

# INSTRUCTION MANUAL

**TEMPO VF/one**



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TEMPO VF/ONE EXTERNAL V.F.O.  
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GENERAL

The VF/ONE External VFO has been designed to provide versatile operation of the TEMPO ONE Transceiver with serial number higher than 313001.

This unit eliminates the need for a separate receiver or transmitter in order to operate cross-band. For the contest operator, DX chaser or Net Control Manager, the VF/ONE becomes an indispensable adjunct to the station.

Selectable fixed crystal positions provide the Novice with legal operating facilities even during the beginning stages of joining the Ham community. To the Net Control Manager this feature assures exact net control frequency on any band.

Construction of the VF/ONE reflects the mechanical rigidity required for long life and dependability. Instrument quality gears provide zero-backlash, tuning and accurate frequency readout to less than 1 KHz.

The VF/ONE offers advantages to every operator whether Novice or Extra Class. We suggest that the following instructions be read thoroughly to attain maximum operator utilization of the VF/ONE.

THEORY OF OPERATION

The VF/ONE is designed to cover the 80 through 10 meter amateur bands when operated with the TEMPO ONE Transceiver. The VFO uses a silicon transistor 2SC372Y as the VFO oscillator and the buffer, 2SC372Y as the crystal oscillator. Both VFO and crystal oscillators operate between 5,000 KHz and 5,500 KHz. This unit may be operated from 6V DC and 12.6V AC power sources supplied from the TEMPO ONE Transceiver.

The series-tuned Colpitts oscillator circuit (sometimes called Clapp circuit) is used to provide very low oscillator drift.

The select switch (S1) selects either the VFO or one of four crystals that may be installed in the VF/ONE. In VFO position, S1a connects VFO output to the transceiver and S1b supplies the DC voltage to VFO printed board PB-1061. DC voltage to the crystal oscillator is disconnected. In all of the crystal positions, DC voltage to the crystal oscillator is supplied through S1b and the VFO circuit is disabled.

## INSTALLATION

### Power Rrequirements

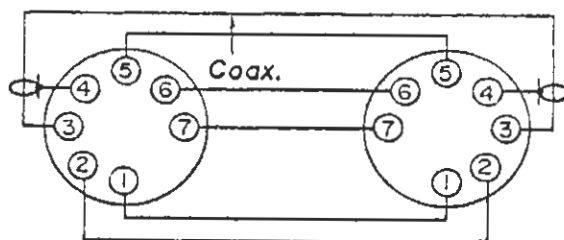
When the VF/ONE is operated together with TEMPO ONE, the power is supplied from the transceiver.

12.6V AC is used for the pilot lamp. The regulated 6V DC is used for VFO and crystal oscillator.

### External Connection

Connect the power cable into the plugs J1 (VF/ONE) or J9 TEMPO ONE as indicated.

Power to the VF/ONE is then supplied from the transceiver, and VFO output is connected into the circuit.



## TEST & ALIGNMENT

### Equipment Required

- 1 TEMPO ONE Transceiver
2. Vacuum tube-volt-ohm meter
3. Suitable alignment tools for capacitors

The VFO linearity has been aligned in the factory and it is not recommended to align the VFO linearity.

### Temperature Compensating Adjustment

Since practically no heat is generated within the VF/ONE cabinet, temperature compensation should not be necessary. In case of extreme ambient temperature change, the temperature compensating capacitor may be adjusted to provide most adequate compensation.

Drift towards a lower dial reading with increasing temperature on 80 meters indicates insufficient compensation and compensating trimmer TC402 should be rotated clockwise to increase compensation. Drift towards a higher dial reading with increasing temperature indicates excessive compensation and TC402 should be rotated counter clockwise to decrease compensation.

## OPERATION

The VF/ONE External VFO dial presentation is identical to the transceiver. The main dial covers 500 KHz with 50 KHz readout. The sub dial provides 1 KHz readout. The dial concentric with the tuning knob may be adjusted to exact frequency by tuning to a known frequency, such as the 100 KHz marker crystal calibrator in the transceiver.

Set the VFO select switch of the transceiver to RX EXT. position, and set the NORMAL-CROSS switch of VF/ONE to CROSS position. Turn the knob to "0" readout and lock the dial by a half turn clockwise rotation of the CAL locking knob of VF/ONE. Turn the OPER-REC-CALI switch of the transceiver to the CALI position, and then rotate the VFO knob carefully until 100 KHz calibrator beat note is heard, and tune the knob to zero beat. Then release the CAL locking knob.

### Select Switch

In the VFO position, the VF/ONE operates as a variable frequency oscillator. In the CH1, CH2, CH3 and CH4 positions, the VF/ONE operates as a crystal controlled oscillator on one of four frequencies.

Crystals are inserted into sockets on the chassis of the VF/ONE which correspond to the SELECT switch. No crystals are supplied with the VF/ONE.

### NORMAL-CROSS Switch (Operation Switch)

The operation switch selects the operation of TEMPO ONE transceiver and the VF/ONE as follows:

- VF/ONE "NORMAL" : In the "NORMAL" position, select switch in the transceiver has no effect on the transceiver VFO. In this position the VF/ONE controls both transmit and receive frequencies of the transceiver, i.e. the VF/ONE takes the place of the internal VFO in the transceiver.
- VF/ONE "CROSS" : In the "CROSS" position, select switch in the transceiver recovers its function. In the "NOR" position, the transceiver acts as a transceiver with its built-in VFO. In the "TX EXT" position, the VF/ONE VFO controls frequency in transmit and the transceiver VFO controls receive frequency. In the "RX EXT" position, the VF/ONE VFO controls frequency in receive and the transceiver VFO controls frequency in transmit.

### Crystal Control Operation

The crystal holders accept standard UC-6U type crystals. All crystal frequencies fall between 5,000 KHz and 5,500 KHz. To permit proper frequency adjustment for SSB operation, a trimmer capacitor has been connected in parallel to each crystal. Adjustment of this trimmer will change the crystal frequency about 1 KHz.

The correct crystal frequency for any desired operating frequency, may be determined by the following formula:

$$F_x = F_1 - F_o \quad (\text{for } 3.5, 21.0, 28.0, 28.5, 29.0 \text{ and } 29.5 \text{ MHz bands})$$

$$F_x = F_o - F_1 \quad (\text{for } 7.0 \text{ and } 14.0 \text{ MHz bands})$$

Where  $F_x$  is the crystal frequency,  $F_o$  is the desired operating frequency, and the constant  $F_1$  is taken from the table.

### Frequency Table F1

Unit : KHz

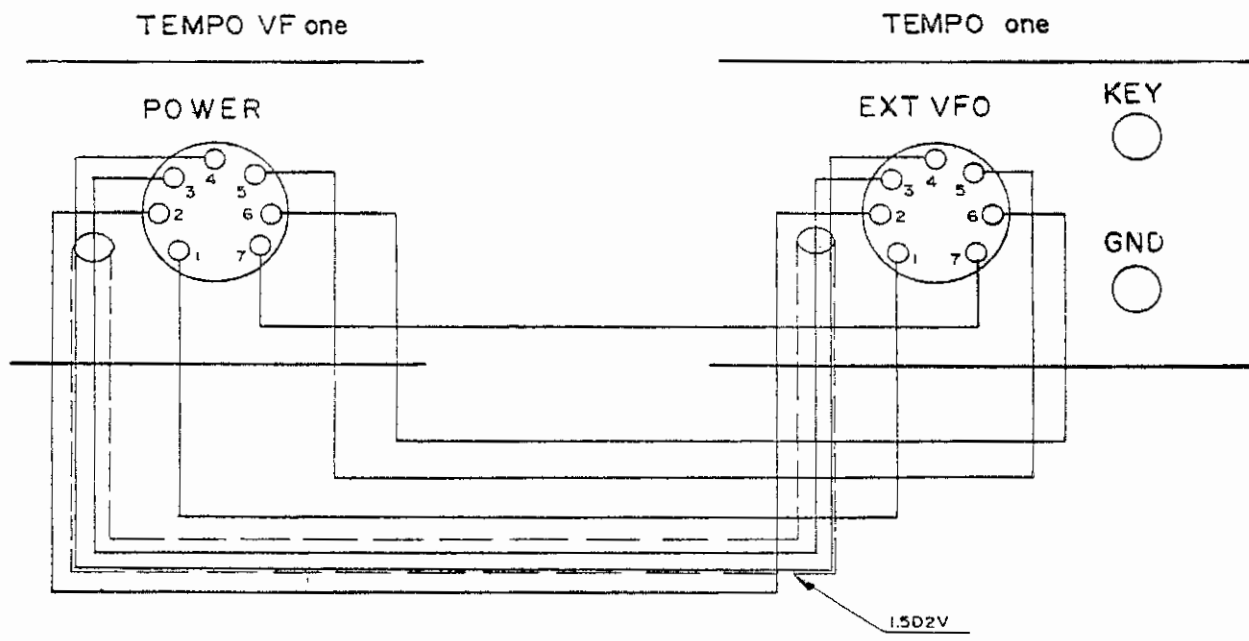
<u>BAND</u>	<u>NOR</u>	<u>REV</u>	<u>AM/CW</u>
3.5	9001.5 (L)	8998.5 (U)	9001.5 (N)
7.0	2001.5 (L)	1998.5 (U)	1998.5 (R)
14.0	8998.5 (U)	9001.5 (L)	9001.5 (R)
21.0	26498.5 (U)	26501.5 (L)	26498.5 (N)
28.0	33498.5 (U)	33501.5 (L)	33498.5 (N)
28.5	33998.5 (U)	34001.5 (L)	33998.5 (N)
29.0	34498.5 (U)	34501.5 (L)	34498.5 (N)
29.5	34998.5 (U)	35001.5 (L)	34998.5 (N)

L: LSB, U: USB, N: NOR, R: REV

For Example:

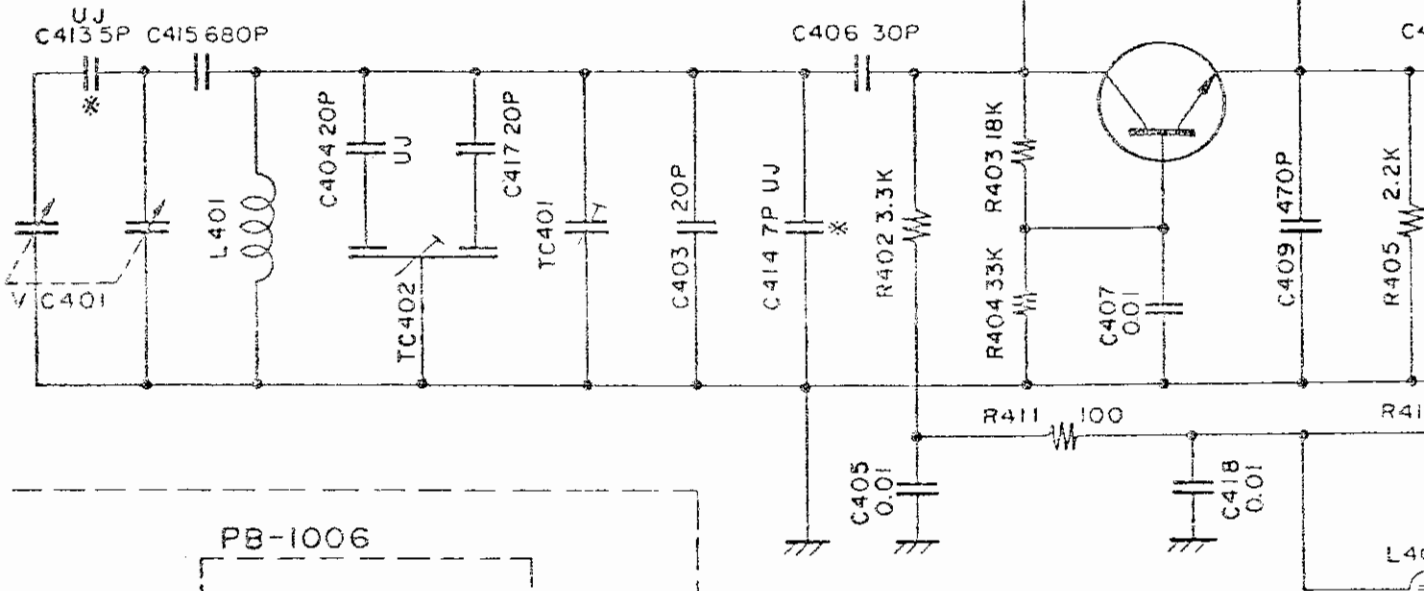
Find the proper crystal for operation at 3900 KHz LSB on the 80 meter band.

From the Table find the constant  $F_1$  for LSB operation on this band.  
The constant is 9001.5, therefore,  $F_x = 9001.5 - 3900$   
 $F_x = 5101.5 \text{ KHz}$

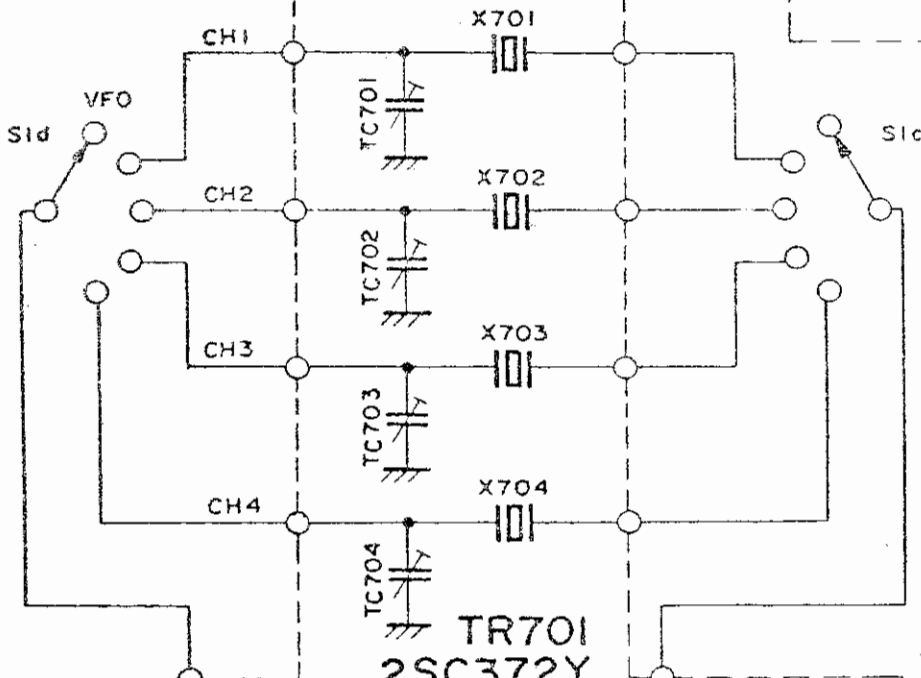


PB-1061

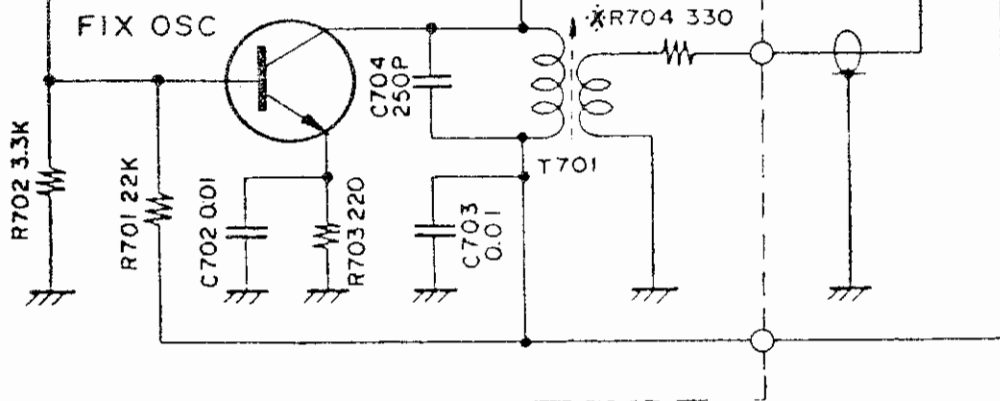
TR401  
2SC372Y  
VFO OSC



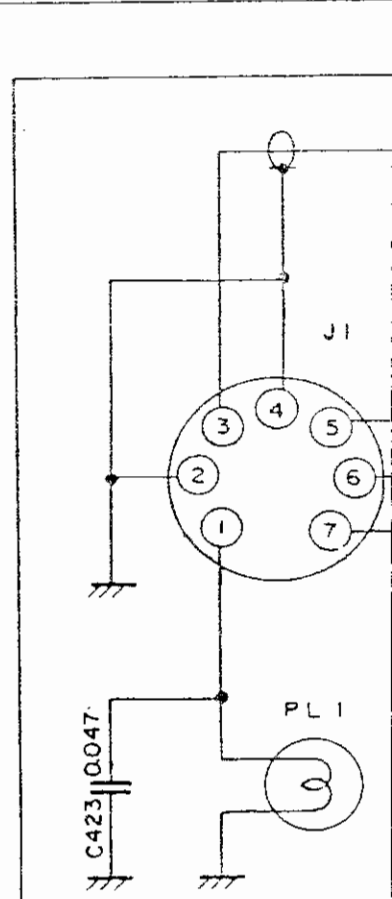
PB-1006

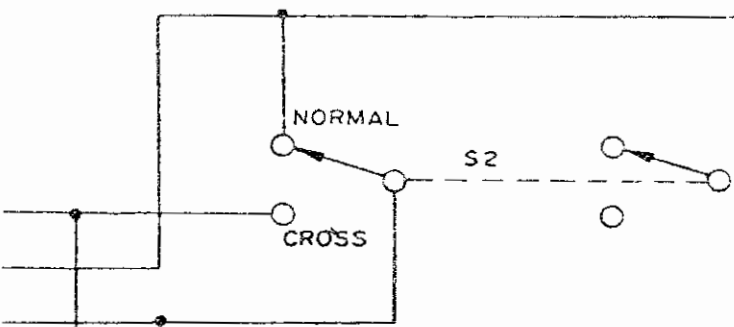
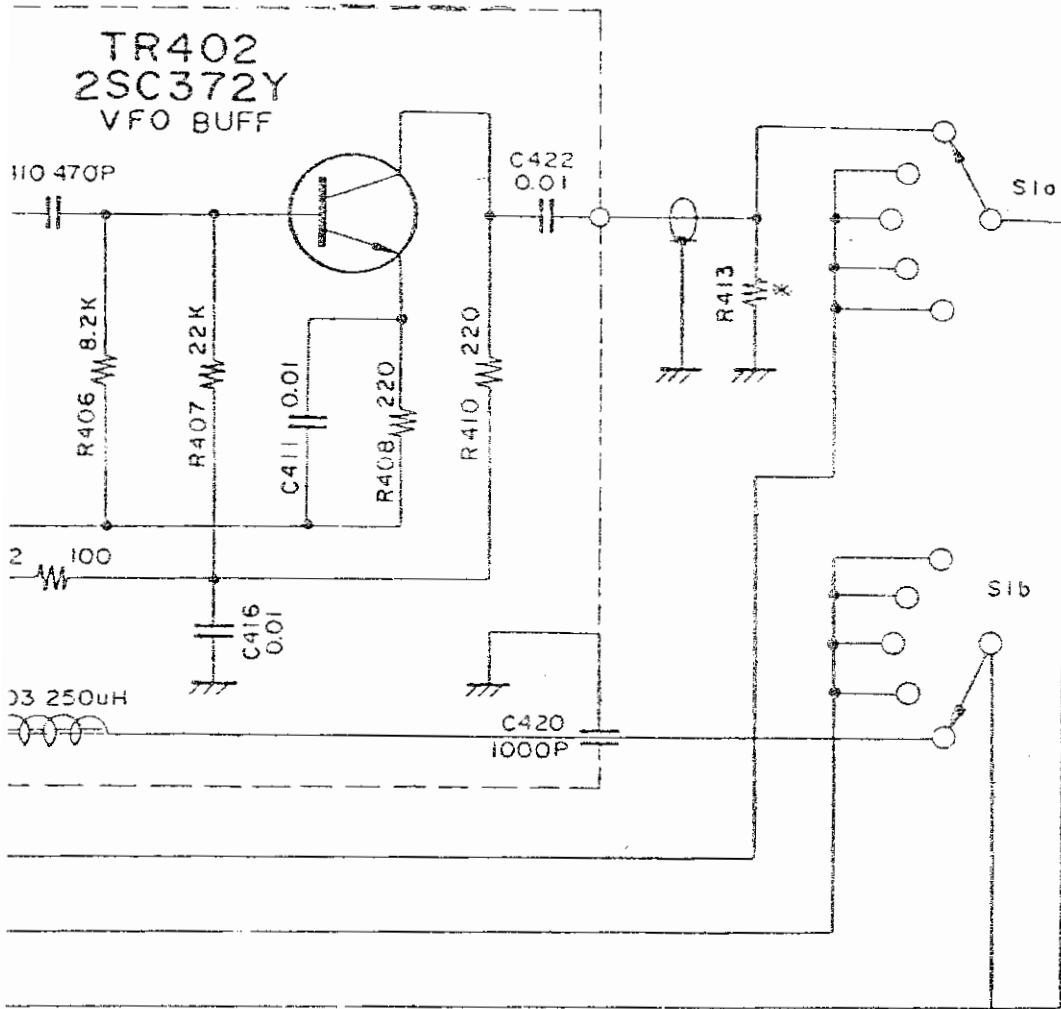


TR701  
2SC372Y



FIX OSC IS OPTIONAL UNIT.





NOTES

1. ALL RESISTORS IN 1/2W ±10% UNLESS OTHERWISE NOTED.
2. ALL CAPACITORS IN uF UNLESS OTHERWISE NOTED.
3. \* VALUE IS NOMINAL.

**TEMPO/VF one**  
**CIRCUIT DIAGRAM**



<http://www.foxtango.org>



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