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S   PRO II

Professional 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 S   PRO II.

Not intended for Law Enforcement use.

ii

Table of Contents

Introduction

Congratulations! You have purchased the finest sports radar system available. The *S*   PRO II Ka-band sports radar was designed to measure the speed of a wide variety of objects such as baseballs, vehicles, tennis balls and just about anything that moves.

The *S*   PRO II 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 *S*   PRO II is a true *digital* radar system. The PRO II 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 *S*   PRO II 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 or filter out vehicles moving opposite from the direction of interest.

While the technology in the *S*   PRO II is extremely advanced, its operation is quite simple. You need only to press the ON/OFF key and pull the trigger to begin measuring target speeds.

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 *S*   PRO II.

Have fun!

- 2 -

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 Package

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

4-RADARS in ONE

The S   PRO II is actually four different radars in one – depending on its target type setting:

1. A Baseball radar
2. A Carnival radar
3. A Car radar
4. A Tennis radar

Page 5 has a definition of the target types.

Unless you were allowed to order your S   PRO II already set to a different mode of operation, the radar will come with the factory default setting of baseball mode.

If you want to select another mode, follow the instructions below.

Change:
Option Menu Item 5 to either an Item Setting of **bALL**, CArn, CAr, or tEnn.

Partial Option Menu

The full Option Menu is on page 12.
Enter the Operator Menu from radar mode by briefly pressing the MENU key. Then proceed to the Option Menu by pressing and holding the MENU key for longer than ½ second. Press the SELECT key to change the setting of a menu item. A section describing each menu item starts on page 13. Pull the trigger at any time to save new settings and exit the menu.

Option Menu
(only the top portion of the Option Menu is shown here)

Menu Item (press MENU key to step down)	Item Description	Item Legend (in Message Window)	Item Settings (in Main Window) (**bold** indicates factory default)
1	Low Speed	LOW	0 – 900 (MPH) 0 – 1448 (km/h) 0 – 782 (knots) 0 – 402 (m/s)
2	High Speed	HIGH	0 – 900 (MPH) 0 – 1448 (km/h) 0 – 782 (knots) 0 – 402 (m/s)
3	Units	MPH, KM/H, KNOTS, M/S	Unit
4	Resolution	RES	**onES**, tnth
5	Target Type	TARGT	**bALL**, CArn, CAr, tEnn

Quick Start Instructions

The *S*   PRO II has several features that allow the gun to work well in a wide variety of applications. With some basic understanding, the gun is very simple to operate.

Basic Operation

Power is supplied from the rechargeable battery handle. If it is not already attached to the radar body, do so by inserting the front tip of the handle into the mating lip on the body, rotating the handle up until it is firmly seated and rotating the thumb latch to engage in the slot in the back of the handle.

The battery handle is not shipped fully charged. Charge it for four hours before initial use to ensure a good charge.

Turn the gun **ON** by pressing the **ON/OFF** key.

Squeeze the trigger to begin operating (transmitting).

Important Settings

The factory default settings configure the gun for baseball operation to measure the release (peak) and roll-down speeds of a pitched ball. If other modes of operation are desired, use the two blue keys on the keypad to configure the radar. The MENU key navigates through the menu structure to choose a menu item, and the SELECT key changes the setting for the chosen item. Refer to the Radar Configuration section (page 9) for details.

The silver PEAK key 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:
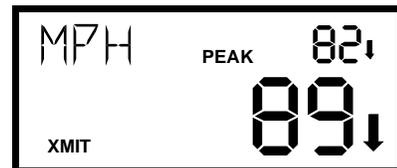Trigger Transmit: Pull the trigger to transmit.
Transmit Key: Press the silver TRANSMIT key to toggle the transmitter ON or OFF.

NOTE:

* When the gun **IS NOT** transmitting, the XMIT icon is off and the target type displays in the message (upper left) window.
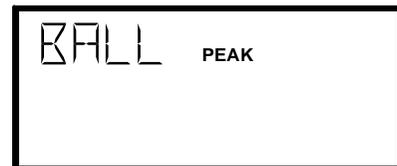
* When the gun **IS** transmitting, the XMIT icon is on and the unit of measure displays in the message window.

The Target Types

The S PRO II can be configured for four different target types as listed below. The gun processes and displays targets differently depending on the selected target type. Processing for short-lived targets like thrown or hit balls must quickly pick a small target out of the surrounding environment. Processing for vehicles assumes that the target will be present for a longer duration and displays its changing speed over a longer period of time.

Baseball

When configured for baseball mode, the factory default, the PRO II measures the peak (release) speed and the live (roll-down) speed of a baseball pitch. It analyzes not only the ball but also the pitcher's motion to report the most accurate release speed. It also measures the speed of a hit ball and can display all three speeds (release, roll-down and hit) at the same time. The ideal location for monitoring baseball speeds is on the straight line beginning at the pitcher, going through the catcher, and continuing to the radar with a clear view of the pitched ball's path.

Baseball mode for Cricket

Baseball mode can also be used to measure the bowled speed of cricket balls. Some differences between baseball and cricket present speed measuring challenges and require modified settings and operation:
the bowling pitch is in the middle of the playing field so the targeted ball is further from the radar unit;
the bowler runs toward the batsman before releasing the ball so there is extra motion to be filtered out before the ball is in flight; and
the bowled ball has a wider range of possible flight paths from lobs to direct throws to bounces, so the radar beam is not always aligned with the ball's path. Refer to the Recommended Settings section for more details.

Carnival

The PRO II can be operated in carnival mode to report the speed of balls thrown only a few feet at a backdrop target in a carnival booth setting. In this application the radar is usually mounted on a side support for the booth, so there is a large angle between the ball's trajectory and the radar's aim. The PRO II can automatically adjust for the angle error to display true ball speed. Carnival mode can also be used for other targets with very short flight durations like bullets or BBs.

Car

Car mode is used to measure the speed of cars, planes, racers, snowmobiles, people, or any other moving object. The most accurate readings are acquired when the object being measured is traveling directly toward or directly away from the radar. Any angle between the vehicle's path and the radar's aim results in lower readings, but the PRO II can be set in the OPTION MENU to

automatically compensate for the Cosine Angle error to display true object speed (see Option Menu item 10 in the Radar Configuration section starting on page 9).

Tennis

Tennis mode is much like baseball mode in that the PRO II measures the peak (serve) speed and the decelerating live speed of a served tennis ball. Since tennis balls are served at a wide range of angles, a good compromise location to mount and run the radar is at the middle of each end of the court. From this spot, many serves travel directly toward or away from the radar down the center of the court, and the most accurate speeds are reported. Speeds for those serves traveling at a large Cosine Angle to the radar's aim will be reported low because of the angle error.

Controls and Indicators

LCD Display Windows

MESSAGE	The five alpha-numeric characters in the upper left corner make up the Message Window. Messages showing configuration or status such as MPH, KM/H, BALL, CAR, LOCK… display here.
MAIN	The four large digits in the lower right corner display the main speed of interest. The arrows to the right of the speed indicate the direction of the target's motion. The up arrow signifies an outbound target moving away from the radar, and the down arrow signifies an inbound target moving toward the radar.
UPPER	The four smaller digits and arrows in the upper right corner show a secondary speed and direction.

Different types of speeds display in these windows depending on the type of target being monitored.

The **Ball, Carnival** and **Tennis** target types are for targets that appear only for a short time. Since the peak speed of these targets is most important, it shows up in the Main Window. The "live" speed of the target slowing down shows up in the Upper Window. And, if enabled, the hit speed of the target moving in the opposite direction displays in the Message Window.

The **Car** target type is for vehicles that may be tracked for long periods of time. In this case, the "live" speed of the vehicle is most important, so it shows in the Main Window. When peak speed is enabled, the highest speed of the tracked vehicle is captured in the Upper Window.

LCD Display Icons

STORE	Is on when recalling the highest peak speed or 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 is "ON" allowing peak speed display.

LCD Backlight

The PRO II display has a backlight that may be used in low light conditions. It is turned on or off in the Operator Menu (refer to the Radar Configuration section page 11 for details).

Keypad

The six keys on the rear panel control the radar gun functions and configuration.

TRANSMIT	Toggles the transmitter on and off (instead of the normal trigger activation).
RECALL	In Radar Mode, displays the highest peak speed or the last 10 speeds recorded and stored. In Menu Mode, decreases the setting for a chosen menu item.
PEAK	Turns ON or OFF the display of the peak speed.
MENU	Navigates the MENU system to choose a menu item to be changed.
SELECT	Increases the setting for a chosen menu item.
ON/OFF	Turns the PRO II power on or off.

8-Pin Interface Connector

The 8-Pin Interface Connector has the following pin-out:

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 radar trigger input
7	**RS-232 RX**	Receive (not used at this time)
8	**RS-232 TX**	Transmit data stream

Radar Configuration

The PRO II has a diagnostic mode in which the user can determine internal unit status and test basic target acquisition capabilities. There are also two separate menus used to configure the unit's operation. The Operator Menu is short and contains items that a user may want to change while operating the gun. The Option Menu is longer and contains items that are not likely to be changed during a user session. Use the MENU key to navigate the diagnostic features and configuration menus in the PRO II.

After the unit powers up and enters radar mode, press the MENU key for longer than ½ second (press & hold) to enter the **Diagnostic Mode** where the unit displays its version of software. This version screen will timeout after two seconds and the unit will automatically return to radar mode. Briefly press the MENU key before the two-second timeout to step through the other diagnostic screens described in detail below. Pull the trigger at any time while in Diagnostic Mode to return to Radar Mode.

While in radar mode, briefly press the MENU key to enter the **Operator Menu** where the first Operator Menu item and its setting are displayed. While in the Operator Menu, press and hold the MENU key to enter the **Option Menu** where its first item and setting are displayed after all display segments briefly flash to indicate the change of menu. Change back and forth between menus using a press and hold of the MENU key.

Once in the desired menu, briefly press the MENU key to step through the menu items and display their settings. Change the setting for an item while it is displayed by pressing the SELECT or RECALL key.

Pull the trigger at any time while in Menu Mode to return to Radar Mode. Any changed menu settings are stored in non-volatile memory when the trigger is pulled so that they are remembered the next time the PRO II is turned on. If the PRO II is turned off while in Menu Mode, the settings will not be remembered – always remember to "trigger out" of the menus to save the settings.

The factory default for each menu setting is indicated in the Operator Menu and Option Menu tables below by the **<u>bold underlined</u>** value.

Diagnostic Mode

Enter the Diagnostic Mode while in Radar Mode as described above by pressing and holding the MENU key. An alternate method of entry into the Diagnostic Mode is to briefly press the MENU key immediately after powering up the unit while all of the display segments are on.

The first display screen in Diagnostic Mode is the **Version Screen** where the version of the operating code is displayed. In the figure at right, the unit is loaded with PRO II Version 1.0.0.
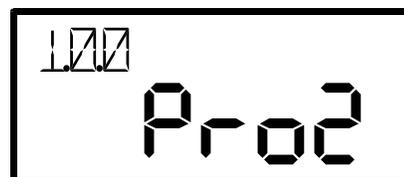
Briefly press the MENU key while the version is displayed to enter the **Fork Diagnostic**. The transmitter is turned on automatically and all directionality, filtering and special target processing is turned off so that any target moving in the range of 25-100 MPH will be displayed. A ringing tuning fork held in front of the radar should produce a steady speed display.

```
FORK
        40
XMIT
```

Briefly press the MENU key while in the Fork Diagnostic to enter the **Voltage Monitor Diagnostic**. The radar gun can be powered from the battery handle voltage or from external voltage, and the Voltage Monitor Diagnostic displays whichever of these two voltages is higher as in the following examples:

```
BATTV
        7.2
```

```
EXTV
        12.0
```

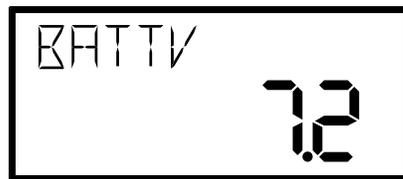Briefly pressing the MENU key cycles the unit through the diagnostics. Pull the trigger at any time to exit Diagnostic Mode and return to Radar Mode.

Operator Menu

Enter the Operator Menu from Radar Mode by briefly pressing the MENU key. Change an item's setting using the SELECT key to advance to the next setting or the RECALL key to revert to the previous setting. A section describing each menu item follows the table below. Pull the trigger at any time to save any changes and exit the menu.

Menu Item (press MENU key to step down)	Item Description	Item Legend (in Message Window)	Item Settings (in Main Window) (**bold** indicates factory default)
1	Range	RANGE	1, 2, 3, **4**
2	Target Direction	DIR	Outb, **Inb**, both
3	Hit Speed Enable	HIT	**OFF**, On
4	Backlight On/Off	LIGHT	**OFF**, On
5	Battery Charge Monitor	BATT	blank, Ch99, Ch9d

Range: The range setting affects the sensitivity (clocking distance and target size) of the radar.

- 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. It is also able to "see" smaller targets. This is the default setting.

- 3, 2 - 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 range 1 setting is handy for clocking objects close to the gun and when you want to restrict the gun from "seeing" smaller objects or objects farther out in the background.

Target Direction: The PRO II can be configured to monitor outbound targets (Outb), inbound targets (Inb), or targets moving in either direction (both). The default setting is Inb.
For Baseball, Carnival or Tennis target types; the target direction corresponds to the direction of the pitch or serve. Hit speed is measured in the opposite direction. Hit speeds are not reported if the target direction is set for both.

Hit Speed Enable: This menu item is only displayed in the Operator Menu if the Target Type is set for Ball, Carnival or Tennis.
It enables or disables the display of hit speeds in the Message Window. The default setting is OFF.

Backlight On/Off: This menu item turns on or off the display's backlight. Independent of this setting, the backlight always turns off while the unit is in the power saving sleep mode. This is usually the only indication that the PRO II has gone to sleep. The default setting is OFF.

Battery Charge Monitor: The last Operator Menu item is a monitor only. It does not actually configure a feature setting; it shows the status of a charging battery.

- If the PRO II is operating on battery only (with no external voltage supplied to the side connector), BATT displays in the Message Window and the main window is blank.
- If external voltage is supplied and a battery handle is attached, the main window shows the charging status: Ch99 (charging) or Ch9d (charged).
- If external voltage is supplied but no battery handle is attached, the main window shows Ch9d even though there is no battery. This just signifies that no charging is taking place.

Option Menu

Enter the Option Menu from the Operator Menu by pressing and holding the MENU key for longer than ½ second. Change an item's setting using the SELECT key to advance to the next setting or the RECALL key to revert to the previous setting. A section describing each menu item follows the table below. Pull the trigger at any time to save any changes and exit the menu.

Menu Item (press MENU key to step down)	Item Description	Item Legend (in Message Window)	Item Settings (in Main Window) (**bold** indicates factory default)
1	Low Speed	LOW	0 – 900 (MPH) 0 – 1448 (km/h) 0 – 782 (knots) 0 – 402 (m/s)
2	High Speed	HIGH	0 – 900 (MPH) 0 – 1448 (km/h) 0 – 782 (knots) 0 – 402 (m/s)
3	Units	MPH, KM/H, KNOTS, M/S	Unit
4	Resolution	RES	**onES**, tnth
5	Target Type	TARGT	**bALL**, CArn, CAr, tEnn
6	Auto-Clear Delay	CLEAR	0SEC, 1SEC, **2SEC**, 3SEC, 4SEC, 5SEC, 6SEC, 7SEC, 8SEC, 9SEC, 10SE, 20SE, 30SE, OFF
7	Trigger Function	TRIG	**Con**, SS, Loc
8	Aux Trigger Function	AUX	**OFF**, StoP, tr ig
9	Stopwatch Mode	STOP	**Std**, LAP, SPLt
10	Cosine Angle	ANGLE	**0** - 45
11	Serial Port Speed	BAUD	12, 24, 48, **96**, 192, 384
12	Serial Port Format	FOR	-, **A**, A1, bE, Co1
13	Format A Speed	A SPD	**LASt**, PEA, Hit
14	Peak Message Type	PKMSG	**Cont**, Sing
15	Leading Zero	LEAD0	2Ero, **SPAC**, nonE

Menu Item (press MENU key to step down)	Item Description	Item Legend (in Message Window)	Item Settings (in Main Window) (**bold** indicates factory default)
16	Message Termination	TERM	Cr, CrLF, u Cr, u CL
17	Reset	RESET	YES, **no**
18	Reset Confirmation	SURE?	YES, **no**

Low Speed and **High Speed:** The Low Speed setting is a speed value under which the radar will not report targets. Likewise the radar will not report speeds higher than the High Speed setting. These settings can be used together to define a speed range to filter out undesired targets. Due to conversions and processing methods, speeds 1 or 2 units (2 or 3 km/h) from the setting values may be reported.

The range of both settings is 0 to 900 MPH (or the equivalent speed in alternate units: 1448 km/h, 782 knots, 402 m/s). Selecting a value in such a large range would be tedious if forced to press the SELECT key (increment) or RECALL key (decrement) for each step. Get around this by pressing and holding down either key to change the setting value at an escalating rate.

When monitoring in a high speed range indoors, don't be surprised to see "speeds" generated by fluorescent lights, other electrical sources, moving/rotating objects, or vibrating objects. Because of the great sensitivity of the PRO II, indoor use will usually require a lower Range setting of 3 or 2.

Setting values for these two menu items are retained separately for each target type. Be sure to select the Target Type prior to setting the Low Speed and High Speed settings, to ensure you are setting up the correct Low and High Speed cutoffs. The default settings for each target type are defined in the Recommended Settings section.

Units: The available units of measure are:
- MPH – Miles per hour. This is the default setting.
- KM/H – Kilometers per hour
- KNOTS – Knots
- M/S – Meters per second

Resolution: Select onES to display speed in whole units, as 25 MPH. This is the default setting.
Select tnth to display speed in tenths, as 25.4 MPH.

Target Type: The target types available on the PRO II are Baseball (bALL is the default setting), Carnival (CArn), Car (CAr) and Tennis (tEnn).

Auto-Clear Delay: The time the speed reading is held after the target is lost and before the display screen clears. The default is 2 seconds to filter out any speed dropouts. If set for OFF, the last speed displayed stays on the screen until the next speed is acquired. This delay also applies to speeds reported in messages sent out to the serial port.

Trigger Function:
- Con – Continuous trigger operation: Pull the trigger to turn on the transmitter and release it to turn off the transmitter. This is the default setting.
- SS – Start-Stop trigger operation: Pull and release the trigger to turn the transmitter on. Pull and release it again to turn off the transmitter.
- Loc – When the transmitter is turned on using the TRANSMIT key on the rear panel, the Trigger Function setting is automatically set to Loc and the trigger becomes a lock/release key. Likewise, if the Trigger Function menu setting is changed from Con or SS to Loc, the transmitter is automatically turned on as if the TRANSMIT key had been pressed. Refer to the Locking Speeds with the Trigger section for details of locking operation.

Aux Trigger Function: The AUX Input pin on the 8-Pin Interface Connector can be used for stopwatch or radar trigger functions. The optional Stopwatch Cable (#155-2272-00) is available for these purposes.
- OFF – The AUX Input pin is ignored. This is the default setting.
- StoP – The AUX Input pin is used to start and stop a stopwatch which displays in the Message Window. Refer to the Stopwatch Mode setting description below for more details.
- tr ig – The AUX Input is used as an alternate trigger input and duplicates the functions of the trigger on the gun body.

Stopwatch Mode: This menu item is only displayed in the Option Menu if the Aux Trigger Function is set to StoP.
The optional Stopwatch Cable (#155-2272-00) is used to control the stopwatch in any of the three modes listed here. When running, the timer takes over the Message Window during standard radar operation as shown below. Press and hold the stopwatch trigger for a full second to stop the timer and clear it from the Message Window.
- Std – Standard Timer: Successive presses of the stopwatch trigger start the stopwatch at 00:00 or stop the stopwatch. This is the default setting.
- LAP – Lap Timer: The first press of the stopwatch trigger starts the stopwatch at 00:00. Each subsequent press displays the time since the last trigger press and resets the timer, which is running in the background, to zero.
- SPLt – Split Timer: The first press of the stopwatch trigger starts the stopwatch at 00:00. Each subsequent press of the stopwatch trigger displays the current cumulative time while the timer continues to run in the background.

When the timer display is under 10 minutes, resolution is in hundredths of seconds.

When the timer display is over 10 minutes, resolution is in tenths of seconds.
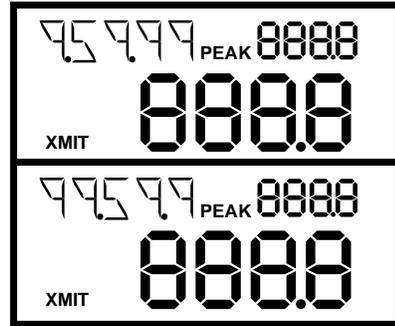
Cosine Angle: This setting is used to automatically correct speed readings for angle errors. It can be set in one degree increments in the range from 0 through 45 degrees. The default setting is 0 degrees. Refer to the Angle Errors section for more details.

Serial Port Speed: This setting configures the baud rate for data transmitted from the serial port. The available settings are 1200, 2400, 4800, 9600, 19200 and 38400. The default is 9600. Refer to the Transmitting Speed Data from the Serial Port section for more details.

Serial Port Format: The PRO II can transmit speed and status information out the serial port in different formats for different applications. Refer to the Transmitting Speed Data from the Serial Port section for more details on the message contents.

- "-" – The "dash" setting turns the serial port off. No data is transmitted.
- A – The "A" format is a simple ASCII format which reports a single speed in each message packet. A PRO II configured to stream data in this format can connect directly to any serial printer, PC or display sign, such as the *S* LED Speed Sign, that receives ASCII data. This is the default setting.
- A1 – The "A1" format is exactly like the "A" format except that a character for the thousands digit is added.
- bE – The "bE" format can report multiple speeds in each message (last, peak, hit) as well as configuration and status information. A PRO II configured to stream data in this format can connect directly to a *S* LED Speed Sign which is configurable and intelligent enough to choose one of the speeds (last, peak or hit) to display. It is also possible to daisy-chain the serial output of the radar gun to three *S* LED Speed Signs which can each be configured to display a different type of speed.
- Col – The "Col" (or colon) format is an alternate ASCII format that reports a single speed. It matches the format of messages from legacy *S* sport guns.

Format A Speed: This menu item is only displayed in the Option Menu if the Serial Port Format is set for the A or A1 Format.

It is used to select the speed to be transmitted in the data message: the last live speed (LASt), the peak speed (PEA) or the hit speed (Hit). LASt is the default setting.

Peak Message Type: This menu item is only displayed in the Option Menu if the Serial Port Format is set for A or A1 Format **and** the Format A Speed is set for Peak.

- Cont – Continuous: the radar continually streams out A Format messages containing the peak speed at the rate of over 46 messages per second. This is the default setting.
- Sing – Single: the radar sends only one A Format message containing the peak speed for each acquired target. This setting could be used if the radar is connected to a printer so that each pitch's release speed is printed once.

Leading Zero: This menu item is only displayed in the Option Menu if the Serial Port Format is set for A, A1 or bE Format.

It defines the character used for leading zeros when speed values are transmitted out the serial port. Examples below show how one-digit, two-digit and three-digit speeds would appear on a speed sign or printout.

- ZEro – ASCII zeros are used for leading zero characters.
  > "500"
  > "050"
  > "005"
- SPAC – ASCII spaces are used for leading zero characters. This is the default setting.
  > "500"
  > " 50"
  > " 5"
- nonE – For the A or A1 Format, leading zero characters are not transmitted, and the message length is reduced by the number of skipped zeros.
  > "500"
  > "50"
  > "5"

  For the bE format, ASCII spaces are used for leading zeros (as above for the SPAC setting) because the bE format uses fixed length fields.

Message Termination: This menu item is only displayed in the Option Menu if the Serial Port Format is set for the A or A1 Format.

It defines the way each A/A1 Format message is terminated. Examples below show the ASCII string that would be sent with each setting for a 100 mile per hour speed message. The 0x0D and 0x0A nomenclature used below represents the hexadecimal values used in serial data transmission to control a printer or display cursor position. The 0x0D character represents a "carriage return" which moves the cursor back to the first character in the current line. The 0x0A character represents a "line feed" which moves the cursor down to the next line.

- Cr – Each message is terminated with only a carriage return. This is the default setting.
  "100(0x0D)"
- CrLF – Each message is terminated with a carriage return followed by a line feed.
  "100(0x0D,0x0A)"
- u Cr – Each message is terminated with the speed's unit of measure followed by a carriage return.
  "100MPH(0x0D)"
- u CL – Each message is terminated with the speed's unit of measure followed by a carriage return and then a line feed.
  "100MPH(0x0D,0x0A)"

Reset and **Reset Confirmation:** Use the following steps to reset the radar 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. After pulling the trigger, the display doesn't change for 3-4 seconds while the internal settings are being erased. Then the unit resets with product 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:

Target Type	Ball
Low Speed	50 MPH (80 km/h, 43 knots, 22 m/s)
High Speed	150 MPH (241 km/h, 130 knots, 67 m/s)
Range	4 – For maximum sensitivity
Peak ON/OFF	ON - This shows ball <u>release</u> speeds.
Auto-Clear Delay	2 seconds – After loss of target tracking, the radar holds the speeds on the display before clearing them.

Settings for Cricket

One of the biggest challenges with cricket is making sure the radar can "see" the bowled ball as the pitch is in the middle of the field far from the radar. The best results are acquired when the radar is positioned to capture as much of the ball's flight path as possible.

Target Type	Ball
Target Direction	Inbound when behind the batter.
Hit Speed Enable	OFF
Low Speed	30 MPH (48 km/h, 26 knots, 13 m/s) – High enough to mask the speed of the running bowler but low enough to register slow bowls.
High Speed	150 MPH (241 km/h, 130 knots, 67 m/s)
Resolution	Tenths – to get the best resolution.
Range	4 – High setting to give the radar the best opportunity to pick up the ball in the middle of the field from outside the field boundary.
Peak ON/OFF	ON - This shows ball <u>release</u> speeds.
Auto-Clear Delay	2 seconds – After loss of target tracking, the radar holds the speeds on the display before clearing them. The bowler likes to see the speed after the ball is returned to him/her prior to bowling again, so delays can be up to 10, 20 or even 30 seconds for practice purposes.
Trigger Function	Con – Release the trigger (XMIT off) after every pitch to hold the last speed seen without any chance of a later target's speed taking over the display.

Settings for Carnival Use

Experiment with the Range setting depending on what motion and what rides are around the gun.

Target Type	Carnival
Low Speed	30 MPH (48 km/h, 26 knots, 13 m/s)
High Speed	150 MPH (241 km/h, 130 knots, 67 m/s)
Range	1 – To mask other nearby moving objects.
Peak ON/OFF	ON - To capture the highest speed of the target.
Auto-Clear Delay	2 seconds – After loss of target tracking, the radar holds the speeds on the display before clearing them.

Settings for Vehicle Racing

Using a Low Speed cutoff of 0 allows the radar to report the instantaneous speed of a vehicle from before it begins moving for an acceleration run and until it stops completely for a braking test.

Target Type	Car
Low Speed	0 MPH
High Speed	300 MPH (483 km/h, 261 knots, 134 m/s)
Range	4 – Use maximum sensitivity for greater distances
Auto-Clear Delay	2 seconds – After loss of target tracking, the radar holds the speed on the display before clearing it to filter out dropouts.

Settings for Tennis

Using a Low Speed cutoff of 50 MPH helps to ignore targets around the court other than tennis balls.

Target Type	Tennis
Low Speed	50 MPH (80 km/h, 43 knots, 22 m/s)
High Speed	150 MPH (241 km/h, 130 knots, 67 m/s)
Range	4 – Change to a lower setting if you track outside motion
Peak ON/OFF	ON - This is for serve speed numbers
Auto-Clear Delay	2 seconds – After loss of target tracking, the radar holds the speeds on the display before clearing them

Detailed Operating Instructions

Providing Power to the PRO II

Battery Handle - The PRO II 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 toward the body until seated. Next, rotate the thumb latch to engage the ramping slot in the back of the handle. When operating on battery power, the gun enters a low-power "sleep" mode when the transmitter is off and no keys or trigger have been pressed for 10 seconds. If the display backlight is on while operating the radar, you can tell when the unit goes to sleep because the backlight will turn off.

External - To power the PRO II from an external 12VDC (nominal) source, use the optional 12VDC CIG Cable attached to the 8-Pin Interface Connector on the side of the gun. The battery handle does not need to be attached to the gun body when running under external power. If it is attached, the 12VDC CIG Cable also charges the battery handle while it is supplying power to the radar. The unit does not enter sleep mode as long as external power is connected.

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 key.

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 Key - The silver TRANSMIT key on the rear panel toggles the transmitter ON and OFF. Each time you press this key, it switches between transmit and hold. Pressing this key to turn on the transmitter allows the gun to transmit continuously, without the need to press the trigger.

NOTE:

* When the gun **IS NOT** transmitting, the XMIT icon is off and the target type displays in the message window. If speeds are present when the transmitter is turned off, they will remain on the screen showing the last speeds registered. Turn the transmitter on again to clear the speed windows and acquire a new target.

* When the gun **IS** transmitting, the XMIT icon is on and the unit of measure displays in the message window.
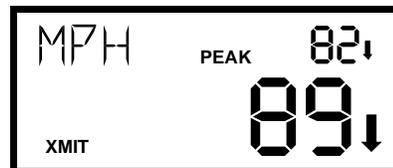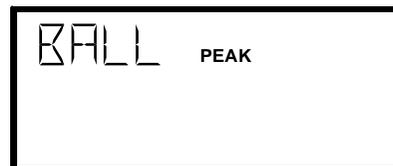
Displaying Peak Speeds

Use the PEAK key to turn on and off the display of the peak speed of targets. 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 Peak mode is OFF, the PEAK icon is off. The live, changing ball speed shows in the upper right window, and the main window is blank.

```
MPH              82↓

XMIT
```

When Peak mode is ON, the PEAK icon appears on the display and the highest speed for each ball displays in the main window. The ball's roll-down speed displays in the upper right window.

```
MPH     PEAK     82↓
                 89↓
XMIT
```
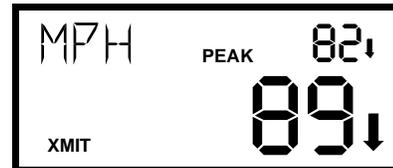
Screens for Ball, Carnival, Tennis modes

When **tracking a vehicle** in Car mode, the peak speed is the highest speed attained as the vehicle speeds up and slows down.

When Peak mode is OFF, the PEAK icon is off. The live, changing vehicle speed shows in the main window, and the upper right window is blank.

```
MPH

                 65↓
XMIT
```
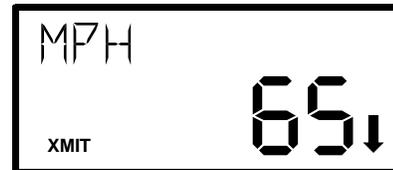
When Peak mode is ON, the PEAK icon appears on the display and the highest speed attained displays in the upper right window. The live vehicle speed displays in the main window.

```
MPH     PEAK     72↓

                 65↓
XMIT
```
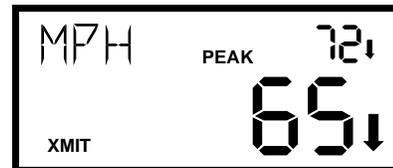
Sample screens for Car mode

Displaying Highest Peak Speed

Not only can you monitor the peak speed for each target, the PRO II also remembers the highest peak speed it has seen since it was turned on. Press and hold the RECALL key for longer than ½ second to display the Highest Peak Speed. The STORE icon turns on, and MAX flashes in the message window during this time.

To clear the highest peak speed from the display, press and hold the RECALL key again or simply pull and release the trigger.

Displaying Hit Speeds

With its direction sensing capabilities, the PRO II can tell the difference between approaching (pitch) and receding (hit) targets. When enabled in the Operator Menu, any acquired hit speed is displayed in the upper left message window. When measuring hit balls, testing has shown that placing the radar approximately 30 feet behind the plate yields the best results. Remember that hit balls will fly away from the radar in a wide range of angles. The speed of a line drive to center field will display more accurately then a hit toward first or third base which will have a large angle error.

Locking Speeds with the Trigger

The trigger serves two functions. It can control the transmitter, or it can be used to lock displayed speeds.

When the gun is placed into continuous transmit mode using the silver TRANSMIT key or if the Trigger Option is set for Loc (lock), the trigger does not affect the transmitter. Instead, press the trigger to lock the currently displayed speed(s). LOCK flashes in the left message window. Press the trigger a second time to release the locked speed. This function is useful if the operator needs to manually lock a speed at an exact moment in time such as when a vehicle crosses the finish line**.**

When the target type is set for Car and Peak mode is off, the main window displays the live vehicle speed, and the locked speed will appear in the upper right window. After locking a speed, the live speed continues to update in real time while the locked speed is frozen (Track-Through-Lock). In the example shown, the target was traveling at 124.8 MPH when the trigger was pressed to lock its speed. After the lock, the target has slowed to 119.4 MPH.

If Peak mode is on, the live speed and the peak speed just freeze in their respective windows. Live speed cannot be tracked after locking when Peak mode is on.

When the target type is set for Baseball, Carnival or Tennis and Peak mode is off, the locked live speed will move to and freeze in the main window while the live speed can continue to be tracked in the upper right speed window.

If Peak mode is on, the live speed and the peak speed just freeze in their respective windows. Live speed cannot be tracked after locking when Peak mode is on.
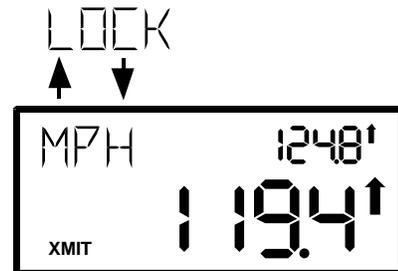
## Recalling Stored Speeds (10 maximum)

The silver RECALL key redisplays the last ten speed readings that were measured. Speeds are added to the recall queue:

- when the trigger is released (the last speeds displayed will also be saved on the display until the next trigger pull),
- when they are locked,
- when they are cleared from the display after the Auto-Clear Delay has expired,
- or two seconds after the target is lost if the Auto-Clear Delay is set to OFF.

The last ten groups of stored peak, live, hit and/or locked speeds display in a sequential manner with successive brief presses of the RECALL key. The message window display cycles through the Recall Number, speed units, LOCK (if recalling a locked speed) and hit speed. The STORE icon is on while recalled speeds are displayed.

```
MPH → LOCK
   ↑      ↘
REC 2 PEAK   82↓
STORE
          89↓
```
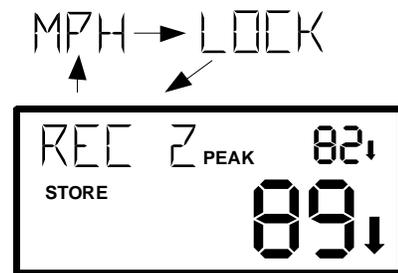
The most recently saved speed group shows first. Pressing the RECALL key briefly once more while the last speed group in the queue is displayed exits Recall Mode. Exit the recall queue at any time by pulling the trigger.

The recall queue is cleared whenever the unit is powered down.

Transmitting Speed Data from the Serial Port

The radar measures speed data at a rate of just over 46 readings per second, and it sends speed data messages out its serial port at that same rate. The messages are streamed out when the radar transmitter is on; no data is sent when the radar is in hold. Refer to the following Option Menu settings which are available to configure the data streaming features: Serial Port Speed, Serial Port Format, Format A Speed, Leading Zero, Message Termination and Peak Message Type. The messages are sent out both the RS-232 and the RS-485 data streams.

The optional RS-232 Serial Cable (#155-2284-00) or Y Cable (#155-2278-00) is required for data communications between the 8-Pin Interface Connector on the side of the gun body and speed signs, computers, printers and other electronic devices. If a 9-pin D serial extender cable is required, use a standard (straight-through) computer cable, NOT a null-modem cable which crosses the transmit and receive signals.

The serial port configuration on the radar is fixed at 8 data bits, no parity and 1 stop bit; so the user must ensure that his receiving device is also configured for those values. The serial port baud rate on the radar is configurable in the range from 1200 through 38400 with a default setting of 9600 baud.

The message contents of the available Serial Port Formats are defined below. An A or A1 Format message is very simple and contains only a single speed value: either last speed, peak speed or hit speed. To ensure that each message in this format is sent out before time to start the next one, the Serial Port Speed should be set for 9600 or higher.

A bE Format message can contain from one to three speed values as well as configuration and status information. If the bE Format message is reporting one speed, the Serial Port Speed should be set for 19200 or higher. For a bE Format message reporting two or three speeds, the Serial Port Speed should be increased to 38400.

A Col Format message also contains only a single speed value: the peak speed if peak speeds are enabled or the last/live speed if not. New messages are sent whenever the speed changes (up to 25 messages per second) and/or every 1/3 second if the speed remains the same.

A Format

When 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

When 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

A1 Format

When Resolution = **ones:**

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

When Resolution = **tenths:**

Byte #	Content
1	Speed thousands digit (ASCII)
2	Speed hundreds digit (ASCII)
3	Speed tens digit (ASCII)
4	Speed ones digit (ASCII)
5	Decimal Point (0x2E)
6	Speed tenths digit (ASCII)
7(+)	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 ID reported (when speeds are <= 999.9) – 15 ASCII bytes:

	Byte	Field	Content
	1	Speed ID:	ASCII 4: Primary – Last/Live Target Speed
			Secondary – Locked Speed
			ASCII 5: Primary – Peak Speed
			Secondary – Highest Peak Speed
			ASCII 6: Primary – Hit Speed
			Secondary - none
	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	Primary speed hundreds digit (ASCII)
4	Primary speed tens digit (ASCII)
5	Primary speed ones digit (ASCII)
6	Primary speed tenths digit (ASCII)
7	Secondary speed hundreds digit (ASCII space)
8	Secondary speed tens digit (ASCII space)
9	Secondary speed ones digit (ASCII space)
10	Secondary speed tenths digit (ASCII space)
11	Reserved (ASCII space)
12	Reserved (ASCII space)
13	Reserved (ASCII space)
14	Reserved (ASCII space)
15	Reserved (ASCII space)

For each Speed ID reported (when speeds are > 999.9) – 15 ASCII bytes:

1	Speed ID:	ASCII 7: Primary – Last/Live Target Speed
		Secondary – Locked Speed
		ASCII 8: Primary – Peak Speed
		Secondary – Highest Peak Speed
		ASCII 9: Primary – Hit Speed
		Secondary - none
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	Primary speed thousands digit (ASCII)	
4	Primary speed hundreds digit (ASCII)	
5	Primary speed tens digit (ASCII)	
6	Primary speed ones digit (ASCII)	
7	Primary speed tenths digit (ASCII)	
8	Secondary speed thousands digit (ASCII space)	
9	Secondary speed hundreds digit (ASCII space)	
10	Secondary speed tens digit (ASCII space)	
11	Secondary speed ones digit (ASCII space)	
12	Secondary speed tenths digit (ASCII space)	
13	Reserved (ASCII space)	
14	Reserved (ASCII space)	
15	Reserved (ASCII space)	
Last Byte	ASCII Carriage Return = 0x0D	

Col Format

When Resolution = **ones:**

Byte #	Content
1	Speed hundreds digit (ASCII)
2	Speed tens digit (ASCII)
3	Speed ones digit (ASCII)
4	ASCII Colon = 0x3A
5	Carriage Return (0x0D)

When Resolution = **tenths:**

Byte #	Content
1	Speed hundreds digit (ASCII)
2	Speed tens digit (ASCII)
3	Speed ones digit (ASCII)
4	Speed tenths digit (ASCII)
5	Carriage Return (0x0D)

Battery Information

The PRO II 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 toward the body until seated. Next, rotate the thumb latch to engage the ramping slot in the back of the handle.

The battery handle is not shipped fully charged. Charge it for three hours before initial use to ensure a good charge.

Operational Time using the Battery Handle

The PRO II draws the most current when it is transmitting, so the run time depends upon how often the radar transmitter is on. The PRO II also has a sleep mode to conserve battery life when it is not being operated. When operating on battery power, the sleep mode is automatically initiated after 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.

Type of Operation	High Capacity 3700 mAh Battery
	Part Number 200-0819-00
Continuous Transmitting	4.5 Hours
Typical Trigger Operation	11-13 Hours

Low Battery Warning

The **LO BAT** icon blinks when the battery runs low. The PRO II 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.
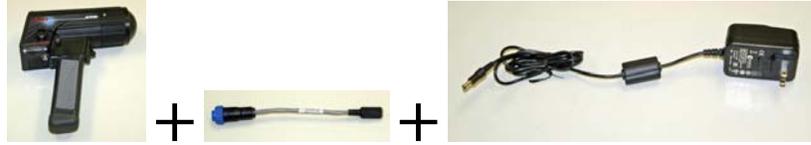
```
 MPH

LOBAT  LoU
```
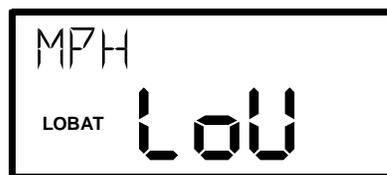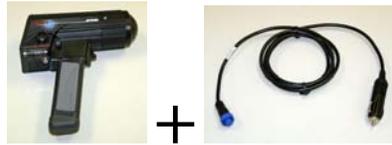
Charging the Battery Handle

The battery handle may be charged while attached to the gun body or when it is removed.

While attached to the gun, it may be charged from 90-250VAC house current or from 12VDC (nominal) power using a CIG plug. The battery handle charges whether the gun is turned on or not.

Charge with the 200-0842-00 Battery Wall Charger Cable set:

Or charge from a 12VDC (nominal) source with the 155-2232-00 12VDC CIG Cable:

A battery charge monitor is available as the last item in the Operator Menu and indicates status: charging (Ch99), charged (Ch9d) or no external voltage present (blank). If external voltage is supplied but no battery handle is attached, the main window shows Ch9d even though there is no battery. This just signifies that no charging is taking place.

When the battery handle is removed from the PRO II body, use the optional Battery Handle Charger (200-0839-00) to charge it. Power the charger from 90-250VAC house current:

Or power it from a (nominal) 12 VDC electrical system using the 015-0182-00 12VDC Power Cable:

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 automatically start when the battery is connected, and the green indicator should glow indicating that the battery is being quick charged. Quick charging should take about 3 hours to complete. After quick charging is complete, the green indicator will extinguish. 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 too 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 has a 30 minute timeout auto-shutdown feature. After 30 minutes in
sleep mode, the PRO II automatically shuts off.

How to Save Battery Life

Since the transmitter has the highest current draw, turn it 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 key to transmit)
then turn the transmitter off between sessions.

Angle Errors

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

All radar guns work on the Doppler principle and return the most accurate readings when clocking objects moving directly toward or away from the gun. Clocking at an angle results in angle error, and the gun displays a speed that is LOWER than the actual speed.

Radar Gun Placement
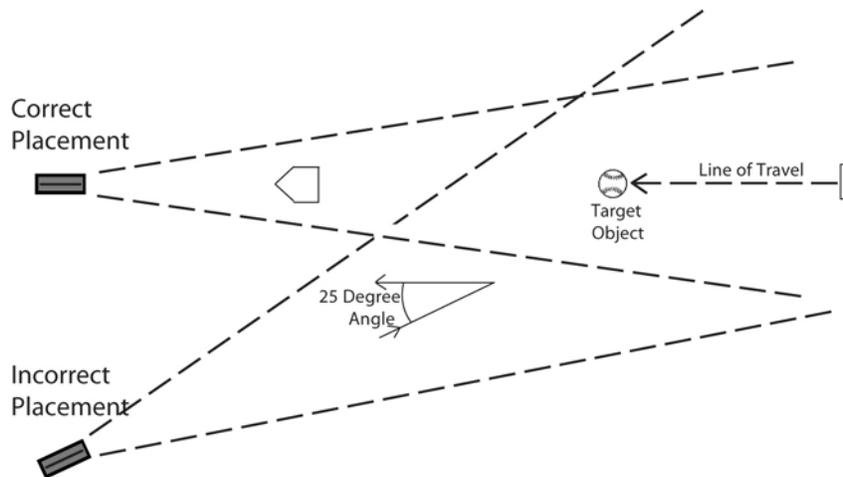
At slight angles the error is very small; however at larger angles, the error becomes substantial as the table below shows.

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
200.0 mph	200.0 mph	199.2 mph	197.0 mph	193.2 mph	173.2 mph	141.4 mph	0 mph
250.0 mph	250.0 mph	249.0 mph	246.2 mph	241.4 mph	216.5 mph	176.8 mph	0 mph

Calculating Angle Errors

If you know the angle at which you are clocking, you can manually 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, divide 129.9 by the cosine of 30 degrees (0.866) to get a true speed of 150.0 MPH.

Compensating for Angle Errors

You can configure the PRO II to compensate for angle error by changing the Cosine Angle setting in the Option Menu. In the above example, if the Cosine Angle setting is 30, the gun will display 150.0 MPH, and no manual calculations are necessary. The accuracy of the corrected speed is directly dependent on the accuracy of the underlined estimated angle error that you have set using the Option Menu.

Interference Problems

Interference Frequencies

The *S*   **PRO II** 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) which is much lower and lies between 100 Hz and 83,000 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 the actual release speed.

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.

Ways to Eliminate Interference

If you are experiencing erroneous readings, try these solutions:
Change your position to affect where the gun is aimed.
Lower the sensitivity by changing the Range in the Operator Menu to a lower setting.
If the erroneous readings are at low speeds (often interference from nearby motors) change the Low Speed setting in the Option Menu to a setting with a higher cutoff to completely eliminate all readings below the set speed. Likewise if the erroneous readings are at high speeds, change the High Speed setting to a lower cutoff.

FCC Requirements

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

PRO II Accessories

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

- ❍ **200-0819-00 High Capacity Li-Ion (3700 mAh) Battery Handle**
- ❍ **155-2232-00 12VDC CIG Cable** – Connects to the 8-Pin Interface Connector on the PRO II and plugs into a cigarette lighter receptacle. Provides external power to the gun for operation and/or battery charging.
- ❍ **200-0842-00 Battery Wall Charger Cable** – Allows charging of a battery handle (from 90-250VAC Power) while it is attached to the gun.
- ❍ **200-0839-00 High Capacity Battery Handle Charger** – Allows charging of a battery handle (from 90-250VAC Power) while it is not attached to the gun.
- ❍ **015-0182-00 12VDC Power Cable** – Used with 200-0839-00 Battery Handle Charger to allow charging of a battery handle (from a 12V CIG receptacle) while it is not attached to the gun.
- ❍ **155-2272-00 Stopwatch Cable** – A 4 foot cable with a momentary switch that connects to the 8-Pin Interface Connector.
- ❍ **155-2284-00 RS-232 Serial Cable** – Connects to the 8-Pin Interface Connector and plugs into a standard 9-Pin D Connector on a PC or other electronic device for RS-232 data output.
- ❍ **155-2278-00 Y Cable** – Combines the functions of the 12VDC CIG Cable and the RS-232 Serial Cable. One end connects to the 8-Pin Interface Connector. The other is split into a "Y" with two connectors: one ends in a Cig Plug for power, and the other ends in a 9-Pin D connector for communications with an electronic device.
- ❍ **200-0778-00** or **200-0779-00 LED Speed Sign** – Displays speeds streamed out of the PRO II serial port. The RS-232 Serial Cable or the Y Cable connects the radar gun directly to the speed sign.
- ❍ **200-0804-00 Tripod Mount** – Attaches to the radar gun body and mounts to any tripod that uses a standard 1/4-20 mounting screw.

Standard cables listed above are available to connect the gun to external power, to a speed display sign or for other interfaces.
If a user desires to make a custom cable, a mating connector for the gun's 8-pin interface connector is available from *S*   Radar or the connector manufacturer as follows:

S part number	Bulgin part number	Description
030-2507-00	PX0410-08S-6065	8-Pos Conn. with 6.0-6.5mm Glands
030-2501-00	SA3347/1	22-26ga. Solder Contacts
030-2546-00	PX0482	Gland Pack for 5-7mm Diameter Cable
030-2530-00	PX0483	Gland Pack for 3-5mm Diameter Cable

Service Information

A Check List Before Servicing the PRO II Radar

Check the Settings - If you are having a problem with your PRO II, first make sure that the settings are correct for your application. Read the Radar Configuration section. Call Customer Service at 1-877-STALKER if you need help with this.

Check the Battery - If the PRO II 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 the Battery Voltage Monitor Diagnostic described in the Diagnostic Mode section to see if the batteries are producing at least 7.2 volts. You may need to order new batteries.

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 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.

S   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 *S*   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, attempted repairs or modifications by an unauthorized service agent, or any other unusual treatment.

S   *PRO II*

Specifications

PERFORMANCE SPECIFICATIONS

Speed Range	1 – 800 MPH
Accuracy	± 3% of reading
	In onE5 resolution, round to the nearest integer;
	In tnth resolution, round to nearest tenth.
Max. Clocking Distances	500 Feet for balls
	1 ¾ Miles for an average auto

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 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	7.4 VDC, 3.7 Ah, Li-Ion
Current Requirements	Transmitting - 0.81 Amps
(At 7.4 Volts DC)	Standby - 0.30 Amps
	Sleep Mode - 0.07 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

The *S* PRO II Radar
is Manufactured by Applied Concepts, Inc.

STALKER RADAR

2609 Technology Drive

Plano, TX 75074

1-888-STALKER

(972) 398-3780 Sales

(972) 398-3781 Fax

www.stalkerradar.com

Made in U.S.A.

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011-0093-00 Rev G