STALKER®

DUAL DSR
Direction Sensing
Moving Police Radar

Operator's Manual

applied concepts, inc.

Dear Valued Radar Customer:

Thank you for choosing the *STALKER DUAL DSR* Radar System. We sincerely appreciate you purchasing the *STALKER DUAL DSR* and giving us the opportunity of serving you and your department. You will find the *STALKER DUAL DSR* to be an invaluable tool in controlling speed violators and making your streets and highways safer. Most importantly, we care about you, our customer, and want you to be completely satisfied. Our success as a company depends upon your satisfaction and experience with the *STALKER DUAL DSR* Radar.

Applied Concepts, Inc. believes that the *STALKER DUAL DSR* offers more than superior performance and versatility. *STALKER DUAL DSR* is backed 100% with reliable, professional, and experienced sales and service support, ready to assist you at your request. We also offer the longest warranty in the industry, with nationwide factory authorized repair centers to assure you of fast and efficient service.

We wish you the greatest success in your speed enforcement program. Please do not hesitate to let us know if there is anything we may do to add to your product satisfaction. Thanks again!

Sincerely,

Applied Concepts, Inc.

TABLE OF CONTENTS

INTRODUCTION

STALKER DUAL DSR is a Ka-band **D**irection **S**ensing **R**adar that can be mounted in a variety of ways, and is operational with one or two antennas. The unique Direction Sensing ability of the **STALKER DUAL DSR** allows the radar to <u>automatically</u> (without the traditional "slower key") determine the correct speed of <u>all</u> same lane targets. In addition, the **STALKER DUAL DSR** can be operated in stationary mode measuring: 1) targets closing on the radar, 2) targets moving away from the radar, or 3) both closing and away targets.

In addition to *Fast Speed* display, the **STALKER DUAL DSR** offers *Fast Speed* locking in moving mode for both opposite lane targets <u>and</u> same lane targets.

Utilizing a state-of-the-art Digital Signal Processor (DSP), **STALKER DUAL DSR** provides a level of performance, convenience, and accuracy previously unavailable. The DSP performs the critical filtering and timing functions required for speed measurement in its software, as opposed to its hardware. This provides less unit-to-unit variation, more reliable performance, and easier maintenance. One of the unique features of the **STALKER DUAL DSR** is that it can be upgraded in the future by simply installing new software, preventing obsolescence!

STALKER DUAL DSR operates in Ka-band from 33.4 to 36.0 GHz and provides a hold mode. Both Ka-band operation and the hold feature reduce the possibility of detection by radar detectors. Target-speed locking with Voice Enunciators, Track-thru-Lock speed, Fast Speed Tracking (both opposite lane and/or same lane), Direction Sensing, and the Doppler audio capability assist the operator in positive target identification and provide operating convenience.

INSTALLATION

STALKER DUAL DSR consists of a dash-mounted display unit; a counting unit that can be mounted with the display unit, or separately using the optional Remote Cabling Kit (P.N. 200-0247-00); one or two antenna units; and a wireless or wired remote control unit. **STALKER DUAL DSR** is powered from the 12-volt, vehicle power system using a Power Cable from the counting unit. Each system component should be installed in a location that provides good operator visibility and convenience, but does not obscure the road or interfere with air bag operation. The Ka-band antenna units are fully waterproof and may be installed outside the vehicle, if desired. The display and counting units are <u>not</u> waterproof and must be installed in a location sheltered from the weather. Longer cables are available from the factory for specific installations, if needed.

Display/Counting Unit - To mount the combined display/counting units, connect the Power Cable to the power jack on the back of the counting unit. Plug the front and/or rear antenna cables into the back of the counting unit. If using only one antenna, plug it into the <u>front</u> jack. After attaching the mounting bracket to the selected mounting surface with Velcro or screws, insert the combined display/counting unit into the mount and secure with thumbscrews (provided) into the threaded holes located on each side of the <u>counting</u> unit.

Display Unit - To mount the display unit only, separate the counting unit from the display unit by unscrewing the two screws on the back panel. Connect the 15-pin cable, supplied in the Remote Cabling Kit, to the connector on the back of the display unit. Attach the display unit to the mounting bracket using one thumbscrew on each side or attach directly to the dash. After mounting, make sure the display will not dislodge during high-speed maneuvers.

Counting Unit - To mount the counting unit separately from the display unit, select an out-of-the-way mounting location, such as under the dash or under the front seat. Connect the Power Cable to the power jack located on the back of the counting unit. Plug the front and/or rear antenna cables into the back of the counting unit. If using only one antenna, plug it into the <u>front</u> jack. Connect the 15-pin cable, supplied in the Remote Cabling Kit, to the connector on the front of the counting unit. Secure the mounting bracket on the counting unit to a suitable mounting surface with Velcro or screws. Install the counting unit into the bracket using a star knob on each side.

Antenna Unit - Before proceeding with the final installation, check the intended mounting locations for fan interference on both antennas. See the section on fan interference, page 17. Find a suitable location and attach the antenna mounting bracket to the selected mounting surface. Attach the antenna unit to the bracket. Connect the antenna cable to the antenna. Repeat these steps for the second antenna, if desired.

Cordless Ergonomic Remote Control - The *only* installation required for the ergonomic remote control is to install the 3V 123 battery. Remove the battery compartment cover by pressing down on the battery cover latch and rotating the battery cover away from the case. Install the battery, paying attention to the polarity markings. Replace the battery cover until it snaps in place. Velcro may be applied to the back of the remote control unit to attach it to the dash or other locations. Also, a microphone lug (supplied) can be attached to the back of the ergonomic remote control to allow installation into a microphone holder. An optional lanyard is also available.

Wired Remote Control - The Wired Remote Control requires that the Standard Power Cable (P.N. 155-2058-00) be replaced with the Power Cable with Serial Port (P.N. 155-2058-01). This provides the connector needed to plug in the Wired Remote.

WATCH STALKER VIDEOS ONLINE

Stalker Installation video

Type this URL into your browser: http://goo.gl/m8Yp7R

Using Your Stalker DSR video

Type this URL into your browser: http://goo.gl/cKRdte

THEORY OF OPERATION

Stationary Mode - All traffic radar uses the Doppler frequency shift technique to measure the speed of moving vehicles. This technique is based on the Doppler Theory, which states that a radar signal reflected from a moving target will experience a frequency shift that is proportional to the speed of the target relative to the radar. Circuitry in the traffic radar then processes the reflected signal to obtain the frequency shift and translate this frequency shift to speed.

In stationary mode, the transmitted signal strikes a moving target and is reflected back to the antenna. The traffic radar then measures the frequency shift to obtain the target speed.

Prior to the introduction of the ***STALKER DUAL DSR***, traffic radar could not sense the direction of vehicles in the radar beam. In conventional traffic radar, targets both closing and moving away generate the same Doppler frequency shift, and it is not possible to distinguish between them. Therefore, a stationary radar always reads the speed of all vehicles in its beam (both closing and moving away) and the operator had to rely on visual observation to determine target direction.

STALKER DUAL DSR is the first practical radar to use a dual channel antenna design. <u>Each</u> antenna actually has two sets of microwave circuits and two sets of amplification/digitizing circuits. The two microwave circuits are designed to provide two simultaneous Doppler signals with a 90° phase difference depending on direction.

Both channels of digitized Doppler information are sent to the DSP (Digital Signal Processor) circuit in the counting unit. A high-speed DSP circuit then performs a <u>Complex Fast Fourier Transform</u> computation simultaneously on <u>each</u> channel to obtain relative direction for each target.

Opposite Lane Moving Mode - In opposite lane moving mode, two (2) signals must be processed to determine target speed. The first signal, patrol speed, results from the radar signal reflecting from passing stationary objects. Since the Doppler shift is proportional to the relative velocity between the radar and the passing reflecting objects, the Doppler shift of this signal will be proportional to the speed of the patrol vehicle. The second signal, closing speed, results from the radar signal reflecting from an approaching or retreating opposite lane moving target back to the patrol vehicle. The Doppler shift of this signal will be proportional to the sum of the patrol speed and target speed, or closing speed. To determine the target speed, ***STALKER DUAL DSR*** subtracts the patrol speed from the closing speed.

Same Lane Moving Mode - In same lane moving mode, two (2) signals must be processed to determine target speed. The first signal, patrol speed, results from the radar signal reflecting from passing stationary objects. Since the Doppler shift is proportional to the relative velocity between the radar and the passing reflecting objects, the Doppler shift of this signal will be proportional to the speed of the patrol vehicle.

The second signal, difference speed, results from the radar signal reflecting from an approaching or retreating same lane moving target back to the patrol vehicle. The Doppler shift of this signal will be proportional to the difference speed between the patrol and target vehicles. If the target vehicle is moving faster than the patrol vehicle, the difference speed will be added to patrol speed to obtain target speed. If the target vehicle is moving slower than the patrol vehicle, the difference speed will be subtracted from the patrol speed to obtain target speed.

Prior to the introduction of the ***STALKER DUAL DSR,*** a radar operator had to observe the relative speed of the target vehicle and "tell the radar" whether to <u>add or subtract</u> the difference speed from the patrol speed as described above. A conventional same lane radar requires the operator to obtain the "correct speed" by the "correct position" of the "Slower" key on the remote control.

The unique Direction Sensing ability of the ***STALKER DUAL DSR*** allows the radar to <u>automatically</u> (without the traditional "slower key") determine the correct speed of <u>all</u> same lane targets in the radar beam.

Fast Mode - ***STALKER DUAL DSR*** offers a feature called *Fast Speed Tracking*. *Fast Mode* is a field selectable feature and can be disabled, if desired. Three options are available: 1) *Fast Mode* disabled, 2) *Fast Mode* enabled for opposite lane targets only, and 3) *Fast Mode* enabled for both opposite lane targets and same lane targets (factory default setting).

The addition of the *fast mode* provides the officer the ability to track small high speed targets that normally could not be tracked because a stronger target shields the weaker target from normal speed measurement. The classic example is where a speeding sports car passes a slower moving eighteen wheeler. The *faster* sports car, although clearly speeding, previously could not be measured because the strongest truck target captures the target display window. ***STALKER DUAL DSR***, in this example, will display the speed of the strongest truck in the target window, while the speed of the *faster* sports car will appear in the middle *fast* window. Tracking of both targets may be performed simultaneously.

Improved Track-Thru-Lock - This feature allows the operator to lock in a target (either strongest or faster) and still continue to track patrol speed. Once the patrol speed is lost (stopping the patrol vehicle, placing the unit in HOLD or losing patrol speed) the unit will automatically display the patrol speed at the time of lock.

DISPLAY OPERATION

Display Front Panel
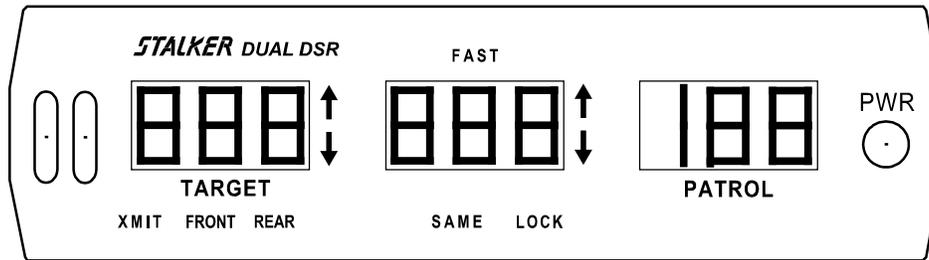
Display Unit Functions

PWR:	The **PWR** switch is the main On/Off power switch. **STALKER DUAL DSR** has a jumper in its power-supply circuit that selects one of the two following options:

1. When vehicle power is applied, the unit must be turned on by pressing the PWR switch. This is the normal factory setting.
2. When vehicle power is applied, the unit always powers on automatically, but may be turned off by pressing the PWR switch. If this setting is desired, call the factory.

TARGET WINDOW: The left, three-digit LED window is the target window. This window displays the speed of the strongest target entering the radar beam. While in stationary mode, the target window will show the speed of the strongest stationary closing target (**SC**) or the strongest stationary away target (**SA**) or the strongest bi-directional target (**S_**) relative to the radar. In opposite lane moving mode, the target window will show the speed of the strongest opposite lane approaching target or the strongest opposite lane receding target. In same lane moving mode, the target window will show the speed of the strongest same lane target (front or rear).

MIDDLE WINDOW: The middle, three-digit LED window is a dual purpose window. First, it is used for locking the *strongest* target shown in the left window. While not containing a "locked" speed, the middle window is used to display the *faster* target in the radar beam. The **LOCK** and **FAST** icons are used to indicate the current status of the window.

The middle window is used to store target speeds that the operator chooses to "lock" using the **LOCK** key. The presence of the **LOCK** icon indicates that the middle window contains a "locked" target speed. Every speed lock will be followed immediately by a 3-word voice enunciator that indicates *antenna/radar mode/direction*.
Examples: ***FRONT/STATIONARY/CLOSING, FRONT/STATIONARY/AWAY, REAR/STATIONARY/CLOSING, REAR/STATIONARY/AWAY, FRONT/OPPOSITE/CLOSING, REAR/OPPOSITE/AWAY, FRONT/SAME/CLOSING, FRONT/SAME/AWAY, REAR/SAME/CLOSING, OR REAR/SAME/AWAY.***
Targets in either the same lane or opposite lane can be displayed and locked in the middle window.

When no **LOCK** target is present, the middle window is used to track the *faster* target in the radar beam. This is indicated by the presence of the **FAST** icon.

PATROL WINDOW: The right, three-digit LED window is the patrol window. In moving mode, the operator should always verify that the patrol window is tracking the patrol vehicle's speedometer. After locking a target speed, the patrol window may be "blanked" by pressing the **PS BLANK** key. Restore the patrol speed by pressing the **PS BLANK** key a second time.

XMIT: The **XMIT** icon indicates that **STALKER DUAL DSR** is transmitting.

FRONT: The **FRONT** icon indicates the front antenna is selected for use. The icon will light with a steady indication if the antenna is operational, or a blinking indication if the antenna is missing or inoperative.

REAR: The **REAR** icon indicates the rear antenna is selected for use. The icon will light with a steady indication if the antenna is operational, or a blinking indication if the antenna is missing or inoperative.

SAME:	The **SAME** icon indicates that the radar is in same lane mode. Conversely, opposite lane mode is indicated by the absence of the **SAME** icon.
LOCK:	An illuminated **LOCK** icon indicates that the operator has locked a target speed in the middle window. Every speed lock will be followed immediately by a 3-word voice enunciator that indicates *antenna/radar mode/direction*. Illuminated **LOCK** *and* **FAST** icons indicate a locked faster speed target.
rFI:	**rFI** is displayed in the Target window indicating the presence of an interfering signal. Operation is inhibited during an **rFI** indication.
U Lo:	**U Lo** is displayed in the Target window when the input voltage falls below approximately 8 volts. Operation is inhibited, but normal operation will resume automatically when the input voltage is restored to a normal voltage (>9.0 volts).
Hot:	The **Hot** message is used to indicate that the counting unit is outside of its rated temperature range. After the counting unit cools down, it will automatically begin normal operations.
↑ or **↓** (TO THE RIGHT OF A SPEED WINDOW)	A red **↑** or **↓** shown to the right of any of the speed windows indicates the direction of travel for the moving or stationary target displayed in that window. Every strong target or fast target displayed (either moving or stationary) in one of the four speed windows, will have a direction arrow associated with it. The direction of the **↑** is defined by the table below.

Arrow Indicator Definition

SPEED ZONE	DIRECTION	ARROW
FRONT OPPOSITE	CLOSING	↓
FRONT SAME	AWAY	↑
FRONT SAME	CLOSING	↓
REAR OPPOSITE	AWAY	↓
REAR SAME	CLOSING	↑
REAR SAME	AWAY	↓

Voice Enunciators

The 〔((►〕 key is used in conjunction with **SQL** key to adjust the volume of the voice enunciators.   Press the 〔((►〕 key followed by the **SQL** key to make the display step through: **u 0, u 1, u 2,** and **u 3**. **u 0** is off and **u 3** is loudest.

The Voice Enunciators announce the description of the target that was just locked. Every **LOCK** will be followed immediately by a 3-word voice enunciator that indicates *antenna/radar mode/direction*. The following table fully describes the voice enunciators.

VOICE ENUNCIATOR	MEANING
FRONT/STATIONARY/CLOSING	The locked target is a stationary mode target approaching the front of the patrol vehicle
FRONT/STATIONARY/AWAY	The locked target is a stationary mode target moving away from the front of the patrol vehicle
REAR/STATIONARY/CLOSING	The locked target is a stationary mode target approaching the rear of the patrol vehicle
REAR/STATIONARY/AWAY	The locked target is a stationary mode target moving away from the rear of the patrol vehicle
FRONT/OPPOSITE/CLOSING	The locked target is an opposite moving mode target approaching the front of the patrol vehicle
REAR/OPPOSITE/AWAY	The locked target is an opposite moving mode target moving away from the rear of the patrol vehicle
FRONT/SAME/CLOSING	The locked target is a front slower same lane target being overtaken by the patrol vehicle
FRONT/SAME/AWAY	The locked target is a front faster same lane target moving away from the patrol vehicle
REAR/SAME/CLOSING	The locked target is a trailing faster same lane target approaching the rear of the patrol vehicle
REAR/SAME/AWAY	The locked target is a trailing slower same lane target traveling behind the patrol vehicle

Audible Indicators

The volume of all of the sounds made by the **STALKER** *DUAL DSR* can be adjusted as described below.

Target Doppler Audio - The 〔((►〕 key is used to adjust the volume of the Target Doppler audio up or down. Press the 〔((►〕 key to make the display step through: **Aud 0 to Aud 9**. **Aud 0** is lowest and **Aud 9** is the loudest.

Radar Beep tones - The ((((►)) key is used in conjunction with **PS BLANK** key to adjust the volume of the beep tones. Press the ((((►)) key followed by the **PS BLANK** key to make the display step through: **b 0 – b 9**. **b 0** is off and **b 9** is loudest.

Different beep tones are used when switching between the front and rear antennas. A 1-beep tone corresponds to the front antenna, while a 2-beep tone corresponds to the rear antenna.

Different beep tones are used to indicate different Radar Modes. A 2-beep increasing beep tone indicates Stationary Away (SA). A 2-beep decreasing beep tone indicates Stationary Closing (SC). A 3-beep increasing/decreasing beep tone indicates bi-directional stationary (S_). A single-beep tone indicates moving mode.

A 4-beep "happy" tone indicates the successful completion of a self-test operation. A 15-beep tone indicates a failed self-test.

Automatic Self-Test - An automatic self-test (indicated by a 4-beep "happy" tone) is performed every 10 minutes. Switching antennas will reset the 10-minute timer.

NOTE: If for any reason "FAIL" comes up on your *STALKER* **DUAL DSR** Radar, the unit must be turned OFF and then back ON to reset the FAIL mode. As an example, if you did not properly attach the antenna cable and the word "FAIL" appeared, it would be necessary to correct this problem, to properly connect the cable, then turn the power OFF and then back ON. The word FAIL should not reappear.

WATERPROOF DISPLAY AND REMOTE CONTROL

In-Car Installation. When the *STALKER* **DUAL DSR** is installed in an in-car setting (Ford Crown Victoria, Dodge Charger, Chevrolet Impala, etc.), the unit is programmed with Standard DSR Software. This type of installation uses the DSR display with directional arrows and the standard DSR remote control.

Motorcycle Installation. When the *STALKER* **DUAL DSR** is installed on a motorcycle, a waterproof display and remote control are available for all-weather use. These waterproof components are designed to function with the Cycle DSR Software. The Cycle DSR Software uses an Operator Menu system. The waterproof display uses one of two sets of Faster/Target windows, top set for the front antenna and bottom set for the rear antenna, depending on which is the active antenna.

STALKER **DUAL DSR** waterproof display (200-0723-01) and remote control (200-0720-01).

ERGONOMIC REMOTE CONTROL FUNCTIONS

The Remote Control can be operated in wired mode by connecting a standard RJ-11 modular telephone handset cord (P.N. 155-2213-00 or Radio Shack #279-312). The cord is connected to the remote and radar unit, and battery removed for wired operation.

Fig 1

The ergonomic remote control shown above is the standard control supplied with the **STALKER DUAL DSR** radar unit.

STRONG LOCK/REL or

STOPWATCH MODE: This dual-function key controls both the Radar Mode function **STRONG LOCK/REL** and **STOPWATCH MODE** initiation.

STRONG LOCK/REL: In Radar Mode, the **STRONG LOCK/REL** key alternates between target lock and release functions. The first time the **STRONG LOCK/REL** key is pressed, with a speed in the target window, that strong target speed is transferred to the middle window and locked along with the present patrol speed. This state is indicated by the illumination of the **LOCK** icon. Pressing **STRONG LOCK/REL** a second time clears the locked contents of both the lock and the patrol windows.

Every speed lock will be followed immediately by a 3-word voice enunciator that indicates *antenna/radar mode/direction*. Examples: *FRONT/STATIONARY/CLOSING, REAR/OPPOSITE/AWAY,* or *FRONT/SAME/CLOSING*.

During lock, the **LOCK** icon will light. The target window and Doppler audio remain active after locking.

The other function of the **STRONG LOCK/REL** key is turning on and off the faster target lock feature. When the operator presses the **STRONG LOCK/REL** key with an empty target window, the unit will acknowledge with a beep and switch between faster target tracking ON

7

	and OFF. The presence/absence of the **FAST** icon on the display represents the enabling/disabling of the faster target window.
STOPWATCH MODE:	Hold down the **STOPWATCH MODE** key for 2 seconds to toggle the radar between Radar Mode and Stopwatch Mode. The display changes when the key is pressed, indicating the mode of operation.
MOV/STA:	The **MOV/STA** key is used to alternate between moving and stationary modes. It toggles between the four operating radar modes. They are: 1) moving (**[ ]**), 2) stationary closing (**SC**), 3) stationary away (**SA**), and 4) bi-directional stationary (**S_**) modes. A speed or a **[ ]** in the patrol window indicates moving. Different audio tones are used to indicate different Radar Modes. While operating in VSS mode (Page 21) the radar uses the presence (or absence) of VSS pulses to automatically switch between moving mode and stationary mode.
SAME/OPP:	The **SAME/OPP** key is used to alternate between same lane and opposite lane modes. The **SAME** icon toggles on and off to indicate same lane mode.
ANT:	The **ANT** key is used to switch between the front and rear antennas, unless the radar was factory set for only one antenna. The **FRONT** or **REAR** icon will light. The display unit can sense the presence or absence of the front or rear antenna. A steady icon indicates an operational antenna and cable, while a blinking icon indicates a missing antenna and/or cable, or a malfunction of the antenna unit.
XMIT/HLD or S/S:	
XMIT/HLD:	The **XMIT/HLD** key toggles between **XMIT** (transmit) and **HLD** (standby). The **XMIT** icon will light for transmitting and extinguish for hold.
S/S:	When in Stopwatch Mode, the **S/S** key is used to start and stop the electronic timing of the target vehicle as it enters and exits the speed measurement zone.
FAST LOCK/REL:	In Radar Mode, the **FAST LOCK/REL** key alternates between faster target lock and release functions. The first time the **FAST LOCK/REL** key is pressed, with a fast target in the middle window, that fast speed is locked along with the present patrol speed. This state is indicated by the simultaneous illumination of both the **FAST** icon and the **LOCK** icon. Pressing **FAST LOCK/REL** a second time clears the locked contents of the middle and the patrol windows.
	Every speed lock will be followed immediately by a 3-word voice enunciator that indicates *antenna/radar mode/direction*. Examples: *FRONT/STATIONARY/CLOSING, REAR/OPPOSITE/AWAY,* or *FRONT/SAME/CLOSING*.
	During lock, the **LOCK** icon will light. The target window and Doppler audio remain active after locking.
SEn or 100:	This key has two functions.
SEn:	The **SEn** key is used to adjust the range up or down at any time. Maximum range (sensitivity) is **SEn 4,** minimum range (sensitivity) is **SEn 1**. The range (or sensitivity) must be set separately for same lane moving mode and opposite lane moving mode. While in <u>each</u> mode, (same lane and opposite lane), indicated by the presence or absence of the **SAME** icon, set each sensitivity as described above.
100:	While in **STOPWATCH MODE**, the **100** key is used to set the 100s digit (in yards) of the length of the speed measurement zone.
SQL or 10:	This key has two functions.
SQL:	The **SQL** key toggles the squelch override on and off. In the normal position, audio will be heard only when a target is being tracked.
	In addition the **SQL** key is used in conjunction with the ⦅(► key to adjust the volume of the voice enunciators – see below.
10:	While in **STOPWATCH MODE**, the **10** key is used to set the 10s digit (in yards) of the length of the speed measurement zone.
PS 5/20 or 1:	This key has two functions.
PS 5/20:	The **PS 5/20** key is used to select one of the three selections for low end patrol speed of either 8, 16, or 32 km/h. For example: a patrol window indication of **32** starts tracking patrol speed at 32 km/h, **16** starts tracking at 16 km/h, while a patrol window indication of **8** starts tracking patrol speed at 8 km/h. If the VSS feature is enabled (Page 21), the **PS 5/20** key will only display **SP** when pressed.

1:	While in **STOPWATCH MODE**, the **1** key is used to set the 1s digit (in yards) of the length of the speed measurement zone.
SELF TEST:	The **SELF TEST** key performs a diagnostic check on the display/counting unit and antenna. The display/counting unit will complete a display segment test, processor check, memory check, and crystal check, followed by a battery and temperature measurement and ending with a display of speeds of 10, 35, and 65. A comprehensive test is also performed on the selected antenna by the counting unit to ensure the integrity of the antenna cable and antenna electronics. **PASS** or **FAIL** is indicated on the display unit after all tests have been completed.
((((►(Target Doppler)	The ((►◄ key is used to adjust the volume of the Target Doppler audio up or down. Press the ((►◄ key to make the display step through: **Aud 0 through Aug 9**. **Aud 0** is lowest and **Aud 9** is the loudest.
((((►(Voice Enunciators)	The ((►◄ key is used in conjunction with **SQL** key to adjust the volume of the voice enunciators. Press the ((►◄ key followed by the **SQL** key to make the display step through: **u 0, u 1, u 2,** and **u 3**. **u 0** is off and **u 3** is loudest.
((((►(Beep Tones)	The ((►◄ key is used in conjunction with **PS BLANK** key to adjust the volume of the beep tones. Press the ((►◄ key followed by the **PS BLANK** key to make the display step through: **b 0 through b 9**. **b 0** is off and **b 9** is loudest.
PS BLANK:	This is a dual function key. If the patrol window indicates an incorrect patrol speed, the **PS BLANK** key blanks the patrol speed window and acquires a new patrol speed. The **PS BLANK** key also blanks the patrol speed after the target speed and patrol speed are locked. Press **PS BLANK** again to restore the blanked speeds.
	In addition the **PS BLANK** key is used in conjunction with the ((►◄ key to adjust the volume of the beep tones – see above.
LIGHT	This is a dual-function key. With a single depression, the **LIGHT** key activates the remote control keyboard back light for six (6) seconds. Two rapid depressions of the **LIGHT** key activate the display unit's brightness control. Additional depressions of the **LIGHT** key toggle the display intensity through six levels of brightness, ranging from **bri 1** (low) to **bri 6** (high).

OPERATING THE STALKER DUAL DSR

Stationary Mode Speed Measurement

Select one of the three stationary modes by pressing the **MOV/STA** key on the ergonomic remote control. Select either: 1) stationary closing (**SC**), 2) stationary away (**SA**), or 3) bi-directional stationary (**S_**) modes. For example, select (**SC**) for stationary closing. Next select the front antenna by pressing the **ANT** key. To transmit, press the **XMIT/HLD** key. The **XMIT** icon should appear on the display unit (Fig 3) indicating that a radar signal is being transmitted.
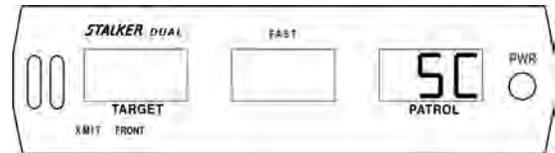
Fig 3

If a target is in range, such as one traveling 54 km/h, the speed will appear in the target window of the display unit (Fig 4); and a Doppler audio tone, which is proportional to the target speed, will be heard from the speaker. The target speed is continually measured and displayed, and the Doppler audio tone is heard as long as the target is present.
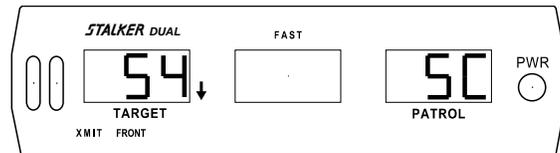
Fig 4

Hold mode can be selected by pressing the **XMIT/HLD** key on the remote control. In hold mode, The **XMIT** icon will be off (Fig 5) and no signal will be transmitted, preventing detection by radar detectors.
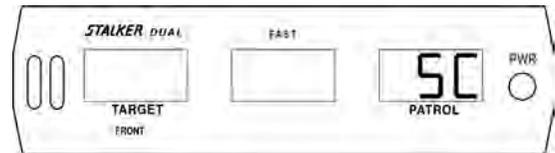

Fig 5

To select one of the other two stationary modes, press the **MOV/STA** key on the ergonomic remote control and select either: 1) stationary away (**SA**) or 2) bi-directional stationary (**S_**) mode.

Fig 6 is an example of stationary away (**SA**). ONLY targets moving away from the radar will be displayed.
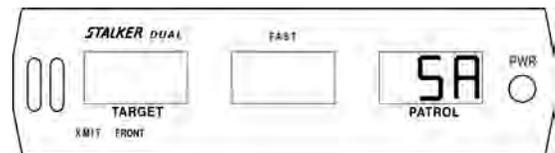
Fig 7 is an example of bi-directional stationary (**S_**). All targets moving in the radar beam will be displayed. Even though the radar is in bi-directional mode, target direction is still known. After every target lock, the voice enunciator will announce the direction of the target.

The only difference between the three stationary modes is the direction of travel of the displayed targets.
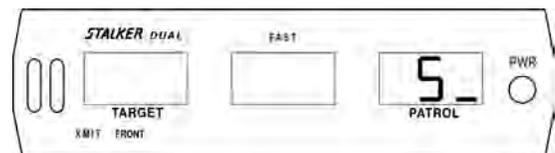
NOTE: While operating in VSS mode (Page 21) the radar uses the presence (or absence) of VSS pulses to automatically switch between moving mode and stationary mode.

Fig 6

Fig 7

Opposite Moving Mode Speed Measurement

Select moving mode by pressing the **MOV/STA** key on the ergonomic remote control. When *STALKER DUAL DSR* is in moving mode, the patrol window will contain either the patrol speed or a **[ ]**. The **[ ]** (Fig 8) indicates that *STALKER DUAL DSR* is in moving mode, but has no ground speed. Select opposite lane mode by pressing the **SAME/OPP** key until the **SAME** icon is not visible. To transmit, press the **XMIT/HLD** key. The **XMIT** icon should appear on the display unit (Fig 8) indicating that the radar is transmitting. Be sure the patrol speed corresponds to the vehicle speedometer. The speed of an approaching target will appear in the target window and a Doppler audio tone will be heard from the speaker. Fig 9 is an example in which the patrol speed is 50 and the approaching target speed is 68. The target speed is continually measured and displayed and the Doppler audio tone is heard while the *STALKER DUAL DSR* is in transmit mode and a target is present.
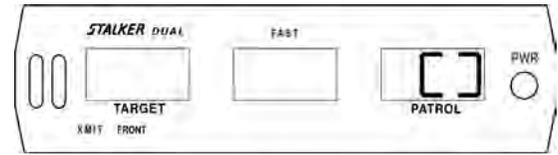
Fig 8
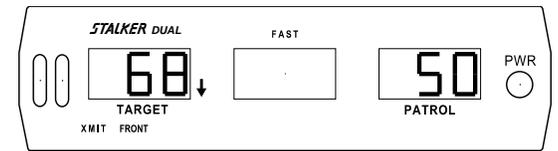
Fig 9

Hold mode can be selected by pressing the **XMIT/HLD** key on the ergonomic remote control. In hold mode, the **XMIT** icon will be off (Fig 10) and no signal will be transmitted. This prevents detection by radar detectors. When in hold, *STALKER DUAL DSR* remembers the last patrol speed and looks for that speed first when changing from hold back to transmit.
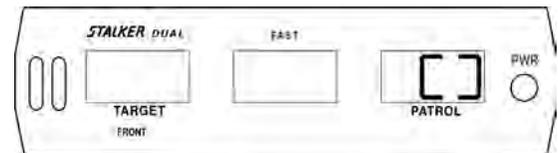
The radar can only acquire a patrol speed up to 153 km/h, but once acquired, the radar will track patrol speed up to 320 km/h. The radar can be placed in the HOLD mode at _any_ speed and then placed back into **XMIT** at a speed below 153 km/h and it will reacquire patrol speed.

NOTE: While operating in VSS mode (Page 21) the radar uses the presence (or absence) of VSS pulses to automatically switch between moving mode and stationary mode.


Fig 10

Same Lane Moving Mode Speed Measurement

To transmit, press the **XMIT/HLD** key. Select moving mode by pressing the **MOV/STA** key, then select same lane mode by pressing the **SAME/OPP** key. Same lane mode is selected when the **SAME** icon is visible (Fig 11). Note: When Same Lane is selected, the sensitivity is automatically reduced internally by software.
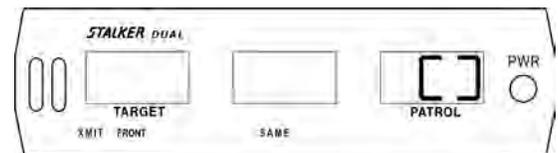
If a same lane target is in the radar beam, its speed will appear in the target window and the difference speed audio will be heard from the speaker. The target speed is obtained by adding the difference speed to the patrol speed. Fig 12 is an example of a patrol speed of 58 and a same lane target in front of the patrol vehicle traveling at 68. The target speed is continually measured and displayed and the Doppler audio tone is heard while the *STALKER DUAL DSR* is in transmit mode and a target is present.

Fig 11
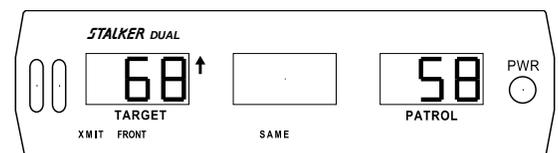
Fig 12

Patrol Speed Shadowing Effect

Traditional radar units exclude patrol speed tracking below 32 km/h. One of the unique features of *STALKER DUAL DSR* is that it allows patrol speed tracking below 8 km/h, when the low-end patrol speed is set to **8**. This feature is very popular and is excellent for enforcing school zones. However, with this setting, *STALKER DUAL DSR* is more prone to "shadowing." Shadowing occurs when a strong same lane target in the radar beam captures the patrol speed, instead of the weaker passing ground reflection.

The following is an example of the shadowing effect: A patrol vehicle traveling 48 km/h is following a pickup traveling 67 km/h. The pickup is pulling away from the patrol vehicle at 19 km/h. The radar, in error, thinks this 19 km/h speed is the correct ground speed and displays 19 km/h in the patrol window, instead of the correct value of 48 km/h.

STALKER DUAL DSR has three options for eliminating the shadowing effect: 1) make the unit re-acquire the correct patrol speed by pressing the **PS BLANK** key, 2) change the low-end patrol speed from 8 km/h to 32 km/h (see following paragraph for instructions), 3) operate the radar using the optional VSS mode. To eliminate the shadowing effect in the city, Option 1 is recommended. Option 2 is recommended for highway radar use. Option 3 eliminates all shadowing and is achieved by installation of VSS cabling in the patrol vehicle.

Low-End Patrol Speed Selection

The **PS 5/20** key is used to set the low-end patrol speed. The right two digits of the patrol window refer to the current low-end patrol speed of either 8 km/h, 16 km/h, or 32 km/h. For example, sensitivity 1 with
5 mph low-end patrol speed would be indicated by: **SEn 1   5** (Fig 13). Sensitivity 1 with 32 km/h low-end patrol speed would be: **SEn 1 20** (Fig 14). During VSS operation this function is not required and thus is not available. During VSS operation, when the **PS 5/20** key is pressed, SP will be momentarily displayed.
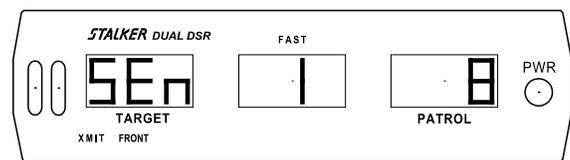
Fig 13
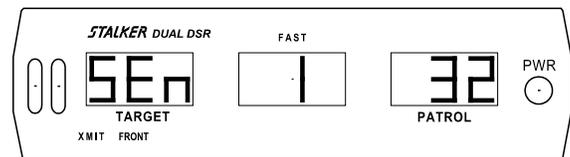
Fig 14

Range (Sensitivity) Adjustment

The range (or sensitivity) of *STALKER DUAL DSR* is adjusted by pressing the **SEn** key. This key cycles through the four (4) sensitivity levels; **SEn 1**, **SEn 2**, **SEn 3**, and **SEn 4** (Fig 15 - Fig 18, respectively). In each case, the center display refers to the current sensitivity setting. The shortest range is **SEn 1** (Fig 15), and the longest range is **SEn 4** (Fig 18). **The range (or sensitivity) must be set for same lane moving mode and opposite lane moving mode separately.** While in each mode, (same lane and opposite lane), indicated by the presence or absence of the **SAME** icon, set each sensitivity as described above.
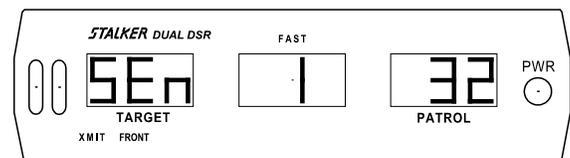
Fig 15
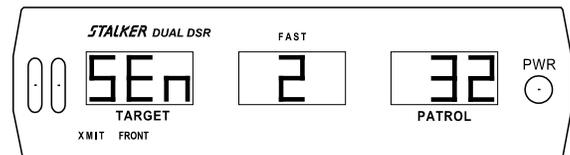
Fig 16
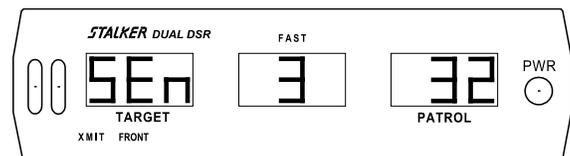
Fig 17
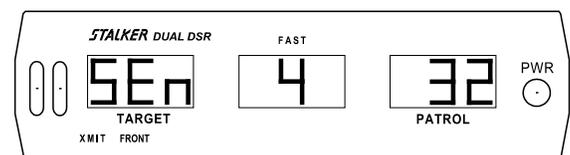
Fig 18

Doppler Audio

The ⦅►key is used to adjust the volume of the Target Doppler audio up or down. Press the ⦅►key to make the display step through **Aud 0 thorugh Aud 9**. **Aud 1** (Fig 20) is lowest and **Aud 9** (Fig 19) is loudest.

When a target is being tracked, a Doppler audio tone can be heard from the speaker. The pitch of this tone is a precise indication of target speed. The tone quality is useful for judging possible interfering or multiple targets.

In opposite lane moving mode, *STALKER DUAL DSR* compensates for patrol speed variations when generating the Doppler audio. Since the audio tones do not vary with patrol speed, the operator soon learns to correlate the Doppler audio with the target speed. This eliminates the need of constantly watching the display to determine target speed. In same lane moving mode, *STALKER DUAL DSR* generates difference audio instead of the true audio described above. The difference audio gives a direct indication of the difference in speed between the patrol vehicle and the target vehicle.

Since *STALKER DUAL DSR* is capable of tracking multiple targets, two or more Doppler tones are often heard.

Two different **Aud** levels can be set – one associated with the moving mode and the other associated with the stationary mode. The levels are set when the radar is in the appropriate mode. When VSS is enabled, the radar will automatically switch between moving **Aud** level and stationary **Aud** level when it switches between modes. The **bEE P** and **UO I CE** volume levels remain the same in both stationary and moving modes.

Voice Enunciators

The ⦅►key is used in conjunction with **SQL** key to adjust the volume of the voice enunciators. Press ⦅►followed by **SQL** to make the display step through: **u 0, u 1, u 2,** and **u 3**. **u 0** is off and **u 3** (fig 19) is loudest.

Beep Tones

The ⦅►key is used in conjunction with **PS BLANK** key to adjust the beep tones. Press ⦅►followed by **PS BLANK** to make the display step through: **b 0, b 1, b 2,** and **b 3**. **b 0** is off and **b 3** (Fig 20) is loudest.

Display Lighting

The display unit can be adjusted for brightness by using the ☀ key. A single depression of the ☀ key activates the remote control keyboard backlight for 6 seconds. Two rapid depressions of the ☀ key activate the display unit's brightness control, and additional depressions of the ☀ key toggle the display intensity through six levels of brightness, ranging from low (**bri 1**) to high (**bri 6**) (Fig 21).

Patrol Speed Blanking

After locking a target and patrol speed (Fig 22), the patrol speed window may be "blanked" by pressing the **PS BLANK** key (Fig 23). The patrol speed can be restored by pressing the **PS BLANK** key a second time. When the lock window is not occupied by a "locked" target speed, the **PS BLANK** key is used to blank the patrol window and re-acquire patrol speed.
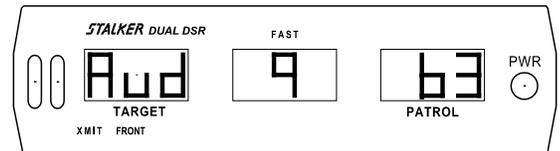
Fig 19
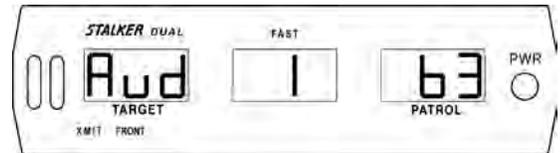
Fig 20

Fig 21
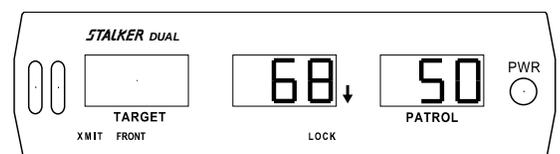
Fig 22
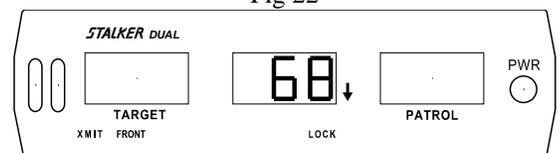
Fig 23

Software Version

During "Power On", while all segments are illuminated (Fig 34), press the **SELF TEST** key to display the installed software version. Fig 24 indicates that software version 17 is installed. Check with the factory for the availability of an updated software version, if desired.
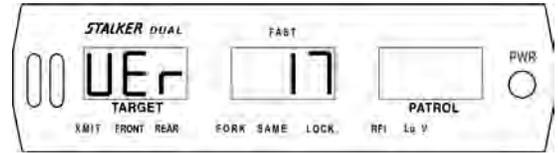
Fig 24

Transmitter Frequency

Immediately after the software version is shown (Fig 24), the transmitter frequency is displayed. Fig 25 indicates a transmitter frequency of 34.7 GHz. *Note: Tenths of a megahertz are indicated by the right-most digit.*
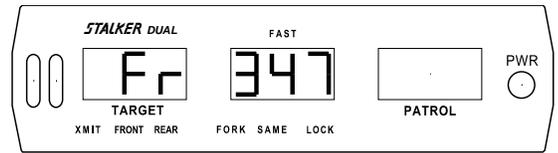
Fig 25

Turning the Faster Window ON or OFF

When faster targets are enabled in the setup menu (either FAS or F_2 selected), the faster target window can be easily turned ON or OFF by the operator. When you alternately press the **STRONG LOCK/REL** key with an empty target window, you will hear a beep along with the alternate ON/OFF toggling of the **FAST** icon on the display. The presence/absence of the **FAST** icon represents the enabling/disabling of the faster target window. You can always turn **XMIT** off (or **HLD**) to obtain an empty target window.

STOPWATCH MODE

STALKER DUAL DSR offers Stopwatch mode. Stopwatch mode is used to measure target speeds using the traditional time-distance method. All of the timing and computing is performed in the *STALKER DUAL DSR* counting unit. The length (in yards) of the measurement zone must first be entered into the counting unit using the remote control keys. The maximum length of the measurement zone is 999 yards.

Since the electronic timer is started (by pressing **S/S**) when the target vehicle enters the measurement zone and stopped when the target vehicle exits the measurement zone, the time to traverse the measurement zone is measured and stored in the counting unit. After the completion of each start/stop timing interval, the counting unit displays the calculated target speed in the patrol window.

NOTE: IT IS REQUIRED THAT THE ANTENNA BE CONNECTED DURING STOPWATCH MODE. THE COUNTING UNIT USES THE ANTENNA INTERNAL CRYSTAL FOR START/STOP TIMING DURING STOPWATCH MODE.

Stopwatch Theory

The counting unit calculates speed by measuring how much time it takes the vehicle to pass through the pre-set distance and then calculates and displays the speed in MPH or KM/H. The known distance is divided by the measured time and multiplied by a conversion factor to obtain target speed.

No hard and fast rule can be established concerning the minimum distance over which a vehicle should be monitored. However, several factors enter into the equation which does establish the fact, that the farther the distance, the less the chance of impact of an error. Three factors that can influence the calculation include:

1. Human error in activating the **START/STOP (S/S)** key

2. The distance measured

3. The speed of the vehicle

Human error can occur by the operator not pressing the **S/S** key at the precise time that the vehicle enters and exits the measurement zone.

If too short of distance is entered, it increases the chance for error. We recommend a minimum of 201.1 meters.

The greater the speed, the longer the measurement distance should be to reduce the possibility of an error. For example, if you are mostly measuring high speeds you should measure using a longer distance than if measuring slow speeds.

Stopwatch Mode Keys

To enter or exit Stopwatch mode, using the ergonomic remote, press and hold the **STOPWATCH MODE** key for two seconds. The **STOPWATCH MODE** key toggles the radar between Radar mode and Stopwatch mode. The display changes when the **STOPWATCH MODE** key is pressed indicating the operating mode. Fig 26 shows a typical display following entry into Stopwatch mode. The 440 Meters display will normally be a different number – depending upon its previous setting.

The **100**, **10**, and **1** keys are used to change the length of the measurement zone.

The **S/S** key is used to start and stop the timing interval of the target vehicle traversing the measurement zone.
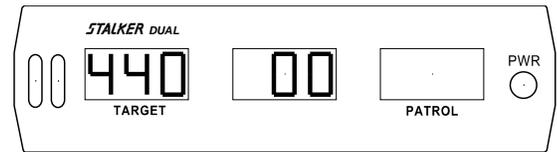
Fig 26

Stopwatch Mode Errors

If you get a **FAIL** message or an **Err** message (Fig 27) while trying to operate in Stopwatch mode, verify that the Antenna is properly connected and functioning. The counting unit uses the antenna internal crystal for start/stop timing during Stopwatch mode. At the end of each timing interval the antenna internal crystal is compared against the counting unit crystal within a small tolerance. If a crystal error is detected, the **Err** message is displayed.
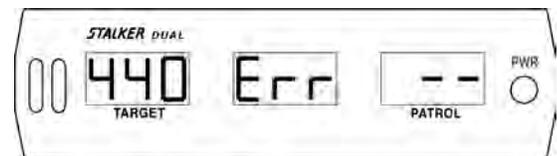
Fig 27

Stopwatch Mode Operation

1. Enter Stopwatch mode using the ergonomic remote control by pressing and holding the **STOPWATCH MODE** key for two seconds (Fig 26).

2. Enter the measurement zone distance using the **100**, **10**, and **1** keys.

3. While observing the target vehicle traverse the measurement zone, start timing by pressing the **S/S** key once upon entry and stop timing by pressing the **S/S** key again upon exit.

4. The Computed speed will be computed and shown in the patrol window. Fig 28 is an example of a 440 meters measurement zone, a 11.9 second measurement interval, and a 133 km/h computed speed. *Note: Tenths of a second are indicated by the right-most digit of the middle window.*
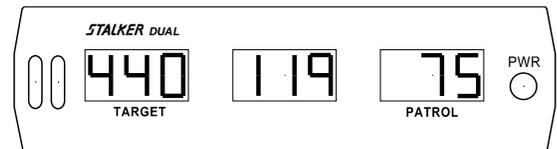
Fig 28

Exit Stopwatch Mode

To exit Stopwatch mode, press the **STOPWATCH MODE** key. The *STALKER DUAL DSR* will reset and revert to Radar mode again.

FASTER SPEED TRACKING THEORY

The following examples are *Faster* targets under various conditions. In addition to the speeds displayed in each window, carefully note the icons illuminated.

Faster mode allows *STALKER DUAL DSR* to track a smaller high-speed target that was previously undetectable because a stronger target shielded the weaker (smaller) target from normal (strongest target) speed measurement. The classic example is where a speeding sports car passes a slower moving eighteen wheeler. The *Faster* sports car, although clearly speeding, could not be measured because the strongest truck target captured the target display window. *STALKER DUAL DSR* with *Faster* capability, however, will display the speed of the strongest target (the truck) in the target window, while the speed of the *Faster* target (the sports car) will appear in the middle *Faster* window.

STALKER DUAL DSR simultaneously tracks both targets: however, the target window is always reserved for the <u>strongest</u> target and the *Faster* window is reserved for the <u>*Faster*</u> target. When the *Faster* target becomes the strongest target, the *Faster* target's speed will transfer to the strongest target window. Either the strong target or the *Faster* target's speed can be locked. See the examples below:

Moving Mode Example:
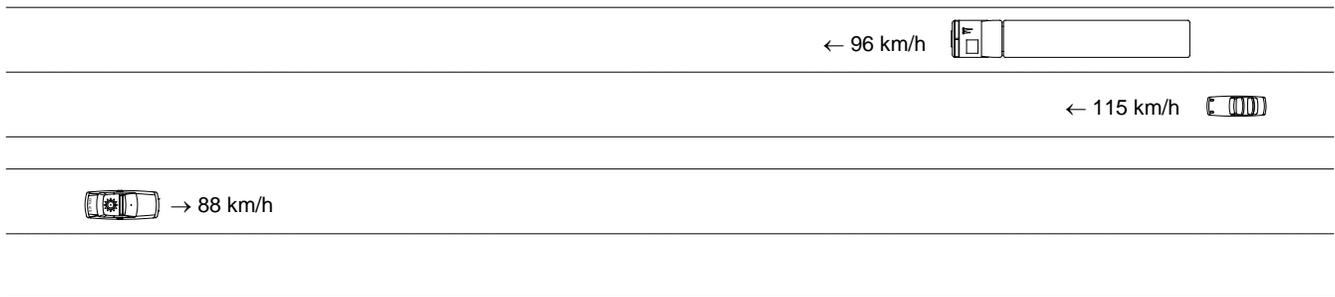
← 96 km/h

← 115 km/h

→ 88 km/h

A Patrol vehicle is cruising at 88 km/h. Two opposite lane targets are approaching from the front - a 96 km/h truck and a 115 km/h sports car behind the truck. The 96 km/h strongest out-front target (the truck) appears in the target window and the 115 km/h *Faster* target (the sports car) appears in the middle window (Fig 29). Either the strong target or the *Faster* target can be locked.
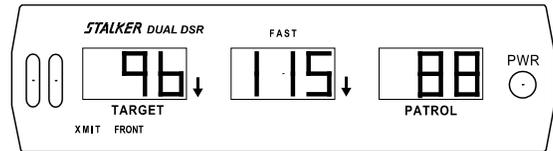
Fig 29

The 96 km/h strongest target can be locked, by pressing the **STRONG LOCK/REL** key and the voice enunciator will announce *Front/Opposite/Closing*. Note how the middle window changes from a *Faster* window to a Lock window (Fig 30). The **FAST** icon has been replaced by the **LOCK** icon. The middle window is therefore defined by the icon that is associated with it.
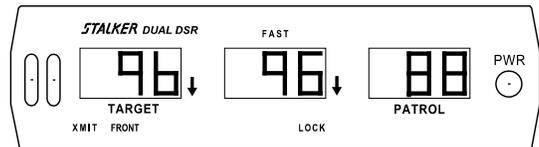
Fig 30

Stationary Mode Example:

← 96 km/h

← 115 km/h

← 104 km/h
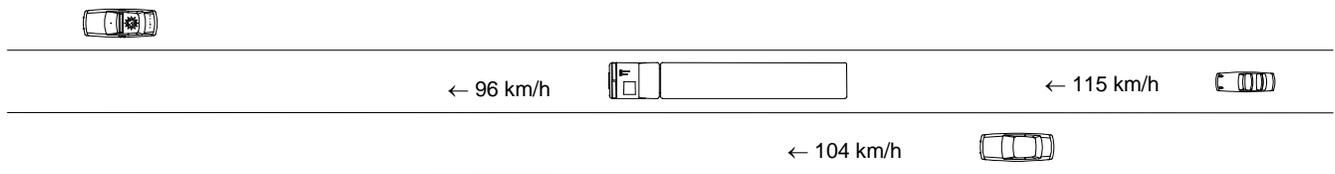
A Patrol vehicle is parked at the top of a hill monitoring approaching traffic with his rear antenna. The first target, a 96 km/h truck, is the strongest out-front target and appears in the target window (Fig 31). The third target, the 115 km/h *Faster* sports car, is tracked in the middle *Faster* window. Either target can be locked by pressing the appropriate **LOCK** key. After lock, the voice enunciator will announce *Rear/Stationary/Closing*.
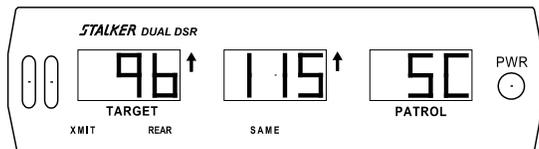
Fig 31

INTERFERENCE SOURCES AND REMEDIES

A variety of sources, both natural and man-made, can cause misleading indications or poor performance. The operator should note the symptoms described below, and take steps to avoid the problem, or ignore the misleading indications.

Terrain

Radar signals will not pass through most solid objects, including tree foliage. Make certain the path between the radar and target vehicle is unobstructed. A glass window is a partial reflector of radar. Therefore, some reduction in range will be experienced when aiming through patrol vehicle windows.

Rain

Rain absorbs and scatters the radar signal. This reduces the range and increases the possibility of obtaining readings from the speed of the raindrops.

Electrical Noise

Electrical noise sources include neon signs, radio transmitters, power lines, and transformers. These influences may cause reduced range or intermittent readings. When these interferences are present, the RFI indicator should come on and suppress all readings.

Vehicle Ignition Noise

An extremely noisy vehicle electrical system may cause erratic operation. If this condition occurs, it is recommended that a two conductor shielded cable be run directly from the vehicle battery to the cigarette lighter plug on the dash. This should eliminate any problems from vehicle electrical noise.

Fan Noise

As you will discover, the **STALKER DUAL DSR** that you have purchased is extremely sensitive, which results in longer range. This extra sensitivity may allow you to pick up fan noise when operating the radar from inside the patrol vehicle.

Fan noise is a common Doppler radar problem when aiming the antenna through a window from inside the patrol vehicle. A small amount of the radar beam is reflected off the glass back into the vehicle. This may allow the radar to pick up fan noise from within the patrol vehicle.

The problem is not a problem with the radar, but with the location of the radar's antenna. Doppler radar is designed to detect moving or vibrating objects; therefore, it may detect any moving or vibrating surfaces inside the patrol vehicle, such as the fan or a dashboard that is vibrating from the fan. Fan interference can be verified by turning off or changing the speed of the fan.

Most fans generate speeds of 30 mph or less. As a result, fan noise is normally only a problem when operating in stationary mode or when operating in moving mode with patrol speeds less than 30 mph.

To eliminate fan noise, try the following steps in numerical order:

1. Find a location (by moving the antenna) inside the vehicle that is free of fan noise; such as a corner of the dash away from the fan. The lower left side of the dash is a recommended location.

2. Insure that the antenna beam is not deflected back into the vehicle by anything in its path such as wipers, window trim, or anything mounted on the dash. Do not mount the counting/display unit or antenna/power cables in front of the antenna on the dash.

3. Locate the antenna as close to the inside glass as possible (preferably less than 1/2 inch).

4. Turn the fan off while operating the radar in stationary mode or moving mode with patrol speed under 30 mph.

5. Install an optional Antenna Port on the glass surfaces directly in front of the antenna. The specially designed Antenna Port consists of two white discs, 3 1/2 inches in diameter, with double-sided tape on one side. Attach one disc on the inside glass surface, and the other disc on the outside glass surface. Due to interference with windshield wipers, the Antenna Port can only be installed on the rear window.

6. If the above suggestions fail, mount the antenna completely outside the vehicle.

Interference From Other Transmitters

Strong signals from nearby radio transmitters may interfere with operation of *STALKER* *DUAL DSR*. The **rFI** indication (Fig 32) signals that an interference source has been detected. Speed readings are inhibited when this occurs to prevent the possibility of false readings. The interference source may be the vehicle's two-way radio, another nearby transmitter, or an illegal radar-jamming device.

Fig 32

Power Supply

A low voltage condition from the vehicle's electrical system will cause the **ULo** indication to illuminate (Fig 33), and will inhibit speed readings. An extremely noisy vehicle electrical system may result in false readings or erratic operation. If this condition occurs, a two-conductor, shielded cable should be connected directly from the vehicle battery to the cigarette-plug on the dash. This should eliminate any problems from vehicle electrical noise.

Fig 33

No Power

If the radar does not have power, check the fuse in the power cable. Unscrew the silver tip on the end of the cigarette plug and remove the fuse. If the fuse is blown, replace with a new fuse and test the radar.

If the power cable fuse is okay, check the fuse in the vehicle's fuse block that provides the power to the cigarette lighter.

If the vehicle's fuse is also okay, place the radar in a different vehicle or try a different radar in your vehicle.
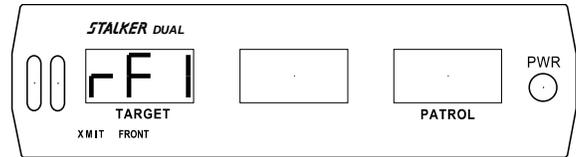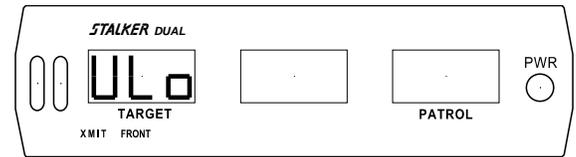
TESTING

In order to ensure continued compliance with FCC rules, meet legal requirements for admissibility of radar speed measurements, and verify full operating performance, the following test procedures are recommended. If the unit fails any of the tests, it should be removed from service until the cause of the problem is corrected.

Periodic Calibration

We recommend that the following performance characteristics should be verified on a regular basis:

1. Transmitter frequency is within specification of licensed operating frequency.
2. Unit indicates correct speed (± 1 km/h) when reading a target of known speed.
3. Unit detects targets of good reflectivity over unobstructed, flat terrain at distances of 0.8 km/h, or more, when set for highest sensitivity (**SEn 4**).

Power-On Self-Test

Each time the unit is powered on, an automatic self-test is performed to verify that the unit functions. The display indicates 888 888 188 (Fig 34) during the test. A 4-beep "happy" tone indicates the successful completion of this test. If a problem is detected, **FAIL** will be displayed along with a 15-beep tone. Immediately after power-on, and while all display segments are illuminated, pressing the **SELF TEST** key will display the software version followed by the transmitter frequency (see page 14).
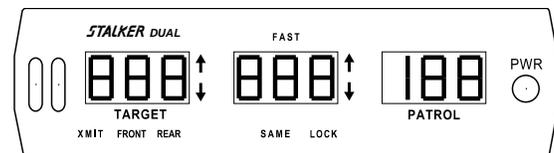
Fig 34

Internal Circuit Test

An internal circuit test can be performed at any time by pressing the **SELF TEST** key. This performs a diagnostic check on the display/counting unit, the selected antenna, and antenna cable. Since only the selected antenna is tested, it is necessary to perform this test twice -- once with the front antenna selected, and once with the rear antenna selected.

A reading of the input battery voltage (e.g., **bAt 13.8**) followed by the display/counting unit internal operating temperature in degrees Celcius (e.g., **43 °C**). If the unit has been ordered in miles, the temperature will be displayed in Fahrenheit (e.g., **110 °F**)), (Fig 35 and Fig 36, respectively) will be displayed. *Note: Tenths of a volt are indicated by the right-most digit.*

The test cycle follows with the display of speeds of **10**, **35**, and **65** (Figures 37, 37a, and 37b).

A comprehensive test is also performed on the selected antenna by the display/counting unit to ensure the integrity of the selected antenna cable and antenna electronics. After all the tests are completed, **PASS** (Fig 38) along with a 4-beep "happy" tone indicate successful test completion. **FAIL** (Fig 39) along with a 15-beep tone indicates a failed self-test.

Note: *We recommend that the internal circuit test be performed on each antenna.*
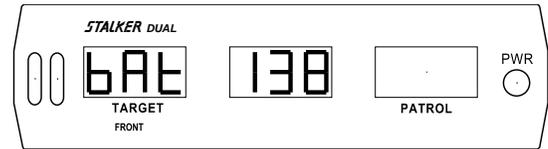
Fig 35
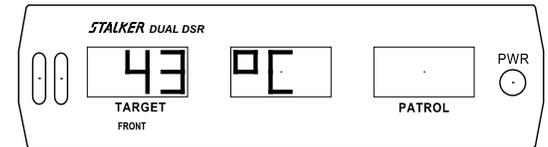
Fig 36
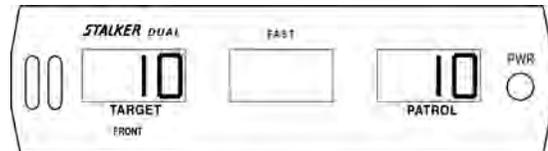
Fig 37
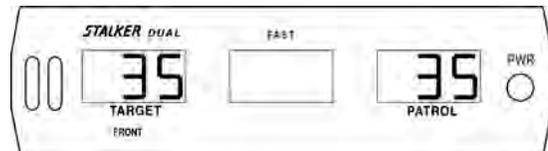
Fig 37a
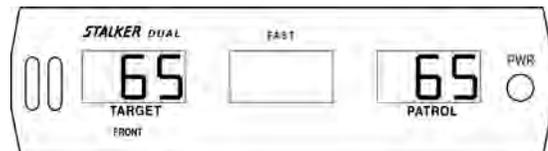
Fig 37b
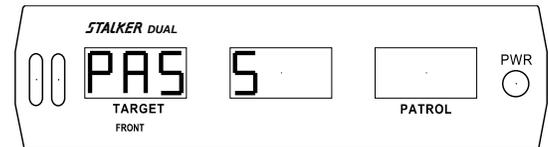
Fig 38
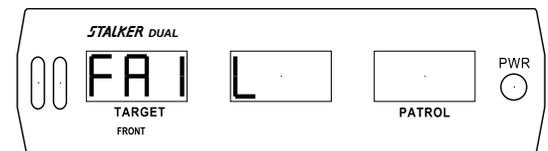
Fig 39

Automatic Self-Test

An automatic self-test (indicated by a 4-beep "happy" tone) is performed every 10 minutes. Switching antennas will reset the 10-minute timer.

Directional Target Moving-Vehicle Test

A directional moving vehicle test can be performed as an additional check of performance and accuracy.

To perform the moving vehicle test: press the **PWR** key to turn on the radar, press the **ANT** key to select the front antenna, and the press the **XMIT** key to enter transmit mode. During this test you will need to repeatedly press the **MOV/STA** key to switch between stationary closing mode (**SC**) and stationary away mode (**SA**).

While driving a patrol vehicle, with an accurately calibrated speedometer, aim the front antenna down an empty highway directly in front of the vehicle. While moving, alternately switch between **SC** mode and **SA** mode. As you alternate between the two directional modes, verify that **SC** mode always shows an accurate approaching ground speed in the target window while **SA** mode always shows no speed in the target window. While in stationary closing (**SC**) mode, the moving roadway appears as an approaching target to the radar and will be seen in the target window but will not be seen when the radar is in the stationary away (**SA**) mode.

If your **STALKER DUAL DSR** is equipped with a rear antenna, repeat the above tests with the rear antenna selected.

The speed indicated by **STALKER DUAL DSR** should match the speedometer indication within a small error (depending on speedometer accuracy). This simple test verifies both accurate speed measurement and proper direction sensing operation.

THE PERFECT PATROL SPEED WITH VSS

Traffic Radar Patrol Speed Measurement

Moving traffic radar systems normally obtain patrol speed by measuring the speed of the radar return from the moving roadway in front of the moving vehicle. Patrol speed tracking sometimes suffers from anomalies known as "batching" and "shadowing." These anomalies occur during moments when the roadway is obstructed from the radar beam by road conditions or other vehicles. The solution is to allow the traffic radar to monitor vehicle tire rotation and to use this information to perform "patrol speed steering." There are two ways to monitor tire rotation. One way is through the CAN Bus using Stalker's exclusive CAN/VSS Adapter; the other is to attach directly to the Vehicle Speed Sensor (VSS) signal in the patrol vehicle.

The CAN/VSS Solution – VSS Advantages without VSS installation problems.

You can skip VSS installation when you use Stalker's CAN/VSS Adapter to power your Stalker radar in the patrol vehicle. Unlike connecting to the vehicle's VSS, which can be a challenge to locate, the OBDII diagnostic connector is easy to find and takes only seconds to connect.

Locate your vehicle's OBDII connector.

Connect the Stalker CAN/VSS cable.

The CAN/VSS Adapter is Stalker's preferred method for automating the radar's patrol speed acquisition as well as transitioning back and forth between stationary to moving modes.

The VSS Speedometer Signal

All modern vehicles have a VSS sensor (Vehicle Speed Sensor) attached to the transmission or an axle that generates a speed signal. The speedometer and other electronics in the vehicle use the VSS speed signal. By tapping into this signal, the Stalker DSR 2X can monitor the actual patrol car speed and use the VSS speed information to help the radar pick the correct ground speed. The radar's patrol car speed is still always measured by radar. The VSS simply helps steer the radar into making the right choice.

VSS Cable Installation

To take advantage of VSS patrol speed steering, requires two cables that are provided with the VSS Option (VSS Installation Kit PN 200-0622-00).

The vehicle VSS cable (PN 155-2221-00), should be permanently installed by an automobile service shop using the included installation instructions.

On the right is how the vehicle VSS cable is normally attached (with 3 screws) to the bottom of the dash with a metal L-bracket for convenience.

The radar VSS cable (PN 155-2178-00) replaces the conventional cigarette power cable and can be removed from the vehicle with the radar.
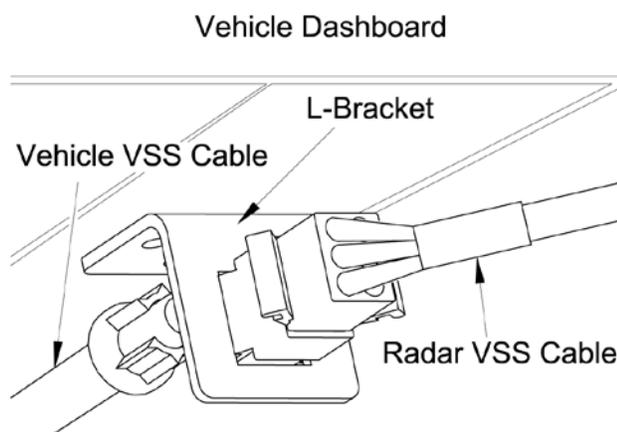
IMPORTANT NOTE: Observe the black polarity marks on the two white 6-pin VSS connectors that plug together. The two white 6-pin VSS connectors can be plugged together with the marks in alignment or the marks opposed. Because of vehicle VSS signal level variations, one of these plug-in positions may not provide a working VSS signal to the radar. If you observe the

symptom of the speedometer not functioning or the symptom of the radar not "seeing" the VSS signal, rotate the marks 180° and try again.

Either Way, the Result is PERFECT Patrol Speed

- The radar will never shadow.
- The radar will never batch.
- It tracks and acquires patrol speeds from 1-200 mph.
- Moving / Stationary selection becomes automatic.
- Patrol speed variations produced by weather effects are greatly reduced.
- Patrol speed variations produced by road clutter cosine effects are greatly reduced.
- Low speed combing effects are eliminated.

AUTOMATIC VSS CALIBRATION

Once the VSS cables are properly installed, the radar is ready to synchronize the vehicle's VSS signal with the radar's ground speed readings. The calibration sequence will determine the proper ratio between the VSS signal speed and the radar ground speed. The numeric result is stored in the radar's memory (called a calibration factor).

Every time the radar is turned on and then operated, the auto-calibration routine is triggered. The very first time the radar is installed and operated, the auto-calibration sequence may take a few minutes (since there is not a previously stored calibration factor to verify). During successive operations, in the same vehicle, the auto-calibration routine will seem instant.

First Time Calibration (or Installing the Radar in a New Vehicle)

To auto-calibrate you will need to operate (with the radar transmitting) in the moving mode for a few city blocks. The radar can complete the calibration sequence much faster if the speed of the vehicle is varied above 32 km/h (don't merely drive at a steady speed at first). When you see the patrol speed window consistently showing an accurate speed, then the auto-calibration sequence has been successful. If, after several blocks of driving, the patrol speed display is either blank or incorrect, then unplug the 6 pin VSS cable connector, rotate it 180 degrees, power up the radar, and try again.

Automatic Moving / Stationary Selection

When the radar is receiving VSS signals, and it has been calibrated, the unit should automatically switch between moving and stationary operation modes when the patrol vehicle moves and stops. While moving, the Radar Mode key will not override the moving / stationary mode selected by the VSS steered radar.

Low Speed Speedometer Problems

In some vehicles, the VSS signal is non-existent at speeds below 8-16 km/h so you may see no change in the car's speedometer reading until the car exceeds 16 km/h. In these cases, the Stalker DSR radar will also not be switched into moving mode until the patrol car exceeds 16 km/h.

Patrol Speed Low Cutoff

Patrol Speed Low Cutoff or Lo5, Lo 20. Patrol 5/20 is overridden when VSS is activated.

PS Blank

Patrol Speed Blanking (see Page 17) has two functions. The function used to re-acquire patrol speed is not necessary with VSS activated. VSS will insure the correct patrol speed automatically.

LEGAL REQUIREMENTS

FCC Requirements

The Federal Communications Commission requires that all transmitting equipment carry a Grant of Type Acceptance. **STALKER DUAL DSR** is Type Accepted by the FCC under Type Acceptance number IBQACMI002. The FCC also requires that an operating license be obtained by the user of the equipment. In the case of local government agencies already licensed under part 90 in the Public Safety Radio Service, the requirement for a separate authorization for radar speed detection devices was eliminated, effective February 1, 1983, and licensees may operate speed detection devices as part of their base/mobile communications systems. As part of this rule change, licensees are required to list the number of speed detection units, and the frequencies on which they operate upon renewal of their land mobile authorizations.

MICROWAVE RADIATION

The following section has been supplied courtesy of the Food and Drug Administration (FDA).

UPDATE ON POSSIBLE HAZARDS

OF TRAFFIC RADAR DEVICES

July 20, 1992

TO: CITY, COUNTY, STATE, AND FEDERAL POLICE OFFICIALS

Recent stories in the news media have focused attention on the possibility that the traffic radar devices used by police officers might increase their risk of cancer, particularly testicular cancer. The Food and Drug Administration (FDA) has prepared the following information to inform police officers about what is known--and what remains unknown--about this question. **We urge you to make this Update available to the officers under your jurisdiction. Feel free to photocopy this Update as needed.**

What kind of radiation is emitted by traffic radar units?

These devices emit microwave radiation similar to the type produced inside microwave ovens, but at a power level more than 10,000 times lower. The radiation travels from the front of the radar device in a narrow, cone-shaped beam, although some of it may be reflected back from hard surfaces such as metal and glass. The amount of radiation decreases rapidly with distance from the source, so that the farther the devices are kept from the body, the lower the exposure.

Is there any experimental evidence that the levels of microwave radiation from a traffic radar device can be dangerous?

Although it is known that very high levels of microwave radiation can be harmful, there is no firm experimental evidence at present that the much lower levels of radiation emitted by traffic radar devices can be hazardous. There are some animal studies that suggest that low levels of radar can cause biological changes, but it is not known whether these results apply to humans. Also, most of these studies were done with a different type of microwave radiation than that produced by traffic radar devices.

What about the cancers that have occurred in police officers who used traffic radar devices for long periods of time?

It is true that some officers who have used these devices have experienced cancer. But it is important to understand that these types of cancers also occur among people who **haven't** used radar devices. That's why it is not possible to tell whether any individual officer's cancer arose because of the radar, or whether it would have happened anyway. **The key question is whether the risk of getting a particular form of cancer is greater among people who work with the radar devices than among the rest of the population.** And the only way to answer that question is to compare the cancer rates among radar- using police officers with people who don't work with radar, or with the cancer rates that would be expected in the general population.

FDA has made a preliminary comparison between the number of cancers reported in police officers who use traffic radar devices and cancer rates in the general population. Based on case reports we have so far, the comparison does not appear to show a greater cancer rate among the police, but it is too soon to conclude that there is no risk.

What's FDA doing to address the question of cancer risk?

FDA will continue to evaluate the research performed by microwave scientists around the world to see if their results apply to traffic radar devices. In addition, FDA will work with police organizations to collect more data about the cancer experience of police officers, to see whether they are developing more than the expected number of cancers. To assist us in this effort, any known cases of cancer in police officers using radar should be reported to FDA by calling 1-800-638-6725. Be sure to provide as much information as possible, including the type of radar unit used, how long the individual worked with radar devices, and the specific type of cancer.

In the meantime, what can be done to reduce the risk, if there is one?

Although it is not known for sure whether traffic radar devices can produce health problems, police officers can take some simple steps which will sharply reduce their exposure to the low-level microwave radiation which these devices emit.
1. Always point the device away from your body, or your partner's body, while it is turned on.
2. Mount fixed radar antennas so that the beam is not pointed at any occupant of the patrol car.

3. Whenever possible, turn off a hand-held unit when it is not in use. If your unit has a "standby" mode, always use it when not measuring the speed of a vehicle. Never rest the unit against your body when it is turned on.
4. When it is on, try to avoid pointing the device toward metal surfaces inside your car, such as the floor or a door, to avoid microwave reflection. (Measurements have shown that the radiation reflected from nonmetallic surfaces, such as glass in the car's windows, is much less intense than that reflected from metal surfaces.)

Again, there is no proof at this point that traffic radar devices can be harmful to the police officers who use them. Future information may reveal that these devices are indeed harmless. But until the question is settled, taking the simple precautions outlined above should reduce any possible risk. In the meantime, FDA will continue to provide updates as more information becomes available.

STALKER DUAL DSR EMISSIONS

The **𝟳𝗧𝗔𝗟𝗞𝗘𝗥 DUAL DSR** Radar operates with a nominal power output of 15 mw and a maximum of 50 mw of power output and emits low level, non-ionizing radio frequency electromagnetic radiation. The American National Standards Institute (ANSI) has the responsibility for establishing standards with respect to human exposure to radio frequency electromagnetic radiation. The current ANSI C95.1 standard in effect, for frequencies from 1500 MHz to 100,000 MHz, specifies a maximum exposure power density of 5.0 mw/cm² (.005 Watt/cm²) on any part of the body. The **𝟳𝗧𝗔𝗟𝗞𝗘𝗥 DUAL DSR** has a maximum power density of 2.0 mw/cm² that is well below the ANSI standard.

REQUIRED MAINTENANCE

No user maintenance is required on the **𝟳𝗧𝗔𝗟𝗞𝗘𝗥 DUAL DSR**. However, if any problems are experienced during testing procedures or normal operation, the unit should be taken immediately to your department's radar specialist to determine the extent of the problem. If a malfunction has occurred, the unit will require servicing. Normal care should be taken by the user in handling the **𝟳𝗧𝗔𝗟𝗞𝗘𝗥 DUAL DSR** to preserve the life and usefulness of the equipment.

TROUBLESHOOTING

PWR key does not function

Make sure all cables are mated correctly with their connectors. Check the vehicle cigarette-plug connector for dirty contacts. Check for a blown fuse in the **𝟳𝗧𝗔𝗟𝗞𝗘𝗥 DUAL DSR** cigarette-plug.

Low or no speaker volume

Press the (((► key on the remote control to adjust the volume. **Aud 0** (lowest level) to **Aud 9** (highest level).

Radar has short range

Set range (sensitivity) control to **SEn 4** (longest range). Note: Opposite direction mode and same direction mode sensitivity settings need to be set independently. See page 12.

Radar suffers from patrol speed shadowing

If the patrol window indicates an incorrect patrol speed, the **PS BLANK** key blanks the patrol speed window and acquires a new patrol speed. *See Patrol Speed Shadowing Effect on Page 12.*

Press the **PS 5/20** key to change the low-end patrol speed from 8 km/h to 32 km/h, thus preventing patrol speed tracking below 20 mph. It is not possible to allow patrol speed tracking below 32 km/h and to eliminate patrol speed shadowing simultaneously. *See Low-End Patrol Speed Selection on Page 12.*

Radar will not lock onto patrol speeds below 32 km/h

Press the **PS 5/20** key to change the low-end patrol speed from 32 km/h to 8 km/h. *See Low-End Patrol Speed Selection on Page 12*. The radar will now be susceptible to patrol speed "shadowing," which can be easily corrected by pressing the **PS BLANK** key.

Radar has trouble maintaining patrol speed

Mount the antenna higher above the dash and/or point antenna slightly down toward the ground. Make sure the wipers are not in the radar beam path. Make sure the windshield does not have paint/mask around the perimeter.

Radar picks up vehicle fan and reads 8 to 48 km/h in stationary mode

Check for proper aiming of antenna. Make sure that the paint/mask or metallic objects are not deflecting the radar beam down into defroster vents. If so, raise antenna above obstruction. *See Fan Noise on Page 17.*

Radar displays LO V icon

Make sure the cigarette-plug is securely installed and the contacts are clean.

Radar flashes Hot in display

The radar is overheating. Move radar out of direct sun. Do not leave radar operating in a closed vehicle.

STALKER DUAL DSR OPTIONS

The ***STALKER DUAL DSR*** offers several performance characteristics, which can be formatted from the "setup menu." Below are some of these features. If your radar does not have a feature listed below and you would like it incorporated, please contact Applied Concepts, Inc. at 1-800-***STALKER*** or your Factory Sales Representative.

- ***STALKER DUAL DSR*** can be interfaced with most In-Car Video systems, computers, etc. The "setup menu" offers a variety of pre-programmed baud rates: 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400.

- Message format can be selected for displaying on video systems, computer, etc.

- Minimum Stationary speed display can be selected to start at either 2 km/h or 26 km/h. Factory setting is 26 km/h.

- Various locking options can be selected. Normal factory setting is to lock both Target and Patrol but to continue tracking the patrol speed through lock. The locked Patrol speed is displayed once the vehicle comes to a stop. The unit is factory set for your state requirements. Choices are Lock only Target Speed (FL); Lock neither Target nor Patrol Speeds (OFF), Lock both Target and Patrol (USA); Track Patrol Speed through lock (TTL). The FL option automatically clears lock within 15 minutes.

- The Harmonic Suppression indicator is a decimal point in the Target window. It lights up when double suppression is suppressing the target display. This is turned off in the normal factory setting.

- Fast Speed Tracking comes standard with the ***STALKER DUAL DSR***. Fast Mode is a field selectable feature and can be disabled or changed, if desired. Three options are available: 1) Fast Mode disabled, 2) Fast Mode enabled for opposite lane targets only, or 3) Fast Mode enabled for both opposite lane targets and same lane targets (factory default setting).

- Selecting speed readings in miles or kilometers per hour is a "setup menu" feature.

- Either one or two antenna operation can be selected. Factory setting is for two antennas unless specified on the order. This allows for easy upgrade to a dual antenna.

- For Michigan customers, there is a special menu selectable sensitivity (range) setting: the radar allows settings of SEn 0 (0 range) through SEn 4 instead of the normal SEn 1 through SEn 4 selections.

- Stationary only operation is a "setup menu" option. Even though the ***STALKER DUAL DSR*** is a moving radar, some departments might want to disable moving mode and use the radar only in stationary mode.

Other menu selections are preset at the factory. We encourage all menu selections to be done by the factory, by factory authorized service centers, or factory sales agents.

WARRANTY

Manufacturer warrants this traffic speed radar to the original purchaser to be free of defects. At its discretion, the manufacturer agrees to repair or replace all radar components that fail due to defective materials or workmanship for a period of <u>three</u> (3) <u>years</u> from the date of purchase.

During the warranty period, there will be no charge for repair labor or parts. Purchaser shall return the failed unit to the factory or authorized service center, freight prepaid. The manufacturer will pay return shipping.

This warranty applies only to internal electronic components and circuitry. Warranty excludes normal wear-and-tear such as frayed cords, broken connectors, scratched or broken cases, or physical abuse. Manufacturer reserves the right to charge for defects and/or damages resulting from abuse or extraordinary environmental damage to the unit during the warranty period at rates normally charged for repairing such units not covered under warranty.

Seller warrants the radar devices manufactured by Applied Concepts, Inc. are designed to perform the function of determining the speed of motor vehicles. The foregoing warranty is exclusive, in lieu of all other warranties, of quality, fitness, or merchantability, whether written, oral, or implied.

As a further limit on warranty, and as an expressed warning, the user should be aware that harmful personal contact may be made with seller's radar devices in the event of violent maneuvers, collisions, or other circumstances, even though said radar devices are installed and used according to instructions. Applied Concepts, Inc. specifically disclaims any liability for injury caused by the radar devices in all such circumstances.

Note: We have several Factory Authorized Service Centers located throughout the United States. For the Service Center nearest you, call the factory at 1-800-***STALKER*** (1-800-782-5537).