



An Easy-to-Build SIDEBAND ADAPTOR for your CB receiver

By Herb Friedman, 2W6045

SINGLE-SIDEBAND operation, a technique that multiplies effective transmitter power, is now a reality on the Citizens Band. But try to tune an SSB signal on your transceiver and all you'll get is a slightly seasick Donald Duck. Though sideband has much to offer CBers, it is not compatible with normal AM signals or equipment. It needs additional processing to convert a carrier-less signal to something which can be detected by any CB receiver. EI's SSB adaptor does this processing.

Without modifying your rig, you can add our adaptor and be able to monitor any SSB signal that comes your way. The adaptor actually is a crystal-controlled oscillator that generates the carrier missing from an incoming SSB signal. Both signals mix in the receiver and sideband modulation is made intelligible. The adaptor may be used with any type receiver, tunable or crystal controlled. Oscillator drift in the receiver, a problem in receiving SSB, is not a factor in this system. Since the carrier is generated outside the receiver, a tuning control on the adaptor permits fine frequency adjustment of the injected carrier. The unit is easy to build and the parts cost only about six dollars.

Construction. The adaptor is built on the U section of a small Minibox. Lead dress is somewhat critical so follow the pictorial as closely as possible. J1 and J2 are coaxial jacks which must match your existing connectors. Battery B1 can be any miniature 9-volt transistor type, strapped to the Minibox by a length of wire passed through two solder lugs.

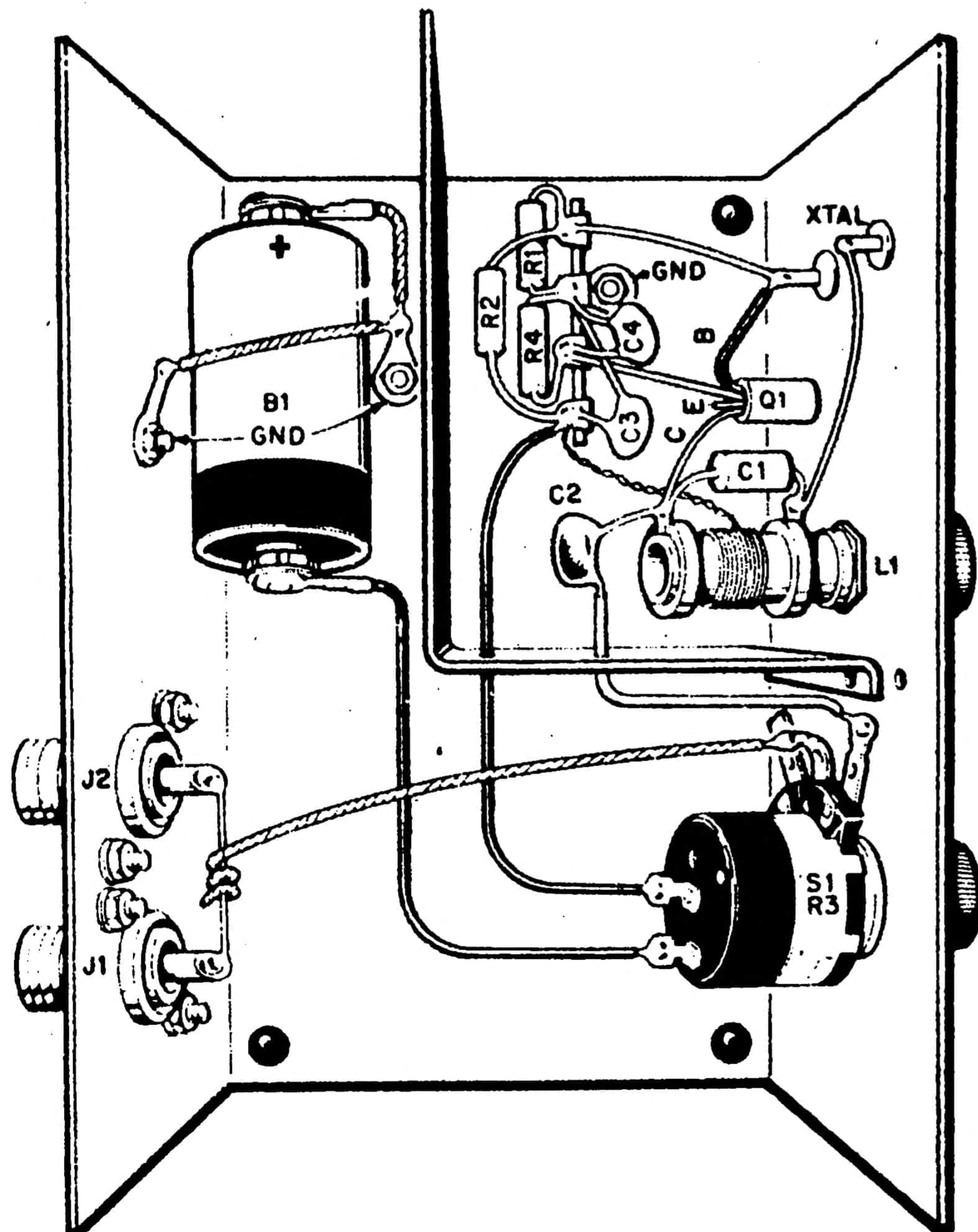
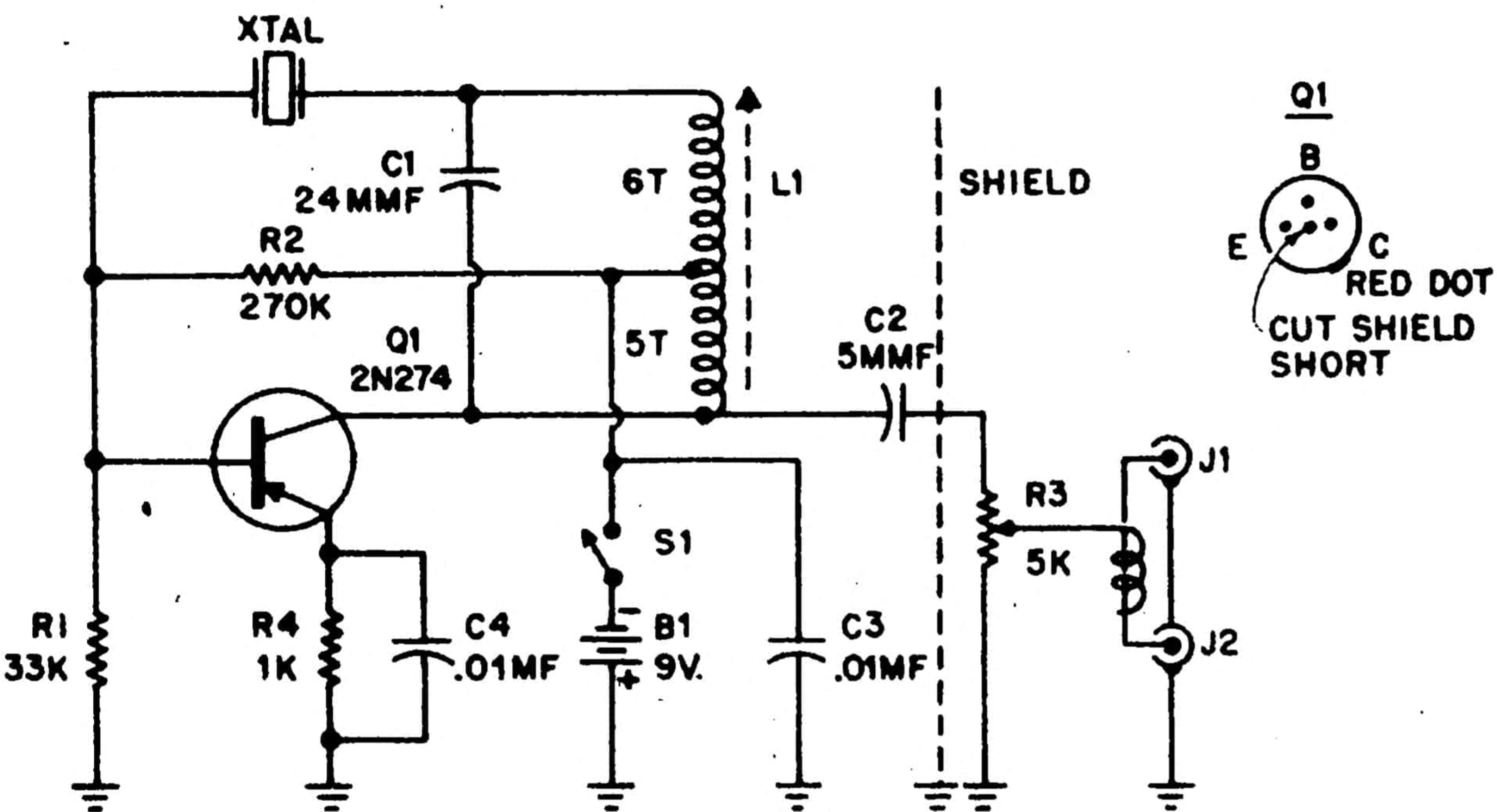
L1 must be wound carefully on the coil form. Scrape the insulation off one end of a length of #22 enameled wire and attach it to the coil terminal adjacent to the mounting nut. Tightly wind six close-wound turns and bring the wire away from the form about 3 inches. Loop the free end back to the form and continue to wind five more close-wound turns in the same direction as the original six. Scrape off the insulation and fasten the free end to the other coil terminal. Scrape all the insulation off the middle loop, twist it and tin with solder. This

will form the centertap connection.

When soldering the transistor leads, avoid damage by using a heat sink, such as an alligator clip, on each lead.

After the circuit is wired, install the shield. Cut it from scrap aluminum or tin to fit snugly around all components, as shown. The shield extends the full height of the U section and to the right end. Using a $\frac{3}{16}$ bit, drill two holes in the shield for B1's negative and C2's leads. The negative battery lead passes through the hole at the bottom of the shield. The insulated lead from C2

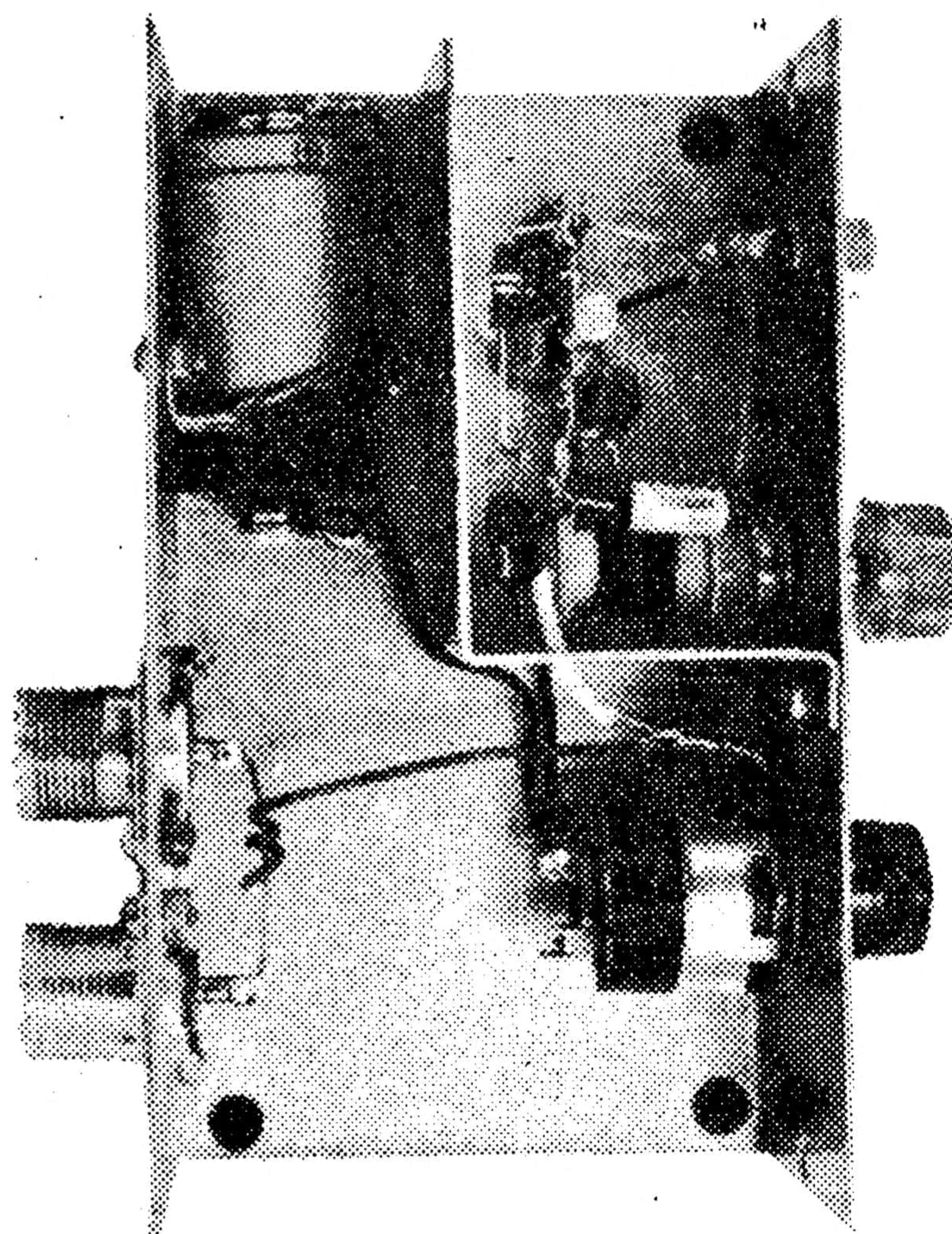
Circuit is a crystal-controlled transistor oscillator. Coil L1 permits fine frequency adjustments, needed for SSB reception.



passes through the hole approximately one third down from the top. Make certain C2 is mounted *inside* the shield.

The output lead from injection control R3 is pulled taut and wrapped two or three times around the J1-J2 jumper. Do not remove the insulation from this lead; no solder connection is required at the wrap-around point.

Calibration and Use. An overtone transmit crystal is plugged into the crystal socket on the adaptor. There are two possibilities. If your crystals are of the series type, they will bring in the



L-shape shield, seen in the photo above, keeps the oscillator coil from radiating excessively strong RF carrier signal to the CB receiver.

PARTS LIST

R1—55,000 ohms
R3—5,000-ohm

**R5—5,000-Unit Potentiometer
Capacitors:**

CI-24 mmf molded mica

C1—24 mmf molded mica
C2—5 mmf molded mica

C3,C4-.01 mf, 75-V

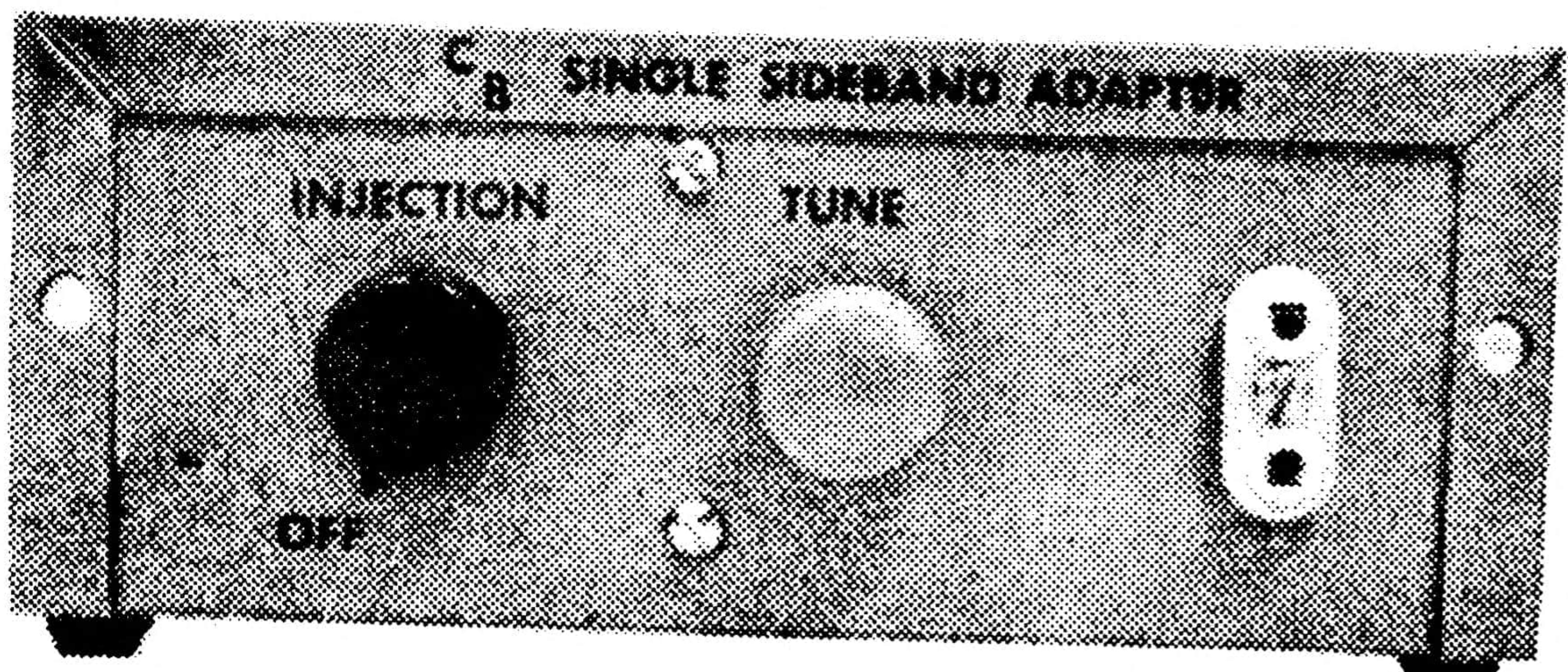
Q1—2N274 transistor
LI—Coil form, slug tuned, Cambridge Thermionic,
270-280-300-320-340-360-380-400-420-440-460-480-500-520-540-560-580-600-620-640-660-680-700-720-740-760-780-800-820-840-860-880-900-920-940-960-980-1000-1020-1040-1060-1080-1100-1120-1140-1160-1180-1200-1220-1240-1260-1280-1300-1320-1340-1360-1380-1400-1420-1440-1460-1480-1500-1520-1540-1560-1580-1600-1620-1640-1660-1680-1700-1720-1740-1760-1780-1800-1820-1840-1860-1880-1900-1920-1940-1960-1980-2000-2020-2040-2060-2080-2100-2120-2140-2160-2180-2200-2220-2240-2260-2280-2300-2320-2340-2360-2380-2400-2420-2440-2460-2480-2500-2520-2540-2560-2580-2600-2620-2640-2660-2680-2700-2720-2740-2760-2780-2800-2820-2840-2860-2880-2900-2920-2940-2960-2980-3000-3020-3040-3060-3080-3100-3120-3140-3160-3180-3200-3220-3240-3260-3280-3300-3320-3340-3360-3380-3400-3420-3440-3460-3480-3500-3520-3540-3560-3580-3600-3620-3640-3660-3680-3700-3720-3740-3760-3780-3800-3820-3840-3860-3880-3900-3920-3940-3960-3980-4000-4020-4040-4060-4080-4100-4120-4140-4160-4180-4200-4220-4240-4260-4280-4300-4320-4340-4360-4380-4400-4420-4440-4460-4480-4500-4520-4540-4560-4580-4600-4620-4640-4660-4680-4700-4720-4740-4760-4780-4800-4820-4840-4860-4880-4900-4920-4940-4960-4980-5000-5020-5040-5060-5080-5100-5120-5140-5160-5180-5200-5220-5240-5260-5280-5300-5320-5340-5360-5380-5400-5420-5440-5460-5480-5500-5520-5540-5560-5580-5600-5620-5640-5660-5680-5700-5720-5740-5760-5780-5800-5820-5840-5860-5880-5900-5920-5940-5960-5980-6000-6020-6040-6060-6080-6100-6120-6140-6160-6180-6200-6220-6240-6260-6280-6300-6320-6340-6360-6380-6400-6420-6440-6460-6480-6500-6520-6540-6560-6580-6600-6620-6640-6660-6680-6700-6720-6740-6760-6780-6800-6820-6840-6860-6880-6900-6920-6940-6960-6980-7000-7020-7040-7060-7080-7100-7120-7140-7160-7180-7200-7220-7240-7260-7280-7300-7320-7340-7360-7380-7400-7420-7440-7460-7480-7500-7520-7540-7560-7580-7600-7620-7640-7660-7680-7700-7720-7740-7760-7780-7800-7820-7840-7860-7880-7900-7920-7940-7960-7980-8000-8020-8040-8060-8080-8100-8120-8140-8160-8180-8200-8220-8240-8260-8280-8300-8320-8340-8360-8380-8400-8420-8440-8460-8480-8500-8520-8540-8560-8580-8600-8620-8640-8660-8680-8700-8720-8740-8760-8780-8800-8820-8840-8860-8880-8900-8920-8940-8960-8980-9000-9020-9040-9060-9080-9100-9120-9140-9160-9180-9200-9220-9240-9260-9280-9300-9320-9340-9360-9380-9400-9420-9440-9460-9480-9500-9520-9540-9560-9580-9600-9620-9640-9660-9680-9700-9720-9740-9760-9780-9800-9820-9840-9860-9880-9900-9920-9940-9960-9980-10000-10020-10040-10060-10080-10100-10120-10140-10160-10180-10200-10220-10240-10260-10280-10300-10320-10340-10360-10380-10400-10420-10440-10460-10480-10500-10520-10540-10560-10580-10600-10620-10640-10660-10680-10700-10720-10740-10760-10780-10800-10820-10840-10860-10880-10900-10920-10940-10960-10980-11000-11020-11040-11060-11080-11100-11120-11140-11160-11180-11200-11220-11240-11260-11280-11300-11320-11340-11360-11380-11400-11420-11440-11460-11480-11500-11520-11540-11560-11580-11600-11620-11640-11660-11680-11700-11720-11740-11760-11780-11800-11820-11840-11860-11880-11900-11920-11940-11960-11980-12000-12020-12040-12060-12080-12100-12120-12140-12160-12180-12200-12220-12240-12260-12280-12300-12320-12340-12360-12380-12400-12420-12440-12460-12480-12500-12520-12540-12560-12580-12600-12620-12640-12660-12680-12700-12720-12740-12760-12780-12800-12820-12840-12860-12880-12900-12920-12940-12960-12980-13000-13020-13040-13060-13080-13100-13120-13140-13160-13180-13200-13220-13240-13260-13280-13300-13320-13340-13360-13380-13400-13420-13440-13460-13480-13500-13520-13540-13560-13580-13600-13620-13640-13660-13680-13700-13720-13740-13760-13780-13800-13820-13840-13860-13880-13900-13920-13940-13960-13980-14000-14020-14040-14060-14080-14100-14120-14140-14160-14180-14200-14220-14240-14260-14280-14300-14320-14340-14360-14380-14400-14420-14440-14460-14480-14500-14520-14540-14560-14580-14600-14620-14640-14660-14680-14700-14720-14740-14760-14780-14800-14820-14840-14860-14880-14900-14920-14940-14960-14980-15000-15020-15040-15060-15080-15100-15120-15140-15160-15180-15200-15220-15240-15260-15280-15300-15320-15340-15360-15380-15400-15420-15440-15460-15480-15500-15520-15540-15560-15580-15600-15620-15640-15660-15680-15700-15720-15740-15760-15780-15800-15820-15840-15860-15880-15900-15920-15940-15960-15980-16000-16020-16040-16060-16080-16100-16120-16140-16160-16180-16200-16220-16240-16260-16280-16300-16320-16340-16360-16380-16400-16420-16440-16460-16480-16500-16520-16540-16560-16580-16600-16620-16640-16660-16680-16700-16720-16740-16760-16780-16800-16820-16840-16860-16880-16900-16920-16940-16960-16980-17000-17020-17040-17060-17080-17100-17120-17140-17160-17180-17200-17220-17240-17260-17280-17300-17320-17340-17360-17380-17400-17420-17440-17460-17480-17500-17520-17540-17560-17580-17600-17620-17640-17660-17680-17700-17720-17740-17760-17780-17800-17820-17840-17860-17880-17900-17920-17940-17960-17980-18000-18020-18040-18060-18080-18100-18120-18140-18160-18180-18200-18220-18240-18260-18280-18300-18320-18340-18360-18380-18400-18420-18440-18460-18480-18500-18520-18540-18560-18580-18600-18620-18640-1866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CTC—PLS5-2C4L/B. (Allied Radio
11-18-61)

J1,J2—Coaxial connectors (see Diagrams I and II).

BI-9-V transistor type battery
Misc.—Crystal and socket; 4-lug terminal strip; aluminum case 5 $\frac{1}{4}$ " x 2 $\frac{1}{4}$ " x 3"

At lower left of wiring guide, notice how insulated wire is wound around J1-J2 jumper.



Transmitting crystal plugs into socket at the right. Both the injection and tuning knobs are carefully adjusted for the clearest audio signal from an SSB transmission.

SSB signal on the *same* channel marked on the crystal. Many rigs, however, use *parallel* crystals and require different treatment. (You can identify crystal type by examining the schematic of your CB transmitter: if the crystal goes from the grid of the oscillator tube to ground, it's a parallel type.) When parallel crystals are used, they must be one channel higher than the one you wish to receive. Thus, an SSB signal on channel 6 requires a channel 7 crystal of the parallel type.

Now connect a 0-10 milliammeter in series with the negative lead of the battery and start rotating L1's slug from its full-in position. Turn counterclockwise until the meter shows a noticeable increase in current. This indicates the crystal is oscillating properly.

The adaptor next is hooked to your receiver. Connect J1 to the antenna input on the CB rig and J2 to the antenna. Tune the receiver to a normal CB signal on the desired channel and turn on the adaptor's power switch. If everything is operating correctly, you should hear a heterodyne (or whistling sound) along with the modulation. When the slug of L1 is rotated slowly the pitch of the heterodyne changes from high to low—then back to high. The precise point to find is the zero beat. It occurs *between* the two high-pitch points. In this tuning position the heterodyne should disappear.

After you get an SSB signal, make a fine adjustment on the adaptor. Begin by tuning the signal for maximum audio. You won't be able to make out words, but it's not difficult to judge strongest sound. With the adaptor power on, adjust both R3 and the coil slug until the speech becomes intelligible. It's a little tricky at first, but the technique is soon learned. Just be sure

that the coil slug is never rotated too far from the zero-beat setting found earlier on a normal station. (The heterodyne is not present on an SSB station, regardless of coil setting.)

Until you get the hang of tuning an SSB signal, we suggest you practice this way: Tune in an SSB signal of moderate strength—not too strong and not too weak. Set R3 to approximately mid-position. Slowly adjust L1's slug until the high-pitched chatter becomes recognizable speech. Then adjust R3 for optimum signal.

On weak SSB signals, it's possible for the adaptor to inject excessively strong signals into your receiver. The remedy is to reduce R3 (full counterclockwise). If this doesn't help, remove the adaptor from the transceiver and antenna leads. The antenna is plugged back into the transceiver in normal fashion. Add a short length of wire to J1 or J2 and move the adaptor away from the receiver until signal injection is reduced to lower levels.

RADIO COMMUNICATION EQUIPMENT

In Australia the establishment, erection or maintenance of any type of radiocommunication equipment capable of either transmitting or receiving a signal is governed by the Wireless Telegraphy Act 1905-1970. The Act provides for penalties of \$1,000 or 5 years' imprisonment with or without hard labour.

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Information concerning provisions of the Australian Wireless Telegraphy Regulations, as applied to any specific equipment or operating conditions mentioned in this publication, may be obtained from the State Superintendent or District Radio Inspector, Radio Branch, Postmaster-General's Department.