STALKER® II MDR

Moving Directional Radar

Operator's Manual

applied concepts, inc.

2609 Technology Drive
Plano, TX 75074
Phone (972) 398-3780
Fax (972) 398-3781

Toll Free Sales 1-800-STALKER
Toll Free Service 1-877-STALKER
sales@stalkerradar.com
www.stalkerradar.com

011-0066-00 Rev N

Dear Valued Radar Customer:

Thank you for choosing the ***STALKER*** Radar System. We sincerely appreciate you purchasing the ***STALKER*** and giving us the opportunity of serving you and your department. You will find the ***STALKER*** 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*** Radar.

Applied Concepts, Inc. believes that the ***STALKER*** offers more than superior performance and versatility. ***STALKER*** 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

The ***STALKER II*** is a Ka-band Direction Sensing Radar designed to allow the speed enforcement officer maximum flexibility both in moving and stationary modes. The unique Direction Sensing ability of the ***STALKER II*** allows the radar to automatically (without the traditional "slower key") determine the correct speed of all same-lane targets. In addition to *Fast Speed* display, the ***STALKER II*** offers *Fast Speed* locking in moving mode for both opposite-lane targets and same-lane targets.

Utilizing a state-of-the-art Digital Signal Processor (DSP), ***STALKER II*** 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 II*** is that it can be upgraded in the future by simply installing new software, preventing obsolescence!

STALKER II 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 Track-thru-Lock speed, Fast Speed Tracking (both opposite lane and/or same lane), Target Direction Arrows, and Target Doppler Audio capability assist the operator in positive target identification and provide operating convenience.

HOW TRAFFIC RADAR WORKS

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 Principle, 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 DSR*** line of products, 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. Now, the ***STALKER II*** has the ability to filter out Doppler signals from targets moving in the opposite direction of the targets being tracked.

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 the roadway ahead of the radar. Since the Doppler shift is proportional to the relative velocity between the radar and the roadway, 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 II*** 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 the roadway ahead of the radar. Since the Doppler shift is proportional to the relative velocity between the radar and the roadway, the Doppler shift of this signal will be proportional to the speed of the patrol vehicle.

The second signal, the 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 DSR*** line, a radar operator had to observe the relative speed of the target vehicle and "tell the radar" whether to add or subtract 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 II*** allows the radar to automatically (without the traditional "slower key") determine the correct speed of all same lane targets in the radar beam.

Fast Mode - ***STALKER II*** offers a feature called *Fast Speed Tracking*. *Fast Mode* display can be easily turned ON/OFF in the Operator Menu. See Page 5.

The addition of the *fast mode* allows 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 II***, 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.

INSTALLATION

The *STALKER II* Ka-Band radar can be operated hand-held, motorcycle mounted, or dash mounted. Every *STALKER II MDR* comes standard with a choice of mount. A motorcycle mount and a dash mount are available. *STALKER II* can be powered from two different power sources: 1) Battery Handle or 2) 12VDC Cigarette Plug Power Cable.

Battery Handle Installation

ATTENTION: The battery must be charged prior to initial use.

The *STALKER II* Battery Handle (200-0661-00) is recommended when trigger activated transmit mode is used and when the operator desires to use the radar hand-held. Attach the Battery Handle to the body by inserting the top front tip of the Battery Handle into its mating lip on the radar body and rotating the back of the Battery Handle up until seated. Next, rotate the thumb latch to engage the ramping slot in the back of the Battery Handle. The radar is now ready for use.

Power Cable Installation

There are several power cables available and they all supply power through the data connector on the right side of the radar. Remove the data connector dust cover and then insert and twist-to-lock the power cable connector to the radar connector. The cigarette plug may plug into any 12VDC power receptacle.

Battery Charger Installation

This Battery Charger may be powered either from 120 VAC house current using the wall adapter supplied, or from a 12VDC vehicle electrical system by using the optional cigarette plug cable. To use the charger, plug either the wall adaptor or the optional cigarette plug cable into the 12 V AC/DC jack on the charger and plug the other end into a wall outlet or cigarette plug receptacle. Install a battery on the charger by inserting it into the mating battery connector in a manner similar to STALKER II. The charging cycle will be automatically started when the battery is connected, and the green indicator should glow indicating that the battery is being quick charged.

Cordless Remote Control Installation

The *only* installation required for the ergonomic remote control is to install the 3V Lithium battery (type 123). 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.

Dash Mount Installation

The dash mount uses windshield suction cups to secure the front of the mount, and either bungee cords or Velcro to secure the rear of the mount. Some new car dashes may require special mounting hardware or modifications. Check with the factory if help is needed. Install the dash mount in a convenient location that does not obscure the view of the road. Make sure the radar beam is approximately level, points straight ahead, and is not blocked by objects such as windshield trim or windshield wipers. Ensure after mounting that the mount will not be dislodged during high-speed maneuvers.

Rear Antenna Installation

Mount antenna facing rearwards. Make sure the radar beam is approximately level and is not blocked by other objects in the vehicle. Ensure after mounting that the mount will not be dislodged during high-speed maneuvers.

Connect cable from antenna to the port on the left-hand side of the *STALKER II MDR*.

ACCESSORIES

STALKER II can be powered from two different power sources: 1) Battery Handle or 2) One of several Power Cables. The *STALKER II* Ka-Band radar can be operated hand-held, motorcycle mounted, or dash mounted. A motorcycle mount, motorcycle holster, and a dash mount is available. Check with your salesman for further information.

Battery Handle

ATTENTION: The battery must be charged prior to initial use. Batteries are shipped in a partial state of charge to help extend battery life.

The *STALKER II* Battery Handle (200-0661-00) is recommended when trigger activated transmit mode is used and when the operator desires to use the radar hand-held. Attach the Battery Handle to the body by inserting the top front tip of the Battery Handle into its mating lip on the radar body and rotating the back of the Battery Handle up until seated. Next, rotate the thumb latch to engage the ramping slot in the back of the Battery Handle. The radar is now ready for use.

Power Cable

There are several power cables available and they all supply power through the data connector on the right side of the radar.

ACI Part Number	Description
155-2232-00	12VDC Power Cable with a cigarette plug only
155-2232-01	12VDC Power Cable with both a cigarette plug and a serial port connector

Battery Charger Operation

The Battery Handle Charger is used to charge the battery handle used with *STALKER II*. This charger may be powered either from 120 VAC house current using the wall adapter supplied, or from a 12VDC vehicle electrical system by using the optional cigarette plug cable. To use the charger, plug either the wall adaptor or the optional cigarette plug cable into the 12 V AC/DC jack on the charger and plug the other end into a wall outlet or cigarette plug receptacle. Since the charger monitors the battery temperature to prevent damage to the battery, the battery must not be hot or cold while charging. Install a battery on the charger by inserting it into the mating battery connector in a manner similar to attaching it to the *STALKER II* radar body. The charging cycle will be automatically started when the battery is connected, and the green indicator should glow indicating that the battery is being quick charged. Quick charging should take 2-3 hours to complete. After quick charging is complete, the green indicator should extinguish. After the green indicator extinguishes, the battery is still being "topped off". The battery should remain on the charger the entire 3 hours to ensure the battery reaches a full state of charge. For longest battery life and best service, batteries should only be charged in an environment where the temperature is between 0°C and 40°C (32°F and 104°F).

NOTE: *The charger senses battery temperature to prevent damage to the battery. As a result, it may refuse to charge a battery that is hot or cold. If this occurs, allowing the battery to stabilize in a room temperature environment for a few minutes should correct the problem.*

NOTE: *Battery performance and longevity will be greatly reduced if it is exposed to temperatures over 125° F.*

NOTE: *Batteries do NOT need to be fully discharged prior to charging. The battery will last longer if recharged frequently.*

Hand Controller

An optional Hand Controller (200-0671-00) is available for the *STALKER II*. The remote is normally used with the moving model of the *STALKER II*, but it can also be used with the stationary model.

Rear Antenna

Also available is a rear antenna (200-0326-52) and connecting cable (155-2248-16).

SETTING UP THE *STALKER II*

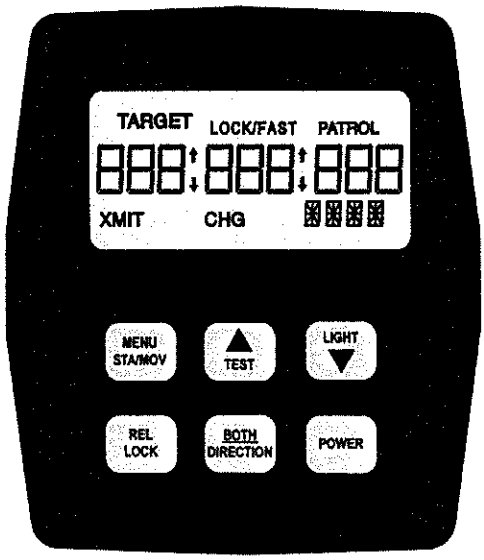
OPERATOR MENU OPERATION ON *STALKER II* – Setting up the radar unit is fast and easy, and is accomplished using either the keypad or the remote control. Press the **MENU** key, on either the keypad or remote, (for ½ second on the keypad) to enter the OPERATOR MENU. The ▲ and ▼ keys change the value. To exit the OPERATOR MENU, press either the trigger or the **XMIT** key on the remote. The factory default, for each setting, is indicated by the bold underlined setting.

OPERATOR MENU

		FEATURE Step down by pressing MENU key	SETTINGs Change using the ▲ and ▼ keys
Menu Step ORDER	Description	LOCK/FAST WINDOW	Patrol Window (**bold** indicates factory default)
1	Faster On/Off	FAS	**On**, OFF
2	Opposite/Stationary Sensitivity	OP SEn	0, 1, 2, 3, **4**
3	Same Lane Sensitivity	SL SEn	0, 1, 2, **3**, 4
4	Patrol Speed Low Cutoff	PAt	LoS, **L20**
5	Squelch	SQL	**On**, OFF
6	Audio Volume	AUd	0, 1, 2, 3, **4**
7	Beep Volume	bEE P	0, 1, 2, **3**
8	Stopwatch	StO P	**On**, OFF

DISPLAY OPERATION

Display Rear Panel



The *STALKER II* display unit presents the radar operator with a clear and logically organized picture of how the unit is operating and the targets that it is tracking. The operator knows in a glance the speed of the target, its direction of travel, and its position relative to the patrol car. The display backlight can be toggled on and off by pressing the **LIGHT** key. Other features include:

LCD ICON INDICATOR DEFINITION

XMIT:

The **XMIT** icon indicates that unit is transmitting

CHG:
↑ or ↓
(TO THE RIGHT OF A SPEED WINDOW)

The **CHG** icon is used to indicate that the internal battery is being charged
A ↑ or ↓ shown to the right of any of the two 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 two speed windows, will have a direction arrow associated with it. The direction of the ↑ is defined by the table below.

ARROW INDICATOR DEFINITION

MOVING TARGET LANE	DIRECTION	ARROW
OPPOSITE	CLOSING	↓
SAME	AWAY	↑
SAME	CLOSING	↓

STATIONARY TARGET DIRECTION	ARROW
CLOSING	↓
AWAY	↑

Power Modes

The radar has four power modes:

1. Transmit mode - all circuits operating with or without backlight on
2. Standby mode - all circuits operating except the gunn oscillator. Trigger operation will again initiate transmitting. After 10 seconds in Standby mode, the unit will go into Sleep mode only if it is powered by a battery handle.
3. Sleep mode - all circuitry off except the display driver and LCD. Pressing any key except POWER will return the radar to Standby mode. Operating the trigger will place the unit into Transmit mode. After 30 minutes in Sleep mode, the automatic shutdown feature, if enabled, will turn the unit off.
4. Off.

DISPLAY MESSAGES IN THE MESSAGE WINDOW

BATT:	A flashing BATT message indicates a nearly exhausted battery.
MENU:	A MENU message is displayed after the **MENU** key is pressed and indicates that the radar is in MENU mode.
TEST:	A TEST message indicates that a test sequence is in process.
FAWY / RAWY:	Press the **DIRECTION** key to change the stationary target direction. FAWY or RAWY showing in the message window indicates that the radar is set to track targets moving away from the radar.
FCLO / RCLO:	Press the **DIRECTION** key to change the stationary target direction. FCLO or RCLO showing in the message window indicates that the radar is set to track moving targets closing on the radar.
FBTH / RBTH:	Press the **DIRECTION** key for ½ second to change the target direction to simultaneously track both strong and faster closing and away targets. FBTH or RBTH will show in the message window.
FSAM / RSAM:	A FSAM or RSAM message indicates that same-lane moving mode has just been selected.
FOPP / ROPP:	A FOPP or ROPP message indicates that opposite-lane moving mode has just been selected.
	Note: In the five preceding message window items the prefix "F" is used when referring to the front (Fxxx) and the prefix "R" refers to the rearward view (Rxxx).
FEET / MTR	The sequence of messages displayed in Stopwatch mode.
TIME	
MPH / KPH	
LOCK:	A LOCK message indicates that a strong target has been locked. The LOCK message will alternate with the operating mode in the message window.
FLOK:	A FLOK message indicates that a faster target has been locked. The FLOK message will alternate with the operating mode in the message window.
FORK:	A FORK message indicates that the radar is in fork mode. The FORK message will alternate with the operating mode in the message window.

DISPLAY MESSAGES IN THE SPEED WINDOWS

PASS:	A PASS message indicates that a test sequence has been successfully completed.
FAIL:	A FAIL message indicates that a circuit malfunction has been detected, in which case speed readings are inhibited and the unit should be removed from service and repaired. FAIL will remain in the speed windows until reset by being powered off.
V LO:	A V LO message in the Patrol Window indicates the input voltage is too low. Operation is inhibited while the V LO message is displayed.
RFI:	An RFI message in the Target Window indicates the presence of an interfering signal. Operation is inhibited during an RFI indication.

SWITCHES (BOLD MEANS BACKLIT)

1. Trigger (XMIT/HOLD)(In COn mode only, freezes strong, faster, & patrol speed windows on release)
2. **MENU | STA/MOV**
3. **▲ / TEST**
4. **LIGHT / ▼**
5. **LOCK/REL**
6. **BOTH / DIRECTION**
7. **POWER**

All Rear Panel Switches are mechanical and backlit (like the ergonomic remotes)

SWITCH DEFINITION

TRIGGER:

Setup Menu selectable:

1. (COn in OPTIONS MENU) - The trigger is pulled to continuously transmit. A displayed target speed is "frozen" in the stong window when the trigger is released. The faster target and patrol speed windows are also frozen.
2. (SS in OPTIONS MENU) - Start/Stop transmit. Constant transmit is started by a trigger depression and released by another trigger depression.
3. (Loc in OPTIONS MENU) - The trigger is a lock (but not a release) key. Each time the trigger is pressed, the target speed is transferred to the locked speed window, replacing a previously locked speed, if present.

When Loc mode is selected for the trigger, the transmitter is automatically turned on. When COn or SS mode is slected, the transmitter is automatically put into hold.

MENU | STA/MOV:

The **MENU | STA/MOV** key is a dual-function key. Press and hold (for ½ sec) the **MENU** key to enter the OPERATOR MENU. Press the **MENU** key to step between the various options while in the OPERATOR MENU or OPTIONS MENU.

The ▲ and ▼ keys are used with the **MENU** key to change options from the OPERATOR MENU or OPTIONS MENU.

Press the **STA/MOV** key to alternate between stationary and moving modes. A speed or a [ ] in the patrol window along with either OPP or SAME in the message window indicates moving. Different audio tones are used to indicate different Radar Modes. While operating in VSS mode, the radar uses the presence (or absence) of VSS pulses to automatically switch between moving mode and stationary mode.

▲/TEST:

A triple-function key.

The ▲ key is used with the **MENU** key to change options from the OPERATOR MENU or OPTIONS MENU.

The ▲ key is also used in stopwatch mode (along with the ▼ key) to set the length of the measurement distance.

The **TEST** key performs a diagnostic check on the radar. It will complete a display segment test, processor check, memory check, and crystal check. PASS or FAIL is indicated in the message window after all tests have been completed.

Immediately following the Internal Circuit Test (activated with the **TEST** key), the FORK message will be displayed in the message window (alternating with the radar operational mode) for 60 seconds. During this 60-second interval, direction sense operation is disabled allowing conventional tuning fork calibration.

LIGHT/▼:

A triple-function key.

The **LIGHT** key toggles the LCD backlight and the keyboard backlight on and off.

The ▼ key is used with the **MENU** key to change options from the OPERATOR MENU or OPTIONS MENU.

The ▼ key is also used in stopwatch mode (along with the ▲ key) to set the length of the measurement distance.

LOCK/REL:

To LOCK the strongest target speed, press **LOCK/REL** once to transfer the contents of the target speed window to the lock speed window. Press again to RELEASE (clear) the lock speed window.

BOTH / DIRECTION:

The **BOTH / DIRECTION** key is a dual function key. While in stationary mode, press the **BOTH** key for ½ second to select both direction mode. FBTH or RBTH will be displayed in the message window. Both closing stationary targets and away stationary targets may be tracked. To leave both direction mode, press the **BOTH / DIRECTION** key to select stationary closing or stationary away targets.

While in stationary mode, the **DIRECTION** key can be used to toggle between closing stationary targets and away stationary targets. Either FCLO (or RCLO) or FAWY (or RAWY) will be displayed in the message window.

While in moving mode, the **DIRECTION** key can be used to toggle between opposite lane targets and same lane targets. Either FOPP (or ROPP) or FSAM (or RSAM) will be displayed in the message window.

POWER:

Toggles main power ON and Off.

REMOTE CONTROL USE

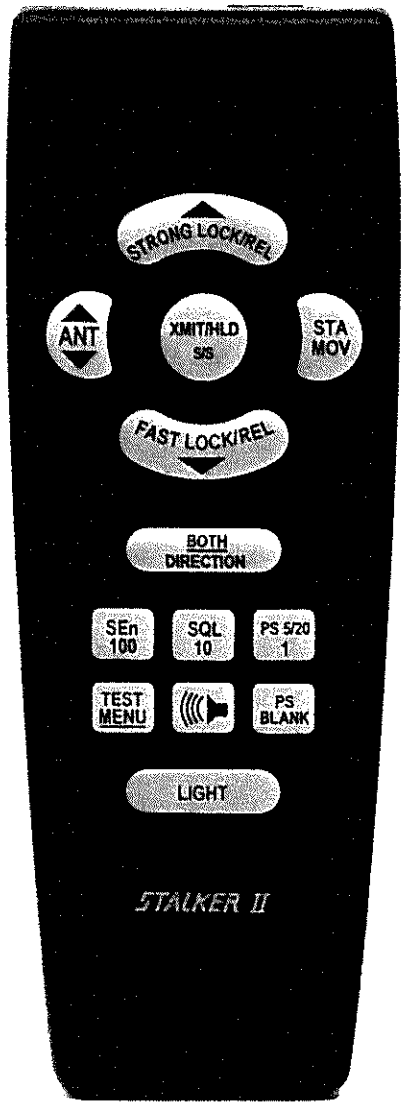


Fig. 1

REMOTE CONTROL KEYS:

▲ | STRONG LOCK/REL:

▲: For menu operations, the ▲ key is used with the **MENU** key to select options from the OPERATOR MENU or OPTIONS MENU. This key also increases the distance variable in Stopwatch mode.

STRONG LOCK/REL: In Radar Mode, the **STRONG LOCK/REL** key alternates between strong 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 LOCK in the message window. Pressing **STRONG LOCK/REL** a second time clears the locked contents of both the lock and the patrol windows.

During lock, LOCK will be displayed (alternating with the operational mode) in the message window. The target window and Doppler audio remain active after locking.

ANT: Select antenna front or rear.

XMIT/HLD or S/S:

XMIT/HLD: The **XMIT/HLD** key toggles between **XMIT** (transmit) and **HLD** (standby). The **XMIT** icon (on the LCD) will illuminate for transmitting and extinguish for hold.

When the unit is put into **XMIT** mode with the remote control, the trigger is automatically put into Loc mode allowing it to lock speeds. When the unit is put into **HLD** mode with the remote control, the trigger mode is automatically returned to its previous setting, CON or SS.

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. Stopwatch Mode is selected in the OPERATOR MENU.

STA/MOV: Press the **STA/MOV** key to alternate between stationary and moving modes. A speed or a | | in the patrol window, along with either FOPP or FSAM (ROPP or RSAM for rear antenna) in the message window, indicates moving mode. When stationary mode is selected, either FCLO, FAWY, or FBTH (RCLO, RAWY, or RBTH for rear antenna) is displayed in the message window. Different audio tones are used to indicate different Radar Modes. While operating in VSS mode, the radar uses the presence (or absence) of VSS pulses to automatically switch between moving mode and stationary mode.

FAST LOCK/REL | ▼:

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 FLOK in the message window. Pressing **FAST LOCK/REL** a second time clears the locked contents of the middle and the patrol windows.

During a fast lock, the FLOK will appear in the message window (alternating with the radar operational mode). The target window and Doppler audio remain active after locking.

▼: The ▼ key is used with the **MENU** key to change options from the OPERATOR MENU or OPTIONS MENU. The ▲ and ▼ keys also adjust the Doppler volume and the Beep volume.

This key also decreases the distance variable in Stopwatch mode.

BOTH/DIRECTION: The **BOTH / DIRECTION** key is a dual-function key.

BOTH : While in stationary mode, press the **BOTH** key for ½ second to select both direction mode. FBTH (RBTH for rear antenna) will be displayed in the message window. Both closing stationary targets and away stationary targets may be tracked. To leave both direction mode, press the **BOTH / DIRECTION** key momentarily and select stationary closing or stationary away targets.

DIRECTION : While in stationary mode, the **DIRECTION** key can be used to toggle between closing stationary targets and away stationary targets. Either FCLO or FAWY (RCLO or RAWY for rear antenna) will be displayed in the message window.

While in moving mode, the **DIRECTION** key can be used to toggle between opposite lane targets and same lane targets. Either FOPP or FSAM (or ROPP or RSAM for rear antenna) will be displayed in the message window.

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 0. The range (or sensitivity) must be set separately for same lane moving mode and opposite lane moving mode. While in each mode, (same lane or opposite lane/stationary), indicated by FSAM or FOPP (RSAM or ROPP for rear antenna) in the message window, set each sensitivity as described above.

100: While in Stopwatch Mode, the **100** key is used to set the 100s digit (in feet or meters) 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.

10: While in Stopwatch Mode, the **10** key is used to set the 10s digit (in feet or meters) 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 two selections for low end patrol speed of either 5 or 20 mph (8 or 32 kph). The first key press shows the current setting in the patrol window and the next press changes the setting. For example: a patrol window indication of 20 starts tracking patrol speed at 20 mph (32 kph), while a patrol window indication of 5 starts tracking patrol speed at 5 mph (8 kph) or less. If the VSS cable is installed, 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 feet or meters) of the length of the speed measurement zone.

TEST / MENU: The **TEST / MENU** key performs a diagnostic check on the radar. It will complete a display segment test, processor check, memory check, and crystal check. PASS or FAIL is indicated in the speed windows after all tests have been completed.

Immediately following the Internal Circuit Test (activated with the **TEST / MENU** key), the FORK message will be displayed in the message window for 60 seconds (alternating with the radar operational mode). During this 60-second interval, direction sense operation is disabled allowing conventional tuning fork calibration.

Press and hold the **TEST / MENU** key to enter the OPERATOR MENU and to step between the various options while in the OPERATOR MENU or OPTIONS MENU.

The ▲ key and the ▼ key are used with the **TEST / MENU** key to change options from the OPERATOR MENU or OPTIONS MENU. The ▲ and ▼ keys also adjust the Doppler volume and the Beep volume.

(Doppler/Beep volume) The key is used with the ▲ and ▼ keys to adjust the Doppler volume and the Beep volume. The first press of the key will display AUd (0, 1, 2, 3, or 4) and the second press will display bEE P (0, 1, 2, or 3). The ▲ key and the ▼ key are used to increase or decrease the volume of each sound. For each attribute, 0 is off and 3 or 4 is maximum volume.

Another means of adjusting the Doppler and Beep volume is pressing the AUd key once.

- Subsequent presses less than one second cycle the Doppler audio through settings 0, 1, 2, 3, and 4.
- A subsequent press longer than one second and shorter than two seconds cycles to the bEE P volume adjustment.
- Subsequent presses less than one second cycle the Beep audio through settings 0, 1, 2, and 3.
- A subsequent press longer than one second and shorter than two seconds cycles back to AUd.

The Doppler volume and Beep volume can also be adjusted from the rear panel of the *STALKER II* by pressing the **MENU** key six or seven times, respectively. The ▲ and ▼ keys are then used to adjust the volume levels as described above.

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 (or fastest speed) and patrol speed are locked. Press **PS BLANK** again to restore the blanked speed.

LIGHT Press the **LIGHT** key to activate the remote control keyboard back light for six (6) seconds.

SETTING UP AND OPERATING THE STALKER II

OPERATOR MENU

The *STALKER II* features an Operator Menu to access some controls and uses either the rear panel keys or the remote control to enter the Operator Menu and to select options. Press and hold the **MENU** key once enters the Operator Menu and displays the first option. Subsequent pressings of the **MENU** key will step through the other options. The ▲ and ▼ keys are used to change the setting of each option. (See Page 5.)

Operator Menu Options — SII Display Unit

Faster Target Display On / Off

Pressing and holding the **MENU** key once initiates the first option in the Operator Menu, turning Faster Target Display On or OFF. (Fig. 2) Press the trigger (or **XMIT/HLD** on the remote control) to exit the Operator Menu.

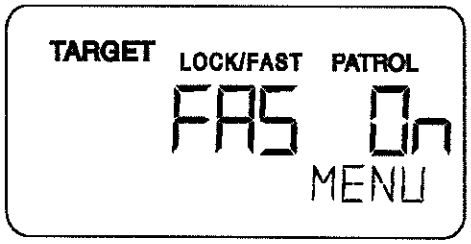


Fig. 2

Opposite Lane Sensitivity (Range) Adjustment

The Opposite Lane sensitivity of *STALKER II* is adjusted by pressing the **MENU** key a second time. The ▲ and ▼ keys then cycle through the five (5) sensitivity levels: SEn 0, SEn 1, SEn 2, SEn 3, and SEn 4 (Fig. 3 shows sensitivity level 4, the factory default setting). In each case, the right-hand display refers to the current sensitivity setting. Sensitivity varies from SEn 0 (0 range) to SEn 4 (maximum range). **The sensitivity must be set for same-lane mode and opposite-lane mode separately.** Press the trigger (or **XMIT/HLD** on the remote control) to exit the Operator Menu.

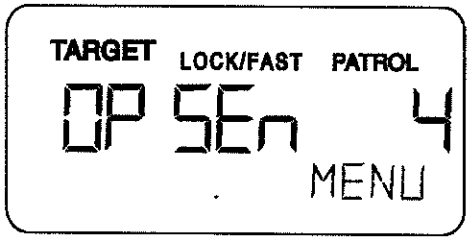


Fig. 3

Same Lane Sensitivity (Range) Adjustment

The Same Lane sensitivity of *STALKER II* is adjusted by pressing the **MENU** key a third time. The ▲ and ▼ keys then cycle through the five (5) sensitivity levels: SEn 0, SEn 1, SEn 2, SEn 3, and SEn 4 (Fig. 4 shows sensitivity level 3, the factory default setting). In each case, the right-hand display refers to the current sensitivity setting. Sensitivity varies from SEn 0 (0 range) to SEn 4 (maximum range). **The sensitivity must be set for same-lane mode and opposite-lane mode separately.** Press the trigger (or **XMIT/HLD** on the remote control) to exit the Operator Menu.

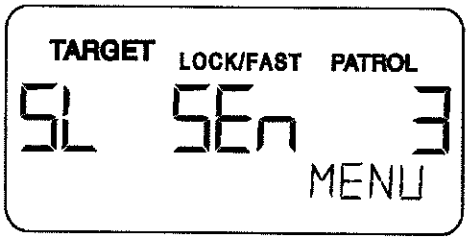


Fig. 4

Low-End Patrol Speed Selection

The Low-End Patrol Speed of *STALKER II* is adjusted by pressing the **MENU** key a fourth time. (Fig. 5) The ▲ and ▼ keys are then used to set the low-end patrol speed. The digits displayed in the patrol window refer to the current low-end patrol speed of either 5 mph (8 kph) or 20 mph (32 kph). Fig. 6 shows a low-end patrol speed of 20 mph (32 kph), the factory default. During VSS operation this function is not required and thus is ignored. Press the trigger (or **XMIT/HLD** on the remote control) to exit the Operator Menu.

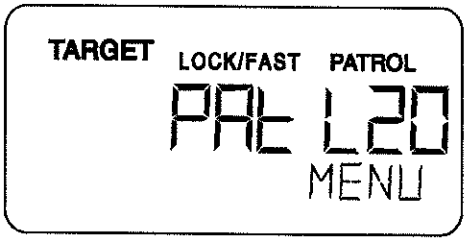


Fig. 5

Audio Squelch ON / OFF

The audio squelch of *STALKER II* is adjusted by pressing the **MENU** key a fifth time. (Fig. 6) The ▲ and ▼ keys toggle the squelch override on and off. In the normal position, audio will be heard only when a target is being tracked. Press the trigger (or **XMIT/HLD** on the remote control) to exit the Operator Menu.

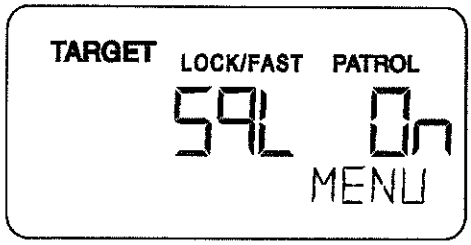


Fig. 6

Doppler Audio

The Doppler audio of *STALKER II* is adjusted by pressing the **MENU** key a sixth time. (Fig. 7) Use the ▲ and ▼ keys to step the display through AUd 0, AUd 1, AUd 2, AUd 3, and AUd 4. AUd 0 is off, AUd 1(Fig. 7) is softest and AUd 4 (Fig. 8) 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 moving mode, *STALKER II* 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.

Press the trigger (or **XMIT/HLD** on the remote control) to exit the Operator Menu.

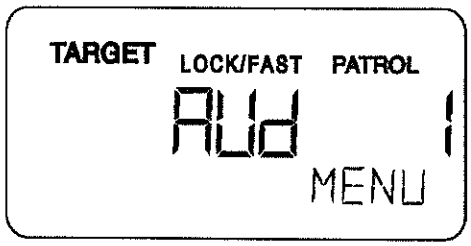


Fig. 7

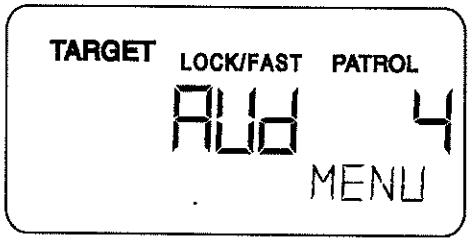


Fig. 8

Beep Tones

The beep tones volume of *STALKER II* is adjusted by pressing the **MENU** key a seventh time. (Fig. 9) Use the ▲ and ▼ keys to step through: 0, 1, 2, and 3. The beep tone is off when set to 0 and loudest when set to 3.

Press the trigger (or **XMIT/HLD** on the remote control) to exit the Operator Menu.

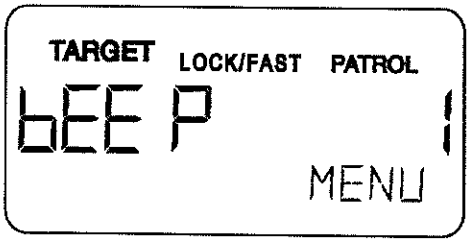


Fig. 9

Stopwatch Mode ON / OFF

The stopwatch mode of *STALKER II* is entered by pressing the **MENU** key an eighth time. The ▲ and ▼ keys are then used to switch between On and OFF. Fig. 10 shows the Stopwatch Mode in its OFF setting, the factory default. Press the trigger (or **XMIT/HLD** on the remote control) to exit the Operator Menu and enter Stopwatch Mode.

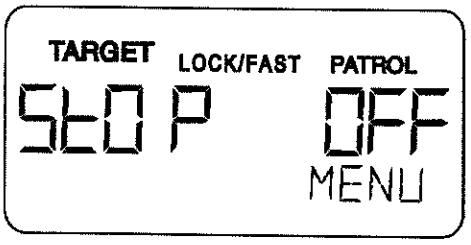


Fig. 10

Adjusting the STALKER II SII Display Unit

Display and Remote Backlighting

The display LCD backlight can be toggled on and off by pressing the rear panel **LIGHT** key.
The remote control key backlight is activated by a single depression of the remote control's **LIGHT** key. This turns the remote control keyboard backlight on for 6 seconds.

Patrol Speed Blanking

After locking the strongest or faster target speed (Fig. 11), the patrol speed window may be "blanked" (Fig. 12) by pressing the
PS BLANK key on the remote control. The **PS BLANK** key can then be used to toggle between the blanked patrol speed window and the locked patrol speed. 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.

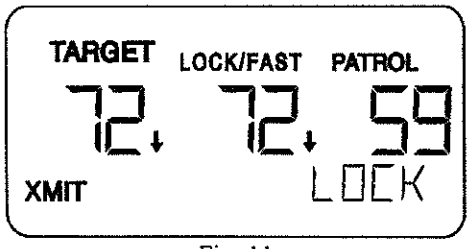


Fig. 11

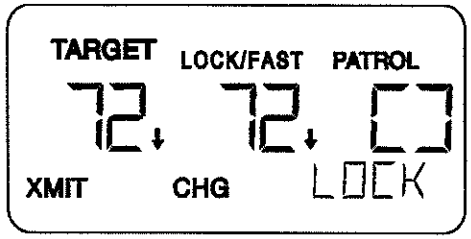


Fig. 12

Software Version

During "Power On", while all segments are illuminated, press the **TEST** key on the radar or remote control to display the installed software version. Fig. 13 indicates that software version 1.0.0 is installed in the MDR. Check with the factory for the availability of an updated software version, if desired.

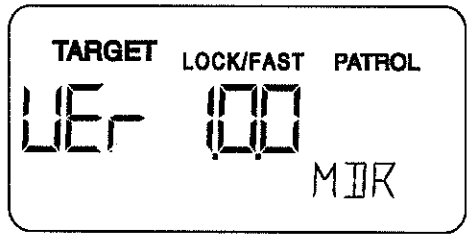


Fig. 13

Transmitter Frequency

Immediately below the software version, the nominal transmitter frequency is displayed (Fig. 14). A transmitter frequency of 34.7 GHz is indicated.

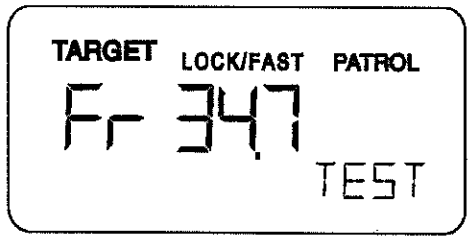


Fig. 14

STATIONARY MODE DIRECTION SETTINGS

Stationary Target Direction — SII Display Unit

Perform the tuning fork test on the radar before using for traffic measurements. *See page 24 for instructions on this procedure.*

In stationary mode, targets closing and moving away can be monitored individually or simultaneously. To activate either target direction, press the **BOTH DIRECTION** key on either the ***STALKER II*** rear panel or remote control. The corresponding direction will illuminate in the Message Window. To activate the both target directions, press and hold the **BOTH DIRECTION** key. FCLO, FAWY, or FBTH (RCLO, RAWY, or RBTH for rear antenna) display icons will be illuminated. Fig. 15 illustrates the Closing target direction as active for the front antenna.

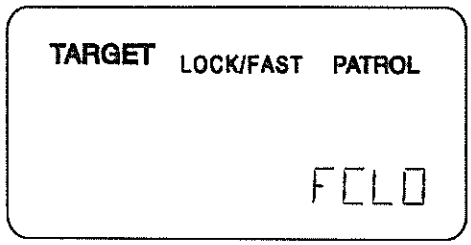


Fig. 15

Fig. 16 illustrates the Away target direction is selected for the front antenna.

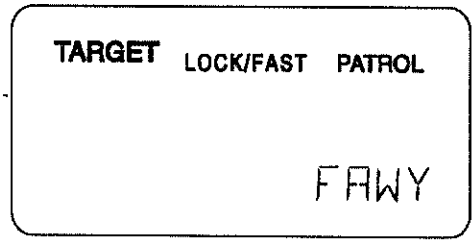


Fig. 16

Fig. 17 illustrates when both Closing and Away target directions are selected for the front antenna.

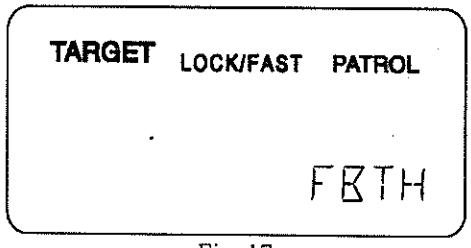


Fig. 17

The ***STALKER II*** can be switched into transmit mode by either pulling the trigger or pressing **XMIT/HOLD** on the remote control. Fig 18 illustrates the ***STALKER II*** in transmit mode. In hold mode, the **XMIT** icon will be off (Fig. 19) and no signal will be transmitted, preventing detection by radar detectors.

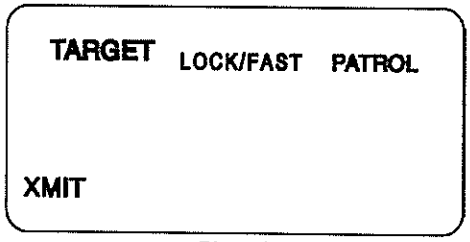


Fig. 18

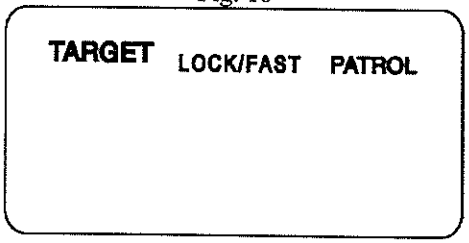


Fig. 19

BOTH-DIRECTION STATIONARY MODE

Having FBTH (RBTH for rear antenna) in the message window indicates that BOTH-DIRECTION stationary mode is selected.

To enter Both-Direction Stationary Mode, Press and hold the **BOTH DIRECTION** key on the ***STALKER II*** or the remote control until FBTH (RBTH for rear antenna) appears in the message window.

While in BOTH-DIRECTION Stationary Mode, pressing the **LK/REL** key will lock or release the target. To exit BOTH-DIRECTION Stationary Mode, press the **DIRECTION** key on the remote, or on the rear panel.

Moving Mode Settings — SII Display Unit

Perform the tuning fork test on the radar before using for traffic measurements. See page 24 for instructions on this procedure.
In moving mode, either the Opposite-Lane or Same-Lane mode can be selected. To select either mode, press the **BOTH DIRECTION** key. FOPP or FSAM (ROPP or RSAM for rear antenna) will be displayed in the message window. Figs. 20 and 21 illustrate the two modes.

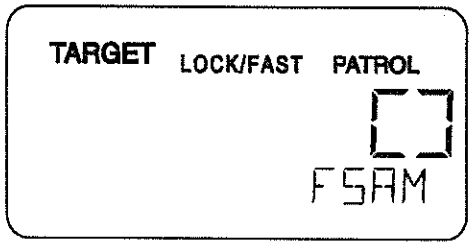


Fig. 20

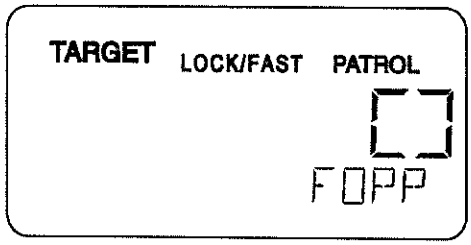


Fig. 21

The ***STALKER II*** displays the **XMIT** icon when transmitting a signal. When in **HOLD**, no signal is transmitted and the **XMIT** icon is not displayed. This prevents detection by radar detectors. In addition, when in hold, ***STALKER II*** 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 95 mph (152 kph), but once acquired, the radar will track patrol speed up to 199 mph (320 kph). The radar can be placed in the HOLD mode at *any* speed and then placed back into **XMIT** at a speed below 95 mph (152 kph) and it will reacquire patrol speed.
NOTE: While operating in VSS mode (see section titled "VSS OPTION" on Page 29) the radar uses the presence (or absence) of VSS pulses to track and acquire patrol speeds from 1-200mph (1-321 kph).

THE HOW AND WHY OF PATROL SPEED SHADOWING

Traditional radar units exclude patrol speed tracking below 20 mph (32 kph). One of the unique features of ***STALKER II*** is that it allows patrol speed tracking below 5 mph (8 kph), when the low-end patrol speed is set to **5**. This feature is very popular and is excellent for enforcing school zones. However, with this setting, ***STALKER II*** 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 30 mph (48 kph) is following a pickup traveling 42 mph (67 kph). The pickup is pulling away from the patrol vehicle at 12 mph (19 kph). The radar, in error, thinks this 12 mph (19 kph) speed is the correct ground speed and displays 12 mph (19 kph) in the patrol window, instead of the correct value of 30 mph (48 kph).

STALKER II 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 5 mph (8 kph) to 20 mph (32 kph) (see Page 13 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.

USING THE STOPWATCH MODE

STALKER II 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 II***. The length (in feet or meters) of the measurement zone must first be entered into the LCD using the ▲ and ▼ keys. The maximum length of the measurement zone is 9999 feet or 9999 meters.

Since the electronic timer is started (by pressing **START/STOP** or the trigger) when the target vehicle enters the measurement zone and stopped (by pressing **START/STOP** or the trigger again) when the target vehicle exits the measurement zone, the time to traverse the measurement zone is measured and displayed on the LCD. After the completion of each start/stop timing interval, the LCD displays the calculated target speed in the patrol window.

Stopwatch Principle

The ***STALKER II*** 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 KPH. The known distance is divided by the measured time and multiplied by a conversion factor to obtain target speed.

Example: 1/2 mile / .8 km (2640 feet / 804 m) of distance over 30 seconds of time = 60 mph (96 kph)

1/4 mile / .4 km (1320 feet / 402 m) of distance over 15 seconds of time = 60 mph (96 kph)

1/4 mile / .4 km (1320 feet / 402 m) of distance over 11.9 seconds of time = 75 mph (120 kph)

The speed (mph) formula is: $\text{mph} = 0.682 \times \frac{\text{Distance (in feet)}}{\text{Time (in seconds)}}$

The speed (kph) formula is: $\text{kph} = 3.6 \times \frac{\text{Distance (in meters)}}{\text{Time (in seconds)}}$

To easily convert feet/sec into mph, there is a 0.682 conversion factor that is used. Multiplying feet/sec by the 0.682 conversion factor will provide speed in miles per hour. To easily convert meters/sec into kph, there is a 3.6 conversion factor that is used. Multiplying meters/sec by the 3.6 conversion factor will provide speed in kilometers per hour.

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** key or the trigger
2. The distance measured
3. The speed of the vehicle

Human error can occur by the operator not pressing the **START/STOP** key or the trigger 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 660 feet (201 m).

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.

Using Stopwatch Mode — SII Display Unit

Stopwatch Mode Operation

1. Enter Stopwatch Mode using either the *STALKER II* rear panel or the remote control. Press and hold the **MENU** key to enter the Setup Mode, and then press the **MENU** key seven more times to get to the Stopwatch menu step. Use the ▲ and ▼ keys to set StO P to On.
   Fig. 23 shows the Stopwatch Mode in its ON setting. Press the trigger to exit Setup Mode and enter Stopwatch Mode (shown in Fig 24). The 1320 feet display will normally be a different number – depending upon its previous setting.
2. Change the measurement zone distance using the ▲ and ▼ keys.
3. While observing the target vehicle traverse the measurement zone, start timing by pressing the **START/STOP** key or trigger once upon entry and stop timing by pressing the **START/STOP** key or trigger again upon exit. Fig. 24a illustrates the timing function in the Stopwatch mode.
4. The computed speed will be computed and shown in the patrol window. Fig. 25 is an example of a 1320-foot measurement zone, an 11.6-second measurement interval, and a 77 mph (124 kph) computed speed.

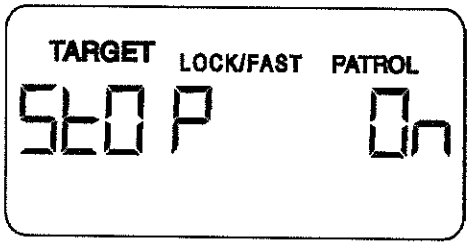


Fig. 23

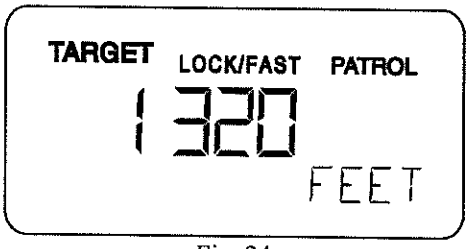


Fig. 24

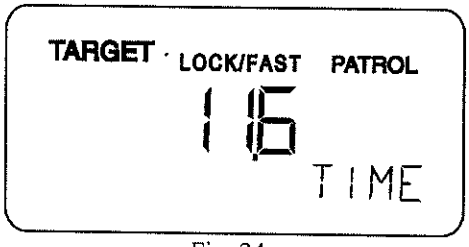


Fig. 24a

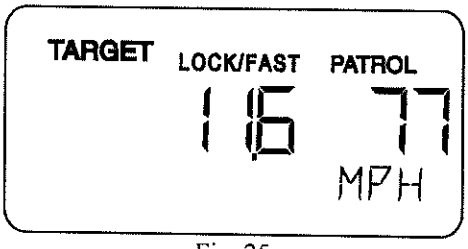


Fig. 25

Exit Stopwatch Mode

To exit Stopwatch mode, press **MENU/STA/MOV** key on the rear panel or the **ANT** or **STA/MOV** keys on the remote. The *STALKER II* will revert to Radar mode again.

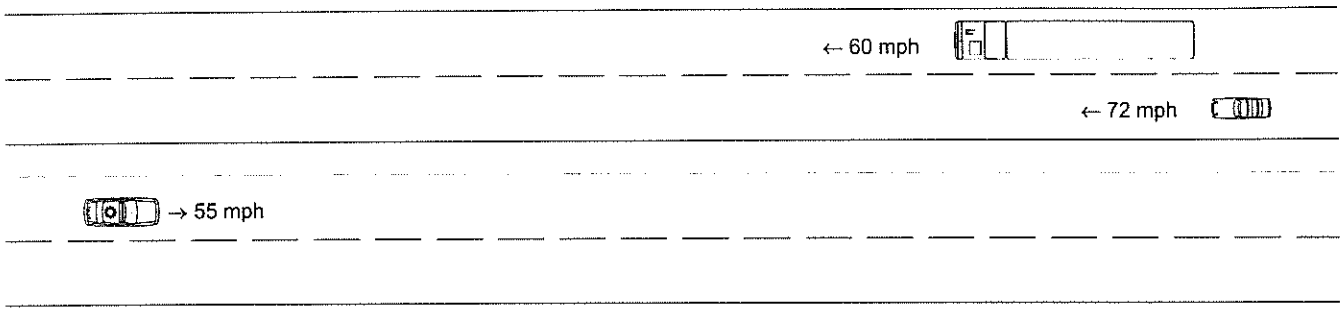
HOW FASTER SPEED TRACKING HELPS THE PATROL OFFICER

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 II*** 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 II*** 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 II simultaneously tracks both targets: however, the target window is always reserved for the strongest target and the *Faster* window is reserved for the *Faster* 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:



A Patrol vehicle is cruising at 55 mph (88 kph). Two opposite lane targets are approaching from the front - a 60 mph (96 kph) truck and a 72 mph (115 kph) sports car behind the truck. The 60 mph (96 kph) strongest out-front target (the truck) appears in the target window and the 72 mph (115 kph) *Faster* target (the sports car) appears in the middle window (Fig. 29). Either the strong target or the *Faster* target can be locked.

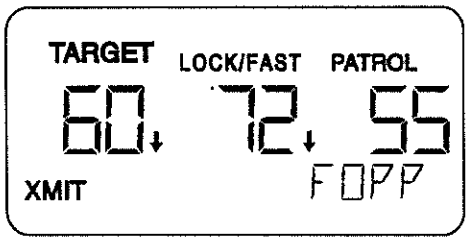


Fig. 29

The 60 mph (96 kph) strongest target can be locked, by pressing the **Strong Lk/Rel** key on the remote. Note how the middle window changes from a *Faster* window to a Lock window. The FOPP message has been replaced by alternating FOPP and LOCK messages. When the Fast Lock option is enabled and a faster target is locked, FOPP and FLOK will alternate in the message window, as in Fig. 30. The middle window is therefore defined by the alternating text (LOCK or FLOK) that appears in the message window.

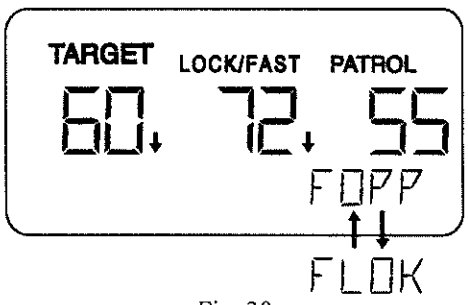


Fig. 30

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 (fused) 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.

HOW TO INITIATE A SELF-TEST

Self Testing Modes — SII Display Unit

Power-On Self-Test

Each time the unit is powered on, an automatic self-test is performed to verify that the unit functions. All displays indicate 8.8.8 (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 20-beep tone. Immediately after power-on, and while all display segments are illuminated, pressing the TEST key will display the software version and operating frequency.

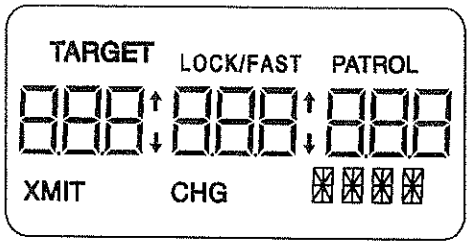


Fig. 34

Internal Circuit Test

An internal circuit test can be performed at any time by pressing the TEST key. This performs a diagnostic check on the radar (Fig. 35).

The unit performs a segment test, processor check, memory check, and crystal accuracy check.

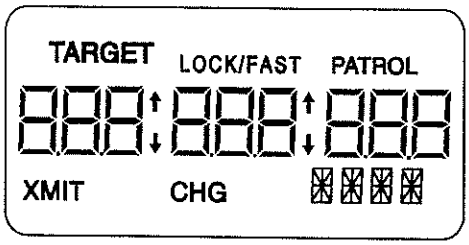


Fig. 35

After all the tests are completed, PASS (Fig. 36) along with a 4-beep "happy" tone indicate successful test completion. FAIL along with a 20-beep tone indicates a failed self-test.

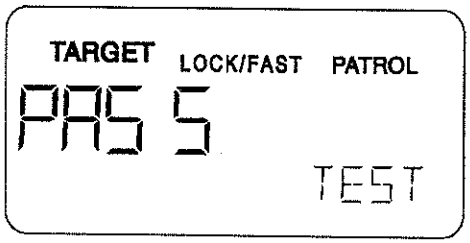


Fig. 36

After PASS is displayed, the radar goes into a 1-minute "fork mode" time interval (Fig. 37) that is used for the tuning fork tests (see Tuning Fork Test Section on Page 24).

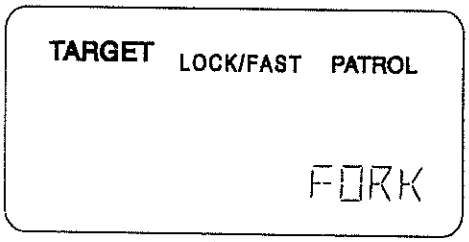


Fig. 37

Automatic Self-Test

An automatic self-test (indicated by a 4-beep "happy" tone) is performed every 14-15 minutes.

Tuning Fork Testing Modes — SII Display Unit

Stationary Mode Tuning Fork Test

The following tuning fork test can only be performed during the 1-minute interval that follows the Internal Circuit Test. Press the **TEST** *key on the* ***STALKER II*** *or remote control and wait for it to cycle through its internal test sequence. The presence of alternating* **FBTH** *and* **FORK** *in the message window indicates that the* ***STALKER II*** *is in stationary tuning fork mode (Fig. 42 and 43).*

Two (2) tuning forks are supplied with ***STALKER II***. The tuning forks are calibrated for 25 mph and 40 mph (40 and 64 kph).

To perform the tuning fork test: Turn the transmitter on with the trigger or remote control, then strike the 25 mph (40 kph) tuning fork against a hard nonmetallic surface, such as the heel of a shoe. Quickly hold the tuning fork approximately two (2) inches in front of the antenna, with the narrow edge of the fork facing the antenna. The target window should indicate 25 ± 1 mph (40 kph) (Fig. 44).

Repeat the above test with the 40 mph (64 kph) tuning fork.

Select the rear antenna, if present, and repeat both tuning fork tests.

To exit tuning fork mode before the 1-minute interval is over, press the **XMIT/HLD** key on the remote control to turn off the transmitter, or press the ***STALKER II*** **MENU** key to enter **MENU** mode and then press the trigger to exit **MENU** mode.

During VSS operation, the **TEST** key allows the **MOV/STA** key (normally disabled during VSS operation) to be used to switch between various stationary and moving modes as required for the tuning fork tests.

Note: *We recommend that the tuning fork test be performed periodically. Some departments perform this test both before and after each citation. Check your department policy.*

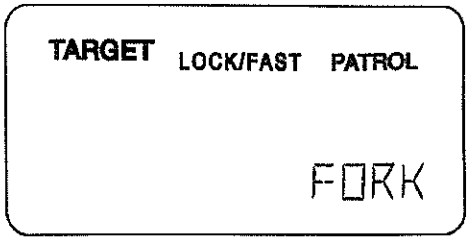


Fig. 42

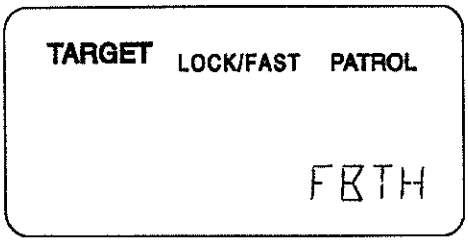


Fig. 43

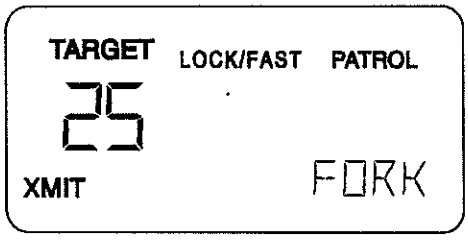


Fig. 44

Opposite-Lane Moving Mode Tuning Fork Test

The following tuning fork test can only be performed during the 1-minute interval that follows the Internal Circuit Test. Press the **TEST** *key on the* ***STALKER II*** *or remote control and wait for it to cycle through its internal test sequence. The presence of alternating* **FOPP** *and* **FORK** *in the message window indicates that the* ***STALKER II*** *is in opposite-lane moving tuning fork mode (Fig. 45 and 46).*

Two (2) tuning forks are supplied with ***STALKER II***. The tuning forks are calibrated for 25 mph and 40 mph (40 and 64 kph).

To perform the tuning fork test: press the **PWR** key, press the **MOV/STA** key and select moving mode, select the FOPP mode with the **DIRECTION** key. Press the **TEST** key and wait for the tuning fork mode following the internal test sequence. Turn the transmitter on with the trigger or remote control, then strike the 25 mph (40 kph) tuning fork against a hard nonmetallic surface, such as the heel of a shoe. Quickly hold the tuning fork approximately two (2) inches in front of the antenna, with the narrow edge of the fork facing the antenna. The patrol window should indicate 25 ± 1 mph (40 kph). Then move the higher speed fork in front of the antenna with the narrow edge facing the antenna. The target window should register 15 mph ± 2 mph (24 kph) (Fig. 47), which is the difference in speed of the two forks. Repeat the above test with the rear antenna selected, if installed.

To exit tuning fork mode before the 1-minute interval is over, press the **XMIT/HLD** key on the remote control to turn off the transmitter, or press the ***STALKER II*** **MENU** key to enter **MENU** mode and then press the trigger to exit **MENU** mode.

During VSS operation, the **TEST** key allows the **MOV/STA** key (normally disabled during VSS operation) to be used to switch between various stationary and moving modes as required for the tuning fork tests.

Note: *We recommend that the tuning fork test be performed periodically. Some departments perform this test both before and after each citation. Check your department policy.*

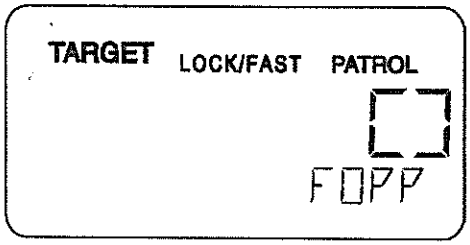


Fig. 45

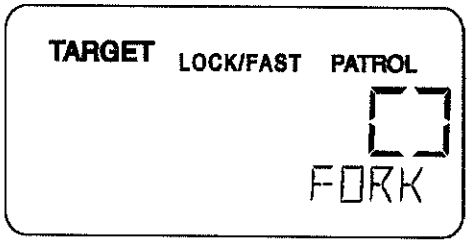


Fig. 46

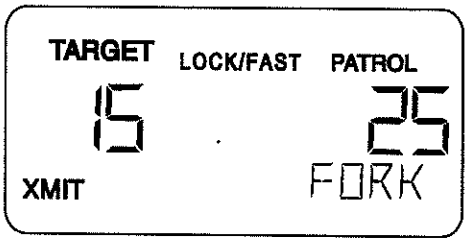


Fig. 47

Same-Lane Moving Mode Tuning Fork Test

The following tuning fork test can only be performed during the 1-minute interval that follows the Internal Circuit Test. Press the **TEST** *key on the* ***STALKER II*** *or remote control and wait for it to cycle through its internal test sequence. The presence of alternating* **FSAM** *and* **FORK** *in the message window indicates that the* ***STALKER II*** *is in same-lane moving tuning fork mode (Fig. 48 and 49).*

Two (2) tuning forks are supplied with ***STALKER II***. The tuning forks are calibrated for 25 mph and 40 mph (40 and 64 kph).

To perform the tuning fork test: press the **PWR** key, press the **MOV/STA** key and select moving mode, select the **FSAM** mode with the **DIRECTION** key. Press the **TEST** key and wait for the tuning fork mode following the internal test sequence. Turn the transmitter on with the trigger or remote control, then strike the 40 mph (64 kph) tuning fork against a hard nonmetallic surface, such as the heel of a shoe. Quickly hold the tuning fork approximately two (2) inches in front of the antenna, with the narrow edge of the fork facing the antenna. The patrol window should indicate 40 ± 1 mph (64 kph). Then move the lower speed fork in front of the antenna with the narrow edge facing the antenna. The target window should register 65 mph ± 2 mph (104 kph) (Fig. 50), which is the sum of speeds of the two forks. Repeat the above test with the rear antenna selected, if installed.

To exit tuning fork mode before the 1-minute interval is over, press the **XMIT/HLD** key on the remote control to turn off the transmitter, or press the ***STALKER II*** **MENU** key to enter **MENU** mode and then press the trigger to exit **MENU** mode.

During VSS operation, the **TEST** key allows the **MOV/STA** key (normally disabled during VSS operation) to be used to switch between various stationary and moving modes as required for the tuning fork tests.

Note: *We recommend that the tuning fork test be performed periodically. Some departments perform this test both before and after each citation. Check your department policy.*

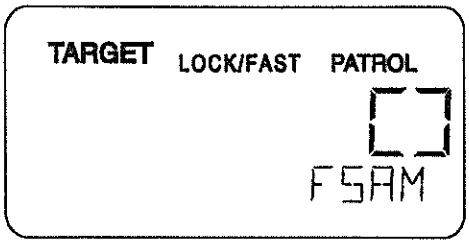


Fig. 48

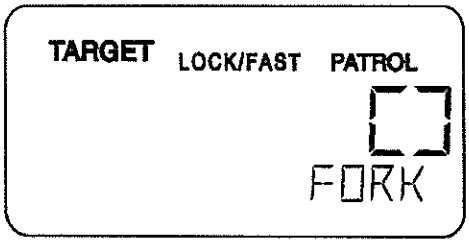


Fig. 49

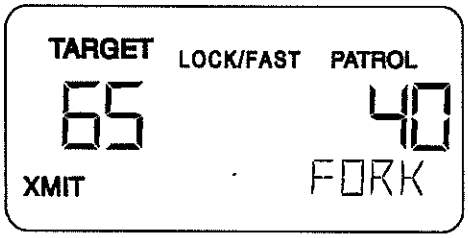


Fig. 50

OPTIONS MENU

The ***STALKER II*** offers several performance characteristics, which can be formatted from the "OPTIONS MENU." Below are some of these features. The factory default, for each setting, is indicated by the bold underlined setting.

Since most of these settings are mandated by department policy, access to these settings is controlled. If you would like to change any of the option settings listed below, please contact Applied Concepts, Inc. at 1-800-***STALKER*** or your Factory Sales Representative to obtain access instructions.

Menu Step	Description	SPEED WINDOWS	Patrol Window (**bold** indicates factory default)
1	Units	Un ı tS	**USA** Int
2	Max Sensitivity	SEn	13, 14, 15, **16**
3	Fast Lock	FAS Loc	**On**, OFF
4	Stationary Low Cutoff	StA Lo	H I, Lo
5	Double Suppression	dbL	0, 1, 2, **3**, 4, 5
6	Lock Options	Loc	**USA**, FLA, OFF
7	Serial Port Speed	bAu	3, 6, 12, 24, 48, **96**, 192, 384
8	Serial Port Format	For	-, EE, EF, **b**, S, F, A, AF
9	Voltage Calibration	CAL	7.5 to 9.2
10	Automatic Shutdown	Aut Sht	**On**, OFF
11	Speaker perceived loudness	SP Aud	Ah ı, **ALo**
12	Audio 0 "ON/OFF"	Aud 0	**On**, OFF
13	Stopwatch Enable	StP En	**On**, OFF
14	Faster Enable	FAS En	**On**, OFF
15	Trigger Operation Mode	tr ı 9	**COn**, SS, LOc

DIRECTIONAL 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. Use the **MOV/STA** key to switch into Stationary mode. (Note: This test cannot be performed with VSS activated.)

TO TEST THE ANTENNA:

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

This test is optional and is not a substitute for the tuning fork test, but is a good overall indication of proper operation of the unit.

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." The simplest way to monitor tire rotation is to attach to the Vehicle Speed Sensor (VSS) signal in the patrol vehicle.

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 II*** 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.

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 (1-321 kph).
- Moving / Stationary selection becomes automatic.
- Weather effects are eliminated.
- Cosine effects are eliminated.
- Low speed combing effects are eliminated.

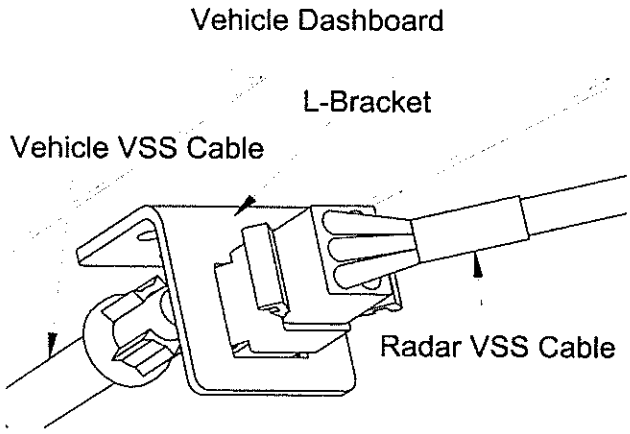
VSS Cable Installation

To take advantage of VSS patrol speed steering, requires two cables that are provided with the VSS Option (VSS Installation Kit PN 200-0670-00).

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 155-2234-00) replaces the conventional cigarette power cable and can be removed from the vehicle with the radar.



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 20 mph (32 kph) (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.

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. (Note: During the 1-minute tuning fork test the VSS is deactivated to allow manual switching from stationary to moving mode.)

Low Speed Speedometer Problems

In some vehicles, the VSS signal is non-existent at speeds below 5-10 mph (8-16 kph) so you may see no change in the car's speedometer reading until the car exceeds 10 mph (16 kph). In these cases, the ***STALKER II*** radar will also not be switched into moving mode until the patrol car exceeds 10 mph (16 kph).

Tuning Fork Tests with VSS

With VSS activated, the radar must be in the TEST mode prior to manually selecting moving mode.

NOTE: During the 1-minute tuning fork test, the VSS is deactivated to allow manual switching from stationary to moving mode.

Patrol Speed Low Cutoff

The 4th Menu option (see page 5) is Patrol Speed Low Cutoff or Lo5, Lo 20. Patrol 5/20 is overridden when VSS is activated.

PS Blank

Patrol Speed Blanking 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.

SPEED RADAR AND THE LAW

FCC Requirements

The Federal Communications Commission requires that all transmitting equipment carry a Grant of Type Acceptance. *STALKER II* 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.

Case Law

Legal precedent has clearly established the accuracy and admissibility of Doppler speed radar evidence. This section on case law is included so the radar operator can familiarize himself with the more important legal cases involving the use of Doppler speed radar, and be aware of the guidelines concerning admissibility established by these cases. Much of the referenced material may be obtained at your local law library or prosecutor's office.

Reference A -- State v. Dantonio (N.J.), 115 A2d 35, 49 ALR 2d 460: The landmark case on the use of traffic radar. This case sets precedent of the following:

1. Judicial notice has been taken of accuracy of radar.
2. A few hours training is sufficient to qualify an operator.
3. The operator need not understand or be able to explain internal workings of the radar.

Reference B -- Everight v. Little Rock, (Ark.), 326 SW2d 796: Establishes that the court may take judicial notice of the reliability of radar.

Reference C -- State v. Graham (Mo.), 322 SW2d 188: Establishes that the court may take judicial notice of the ability of radar to measure speed.

Reference D -- State v. Tomanelli (Conn.), 216 A2d 625: Reviews the matter of judicial notice; recognizes the ability of Doppler radar to measure the speed of a motor vehicle; and acknowledges that the tuning fork is a reliable accuracy test.

Reference E -- Honeycut v. Commonwealth (Ky.), 408 SW2d 421: In this appeal, the court rejects, one by one, the arguments of the appellant that the evidence should not have been admitted; and again establishes the following:
(1) A properly constructed, and operated radar device is capable of measuring accurately the speed of a motor vehicle.
(2) The tuning fork test is an accurate method of determining accuracy of the radar. (3) It is sufficient to qualify an operator that has such knowledge, and training that enables him to properly set up, test, and read the radar. (4) The operator is not required to understand the scientific principles of radar, nor explain its inner workings; in addition, the operator may be qualified to operate the radar after receiving a few hours of instruction. (5) The officer's estimate of excessive speed, from visual observation, when confirmed by the reading of the radar device and when the offending vehicle is out-front, by itself, nearest the unit, is sufficient to identify the vehicle, if the officer's visual observations support the radar evidence.

Reference F -- People of the State of Michigan v. Zolton Anton Ferency, 133 Mich.App. 526, 351 N.W. 2d 225 (1984)
- Judicial notice of the Doppler Principle. (Moving Radar).
- Officers are not required to present scientific evidence.
- Seven guidelines established for moving radar:

1. Adequate officer training and experience.
2. Radar in proper working condition and installed properly at the time of citation.
3. Radar was used in an area with a minimum of distortion.
4. Patrol speed is displayed and independently verified by speedometer.
5. Testing of unit at the beginning and end of the shift.
6. Officer must be able to establish that the target vehicle was within the beam width.
   Lead vehicle theory dismissed
7. Technician certification of the radar.

From the case law above, a successful prosecution may depend on the officer's ability to testify to the following points:

1. The qualifications and training of the officer.
2. The time, place, and location of the radar device at the time the offense occurred.
3. The location of the offending vehicle at the time the offense occurred.
4. The identification of the offending person as the operator of the vehicle.
5. The identification of the offending person's vehicle.
6. The visual observation of its apparent, excessive speed.

IS MICROWAVE RADIATION DANGEROUS?

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 II MICROWAVE EMISSIONS

The ***STALKER II*** 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 ***STALKER II*** 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 ***STALKER II***. 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 ***STALKER II*** to preserve the life and usefulness of the equipment.

TROUBLESHOOTING

POWER ***button 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 ***STALKER II*** cigarette-plug.

Low or no speaker volume

Press the **VOLUME** key on the remote control to adjust the volume. Aud 1 (lowest level) to Aud 4 (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 13.

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 18.*

Through the Operator Setup Menu, change the low-end patrol speed from 5 mph (8 kph) to 20 mph (32 kph), thus preventing patrol speed tracking below 20 mph (32 kph). It is not possible to allow patrol speed tracking below 20 mph (32 kph) and to eliminate patrol speed shadowing simultaneously. *See Low-End Patrol Speed Selection on Page 13. Install VSS. See page 29.*

Radar will not lock onto patrol speeds below 20 mph (32 kph)

Through the Operator Setup Menu, change the low-end patrol speed from 20 mph (32 kph) to 5 mph (8 kph). *See Low-End Patrol Speed Selection on Page 13.* 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 radar higher above the dash and/or point it 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 5 to 30 mph (8-48 kph) in stationary mode

Check for proper aiming of radar. Make sure that the paint/mask or metallic objects are not deflecting the radar beam down into defroster vents. If so, raise radar above obstruction. *See Fan Noise on Page 34.*

Radar displays U Lo ***(low voltage)***

Make sure the cigarette-plug is securely installed and the contacts are clean (and/or the battery is fully charged).

AVOIDING FAN NOISE

As you will discover, the ***STALKER II*** that you have purchased is extremely sensitive resulting in longer range. If care is not taken when installing the radar in the vehicle, this extra sensitivity may allow you to pick up Fan Noise when operating the radar from inside the patrol vehicle. Fan Noise can result in erroneous high-speed readings when operating in Same Lane mode – particularly with Same Lane Fastest mode enabled.

Fan Noise Is Common

Fan Noise is a common Doppler radar problem when aiming the antenna through a window from inside the patrol vehicle. Doppler radar is designed to detect moving or vibrating objects. A small amount of the radar beam is reflected from the glass back into the vehicle. This beam reflection may allow the radar to "see" the vibrating defroster vents or the vehicle dash that is vibrating as a result of the fan blower motor. If the radar is mounted close to the top surface of the vehicle dash, the radar beam can "see" a portion of the vehicle dash that is vibrating. Higher mounting will also result in better patrol speed tracking and longer operational range. Fan Noise can be verified by turning off or changing the speed of the fan.

How to check for Fan noise:

1. Operate the ***STALKER II*** in **XMIT** mode, BOTH Stationary, and SEn 4.
2. Turn your vehicle fan motor to the "highest" speed.
3. Locate your stationary vehicle so that the radar beam is clear of moving objects or large reflective objects.
4. Fan Noise can be verified by turning off or changing the speed of the fan.
5. Verify that no speed readings are observed – realize that moving trees or grass can result in speed readings corresponding to the speed of the wind.
6. Move the radar (as required) until a location is found that results in no Fan Noise readings above about 4 mph (6 kph) – a high corner of the windshield is usually best.

To Eliminate Fan Noise, try the following steps in numerical order:

1. Find a location (by moving the radar) inside the vehicle that is free of Fan Noise.
2. Ensure 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 obstruct the antenna on the dash.
3. Locate the radar as close to the glass surface 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 (48 kph) or Same Lane mode – especially with Same-Lane Fastest mode enabled.

As a last resort, turn Same Lane sensitivity from 4 down to 3 (SEn 3).

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 two (2) years from the date of purchase.

Manufacturer warrants the battery handle to the original purchaser to be free of defects. At its discretion, the manufacturer agrees to repair or replace the battery handle if it fails due to defective materials or workmanship for a period of six (6) months 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 country. For the Service Center nearest you, call the factory at 1-800-***STALKER*** (1-800-782-5537).