













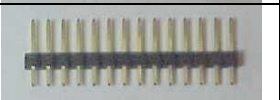


## DFD2 instructions.

After completing assembly, carefully inspect all of your solder connections, and the polarity of the diodes, voltage regulator, the electrolytic capacitor, and the IC's.

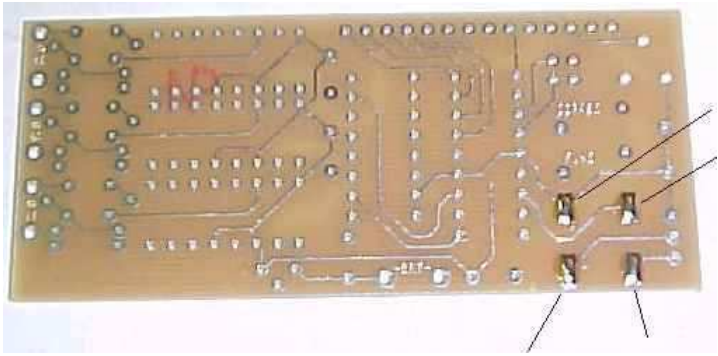
Adjust the contrast control fully counter-clockwise. Apply power from 8 to 18VDC. You should see some frequency displayed. Adjust the contrast control for the desired effect. Adjust the coarse and fine trim-pots until the IF frequency of your unit is displayed. (Custom micro-controllers have this value pre-stored and it should be displayed). It is best to remove the 4046 chips during setting of the offset to prevent noise from triggering the inputs.

### PARTS LIST

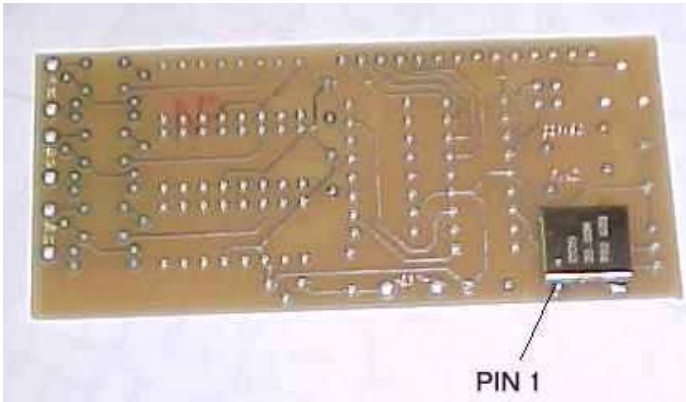
D1, D2, D3, D4, D5, D6	1N4148		U1, U3	74HC4046 <b>U2 is left blank</b>	
R1	100ohms Brown-black-brown		U4	74HC153	
R2, R3	1000 ohms brown-black-red		U5	PIC16F716 Labeled according To the model DFD2	
R4	10K trimpot <b>contrast control adjust fully CCW</b>		U6	78L05 Voltage regulator	
	25 Turn trimpot value may vary		U7	20MHz TCXO	
C1, C2, C3 C4, C5, C6 C7, C8, C11	.1uF <b>C1, 4 and 6 Mislabeled on schematic</b>		H1	2 pin header 2 Pin jumper	
C12	10uF		J1	Female connector	
			P1	Male connector	

**Use pins 1-14 of the display module. If 16 pins are available, last two are not used. Backlit option is powered according to supplemental instruction manual included if you bought backlit option.**

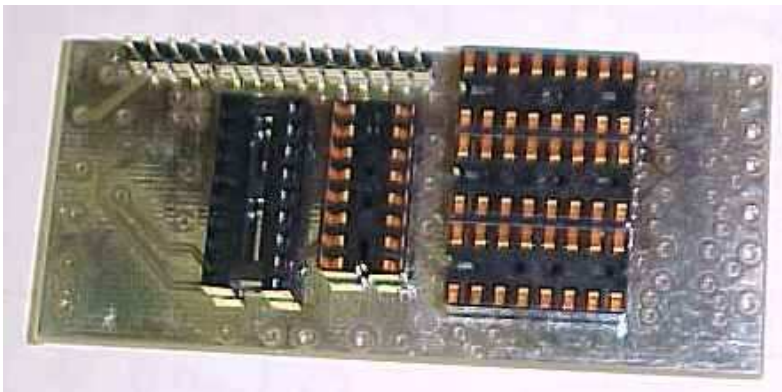
## DFD2 assembly instructions.



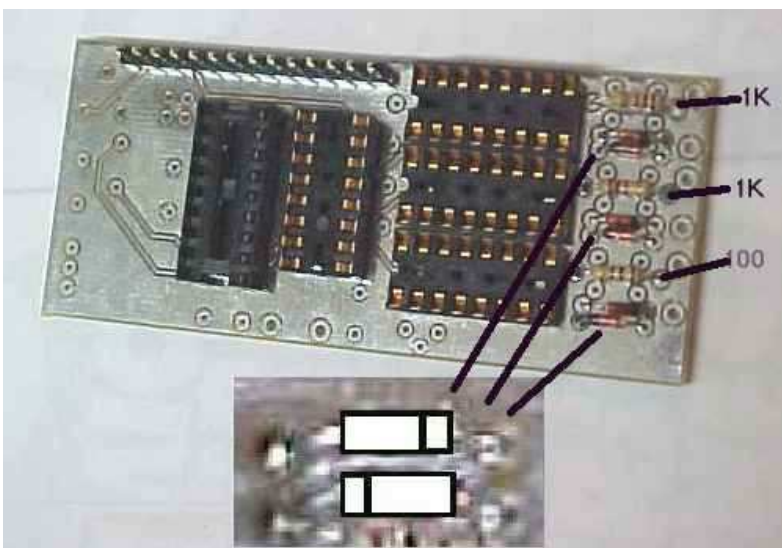
Begin by placing solder globs on the four rectangular pads for the surface mount TCXO. **If I pre-installed the TCXO, I could not test it. If unit displays only 8 black squares then check and reflow the solder on its four corners.**



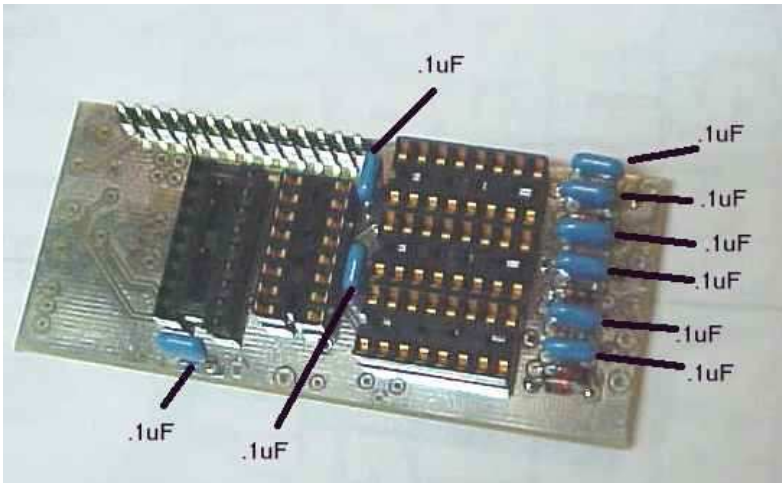
Carefully Position the TCXO with pin 1 as shown and remelt the solder globs while pushing down on that side of the device until all four pads of the TCXO are soldered. You can check by looking at the edge view to verify that solder has flowed onto the TCXO terminals. If later the unit shows only 8 black squares on the display it may be because one or more of these terminals did not properly reflow solder.



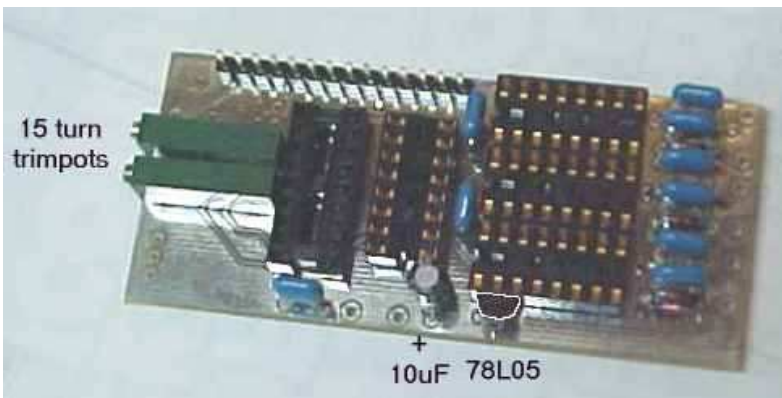
Next mount the IC sockets and display header.



Next install and solder the two 1K and the 100 ohm resistors and the six back to back diodes.

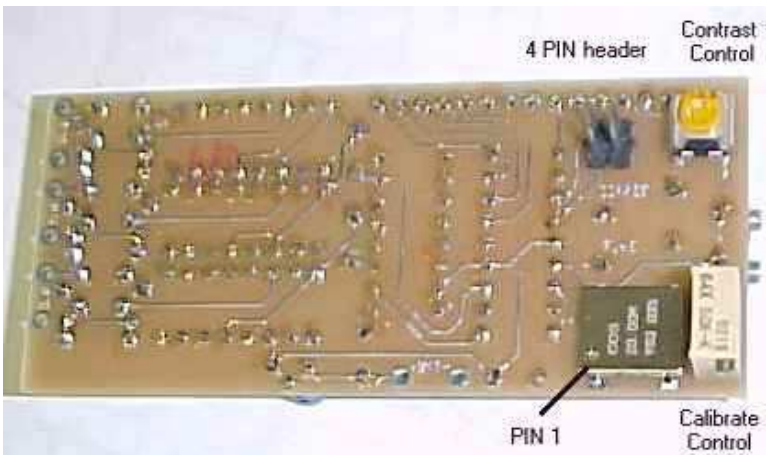


Then install and solder 9 each .1 uF capacitors  
**Caps can be blue or brown.**

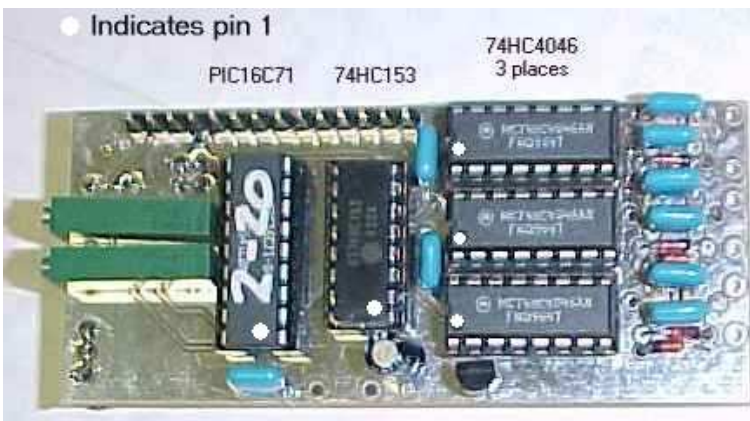


Next install the 78L05 voltage regulator, the 10uF electrolytic. **Two green trimpots are not used or included.**

+ Terminal of 10uF electrolytic in hole closest to edge of PCB. Flat side of 78L05 toward IC sockets.

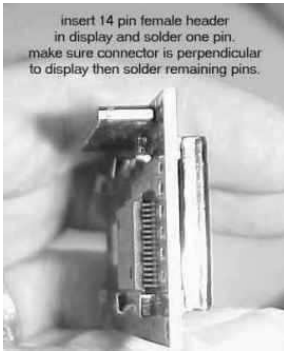


On the back side of the PCB install and solder the 10K contrast control (**adjust it fully CCW**) and the 25K calibration control.



Next, Install the ICs

**Two green trimpots and U2 shown are not used or included for DFD2-820**



Mount the 14 pin female header on the display module soldering only one pin. Then verify the connector is at a right angle to the module, remelting the soldered pin and adjusting the connector if necessary.

Then solder the remaining pins.

Plug the module into the DFD2 PCB.

At this point you can plug the counter board into the module and power them with a 9 volt battery.

You should see something displayed.

What you see at this point is not important as some inputs are still floating until final assembly in your enclosure.

**If only 8 black squares appear, either the TCXO has not been soldered on all 4 points or there is a solder problem on the circuits between the 18 pin chip and the display connector, or on the display module connector.**

## CALIBRATION

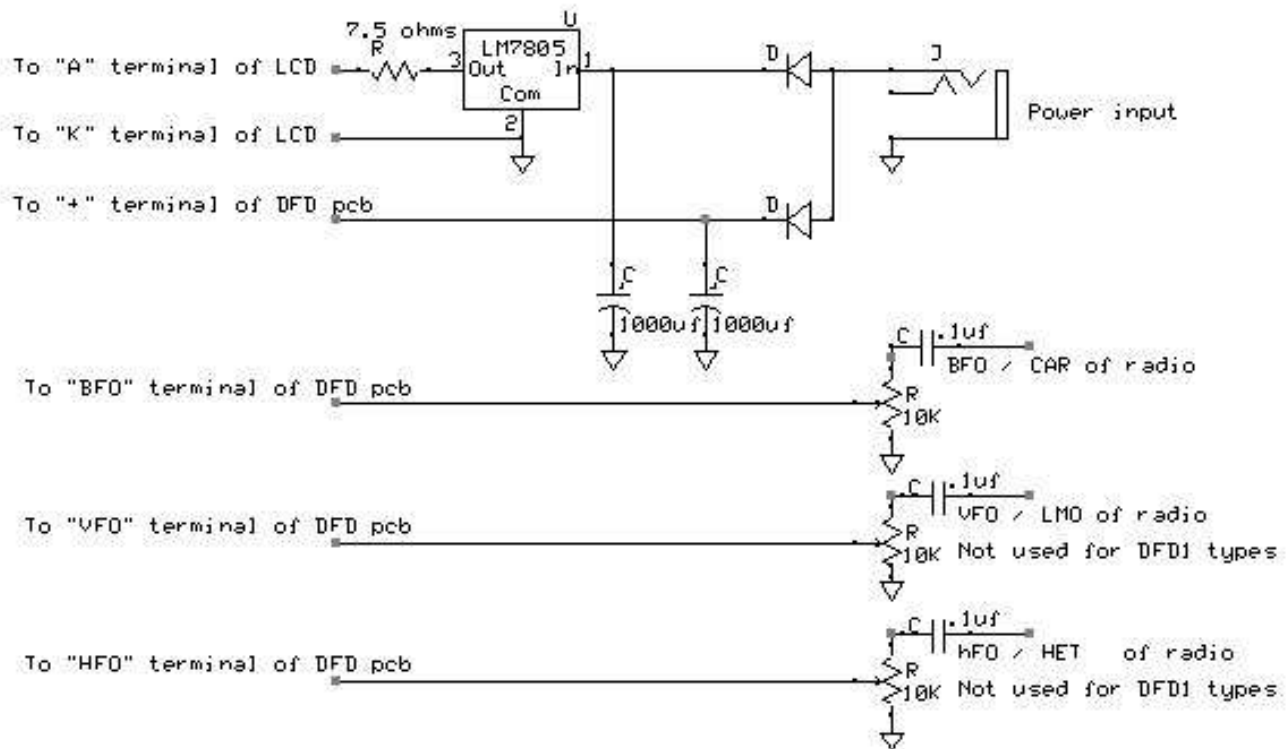
- There are many ways to calibrate a frequency counter depending on available test equipment.
- The simplest is to zero beat a signal generator against WWV (receiver bfo off) while measuring the generator's frequency with the counter.
  - Adjust the 25 turn trimpot on the back of the PCB to obtain the WWV frequency (20 MHz) on the counter's display.
  - Or listen to TCXO on receiver while zero beating it to WWV on 20MHz.
- Any other KNOWN frequency can also be used.

## Installation

It is possible to overdrive the inputs causing erratic frequencies to be displayed. A 10K trimpot can be used to set the levels going into the DFD2.

the levels should be set only slightly greater than required for a stable display. Set the BFO input first, then the VFO and finally the HFO (usually on 10mtr band).





### Power Conditioning module for DFD1 and DFD2 applications

**This is the power conditioning module supplied as part of the plug-n-play fully assembled digital dials. Something similar is recommended for DFD2 applications to provide level controls.**

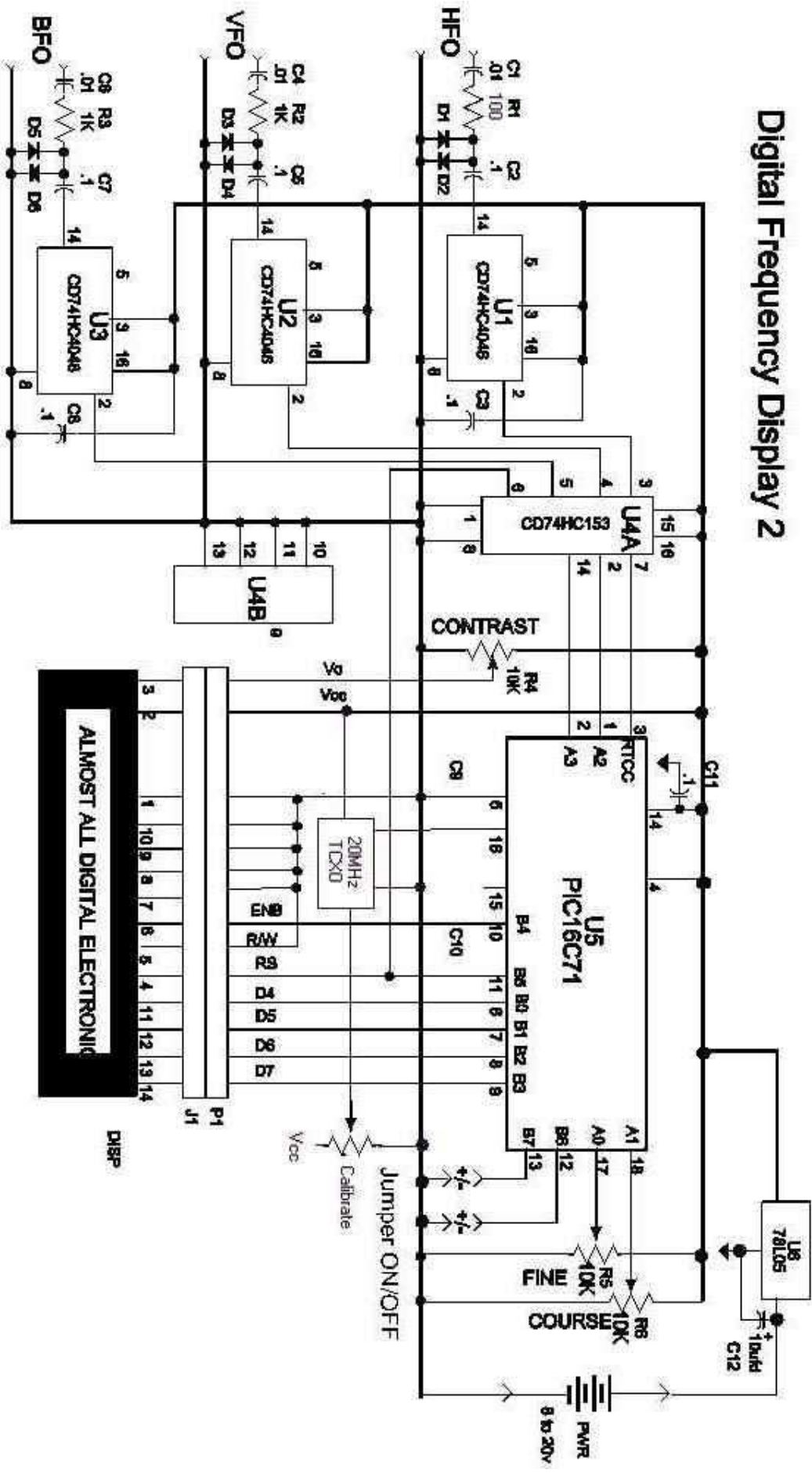
Only one input is required for a DFD1.

**The 7805 part is to power a backlit display option.** The 7.5 ohm resistor may not be required for some types of backlit displays. See backlite instructions

**For additional installation hints see**

**<http://www.aade.com/applications2/app2.html>**

# Digital Frequency Display 2



ALMOST ALL DIGITAL ELECTRONICS

- TS-820 [DFD1](#)
  - Set IF offset to 8.83 Mhz
  - The LO is always high-side (above the RF frequency). This makes the maximum LO frequency 38.83 MHz. With 2V p-p or more the DFD can be connected to the LO output at pin 4 of the RF unit (X44-1150-001). This signal will have to be routed out of the unit. I suggest using high impedance shielded cable such as used for RCA type video cables between VCR and TV.
  - A [preamp may be required](#) as shown in this application note.
- **Here is how one customer built it into the radio.** using a **DFD2-820**.

A standard DFD2 can be used if externally mounted.

**NOTE: only two of the DFD2 inputs are used because the radio has already mixed the HFO and VFO.**

**Connect the HFO input of the DFD to CVC1 and BFO input to CCR7**



the second of 2 pictures is from the top down with left side at the top. at the center you can see ribbon cable running back over the vfo. to the left, top of picture was filled by the counter assembly now removed and the rectangular hole is the location of the connector for same. the only 2 coax leads were removed from the connector and spliced to the input leads. the vco input labeled (cvc) pin 1 and ground pin 3. the bfo input labeled (ccr) pin7 and ground pin 6. looking to the right of the rectangular hole in chassis you see a very shiny aluminum heat sink (avr unit) a 5v supply a convenient point for power. the 5 pin white connector is power in and out. pin 1 is +5, pin 2 is ground and pin 4 is +12. at present the backlight is tied to pin 4 through a 180 resistor. that will be the same place for dfd power. ....Ron

