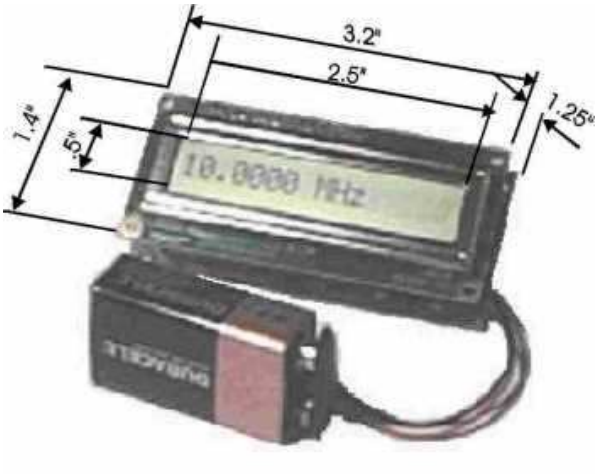
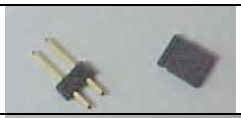
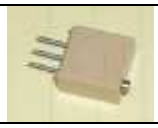
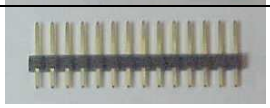
Instructions for DFD1- Drake



Digital Frequency Display 1

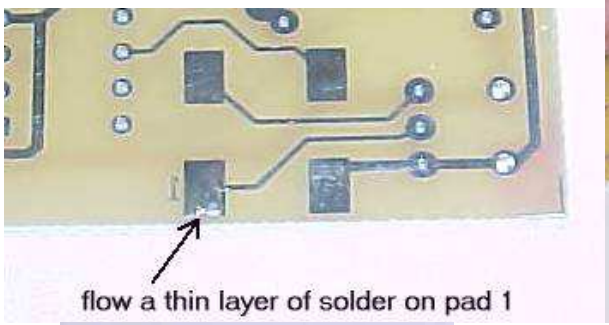
- A miniature digital frequency counter designed to display the frequency of operation of the DRAKE R4 series
- (usable with the SPR4)

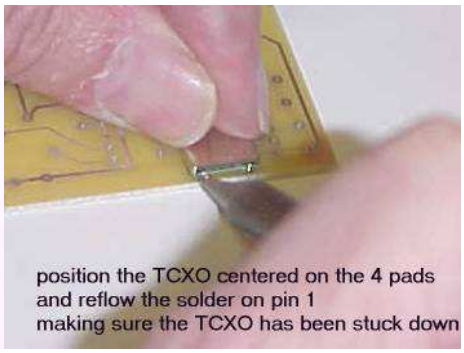
PARTS LIST

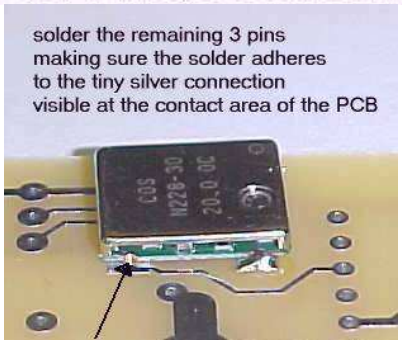
D1, D2	1N4148		U1	74HC4046	
R1, R8	100ohms Brown-black-brown		U2	PIC16C71 Labeled according To the model DFD1	
R2	390 ohms Orange-white-brown		U3	78L05 Voltage regulator	
C8,C9	10uF		U4	20MHz TCXO	
R3	10K 15 turn trimpot				
R5	10K trimpot		H1	2 pin header 2 Pin jumper	
R7	10K ohms Brown-black-orange		J1	Female connector	
	25 Turn trimpot value may vary		P1	Male connector	
C1,C2,C3,C5	.1uF		C4	100 pF	

Some pictures and the schematic are for a generic DFD1. Two Green trimpots and one 2 pin header are not used for the DFD1-Drake.

DFD1 assembly instructions with built-in TCXO
Install the TCXO (if I have not already done that)
Pin 1 is a tiny dot in the corner of the device. It may have a screw driver adjust hole that is not used and not pin 1.

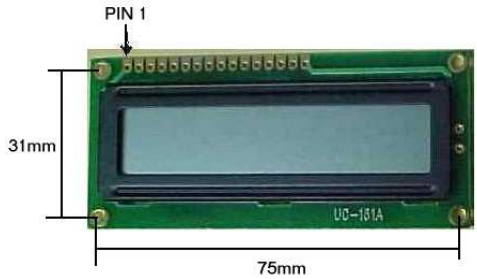






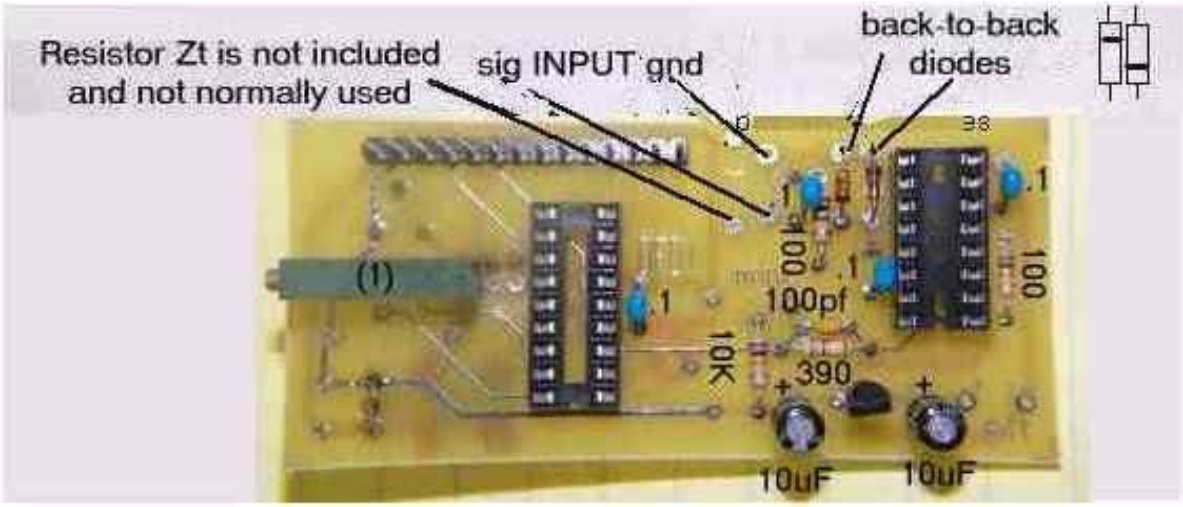
If I installed the TCXO I cannot test it
So, if the unit does not work check the connections per this illustration

.



solder the female 14 pin connector in pins 1-14 of the display module

Solder only one pin then check to make sure connector is at right angle with display. Then solder remaining pins.



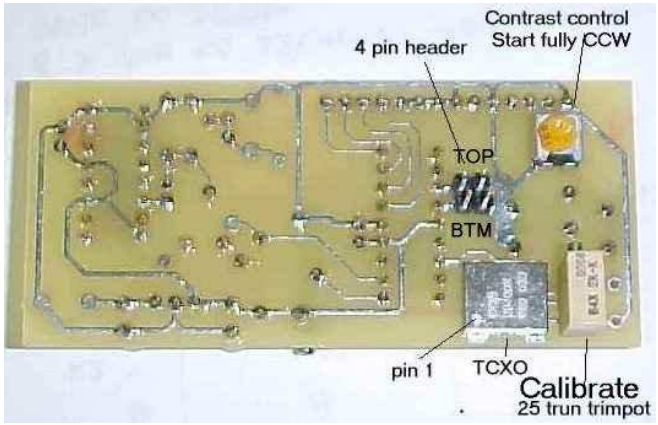
Install the parts as shown in the above and below illustration

(green trimpot (1) is included for TWEAK adjustment).

Resistor Zt is not included and not normally used.

Input signal goes to LO terminals, one ground, one signal.

If I pre-installed the TCXO, I could not test it. If unit displays only 8 black squares then check and reflow the solder on its four corners.



Only TOP 2 pin header is included or needed for DFD1-Drake

There is a two pin header on the back of the counter PCB. When the shorting bar is installed TWEAK mode is enabled. TWEAK mode allows adjusting the IF frequency +/-1200 Hz to compensate for any errors in the crystal in the radios second conversion oscillator. To adjust, tune to a KNOWN frequency (net frequency etc.) and adjust green trimpot (1) for correct frequency to be displayed

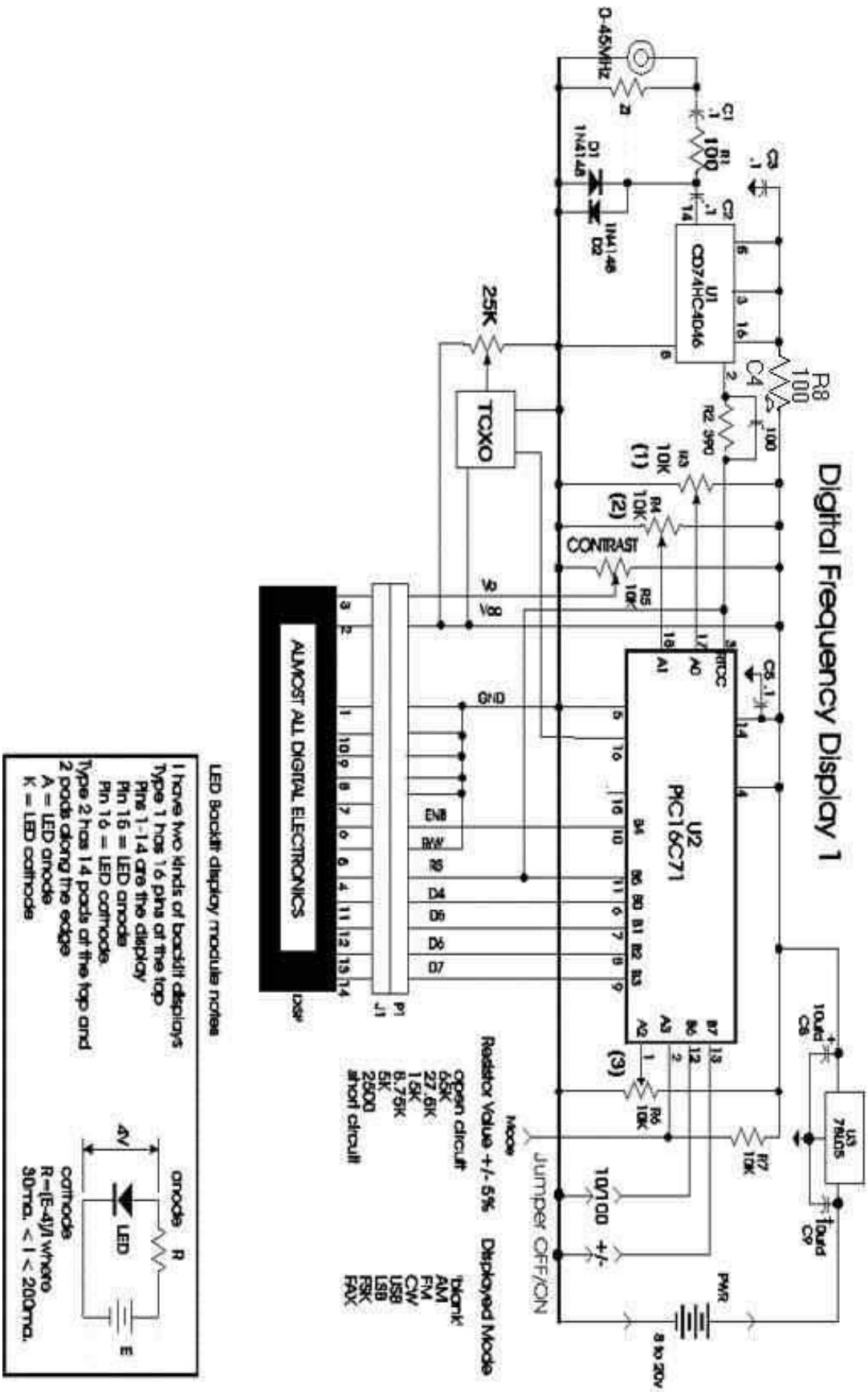
Reference TCXO Alignment procedure

A) connect the counter to a KNOWN frequency source and adjust the display to read that frequency minus the IF frequency of 5.645 MHz. or

B) zero beat the TCXO to 20MHz WWV. or

C) tune to KNOWN frequency and adjust TCXO to display that frequency

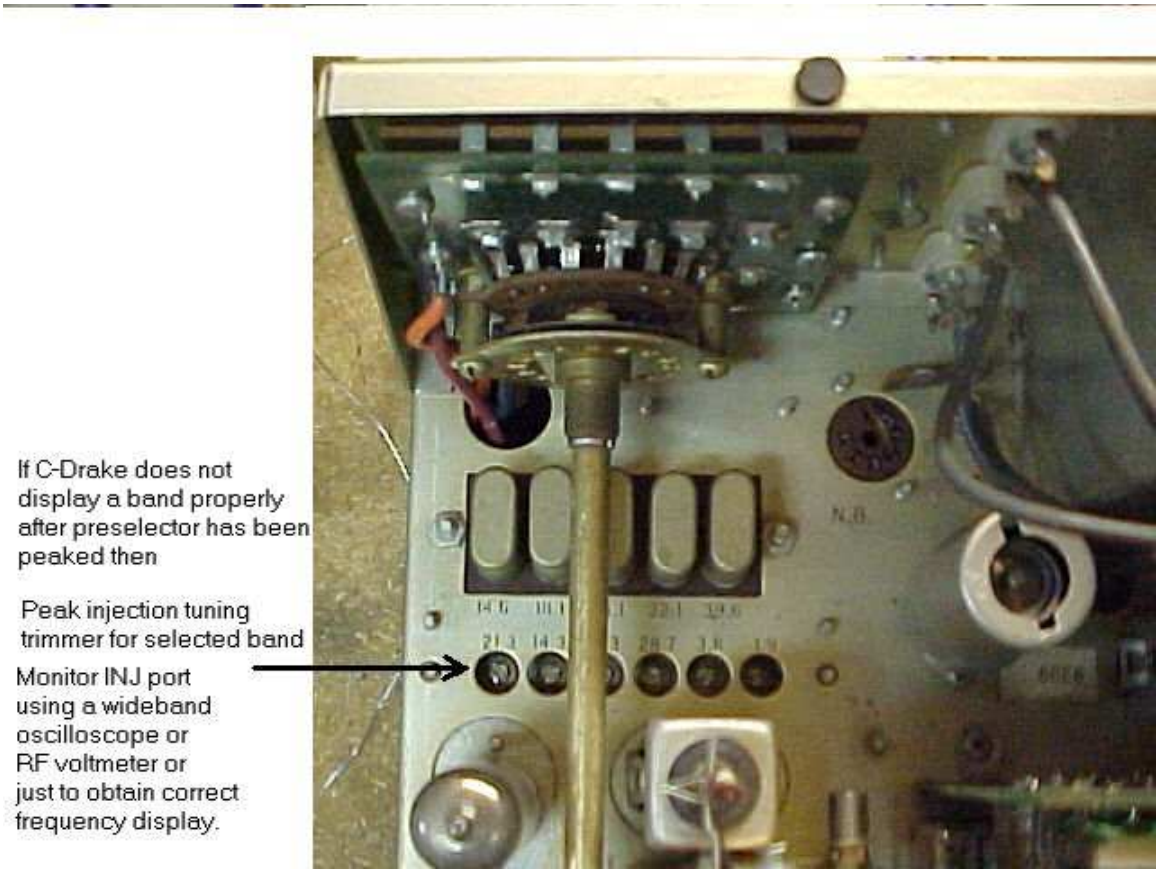
There are pads on the PCB to install a termination resistor, Zt, if desired. Almost nobody does that.



Get signal from the INJ port on the R-4,

The preselector control must be tuned reasonably close to the band being used, which is of course true anyway.

If C-Drake does not operate properly on a band it will be necessary to peak the premix circuit, for that band, as shown below.



This is very easy to do.

To use DFD1-Drake with the SPR-4 the following is suggested: A mod kit for the SPR-4 called the TA-4 was available to provide full transceive operation with a T-4, much like when an R-4 is used with a T-4. You could replicate the whole thing or just the emitter follower portion highlighted in BLUE on the diagrams below.

6.4 MODEL TA-4 TRANSCEIVE ADAPTOR

6.4.1 GENERAL DESCRIPTION

The TA-4 Transceive Adaptor allows the SPR-4 to transceive with the T-4/T-4B/T-4X/T-4XB Drake Transmitters.

6.4.2 INSTALLATION

This modification should be made by a competent technician. If you need help or want the TA-4 to be installed by one of our factory authorized service centers or by the factory service technicians, please call or write our Customer Service Department.

Disconnect the speaker cable and the line cord and remove the SPR-4 cabinet. Mount the TA-4 circuit board with two number 4 sheet metal screws and two lockwashers (with the lockwashers between the screw-heads and the mounting feet) in the chassis holes as shown in Figure 16 .

Connect the five color coded TA-4 circuit board wires by pushing the connectors at the end of each wire onto the appropriate mating pins in the SPR-4 until they are fully seated. See Figure 17 for the location of the pins. Late SPR-4's have a 12 K 1/2 watt resistor between T-6 and the pre-mixer board. Cut the resistor lead from T-6 and remove the resistor. Route the coax cable along the wiring harness and install the phono fitting on the end of the cable in the large hole near the center of rear chassis apron as shown in Figure 17 . The nut and the flat washer should be on the outside of the chassis.

Remove the SPR-4 S-meter lamp bracket by squeezing the sides of the bracket. Remove the lamp bracket from the crystal selector frame by removing the mounting screw.Locate the audio transformer mounting feet over the two holes in the top of the chassis which are in front of the crystal selector. The black transformer lead should be facing the front panel. Mount the audio transformer by inserting number six screws through the chassis holes from the bottom and into the speed nuts on the transformer. Route the two transformer leads through the rectangular chassis hole. Push the pin on the black wire into the clip on the head-phone jack. Some early SPR-4 Receivers do not have this clip. In this case, solder the black wire to the headphone terminal closest to the RF and audio gain controls. Route the red wire along the wiring harness to the rear of the chassis and mount the phono fitting in the 3/8 inch hole directly below the speaker jack. Some early SPR-4 Receivers may have a 1/4 inch hole in this location. In this case, enlarge the 1/4 inch hole to 3/8 inch. Replace both lamp brackets.

It will be necessary to adjust the injection trimmers after the TA-4 installation. See "5.3 , Paragraph 3" for the required accessory crystals for tuning the injection trimmers. Tune in the signals in the chart below from a signal generator or the crystal calibrator and peak the preselector for maximum S-meter reading. Detune T6 by grasping a metal screwdriver shaft and touching it to the rotor contact of S4R and tune the rear most injection trimmer for the band under alignment for maximum AVC deflection or S-meter reading. Detune T1 by touching the rotor contact of S8F and tune the front injection trimmer for maximum AVC deflection or S-meter reading.

BAND	FREQUENCY IN MHz
H	28.7 MHz
G	21.5
F	14.0
E	6.0
D	3.8
C	1.9
B	1.6

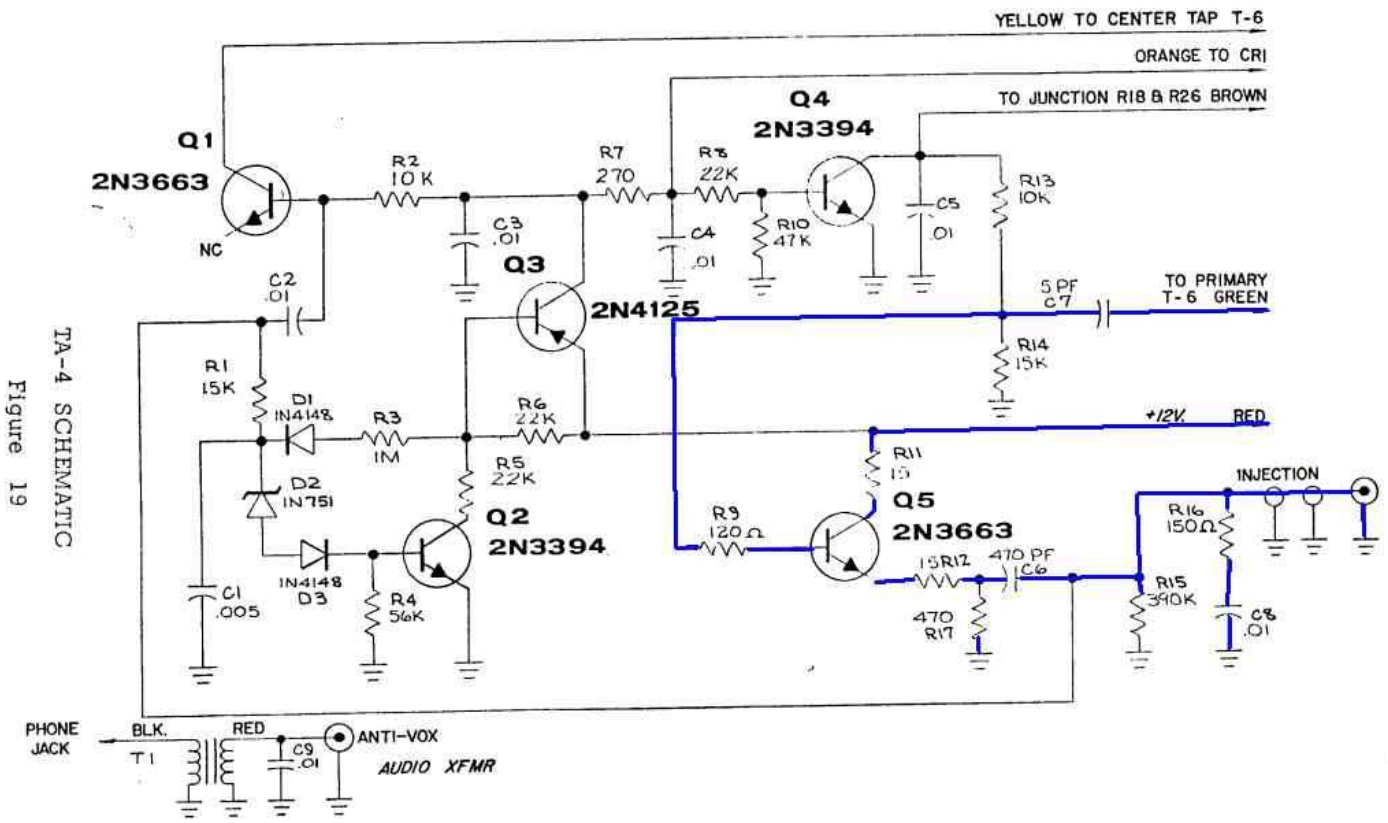
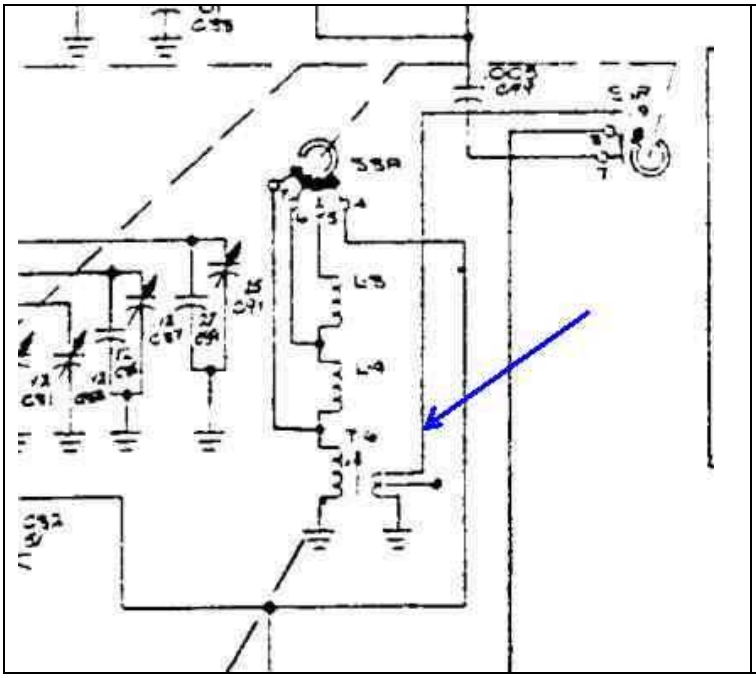
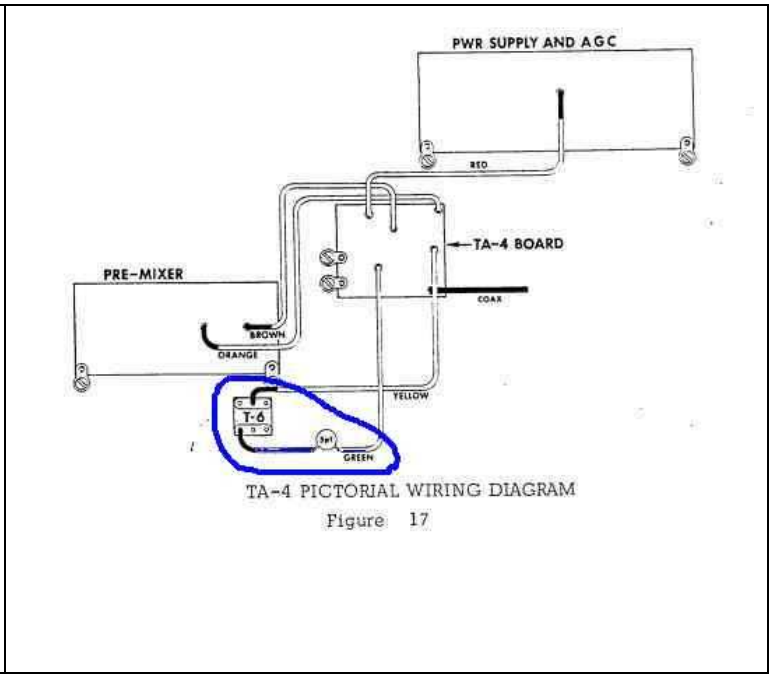


Figure 19 TA-4 SCHEMATIC

TA-4 Schematic **Only the circuit in blue is necessary just to display frequency**





TA-4 PICTORIAL WIRING DIAGRAM
Figure 17

Connection to primary of T6 to the circuit above through a 5pf capacitor

Additional information is available at
http://www.aade.com/applications2/app2.html