A PORTABLE SUCTION CUP ANTENNA

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A simple portable antenna that can be used on 80-10 meters is often desired for ordinary portable or emergency uses. This antenna will mount on any flat surface almost instantly and provides good efficiency for its small size.

THE author can perhaps be described as an occasional mobiler and the antenna described in this article was developed to permit such operation with a popular multi-band transceiver on 80 through 15 meters. It can be used on 10 meters as well and provides a vertical antenna that can be mounted on any flat surface on a car or boat in a few seconds. Rubber suction cups are used to permit rapid mounting and have several advantages over the clamp type arrangements used with many removable antennas. The suction cups are inexpensive although strong enough to firmly support the antenna. They permit mounting of the antenna on almost any flat surface and easy repositioning of the antenna for best performance. Even if one already has a regular fixed or mobile antenna for one band, the suction cup antenna provides a very simple means to enable operation on other bands.

The suction-cup portable antenna mounts quickly on the windowpane of any automobile in a matter of seconds.

Basically, the antenna is simple, a whip section of 8 to 10 feet length with a base loading coil and rubber suction cup mounting. The whip section itself can be a surplus item such as the approximately 10 feet long folding whip commonly available or a commercial telescoping element such as the Mosley LC-100 (39" folded to 100" extended in 4 sections) or the Tenna RAD-5 (29" folded to 112" extended in 5 sections). Alternatively, if storage space is not a problem the whip element could be an 11 meter mobile whip or simply two 5 feet sections of aluminum tubing which join together.

The loading coil used is made from standard coil stock or it can be home-made from number 12 or 14 copper wire. A commercial multi-band loading coil with a continuous sliding contact to vary the in-

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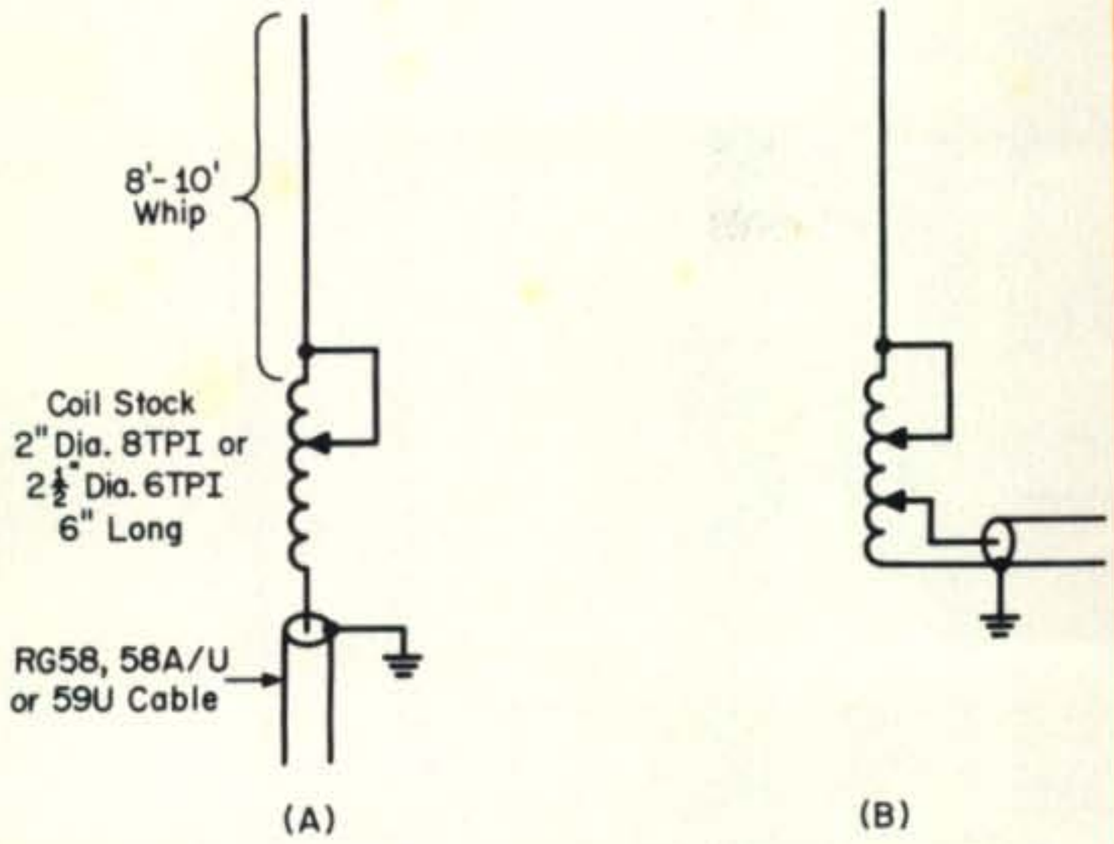


Fig. 1—Shown above are two simple circuits for the loading coil of the mobile whip antenna. The coil for both circuits is 48 turns of # 14, with a 2" diameter. Commercial coil stock can also be used (Air-Dux # 1608T). Either the feed system at (A) or (B) can be used as explained in the text.

ductance value can, of course, also be used. However, its cost will generally not be justified unless the antenna is used as a semi-permanent installation and continuously exposed to weather or used in a salt-water environment where enclosure of the coil and its contact elements is very desirable: In this case the Mosley No. 333 loading coil or a similar enclosed coil can be used.

Construction

Figure 1 shows two configurations which can be used for the loading coil connections and fig. 2 shows the corresponding construction necessary. Either circuit requires basically the same construction. The circuit in fig. 1 (A) permits somewhat quicker band switching since only one adjustable connection is involved. This is the only circuit that can be used if a commercial enclosed type of loading is used.

The circuit in fig. 1 (B) requires two tap adjustments on most bands but has the advantage of providing a closer match to a coaxial line. This feature may be particularly desirable if the antenna is used with a transmitter having fixed output loading which requires working into a line with a very low s.w.r. Another advantage of the circuit is that the whip is grounded for static drain and lightning protection purposes.

The suction cups used to support the antenna are shown in the photographs and are simply replacement types for automobile roof top carriers costing about 20 cents each. They can be purchased in any automotive parts store. The suction cups come complete with an imbedded screw thread.

The holders used to fasten the whip to the suction cups are fabricated from brass or aluminum pieces ¾" wide and 1/16 to ⅛" thick. The holders are shaped by forming them around a piece of wooden dowel approximately the same diameter as the whip. Alternatively, if one can find plastic cable clamps of the correct size they can be used directly. The use of such plastic clamps would also solve the problem of insulating the upper clamp from the whip. In the case of the metal clamp, insulating tape or preferably a thin sheet of teflon is wrapped around the whip underneath the clamp. Some production runs of the surplus folding whips come

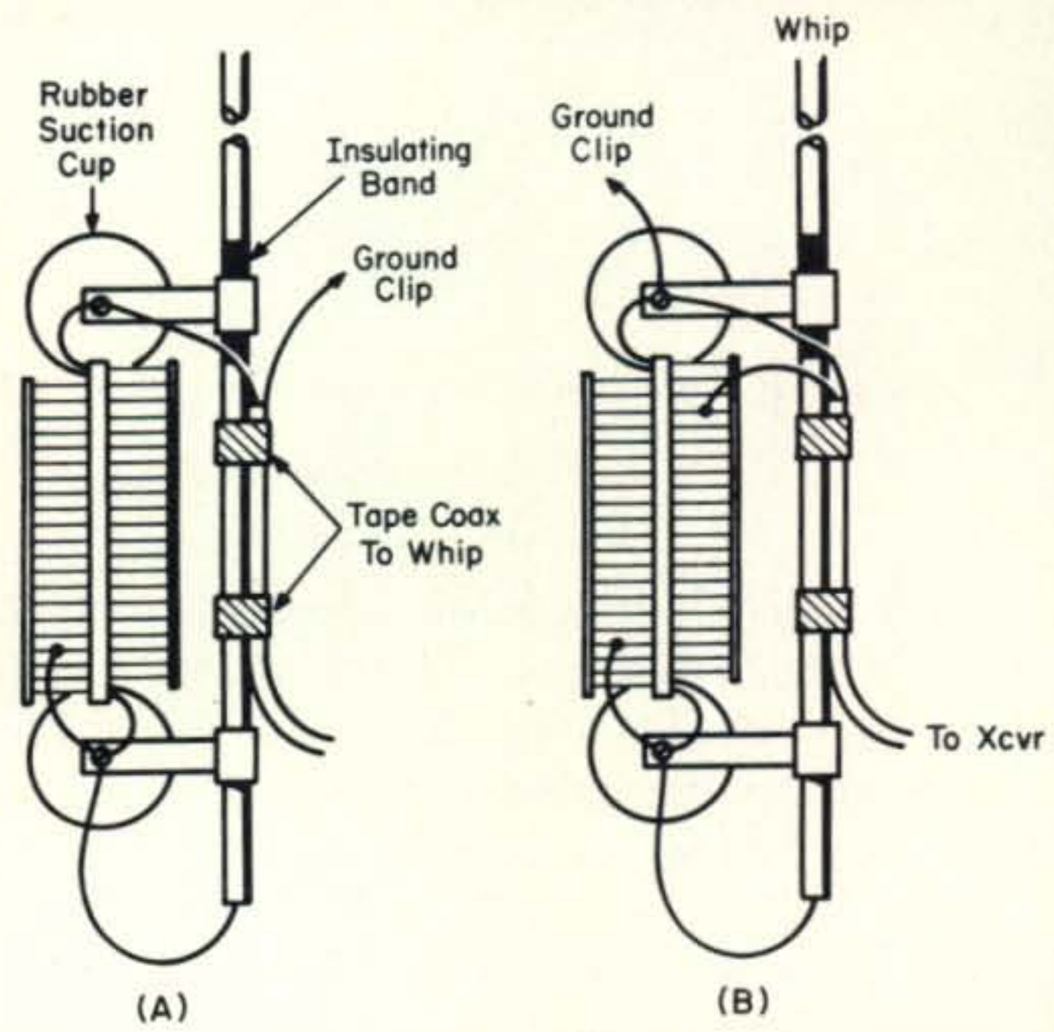
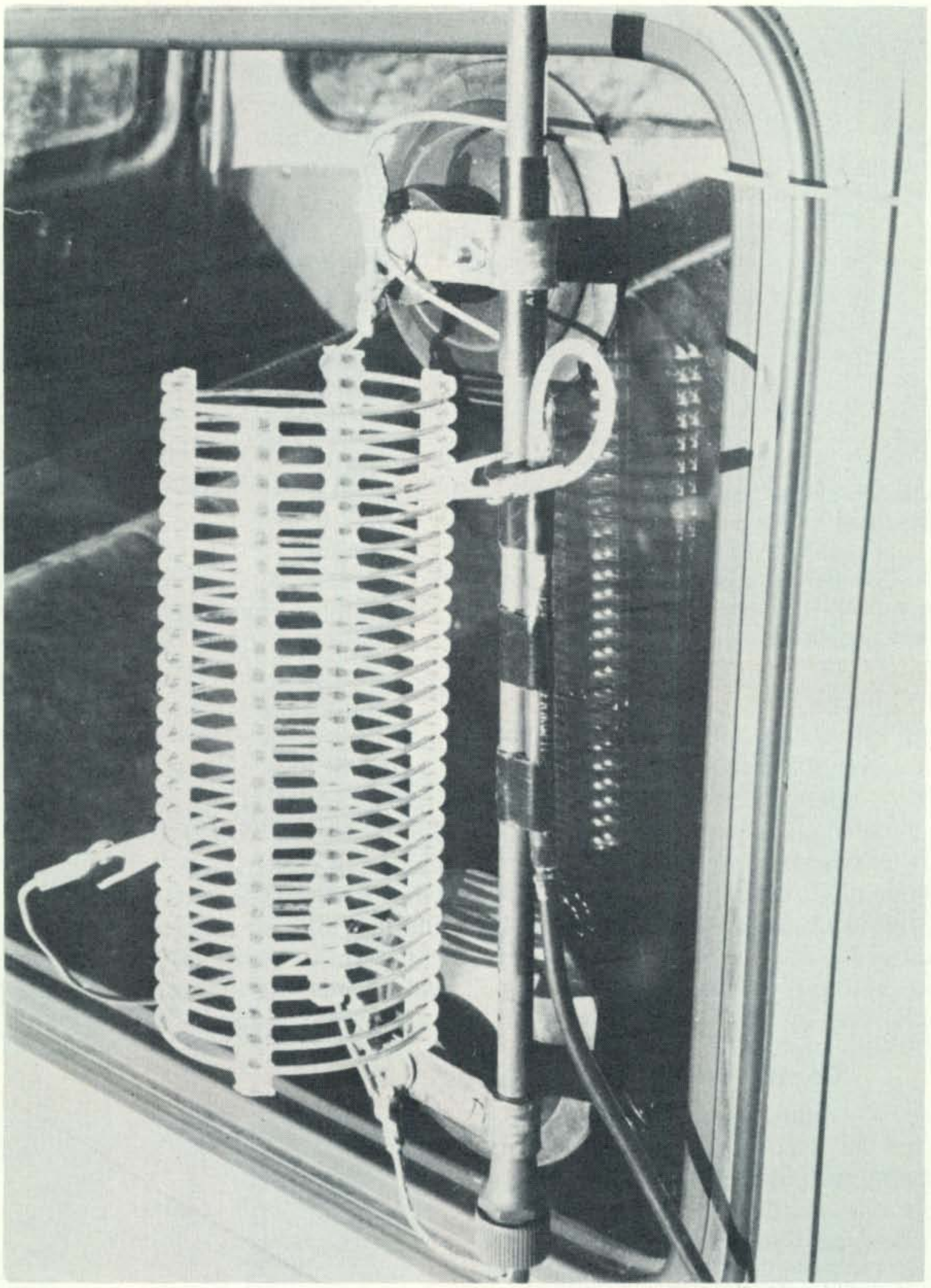


Fig. 2—Construction at (A) corresponds to circuit of Fig. 1 (A) and construction at (B) to Fig. 1 (B).



Close-up view shows how coaxial cable is taped to whip and how loading coil is supported between sucton cup mounts.

with an identification sleeve made of an insulating material attached to the lower section which can be used directly as a means to insulate the clamp.

The lower clamp may not achieve a good electrical bond to the whip and therefore a separate wire is soldered or otherwise attached to the bottom of the whip and connected to the lower end of the loading coil. The loading coil itself is supported between the two suction cups by attaching the lead ends of the coil to large solder lugs supported by the suction cup screws.

Coax Preparation

The end of the coaxial cable used to feed the antenna is prepared by removing the jacket and braid for about 5 inches so the center conductor can be used directly as a lead to tap the coil. If RG-58 A/U is available instead of normal RG-58/U it is preferred since the stranded center conductor used in the former will withstand flexing better. The jacket is further slit open, but

not removed, for several inches and a length of bare hookup wire is inserted underneath the shield and spot soldered. A piece of heat shrinkable tubing is then formed over the slit in the cable jacket so the entire assembly is sealed. If shrinkable tubing is not available, insulating tape can be wrapped around the jacket. The completed cable is simply taped to the whip as shown in the photographs.

Additional solder lugs are used at the suction cups for the hookup wire leads for the coil tap and ground clip connection.

Operation

As shown in the photographs, the antenna is mounted on the window pane of the author's VW. The ground connection is made to a metal clip inside the car which is screwed into the car body. One could also make the ground connection to the rain gutter if a clean contact were made by removing the paint. The ground connection, in any case, for an automobile should be made to a large metal surface of the car and not to one which is effectively electrically insulated by means of rubber stripping or other means. Some experimentation in this area will pay good dividends in terms of better antenna performance as it is surprising how many metal surfaces of an automobile have relatively high resistance electrical contacts between them.

An s.w.r. meter is used to find the proper loading coil taps for each band, starting with minimum inductance loading on each band. Once the proper tap points have been found they will remain the same as long as the antenna is installed in the same position on the vehicle each time. The tap points for each band can be marked with a magic-marker pen on the coil or small wire stubs can be soldered to the coil at each tap point. The rest of the coil and assembly should be sprayed with Krylon or a similar plastic spray to protect the assembly from weather deterioration.

On 10 meters there are several modes of loading which may produce proper tuning and low s.w.r. In general, the one which involved the least amount of inductive loading (with either the ground connection at the antenna removed or in place) will prove the most efficient. ■

A.M. Operation With The Heath SB-110A

BY WILFRED M. SCHERER,* W2AEF

THE a.m. modifications for the Heathkit SB-110 6-meter S.S.B. Transceiver, as described in *CQ* some time ago,[1] have proved to be quite popular. In addition, inquiries have been received about whether or not the changes can be made in the same manner on the later model, the SB-110A. Happily the answer is yes, the only difference being in the SB-110A manual diagram and page numbers referred to in the text of the article.

For SB-110A

In the steps set forth on page 11 of Nov. '66 *CQ* the pictorial numbers and pages should be related to the SB-110A manual as follows:

1—Pictorial 3-19, page 51.
2—Pictorial 3-20, page 52.
3—Pictorial 3-28, page 60.
19—Pictorial 3-22, page 54, as identified in Pictorial 3-28, page 60.
20—Pictorial 3-29, page 61.

For SB-110 and SB-110A

Relating to *both* the SB-110 and SB-110A, an error should be corrected in the circuit diagram at fig. 1 of the modification article. The right-hand arm of the d.p.d.t. switch should go to the *bottom* end of the 0.1 mf 75 v. discapacitor, instead of to the top end. This is *correctly* shown in the pictorial wiring diagram at fig. 5 on page 13 of the article.—*W2AEF*

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[1]A.M. for the HeathKit SB-110 6-Meter Transceiver, *CQ*, November '66, page 10.