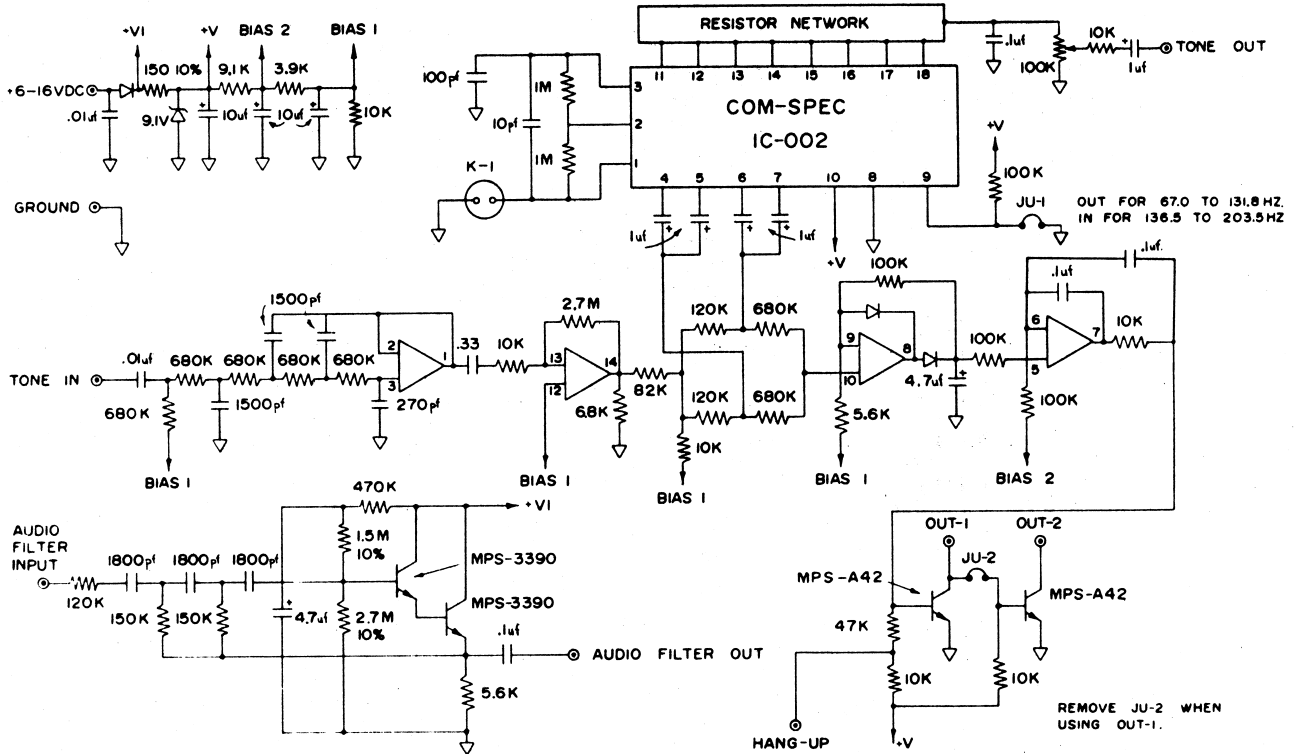


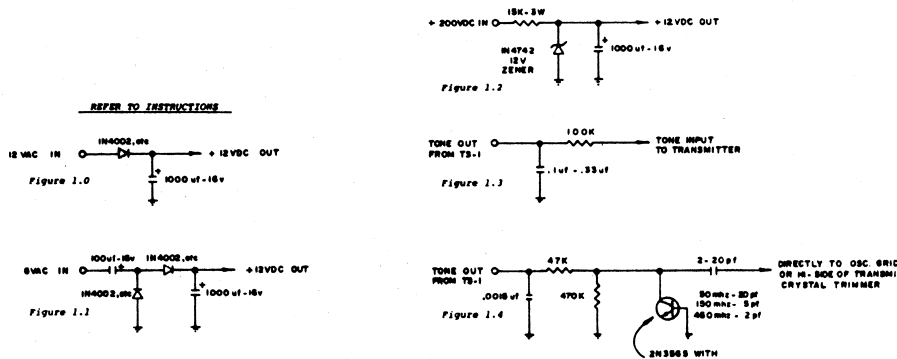
TS-1 INSTRUCTION SHEET

ALL RESISTORS 5% UNLESS OTHERWISE SPECIFIED
 K=1,000 M=1,000,000

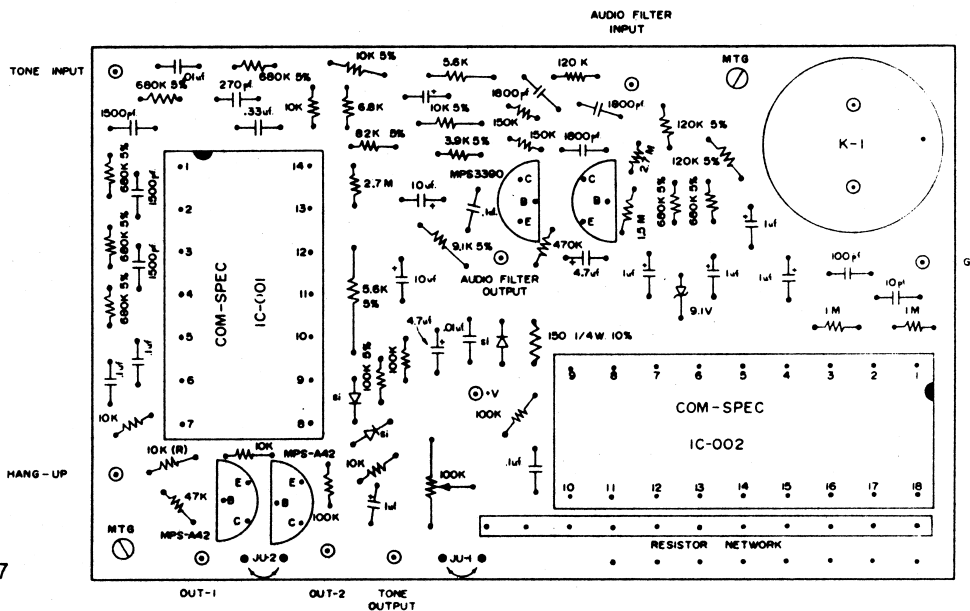


Parts List - TS-1

1 - 3.9K	1/8 watt Resistor, 5% Carbon Film	.31 ea.
2 - 5.6K	" " " " " " " "	.31 ea.
1 - 6.8K	" " " " " " " "	.31 ea.
1 - 9.1K	" " " " " " " "	.31 ea.
7 - 10K	" " " " " " " "	.31 ea.
1 - 47K	" " " " " " " "	.31 ea.
1 - 82K	" " " " " " " "	.31 ea.
4 - 100K	" " " " " " " "	.31 ea.
3 - 120K	" " " " " " " "	.31 ea.
2 - 150K	" " " " " " " "	.31 ea.
1 - 470K	" " " " " " " "	.31 ea.
7 - 680K	" " " " " " " "	.31 ea.
2 - 1 Meg.	" " " " " " " "	.31 ea.
1 - 1.5 Meg.	" " " " " " 10% Carbon Comp.	.22 ea.
2 - 2.7 Meg.	" " " " " " " "	.22 ea.
1 - Resistor Network		2.50 ea.
1 - 150 ohm 1/4 watt Resistor, 10%		.10 ea.
1 - 100K Potentiometer, Mepco ET14W		1.39 ea.
1 - COM-SPEC IC-001 microcircuit		3.00 ea.
1 - COM-SPEC IC-002 microcircuit		17.50 ea.
1 - 1N5239B Zener diode, 9.1v		1.05 ea.
2 - MPSA42 Transistors, NPN, Silicon		.85 ea.
2 - MPS3390 Transistors, NPN, Silicon		.49 ea.
3 - Diodes, Silicon		.15 ea.
1 - 10pf 50v Capacitor, CN15 ceramic		1.00 ea.
1 - 100pf " " " " CW15		1.00 ea.
1 - 270pf " " " " " "		1.00 ea.
3 - 1500pf " " " " " "		1.25 ea.
3 - 1800pf " " " " " "		1.25 ea.
2 - .01uf " " " " " "		1.50 ea.
4 - .1uf " " " " " "		2.00 ea.
1 - .33uf " " " " " "		2.25 ea.
5 - 1uf 35v " " Tantalum		.84 ea.
2 - 4.7uf 20v " " " "		.87 ea.
3 - 10uf 16v " " " "		.92 ea.
1 - Printed Circuit Board		6.00 ea.
2 - K-1 Socket pins		.25 ea.
1 - K-1 element (specify frequency)		3.00 ea.
9 - Chassis terminals		.10 ea.
8 - Sets wires with push-on terminals attached (colored)		2.00 set
2 - 4-40 spacers with 4-40 screws		.15 ea.
2 - 4-40 angles, 90 degree		.15 ea.
2 - 4-40 Fiber spacers		.05 ea.
2 - Jumper wires		.01 ea.
1 - 14 pin IC socket		.49 ea.
1 - 18 pin IC socket		.69 ea.



VIEW FROM COMPONENT SIDE OF BOARD



Mounting

Mount unit with hardware supplied. When using a 90 degree angle bracket against the PCB, be sure to use the two fiber spacers provided between the angle bracket and the PCB. If this is not done, the bracket will short out the foils on the PCB.

Jumper Placement

If jumpers are used in JUI or JU2, be sure to solder the eyelets to the foil as well as the jumper wires. Jumper JUI is used to select the proper frequency range for the unit. Jumper JU1 is cut for the 10 range of 67.0Hz to 131.8Hz. Jumper JU1 is in for the hi range of 136.5Hz to 203.5Hz. If you do not have JU1 in or out as required for the desired frequency, THE FREQUENCY WILL BE EITHER 1/2 OR TWICE THE CORRECT FREQUENCY EXACTLY. Refer to squelch gating section for proper installation of JU2.

Power hook-up

Hook +V on PCB to +6 to +16vdc continuous. It is preferable to use +12vdc as a supply voltage if high tone output is needed as output voltage is a function of supply voltage. Hook GND on PCB to chassis ground in negative ground systems. If positive ground operation is required, interchange GND and +V connections and also make proper provisions for returning mike hang-up to +V instead of ground. If polarity is reversed to the unit, it will not operate but will not be damaged. Use the following as a guide for obtaining proper operating voltage.

- Mobiles, 12v negative ground--standard hook-up
- Mobiles, 12v positive ground--reverse board +V and GND connections, return mike hang-up to +V instead of ground
- Mobiles, 6v pos. or neg ground--use B+ dropping method figure 1.2
- Bases--Use appropriate figure 1.0, 1.1, or 1.2

Tone output

Tone may be added to most transmitters directly to the center of the mod pot or to the modulator grid through a large value resistor of 100k or so. Use shielded wire with tube type circuits. Some older tube type transmitters accept tone more readily if injected with a crystal modulator circuit as shown in figure 1.4. Various values of coupling capacitors are shown for the different frequency ranges of the transmitter. The VARICAP (transistor base to collector junction of an NPN silicon transistor) changes AC voltage into changing capacitance with truely FM modulates the transmitter. No intermoding or distortion of the voice will be noted with this method. Varicap networks are available from us for \$3.00each. If tone is injected into a phase modulator, it is possible for a slight amount of high frequency component to be amplified along with the low frequency tone. If this is noticable, use the circuit in figure 1.3.

Hang-up

In normal operation, the hang-up lead is grounded by the mike hookswitch until the mike is removed from the hanger. Ungrounding the hang-up pin allows the switching circuit to unmute the receiver for monitoring of the channel prior to transmitting. Resistor R (10k) is cut out if +V is supplied to the hang-up terminal with the mike off the hanger and no voltage if it is hung-up as in the RCA types of radios. Some mikes have the hang-up wire in the mike cord going to the rear mounting of the mike so no extra hang-up hookswitch is required.

Decoder input

Hook tone input on board directly to the discriminator of the receiver forward of any metering resistance going to the discriminator jack. Some receivers provide amplified audio which is used to drive factory installed tone decoders. If your receiver has such an amplifier in it, it may be used. In tube type receivers, shielded wire may be necessary.

Audio filter

Cut audio path in receiver and hook-up input and output wires in series with that broken path. The discriminator, where the input to the tone decoder is hooked is usually a good spot. The center of the volume control in some receivers is a good place also. Receivers that incorporate factory installed tone decoders have high pass filters in them or on the tone deck. Hook-up should be where that filter would have been connected. Use shielded wire if hum is present in the audio after filter installation.

Squelch gating

The TS-1 uses 300v switching transistors to provide solid state receiver muting. Both a pull to ground upon receipt of proper tone (or lifting of the hookswitch) and a pull away from ground are provided for in the circuit. By the correct selection of Out 1 or Out 2 and JU2 in or out, any type of receiver, tube or transistor may be switched. If a tube type squelch circuit is to be gated, usually a large value of resistance (1meg) is inserted in series with the selected Out 1 or Out 2. If it is required that a relay be driven, a coil of 185 ohms or so may be used. One side of the relay coil is connected to +V and the other side is connected to Out 1 with JU2 out. The relay will energize upon receipt of proper tone or removal of the mike from the hookswitch.

Out 1	JU2 out	Transistor pulls Out 1 to ground upon receipt of proper tone.
Out 2	JU2 in	Transistor pulls Out 2 away from ground upon receipt of proper tone.

Price of the TS-1 with K-1 element is 59.95. Replacement K-1 elements are 3.00 each. Your PREPAID order will be sent POSTPAID by AIR MAIL or UPS BLUE LABEL the same day it is received. California residents add 6% sales tax or supply resale number. When ordering parts only, please remit an additional 75¢ to cover postage.