

PROFESSIONAL SPORTS RADAR



*OWNERS
MANUAL*

Radically Advancing the State of the Art

Not intended for Law Enforcement use.

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STALKER

PROFESSIONAL SPORTS RADAR

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The Best Sports Radar Money Can Buy

INTRODUCTION


Congratulations! You have purchased the finest, high performance radar gun available. The STALKER Professional Sports Radar is the ultimate sports radar because it is based entirely on Digital Signal Processing (DSP). This gives it substantially greater performance with many more features than any other radar gun ever manufactured. The STALKER has been designed to be capable of clocking almost any type of object and it has many unique features to make it easy to operate in any application.

Reading this owners manual will help you to take full advantage of the many features and capabilities of the STALKER.

QUICK START INSTRUCTIONS

A BRIEF OVERVIEW


1. Slide the battery handle onto the bottom of the radar gun until it locks into place.


 2. Depress the green Power key to turn the gun on.
3. The display should first illuminate all of the icons and digits for a few seconds.


4. The test key begins the STALKER's self diagnostic and calibration test. It should display PASS (not FAIL) and 80.0 mph.



5. Position the radar gun in the line of travel of the object you wish to clock. Radar will only provide accurate readings when clocking targets coming directly at or away from the radar

6. To begin operation (transmitting), squeeze the trigger or  press the X-Mit / Hold key for continuous transmitting. Notice the XMIT icon shows if the gun is in the transmitting mode.

 Use the trigger to lock the speed reading when the in the constant-transmit mode.

7. If desired, use the Peak Hold key to have the highest speeds automatically held on the upper display. The PEAK  icon will be displayed if the gun is in the peak mode.

8. Read the Detailed Operating Instructions for a full explanation of all of the features and settings of the STALKER.

REVISED KEYPAD AND PROGRAM

There has been a revision to the Stalker Professional Sport Radar's keypad and internal programming. The new keypad is designed to be easier to operate and understand.

THE NEW KEYPAD

Setup Menu - adjusts the lowest and highest speed ranges to display. Also runs a new ball and carnival processing program to improve performance

Range - adjusts the level of sensitivity Hi or Lo

X-Mit Hold - toggles the transmitter on or off (used for transmitting continuously).

Recall Speed - recalls previous speeds on both displays

The Setup Menu allows the operator to select different speed ranges and DSP programming to "fine tune" the Stalker's performance for different applications. There are 16 menu options:

H140 - Lo 0	H300 - Lo 0	ball - Lo 10	tenn - Lo 50
H140 - Lo 5	H300 - Lo 5	ball - Lo 20	
H140 - Lo 15	H300 - Lo 15	ball - Lo 30	
H140 - Lo 25	H300 - Lo 25	ball - Lo 40	
H140 - Lo 50	H300 - Lo 50	ball - Lo 50	

The upper number is the high speed cutoff. (High 300 or High 140 MPH)
 The lower number is the low speed cutoff. (Lo from 0 to 50 MPH)
 The ball mode has a 110 MPH high speed cutoff and activates a special program to help track baseball targets.

See the inside back cover for more information on the Setup Menu.

The Range Control adjusts the sensitivity (clocking distance) of the radar gun. **Hi is the recommended setting for nearly all applications.** Only choose LO for carnival use, or if there is some interference that can be eliminated with the LO setting.

Units - switches between MPH, KPH, or Knots, whole or tenth increments

Auto Clear - controls how many seconds (0 to 4) the display holds the readings

Peak Mode - activates

high speed lock display window

Power - turns gun on or off

Self Test - activates diagnostic mode and checks the calibration



DETAILED OPERATING INSTRUCTIONS

OPERATING MODES

There are two ways to make the STALKER operate.



1. **Trigger Transmitting Mode.**

Squeeze trigger to transmit.



2. **Continuous Transmitting Mode.**

Press XMIT key to transmit.

The HOLD indicator will be displayed when the gun is not running and the XMIT indicator will be displayed when the gun is transmitting. Since STALKER draws about 10 times more current when transmitting, the trigger transmitting mode is best for conserving battery life. Continuous transmitting mode is good for fully automatic operation, or tripod operation, requiring no additional input from the operator.

DISPLAY MODES



Peak Mode (*Automatic Highest Speed Lock*):

The peak key will activate the peak mode. When the peak mode is activated, the upper display will automatically hold the highest recorded speed. When clocking baseballs, this will allow STALKER to hold the release speed (as it leaves the pitchers hand) while the lower display clocks the ball as it slows down on its way to the plate. The lower display will always show current (updated) speeds.



Read-Thru-Lock Mode:

This mode is for locking a speed taken at an exact moment in time, making it ideal



for drag racers. To operate in this mode, the peak mode

must be turned off, and the XMIT key pressed for



continuous transmitting. Squeeze the trigger as the

vehicle crosses the finish line. The exact speed will be

locked on the upper display yet the gun will continue to clock on the lower display.

SETTINGS



Auto Clear: The auto clearing function causes the speed readings to be automatically erased after the target is no longer present. The time to clearing can be set from 0 - 4 seconds. The auto clear will only clear readings while the gun is transmitting which means it will not clear readings if the trigger is released or the transmitter is shut off. As the Auto Clear key is pressed, the upper display will toggle through 6 different settings; OFF, 0SEC, 1SEC, 2SEC, 3SEC, and 4SEC. The AUTO CLEAR icon indicates it will automatically clear. Toggling the auto clear to off (the icon will blank) will keep the displayed speeds on the readout until they are manually



cleared using the trigger. (Note: The RECALL key will redisplay both speed readings whether they were cleared manually or automatically.)



Units: The STALKER can display speeds in 3 different units of measurement and two different resolutions. Pressing the Unit key will toggle through whole or tenths in Miles per Hour, Kilometers per Hour, or Knots per Hour. One of the three icons on the right side will indicate which unit of measurement, and the decimal point on the lower display will indicate it is in the tenth resolution.

When the STALKER is displaying in the one tenths resolution, it takes additional time to ensure an accurate reading to that resolution. This means it will not update the display as quickly or lock onto new readings as quickly as it does in the whole number resolution. In tenths, the STALKER takes about 0.04 seconds to lock-on and it updates about 30 times per second. In the whole resolution, it takes only 0.01 seconds to lock-on, and it updates about 100 times each second. Keep in mind that even in tenths, the STALKER is substantially faster than conventional guns.

TESTING

TEST

Internal Test: The Test key activates the STALKER's self-diagnostic test mode.

The internal computer will check all critical circuits and functions and display either a PASS or FAIL in the upper display. It also



checks calibration. The lower display should read 80.0 mph. A reading of 80.0 mph means the STALKER is perfectly calibrated and it will be accurate throughout the entire speed range. Should your STALKER read any other speed or display FAIL, see the service instructions at the end of this manual.

Tuning Fork Test: The tuning fork is the method of testing operation and calibration of the STALKER microwave assembly. Strike the tuning fork against a solid, non-metallic object so it audibly rings. Place the ringing fork about two inches past the end of the STALKER and squeeze the trigger (or press XMIT). The STALKER should display the speed that the fork is stamped.

XMIT
HOLD

The tuning fork may not produce an exact reading to a tenth mile per hour every time like the internal test, however the tuning fork does verify that the STALKER is successfully reading a return signal.

The fork may produce a peak reading higher than the stamped speed, due to some distortion. The main (or lower) display may fluctuate several tenths, and different fork temperatures will vary the readings several tenths of a mile per hour.

BATTERY INFORMATION

The STALKER battery handle contains a 1.5 Amp-Hour Nickel-Cadmium (Ni-Cad) cell or a 2.7 Amp-Hour Nickel-Metal Hydride (NiMH) cell, both producing 7.5 volts. The run time varies between the different operating modes.

	Ni-Cad	NiMH
Continuous Transmitting	2 - 3 Hours	4 - 6 Hours
Typical Trigger Operation	4 - 20 Hours	8 - 35+ Hours
In Sleep Mode	38 Hours	>60 Hours

When the battery runs low, the LOW VOLT icon will begin to flash. The STALKER will still operate for a short time after the icon flashes.

When the LOW VOLT icon is con-

tinuously displayed, the STALKER will not operate. Anytime after the LOW VOLT icon appears, the battery handle can be charged.



****WARNING** Never charge a NiCad battery handle until the gun is reading LOW VOLT. Charging any Ni-Cad battery when it is only partially discharged will result in damage to the battery which will substantially decrease the battery performance.**

On the other hand, NiMH batteries can be charged when only partially discharged with no danger.

CHARGING INFORMATION

After the STALKER indicates the battery handle is low, remove the handle from the gun and slide it into the Smart Charger Platform. Plug the wall adapter into the platform and into a 110 volt AC outlet. Depress the START button to begin full charge. After the battery is fully charged, the green light will shut off and the charger will drop to a trickle charge. This should take about 6 hours. The handle can be left on a trickle charge without damage. Ni-Cad batteries should always be fully discharged and then fully recharged to operate properly.

COMMON ERRORS WITH RADAR

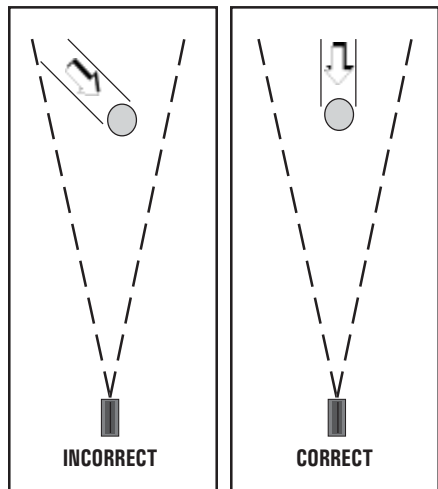
ANGLE ERROR (COSINE ERROR)

The most common mistake made with all radar guns is trying to clock targets at angles. All radar guns work on the Doppler principle and need to clock objects moving directly at or away from the gun. Clocking at an angle with a stationary radar will result in angle error, and the gun will display a speed that is LOWER than the actual speed. Below is a chart to determine how much angle error is caused at different angles.

	0 degrees	5 degrees	10 degrees	15 degrees	30 degrees	45 degrees	90 degrees
% Error	0 %	0.4 %	1.5 %	3.4 %	13.4 %	29.3 %	100 %
25 mph	25.0 mph	24.9 mph	24.6 mph	24.1 mph	21.7 mph	17.7 mph	0 mph
50 mph	50.0 mph	49.8 mph	49.2 mph	48.3 mph	43.3 mph	35.4 mph	0 mph
75 mph	75.0 mph	74.7 mph	73.9 mph	72.4 mph	65.0 mph	53.0 mph	0 mph
100 mph	100.0 mph	99.6 mph	98.5 mph	96.6 mph	86.6 mph	70.7 mph	0 mph
125 mph	125.0 mph	124.5 mph	123.1 mph	120.7 mph	108.3 mph	88.4 mph	0 mph
150 mph	150.0 mph	149.4 mph	147.7 mph	144.9 mph	129.9 mph	106.1 mph	0 mph
200 mph	200.0 mph	199.2 mph	197.0 mph	193.2 mph <td 173.2 mph	141.4 mph	0 mph	
300 mph	300.0 mph	298.9 mph	295.4 mph	289.8 mph	259.8 mph	212.1 mph	0 mph

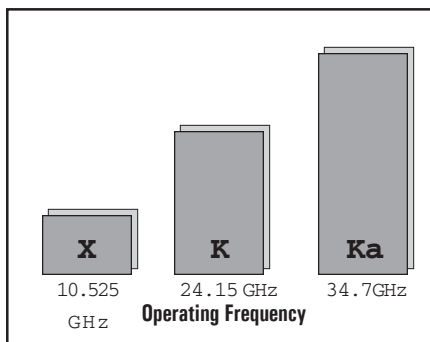
CALCULATING SPEEDS

If you know the angle that you are clocking, you can calculate the actual speed by taking the radar reading and dividing that by the cosine of the angle. Example: if you are clocking at 30 degrees and the gun displays a speed of 129.9 mph; take the 129.9 mph and divide by the cosine of 30 degrees (0.866) to get 150.0 mph.



INTERFERENCE ERRORS

The STALKER Professional Sports Radar operates at a very high frequency of 34.7 GHz, known as Ka band. Conventional radar guns operate at either X band (10.525 GHz) or K band (24.150 GHz). In the Ka band there are fewer other transmitter devices licensed which means STALKER has fewer sources of radio frequency interference. There are however, still some types of sources that can cause "ghost" readings.



Interference Types: The two main types of sources to cause ghost readings are electrical devices and objects in motion. Electrical sources include television monitors, fluorescent lights, some radio transmitters and power transformers. Objects that move, spin, or vibrate can also produce a reading; like ventilation fans, motors, and rain or blowing dust.

Ways to Eliminate Interference: If you are experiencing some random readings, you can change your position to affect where the gun is aimed. You can lower the sensitivity setting. And, if the random reading is a lower speed, and your target being clocked is higher, you can adjust the low speed cutoff up to 25 or 50 mph which will completely eliminate all readings below the set speed.

Shielded Version STALKER: The advanced design of the STALKER should be able to work in very high interference environments, however if you cannot eliminate readings in some applications, a special version of the STALKER is available with a fully shielded metal coated case, with RFI detection circuitry. See a current price list for the additional cost of this version.

OPERATING TIPS

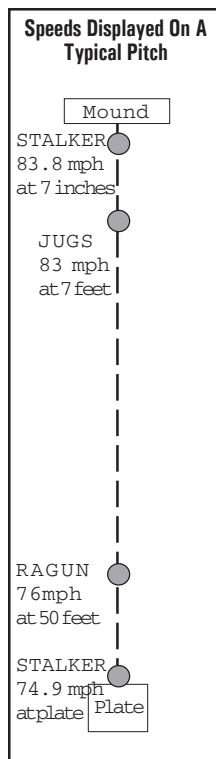
BASEBALL APPLICATION

Many of the features on the STALKER were designed with baseball applications in mind. The **Low Speed Cutoff** should be set at 10, 20, 30, 40, or 50 mph. Most importantly is the **Peak Mode**. When running the STALKER in the Peak Mode, it will display two separate readings for each pitch. The peak display will hold the ball speed as it leaves the pitchers hand. And, the lower display will hold the actual ending plate speed.

Many are familiar with the Decatur Ragun and the JUGS Gun and how they read on pitches. The reason different radar guns read different speeds is because they are taking readings at different places during the pitch. **Target Acquisition Time** is what determines how quickly a radar can lock onto a target speed. The JUGS Gun responds relatively quick, taking the ball speed at about 7 feet after release.

The Decatur Ragun responds very slowly, taking it's reading between 30 and 50 feet after release. With the STALKER's extremely fast target acquisition, it can get the ball speed at about 7 inches, displaying that speed in the peak display and then freezing the true ending plate speed on the lower display. In the future, all pitchers will be evaluated on the true release and plate speeds that only the STALKER can measure.

A fast ball may only slow down 4 mph, where a change up could slow as much as 12 mph. Pitchers can use the dual displays to learn which techniques vary the ball speed the most.

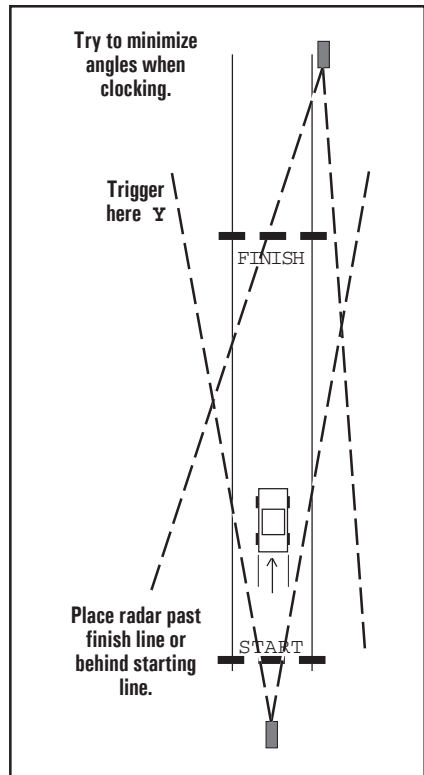


DRAG RACING

TRAP SPEEDS for Performance Tuning: One of the best ways to measure increases in engine performance is to set up an acceleration run and measure the finish line speeds. Changes in horsepower will be demonstrated by the trap speeds.

STALKER has a Read-Thru-Lock Mode which is perfect for this type of testing. To activate this mode (detailed on page 7), make sure the Peak Mode is OFF, and the gun is continuously transmitting. The trigger will lock speed readings into the upper display while the lower display continues to track the speeds. You may want to trigger the gun at 500 feet, check that speed, and then retrigger at the finish line. This gives you two places to compare speeds. The first comparison indicates the quality of the start, and the second measurement indicates the change in horsepower.

Placement of the radar gun is very important. You want to be able to clock the target with a minimum of angle error. When clocking the vehicle, the gun should be able to remain in the same direction. If you are positioned correctly, you will not have to pan with the radar to keep the vehicle in the beam. STALKER's unusually long range is a great benefit because the gun can be placed well past the finish or even behind the starting line, and still clock the vehicle during the entire run.



ACCESSORIES

AVAILABLE OPTIONS

Extra Battery Handles - Highly recommended for convenient charging and as a backup for extended operation.

Corded 12VDC Handle - Plugs into a cigarette lighter for continuous operation.

Corded Interface Handle - Includes an output driver for communicating to the remote display boards or to a computer.

RS-232 Format Assembly - Converts the data output from the interface handle to RS-232 format for easy computer interfacing.

IBM Graphing Software - Graphs acceleration runs for the ultimate in testing.

Giant AC Display Board - Available in 2, 3, and 4 digit versions. The 3 digit board has a switchable decimal for tenth resolutions.

Shielded Extension Cables - For both displays, available in 20 and 90 foot lengths.

Genuine STALKER Soft Case - A superb compact custom padded bag with pockets for handles, charger, fork, and gun.

Portable 12VDC Battery Pack - Runs gun for over 16 hours of continuous transmitting.

AC Power Supply with Lighter Socket - For continuous operation from a wall outlet.

Tripod Mounting Cradle - Easily attaches to any camera tripod for secure mounting.

Quality Tripod - Includes a quick release top for simple setup.

Shielded Metal Case Housing - This is a separate version of the Stalker for high interference applications.



Corded Interface



Giant AC Display



AC Power Supply



Tripod Mounting Cradle

SERVICE INFORMATION

CHECKLIST BEFORE SERVICING A STALKER

Check Settings: Should you have a problem with the STALKER, first read through the settings portion of this manual to make sure your problem is not simply having the STALKER setup improperly.

Check Battery: If the STALKER is not turning on, the problem is most likely the battery. Try charging the battery, then retry the STALKER. If it still will not turn on, contact Stalker Radar to replace the battery handle.

Internal Test Failure: If the STALKER displays FAIL or a number other than 80.0 mph on the self-test, it most likely needs to be factory serviced. In that event contact Applied Concepts Customer Service for service instructions.

If Factory Service is Required:

Applied Concepts (Stalker Radar)
2609 Technology Drive
Plano, Texas 75081
972-398-3760
972-398-3781 Fax

Warranty Information: The STALKER Professional Sports Radar is covered for 3 Years against defects or failures by ACI. (The battery handle is covered for 90 Days)

SPECIFICATIONS

STALKER

PROFESSIONAL SPORTS RADAR

PERFORMANCE SPECIFICATONS

Speed Range

1 to 300 MPH
1 to 480 KPH
1 to 260 Knots

Accuracy: +/- 0.1 MPH

Target Acquisition Time:

0.01Seconds in Whole Digits
0.04Seconds in Tenth Digits

Update or Sample Rate: (Approximate)

100 per Second in Whole Digits
30 per Second in Tenth Digits

Maximum Estimated Clocking Distances:

Semi Truck - 10,000 Feet
Automobile - 6000 Feet
Motorcycle - 4000 Feet
Boat - 3500 Feet
Personal Watercraft - 2500 Feet
Model Plane - 1000 Feet
Baseball - 300 Feet

(All distances are under ideal conditions, typical clocking distances may vary)

MICROWAVE SPECIFICATIONS

Operating Frequency: 34.7 GHz (Ka Band)

Antenna: Built-In Dual Rectangular Horn

Polarization: Vertical

3db Beamwidth: 9 Degrees Nominal

Microwave Source: Gunn-Effect Diode

Receiver Type: Direct Conversion Homodyne

Using Low-Noise Schottky Barrier Mixer Diode

Power Output:

10 Milliwatt Minimum
25 Milliwatt Nominal
60 Milliwatt Maximum

Power Density: 3 mw/cm² @ 10 cm

GENERAL SPECIFICATIONS

Type: Handheld Stationary Doppler Radar

Processor: Motorola 100K Digital Processor

Display: Backlighted Liquid Crystal

Electrical Specifications For Battery Handle:
7.5 VDC (6.6 - 9.0 VDC)

Electrical Specifications for Corded Handle:
13.8 VDC (9.0 - 16.0 VDC)

Current Requirements At 7.5 VDC (Battery):

Transmitting - 0.66 Amp

Standby - 0.20 Amp

Sleep Mode - 0.04 Amp

Current Requirements at 13.8 VDC (Corded)

Transmitting - 0.40 Amp

Standby - 0.12 Amp

Sleep Mode - 0.03 Amp

Operating Temperature: (90% Rel. Humidity)
-20F to +120F

PHYSICAL SPECIFICATIONS

Weight: 3 lbs 3 oz Including Battery Handle

Height: 9.25 Inches Including Handle

Length: 10.2 Inches

Width: 3.5 Inches

Case: High Impact Polycarbonate

Battery: 1.5 Ah Nickel-Cadmium (Ni-Cad)

2.7 Ah Nickel-Metal Hydride (NiMH)

Mounting Cradle: Extruded Aluminum

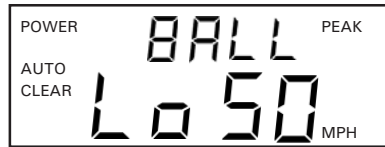
WARRANTY INFORMATION

Warranty On Gun: 3 Years Part and Labor

Warranty On Battery: 90 Days Replacement

All Specifications Are Subject to Change Without Notice.

SETUP MENU OPTIONS



Hi and Lo Speed Cutoffs - The upper display indicates the highest speed that the radar will track. The lower display shows the lowest speed the radar will track. By limiting the upper end of the speed range, the Stalker can ignore unwanted signals that occur beyond the speed range. And by limiting the lower end of the speed range, background motion can be ignored. This also helps to increase the sensitivity for objects in the middle of the speed range.

For best performance - Limit the high and low speed cutoffs to the narrowest range of speeds that you are interested in. For example, if you are clocking vehicles that are always going faster than 30 MPH, and never go over 100 MPH, select H140 - Lo 25. The radar will then only look for targets between 25 and 140 MPH.

The "BALL" Mode activates a new program designed to pick out baseball type targets easier. In the BALL mode, 110 MPH (or 177 KPH) is the highest speed the radar will track. The lowest speed can be set from 10 to 50 MPH. The ball mode substantially improves the clocking distance of baseballs, and reduces interference that could cause the gun to miss a reading.

Special Carnival Application - When tracking balls that are in close proximity to the radar gun, use a "ball" mode option, **and set the Range setting to Lo**. With the range set on Lo, it will reduce signal overload.

Best Settings for Popular Applications:

Slow targets	H140 - Lo 0 (or H140 - Lo 5)
Watercraft	H140 - Lo 15 (or H140 - Lo 25)
Passenger Cars	H140 - Lo 25
Fast Racing Cars	H300 - Lo 50
Tennis and golf	tenn - Lo 50
(higher speed balls)	(if speeds are under 110, then use ball - Lo 40)
Baseball Scouting	ball - Lo 50 Range on Hi
Carnival	ball - Lo 20 Range on Lo
STATS Prog. Testing	H140 - Lo 0 (or H300 - Lo 0)
	Set Auto Clear to 0 SEC

Factory Preset Options

What is a Factory Preset Option - There are two settings that are intended to be set at the factory and never changed again. However, these settings can be changed by the user under certain conditions.

Accessing the Preset Options Menu - A specific combination of buttons must be pressed to access the preset menu. This is intended to make accidentally changing the presets highly unlikely.



1. When the gun is on, press the **Range** button once. It should display the current range option.



2. While the current range option is displayed, press the **Units** button followed immediately by pressing the **Setup Menu** button and the **Peak Mode** buttons at the same time. If this sequence is not accomplished in quick order the Preset Option Menu will not be accessed.



3. If you are successful at accessing the Preset Option Menu, the readout should display the master sensitivity setting. This is normally **SEn8**.



Changing the Factory Preset Options - Once you have accessed the Preset Options Menu following the above steps, the settings can be changed. Warning: an incorrect master setting will result in poor performance or ghost readings.

Master Sensitivity Setting



Use the **Range** key to toggle through these four different sensitivity settings.

SEn6 lowest setting - only used in high-noise environments.

SEn7 lower than normal - use if the gun is giving random readings.

SEn8 normal setting for most use.

SEn9 highest setting - may cause random readings of distant objects.

When you have reached the desired setting, squeeze the trigger. After a few seconds, the gun will return to normal operation and retain the change that was made.

The STALKER PRO - Professional Sports Radar
is Manufactured by
Applied Concepts, Inc. / Stalker Radar

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