PR-100A 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

- .5 PPM TCXO FOR SUPERIOR FREQUENCY STABILITY UNDER ALL TEMPERATURE CONDITIONS

- NEW 4 POSITION RF GAIN SWITCH FOR PINPOINT CLOSE-IN POSITION ACCURACY

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

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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.

MODEL PR-100A 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: -20, -40, -70dB switchable
- 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
- External power jack: standard circ., 5.5mm x 2.1mm, center positive
- 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
- Size: 6.2"x3.5"x1.4", less projections
- Overall size with antenna folded: 12"x4.75"
- Overall size with antenna extended: 20.25"x11.25"
- Weight: 18oz without antenna, 31oz with antenna
- 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

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-100A 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-100A 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-1 Low power hanging transmitter for kids or walk-aways

PR-100A RECEIVER CONTROLS

1. ANTENNA JACK
2. LIGHTED METER
3. RF GAIN SWITCH
4. SPEAKER
5. ON-OFF-BATTERY TEST SWITCH
6. VOLUME CONTROL
7. TUNE CONTROL
8. CHANNEL SELECTOR

9. BATTERY COMPARTMENT
10. HEADPHONE JACK
11. DC POWER JACK

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-100A 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 TEST 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. RF GAIN SWITCH

The RF GAIN SWITCH is a 4 position rotary switch that is used to attenuate the signal going from the antenna to the PR-100A. This is so the PR-100A is not overloaded by a strong signal. In HIGH there is no attenuation, therefore the PR-100A is listening with full sensitivity. In the second CCW (counter clockwise) switch position approximately 20dB of attenuation is inserted between the antenna and the PR-100A. In the third CCW switch position another 20dB is inserted for a total of 40dB. In the LOW or full CCW switch position another 30dB is inserted for a total of 70dB. To DF your transmitter, always start in the HIGH position to make sure it can be heard and

you are satisfied with the pitch of the received tone (as set by the TUNE CONTROL). If you are able to hear your transmitter, change switch positions to the second CCW position and see if it can still be heard. If it can not, go back to HIGH, reduce the volume so the meter indicates around half scale and turn around in order to find the strongest signal strength. This will show what direction your transmitter is. Walk or drive in that direction until you can move the RF GAIN SWITCH to the second CCW position and still hear the signal. Continue to walk or drive in the direction of the strongest signal strength until you can change the RF GAIN SWITCH to the third CCW position. Finally, when you can change it to the LOW or full CCW position, you should be in sight of it.

4. SPEAKER

A large, full audio range speaker is used to provide very good sound quality. Keep liquids, dirt, sand, and other foreign material from falling into the small holes in the speaker grill.

5. 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-100A is not in use. When switched to the ON position, the PR-100A is active and drawing current from the battery. In the BATTERY TEST position, the condition of the battery under load is tested and the results are available on the METER.

6. 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.

7. 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.

8. 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.

9. BATTERY COMPARTMENT

The BATTERY COMPARTMENT on the bottom of the PR-100A 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-100A 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 four (4) hours. To conserve battery life, turn the PR-100A off when not in use. Keeping a spare battery in your pocket, carrying case pocket, or vehicle is a good idea.

10. 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 be normally only be heard in one ear. When a plug is inserted into the jack, the internal speaker in the PR-100A is disconnected.

11. DC POWER JACK

The DC power jack is used to power the PR-100A with or without a battery in the BATTERY COMPARTMENT. Use the CM-1, 12vdc power cable, to connect to the cigarette lighter socket in the vehicle. If either an alkaline, NiMH, or Li-Polymer battery is installed, the battery is automatically bypassed and no current is drawn from it when this jack is used.

CHANNEL TO FREQUENCY LIST (MHz)

PR-100A 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

USING THE PR-100A 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-100A set to the proper channel. This will insure that the battery was properly installed and that it is functioning. Follow the directions below to locate your transmitter.

1. Momentarily put the ON-OFF-BATTERY TEST SWITCH on the PR-100A 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 RF GAIN SWITCH in the HIGH position. If you can not, hold the PR-100A 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.

Vertical Polarity

Horizontal 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-100A 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 RF GAIN SWITCH to one of the two middle positions. 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 RF GAIN SWITCH to the LOW position (Full CCW) 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.

ANTENNA

The PR-100A is supplied with a high gain, directional antenna that attaches directly to the receiver. In order to find your transmitter's direction, the antenna elements must be fully extended as shown on page 10. You may change the polarity by rotating the receiver with your hand. The photos on page 10 show both vertical and horizontal polarization. Hold the PR-100A as shown in the photos and try both vertical and horizontal polarization while turning your body around in a circle. See which polarity either gives the loudest signal or the most accurate bearing information.

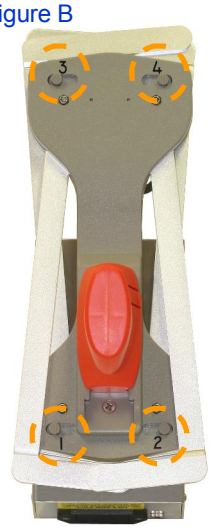
The directional antenna comes with a removable pistol grip handle. You can use the receiver with or without the grip. The grip slides into the bracket beneath the antenna and will lock into place with a small click. To remove the grip, depress the grip release button slightly and slide grip free as shown in Figure A.

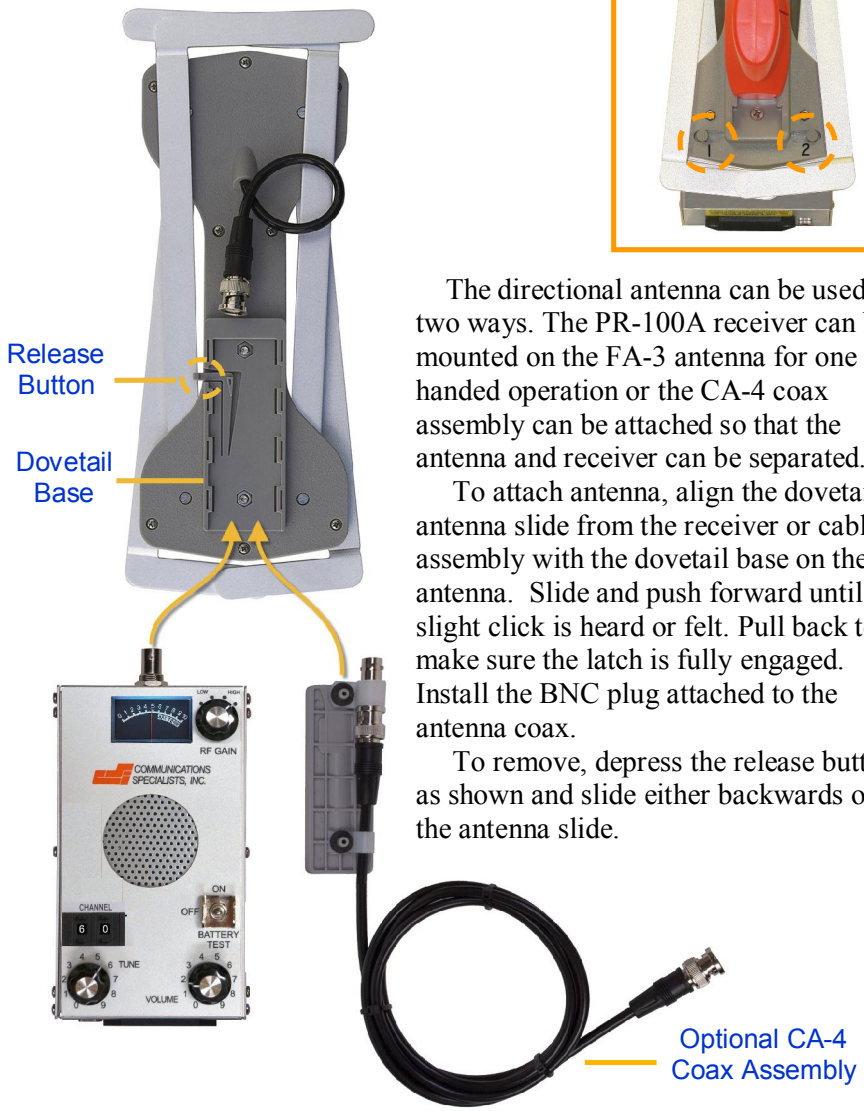
A holster style carrying case is supplied with the receiver. It can be attached to a belt and worn while searching for your transmitter, or used to protect the receiver and antenna during storage. There is a small pocket on the case for storing spare 9 volt batteries.

Figure A

To collapse the antenna elements, slide the numbered buttons shown in Figure B. Start 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.

Figure B





The directional antenna can be used in two ways. The PR-100A receiver can be mounted on the FA-3 antenna for one handed operation or the CA-4 coax assembly can be attached so that the antenna and receiver can be separated.

To attach antenna, align the dovetail antenna slide from the receiver or cable assembly with the dovetail base on the antenna. Slide and push forward until a slight click is heard or felt. Pull back to make sure the latch is fully engaged. Install the BNC plug attached to the antenna coax.

To remove, depress the release button as shown and slide either backwards off the antenna slide.

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-100A RECEIVER
$249.95

Model PR-100A 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 level control for each ear.
$36.95

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

CA-4 Coax Assembly 5' long with molded BNC connectors, barrel connector, and clamps assembled on antenna slide so antenna can be used when detached from PR-100A $11.95

CM-1 12vdc Cigarette lighter power cable $12.95

* FA-3 and FA-3-C are shipped at no extra cost with each PR-100A

TROUBLESHOOTING

The PR-100A sounds different than it used to:
-Test battery and replace if the needle is below 8 on the meter.
(see page 5)

Unable to hear signal from transmitter:
-Set the Receiver to the proper channel
-Set the RF GAIN SWITCH to the high position, fully clockwise.
(see page 5)

Notes:

FCC COMPLIANCE INFORMATION

The PR-100A 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-100A 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-100A.
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:

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