RELAY CRYSTAL SWITCHING

(FOR CRYSTAL SYNTHESIZED RADIOS)

INSTALLATION:

It is important to first note that each 6 crystal board is made up of three individual 2 crystal units that may be cut apart to meet individual requirements. The basic function of each unit is to switch in two new crystals and switch out two stock crystals as +12 volts is applied to the relay via terminal point B and terminal point A is grounded. This can be done by use of any unused stock switch or by installing a new single pole, double throw toggle switch.

Most crystal synthesized radios use 10 basic crystals. 4 mixer crystals (usually in a group), and 6 oscillator crystals also in a group. It is the group of 6 that are to be switched.

Each single crystal replaces 4 channels in sequences from 1-4, 5-8, 9-12, 13-16, etc. Therefore, it is important to determine which crystals you wish to switch in and out. This can be done easily by placing set on the desired channel and removing or disconnecting each stock crystal one at a time with the set on. When unit becomes quiet on receive and will not transmit you have located the correct crystal.

Work carefully and complete each crystal one at a time, paying close attention to identifying each stock crystal and its corresponding wire.

Cut wire leading from stock oscillator crystal to rotary channel selector switch. (See Figure C) Connect crystal side to point (F). Connect the switch side to point (C). Connect wire from crystal ground to point (G). Cut second wire for next stock crystal and connect crystal side to point (E) and switch side to point (D). This will complete the installation of two new crystals which will replace stock ones when control switch is turned on and channel selector is placed in the corresponding channel of replaced crystals.

A typical 6 crystal installation incorporates many wires, all delicate and important. When taken one crystal at a time, the installation can be easy and give great sense of accomplishment. But without due care the project can become terribly confusing. Test each step as you progress. If one step does not work, stop and find out why before going on.

Each new crystal on the crystal board has a corresponding trim capacitor which is used to set crystal frequency exactly by turning slot in the top of CX^1 and CX^2. (See Figure 1).

Once installation is complete the new crystals must be checked for frequency. The best method is with use of a frequency counter. An alternate method called zero beating is to place a second set near by tuned to the same frequency and

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turned on. By keying the modified radio and tuning crystal adjusting capacitors until feed back tone is at zero or lowest point and "S" meter reading is at maximum point, frequency is set. This method is not exacting, nor acceptable for maximum performance, but will suffice on most AM type transmitters.

TERMINAL IDENTIFICATION:

A = Ground
B = +12V
C = SW_1 output
D = SW_2 output
E = SW_2 input
F = SW_1 input
G = Crystal ground

COMPONENT IDENTIFICATION:

CR_1, CR_2 = Crystals
CX_1, CX_2 = 5 - 30 pf capacitors
D_1 = 1N4001 diode
Relay = DPDT - 12V