

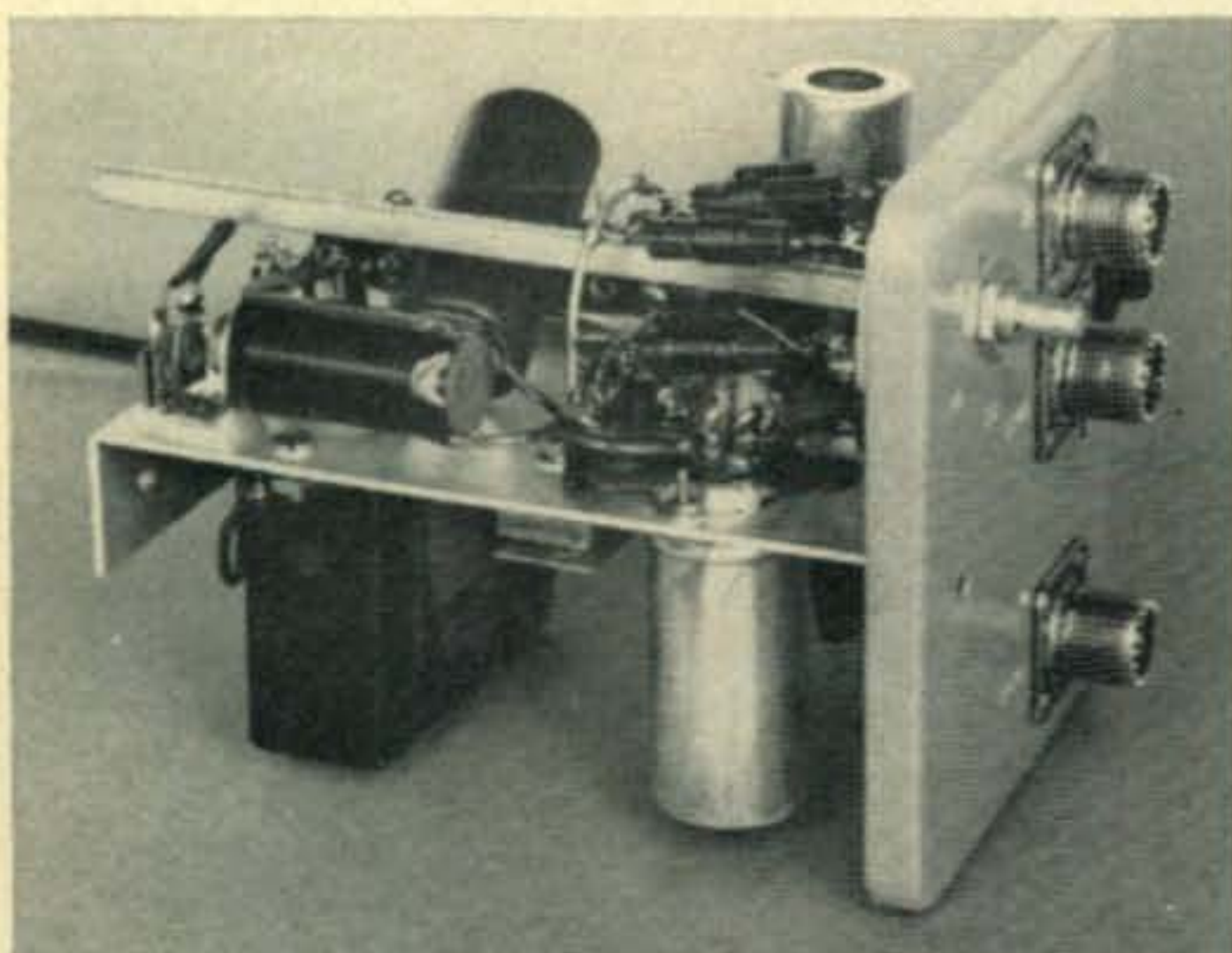
The Barker & Williamson Model 381B T-R Switch

AN all-electronic transmit-receive (T-R) switch permits use of a common antenna for both receiving and transmitting without the necessity of an antenna changeover relay. It ensures quiet operation and instantaneous transfer for fast break-in work together with trouble free and efficient performance. There are no relay contacts to arc or burn. Such a device is the B & W Model 381B T-R Switch which is a real neat job for use on the 10, 15, 20, 40 and 80 meter amateur bands.

The unit is designed for operation with either a 52 or 72 ohm coaxial transmission line. At a standing-wave ratio of 1:1 it will safely handle a peak power of at least 5 kw with a 52 ohm line and 3 kw using a 72 ohm line. For a higher s.w.r. the maximum allowable power is proportionately lower. With c.w., s.s.b. and d.s.b., operated at legal power limits, the s.w.r. may be as high as 4:1. With maximum a.m. power the s.w.r. may be almost 2:1.

Operation

The antenna feedline and the transmitter are connected together at the input terminals of the T-R switch at all times, so during transmissions the signal is fed directly to the antenna line without any switching (see fig. 1). The input terminals are also connected to the cathode of a 6S4 in a grounded-grid configuration. During reception the incoming signals are fed to this tube, the plate circuit of which is tuned to the operating band and is coupled to a 6AG5 amplifier. Bandswitched circuitry is used. The output of the 6AG5 embodies a special broadband r.f.



Inside view of the B & W Model 381B T-R Switch. The bandswitched coils are mounted in a ring configuration around the switch. Power supply is underneath the deck. The panel shown is the rear panel, with the three coaxial connectors. The rear end of the band-switch shaft extends through this panel and may be coupled to an external arrangement for other band-switching needs such as operating relays to change antennas for different bands, etc.



B & W Model 381B T-R Switch. It is a neatly packaged unit with self contained a-c power supply. The knob at the lower left is for the band-selector switch.

transformer which is connected to the receiver.

No incoming-signal loss is incurred with the unit; in fact, a substantial gain is realized which can improve the sensitivity of the receiving system. The bandswitched circuits also provide a high degree of selectivity, excellent signal-to-noise ratio and a minimum of intermodulation effects.

When the transmitter is turned on, some of the r.f. potential is rectified in the grounded-grid stage and is applied as a d.c. cutoff bias to the 6AG5. The transmitted signal, which would otherwise pass on to the receiver, is thereby attenuated. Damage to the receiver cannot occur. The biasing arrangement functions regardless of the bandswitch setting, so protection of the receiver is afforded at all times.

Provisions are not furnished for receiver muting during transmissions, so other means of receiver disabling must be used, such as are available from many transmitter units.

The Model 381B is self powered from a 117 volt a.c. source. Type SO-239 coaxial fittings are provided on the rear of the unit for the antenna, transmitter and receiver connections. The only control is the receiving bandswitch which is located on the front panel.

Performance

The B & W T-R switch proved to be an excellent performer. When connected in the recommended manner for reception, its inherent sensitivity averaged $0.5 \mu\text{v}$ for a 10 db signal-to-noise ratio on a.m. and $0.5 \mu\text{v}$ for a 20 db s/n ratio on c.w., s.s.b. and d.s.b. Noise figure on 28 mc was 6 to 7 db. The measured gain was 8 db on 10 meters; 14 db on 15; 19 db on 20; 18 db on 40 and 14 db on 80.

In some cases this amount of gain could re-

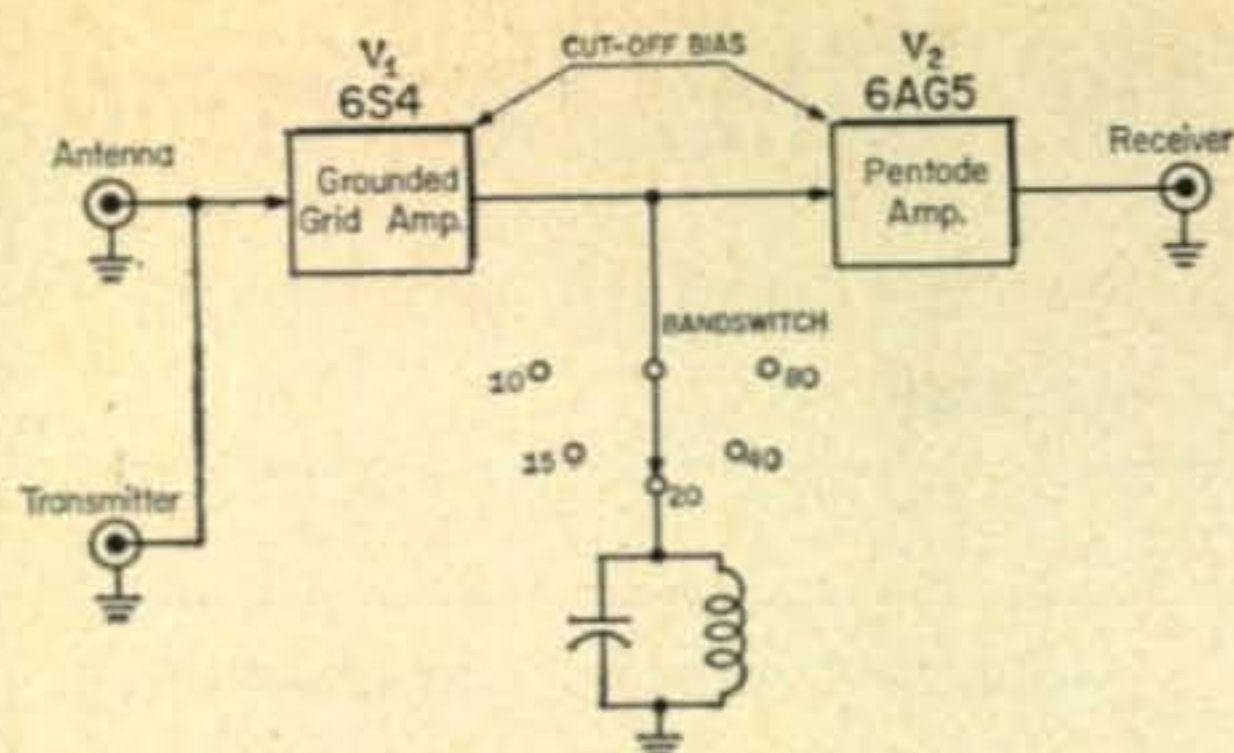


Fig. 1—Block diagram of the B & W Model 381B T-R switch.

sult in receiver overloading from strong signals, in which case several different measures can be taken. The receiver r.f. gain may be backed off, but at a possible sacrifice in a.v.c. and S-meter action. Another method is to rotate the T-R bandswitch to an adjacent band which will decrease the gain, but the signal-to-noise ratio will drop; however, good noise ratio is not essential with strong signals anyway, so this method could be a satisfactory expedient. The best arrangement would be the use of a 100-ohm potentiometer as a variable pad connected in the line between the T-R switch and the receiver; in fact, there is room to mount such a control on the rear of the unit next to the connector for the receiver.

Signal Suckout

When a T-R switch is connected across the output line of a transmitter, the tuned tank of the latter can act as an absorption trap which sucks out received signals. The extent to which this occurs will largely depend on the point at which the switch "sees" the tank circuit. Signal suckout usually will not be experienced on any band when the output of the transmitter is connected to the Model 318B with a three or four

foot length of transmission line. At the same time, the transmitter tank must be properly tuned up for operation on the desired frequency range.

Should a *small* degree of suckout occur, there will be little deterioration of signal-to-noise ratio and due to the high gain of the T-R switch, the overall signal level will still be higher than it will be without the switch connected in the circuit. *Severe* loss of signal will require a little experimentation for the best line length needed to overcome it.

T.V.I.

The bane of many T-R switches is the generation of harmonics with resultant TVI. The manufacturer of the Model 381B recommends the use of a low-pass filter inserted between the T-R switch and the transmission line. Under these conditions, during field tests, no change in TVI was noted with the switch in or out of the line.

No a.c. line switch has been provided in the unit, so B & W recommends connection of the a.c. line cord to the primary terminals of the receiver's power transformer in order that the T-R switch be automatically disabled when the receiver is turned off. This will protect the unit against needless hours of operation, should the operator otherwise forget to remove the line plug from the a.c. outlet.

Appearance

The unit is nicely packaged with a light gray panel and perforated cabinet measuring 4¾" h. × 4" w. × 5¼" d. The panel lettering is white and the control knob is dull aluminum. The B & W Model 381B T-R Switch is priced at \$60.00. The manufacturer is Barker & Williamson, Inc., Bristol, Pa.—W2AEF

CQ Reviews:

The Ameco All-Band Pre-Amplifier Model PCL

AN r.f. pre-amplifier (often called a pre-selector) is used ahead of a receiver to improve its sensitivity, gain, signal-to-noise ratio, noise figure or its front-end selectivity together with better image and spurious signal rejection.

The Ameco Model PCL Pre-Amplifier has been designed to include the above features. It is a tunable device, not broadbanded, which covers the entire frequency spectrum from 1.8 to 54 mc in four bandswitched ranges of 1.8 to 4, 4 to 10, 10 to 23 and 23 to 54 mc. Operation is not limited to just the amateur bands, making it desirable for use with continuous-coverage communications receivers as well as the amateur-band type. Coverage through 54 mc also makes

[Continued on page 104]



The Ameco Model PCL all-band nuvistor cascode pre-amplifier is a small attractive unit. The tuning control is at the left, the range selector is toward the right. On-off switch is at the right.