AMECO DELUXE CODE PRACTICE OSCILLATOR AND MONITOR
OPERATING INSTRUCTIONS FOR MODELS CPS-KL, CPS-WL, CPS-KT, CPS-WT

Insert the line cord plug into a 110 V. AC or DC receptacle. IF DC is used, it may be necessary to reverse the plug. Hook the key up to the two terminals marked "KEY". If you desire to use a speaker, hook the two wires coming from the speaker to the two terminals marked "SPKR. or PHONES". Should you want to use headphones instead of the speaker, disconnect the speaker leads from the "SPKR. or PHONES" terminals and connect a pair of headphones to these two terminals. Then turn the switch on and adjust the pitch and volume controls for the most desirable tone.

If more than one key is to be used, they should all be hooked in parallel. If two or more sets of headphones are to be used, they too should be hooked in parallel.

CONVERTING CODE PRACTICE OSCILLATOR INTO CW MONITOR

In order to convert the Ameco Code Practice Oscillator into a CW monitor, the following steps should be taken:

1. Disconnect and remove the lead that connects the plate of the 35W4 (pin 5) to the switch.
2. Disconnect the negative (black) lead of the filter condenser from the ground point of the oscillator and tape it up. (Note that the ground point of the oscillator is NOT the chassis. It is the terminal A that the negative lead of the filter condenser was originally connected to).
3. Connect a 0.1 mfd. 400 volt condenser from pin 7 of the 35W4 socket to terminal A.
4. Obtain a 3 foot length of line cord wire and form a two-turn loop (2 inches in diameter) at one end. See diagram. Pass the other end of the line cord through the hole marked "MON." at the rear of the chassis and tie a knot in the line cord on the inside of the chassis.
5. Connect one of the line cord leads to pin 5 of the 35W4. Connect the other line cord lead to terminal A of the oscillator.

The unit is now ready to operate as a CW monitor.

OPERATION OF THE CW MONITOR

In order to monitor a CW signal, place a shorting wire across the two "KEY" terminals and connect the speaker or phones to the two "SPKR. or PHONES" terminals. Place the link near the cold end of the final tank coil of the transmitter. The exact distance between the link (or loop) and the final tank coil depends upon the output power of the transmitter. Move the link close enough to the coil so that sufficient RF energy is picked up to operate the audio oscillator. Then adjust the pitch and volume controls for best results.

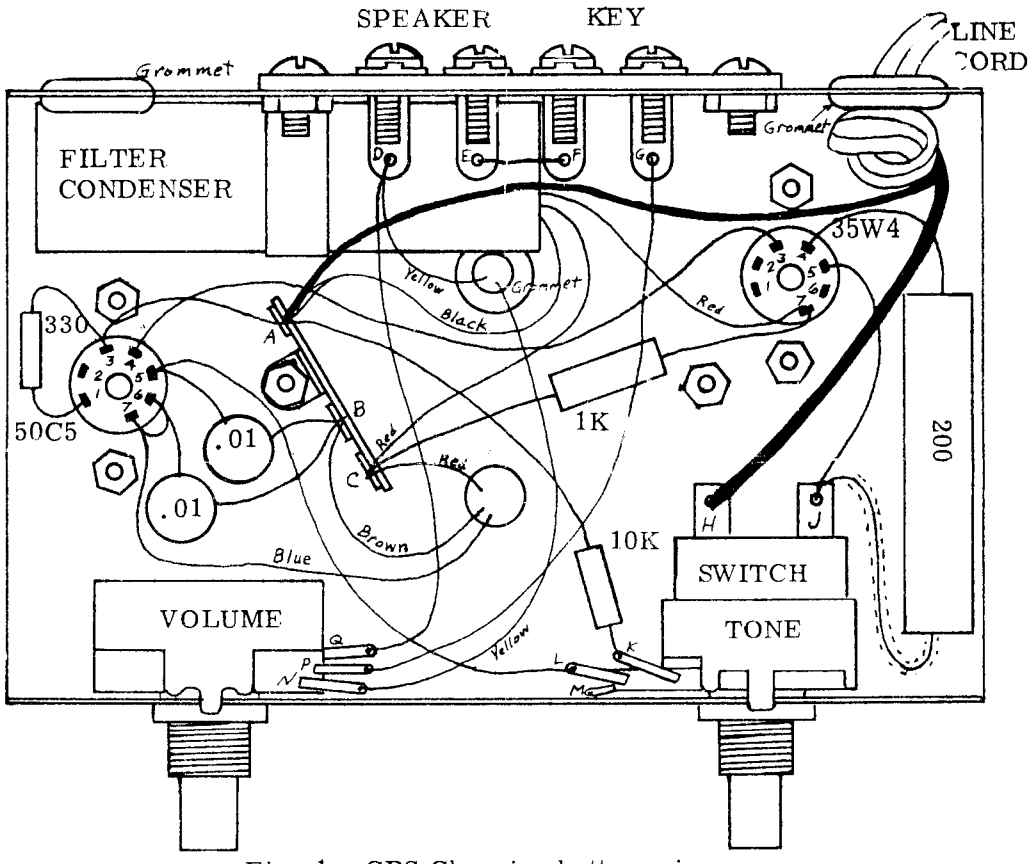


Fig. 1. CPS Chassis, bottom view.

LB

NOTES ON CONVERTING CODE PRACTICE OSCILLATOR TO A MONITOR

If the above instructions for converting the Code Practice Oscillator to a monitor are followed, satisfactory results will be achieved for practically all transmitters currently found on the market. However, there are a few transmitters with which the monitor will not perform in a satisfactory manner. In these few cases, it will be necessary to add the circuit shown below in Fig. 4.

When this circuit is added to the monitor, it is no longer necessary to couple a loop into the transmitter. This also reduces the possibility of television interference. The tuned circuit and the monitor antenna take the place of the loop and can be placed at a distance from the transmitter.

If the transmitting antenna is very far from the monitor and coaxial cable is used, use a coaxial "T" fitting in the transmission line. Connect the pickup antenna of the monitor to the center terminal of the middle portion of the "T". Use a 1 to 5 mmfd. condenser between the "T" fitting and the wire to the monitor antenna connection. If the transmitting antenna is very far from the monitor and a twin lead transmission line is used, lay part of the monitor antenna along the transmission line for pickup purposes.

In converting the oscillator to a monitor using the method shown below, follow the first three steps above. Eliminate steps 4 and 5. After the circuit is hooked up to the monitor, short the terminals marked KEY with a small piece of wire. Connect the speaker or phones to the two "SPKR. or PHONES" terminals. Select the coil tap and tune the variable condenser for maximum volume from the monitor when the transmitter is on the air. A weak or chirpy sound indicates insufficient signal. A little closer coupling between the monitor and the transmitter would be needed. The performance as a monitor is as clean as when the CPS is used as a practice oscillator.

The parts for this additional circuit may be purchased in any electronic parts store or from Ameco Equipment Corp. Prices are shown in the circuit in Fig. 4.

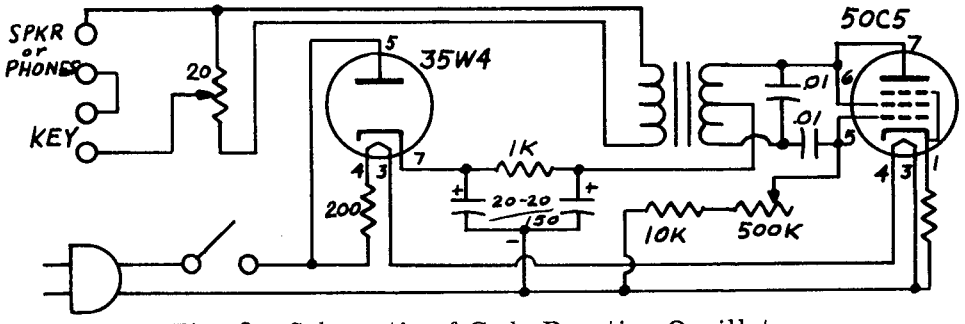


Fig. 2. Schematic of Code Practice Oscillator.

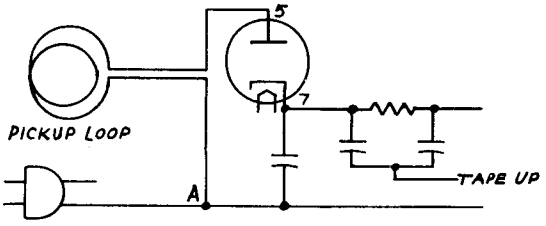
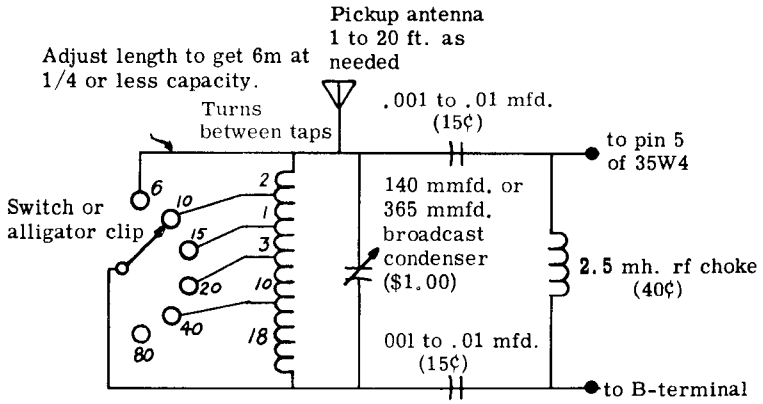


Fig. 3. Changes for operation as Monitor.



34 turns on 1-1/4" form. #22 enamelled wire. Spread out 1 and 2 turn sections. Space between sections - about 1/16" (cost of form - 50¢)

Fig. 4. Tuned pickup unit for Monitor.

LB CPS-OP. INST.

INSTRUCTIONS FOR AMECO CODE PRACTICE OSCILLATOR KITS, MODELS CPS-KL AND CPS-KT

PARTS LIST

Quantity	Description	Quantity	Description
1	Cabinet	8	6/32 x 1/4 screws
1	Chassis	4	6/32 x 1/4 flat head screws
1	4 inch PM Speaker	12	6/32 nuts
1	500K Tone Control and Switch	12	#6 Lockwashers
1	20 ohm WW Volume Control	4	Control nuts
1	200 ohm 10 watt resistor	2	Control lockwashers
1	10K, 1/2 W. resistor (brown, black, orange)	2	Spade lugs
1	330 ohm, 1/2W. resistor(orange, orange, brown)	1	Length insulated sleeving
1	1K, 1 W. resistor (brown, black, red)	1	12" length twin wire for speaker
1	20x20 mfd., 150V. condenser	2	7 pin sockets
2	.01 mfd. condenser	2	Knobs
1	Transformer, Ameco No. T-140	1*	35W4 Tube
1	4 screw terminal strip	1*	50C5 Tube
1	4 lug tie point strip		Hookup wire
1	Line cord with plug	1	Instruction Sheet
3	Rubber grommets		

*Only in Model CPS-KT.

GENERAL INSTRUCTIONS

1. Check the parts in the kit with the Parts List. Should inspection reveal a missing part, notify the factory in writing. There should be no shortage of parts since all kits leaving the factory are thoroughly inspected. A slight difference in value between the actual part and the Parts List does not mean that you have the wrong part. For instance, the kit may have a 500 ohm resistor while the Parts List calls for a 510 ohm resistor. Both parts will work equally well.
2. Follow the Step-by-Step Instructions carefully. Double check frequently and do not attempt short cuts. The instructions have been written so as to complete the kit in the shortest time and with the least difficulty.
3. Use a rosin core solder to solder all connections. Make sure that the soldering iron is properly tinned and clean before soldering any connections.

STEP-BY-STEP ASSEMBLY

1. Mount the two tube sockets from the top of the chassis, using 6/32 round head screws, lockwashers and nuts. See Fig. 1 for the correct positioning of the wide spacing between two of the socket terminals. The lockwasher should be placed between the nut and the chassis.
2. Mount the 4 screw terminal strip on the rear of the chassis. See Fig. 1 for the correct position of the strip since there are actually two positions that it can be mounted in. Use a 6/32 screw, a lockwasher and a nut on the mounting hole near the 35W4 socket. Use the other mounting hole to mount the filter condenser. Bend the strap on the filter condenser slightly so that the condenser fits neatly into the corner of the chassis.
3. Place grommets at three holes: one at each end of the back of the chassis (near the ends of the 4-screw terminal strip) and the other in the top of the chassis, near the rear. See Fig. 1.
4. Mount the transformer on the top of the chassis, using two 6/32 screws, two lockwashers and two nuts. Note the position of the transformer leads in Fig. 1.

NOTE: The standard transformer color code is used in these instructions. Some may be different.

Three wires come from one side of the transformer.
The red wire must go as shown. The other wires from this side of the transformer are interchangeable, regardless of color. These three wires must go through the front hole in the chassis top.
The leads of the other winding come out of the other side of the transformer. There are only two leads from this winding, both are of one color, polarity is of no importance.
Mount the 4-lug terminal strip using the transformer mounting hole nearest the 50C5 socket. See Fig. 1 for the correct position of this strip.

5. Mount the volume control and the tone control on the front of the chassis as illustrated in Fig. 1. Use a lockwasher between the control and the chassis and a nut outside the chassis.

WIRING

For best results, refer frequently to Fig. 1 for placement of parts and leads. In some cases, more than one wire or part will go to the same terminal. This situation will be indicated in the instructions by the abbreviation (CR). This will mean that the connection should be crimped but NOT soldered until other leads have been connected to the terminal. When the last lead has been connected, the joint should be soldered

and this will be indicated by the abbreviation (S). The number such as (S-2) refers to how many leads must be in place before soldering.

The leads on some of the parts may be longer than necessary. When wiring these parts, cut the leads to the proper length. The wiring will thus be neat and will help insure proper operation.

At times the instructions will refer to the "top, bottom, right or left". Bear in mind that these terms are used with reference to your looking at the underneath of the chassis with the controls facing you.

1. Run a length of hookup wire from pin 3 of the 35W4 (S1) to pin 4 of the 50C5 (S1).
2. Connect one of the positive (red) leads of the filter condenser to pin 7 of the 35W4 (CR).
3. Run the other positive (red) lead of the filter condenser to terminal C (CR).
4. Run the negative (black) lead of the filter condenser to terminal A (CR).
5. Run a length of hookup wire from pin 5 of the 35W4 (S1) to terminal J of the switch on the tone control(CR).
6. Connect the 200 ohm, 10 watt resistor from pin 4 of the 35W4 (S1) to terminal J of the switch (S2). Use insulated sleeving to prevent the leads of the resistor from touching other terminals or parts.
7. Run a length of hookup wire from the center terminal L of the tone control (S1) and pin 5 of the 50C5 (CR).
8. Connect the 330 ohm resistor between pin 3 of the 50C5 (CR) and pin 1 of the 50C5 (S1).
9. Run a length of hookup wire between pin 3 of the 50C5 (S2) and terminal A (CR).

NOTE: The standard transformer color code is used in these instructions. Some may be different.
Three wires come from one side of the transformer.
The red wire must go as shown. The other wires from this side of the transformer are interchangeable, regardless of color. These three wires must go through the front hole in the chassis top.
The leads of the other winding come out of the other side of the transformer. There are only two leads from this winding, both are of one color, polarity is of no importance.

10. Connect the blue lead of the transformer to pin 7 of the 50C5 (CR).
11. Run a small piece of bare wire between pin 6 of the 50C5 (CR) and pin 7 of the 50C5 (S2).
12. Connect a .01 condenser between pin 6 of the 50C5 (S2) and terminal B (CR).
13. Connect the other .01 condenser between pin 5 of the 50C5 (S2) and terminal B (CR).
14. Connect the brown transformer lead to terminal B (S3).
15. Connect the red lead of the transformer to terminal C (CR).
16. Connect one yellow lead from the transformer to terminal N of the volume control (S1). Carefully scrape off the enamel coating on that part of the lead that will be soldered to the terminal first.
17. Connect the other lead from the transformer to terminal D (CR).
18. Run a length of hookup wire between terminal D (S2) and terminal Q of the volume control (S1).
19. Run a length of hookup wire between terminal G of the 4-screw terminal strip (S1) and the center terminal P of the volume control (S1).

19A. Run a piece of bare wire from terminal E (S1) to terminal F (S1).

20. Connect a 10K resistor between terminal K of the tone control (S1) and terminal A (CR).
21. Connect a 1K resistor between pin 7 of the 35W4 (S2) and terminal C (S3).
22. Put the line cord through the grommet at the right end of the chassis. Tie a knot in the line cord on the inside of the chassis.
23. Connect one end of the line cord to the empty terminal on the switch (terminal H) (S1).
24. Connect the other end of the line cord to terminal A (S4).

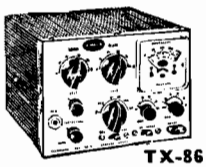
The chassis itself is now completely wired. Go over the wiring again and check it carefully against the instructions and diagrams to make sure that everything is correct. Also, check to see that adjacent wires or terminals do not touch each other (assuming, of course, that they are not supposed to touch each other).

25. Mount the speaker in the cabinet - using the 4 binding head screws, 4 washers and 4 nuts. The voice coil terminals should be facing the top of the cabinet.
26. Take the 12 inch piece of twin wire and solder the two spade lugs to one end. Fasten the two spade lugs to the terminals marked "SPKR OR PHONES" at the rear of the chassis. Pass the other end of the wire into the chassis, through the grommet at the left rear of the chassis. Pass the wire also out through the grommet in the top of the chassis, along with the two yellow leads.
27. Place the chassis into the cabinet and fasten the chassis against the cabinet with the two remaining control nuts.
28. Run the pair of leads up to the two lugs on the speaker voice coil (S).
29. Put the tubes in the correct sockets and place the knobs on the controls.

The assembly of the Code Practice Oscillator is now complete and it is ready for use. See instructions for operation of the Oscillator.

AMECO Amateur Gear, Accessories

MODEL TX-86 HAM BAND TRANSMITTER


TX-86

Compact, versatile ham band transmitter handles 90 watts CW and phone on 6 through 80 meters. Ideal for mobile and fixed station use. Final 6146 operates straight-through on all bands. Pi-network output will feed antennas of 35 to 600 ohms. Other features include: Exclusive modulator circuit, audio gain control, potentiometer drive control (no detuning), push-to-talk mike jack, TVI filtered. Can take crystal or VFO. **Power Requirements:** 6.3 v. at 3.2 a., 12.6 v. at 1.6 a., 300 v. at 75 ma, and 600 v. at 150 ma. **Size:** 7″ w. x 7″ d. x 5″ h.

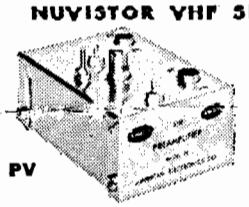
Ameco Model TX-86K Ham Band Transmitter—Kit. Specify 6 or 12 v. filament. Net Each..... **$89.95**

Ameco Model TX-86W Ham Band Transmitter—Wired and tested. Specify 6 or 12 v. filament. Net Each..... **$119.95**

Ameco Model W612A Mobile Supply—Wired and tested. Net Each..... **$54.95**

Ameco Model PS-3 Power Supply—Wired and tested. Net Each..... **$44.95**

NUVISTOR VHF SINGLE BAND PREAMPLIFIER


PV

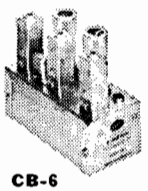
For 27 (CB), 28, 50, 144, or 220 mc. Over 20 db gain. Will improve gain and noise figure considerably. Two tuned circuits and one 6CW4 Nuvistor are used. **Noise Figure:** 2.0 db at 27 mc, 2.5 db at 50 mc, 3.0 db at 144 mc, 4.0 db at 220 mc. **Power Required:** 110–150 v. at 8 ma and 6.3 v. at .135 a. **Ameco Model PV Nuvistor Preamplifier**—Wired and tested. Specify frequency desired. Net Each..... **$13.95**

HIGH FREQUENCY PREAMPLIFIER

For any band, 80, 40, 20, 15 or 10 meters. Has a better noise figure than most multiband receivers. Minimum gain is 20 db. Two tuned circuits will improve image and spurious rejection. Uses 6CB6 tube. Especially effective on 10 or 15 meters.

Ameco Model PH Preamplifier—Wired and tested. Complete with tube. Specify frequency desired. Net Ea. **$13.95**

MODEL CB TUBE TYPE CONVERTERS


CB-6

Compact 2- and 6-meter converters feature low noise and high gain. IF output easily changed to any frequency to meet any possible future change of receiver. **Noise Figure:** Less than 4 db. **Gain:** Over 30 db. **IF, Image and Spurious Rejection:** Over 70 db. **Tube Complement:** 2-meter unit—6ES8 low noise Cascode first RF amp., 6U8 second RF amp./mixer and 6J6 osc./mult. 6-meter unit—6ES8 Cascode RF amp., 6U8 mixer/osc. **Power Required:** 2-meter unit—100–150 v. at 28 ma and 6.3 v. at 1.26 a. 6-meter unit—100–150 v. at 16 ma and 6.3 v. at .85 a. **Size:** 2½″ w. x 5″ d. x 2″ h.

Ameco Model CB-6K 6-Meter Converter—Kit. Specify IF output. Net Each..... **$19.95**

Ameco Model CB-6W 6-Meter Converter—Wired and tested. Specify IF output. Net Each..... **$27.50**

Ameco Model CB-2K 2-Meter Converter—Kit. Specify IF output. Net Each..... **$23.95**

Ameco Model CB-2W 2-Meter Converter—Wired and tested. Specify IF output. Net Each..... **$33.95**

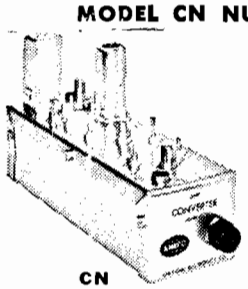
POWER SUPPLY

Delivers 50 ma at 125 v. DC and 2 amps at 6.3 v. AC from 115 v. AC input. Plugs directly into all Ameco CN and CB units.

Ameco Model PS-1K Power Supply—Kit form. Net Each..... **$10.50**

Ameco Model PS-1W Power Supply—Wired and tested. Net Each..... **$11.50**

MODEL CN NUVISTOR CONVERTERS


CN

Use of three Nuvistors plus one tube gives an extremely low noise figure and high gain. Will never become obsolete since the IF output is easily changed to match any receiver. Special circuit to reduce overload from strong stations. **Noise Figure:** 2.5 db at 50 mc, 3.0 db at 144 mc, 4.0 db at 220 mc. **Gain:** 45 db, average. **Image and Spurious Rejection:** Better than 70 db. **IF Rejection:** Better than 100 db. **Control:** Gain. **Power Required:** 100–150 v. at 30 ma; 6.3 v. at .84 a. **Size:** 2½″ w. x 6¾″ d. x 2½″ h.

Ameco Model CN-50W, CN-144W, or CN-220W Nuvistor Converter—Wired and tested for any one band, using any IF output (specify). Net Each..... **$49.95**

Ameco Model CN-50K, CN-144K or CN-220K Nuvistor Converter—Kit. For any one band, using any IF output (specify). Net Each..... **$34.95**

CODE PRACTICE OSCILLATOR, KITS

Available in kit or wired form. Produces a pure, steady tone without clicks or chirps. Will handle a large number of headphones or keys. Converts easily to an excellent CW monitor. Variable tone control and volume control. Built-in 4″ speaker. Operates on 110 volts AC or DC.

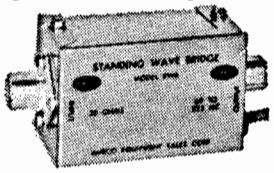
Ameco No. CPS-KL—Kit form, less tubes. Net Each..... **$11.95**

Ameco No. CPS-WL—Wired, less tubes. Net Each..... **$13.15**

Ameco No. CPS-KT—Kit, including tubes. Net Each.. **13.75**

Ameco No. CPS-WT—Wired, with tubes. Net Each.... **14.95**

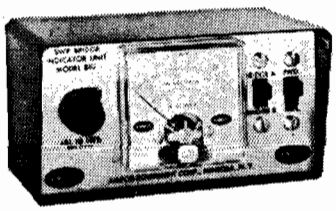
MODEL SWB STANDING WAVE BRIDGE



Reads SWR accurately from 1.8 mc to 225 mc. Handles up to 1 kw. Quality inductive coupling can be left in the line continuously without insertion loss. Contains two SO-239 VHF connectors. **Size:** 4½″ w. x 1¾″ d. x 2¼″ h.

Ameco Model SWB Standing Wave Bridge—Wired and tested. Net Each..... **$9.95**

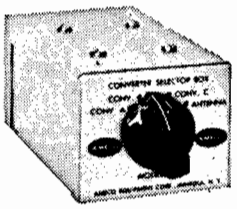
MODEL BIU BRIDGE INDICATOR UNIT



Accurately indicates SWR, % of power and % of voltage (three scales) when used with Ameco SWB or other bridge. Contains a sensitive 100 μa 2⅛″ square d'Arsonval meter. Switching circuit provides for reading either one of two bridges. **Size:** 5″ w. x 2¾″ d. x 2″ h.

Ameco Model BIU Bridge Indicator Unit—Wired and tested. Net Each..... **$15.95**

MODEL CSB CONVERTER SWITCH BOX



Makes band switching possible with several VHF converters. Four-position selector switch allows to switch any one of up to three converters or connects the receiver directly to the low band antenna. A single switch automatically switches both RF and power. Plugs directly into Ameco PS-1 power supply and Ameco Converters or any other makes. **Size:** 2½″ w. x 4½″ d. x 2″ h.

Ameco Model CSB Converter Switch Box—Kit. Complete with all plugs and cables. Net Each... **$9.95**

TECHNICAL BOOKS

No. 3-01 Radio-Electronics Made Simple—Simplified explanation of radio theory written for the layman's complete understanding. Covers basic electricity and all phases of radio through transmitters and receivers. 200 pages. Price Each **$1.95**

No. 5-01 Amateur License Guide—Prepares for Novice, Technician, Conditional and General classes of radio operation. Over 200 questions and answers similar to ones of FCC exams. 32 pages. Price Each..... **50c**

No. 6-01 Mastering the Morse Code—Beginning study for learning International Morse Code. Includes alphabet, how to send, how to receive, hook-up of an oscillator, etc. 32 pages. Price Each..... **50c**

No. 7-01 TV Antennas—Describes the various types of TV antennas and their uses. Provides information for installation and repair. Written in the layman's language. 32 pages. Price Each..... **50c**

No. 8-01 Commercial Radio Operator's Q & A License Guide, Elements 1 and 2—First of a series, covers FCC exams by questions and detailed, simplified answers. Provides answers for Third Class permit. Price Each..... **75c**

No. 9-01 Commercial Q & A License Guide, Element 3—Second in the series for FCC exams. Includes questions and answers plus a sample FCC exam. With Elements 1 and 2, it provides answers for Second Class permit. Price Each..... **$1.75**

No. 10-01 Commercial Q & A License Guide, Element 4—Covers last element required to obtain a First Class Radiotelephone license. Detailed questions and answers with a sample FCC exam. Price Each..... **$1.25**

No. 11-01 Transistor Theory and Circuit Made Simple—Explains both the theory and the applications of transistor in a simple straight-forward manner. Includes many practical circuits. Written for servicemen, amateurs, experimenters and engineers. 128 pages. Price Each..... **$1.75**

CODE AND THEORY COURSES

No. 1—Junior Code Course. Consists of 10 recordings (alphabet through 7½ W. P. M.). Includes typical FCC type code exams. Free instruction book on learning how to send and receive code the simplest, fastest way; plus charts to check your receiving accuracy; plus leatherette bound album. **$6.95**

No. 100-01 Junior Code Course—78 rpm. Net Each.....

No. 100-45 Junior Code Course—45 rpm. Net Each..... **$5.95**

No. 100-33 Junior Code Course—33⅓ rpm. Net Each... **4.95**

No. 2—Senior Code Course. Includes everything in No. 1 course plus 12 more recordings (alphabet through 18 W. P. M.), plus typical FCC type code exams for General Class and 2nd Class Commercial telegraph licenses. Includes album. **$11.50**

No. 101-01 Senior Code Course—78 rpm. Net Each....

No. 101-45 Senior Code Course—45 rpm. Net Each... **$10.50**

No. 101-33 Senior Code Course—33⅓ rpm. Net Each.. **9.50**

No. 3—Complete Radio Theory Course. A complete, simplified home study theory course in radio covering the novice, technician, conditional and general classes—all under one cover—with over 400 typical FCC type questions to prepare for license examination. No technical background required. **$3.95**

No. 102-01 Radio Amateur Theory Course—Net Each...

No. 4—Advanced Code Course. Prepares novice operators for the amateur general class and second class commercial license tests. Contains 12 recordings (8 through 18 W. P. M.) plus a complete code book; plus typical FCC code examinations for general and commercial tests. **$5.95**

No. 103-01 Advanced Code Course—78 rpm. Net Each...

No. 103-45 Advanced Code Course—45 rpm. Net Each... **$4.95**

No. 103-33 Advanced Code Course—33⅓ rpm. Net Each. **4.95**