L-brace. Then screw the post into the threaded mounting hole.

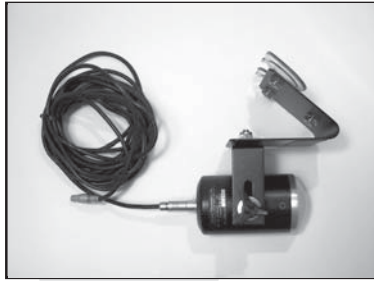


Figure 2.3a A front mount antenna (Ka-band)



Figure 2.3b A rear mount antenna (K-band)

For maximum adhesion, moisten the suction cups on the bracket before affixing them to a surface. Mount the forward-facing antenna assembly on the windshield. Mount the rear-facing antenna near the center brake light where it is not obstructing a clear view of traffic.

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

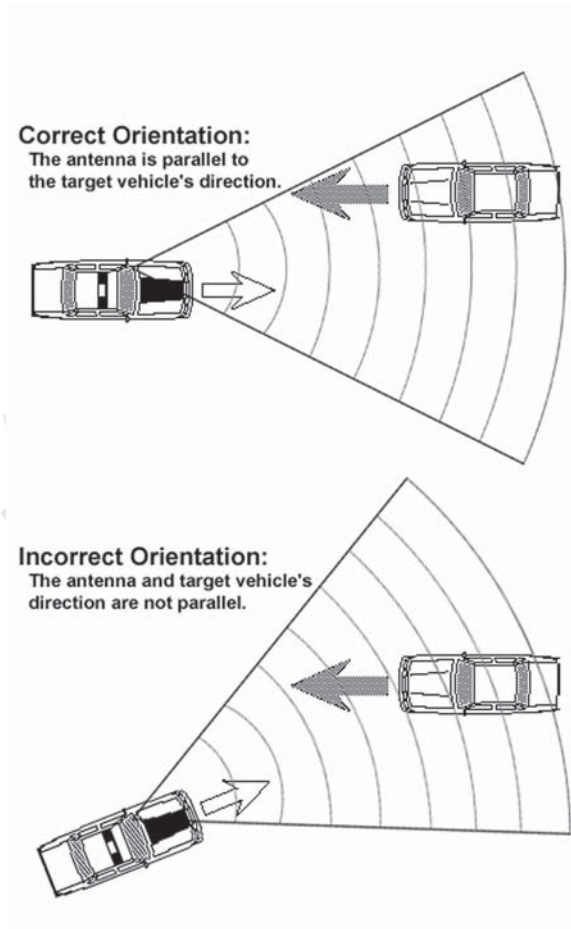


Figure 2.3c Orientation of the antenna to the target vehicle

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

- • *Use only the mounting hardware provided. Damage to the antenna housing can occur if you use incorrect fasteners. The radar antenna should be mounted in a safe manner with either hardware provided with the unit or developed for use with the equipment by the Police Service.*
- *To reduce interference, position the antenna away from the patrol vehicle's display, fans, engine, and the Genesis-II computer unit.*
- *When removing the bracket, use the tabs on the suction cups to break the vacuum seal.*

After you have mounted the antenna, plug the cable into the antenna and 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.
2. Power up by pressing the PWR button on the hand-held remote and select the front antenna by pressing the FRONT button.
3. Cycle through the fan's low to high settings.
4. 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.

3. Operating the *Genesis-II*

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

3.1 Power

The PWR button on the hand-held remote turns the *Genesis-II* on and off. After you press the PWR button, the display illuminates and the computer checks the circuitry. If the power-up checks pass, the computer displays TEST PASS in the MODE window. If the power-up checks fail, a system error message (SYS) will display in the MODE window 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 the Decatur Electronics Repair Department.

 *When the Genesis-II is powered down, it stores the current settings. These settings are restored the next time you power up the unit.*

3.2 Front and Rear Antenna

At powerup, the *Genesis-II* 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 MODE window.

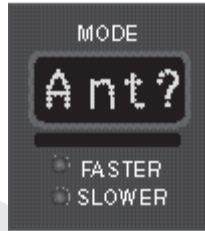


Figure 3.2a If no antenna is connected, Ant? displays.

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 hand-held remote activate and deactivate the antennas. The FRONT or REAR light will illuminate when the antenna is transmitting.



Figure 3.2b When the FRONT light illuminates, the FRONT antenna is transmitting.

The *Genesis-II* 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.

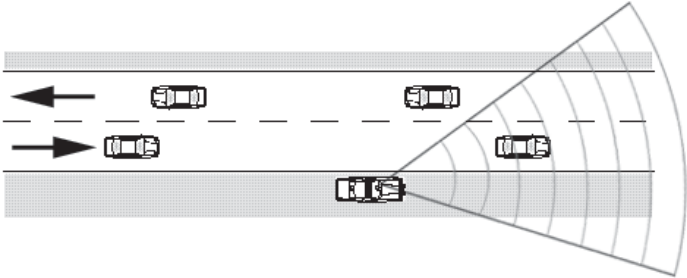


Figure 3.3a Tracking a target vehicle with a parked patrol vehicle and the radar in Stationary Mode

To switch to Stationary Mode, press and hold the MODE button for two seconds. The straight vertical bar represents the stationary patrol vehicle, and the two arrows show the target's travel direction.

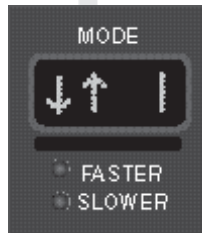


Figure 3.3b The MODE window when the radar unit is in Stationary Mode

Detected target speeds will display in the TARGET window. The PATROL window will always remain blank while in this mode.

3.4 Moving Mode Opposite Direction

Use the *Genesis-II* in the Moving Mode Opposite Direction setting to display the speed of a target moving toward or away from the moving patrol vehicle.

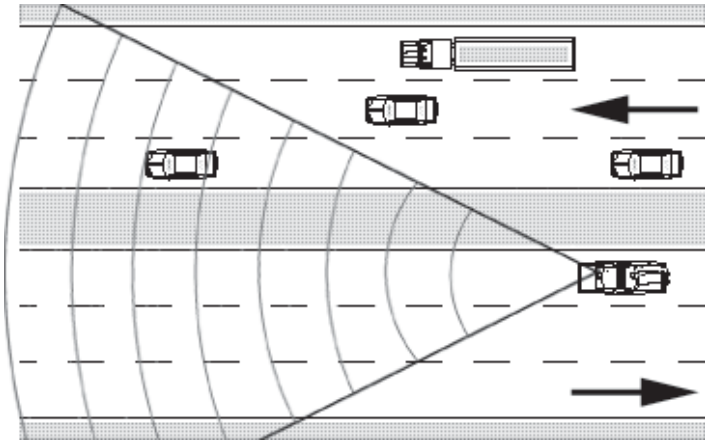


Figure 3.4a A patrol vehicle that is tracking a target vehicle with the rear antenna while traveling with the radar unit in Moving Mode Opposite Direction.

To select Moving Mode Opposite Direction, press the MODE button until the MODE window displays a down arrow on the left and an up arrow on the right. The down arrow indicates the target's travel direction. The up arrow indicates the patrol vehicle's travel direction.

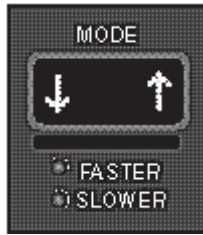


Figure 3.4b The MODE window with Moving Mode
Opposite Direction arrows

In this mode, the *Genesis-II* 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 be blank. 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.

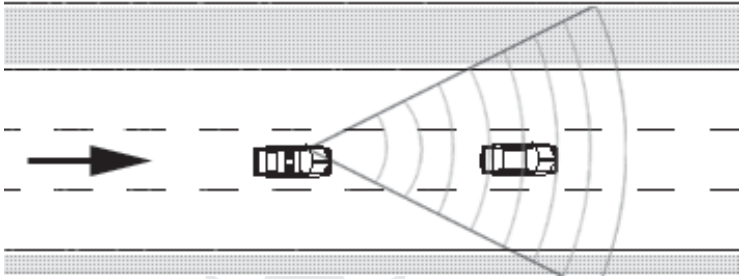


Figure 3.5a A patrol car tracking a target using the Moving Mode Same Direction setting.

To select this mode, press and release the MODE button until the MODE window shows two upward pointing arrows.

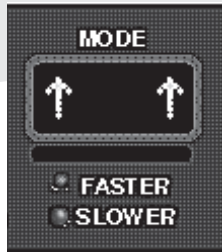



Figure 3.5b The MODE window when the unit is in Moving Mode Same Direction

Moving Mode Same Direction is different than Moving Mode Opposite Direction and Stationary mode, because you must set the radar for Faster or Slower speed processing mode.

Use the Slower mode only while the unit is in Moving Mode Same Direction and when you determine that a target vehicle is moving slower than the patrol vehicle. To activate this mode, press and release the *FAST* button on the hand-held remote. The SLOWER light illuminates.

 *You can not access the Slower mode in any setting other than Moving Mode Same Direction.*

An incorrect selection will display an inaccurate speed. Fortunately, this is rarely a problem, because in most law enforcement situations the target vehicle is traveling faster than the patrol vehicle. The *Genesis-II* defaults to Target Faster Same Direction mode.

To confirm that you have the correct setting, you can:

1. Change your patrol speed to a few Km/H higher or lower.
2. Observe the target speed.
3. If the target speed changes with the patrol speed, it means you need to switch to the other mode.

3.6 Faster Mode

The *FAST* button¹ controls the Faster Mode feature that modifies the operation of the Stationary and Moving Mode Opposite Direction modes.

The Faster light illuminates when you press and hold the *FAST* button on the hand-held remote. (The unit will remain in Faster Mode for 2 seconds after you release the *FAST* button.)

When activated, the system switches from processing the speed of the strongest target to processing the next strongest target going faster than the strongest. In the figure below, the 99 Km/H vehicle is the strongest target if the *FAST* button is activated, then the next stronger faster target, namely the passenger vehicle at 123 Km/H will be displayed.

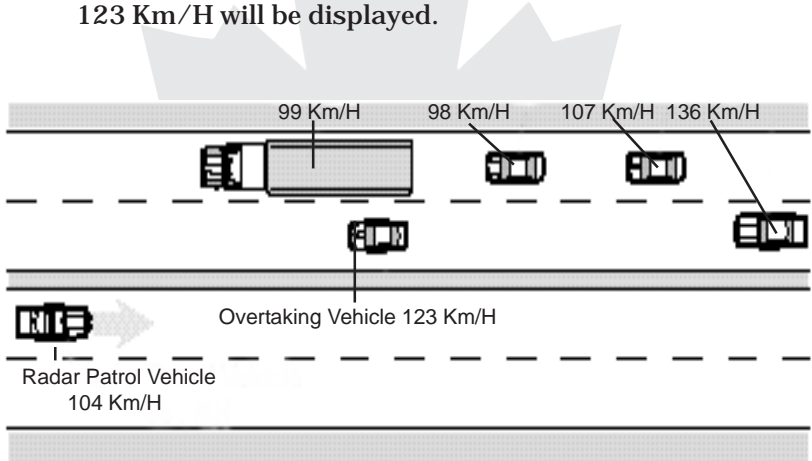


Figure 3.6 Evaluating multiple targets in Faster Mode



When in Stationary Mode, it is possible that the Faster vehicle is not traveling in the same direction as the Strongest vehicle.

¹The Genesis II may be ordered with a different faster feature. When you press the *FAST* button, the strongest target displays in the TARGET window, the next strongest target speed going faster than the strongest target displays in the LOCKED window.

3.7 Lock a Speed

The LOCK button transfers the target speed in 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. If the target locked was a speed of a motor vehicle clocked using the FAST function, that speed will be displayed in the locked window and the radar unit will then revert to monitoring and displaying the speeds of the strongest target. This will form part of the tracking history, because the strongest target all be it lower than the locked speed will be representative of the medium flow and you will have a tracking history/visual observation of the faster target closing in on the slower motor vehicle. Refer to diagram 3.6. This lets you continue to track the history of the target.

Clear a locked speed one of the following ways:

- 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

The *Genesis-II* can track the speed of targets that exceed 914.4 meters when the unit is set at maximum range. The five LED lights above the word RANGE indicate the target-acquisition range.

Press the negative (-) or positive (+) side of the RANGE button to decrease or increase the range setting. The range lights progressively illuminate as you increase the distance. When all lights are on, the unit is in maximum range. Initially, you will want to start with maximum range, then decrease the range setting until you obtain a desired range. For example, an officer would usually reduce range when operating within a city environment.



4. Computer/Display Unit

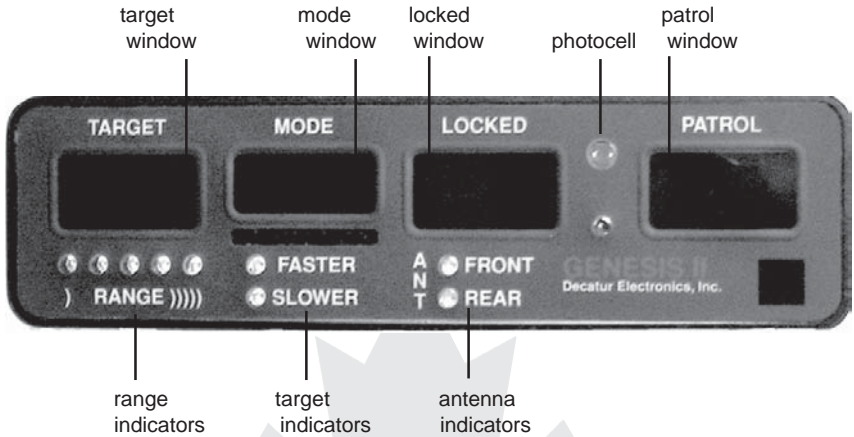


Figure 4a The *Genesis-II* display unit (front)

The *Genesis-II* 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.

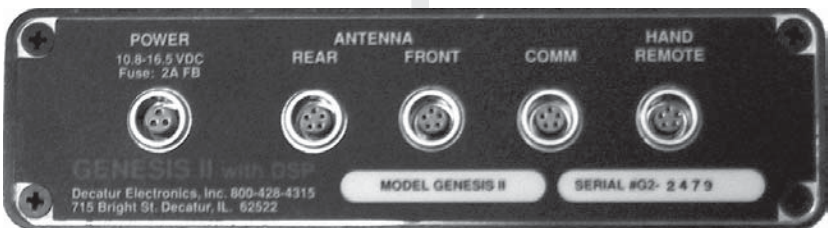


Figure 4b The *Genesis-II* computer unit (back)

4.1 Display Windows

TARGET

The TARGET window displays target speeds and is blank when no target is present.

MODE

The MODE window displays the mode of operation (Stationary, Moving Mode Opposite Direction, or Moving Mode Same Direction) except during powerup, self-test or when an error occurs. When an error occurs, one of the following appears in the MODE window:

- LowV – low voltage
- RFI – radio frequency interference
- SYS – system failure
- RMT? – disconnected hand-held remote

LOCKED

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

PATROL

The PATROL window 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.

4.2 Lights

RANGE

The range lights indicate the radar beam's target-acquisition distance.

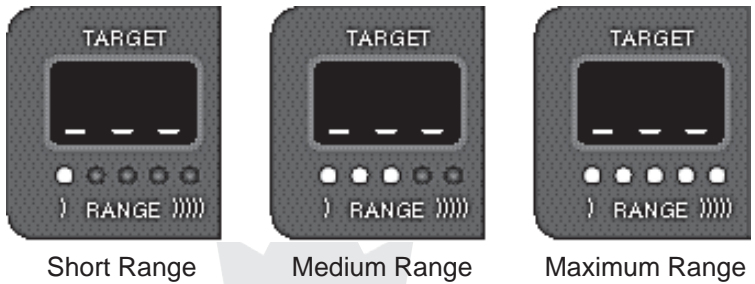


Figure 4.2a RANGE lights

FASTER

The Faster light illuminates when you press and hold the *FAST* button to activate Faster Mode.

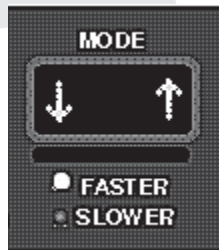


Figure 4.2b The FASTER light

SLOWER

The SLOWER light illuminates indicating that the unit is in Slower Mode if you press the *FAST* button when a target vehicle is moving slower than the patrol vehicle and the unit is in the Moving Mode Same Direction setting.

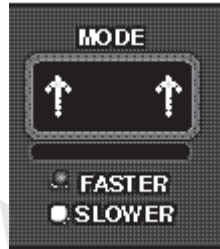


Figure 4.2c The SLOWER light

ANT FRONT and REAR

The ANT FRONT and REAR indicator lights show which antenna is transmitting. In standby mode, neither light is on and neither antenna is transmitting.



Figure 4.2d The FRONT and REAR antenna lights

5. Antennas

The *Genesis-II* K- or Ka-band silver ring and Ka-band patch antennas are incredibly strong, yet compact and light weight. The antennas are interchangeable, so you can configure your radar unit with a second antenna of the same or different band, without changing the hardware, software, and controls. The cables and connectors are also interchangeable and work with both antenna types.



Figure 5 Antennas for the *Genesis-II* include (clockwise from top right) the K-band silver ring (top) and Ka-band silver ring (bottom) and the Ka-band patch (left).

6. Hand-Held Remote Control

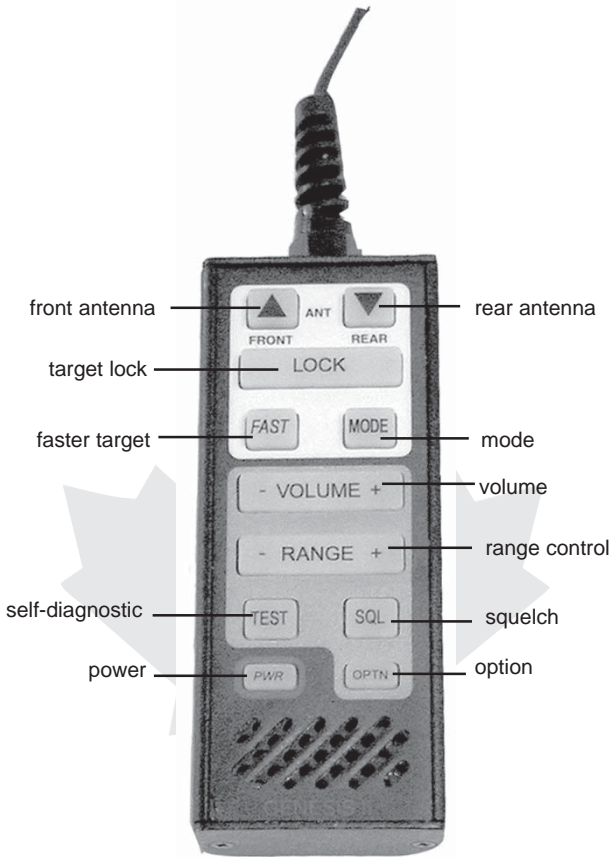


Figure 6 The hand-held remote control unit

➤ *If the hand-held remote is removed during operation, RMT? appears in the MODE window, and the unit will power down within three seconds. If RMT? is displayed, the unit will become inoperative and no speed readings can be taken. To continue operating, plug the hand-held remote back into the unit and press the power (PWR) button.*

6.1 Control Buttons

Power (PWR)

The PWR button powers the *Genesis-II* on and off.

Option (OPTN)

City / Highway

The City/Highway option helps reduce shadowing 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. Patrol speed shadowing cannot occur regardless of whether the member selects the City or Highway option if the Genesis II Select is connected to the Decatur V.I.P. interface.

When you press the OPTN button, CITY temporarily appears in the MODE window, and the unit tracks patrol speeds only as low as 8 kph. Press OPTN again to set the unit to Highway Mode. HWY temporarily appears in the MODE window, and the unit tracks patrol speeds no lower than 32 kph. The radar unit will power up with the settings you select. The main function of the OPTN button is toggling between City and Highway Modes, but other options are available.

Patrol Speed Lock, Recall, and Blanking

(This is an optional feature that does not come with the standard *Genesis-II* package and can be purchased separately from Decatur Electronics.)

This option will enable the patrol officer to lock a target speed which will then become displayed in the locked window, while remembering internally what the patrol speed was at the time the speed was locked. The Genesis II will, as long as the antenna remains activated, continue to track both the speed of the target in the target window and the patrol vehicle speed in the patrol window.

1. When the antenna is turned off by the operator, the locked patrol speed will appear in the patrol

window. This locked patrol speed will be reflective of the speed of the police platform at the time initial target reading was locked.

2. To blank the patrol speed, press the OPTN button. Then press the OPTN button again to recall it.
3. To permanently remove the locked patrol speed, reactivate the antenna by turning it on.

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 SYS message will appear in the MODE window. For more information on tests, see section 9 Field Tests.

Squelch (SQL)

The SQL button lets you select the type of Doppler audio you hear. In squelch mode, the sound is only the Doppler tone for the currently displayed target. In unsquelch mode, the unit sends out all Doppler tones received by the antenna—patrol vehicles, targets, interference, and noise. You typically use unsquelched audio when you listen for interference.

Range (– RANGE +)

The RANGE button on the hand-held remote regulates the maximum target-acquisition distance. You press the negative (–) or positive (+) side of the RANGE button to decrease and increase the target acquisition distance.

Volume (– VOLUME +)

The 16-step volume control regulates the Doppler audio and system status tone (beep) volume. Press the negative (–) or positive (+) side of the VOLUME button to decrease and increase the volume level. If your radar unit has audio settings that include muted or a numerical value of zero, it is imperative that your volume never be set at either of those settings as the Doppler audio is a mandatory requirement for a valid

tracking history and the selection made is an operator preference. Refer to 9.3, item 4.

Fast (*FAST*)

Use the *FAST* button to control the Faster Mode feature when you are evaluating multiple targets, either moving opposite or stationary modes, also use the *FAST* button to switch to between Faster and Slower settings when operating in the Moving Same Direction Mode.

Mode (*MODE*)

The *MODE* button switches between the three operating modes: Stationary Mode, Moving Mode Opposite Direction, and Moving Mode Same Direction.

Lock (*LOCK*)

The *LOCK* button transfers the target speed 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*

The antenna (*ANT*) up arrow (*FRONT*) and down arrow (*REAR*) buttons activate and deactivate the front and rear antenna. An antenna must be activated to track a target speed.

7. Communication System Controls

You can configure the *Genesis-II* 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 *Gemini™* 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 more details on the serial communications port configuration.



8. Performance Tips

Understanding potential radar interference and what to do when it occurs can greatly increase the radar's performance.

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 deployed 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 enters the operational range and overrides the interference signal, causing the displayed speed to change suddenly to the vehicle's speed.
- The Doppler tone is corrupted with noise.
- Speeds are irregular and do not provide a valid tracking history.

Interference regardless of the source is neither additive or subtractive of a valid target reading. Interference will not impact on the accuracy of

the radar unit, but it will impact on the operational range. If a member establishes a solid tracking history, as referred to in section 9.3, it can be established that interference was not present at the time of the speed reading.

8.2.1 Angular Interference (Cosine Effect)

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.

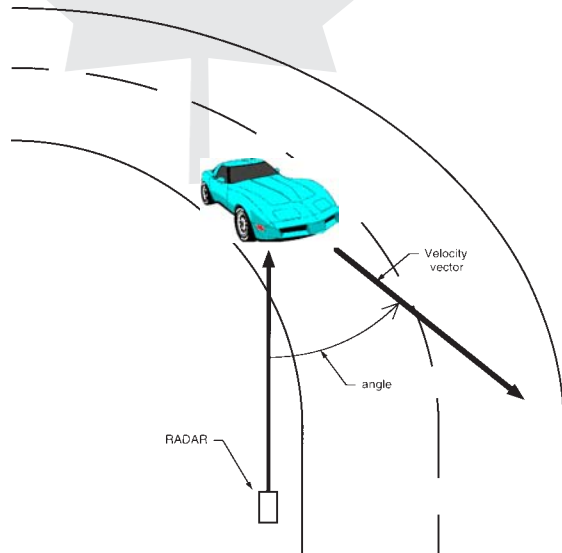


Figure 8.2.1 An angle between the antenna and the target vehicle causes the cosine effect.

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

	Horizontal angle degrees:										
	0°	1°	3°	5°	10°	15°	20°	30°	45°	60°	90°
Actual speed:	Displayed speed:										
48 km/h	48	47	47	47	47	45	45	42	34	24	0
64 km/h	64	63	63	63	63	61	60	54	45	32	0
80 km/h	80	79	79	79	79	77	74	69	56	40	0
97 km/h	96	95	95	95	95	92	90	82	50	48	0
113 km/h	112	111	111	111	111	108	105	97	79	56	0
129 km/h	128	127	127	127	127	124	121	111	92	64	0

Table 8.2.1 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 target speed is 0 kph—grossly incorrect. Cosign Effect will always result in a target speed being displayed that is less than the actual speed of the moving motor vehicle, which will always be advantageous to the motorist.

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.

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 *Genesis-II* 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.

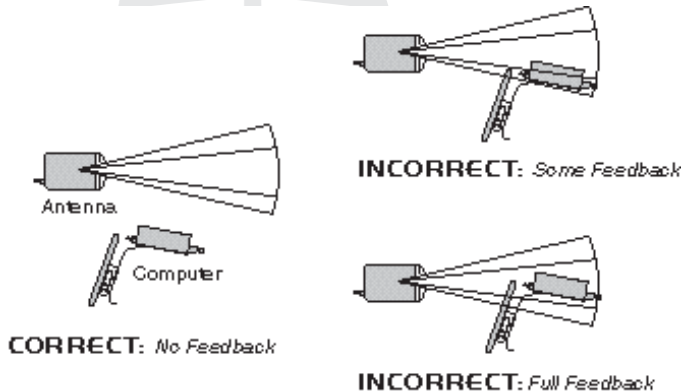


Figure 8.2.5 Correcting feedback interference

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 Genesis-II 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 Genesis-II detects this condition and will not display speeds which are generated by this overloading, but instead it rejects these speeds while continuing to display speeds from valid targets.

For example, suppose both the patrol vehicle and target vehicle are traveling at 97 Km/H, and an overpass is between the target and patrol vehicle. Initially, the radar detects and displays the speed of the target vehicle. But as the patrol vehicle moves closer to the overpass, the return signal overloads the computer, causing the TARGET window to go blank. Targets traveling at speeds, which are close to the patrol speed will also be rejected. To process this type of target simply increase or decrease your patrol speed by at least 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 *Genesis-II* 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 passing stationary objects. 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. A valid tracking history, as referred to in Sections 9.3, will confirm that patrol speed shadowing was not present. Furthermore, after exhaustive field tests with a Genesis II Select connected to a VIP interface, it has been impossible to create a patrol speed shadowing event. Notwithstanding these field tests, the requirement for a correlation between the patrol vehicle speed displayed on the radar and the actual patrol speed of the police vehicle is mandatory. Please refer to 9.3.

 *The Genesis-II usually recognizes and ignores shadowing. On the rare occasion that it appears, turning the antenna on and off usually quickly remedies shadowing.*

With regard to this phenomenon, it is important that the operator has obtained a solid tracking history which includes that there be a correlation between the patrol speed displayed on the radar and the patrol speed displayed on the police platform. By ensuring that correlation exists, the operator can be satisfied that the patrol speed shadowing did not occur.

In addition, if your Genesis-II is equipped with the VIP (Vehicle Interface Portal) interface there is no possibility of obtaining an artificially low or high patrol speed, because the VIP is integrated to the speedometer and the electronically components of the police vehicle. Field tests under every possibly situation have been attempted and every effort has been made to create a patrol speed shadowing situation with a VIP unit connected, and it has been found to be impossible to create that phenomenon. Notwithstanding these rigid tests it is still a mandatory requirement that the officer have an actual correlation of his or her patrol speed and the patrol speed displayed on the radar unit prior

to any enforcement action being taken. Listed below are the components of a tracking history:

1. A Visual observation of an approaching or receding Motor Vehicle that appears to be in excess of the posted limit in the area and an estimation by the officer of the speed of that motor vehicle is travelling. Generally, skilled officers are able to estimate the speeds of moving motor vehicles within plus or minus 5 km/h per hour of the actual speed. This is an acquired skill that is taught on the basic operators course.
2. Having made the visual observation and estimate of the rate of speed, the radar unit will be placed in the operational mode, selecting the appropriate antenna if the unit is a dual antenna configuration.
3. The officer then must determine or confirm the correlation between the patrol speed of the police vehicle and the patrol speed displayed on the radar unit. This correlation should be consistent with the results noted while conducting the road test in 9.2
4. Note, that the target speed displayed on the radar unit is consistent and confirms the officers initial observations and estimate, and that the audio tracking tone emitted by the radar unit is consistent with the visual observations and the target speed displayed.

Absent of any one of the above tracking history components and NO ENFORCEMENT ACTION shall be undertaken.

9. Field Tests

You can do the following tests to verify the accuracy of the *Genesis-II*.

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 *Genesis-II* will not power down during a self test and checks the following:

Display Test — The 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 burned out.

Circuitry Test — The system checks the internal circuitry. If the unit passes all internal checks, the messages ROM PASS, RAM PASS, and DSP PASS or FAIL (if a test fails) display in the MODE window.

Speed Simulation Test — The *Genesis-II* verifies the speed accuracy using synthesized Doppler frequencies corresponding to a series of four simulated speeds: 25, 50, 75, and 100 Km/H.

9.2 Road Test

After the radar unit has passed the self test the operator shall conduct a road test at the start and conclusion of his or her tour of duty and confirm the correlation that exists between the patrol vehicles speedometer and the patrol speed displayed on the radar unit. Generally, the correlation will be the same for both units and seldom beyond 3 km/h per hour. That difference if present is reflective of the under estimation of the speedometer in the police vehicle and NOT an indication of an inaccuracy with the radar unit.

If your *Genesis-II* is configured as a dual antenna unit, the verification requirements will be met by the officer maintaining a stable patrol speed and toggling between the front and rear antenna at which time the patrol speeds for the front and rear antenna should be the same.

In addition to this road test, as part of the tracking history for any violation in which enforcement action is to be taken, it is a mandatory requirement that there be this correlation between the patrol speed of the police vehicle and the patrol speed displayed on the radar unit at that time. Without this correlation no enforcement action shall be taken.



An incorrectly aimed antenna will cause the radar unit's patrol speed to be lower than the speedometer's speed.

9.3 Tracking History

For each enforcement action taken by the police with respect to a speeding offence arising out of the use of this radar unit a tracking history must occur. The tracking history shall consist of:

1. A Visual Observation of an approaching or receding Motor Vehicle that appears to be in excess of the posted speed limit in the area and an estimation by the officer of the speed of that motor vehicle is traveling. Generally, skilled officers are able to estimate the speeds of moving motor vehicles within plus or minus 5 Km/H per hour of the actual speed. This is an acquired skill that is taught on the basic operators course.
2. Having made the visual observation and estimate of the rate of speed, the radar unit will be placed in the operational mode, selecting the appropriate antenna if the unit is a dual antenna configuration.
3. The officer then must determine or confirm the correlation between the patrol speed of the police vehicle and the patrol speed displayed on the radar unit. This correlation should be consistent with the results noted while conducting the road test in 9.2.
- 4) Note, that the target speed displayed on the radar unit is consistent and confirms the officers initial

observations and estimate, and that the audio tracking tone emitted by the radar unit is consistent with the visual observations and the target speed displayed.

5. Where a target speed is determined while in same direction mode, regardless of whether a VIP interface exists, the operating member must conduct a target vehicle discrimination test. For non-direction sensing units, it will confirm that the unit was being deployed in the correct same direction mode, and for all other radar units, it will confirm that there is no fan or spurious response.
6. Absence of any one of the above tracking history components and NO ENFORCEMENT ACTION shall be undertaken.

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 *Genesis-II* can withstand temperature variations, however, only the antenna is weather resistant.
- Insert and remove the connectors by following the correct connect and disconnect procedures.

11. Specifications

11.1 Mechanical

Display Unit	
Dimensions	5.25 in x 1.45 in x 1.10 in 13.33 cm x 3.68 cm x 2.79 cm
Weight	5.90 oz 0.17 kg
Computer Unit	
Dimensions	5.25 in x 1.45 in x 1.96 in 13.33 cm x 3.68 cm x 4.97 cm
Weight	16 oz 0.45 kg
Hand-Held Remote	
Dimensions	5 in x 1.20 in x 2.10 in 12.70 cm x 3.04 cm x 5.33 cm
Weight	9.10 oz 0.26 kg
Ka-Band Antenna	
Dimensions	3.85 in x 2.10 in 9.77 cm x 5.33 cm
Weight	13.25 oz 0.37 kg
Ka-Band Antenna (Patch Model)	
Dimensions	2.3 in x 2.3 in x 1.7 in 5.84 cm x 5.84 cm x 4.31 cm
Weight	6.5 oz 0.18 kg
K-Band Antenna	
Dimensions	4.15 in x 3.0 in 10.54 cm x 7.62 cm
Weight	7.25 oz 0.20 kg

11.2 Antenna

K-Band (Silver Ring)	
IACP type	IV
Nominal transmission frequency	24.150GHz ± 50MHz
Nominal horizontal beamwidth	12°
Polarization	Circular
Nominal microwave power output	7mW
Maximum aperture power density	≤ 1mW/cm ²
Ka-Band (Silver Ring and Patch)	
IACP type	VI
Nominal transmission frequency	35.50GHz ± 100MHz
Nominal horizontal beamwidth	12°
Polarization	Circular
Nominal microwave power	Output 15mW
Maximum aperture power	Density ≤ 1 mW/cm ²

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 voltage range	10.8 to 16.5VDC with internal, resettable fuse
Low voltage threshold	10.8VDC with visual indicator
Current draw with 13.6VDC applied in various modes:	
Standby (antenna OFF)	0.60 amperes
Antenna ON, no targets displayed	0.85 amperes
Antenna ON, 55 target displayed	0.95 amperes
Antenna ON, 20 target, 35 patrol	1.00 amperes
Antenna OFF, segment check 888 888 888	1.05 amperes
Antenna ON, segment check 888 888 888	1.30 amperes

11.5 Speed Range

Stationary Mode	
Target	24 Km/H - 337 Km/H
Moving Mode Opposite Direction	
Patrol 16 Km/H - 144 Km/H	Patrol with High-Speed Option 16 Km/H - 180 Km/H
Target 24 Km/H - Closure of 337 Km/H	
Moving Mode Same Direction	
Patrol 32 Km/H - 144 Km/H	Patrol with High-Speed Option 32 Km/H - 180 Km/H
Slower Target 24 Km/H - 107 Km/H	Slower Target with High-Speed Option 8 Km/H - 135 Km/H
Faster Target 40 Km/H - 252 Km/H	Faster Target with High-Speed Option 40 Km/H - 3089 Km/H
<p>The Moving Mode Same Direction target speed is computed as follows:</p> <p>when tracking a slower target $TS = PS - SS$ when tracking a faster target $TS = PS + SS$</p> <p>where</p> <p>TS = Target Speed SS = Separation Speed, which must be at least 8 Km/H, but no greater than 75% of the patrol speed.</p>	

12. Legal Requirements

FCC Form 725-A
October 1975

FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D. C. 20554

GRANT OF TYPE ACCEPTANCE

Decatur Electronics, Incorporated
725 Bright Street
Decatur, IL 62522

Attention: Mr. Ralph R. Henry

Re: Application dated July 7, 1977
Name of Grantee Decatur Electronics, Incorporated
Equipment Type Number 726

Pursuant to the above referenced application, TYPE ACCEPTANCE of the equipment specified IS HEREBY ISSUED to the above-named GRANTEE for use under the Commission's Rules and Regulations as shown herein.

DATE OF GRANT: September 27, 1977

Manufacturer: Decatur Electronics, Incorporated

Note(s)	Rule(s) Part Number(s)	Frequency Range (MHz)	Input Watts	Output Watts	Frequency Tolerance	Emission
-	89, 91, 93	24050-24250	-	0.15	0.2	6A0
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Remarks:

C-6
e12



12.1 FCC Documents



FEDERAL COMMUNICATIONS
COMMISSION
WASHINGTON, D.C. 20554



GRANT OF EQUIPMENT
AUTHORIZATION
Type Acceptance

Decatur Electronics Inc
715 Bright Street

Date of Grant: 03/17/1998

Decatur, IL 62522

Application Dated: 03/06/1997

Attention: Randall Sanner

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER HTRKA2

Name of Grantee Decatur Electronics Inc

Equipment Class: Licensed Non-Broadcast
Station Transmitter

Notes:

Grant Notes	FCC Rule Parts	Frequency Range (MHz)	Output Watts	Frequency Tolerance	Emission Designator
	90.103	34700 - 35900	0.01	%	NON

Mail To:

9703178315024004

12.2 Canadian Industry Certificates of Technical Acceptability



Industry Canada

Industrie Canada

No. ▶ 6894

CERTIFICATE OF TECHNICAL ACCEPTABILITY FOR RADIO EQUIPMENT

CERTIFICAT D'ACCEPTABILITÉ TECHNIQUE DE MATÉRIEL RADIO

CERTIFICATION No. No. DE CERTIFICATION	▶ 1270 B237		
ISSUED TO DÉLIVRÉ À	▶ DECATUR ELECTRONICS INC.		
TYPE OF EQUIPMENT GENRE DE MATÉRIEL	▶ POLICE RADAR		
TRADE NAME AND MODEL MARQUE ET MODÈLE	▶ GENESIS II K		
FREQUENCY RANGE BANDÉ DE FRÉQUENCES	▶ 24.05 GHz - 24.25 GHz		
EMISSION DESIGNATION DESIGNATION D'ÉMISSION	▶ 60H0NON		
R.F. POWER RATING PUISSANCE NOMINALE H.F.	▶ 15 mWatts		
CERTIFIED TO CERTIFIÉ SELON LE	▶ SPECIFICATION CAHIER DES CHARGES	RSP100 GL-33	ISSUE ÉDITION 7

Family approval reference certificate #2590 of January 7, 1993.

Certification of equipment means only that the equipment has met the requirements of the above noted specification. License applications, where applicable to use certified equipment, are acted on accordingly by the issuing office and will depend on the existing radio environment, service and location of operation.

La certification du matériel signifie seulement qu'il est conforme aux exigences du cahier des charges mentionné ci-dessus. Les demandes de licence, le cas échéant en vue de l'utilisation de matériel certifié seront traitées en conséquence par le bureau chargé de délivrer lesdites licences, en tenant compte du milieu radioélectrique ambiant, du service radio existant et de l'emplacement de la station.

This certificate is issued on condition that the holder complies and will continue to comply with the requirements of the radio standards specifications and procedures issued by the department.

Le présent certificat est délivré à condition que le détenteur se conforme et continue à se conformer aux cahiers des charges et procédures sur les normes radioélectriques publiées par le ministère.

ISSUED UNDER THE AUTHORITY OF MINISTER OF COMMUNICATIONS
DÉLIVRÉ AVEC L'AUTORISATION DU MINISTRE DES COMMUNICATIONS

DATE November 20, 1996

For

Canada

DIRECTOR GENERAL
ENGINEERING
PROGRAMS
BRANCH

DIRECTEUR GÉNÉRAL
DIRECTION
DES PROGRAMMES
TECHNIQUES



Industry Canada Industrie Canada

No. ► 8125

CERTIFICATE OF TECHNICAL ACCEPTABILITY FOR RADIO EQUIPMENT

CERTIFICAT D'ACCEPTABILITÉ TECHNIQUE DE MATÉRIEL RADIO

CERTIFICATION No. No. DE CERTIFICATION	► 1270 K1438	
ISSUED TO DÉLIVRÉ À	► DECATUR ELECTRONICS INC.	
TYPE OF EQUIPMENT GENRE DE MATÉRIEL	► LOW POWER POLICE RADAR	
TRADE NAME AND MODEL MARQUE ET MODÈLE	► GENESIS II SILVER RING KA	
FREQUENCY RANGE BANDE DE FRÉQUENCES	► 35.4 GHz to 35.6 GHz	
EMISSION DESIGNATION DESIGNATION D'ÉMISSION	► 60H0N0N	
R.F. POWER RATING PUISSANCE NOMINALE H.F.	► 10 mWatts	
CERTIFIED TO CERTIFIÉ SELON LE	► SPECIFICATION RSP100 CAHIER DES CHARGES SL-33	ISSUE 7 ÉDITION 7

FAMILY APPROVAL WITH CERTIFICATE NO. 5140

Certification of equipment means only that the equipment has met the requirements of the above noted specification. License applications, where applicable to use certified equipment, are acted on accordingly by the issuing office and will depend on the existing radio environment, service and location of operation.

This certificate is issued on condition that the holder complies and will continue to comply with the requirements of the radio standards specifications and procedures issued by the Department.

ISSUED UNDER THE AUTHORITY OF MINISTER OF INDUSTRY
DELIVRÉ AVEC L'AUTORISATION DU MINISTRE DES INDUSTRIE

DATE **October 29, 1997**

L'homologation de matériel terminal signifie seulement qu'il est conforme aux exigences du cahier des charges mentionné ci-dessus. Les demandes de licence, le cas échéant en vue de l'utilisation de matériel certifié seront traitées en conséquence par le bureau chargé de délivrer lesdites licences, en tenant compte du milieu radioélectrique ambiant, du service radio existant et de l'emplacement de la station.

Le présent certificat est délivré à condition que le détenteur se conforme et continue à se conformer aux cahiers des charges et procédures sur les normes radioélectriques publiées par le ministère.

FOR

DIRECTOR GENERAL
SPECTRUM
ENGINEERING
BRANCH

DIRECTEUR GÉNÉRAL
GÉNIE
DU SPECTRE

12.3 Radar Case Law

See Appendix B for more information on the Offense of Speeding and Training Qualifications.



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 *Gemini™* 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 then 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 radar products?

A. Yes, the *Genesis™* series of hand-held stationary radar guns, such as the *GHS™*, *Genesis-VP™*, *Genesis-VPD™* (*Directional*) and dash-mount radar systems.

Q. Does Decatur Electronics have a sports radar gun?

A. Decatur Electronics has developed a radar gun specifically for use in baseball and softball. We market this radar gun exclusively through the JUGS Company. Contact 800.547.6843, www.thejugscompany.com.

Decatur's *Prospeed™* model CR-1K sports radar 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 *Galaxy™* series. Contact your Decatur sales representative for more information on these products.

Q. What upgrades are available now for my *Genesis-II*?

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

Q. SYS appears in the MODE window and nothing else works?

A. If your unit has a system error, turn the unit off and on. If it still says SYS, contact Decatur Electronics.

14. Service

14.1 Warranty

TWO-YEAR RADAR WARRANTY

Decatur Electronics, Inc. guarantees the *Genesis-II* to be free from defects in workmanship and material and to operate within specifications for a period of two 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 the factory or a Decatur authorized warranty service center.

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.)

For repairs, simply return the unit (transportation prepaid) directly to the factory or to a Decatur authorized warranty service center. Refer to section 14.2 Service Return Procedure.

TWO-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.

If you are interested in an extended warranty or the Maintenance*PLUS* maintenance contract, contact your sales representative to discuss the options.

14.2 Service Return Procedure

If you have questions, want a quick problem diagnosis, or need to return your *Genesis-II* to the factory.

- Call Decatur Electronics Customer Service and ask for the Repair Services Department. Have the serial number of the radar unit ready.

Phone: 800.428.4315
Fax: 217.428.7508

If you need to return your radar unit to Decatur Electronics:

- Return ALL of the *Genesis-II* parts in the original packaging (transportation prepaid).
- Include a note describing the problem and/or the incident that resulted in the problem. Failure to do so can delay the return of your radar device.
- The Repair Services Department will issue you a return authorization (RA) number. Write the RA number on your note and shipping label.
- Return the system to:

Decatur Electronics, Inc.
715 Bright Street
Decatur, IL 62522 USA

RA# XXXXXX

The customer is responsible for the shipping charges to send the system to Decatur Electronics, Inc.

If we receive a system from a customer COD that is still under warranty, we will charge the customer for the amount of COD freight charges plus an additional 10% for handling after we repair the system. Also, we will

add COD and a 10% handling fee to the repair bill for out-of-warranty repairs.

The customer is responsible for all shipping charges to the Decatur service location. Decatur does not accept incoming COD shipments. Decatur Electronics will pay the freight (up to \$10.00 US) for shipping the system from the repair facility to the customer, provided the system is still under warranty. We will charge the customer for any shipping charges above the initial \$10.00. If you want to ship your package express or next day air, we will invoice you for these freight charges.

If your radar is out of warranty and you would like to know the cost of repair prior to the actual repair work being performed, Decatur would be happy to give you a repair estimate. To obtain an estimate, request it either on the paperwork you submit with the radar device when you send it in for service or when you obtain a Return Authorization (RA) number. Decatur provides estimates only upon request.

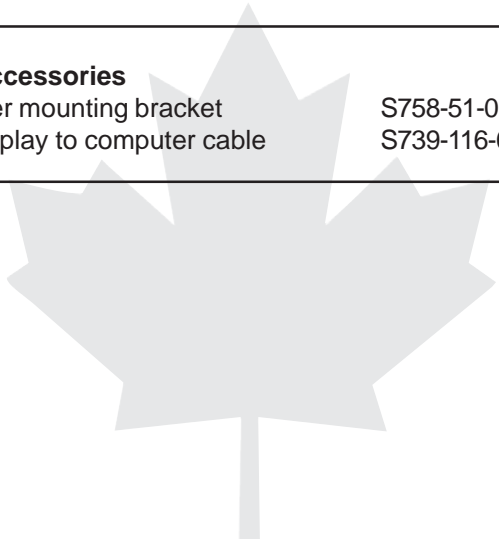
The initial charge for an estimate is currently \$50.00 per unit if your radar gun is not under warranty, plus the return shipping and handling fees. If, after reviewing the estimate cost, you decide not to have your radar repaired, you will be invoiced a \$50.00 minimum charge. If you decide to have your radar gun repaired, you do not owe the estimated charge (the charge is waived) and only pay the amount stated in the estimate.

15. How to Order Additional Products

You can order upgrades (when available) to the *Genesis-II* from Decatur Electronics as well as cases, power supplies, tripods, tuning forks, different cable lengths and mounting brackets. To see product descriptions or to order products, visit the Decatur Electronics Web site at www.decaturradar.com or contact the Decatur Electronics sales office at 800.428.4315.

Antennas (for both front and rear mounts)		
Silver Ring K-band antenna Part number	S774-300-0	\$550.00
Silver Ring Ka-band antenna	S771-20-0	\$650.00
Patch Ka-band antenna	S771-10-0	\$650.00
Antenna cables (An 8-ft. front and 16-ft. rear antenna cable is good with most vehicles)		
4-ft. antenna cable	S769-117-0	\$ 80.00
8-ft. antenna cable	S769-105-0	\$ 90.00
16-ft. antenna cable	S769-118-0	\$ 95.00
22-ft. antenna cable	S769-115-0	\$100.00
Front and rear antenna mounting bracket		
Ka-band bracket (mounts on windshield) (comes standard with <i>Genesis-II</i> order)	S758-38-0	\$25.00
Universal bracket (mounts on windshield or side window)	S758-33-0	\$50.00
Deck mount (mounts on flat surface)	S758-34-0	\$35.00
Visor bracket (mounts on sun visor)	S758-40-0	\$25.50
Glue-on bracket (mounts on windshield)	S773-235A-0	\$25.50
Communication cable (optional, connects radar to an external device)		
24-ft. cable (connects to IBM format PC and some video systems)	S769-111-0	\$70.00

Carrying Case		
Cardboard packing box / carrying case	P1025-36	\$40.00
Hard case with cut-out foam	P801-20	\$70.00
Interconnect cable for connecting computer unit to detachable display unit (optional)		
9-ft. interconnect cable	S769-116-0	\$15.00
Detachable display bracket for mounting detached display unit on windshield		
Detachable display bracket	S758-51-0	\$15.00
Other accessories		
Computer mounting bracket	S758-51-0	\$15.00
10-ft. display to computer cable	S739-116-0	\$15.00



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 *Genesis-II* 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 *Genesis-II* 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 *Genesis-II* transmits the following digital sequence

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

Appendix B Radar Case Law

The Offence of Speeding (General)

R. v. Hickey (O.C.A.) 1976

Speeding is an offence of absolute liability. Defence of reasonable mistake of fact is not available.

R. v. Hickey (O.H.C.J.) 1976

Speeding - defendant's speedometer inaccurate - Court held speeding was a strict liability offence to which defence of reasonable mistake of fact did exist.

NOTE: OVERTURNED ON Appeal, See: R.v. Hickey (O.C.A.) 1976

R. v. Cunningham (O.H.C.J.) 1979

Accused misread speed limit sign and believed he was in a higher speed limit zone. HELD: Accused's mistake was a mistake of law, which is no defence to the charge of speeding.

R. v. Naugler (N.S.S.C.) 1981

Speeding is an offence of absolute liability, to which mistake of fact is no defence.

R. v. Bigioni (O.C.A.) 1988

ISSUE: What evidence is required to satisfy burden on crown prima facie in prosecution of charge of speeding when evidence obtained by radar?

The Ontario Court of Appeal affirmed that the evidence adduced at trial was sufficient prima facie evidence of speeding. (Refer to transcript of trial proceedings for particulars of evidence adduced)

R. ats. Sim (O.C.A.) 1988

See transcript of evidence at trial

- no evidence of visual observation
- no evidence of officer's training and qualifications
- no evidence tests performed on radar unit conformed with manufacturer's specifications
- no evidence as to accuracy of tuning forks
- no evidence radar units "is capable of accurately measuring the speed of moving motor vehicles"

Held on appeal: Evidence before trial Court was sufficient to support conviction.

R. v. Grainger (O.C.A.) 1958

Speed by radar: Counsel argued it must be established that radar, when properly used, was capable of registering speed of a motor vehicle on a highway and that the machine was in good working condition and was properly used.

HELD: On summarized evidence it was implicit that radar when properly used is capable of registering speed of motor vehicle and at time was being properly used and in good working order. As defence merely claimed but did not show machine subject to weaknesses, conviction proper on weight of evidence.

R. v. Werenka (Alta. Q.B.) 1981

ISSUE: What evidence Crown must establish to prove prima facie case where speed by radar.

HELD: Crown only had to prove prima facie case. Not obliged to demonstrate that the instrument was capable of accurately registering speeds over the entire range of the instrument where there was no evidence to throw doubt on the officer's evidence.

1. qualified operator
2. tested and accurately measured the speed of the appellants' vehicle
3. evidence prima facie notwithstanding that the officer did not have a detailed knowledge of the working of the radar set.

R. v. Joudrey (1992) Nova Scotia Prov. Court

The accused was charged with speeding contrary to s. 106(2) of the Motor Vehicle Act. The night of the alleged offence was foggy and drizzly. The accused insisted that he was not driving over the speed limit and challenged the accuracy of the RADAR readings. His lawyer cross-examined the RADAR operator and, in doing so, referred to a textbook, “the Law of Speeding and RADAR”, and specifically to passages stating that certain atmospheric or environmental conditions could give spurious readings. The court did take judicial notice of the passages in the textbook and the accused was acquitted.

Griffin v. the Queen (N.S. Cnty. Cr.) 1980

Officer testified the appellant traveled at 107 kilometres in a zone marked for a maximum of 80 kilometres. He neither described the speed in terms of “kilometres per hour”, nor did he describe the purpose or functioning of the radar gun. HELD: Judicial notice could be taken of the functioning of the radar gun. While the description of the speed was imprecise, the intended meaning was clear.

R. v. Longmire (1993) Nova Scotia Supreme Court (Appeal Div.)

The appellant’s conviction was affirmed on appeal. The appellant appealed further, arguing that the trial Judge erred in his interpretation and application of s. 88(5) of the Motor Vehicle Act and that the Crowns refusal to provide him with a copy of the RADAR operation manual violated his rights under ss. 7 and 11(d) of the Charter, preventing him from making full answer to the charge. Defence council indicated that his reason for asking for the manual was “so that the defence can make itself familiar with the particular operation of this RADAR unit and in order that we can intelligently cross-examine the Crown with regards to how he operated the RADAR on that day.” He also wished to have the manual

to review sources of interference that may make the unit susceptible to inaccuracies. In addition, the testing procedure was sought for review. The Crown, in response to the preliminary motion, indicated that it would not provide a copy of the manual, but would consent to an adjournment so the defence could hire an expert in the operation of the RADAR machine. The trial Judge declined to order a stay, as defence requested, but did grant an adjournment so that defence counsel might obtain the manual from another source. Defence counsel did not pursue the matter of disclosure on the adjourned date, nor did they cross-examine the officer with respect to the operation of the RADAR. The appellant did not lay a rational basis or factual foundation for his claim for disclosure. In an absence of an air of reality to the request for production, there was no evidence of a breach of the Charter. The appeal was dismissed.

R. v. Windrem (May 27, 1986, Brampton Prov. Off. Appt. Ct.)

Defence agents/counsel use this case to support their argument that there must be evidence before the Court that the tests conducted on the radar device were in accordance with the accepted manufacturer's technique. It is apparent from the Judgment that the appeal was allowed as the Justice of the Peace at trial misdirected himself on the evidence. The J.P. in his reasons for judgement found that the officer had checked the radar before and after use by the accepted manufacturer's technique. That evidence was not before the J.P. at trial.

R. v. Furlong (P.O.A.) 1985

Defence agents/counsel use this case to support their argument that the officer must state in evidence “- I tested the radar...” It is apparent from the Judgment on appeal, that the appeal was allowed due to the fact that the J.P. at trial misdirected himself on the evidence before him. The J.P. found as a fact that the officer was the person that did the testing, because there was no one else in the police car. There was no such evidence before the J.P. at trial.

Owusu v. R. (P.O.A. Appeal Crt.) 1988

1. It is not mandatory for the speed limit sign to display a tab sign below.
See Reg. 486 (d) "MAY" display...
2. There is no statutory provision in Ontario Highway Traffic Act, for the admissibility
Of a certificate as to the accuracy of the tuning forks.
(Alberta Court of Appeal decision Re: speeding and necessity to file certificate distinguished)

R. v. Wagner (1999), Ontario Court of Justice

The appellant in this case as charged for speeding and requested a trial. The officer in charge of the matter encouraged the woman to plead guilty in exchange for a reduction of the offence by 10 km/h. The officer later had a paralegal approach the woman and offer his unsolicited opinion that she was unlikely to be successful at trial and should accept the officer's reduction, which she did and plead guilty. She later appealed the conviction citing that she had been intimidated into the agreement. In his ruling, Judge K.P.Evans stated, "This long time practice of having the charging police officer attempt to negotiate a plea or arrange a settlement of a case such as this, is archaic and fraught with dangers to the integrity of our judicial system as it stands today. The responsibility for offering or accepting any plea negotiations are solely within the jurisdiction of the Provincial Prosecutor assigned to the said Court." The appeal was granted and a dismissal was ordered.

R. v. Howe (P.O.A. Appeal Crt.) 1988

Requirement in Alberta case for a certificate as to accuracy of tuning forks is unreasonable and not necessary. See R. v. Bourque (1985 Alta. Q.B.)

R. v. Meyer (P.O.A. Appeal Crt.)

On appeal, Court held that there must be evidence that the radar device was “capable of registering the speed of vehicles”.

R. v. O'Reilly (Alta. Dist. Crt.) 1979

Where Crown failed to adduce evidence that the radar set was capable of accurately measuring the speeds and that the tests were approved tests, which evidence would have been given by the officer who testified, then appeal must be allowed and conviction set aside.

NOTE: Speeding is an offence of absolute liability. This means that MENS REA (a guilty mind) is not an element that must be proven. Guilt follows proof of the ACTUS REUS (proscribed act).

Because speeding is an absolute liability offence, a defence argument that, owing to a defective speedometer the accused honestly believed that he or she was not exceeding the speed limit, would not be successful.

R. v. Keenan (1994) British Columbia Supreme Court

The accused appealed a conviction for speeding. One of his three grounds for appeal was that there was insufficient evidence of the accuracy of the RADAR measurement showing that the accused was speeding.

The police officer testified that, prior to starting his shift, he had tested the device using a tuning fork. He also testified that he visually estimated the speed of the vehicle to be 90 km/h: the RADAR device displayed a speed of 92 km/h. There was ample evidence to support the justice of the peace's conclusion that the measured speed was accurate. It was not necessary that the accuracy of the tuning fork be proven.

R. v. Cook (1994) Nova Scotia Supreme Court

The accused was convicted of speeding based on a reading from a moving RADAR. The accused appealed arguing that the trial Judge erred in finding that a prima facie case as to the accuracy of the RADAR equipment had been established since no certificate was produced attesting to the frequency used by the tuning fork to calibrate the machine. He also argued that the Crown failed to make full disclosure in that it failed to give notice that it intended to give expert testimony from the officer/RADAR operator. Finally, he argued that the Crown failed to prove that signs were erected and maintained imposing an 80 km/h speed limit at the time and place in question. The appeal was dismissed.

The Motor Vehicle Act makes it clear that, whether posted on not, there is a prima facie speed limit on all highways in Nova Scotia of 80 km/h. The accused conceded that he had the entire file of the Crown. There was no withholding of any information; there was no expert's report and no need for the preparation of any expert report. The accused argument as to the accuracy of the instrument would be persuasive if the alleged offence was one in which there was a marginal difference between the speed limit (80km/h) and the speed of the accused (130km/h) and if there was no other persuasive evidence.

R. v. Lounsbury (1993) Manitoba Court of the Queen's Bench

The accused was charged for speeding. The RADAR operator testified at trial that it was his usual practice to test the unit both before and after issuing an offence notice, but he had no independent recollection of performing the tests in this case. He made a note in his notebook that he had performed a test or tests, but did not note the time of the test. The accused was convicted and appealed. The appeal was allowed.

Evidence as to the operator's usual practice did not constitute proof beyond a reasonable doubt that the RADAR device was operation in this case. All that could be safely inferred from the RADAR operators testimony and notes was that he tested the RADAR device and found it to be in good working order at some point or points during the relevant shift. As a result, the appeal was allowed and the conviction was quashed.

R. v. Friedlan (1993) Ontario Court of Justice (Prov. Div.)

Where a person is charged with speeding in a construction zone, the onus is on the Crown to prove that the portion of the highway travelled was designated as construction zone under s. 128(8) of the Highway Traffic Act. Pursuant to s.128(9) of that Act, such designation is not a regulation within the meaning of the Regulations Act.

In this case, despite the fact that the officer testified that this was a construction zone in question and the area was clearly posted as an 80 km/h zone, the court allowed the conviction, but amended the offence to indicate the non-construction zone speed limit of 100 km/h.

Quebec c. Robitaille (1991) Quebec Court of Appeal

A police officer who was following the accused's vehicle testified that the speedometer of his own car recorded a speed of 140 km/h while the speed limit was 90 km/h. At the end of the Crown's case, the accused moved for non-suit on the grounds that the speed at which he was travelling was not established. This argument was rejected and the accused was convicted. On appeal by trial de novo, the Superior Court quashed the conviction. The Crown appealed.

The appeal was allowed and the conviction was restored. If a speed established by a RADAR device is sufficient prima facie evidence, a fortiori is the speed recorded by the speedometer. Expert evidence establishing the speed

at which the accused was driving is not required, since the accused had not adduced evidence raising a reasonable doubt as to the accuracy of the police officer's speedometer. Therefore, the conviction was justified and had to be restored.

Quebec c. Mason (1988) Quebec Superior Court

The accused was convicted of speeding. He appealed, challenging the RADAR evidence. The appeal was dismissed. Leaving aside cases in which calibration, verification of calibration, method of operation, qualifications of the operator or other factors cast a doubt on the evidence of operation and capabilities of a device, the testimony of a qualified operator can found a conviction. Once the conditions precedent are met the fallibility of the device goes to weight. It is unnecessary to show scientifically the principles of RADAR.

R v. Strong (1988) Nova Scotia County Court

The accused was acquitted of a speeding charge. Although the trial Judge accepted the evidence of the police officer with respect to the actual speed of the accused's vehicle as indicated by the RADAR, he entered an acquittal on the basis that the Crown had failed to prove that the accused had passed a speed zone sign indicating the posted speed in the area in question. The Crown appealed. The appeal was allowed.

There was requirement in the relative statutory provision that speed zone signs be erected so as to be always visible to a motorist traversing a section of highway covered by the speed approved for that area. Common sense dictated that such could not have been the intention of the Legislature - otherwise such signs would have to be erected at each street intersection and at various intervals along all the province's roadways.

Quebec c. Rannaud (1988) Quebec Provincial Court

The accused was stopped for speeding. The sole evidence was from a RADAR operator. The operator testified that he took an instruction course and that he frequently used the device on duty. He indicated that on the night in question he manually and electronically verified the accuracy on three occasions. He also verified the devices operation after stopping the accused. Manual checks were done by means of a tuning fork. The accused was convicted.

No expert was needed to provide evidence regarding calibration. The absence of legislative approval of the use of tuning forks did not invalidate its effectiveness on calibration. If the operator carries out tests correctly and in conformity with recognized methods, he can speak to accuracy of the device and its proper functioning. An operator need not be familiar with the relevant laws of physics. Here, the results of the test confirmed the accuracy.

TRAINING/QUALIFICATIONS

R. v. Wolfe (B.C.C.C.) 1979

The officer had some training and experience operating radar set, but training “fell short” which cast doubt on the accuracy of the device and its results.

R. v. Brewer (May 19, 1988, Prov. Off. Ct. Nwkt, Ont.)

At trial, officer had stated in-chief that he was a qualified radar operator and that he had received some basic training from an experienced officer in the use of the radar. In cross-examination, the officer’s qualifications were challenged.

HELD ON APPEAL: In this case, the officer could not be regarded as a “qualified radar operator” and therefore, a prima facie case was not made out.

NOTE: Can be distinguished on the facts of this case, as officer had no formal training.

R. v. Waschuk (Sask. Q.B.) 1970

Judicial notice of radar: Judicial notice may only be taken of facts which are known to intelligent persons generally, therefore, judicial notice may not be taken of meaningfulness of tests.

Radar operator should be able to give evidence as to whether the machine is in good working order and capable of recording the speed of the vehicle being tested.

R. v. Karpetz (Unreported, March 18, 1982 (Prov. Off. App. Ct.))

His Honour, Provincial Court Judge W. Hryciuk.

Failure to show the radar reading to the defendant does not make the charge bad. No duty is cast upon the officer to show the reading on the radar screen. As a matter of courtesy, he can advert the defendant's attention to the reading whether the defendant asked to see it or not.

R. v. Axler (Unreported August 20, 1981, Prov. Off. App. Ct.)
His Honour, Provincial Court Judge R.B. Dnieper.

Radar alone is good evidence. After 42 years of use, the courts will accept as prima facie evidence, the accuracy of radar devices. No longer is radar merely corroborative evidence. It is now primary evidence.

Before the prima facie rule applies, it has to be established in evidence that:

1. the radar machine was in proper working order, and
2. the radar operator was qualified to operate the machine in question.

At all times, the onus is on the crown to prove its case beyond a reasonable doubt.

R. v. Seymour (Unreported, June 16, 1982 Prov. Off. App. Ct., County of Huron, Ont.)

The crown must establish in evidence that the officer is a person who has been properly trained in the use of the device and further, that at the time in question the radar device was operating accurately.

R. v. Lehane (1982, 15 M.V.R. 160 (Ata Q.B.)

There was no evidence that the device had been recently tested to determine whether or not the device was operating properly and was capable of accurately registering speeds.

The Judge stated in his opinion it would be easy matter for police to test the accuracy of radar devices by means of a calibrated tuning fork or by some other means before and after a duty shift during which the device was used.

R. v. Ellision (Feb. 11, 1987, British Columbia County Court)

The accused was convicted of speeding. He appealed on the ground that the denial by the police officer who stopped his car of his request to see the radar reading erasure of the reading by the officer contravened the best evidence rule and violated his right to make full answer and defence under section 7. of the Charter.

Held - The appeal was dismissed.

The best evidence rule was confined largely to documentary evidence; apart from documentary evidence it was not usually applied to exclude secondary evidence otherwise admissible. There was no suggestion of an attempt to conceal evidence. The accused had been given the opportunity to make full answer and defence.

R. v. Hallett (May 3, 1988, N.S. Co. Ct.)

Appeal by accused from his conviction on a charge. The accused's vehicle had been clocked on radar and the accused now argued that the police officer operating the radar device had never been properly qualified as an expert to do so - No objection had been raised as to the qualifications of the police officer during his evidence at trial nor was the officer cross-examined as to his qualifications. In the circumstances it was not necessary for the Crown to establish that the police officer was an "expert" as the evidence which he was being asked to give was not in the nature of an opinion but more in nature of observations. The trial judge clearly found that the police officer could operate the machine, that the machine was working properly, and that there was no evidence to show that it's reading was inaccurate. There was no basis to disturb those findings on appeal.

R. v. McDonald (Feb. 26, 1987, B.C. Co. Ct.)

Opinion Evidence - Whether radar operator giving "expert" evidence. The trial judge did not err in finding police officer who testified concerning his operation of radar was not an "expert" so as to require 30 days' notice in writing of his proposed evidence under s.11 of the Evidence Act. Accordingly, the officer gave evidence only of a technical skill, which did not reach expert status.



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