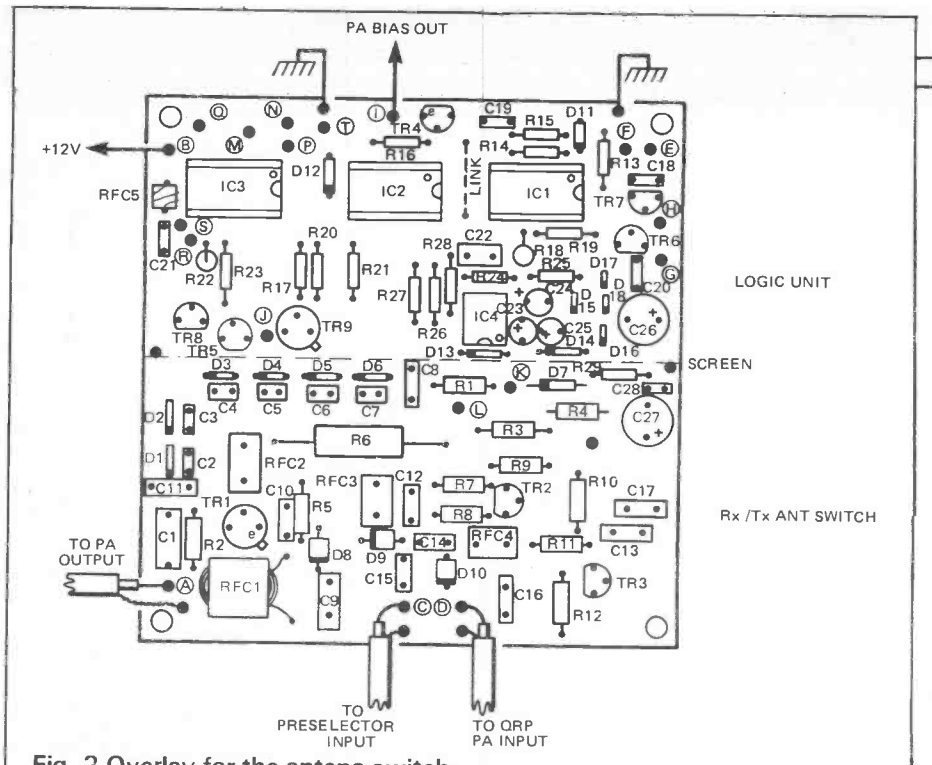

Fig. 2 Overlay for the antena switch.

carriers created in the device provide an almost 'metallic' contact from collector to emitter. The alternative would have been to use a high voltage PIN diode at a cost of some several pounds. As it is, the BF259 does the job equally well and only costs a few pence.

D9 turns on connecting the receive signal at the emitter of Tr1 with the input to the preselector. D10 now isolates the PA strip input from the receive path. Strictly speaking the DC to DC generator is not necessary for basic operation but its inclusion does, we feel, extend further the performance of the sold state switch. Overall, the losses of the SSS amount to just a fraction of a dB.

The Logic sequencing unit

In order to achieve full break-in operation on CW using an antenna switching unit such as just described, it is necessary to have additional circuitry which will change the transceiver from receive to transmit mode, and back again as the key is made and released. This has to take place at keying speeds, with no clicks or thumps being generated.

As you would soon discover, any attempt to switch the voltages involved between Tx and Rx in a simple fashion will generate an assortment of clicks and thumps, making operation impossible. Some form of sequencing is required which wil perform the following operations in the listed order:

a) Mute the receiver.
b) Change the antenna from receive to transmit.
c) Switch on the Tx carrier oscillator.
d) Apply bias to the PA, and therefore radiate RF.
e) Remove bias from the pa.
f) Switch off Tx carrier oscillator.
g) Change antenna from Transmit to receive.
h) Activate receiver.

In the case of this system, the first three and the last three operations take place virtually simultaneously, and it then becomes a matter of delaying the application of the PA bias for a suitable time, dictated by how long it takes the Tx carrier oscillator to stabilise after switch on. A slightly longer delay after releasing the key before the receiver is activated is required to ensure no RF is present when the antenna is reconnected to the receiver.

All this is performed by the Logic Sequencing unit. Although it looks complicated, it is in fact fairly simple, the heart of the unit being the delay circuit comprising IC1a/b and IC2a. The rest of the circuit is simply to isolate the various switching voltages from each other. The "delayed" outputs from IC2b and IC2c have been selected so that the PA bias is applied about 1ms after the key is depressed, or 1mS after the receiver has been muted and the antenna switch changed.

On release of the key, the PA bias is removed, and about 2-3 milliseconds later the rest of the circuitry is returned to receive, via the outputs controlled by IC1b.

The receiver muting is achieved by activating the noise blanker gate (via output H) and reducing the gain of the first I.F. via output G. If needed, muting can be even further enhanced by applying output G to the second I.F. as well.

It is necessary to switch off the noise blanker amplifier chain during transmit, so the blanker on/off switch must be connected via the output from T9.

Metering. The S Meter is also required to perform the functions of a transmit monitor, so a 4016 CMOS Quad Bilateral switch is used to change the meter inputs between transmit and receive at keying speeds. The selection of the meters' monitoring function on Tx is made via a separate rotary switch.

CONSTRUCTION

Logic antenna switch unit. Both of the circuits described are built on the same single sided PCB, with a screen separating them.

The construction is not difficult, and the whole board can be built in one go, starting with the insertion of the connection pins. Take note of the following:

a) All three of the CMOS IC's are held in sockets — avoid handling the pins if you can, although modern 'B' type CMOS is not as notoriously static sensitive as the earlier type.
b) C1 must be a high voltage type as specified.
c) As usual, keep all the leads as short as possible, especially round the RF switching unit.
d) RFC1 requires 35cm of .25mm wire to wind. RFC5 needs 18cm of the same wire.

Testing

It is important that the operation of this unit is checked before connecting it to the PA and firing up the rig. If it isn't working properly you may lose the SBL1 mixer in the CIFPU unit rapidly! Double check all the component positions and orientations before proceeding.

a) Connect + 12V and an earth to the PCB. Check that the current consumption is around 130mA or so.
b) Check that approx —9-12V is present at point U. If too high or low, a slight change to the value of R7 will put it right.
c) Check that points I, J, K do not have a positive voltage on them. Then that