

# PF1 CONVERSION

Steven Ibbs explains how to transform the PF1 into a 70cm base station.

The PF1 consists of a pair of boxes, one containing the transmitter with a small spring loaded aerial, and the other the receiver. Formerly used by the police, they have been largely replaced by the PF70 and are therefore cheap and easy to come by. The PF1 is a basic single channel rig, built in transducer microphone, with a small grill acting as a receiver aerial. However with a modest amount of attention, they can be converted to become surely the cheapest way onto 70cms.

## The Receiver

This requires 9 volts and consists of a double superhet receiver with a first IF of 10.7MHz and a second IF of 100kHz. It has an automatic battery economiser which operates in the absence of an incoming signal. Some have a transducer output, others incorporate a very small speaker.

When a battery is inserted and the unit turned on, a ticking sound should be heard in the speaker, showing the economiser circuit is working. Take out

the battery, undo the case screws and remove the circuit board.

The next job is to change the crystal, but *NOT* the one that is immediately visible (this is the 2nd oscillator crystal, operating at 10.8MHz, and attempting to put an 84MHz crystal will upset the receiver). Instead, remove the metal screening can by undoing the small nuts. A second crystal location will be found. Insert the appropriate crystal, check that no solder joints have been made on the very compact track side, and replace the screening-can.

It is usually easier to disable the squelch when tuning; accomplished by temporarily linking the base of Q14 to earth via a short piece of insulated wire. Connect a voltmeter between the base of Q11 and earth. Inject a signal and adjust C2,C6,C11,C18,T2,T3 for the best quieting, reducing the input level to achieve optimum sensitivity — the voltmeter is helpful here because the capacitors can be initially adjusted for maximum dip.

Once this has been done, all sorts of adjustments are possible using crystal

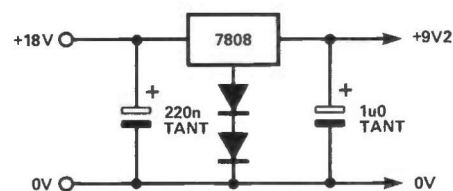


Figure 2. Regulated receiver supply.

IF oscillators etc. However, probably the best course is to make small changes towards the highest quality audio — it may not be very accurate, but it works.

Disconnect the temporary link wire and check that the squelch circuit operates properly. The economiser circuit holds the receiver on for a couple of seconds before switching it to economiser mode. If all is satisfactory, receiver modifications are complete.

## The Transmitter

Operating on 18 volts, it consists of a phase modulated signal which goes through four stages of multiplication (x3,3,2,2) before being boosted by a 2N3866 PA in common base mode. The conversion usually proves to be a much simpler affair than the receiver.

First, remove the battery, the retaining screws, and the top half of the case. Disconnect the lead to the aerial and connect a co-ax lead to either a terminated power meter or a dummy load via an SWR bridge. Insert the 12MHz crystal, connect the supply and press the PTT switch. The meter should show some deflection and

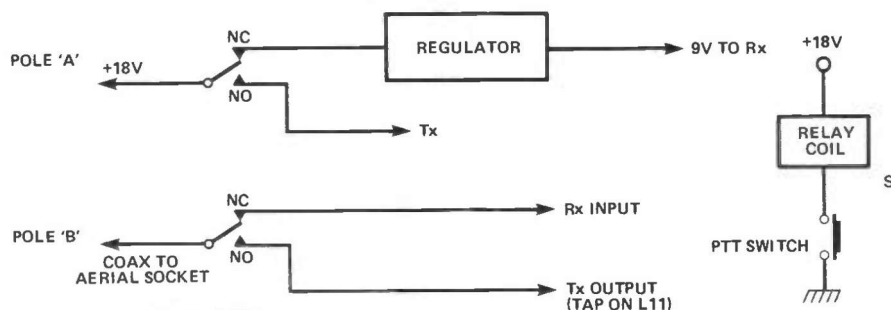


Figure 1. Receive/transmit switching.

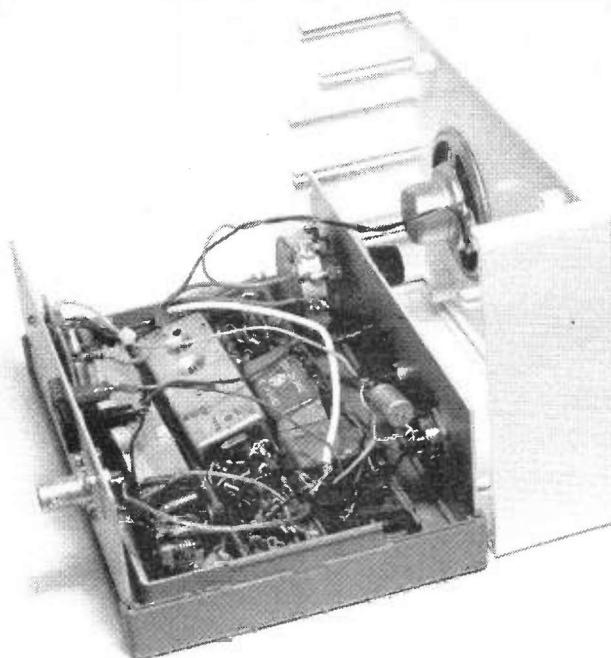
tuning consists of peaking the various stages for maximum RF out. Do not, however, adjust L1, which is furthest away from the PA. Capacitor, C17, (by L1) adjusts the frequency and should be trimmed with reference to a frequency meter or other reliable source. In troublesome PF1s, a simple sniffer (2-3 turns of 18-20SWG wire, a diode and a 50uA meter movement) is extremely valuable. It can be moved along the transmitter strip and is a good means of finding, say, a useless PA stage or a low gain multiplier — a healthy transmitter should produce at least 100mW!

### A Combined Effort

Having finished the conversions to both units, the 'icing on the cake' is to fit both into a single case. The two units are mounted, each resting in one half of its plastic case, into a metal cabinet. The receiver volume control is removed and leads run to a panel-mounted 5k log volume control. The power supply and aerial connections are fed from an 18V relay. This relay is mounted using double-sided sticky pads in the receiver battery

compartment. The two units are then sited so that the Tx PA is close to the relay to keep co-ax leads short. The regulator — a 7808 with 2 diodes in series in the common lead — is secured via a small piece of veroboard in the case. The receiver grill aerial is discarded and a co-ax lead run to the relay pole B.

Disconnect the transducer from the transmitter, and run a screened lead from the audio input position to a standard 4 pin mic socket on the front panel. The unit will then need to be retrimmed, but there should be no problem with this, and the final result is a very useful base rig.



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