

PR-100 RECEIVER

AMATEUR RADIO VERSION



- COVERS 50 CHANNELS IN THE 222/223 MHZ AMATEUR RADIO BAND PLUS 50 CHANNELS IN THE LEGACY 218/219 MHZ BAND

- .5PPM TCXO FOR SUPERIOR FREQUENCY STABILITY

Operating Manual



COMMUNICATIONS SPECIALISTS, INC.
426 WEST TAFT AVENUE • ORANGE, CA 92865-4296
714.998.3021 • FAX 714.974.3420
US & CANADA 800.854.0547 • FAX 800.850.0547
www.com-spec.com

TABLE OF CONTENTS

- SIMPLE HAM RADIO LICENSING	Page 2
- HOW THE SYSTEM WORKS	Page 3
- PR-100 RECEIVER SPECIFICATIONS	Page 4
- PR-100 RECEIVER CONTROLS	Page 5
- ANTENNA JACK	Page 6
- METER	Page 6
- RANGE SWITCH	Page 7
- ON-OFF-BATTERY TEST SWITCH	Page 7
- VOLUME CONTROL	Page 7
- TUNE CONTROL	Page 8
- CHANNEL SELECTOR	Page 8
- BATTERY COMPARTMENT	Page 8
- HEADPHONE JACK	Page 9
- USING THE PR-100 TO FIND YOUR TRANSMITTER	Page 10
- ANTENNA	Page 12
- CHANNEL TO FREQUENCY LIST (MHz)	Page 14
- ORDERING	Page 15
- ACCESSORIES	Page 16
- FCC COMPLIANCE INFORMATION	Back-
- ABOUT US	Cover
- WARRANTY	



COMMUNICATIONS SPECIALISTS, INC.
426 WEST TAFT AVENUE • ORANGE, CA 92865-4296
714.998.3021 • FAX 714.974.3420
US & CANADA **800.854.0547** • FAX 800.850.0547
www.com-spec.com

Introduction by Gordon West **WB6NOA**

SIMPLE HAM RADIO LICENSING



It is easy to obtain your Amateur Radio entry level Technician Class license.

The licensed amateur radio operator, nicknamed a “ham”, has unrestricted full privileges on all VHF and UHF bands. These unrestricted privileges include the popular 6 meter band for Radio Control (R/C) operation, plus the 222 MHz band for HIGH POWER R/C, rocket, pet, and hidden "T" transmitters.

Simple ham radio licensing puts you at 1 FULL WATT on R/C 6 meter channels with nearly unrestricted power levels on 222 MHz R/C channels.

The Communications Specialists, Inc. 222 MHz transmitters are designed for licensed ham radio operation on vacant interstitial “channels” throughout the 222 MHz – 225 MHz ham band. The 25 millisecond pulse won’t usually be detected by ham operators using conventional FM (Frequency Modulated) mobile or handheld transceivers. Your sensitive Communications Specialists receiver employs SSB (Single Sideband) filtering so narrow that the receiver won’t pick up voice ham radio transmissions either!

Recent FCC rulemaking has simplified the entry level ham radio test. **MORSE CODE HAS BEEN ELIMINATED FOR ALL LEVELS OF HAM RADIO EXAMINATION.** The multiple choice exam has been rewritten to a grade school level. All examination questions, plus the correct multiple choice answers, are published in my Technician Class book, word for word! The test is only 35 Q&A’s with 74% pass requirement. Study time with my book is approximately 20 days, and you take the exam from 3 accredited, local volunteer ham examiners. The FCC issues your license about 7 days later.

To order my book and/or my software and CD audio courses, simply call, toll free, 1-800-669-9594. If you want to learn more about ham radio or my ham classes, see www.gordonwestradioschool.com, or call me with your questions at 1-714-549-5000. Tell them Gordon West and Communications Specialists, want you on the air as a licensed Technician Class ham radio operator. Complete the course, earn your license, and go **LONG RANGE** with Communications Specialists products.

HOW THE SYSTEM WORKS

A miniature transmitter is installed in an R/C plane, rocket, pet collar, or any other item. It also may be hidden for "T" hunting. It transmits either a low or high power, pulsed, radio frequency signal in the 222/223 MHz Amateur Band. This signal is picked up by a folding directional antenna (that rivals a yagi in performance) attached to a very sensitive handheld receiver. As the antenna is pointed towards the transmitter, the signal becomes louder in the receiver. This allows you to "home-in" or DF (direction find) the transmitted signal and locate it. This is the same system biologists use to track wild animals and can be used anywhere in the world. A system is comprised of a PR-100 receiver, which can be shared for club use, and up to 50 transmitters operating simultaneously without interference. Locate the transmitter day or night in the least possible time and avoid unnecessary intrusions into backyards or private property. The range is over 5 miles on the ground and over 50 miles in the air with Communications Specialists' High Power transmitters and up to 1 mile with Communications Specialists' Low Power transmitters. The transmitters are sold separately. The PR-100 is a TCXO controlled, synthesized PLL design, that will not drift in frequency under any temperature extremes.

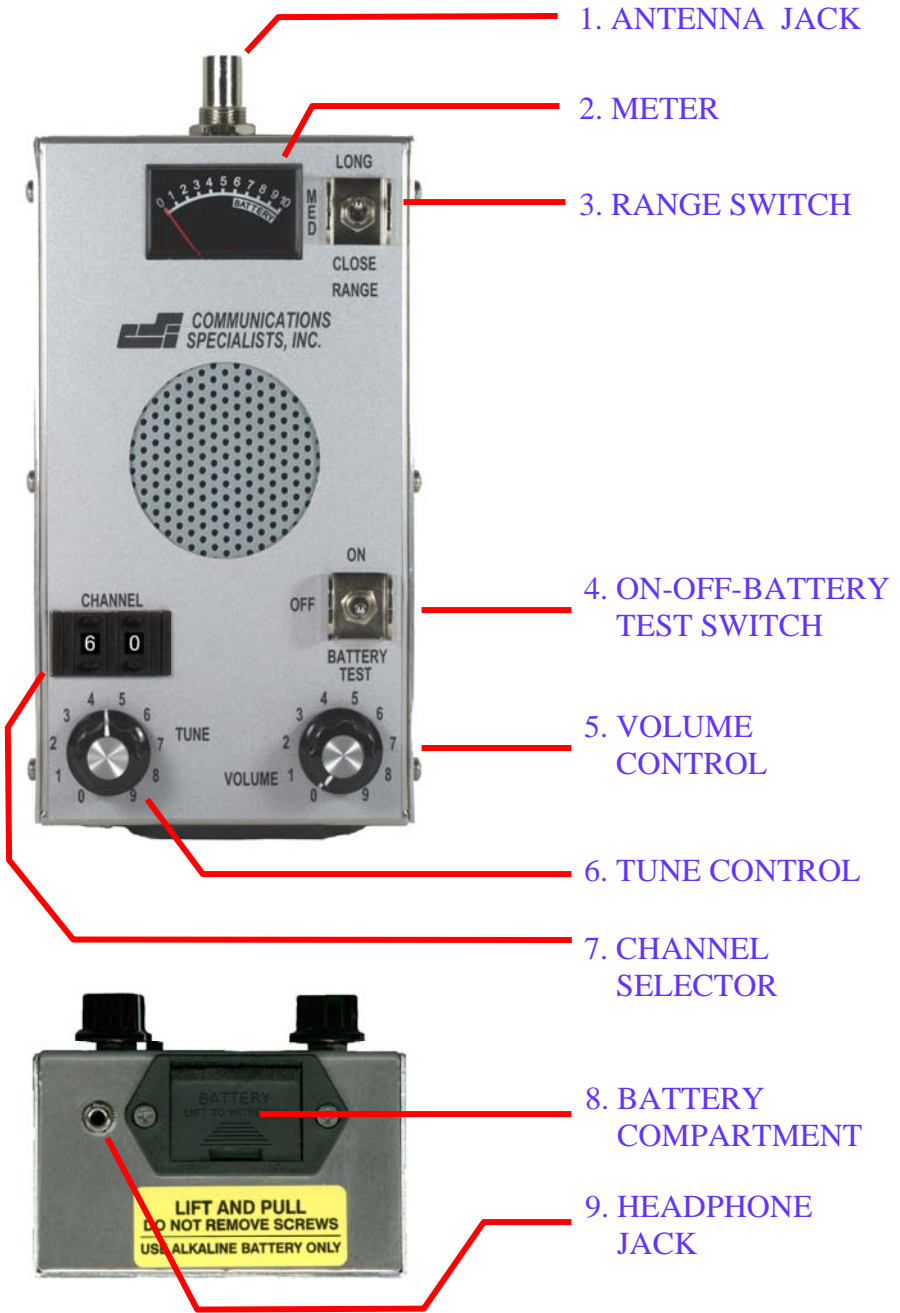
A partial list of compatible Communications Specialists transmitters is shown below. All are TCXO controlled, synthesized PLL designs. They all operate on any one of 50 channels in the 222/223 MHz Amateur Band.

PT-1B Low power (1mW) for R/C planes and "T" hunting
AT-2B High power (50 mW) for rockets, R/C planes, and "T" hunting
AT-2A High power (long life 123A battery)
CT Low power pet collar for cats
DT Low power pet collar for small dogs
PT-1D Low power pet collar for large dogs (long life 123A battery)
PT-1H Low power heavy duty pet collar
PT-1 Low power hanging transmitter for kids or walk-aways

MODEL PR-100 RECEIVER SPECIFICATIONS

- Frequency coverage: 50 channels in the 222/223 MHz Amateur Radio band plus 50 channels in the legacy 218/219 MHz band (100 total channels)
- Fine tuning: + or - 500Hz from channel center
- Extremely good MDS sensitivity: -150dBm
- IF filtering: 10.7MHz 8 pole NBFM crystal filter, 455kHz 8 pole ceramic filter
- Front end: Dual MOSFET with 6 helical resonators, high side injection eliminates interference from television transmitters
- Mode of operation: SSB/CW
- Frequency stability: PLL controlled by .5 PPM TCXO
- Attenuator: 3 step (0dB, -30dB, -60dB)
- Antenna jack: standard BNC female
- Headphone jack: standard 3.5mm monaural
- Loud, great sounding audio for in vehicle use
- Powered by standard, easy to change, 9v alkaline battery
- Housed in a rugged aluminum case
- Supplied with FA-3 high gain (+5dB) Moxon, highly directional folding antenna for easy to use one handed operation
- Weight with FA-3 directional antenna is 31 ounces
- Size: 6.3" x 3.5" x 2.7" without antenna, FA-3 directional antenna is 20.25" x 10.5", folded footprint is 11.25" x 4.5"
- Full 1 year warranty
- Fast same day shipping
- Easy website ordering
- Can be shared for club use
- Price: \$249.95 including battery, FA-3 folding antenna, and FA-3-C carrying case

PR-100 RECEIVER CONTROLS



1. ANTENNA JACK

The antenna jack accommodates the coaxial cable with BNC plug from the supplied FA-3 folding directional antenna. To install the BNC plug, grasp it in one hand and the receiver in the other, push the BNC plug into the receiver antenna jack while turning the knurled nut clockwise until it locks into place. Twist the knurled nut counterclockwise until it stops and gently pull the BNC plug straight out to remove it.

2. METER

The meter on the PR-100 has two uses. The first is to measure the relative strength of the incoming signal from your transmitter. Use the **VOLUME CONTROL** to set the meter around mid scale. Use the changes in upward meter movement in addition to listening to the transmitter's pulsed signal to determine when the signal is the strongest. The meter is also used to measure battery condition when the **ON-OFF-BATTERY TEST SWITCH** is in the **BATTERY** position. The battery indication box on the bottom part of the meter scale will indicate the battery voltage remaining. A six (6) on the meter is six (6) volts remaining (almost totally discharged battery). A nine (9) on the meter indicates nine (9) volts remaining (a good battery). Replace the battery when the needle falls into the bottom of the battery indication box.

3. RANGE SWITCH

The RANGE SWITCH is a three (3) position switch used to attenuate (lower) the signal coming from the antenna to the receiver so it is not overloaded by a strong signal. In LONG, there is no attenuation, so the receiver is listening with full sensitivity. In the MED (or medium) position, approximately 30dB of attenuation is inserted between the antenna and receiver. In CLOSE another 30dB of attenuation is inserted for a total of 60dB. To DF your transmitter, always start in the LONG position to make sure it can be heard. If you are able to hear it, change the switch position to MED and see if it can still be heard. If it can not, go back to LONG, adjust the VOLUME CONTROL so the meter indicates around mid scale and turn around in a full circle pointing the antenna away from you in order to find the strongest pulsed signal strength. The strongest signal strength will be the direction where the transmitter is located. Walk in that direction until you can move to the MED position and still hear the signal. Continue to walk in the direction of the strongest signal until you can move to the CLOSE position. When you can hear the transmitter in the CLOSE position with the antenna pointing towards the strongest signal, you should be close enough to see it.

4. ON-OFF-BATTERY TEST SWITCH

In the OFF position, no battery current is drawn. This is how the switch should be left when the PR-100 is not in use. When switched to the ON position, the PR-100 is active and drawing current from the battery. In the BATTERY position, the condition of the battery under load is tested and the results are available on the METER.

5. VOLUME CONTROL

The VOLUME CONTROL is used to raise or lower the audio level to the speaker and meter circuit. Adjust it to suit your own preference. Note that it is easier to DF a signal that falls around mid scale on the METER than one banging against the upper meter stop.

6. TUNE CONTROL

The TUNE CONTROL is used to fine tune the receiver over a 1 kHz total range (500 Hz to 1500 Hz high of the exact frequency selected by the channel selector). This allows you to adjust the frequency of the received audio tone within limits. The narrow tuning limit also guarantees the transmitter will be heard, no matter where the TUNE CONTROL is set.

7. CHANNEL SELECTOR

The CHANNEL SELECTOR is a two (2) position push wheel switch. To advance to a higher channel, simply push the + button located under the switch window. To go to a lower channel, push the - button located over the switch window.

8. BATTERY COMPARTMENT

The BATTERY COMPARTMENT on the bottom of the PR-100 houses the 9 volt alkaline battery in a pull-out drawer. To open the drawer, place one of your fingernails in the slot on the bottom edge of the drawer and lift up with your finger until the drawer snaps upward. Then pull the drawer out. **DO NOT REMOVE THE TWO SCREWS HOLDING IN THE BATTERY COMPARTMENT!** With the drawer in your hand, pop up the battery and replace it, if discharged, with a new alkaline battery. Be sure to note the proper battery polarity when placing the battery back in the drawer. If you force the battery in with reversed polarity, the PR-100 will not work but will not be damaged. Simply remove the battery drawer and flip the battery over.

Battery life at moderate volume levels is approximately ten (10) hours. To conserve battery life, turn the PR-100 off when not in use. Keeping a spare battery in your pocket, carrying case pocket, or vehicle is a good idea.

9. HEADPHONE JACK

A standard 3.5 mm (1/8") mono headphone plug can be inserted into this jack for use in noisy environments. If a stereo headphone is plugged in, audio will normally only be heard in one ear. When a plug is inserted into the jack, the internal speaker in the PR-100 is disconnected.

USING THE PR-100 TO FIND YOUR TRANSMITTER

As soon as you install a battery in your transmitter, make sure it is operating properly by listening to it with your PR-100 set to the proper channel. This will insure that the battery was properly installed and that it is functioning. When you want to locate it, follow the directions below.

1. Momentarily put the ON-OFF-BATTERY TEST SWITCH on the PR-100 in the BATTERY TEST position to make sure the battery tests O.K. on the meter.
2. Extend the elements of the FA-3 directional antenna. Turn the ON-OFF-BATTERY TEST SWITCH to ON and set the VOLUME CONTROL to a comfortable listening level.
3. Dial in the CHANNEL SELECTOR to the channel of your transmitter. You should be able to hear the pulses from it with the RANGE SWITCH in the LONG position. If you can not, hold the PR-100 level in your hand, use vertical antenna polarity to start with and turn around in a full circle and see if you hear it. If you can not, try horizontal antenna polarity and try again.

Horizontal Polarity



Vertical Polarity



4. If you still do not hear the transmitter, you will have to change location to get closer to it. Try getting the antenna higher by standing on a truck bed, second story balcony, or nearby hill. Use a vehicle to get closer. Have the passenger, not the driver, hold the PR-100 while pointing the antenna out the window until the transmitter is heard. Range will be shorter with the antenna inside the vehicle, so stop now and then, get outside, and turn around in a full circle to increase it. If you are in hilly terrain, drive as high as possible, get outside the vehicle, and turn around in a full circle until the transmitter is heard. Some vehicles generate considerable interference even with the key off. Get outside the vehicle if this is a problem.

5. When you hear the transmitter, note its direction, and head towards it. As the pulsing signal gets stronger, change the RANGE SWITCH to the MED position. Raise or lower the VOLUME CONTROL to keep the meter indication around mid scale.

6. Recheck for proper direction and continue. When you get close to the transmitter, you can change the RANGE SWITCH to the CLOSE position and generally walk towards the strongest signal until you find it.

7. It is a VERY good idea to try a few dry runs having someone else hide the transmitter with you finding it using the above method.



PR-100 SHOWN WITH FOLDING FA-3 ANTENNA.

ANTENNA

Each PR-100 receiver is supplied with an FA-3 antenna. It is a high gain, directional, antenna that attaches directly to the receiver and connects to the antenna jack. The antenna elements must be fully extended as shown in Figure A to find the direction of your transmitter. The elements lock into place when unfolded. To collapse the antenna elements, slide the numbered buttons in as you gently fold in the elements as shown in Figure B.

The directional FA-3 antenna comes with two interchangeable pistol grip handles. You can choose to use the grip color you like, or you can use the receiver without a grip. The grip slides into the bracket beneath the antenna and will lock into place with a small click. To remove the grip, depress the grip release button slightly and slide the grip free.



A carrying case is included as well. The case has a left and right side belt loop so it can be attached to a belt and worn while searching for your transmitter, or used to protect the receiver and antenna during storage. There is a small pocket on the case for storing spare 9 volt batteries.

Figure A

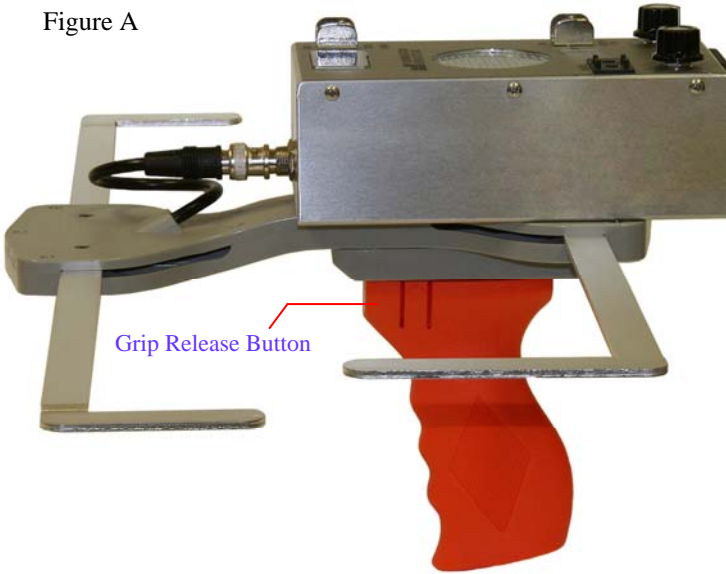


Figure B

To collapse the antenna elements, slide the numbered buttons starting with position 1 as you gently fold in the elements. Repeat for positions 2 through 4. When opening the antenna it does not matter which order the elements are unfolded.



CHANNEL TO FREQUENCY LIST (MHz)

PR-100 Amateur Radio Channel to Frequency List (MHz)

	60-69		70-79		80-89		90-99		00-09
60	222.250	70	222.450	80	222.650	90	222.850	00	223.110
61	222.270	71	222.470	81	222.670	91	222.870	01	223.130
62	222.290	72	222.490	82	222.690	92	222.890	02	223.150
63	222.310	73	222.510	83	222.710	93	222.910	03	223.170
64	222.330	74	222.530	84	222.730	94	222.930	04	223.190
65	222.350	75	222.550	85	222.750	95	222.950	05	223.210
66	222.370	76	222.570	86	222.770	96	222.970	06	223.230
67	222.390	77	222.590	87	222.790	97	222.990	07	223.250
68	222.410	78	222.610	88	222.810	98	223.010	08	223.270
69	222.430	79	222.630	89	222.830	99	223.090	09	223.290

Legacy R/C, Pet, and Captive Wildlife Channel to Frequency list (MHz)

	10-19		20-29		30-39		40-49		50-59
10	218.025	20	218.275	30	218.525	40	218.775	50	219.075
11	218.050	21	218.300	31	218.550	41	218.850	51	219.100
12	218.075	22	218.325	32	218.575	42	218.875	52	219.125
13	218.100	23	218.350	33	218.600	43	218.900	53	219.150
14	218.125	24	218.375	34	218.625	44	218.925	54	219.175
15	218.150	25	218.400	35	218.650	45	218.950	55	219.200
16	218.175	26	218.425	36	218.675	46	218.975	56	219.225
17	218.200	27	218.450	37	218.700	47	219.000	57	219.250
18	218.225	28	218.475	38	218.725	48	219.025	58	219.275
19	218.250	29	218.500	39	218.750	49	219.050	59	219.300

ORDERING

Order using VISA, MasterCard, Discover, PayPal, check, or money order by toll-free phone, FAX, mail, web or E-mail.

FAST SAME DAY SHIPPING



PR-100 RECEIVER \$249.95

Model PR-100 includes battery, FA-3 antenna, and FA-3-C carrying case.

STANDARD ACCESSORIES:

FA-3 Spare high gain,
directional antenna
\$59.95



FA-3-C Spare receiver/antenna case
\$10.00



OPTIONAL ACCESSORIES:

RA-13 Monaural headphone,
comfortable, well padded, coiled
cord, mono 3.5 mm plug, and
separate level control for each ear.
\$36.95



QA-8 Monaural headphone adaptor,
1/4" female to 3.5 mm male \$9.95



FCC COMPLIANCE INFORMATION

The PR-100 complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference including interference that may cause undesired operation. Changes or modifications not expressly approved by Communications Specialists, Inc. could void the user's authority to operate the equipment.

ABOUT US

Communications Specialists, Inc. has been building quality electronic products that the amateur radio, land mobile, wildlife telemetry, aviation, R/C, and pet industries have come to rely on for over 40 years. At our Orange California factory, we utilize the latest in surface mount assembly technology to assure consistent quality throughout our entire product line. All our products are made in the USA.

WARRANTY

The PR-100 is warranted to be free of defects in materials and workmanship for a period of one (1) year from the date of purchase. If you need to take advantage of our warranty, please follow these steps:

1. Securely package the PR-100.
2. Include a note as to the nature of the problem.
3. Include your shipping address and a daytime phone number or E-Mail address.
4. Ship to:



COMMUNICATIONS SPECIALISTS, INC.
426 WEST TAFT AVENUE • ORANGE, CA 92865-4296
714.998.3021 • FAX 714.974.3420
US & CANADA **800.854.0547** • FAX 800.850.0547
www.com-spec.com