



A custom version of DFD1 for Hammarlund radios
 Can also be used with any radio with a 455KHz IF (model = FREQ)

- **Works for Models :**
 - HQ-100 IF=455KHz
 - For HQ-105 use HQ-100
 - HQ-110* IF=455KHz/3.045MHz
 - HQ-120 IF=455KHz
 - HQ-129 IF=455KHz
 - HQ-140 IF=455KHz
 - HQ-145 IF=455KHz/3.035MHz
 - HQ-150 IF=455KHz
 - HQ-160IF=455KHz/3.035MHz
 - HQ-170* IF=455KHz/3.035MHz
 - HQ-180 IF=455KHz/3.035MHz
 - HQ-200 IF=455KHz
 - SP-110 IF=465KHz
 - SP-200/210 IF=465KHz
 - SP-400 IF=455KHz
 - SP-600* IF=455KHz/3.955MHz
 - FREQ IF=455Khz (general purpose)

***Does not work on 6 Meter band**

You simply adjust a 15 turn trimpot until the model of your radio is displayed ie: **HQ-129X** .

No other adjustments required.

(See TWEAK mode below)

For those models that are dual conversion on some bands

DFD1-Hammarlund automatically detects the band and changes the IF offset

DFD1-Hammarlund uses a 20 MHz TCXO reference so it can be easily calibrated by zero beating its oscillator against 20 MHz WWV's carrier.

Jumper selectable 100Hz/1000Hz resolution.

Digital filtering to eliminate flicker due to round off uncertainty.

TWEAK MODE

provides optional accurate calibration capability.

The frequency (F) to which the radio is tuned is computed as

$$F = \text{Local Oscillator freq} \pm \text{IF freq}$$

DFD1-Hamm assumes the local oscillator frequency is tuned above the received frequency by an amount equal to the IF frequency. However, this is not always true for all radios. A switch can be connected from the input marked MODE on the PCB, to ground, which reverses the correction of IF frequency.

DFD1-Hammarlund assumes the IF frequencies shown in the chart above are the actual IF frequencies of your radio. However, some types use a crystal filter or crystal controlled second conversion which make the actual IF frequency a function of the frequency of those crystals which can vary a few hundred Hz from radio to radio.

A jumper on the PC board enables TWEAK mode. In TWEAK mode there are 15 turn trimpots which allows adjustment of the IF frequency +/- 12.8KHz in 100 Hz steps.

Trimpot(1) Tweak Low


















Trimpot(2) Tweak High

Trimpot(3) Model set

The unit has two jumpers with which the user can change it's function.

- **Bottom)** Enable Tweak Mode
- **Top)** 10Hz/100Hz resolution

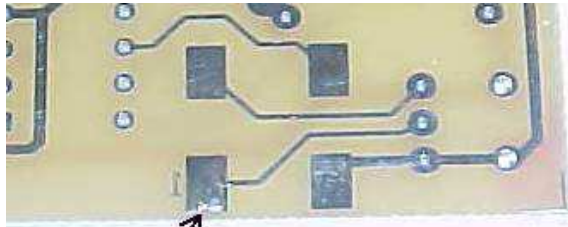
PARTS LIST

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	
R3,R4,R6	10K 15 turn trimpot		U4	20MHz TCXO	
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	
C8,C9	10uF				

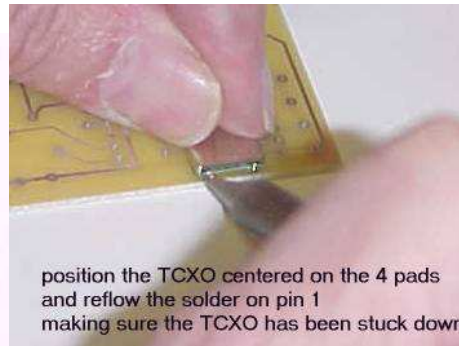
ASSEMBLY

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 is NOT pin 1.**



flow a thin layer of solder on pad 1

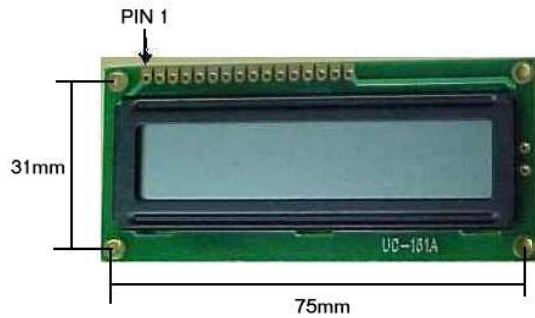


position the TCXO centered on the 4 pads and reflow the solder on pin 1 making sure the TCXO has been stuck down



solder the remaining 3 pins making sure the solder adheres to the tiny silver connection visible at the contact area of the PCB

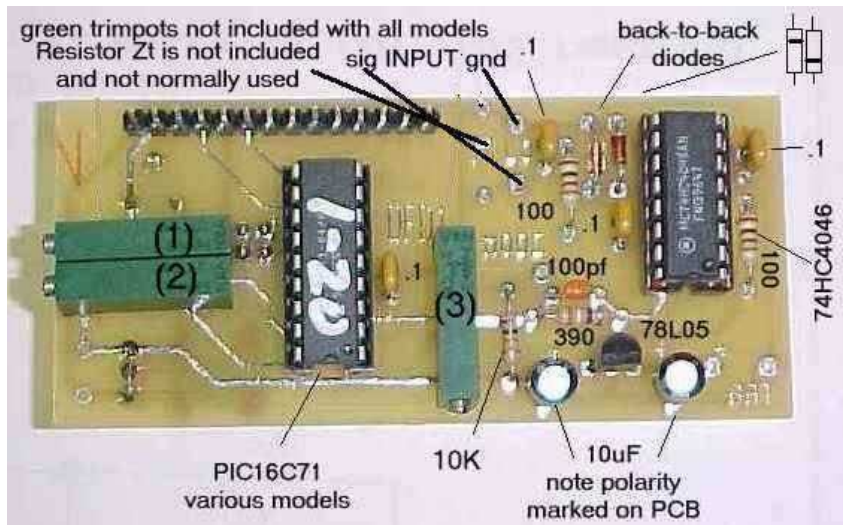
**If I installed the TCXO I cannot test it
So, if the unit only displays 8 black squares check the connections per this illustration**



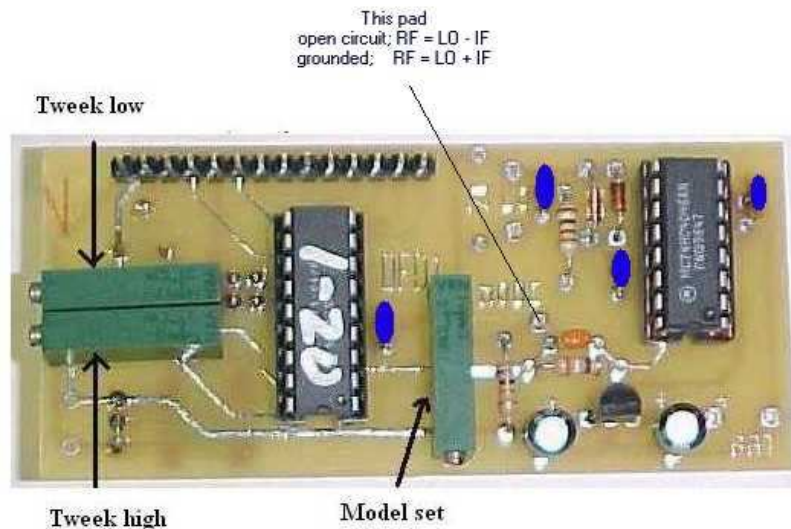
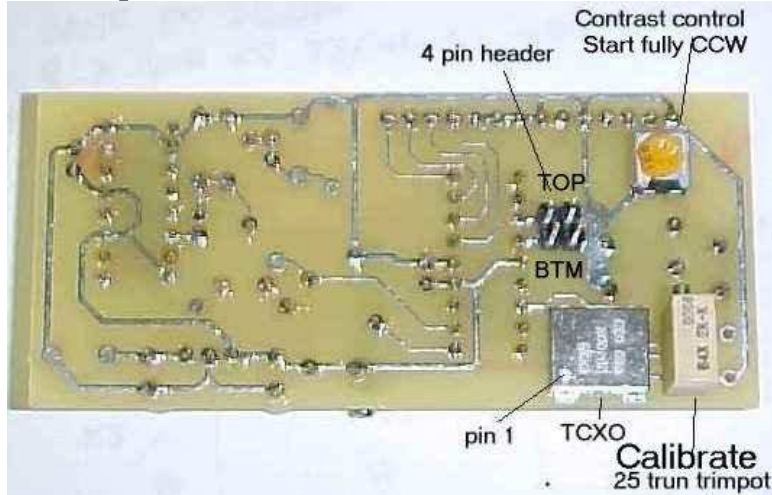
solder the female 14 pin connector in pins 1-14 of the display module



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.



connect a switch from the MODE pad on the PCB to ground .

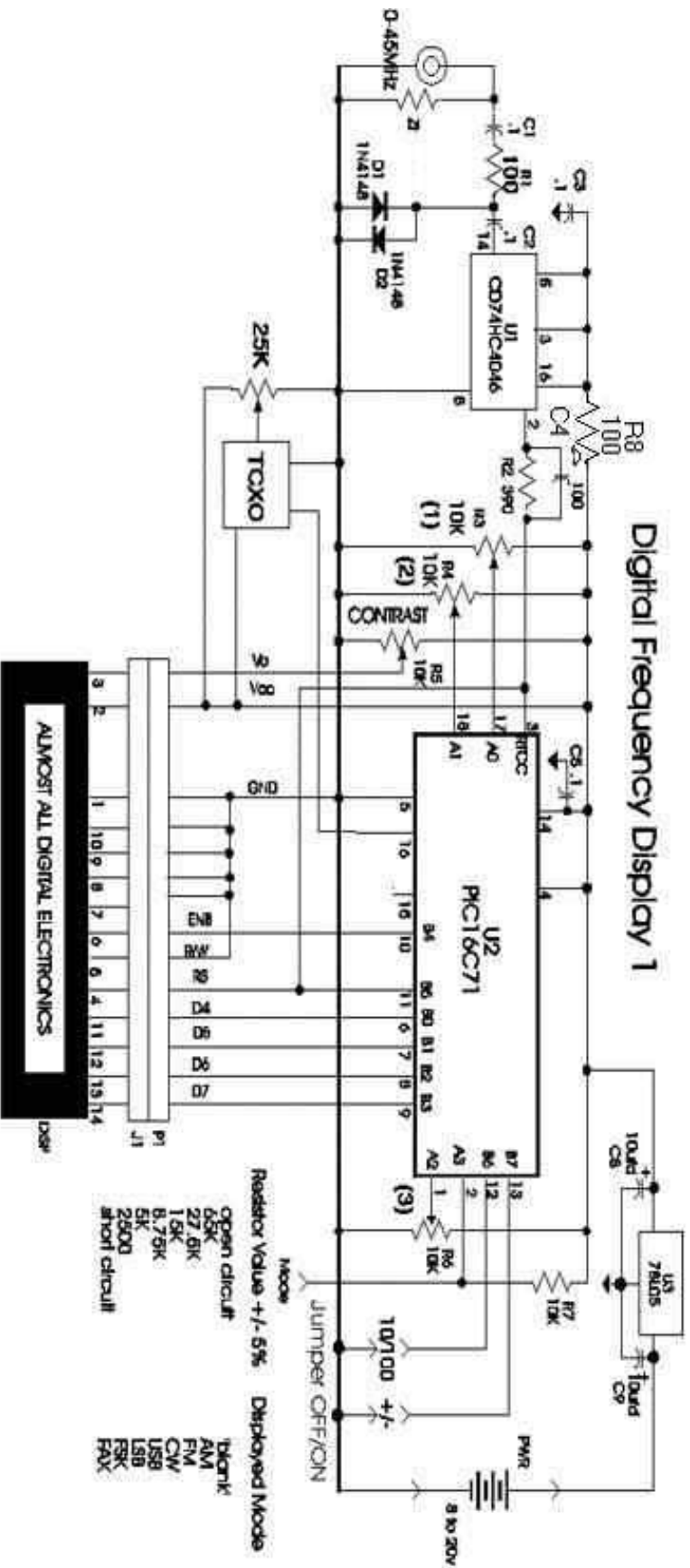
If the displayed frequency is off by twice the IF frequency then flip the switch

Ie: if display off 910KHz for a 455KHz If.

For applications information see:

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

Digital Frequency Display 1



LED backlit display module notes

- I have two kinds of backlit displays
- Type 1 has 16 pins at the top
- Pins 1-14 are the display
- Pin 16 = LED anode
- Pin 16 = LED cathode
- Type 2 has 14 pins at the top and 2 pins along the edge
- A = LED anode
- K = LED cathode

