STALKER®

The World Leader in Speed Measurement

stalkerradar.com

STALKER Pro II Baseball

Digital Sports Radar

Owner's Manual

Any changes or modifications not expressly approved by Stalker Radar / Applied Concepts, Inc., could void the user's authority to operate the Stalker Pro II Baseball.

Not intended for Law Enforcement use.

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Introduction

Congratulations! You have purchased the most accurate baseball gun system available. The Stalker Pro II Baseball radar was designed specifically to measure the speed of balls thrown by baseball players.

The Stalker Pro II Baseball radar sends out very high frequency radio waves and measures the change in the frequency after it bounces off a moving object. This is commonly referred to as *Doppler Radar*. This invisible radio wave is extremely low power (about 1/100th of a watt) and is completely safe for close and continuous operation.

The Stalker Pro II Baseball is a true *digital* radar system. The Pro II Baseball converts the reflected microwave signals into a digital stream of data. The gun's own computer then processes this data stream using sophisticated programming to interpret, filter, and measure the speeds. This technology is closely related to the compact digital disc and modern personal computers. This type of radar system has the potential to provide substantially superior performance and accuracy over conventional radar systems.

The Stalker Pro II Baseball is a directional radar. It can tell the difference between targets moving toward it and targets moving away from it. Using this feature, it can track and report pitch speeds and hit speeds at the same time.

While the technology in the Stalker Pro II Baseball is extremely advanced, its operation is quite simple. You need only to press the ON/OFF key and pull the trigger to begin measuring baseball release speed and plate speed.

If you want to be a power user and try other features and settings, reading through this manual will help you to take full advantage of the other features and capabilities of the Stalker Pro II Baseball.

Have fun!

What's Included

The components included with your radar are listed below. If you are missing any parts or if you would like to upgrade your package, contact **Stalker Radar** at **1-877-782-5537**.

Pro II Baseball Package

Ka-Band Radar Gun
Removable Battery Handle (rechargeable)
Battery Handle Charger
Radar Manual
Hard Case

Quick Start Instructions

The STALKER Pro II Baseball has several features that allow the gun's optimal performance in baseball applications. With some basic understanding, the gun is very simple to operate.

Basic Operation

Power is supplied from the rechargeable battery handle.
Turn the gun **ON** by pressing the **ON/OFF** button.
Squeeze the trigger to begin operating (transmitting).

Important Settings

There are five buttons that control the radar gun functions: The two blue buttons work together, and the three silver buttons work together. The blue buttons are used for changing the settings, while the silver keys are operational keys.

MENU (Blue Button)	This button enters the MENU system to select a feature to be changed.
SELECT (Blue Button)	Once the MENU button has selected a feature, use the SELECT button to change the setting for that feature.
TRANSMIT (Silver Button)	Toggles the transmitter on and off (instead of the normal trigger activation).
RECALL (Silver Button)	Displays the last 10 speeds recorded and stored.
PEAK (Silver Button)	Enables or disables display of the peak speed.

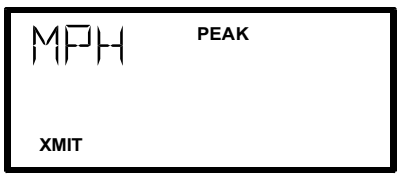
Turning the Transmitter ON and OFF

There are two ways to turn on the radar transmitter to begin operating:

- Trigger Transmit: Pull the trigger to transmit.
- Transmit Button: Press the silver TRANSMIT button to toggle the transmitter ON or OFF.

NOTE:

* The XMIT icon displays when the gun **IS** transmitting.
* The XMIT icon does not display when the gun **IS NOT** transmitting.



Controls and Indicators

LCD Display Icons

STORE	Is on when recalling speeds from the RECALL queue.
LO BAT	Indicates the batteries are low and need recharging or replacement. LO BAT blinks when batteries are approaching exhaustion.
XMIT	Indicates the gun is transmitting and is able to take readings.
PEAK	Indicates the Peak Mode window is "ON" allowing peak speed display.

LCD Display Windows

MESSAGE (upper left)	Messages display in the upper left corner (e.g. MPH, KM/H, LOCK, RECALL). Hit speed, when enabled, is also displayed in this window.
PEAK SPEED (lower right)	Indicates the peak speed (release speed) in large numbers on the lower right. Arrow icons to the right of the window indicate the direction of the ball: down for an inbound (approaching) ball and up for an outbound (receding) ball.
LAST SPEED (upper right)	Indicates the active or last speed (plate speed) in the upper right corner. This window also has arrow icons to show ball direction.

LCD Backlight

The Pro II Baseball display has a backlight that may be used in low light conditions. It is turned on or off in the Operator Menu.

8 Pin Interface Connector

The 8 Pin Interface Connector has the following pinout:

1	**Ground**	Ground
2	**Voltage Input**	External voltage input, 6 VDC to 16 VDC
3	**7V Out**	Output (limited to 50 mA)
4	**RS-485-A**	Transmit data stream
5	**RS-485-B**	Transmit data stream
6	**Aux Input**	Stopwatch trigger input or remote transmit input
7	**RS-232 RX**	Receive (not used at this time)
8	**RS-232 TX**	Transmit data stream

Detailed Instructions

Providing Power to the Pro II Baseball

Batteries - The Pro II Baseball handle is a removable, rechargeable lithium ion battery. Attach the battery handle to the radar body by inserting the front tip of the handle into its mating lip on the radar body and rotating the back of the handle up until seated. Next, rotate the thumb latch to engage the ramping slot in the back of the handle. When fully charged, the handle will power the gun for about 2 hours of continuous transmit time. The handle can be removed and recharged using the included charger. It can also be charged while attached to the gun when using the optional 12VDC Cigar Cable for external power.

External - To power the Pro II Baseball from an external 12VDC (nominal) source, use the optional 12VDC Cigar Cable attached to the 8 pin interface connector on the side of the gun. The 12VDC cigar cable also charges the battery handle while it is supplying power to the radar.

Turning the Transmitter ON and OFF

The radar transmitter must be turned ON to measure speed. There are two ways to transmit: 1) Press the trigger, or 2) press the TRANSMIT button.

Trigger Transmit - Squeeze and hold the trigger in to transmit. In the Continuous trigger mode (default) when the trigger is released, the transmitter turns off and any current readings are left on the screen. Since the transmitter draws most of the power, trigger operation helps to save battery life. Other trigger modes are explained in the Option Menu section.

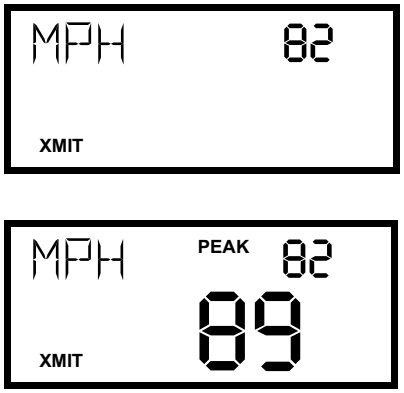
TRANSMIT Button - The silver Transmit button toggles the transmitter ON and OFF. Each time you push this button, it switches between transmit and hold. Using this button to turn on the transmitter allows the gun to continually operate automatically, without the need to press the trigger.

NOTE:

* The XMIT icon displays when the gun **IS** transmitting.
* The XMIT icon does not display when the gun **IS NOT** transmitting.

The Peak Function

The Peak option activates the automatic peak speed display in the PEAK SPEED WINDOW. For example, when tracking a baseball pitch, the peak speed is the same as the release speed since a ball only slows down after it is thrown. When the Peak mode is ON, the PEAK icon appears on the display and only the highest speed for each target acquired displays in the Peak window. The active, changing target speed displays in the upper right window.



NOTE:

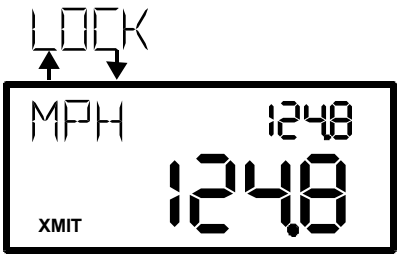
* The PEAK icon and speed window display when the Peak option IS selected.
* The PEAK icon and speed window do not display when the Peak option IS NOT selected.

Hit Speed

With its direction sensing capabilities, the Pro II Baseball can tell the difference between approaching (pitch) and receding (hit) targets. When enabled in the Operator Menu, the hit speed is displayed in the upper left Message Window.

Using the Trigger to Lock Speeds

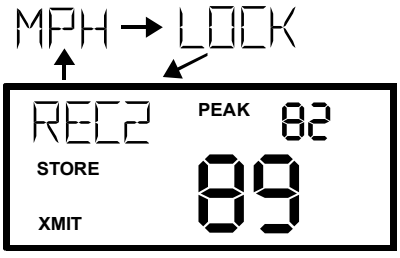
The trigger serves two functions. It can control the transmitter, or it can be used as a speed locking device.



When the gun is placed into continuous transmit mode using the silver TRANSMIT button or if the Trigger Option is on Loc (lock), the trigger does not affect the transmitter. Instead, press the trigger to lock the currently displayed speed to the main window. If Peak mode is on, all speeds just freeze in their respective windows. LOCK alternately displays in the upper left message window. Press the trigger a second time to unlock the readout. This function is useful if the operator needs to manually hold readings.

The Recall Key Function

The silver RECALL button redisplays the last ten speed readings that were measured. The stored peak speed, hit speed, last speed, and/or locked speed in the recall queue display in a sequential mode as the RECALL button is pressed. The MESSAGE WINDOW cycles through the Recall Number, speed units, LOCK (if on) and hit speed. The STORE icon is on while recalled speeds are displayed.



Setting Up the Radar Unit

Setting up the radar unit is fast and easy.

Briefly press the MENU key on the keypad to enter the OPERATOR MENU.
Briefly press the MENU key again to step through the features.
Press the SELECT key to change the settings.
Press the trigger at any time to exit the OPERATOR MENU and save all settings.

The factory default for each setting is indicated by the **bold underlined** setting.

The Operator Menu

Menu Step	Description	FEATURE Step down by pressing MENU key	SETTINGS Change using the SELECT key
MENU Step ORDER	Description	MESSAGE WINDOW	Main Window (bold indicates factory default)
1	Range	RANGE	1, 2, 3, **4**
2	Target Direction	DIR	Outb, **Inb**, both
3	Hit Speed On/Off	HIT	**OFF**, On
4	Backlight	LIGHT	**OFF**, On

The Range Setting

The Range setting affects the sensitivity (clocking distance) of the radar. The settings are:

4	Setting the range to 4 increases the gun's sensitivity and lengthens the clocking distance. It "looks" as far away as possible for targets and gives the gun the highest level of performance. This is the default setting.
2, 3	Setting the range to 2 or 3 sets the gun to a medium range in its clocking distance.
1	Setting the range to 1 decreases the gun's sensitivity and shortens its clocking distance. The 1 range setting is handy for clocking objects close to the gun and when you want to restrict the gun from "seeing" objects farther out in the background.

Target Direction

The Pro II Baseball can be configured to monitor inbound targets, outbound targets, or targets moving in either direction. The target direction corresponds to the direction of the pitch. Hit speed is only measured in the opposite direction.

- When the radar is positioned behind the catcher, configure the unit for inbound (Inb is the default setting).
- When positioned behind the pitcher, configure the unit for outbund (Outb).
- When configured for both, the radar may be positioned in either location. However, while the unit will report active and peak speeds in this configuration, no hit speeds are reported.

Selecting Options

Selecting the options is more involved (but still easy), because there are 15 features to select. The Pro II Baseball ships with the default (BOLD) settings indicated in the chart.

Enter the OPERATOR MENU as described on the previous page.
Press and hold the MENU key (while in the OPERATOR MENU) to enter the OPTION MENU. All display segments will briefly flash to indicate the change of menu.
Briefly press the MENU key again to step through the FEATURES. The SELECT key changes the SETTINGS.
Press the trigger at any time to exit the OPTION MENU, save all settings and return to normal operation.
Press and hold the MENU key to return to the OPERATOR MENU. All display segments will flash to indicate the change of menu.

The factory default for each setting is indicated by the **bold underlined** setting.

The Option Menu

MENU Step	Description	FEATURE Step down by pressing MENU key	SETTINGS Change using the SELECT key
MENU Step ORDER	**Description**	**MESSAGE WINDOW**	**Main Window** (**bold** indicates factory default)
1	Low Speed	LOW	OFF, 15, **30**
2	Units	**MPH**, KM/H	Un it
3	Resolution	RES	**ones**, tnth
4	Auto-Clear Delay	CLEAR	0SEC, 1SEC, **2SEC**, 3SEC, 4SEC, OFF
5	Trigger Function	TRIG	**Con**, SS, Loc
6	Aux Trigger Function	AUX	**OFF**, StoP, tr ig
7	Cosine Angle	ANGLE	**0** - 45
8	Serial Port Speed	BAUD	12, 24, 48, **96**, 192, 384
9	Serial Port Format	FOR	-, **A**, bE
10	Format A Speed	A SPD	**LASt**, PEA, H it
11	Leading Zero	LEAD0	2ero, **SPAC**, nonE
12	Message Termination	TERM	**Cr**, CrLF, u Cr, u CL
13	Peak Message Type	PKMSG	**Cont**, S ing
14	Reset	RESET	YES, **no**
15	Reset Confirmation	SURE?	YES, **no**

Options Defined

- Low Speed: Setting values are different for each type of unit (MPH or KM/H) selected. Those shown above are for the default in MPH units. See below for all values.

Units	Low Speed Settings
MPH	OFF, 15, 30
KM/H	OFF, 25, 50

- Resolution: Select onES to display speed in whole units, as 25 MPH, or tnth to display speed with tenths, as 25.4 MPH.

- Auto-Clear Delay: The time the speed reading is held after the target is lost and before the display screen clears. If OFF, the speed displays until the next speed is acquired.

- Trigger Function: The Trigger settings are Con (Continuous), SS (Start / Stop), and Loc (Lock). The trigger settings function as follows:

Transmit	Trigger Option	Action
ON / OFF	Con	Pull to transmit, release to hold.
ON / OFF	SS	Pull and release to transmit, pull and release to hold.
ON	Loc	Pull and release to lock speed(s), pull and release to release locked speed(s).

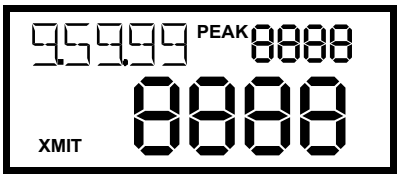
NOTE: When the Loc setting is selected in the Option MENU, the Transmit function is turned on as if the silver TRANSMIT button had been pressed. Clicking the trigger alternately locks and releases the current speed(s).

- Aux Trigger Function: The Aux Trigger settings are: OFF = ignored, StoP = stopwatch, tr ig = duplicates the functions of the main trigger.

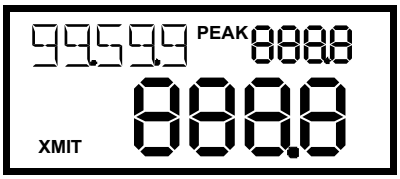
In Stopwatch Mode: The Optional Stopwatch Cable is needed to use this feature. The timer displays in the MESSAGE WINDOW. Press and hold the stopwatch trigger for 1 second to stop the timer and go back to radar mode.

Successive presses of the stopwatch trigger start the stopwatch at 0.00.00 or stop the stopwatch.

Timer Display Under 10 minutes:



Timer Display Over 10 minutes:



- Cosine Angle: The cosine angle is 0 – 45°. See the *Angle Error* topic for details.
- Serial Port Speed: 1200, 2400, 4800, 9600, 19200, or 38400.
- Serial Port Format: The "-" (dash) is for no serial output, the A format is for Selected Target Speed, and the bE format is for multiple speeds.
- Format A Speed: (only for Format A) Last speed, Peak speed, or Hit speed.
- Leading Zero: (only if format = A or bE)

  Zero = 090 090.1
  Space = 90 90.1
  None =90 90.1

- Message Termination: (only if format = A)

  Cr = Carriage Return only (0x0D)
  CrLF = Carriage Return & Line Feed (0x0D, 0x0A)
  u Cr = units followed by Carriage Return e.g. "MPH" 0x0D
  u CL =units followed by Carriage Return & Line Feed, e.g. km/h 0x0D 0x0A

- Peak Message Type: (only if format = A & Format A Speed = PEAK)

  Continuous = continually streams peak speed
  Single = sends one peak speed message per acquired target

❍ Reset Confirmation: The following steps reset the unit to factory default settings:

- Set RESET to YES. Now, the only two Option Menu items are RESET and SURE?.
- Set SURE? to YES also, and pull the trigger to exit all menus and change all settings to factory defaults.
- To exit without forcing factory defaults, set RESET and SURE? to no and pull the trigger.

Recommended Settings

Settings for Baseball Scouts

It is important that the gun is set correctly when measuring baseballs. Check these settings:

Low Speed	30 MPH
Range	4 - Maximum sensitivity is needed
Peak ON/OFF	ON - This is for release speed numbers
Auto-Clear Delay	2 seconds – After loss of target tracking, holds the speeds on the display before clearing them

Battery Information

The Pro II Baseball uses a rechargeable Lithium Ion battery handle. Attach the battery handle to the radar body by inserting the front tip of the handle into its mating lip on the radar body and rotating the back of the handle up until seated. Next, rotate the thumb latch to engage the ramping slot in the back of the handle.

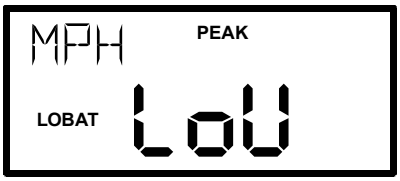
Operational Time using the Battery Handle

The Pro II Baseball draws the most current when it is transmitting, so the run time depends upon how often the gun is transmitting. The Pro II Baseball also has a sleep mode to conserve battery life when it is not being operated. The sleep mode is automatically initiated after about 10 seconds of inactivity when the transmitter is off. Squeezing the trigger or pressing any key immediately "wakes" the gun and brings it back into operation.

Operational Status	**Run Time**
Continuous Transmitting	2.5 Hours
Typical Trigger Operation	6-7 Hours

Low Battery Warning

The **LO BAT** icon blinks when the battery runs low. The Pro II Baseball operates for a short time after this. Operation is disabled when the battery voltage falls to an extremely low level. LoV displays in the large main window in this case. Now is the time to recharge or change the battery handle.



Charging the Battery Handle

The Battery Handle Charger is used to charge the battery handle for the Pro II Baseball. This charger may be powered either from 120 VAC house current using the wall adapter supplied, or from a 12 VDC 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 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.*

Auto-Shutdown Feature

The Pro II Baseball has a 30 minute time-out auto-shutdown feature. After 30 minutes in sleep mode, the Pro II Baseball automatically shuts off.

How To Save Battery Life

Since the transmitter has the highest current draw, turn the transmitter off whenever you are not taking readings.
If you use the trigger to start and stop transmitting, it's easy to save battery life. If you tripod mount the gun, (and use the silver TRANSMIT button to transmit) then turn the transmitter off between sessions.

Angle Errors

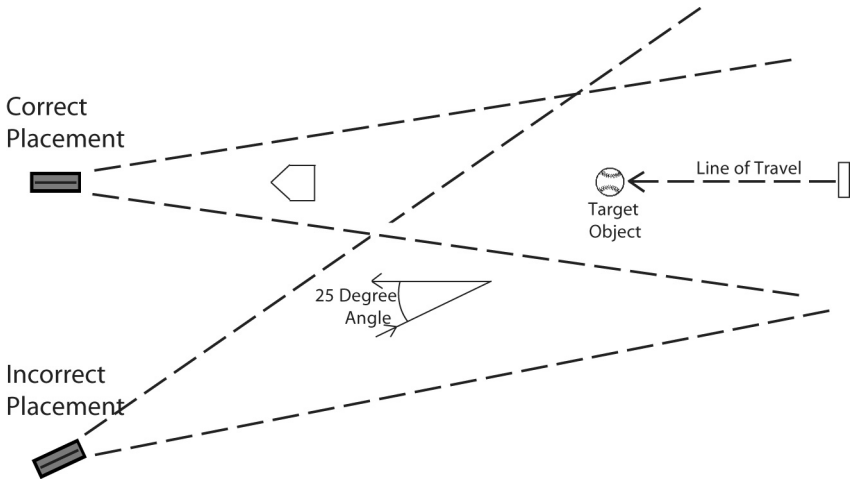
The most common mistake made with all radar guns is trying to clock targets at angles.

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 gun results in angle error, and the gun displays a speed that is LOWER than the actual speed.

Cosine Angle Error Chart

	0 Degrees	5 Degrees	10 Degrees	15 Degrees	30 Degrees	45 Degrees	90 Degrees
True Speed	0% Error	0.4% Error	1.5% Error	3.4% Error	13.4% Error	29.3% Error	100% Error
25.0 mph	25.0 mph	24.9 mph	24.6 mph	24.1 mph	21.7 mph	17.7 mph	0 mph
50.0 mph	50.0 mph	49.8 mph	49.2 mph	48.3 mph	43.3 mph	35.4 mph	0 mph
75.0 mph	75.0 mph	74.7 mph	73.9 mph	72.4 mph	65.0 mph	53.0 mph	0 mph
100.0 mph	100.0 mph	99.6 mph	98.5 mph	96.6 mph	86.6 mph	70.7 mph	0 mph
125.0 mph	125.0 mph	124.5 mph	123.1 mph	120.7 mph	108.3 mph	88.4 mph	0 mph
150.0 mph	150.0 mph	149.4 mph	147.7 mph	144.9 mph	129.9 mph	106.1 mph	0 mph

Radar Gun Placement



For accurate readings, the radar gun must be placed in the line of travel of the target. At slight angles, the error is very small; however, at larger angles, the error becomes substantial.

Also, when measuring hit balls, testing has shown that placing the radar approximately 30 feet behind the plate yields the best results.

NOTE: The Pro II Baseball can automatically adjust for angle error by changing the Cosine Angle settings in the Option MENU.

Calculating Angle Errors

If you know the angle at which you are clocking, you can calculate the actual speed by taking the radar reading and dividing by the cosine of the angle.

For example: if you are clocking at 30 degrees, and the gun displays 129.9 mph, take 129.9 and divide by the cosine of 30 degrees (0.866) to get a true speed of 150.0 mph.

Interference Problems

Interference Frequencies

The STALKER Pro II Baseball radar transmits at a frequency of 34.7 GHz (34,700,000,000 Hz), using a Ka-Band Transmitter. The receiver is designed to read the Doppler frequency (the change in frequency) between 500 Hz and 15,500 Hz. There are very few devices other than another radar gun that could cause interference in a radar gun's transmission frequency range. However, there are a number of devices that could interfere with a radar gun in the receiver's frequency range.

What Does Interference Do?

Interference can cause a radar gun to read random readings, or make it harder for the radar gun to "see" the intended target.

Random readings are an obvious sign that there is interference. However, a loss of sensitivity can be subtle. A common situation occurs when a large number of professional baseball scouts operate many radar guns in close proximity.

A loss of sensitivity can cause the radar gun to be unable to "see" far enough away to get the ball speed right when it leaves the pitchers hand. Then, as the ball gets closer to the plate, the radar is able to get a reading, but only after the ball has slowed down. The result: the peak speed registers lower than it actually is.

Sources of Interference

There are two main sources that can cause ghost (random) readings in radar guns: electrical devices and objects that move or vibrate.

Electrical sources include television monitors, fluorescent lights, cellular phones, computers, some radio transmitters, and power transformers.

Moving or vibrating objects include ventilation fans, motors, and blowing debris that can produce a nearly constant speed reading.

How to Eliminate Interference

If you are experiencing erroneous readings, try these solutions:
Change your position to change where the gun is aimed.
Lower the sensitivity by changing the Range on the Operator MENU to **1** (low setting).
Change the Option MENU Low Speed setting to a setting with a higher low-speed cutoff if the readings are at low speeds (often interference from nearby motors).

FCC Requirements

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

Pro II Baseball Accessories

The STALKER Pro II Baseball radar gun has a host of optional accessories. For current pricing and availability, contact sales at **1-888-STALKER.**

Accessories

- Stopwatch/Radar Control Cable – a 4 foot cable with momentary switch that connects to the 8 pin interface connector.
- 12VDC CIG Cable – Connects to the 8 pin interface connector and plugs into a cigarette lighter receptacle.
- RS-232 Serial Cable that connects to the 8 pin interface connector for RS-232 data output.
- RS-485 Serial Cable that connects to the 8 pin interface connector for RS-485 data output.
- Spare Battery Handle

Service Information

A Check List Before Servicing the Pro II Baseball Radar

1. **Check the Settings** - If you are having a problem with your Pro II Baseball, first make sure that the settings are correct for your application. Read the Operator and Option Setup MENUS sections. Call Customer Service at 1-877-STALKER if you need help with this.

2. **Check the Battery** - If the Pro II Baseball does not turn on, the problem is usually with the battery handle. Try charging the battery handle. If it still does not turn on, you could use a volt meter to see if the batteries are producing at least 7.2 volts. You may need to order new batteries.

3. **Call Customer Service** - If the problem is not rectified with these steps, call Customer Service at 1- 877-STALKER for help. A service representative will determine if the gun needs to be sent to the factory.

Factory Service Center Address

Applied Concepts, Inc.
Attn. Repair Department
2609 Technology Drive
Plano, TX 75074
1-877-STALKER Toll Free
Phone: (972) 801-4807
Fax: (972) 398-3781

Warranty Information

The Pro II Baseball radar is covered for One (1) Full Year, Parts and Labor, against defects in workmanship, parts, or materials, and is guaranteed to operate within specifications for that period.

STALKER Radar will repair or replace, at their option, any component or system found to be defective. The customer is responsible for shipping the defective product to the factory (freight prepaid), and STALKER Radar will pay for the return shipping via UPS ground service back to the customer. Any expedited air shipping charges are to be paid by the customer.

This full warranty does not cover damage due to dropping, water, salt, improper voltage, fire, charging alkaline batteries in the unit, attempted repairs or modifications by an unauthorized service agent, or any other unusual treatment.

STALKER Pro II Baseball

Specifications

PERFORMANCE SPECIFICATIONS

Speed Range	5 - 150 MPH
Accuracy	± 0.1 MPH In ones resolution, round to the nearest integer; In tnth resolution, round to nearest tenth.
Max. Clocking Distances	300 Feet

MICROWAVE SPECIFICATIONS

Operating Frequency	34.7 GHz (Ka-Band) ± 50 MHz
Polarization	Circular Polarization
3 db Beam width	12 Degrees Nominal (± 1°)
Microwave Source	Gunn-Effect Diode
Receive Type	Schottky Barrier Mixer Diode
Power Output	10 Milliwatts Minimum 15 Milliwatts Nominal 25 Milliwatts Maximum

The STALKER Pro II Baseball Complies with Part 90 of the FCC rules.
FCC ID #IBQACMI002.

GENERAL SPECIFICATIONS

Product Type	Stationary Doppler Radar
Computer Processor	Digital Signal Processor
Display Type	Liquid Crystal
Operating Temperatures	-30°C to +70°C (-22°F to +158°F)
Storage Temperatures	-40°C to +85°C (-40°F to +185°F)

ELECTRICAL SPECIFICATIONS

Battery Capacity	7.2 VDC, 2.0 Ah, Li-Ion
Current Requirements	Transmitting - 0.73 Amps
(At 7.2 Volts DC)	Standby - 0.32 Amps Sleep Mode - 0.085 Amps

PHYSICAL SPECIFICATIONS

Weight (with battery handle)	2.15 Pounds
Dimensions	7.35" H x 2.83" W x 7.9" L
Housing Material	Aluminum and Magnesium

Serial Communications Protocol

An **RS-232 or RS-485 Serial Cable** is required for data communications to speed display boards, computers, and other electronic devices. The data connector is on the side of the unit.

Connector Signals:

1. Ground
2. Voltage Input
3. 7 Volts (out)
4. RS-485 A
5. RS-485 B
6. Aux Input
7. RS-232 RX
8. RS-232 TX

BAUD Rate	1200 to 38400 BAUD – default =9600 BAUD
Data Format	8 Data Bits
No Parity	
1 Stop Bit	

Serial Port Message Formats

A Format (Last, Peak, or Hit speed) – Resolution = **ones**

Byte#	Content
1	Speed hundreds digit (ASCII)
2	Speed tens digit (ASCII)
3	Speed ones digit (ASCII)
4(+)	Carriage Return (0x0D) or alternate termination string determined by the message termination setting

A Format (Last, Peak, or Hit speed) – Resolution = **tenths**

Byte#	Content
1	Speed hundreds digit (ASCII)
2	Speed tens digit (ASCII)
3	Speed ones digit (ASCII)
4	Decimal Point (0x2E)
5	Speed tenths digit (ASCII)
6(+)	Carriage Return (0x0D) or alternate termination string determined by the message termination setting

bE Format

Byte #	Content	
1	Message type = 0x88	
2	Unit Config:	Bit 7 = 0 (to force ASCII character)
		Bit 6 = 1 (to force ASCII character)
		Bit 5 = unused

Bit 4 = Resolution: ones = 0, tenths = 1
Bit 3 = always 0 for directional radar
Bit 2 = always 0 for stationary radar
Bit 1 = Peak Speed not enabled = 0; Peak Speed enabled = 1
Bit 0 = always 0

3 Unit Status: Bit 7 = 0 (to force ASCII character)
Bit 6 = 1 (to force ASCII character)
Bit 5 = unused
Bit 4 = unused
Bit 3 = always 0
Bit 2 = always 1
Bit 1 = always 0
Bit 0 = always 0

4 ASCII 0 or space - disregard

5 ASCII 0 or space - disregard

6 ASCII 0 or space - disregard

7 Number of Speeds Reported (ASCII 1, 2 or 3) – One for Last Speed + One for Peak Speed if enabled + One for Hit Speed if enabled

For each speed reported – 15 ASCII bytes:

1 Speed ID: ASCII 4: Last/Live Target Speed
ASCII 5: Peak Speed
ASCII 6: Hit Speed

2 Zone Status: Bit 7 = 0 (to force ASCII character)
Bit 6 = 1 (to force ASCII character)
Bit 5 = always 0
Bit 4 = always 0
Bit 3 = always 0
Bit 2 = always 0
Bit 1 = Target Speed Direction (1 = inbound, 0 = outbound)
Bit 0 = Transmit = 1, Hold = 0

3 Speed hundreds digit (ASCII)

4 Speed tens digit (ASCII)

5 Speed ones digit (ASCII)

6 Speed tenths digit (ASCII)

7 Reserved (ASCII space)

8 Reserved (ASCII space)

9 Reserved (ASCII space)

10 Reserved (ASCII space)

11 Reserved (ASCII space)

12 Reserved (ASCII space)

13 Reserved (ASCII space)

14 Reserved (ASCII space)

15 Reserved (ASCII space)

Last Byte ASCII Carriage Return = 0x0D

The **Leading Zero** setting affects formats A and bE:

When set to SPAC (default setting), ASCII spaces are used for leading zeros:

```
"500"      or      "500.0"
" 50"      or      " 50.0"
"  5"      or      "  5.0"
```

When set to 2Ero, ASCII zeros are used for leading zeros:

```
"500"      or      "500.0"
"050"      or      "050.0"
"005"      or      "005.0"
```

For Format A, when set to nonE, leading zero characters are not transmitted, and the message length is reduced by the number of skipped zeros.

```
"500"      or      "500.0"
"50"       or      "50.0"
"5"        or      "5.0"
```

For Format bE, when set to nonE, ACSII spaces are used for leading zeros (as above for the SPAC setting) because Format bE uses fixed length fields.

The **Message Termination** setting affects only format A:

When set to Cr (default setting), each message is terminated with only a carriage return: (0x0D).

When set to CrLF, each message is terminated with a carriage return and a line feed: (0x0D, 0x0A).

When set to u Cr, each message is terminated with the speed's units and a carriage return: "500MPH(0x0D)".

When set to u CL, each message is terminated with the speed's units, a carriage return and a line feed:"500MPH(0x0D0A)".

The STALKER Pro II Baseball Radar
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