RELAYS

Circuits for the changeover from receive to transmit can have practically infinite variations. Some of the switching that may have to be done, depending on the equipment combination, is as follows:

Disable the receiver.
Transfer the antenna from the receiver to the transmitter.
Short out or otherwise protect the receiver (or converter) input from damage from energy produced by the transmitter. Open contacts on an ordinary relay or switch are no protection.
Key the transmitter.
Key the VFO.

The least expensive system is to use manually operated switches for all changes. However, after a short time, the operating clumsiness of this will become obvious. The best system is to use a relay especially made for this purpose. Two arrangements will be described in detail. The first is for phone operation only, using a microphone with a push-to-talk button. The second is for mixed phone and CW operation. Both use the Dow-Key DK60-G2C Relay with double pole double throw auxiliary contacts and a 115 volt AC coil. The AC coil of this relay works equally well on AC or DC. On DC, it operates well at 22 to 28 volts, 60 to 78 ma. It is approximately 360 ohms. The initial cost may seem high, but there is no equivalent unit on the market that will do the job. The use of the relay makes for extremely convenient operating conditions.

CONNECTING THE DOW-KEY RELAY FOR PHONE OPERATION ONLY: (SEE FIGURE 3)

A. Find a convenient place to mount the relay with two screws. Do NOT mount it directly on to the coax connector on the transmitter or in other equipment because the SO-239 coaxial connector is not made to carry any more load than a plug and flexible cable.

B. Obtain an octal male socket (Amphenol 86CP8 with a 3-12 or 3-24 cap).

C. Connect the relay coil to octal pins 4 and 5 with a good grade of flexible wire. The voltage on this cable is approximately 600 volts. Lamp cord is not good enough. Cover the relay coil terminals with electrical tape. Never handle the relay to change coaxial cable connections unless the transmitter is turned off.

D. Remove the transmitter from its cabinet. The AC line plug must be disconnected during all of the following steps.

E. Cut the jumper between pins 4 and 5 on the octal socket at the rear of the transmitter chassis.

F. Connect a 20 mfd. or larger, 150 volt electrolytic capacitor, negative to pin 5 and connect the positive end to pin 4 of the octal socket.

G. Connect a 1000 ohm, 25 watt wire wound resistor (Ohmite Stock #0205, Ward Leonard #25 F 1000 ohm, etc.), across the same two terminals (4 and 5) of the socket. Do not support the resistor by solder joints. Mount it properly and keep it away from the other components. There are two holes at the rear of the chassis between the antenna jack and the octal socket to mount this resistor.

H. Connect the auxiliary contacts of the relay as described below to provide receiver muting (and keying for the VFO, if desired). See Figure 3.

1. Connect the center terminal of one set of SPDT contacts to the common ground line of all the equipment.

2. Disconnect the lead that connects the speaker to the grounded audio terminal on the receiver.

3. Connect the terminal of the normally closed contact to the speaker terminal that was just disconnected.

4. Do not disturb the other side of the speaker that is connected to the hot audio output terminal on the receiver.

5. Connect a resistor across the output audio terminals of the receiver. If the speaker impedance is 3, 2 or 4 ohms, use a 10 ohm, one watt resistor. If it is a high impedance speaker (4,000 ohms is typical), use a 10,000 ohm, one watt resistor.

6. Connect the normally open contact to the key terminal of the VFO, if one is used.

I. Connect the transmitter to the relay with a short piece of coaxial cable of the same type used in the lead-in from the antenna. Use a PL-259 plug on each end of the cable. A filter, antenna tuner and/or SWR bridge can be connected between the transmitter and the relay, if desired.

J. Connect the relay to the receiver or converter using the same type of cable. Use a PL-259 plug on one end and a connector that will mate with the other unit at the other end.

K. Connect the antenna to the relay with another PL 259 plug.

In this arrangement, the other set of SPDT contacts is not used. When the relay is connected in this way, the changeover from receive to transmit is completed by operating the push-to-talk button on the microphone.

Note that there is no mention of breaking a B+ or cathode line or other disabling of the receiver or converter. There is no benefit to be derived from this kind of switching. There is a definite advantage in having this circuit operating. With the receiver in full operation, except for the broken speaker line and the very high loss between the antenna and the converter or receiver input, the receiver can be used to check the signal from the transmitter. If the headphones are plugged into the receiver, it is possible to monitor the transmitter for distortion, drift, frequency modulation, hum, etc.

Whenever the plug is removed from the octal socket, another plug should be substituted to prevent damage if the transmitter is operated without a Dow-Key relay coil in the circuit. Use an identical octal plug and cap assembly with a jumper wire between pins 4 and 5.

To change over to CW, pull out the relay plug and insert the jumper plug in the octal socket. Connect the relay coil to the AC line through a foot switch or toggle switch. Then plug a telegraph key into the key jack on the front panel. The transmitter is then ready for CW operation.

CONNECTING THE DOW-KEY RELAY FOR MIXED PHONE AND CW OPERATION: (SEE FIGURE 4)

A. Follow step A given above for phone operation.

B. Obtain a foot switch (such as the type used to control photographic enlargers), or if preferred, a toggle switch can be used.

C. Connect a piece of lamp cord (zip cord) to the relay coil terminals and tape them up. Put a male plug on the other end if a foot switch is to be used, or run the wire directly to the toggle switch and AC line.

D. Follow the instructions for phone operation, H-1, H 2, H-3, H-4, H-5 and H-6.

E. Obtain an octal male plug (Amphenol 86CP8 with a 3-12 or 3-24 cap).

F. Connect the center terminal of the other set of