Parts needed for Synthenizer modifications to 6 Meters:

IC Socket – Low profile 24 pin. - 1 of [Jaycar PI-6506]

Capacitors. **Jaycar**

5.6pf	- 1 of	RC-5309
22pf	- 2 of	RC-5216

Note: All capacitors are 50V Ceramic

Wire.

Approximately 200 mm of 0.63mm [22bs] enameled coated wire [Jaycar WW4018].

Initial Testing:

Equipment Needed.

Midland 70-066 transceiver [with 66-88Mhz EPROM installed],
Frequency Counter. Reads up to 88Mhz
Power or VSWR/Power Meter to cover 50Mhz to 88Mhz.
12 Volt power supply. 10 Amps capacity.
Signal Generator to cover 50Mhz to 88Mhz.

Testing.

Hopefully, your Midland 70-066 has an installed EPROM. And the EPROM has not been erased, If this is TRUE then;

Connect your transceiver to a 12 Volt power supply and the antenna to power meter and dummy load. Go to channel 1; Press the transmit button to allow the power out to be loosely coupled to a Frequency counter. Measure the Frequency and power out.

Callsign - **Date -**

Frequency -

Power Out -

Then - Connect your transceiver to a signal generator and, adjust the signal generator to the above noted frequency; Adjust the mute to just close; then - measure the micro-volts for mute opening, for receiver sensitivity.

Rx Sensitivity –

If all of the above are OK then you may continue with the conversion or repair your transceiver before conversion.

INITIAL TRANSCEIVER REMOVAL of COVERS:

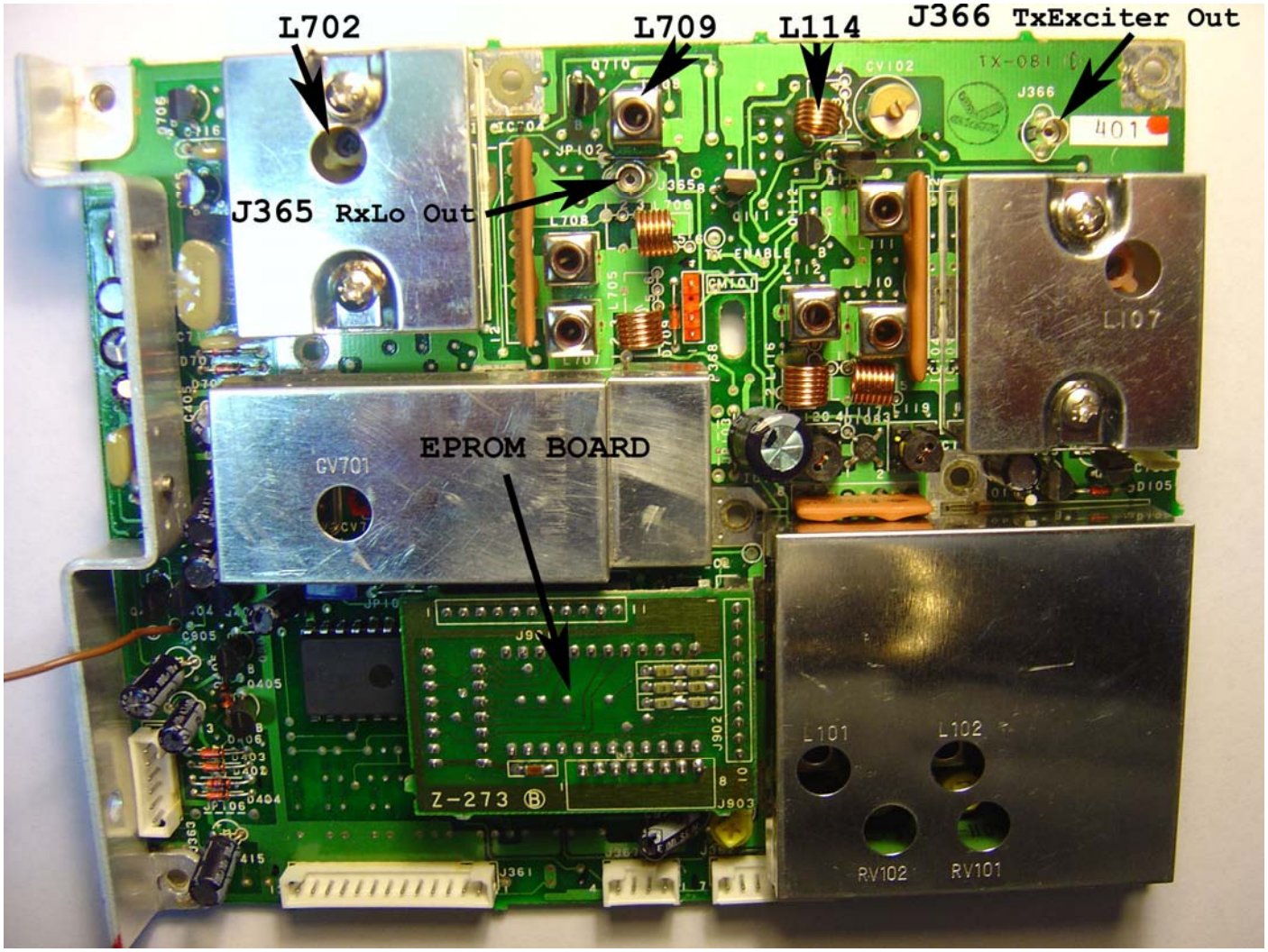
- Remove four screws from each side of the transceiver, then remove the top and bottom covers.
- With a black felt marker pen – Write your call-sign on each cover and inside the top and bottom of the transceiver chassis.
- Then – Modify the Z-273 EPROM PCB [part 1], the synthesizer [part 1], the receiver [part 2], and the transmitter PA [part 4].

CCARC TEST CABLE's to be BUILT:

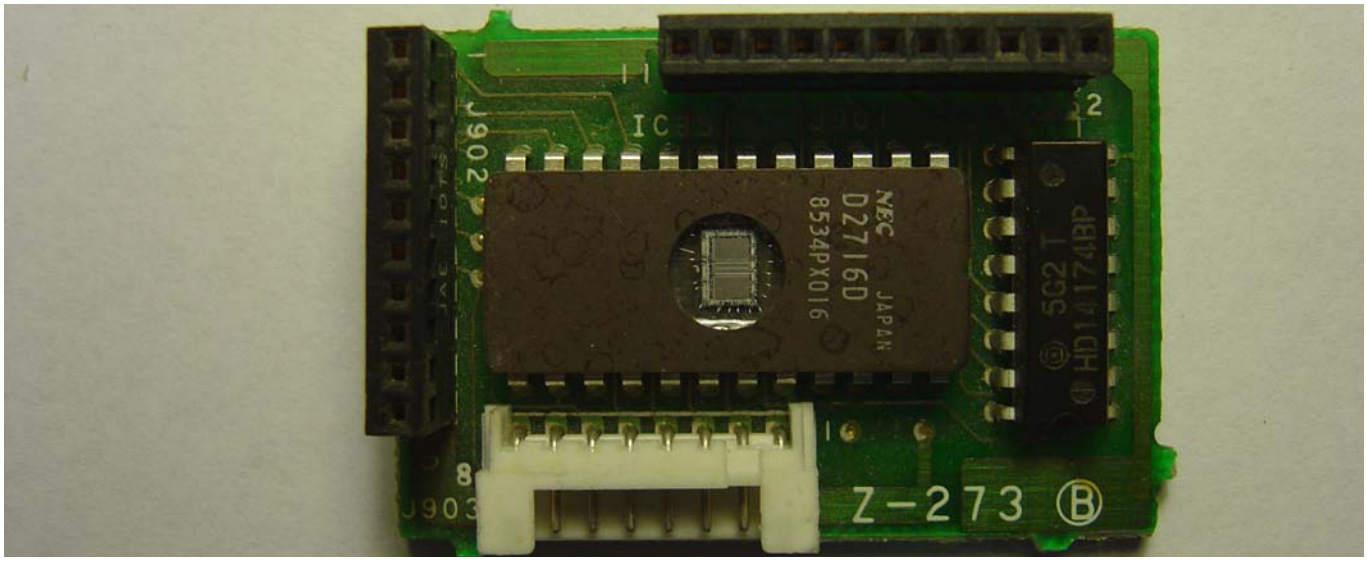
- RF cable Transceiver to Power Meter. RG58 – Type N to UHF connectors.
- RF cable Transceiver to Signal Generator. RG58 – BNC to UHF connectors.
- DC cable for receiver testing. 2 pin connector to 2 of red banana plugs [for DC meter].
- DC cable for synthesizer testing. 1 cable - black banana plug to alligator clip.
  1 cable - red banana plug to red clip.
- UV Light assembly for bulk erasing of Z-273's 2716 EPROM's.

The Synthesizer including EPROM Board.

Midland 70-066 Sync Board Top View - below:



Remove the EPROM board [above as **Z-273**], reverse view below.



REMEMBER

to

REPLACE

the

EPROM

in the

RIGHT WAY on the Z-273

or the

EPROM will blow & be USELESS

Previous converters have done this.

Z-273 EPROM Board:

NOTE: For the CTCSS and receiver to work properly [ie audio out to speaker to work] on the Midland 70-066 transceivers – Make sure the 8 pin plug is plugged into the white 8 pin socket **J903** on the Z-273 EPROM board.

There are two methods of changing the EPROM data for different frequencies,

1. Using a MRP70-1000C (MRP-70) programmer box and software. This method allows you to program the EPROM on the Z-273 board, without de-soldering the EPROM from the Z-273 board. The programmer box can be purchased in Australia for approx $300 or from the US for approx $450 US; **or**;

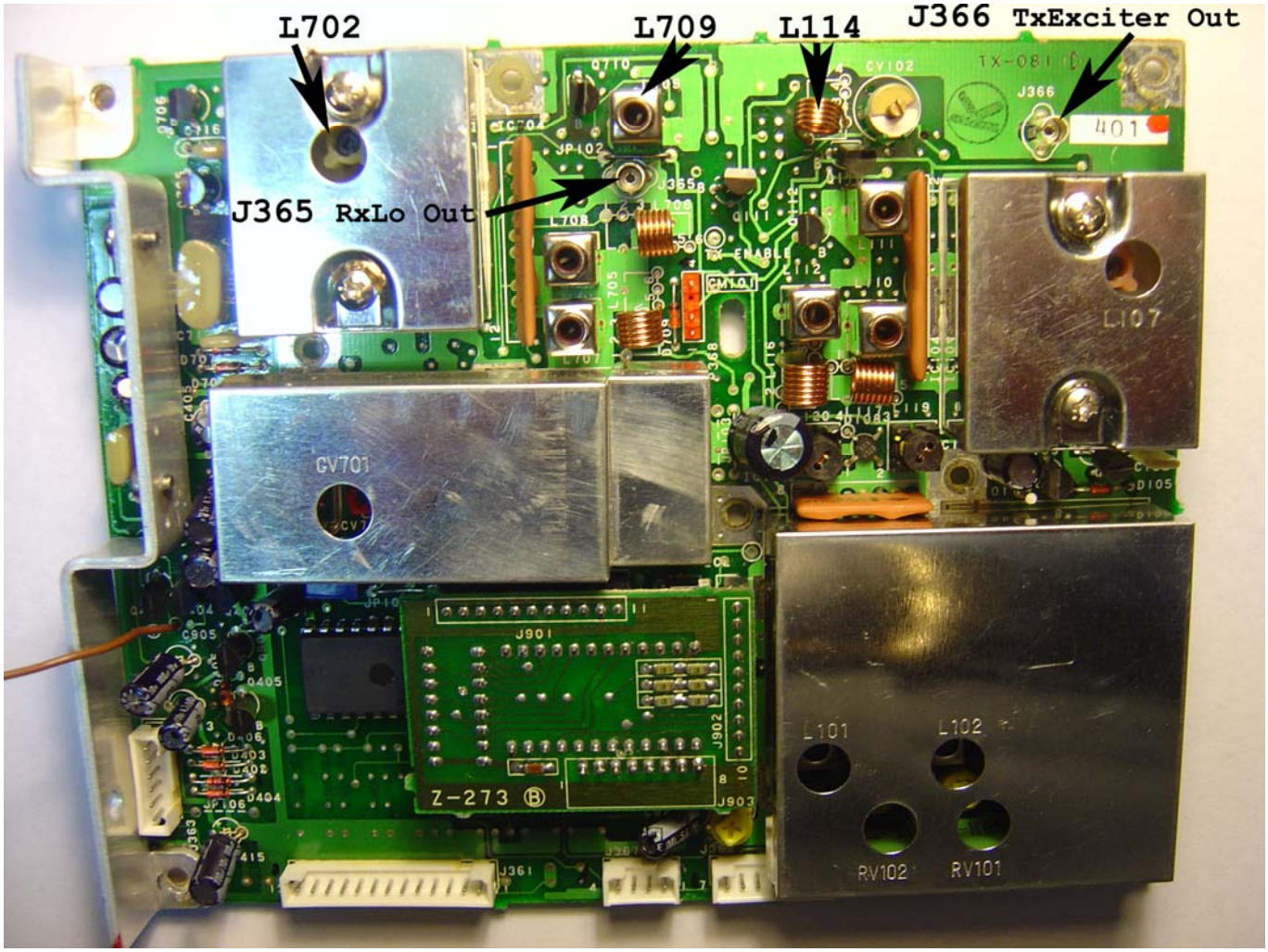
2. Remove the Z-273 board from the Synthesizer Board. Then remove the 2716 EPROM using de-soldering equipment from the EPROM board. Then solder a low profile 24 pin socket to the EPROM board.

   Reprogram EPROM with 6 meter firmware, by using the VK2DOT RT85 software or any other software.

The Synthesizer Board.

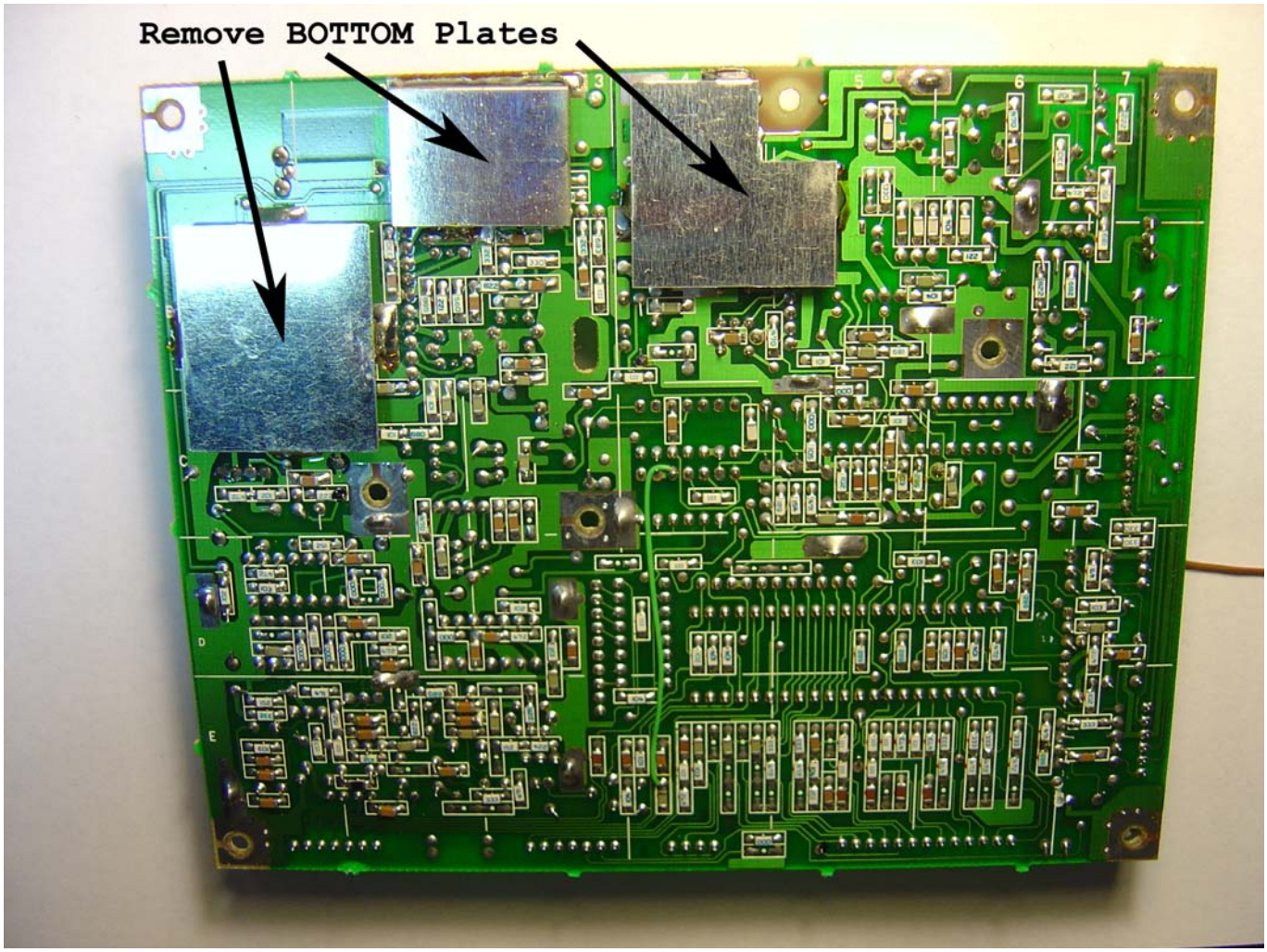
Remove the synthesizer board from the transceiver assembly.

Midland 70-066 Sync Board Top View below:



TX buffer, remove **L114** and keep for use on the PA board; replace with 7.5 turns of 0.63mm wire, same diameter former. [Use a 5mm drill bit to wind the new coil on.]

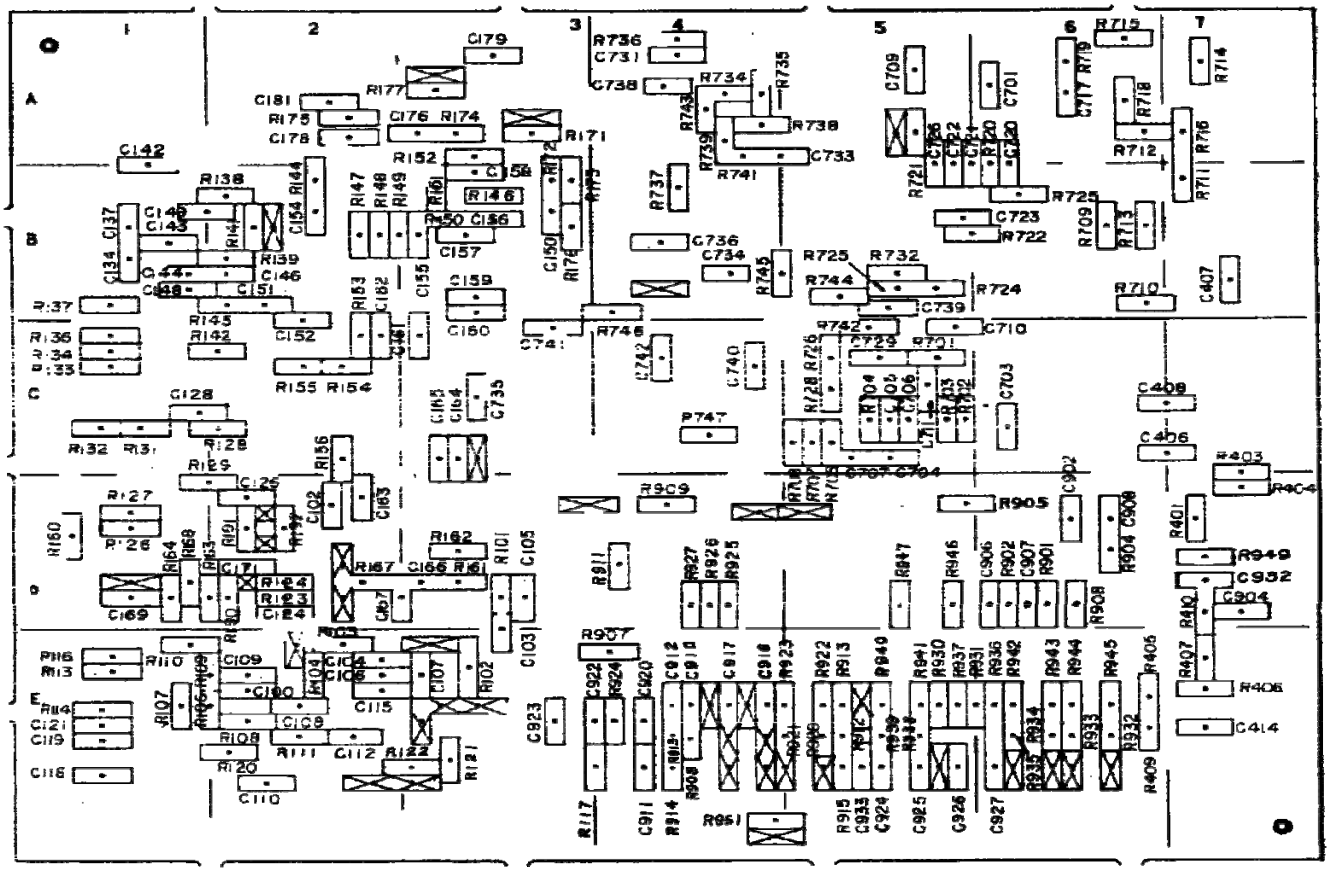
Midland 70-066 Sync Board Bottom – Unsolder Bottom Plates:



It is noticed that the Midland 70-066A & B models have only one shield on the bottom of the synthesizer board, the left one above.

Midland 70-066 Sync Board Bottom View Capacitors - below:

C137 **C709**

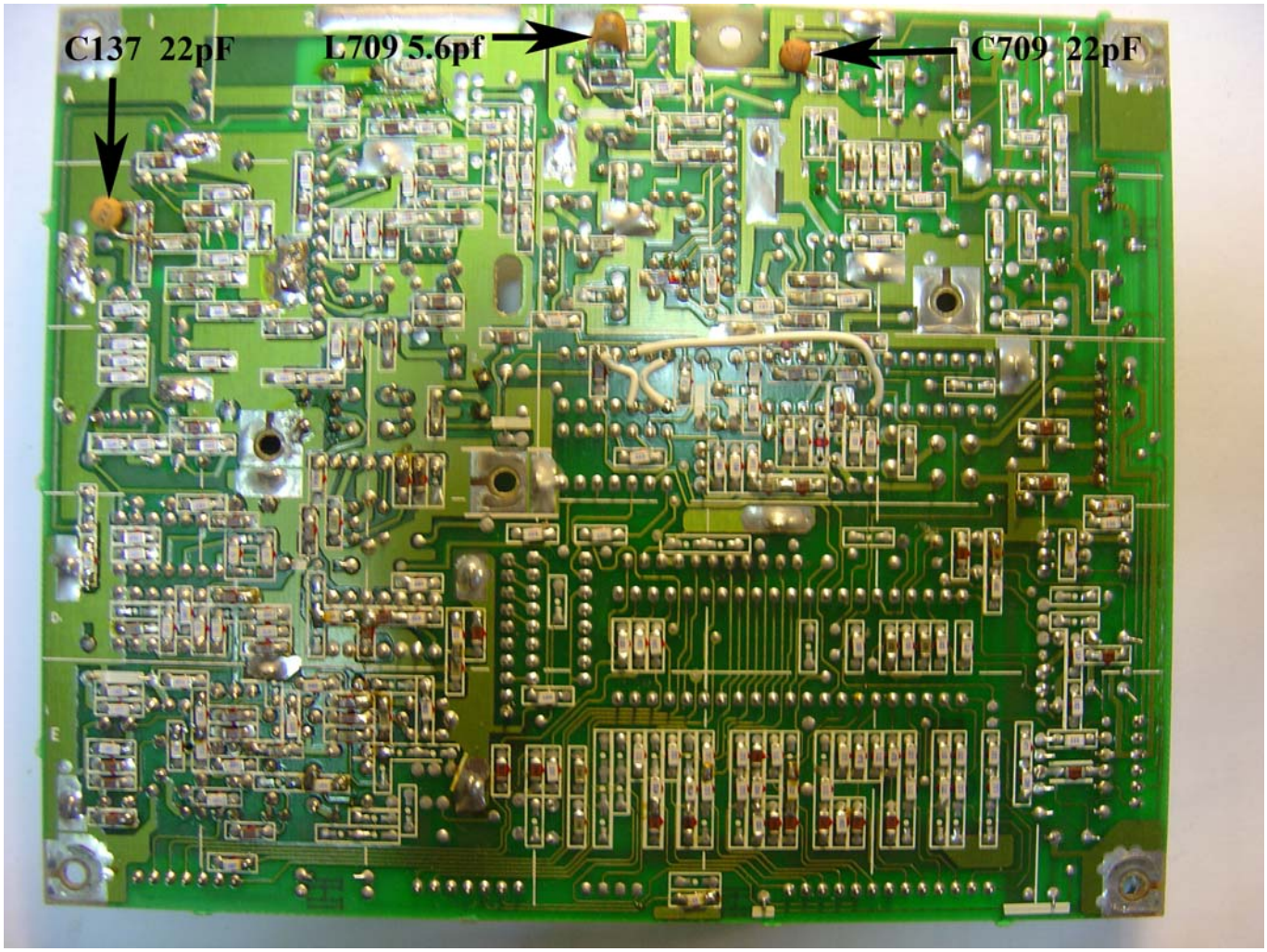


RX (main) VCO, add **22pF** to **C709**.

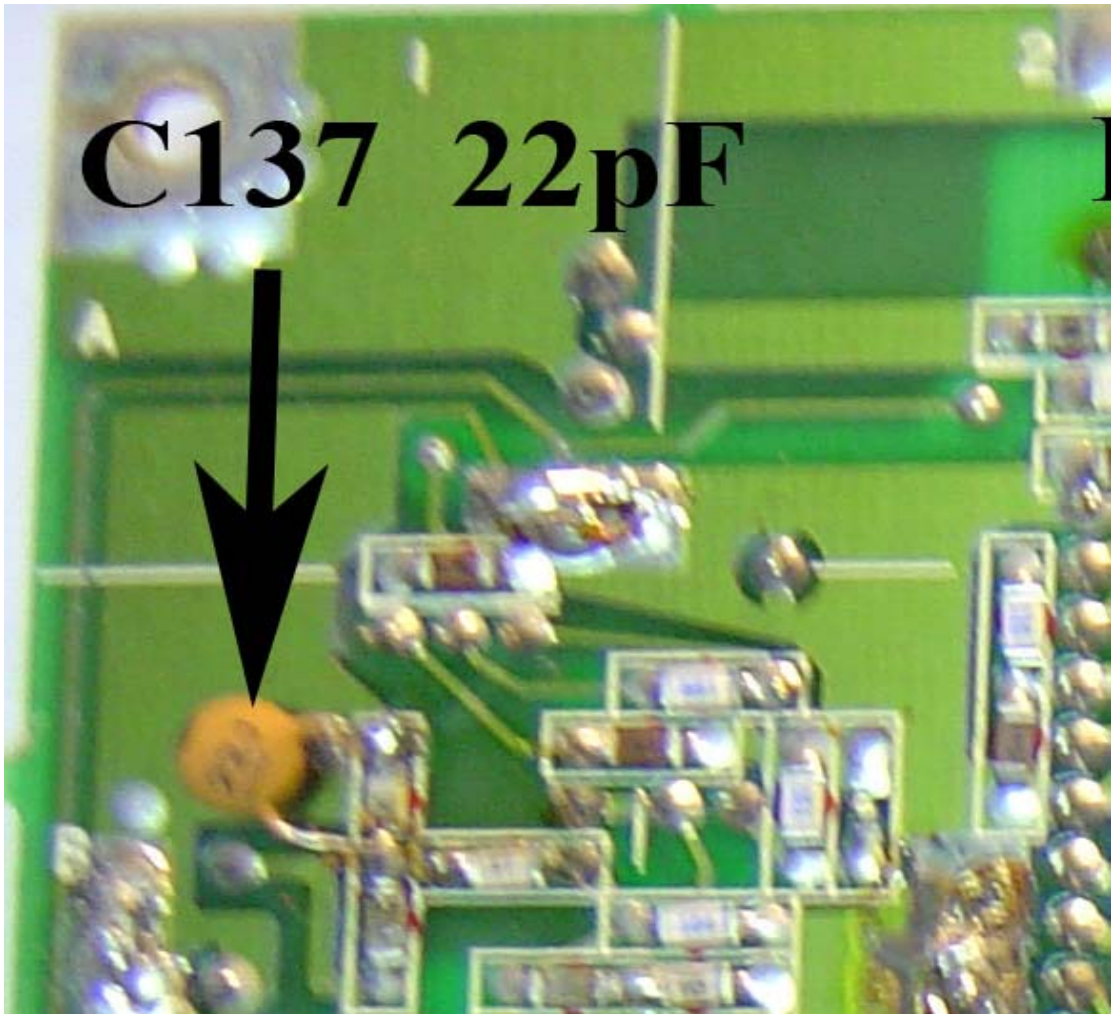
TX (offset) VCO, add **22pF** to **C137** [for Midland 70-066],
located under VCO cover on the track side of the board. Some transceivers may require more.

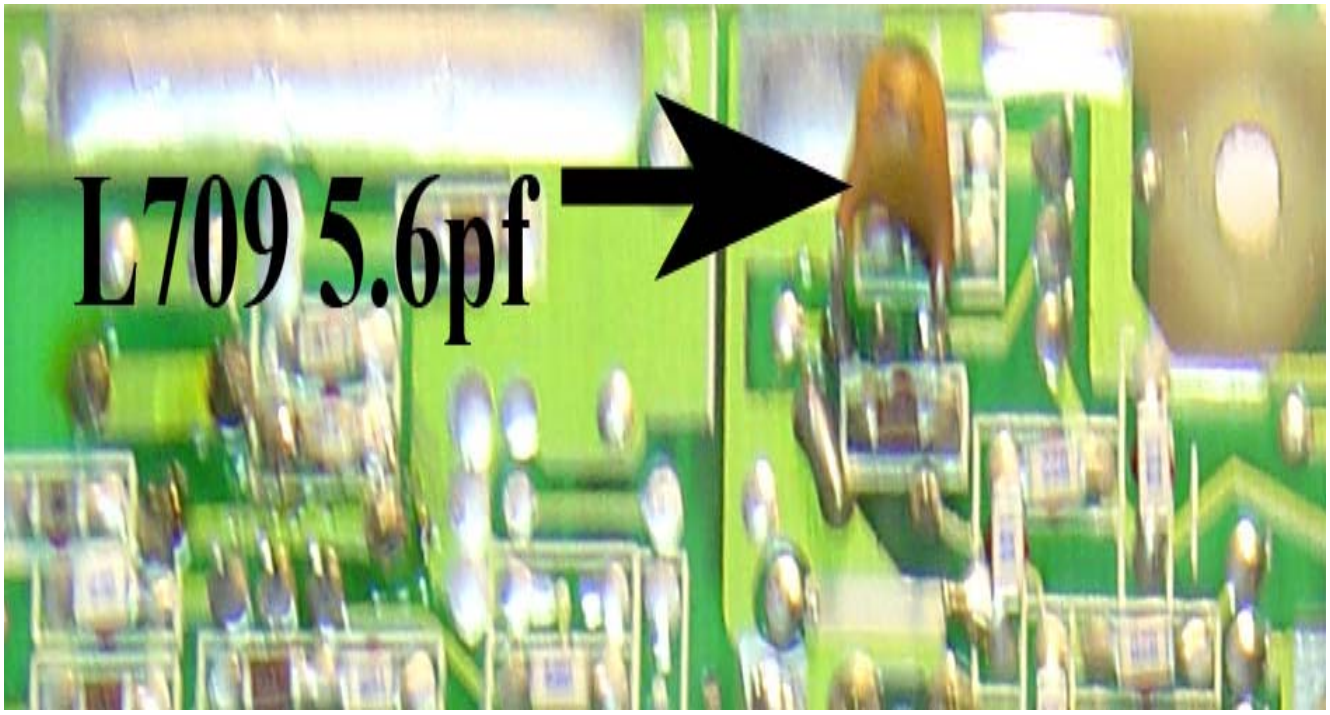
RX buffer amp, add **5.6pF** to primary of **L709**

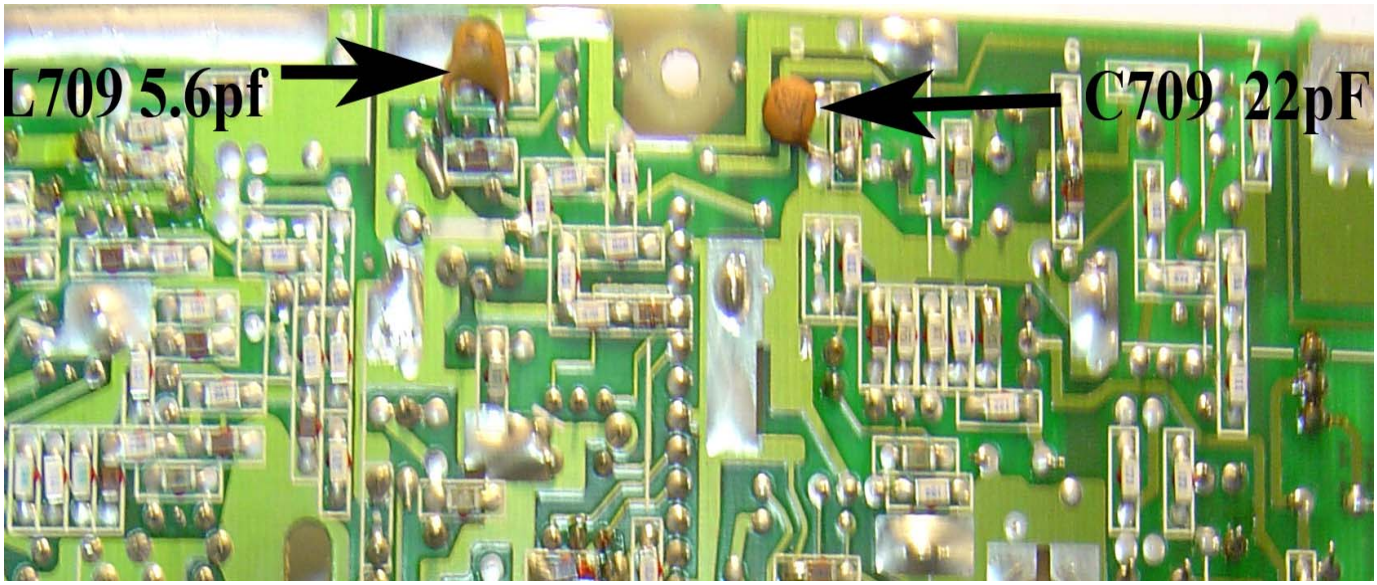
Midland 70-066 Sync Board Bottom View New Capacitors - below:

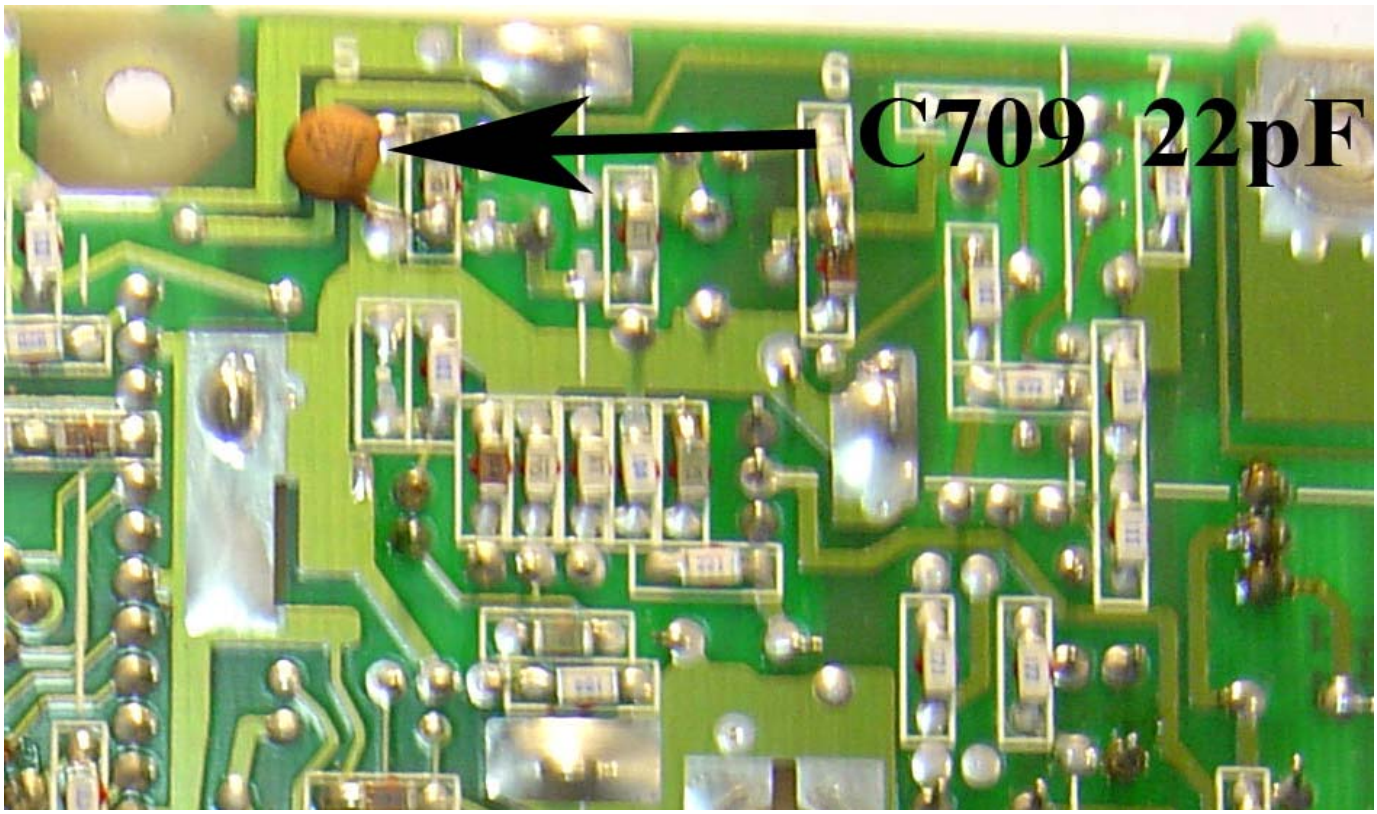


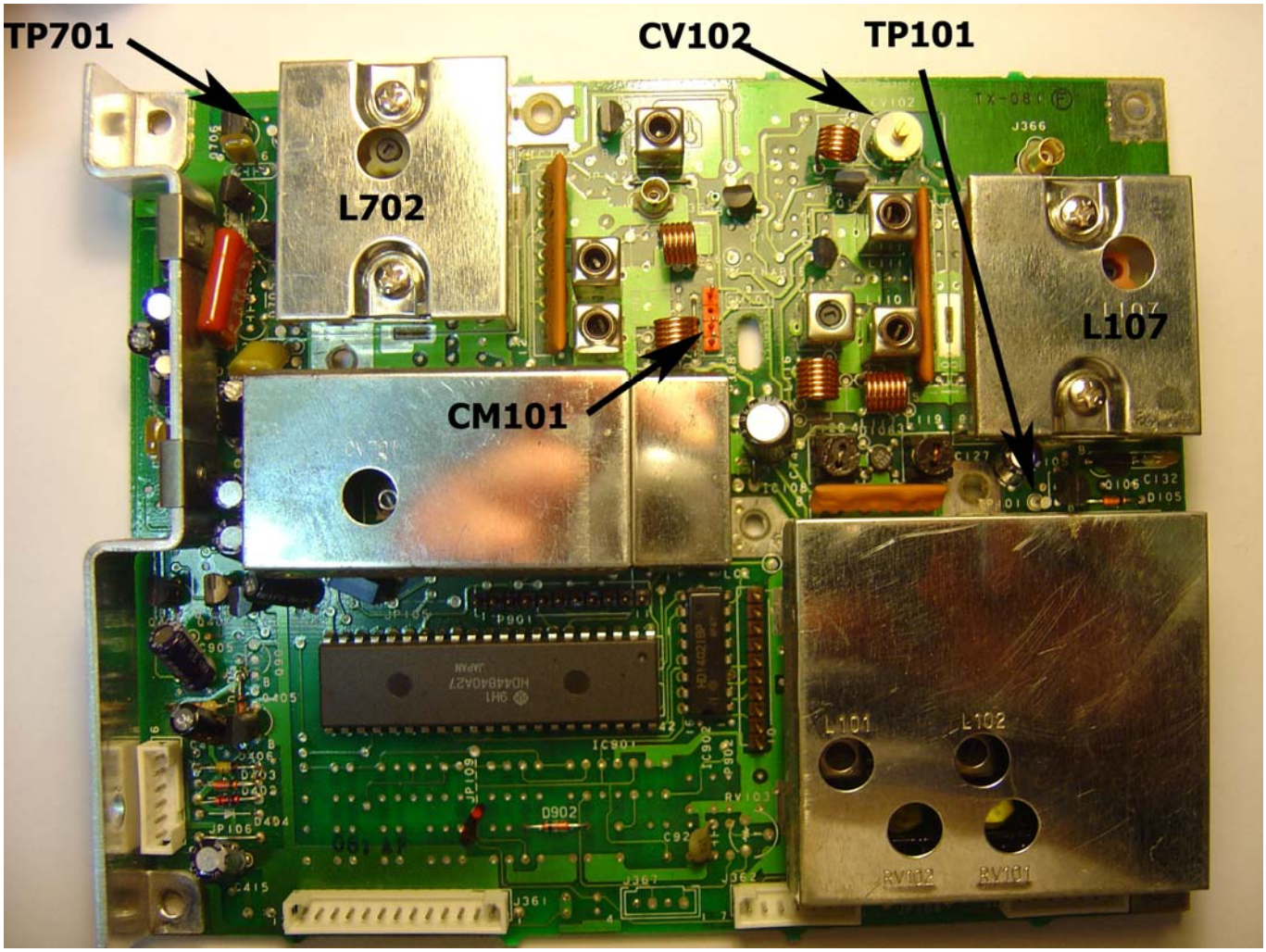
Re-solder bottom plates back onto bottom of Sync Board.


C137 22pF


L709 5.6pf


L709 5.6pf
C709 22pF


C709 22pF



SYNTHESIZER ALIGNMENT:

Plug the 6 meters programmed EPROM into the EPROM module Z-273, into the Synthesizer PCB. Disconnect the Transmitter exciter output J366; And the Receiver Local Oscillator output J365. Set the supply to 13.8 V.

1: **General Setup:**

Switch on unit. Adjust the squelch and volume controls so that the loudspeaker is muted

If the Phase Locked Loop (PLL) is unlocked, the channel display will show "95", alert tone will be sounded, and the dc voltage at **TP701** will be 6 V or less than 1.7 V. You have a problem.

If the PLL is locked, either the first channel number will be displayed or else the unit will wait blank on channel **01** [for Midland 70-066A] until either the UP or DOWN button is pressed.

2: **Receiver Local Oscillator Alignment:**

The main Receiver VCO is set to a frequency which is center of the programmed frequencies, By using the **m6m-5k.bin** EPROM [Generated from VK2DOT RT85 Software or other software] – set to **channel 48** [53.225Mhz].

Connect the frequency counter to **J365.** The frequency counter should read **74.625Mhz**.

Connect DC Voltmeter between ground and **TP701**. On 10 Volt Range.

With the correct alignment tool on all ferrite cores adjust the ferrite cores – the ferrite slugs are easily broken.

Adjust L702 such that the DC voltage at **TP701** is centered on 3.5V for all programmed channels (i.e. some above 3.5V and some below 3.5V). Voltages will swing between 2 Volts and 4 Volts.

NOTE:

f= (RX freq - 21.4MHz) +- 244Hz : for V HF(HB) and UHF

or

f= (RX freq + 21.4MHz) +- 244Hz : for VHF{LB}

52.525Mhz= Tx frequency then **73.925Mhz** = Rx Oscillator frequency.

3: **Transmitter VCO Alignment:**

Ensure that the exciter output is disconnected at J366.

Connect the frequency counter to **J366.** The transmitter output local oscillator frequency will be at the transmitter frequency. Ie for channel **48** will be **53.225Mhz** when transmitting.

****

A: The main transmitter VCO should be adjusted on the **highest** transmitter programmed frequency. Adjust channel to channel **38** [**53.975Mhz**].

With DC Voltmeter still connected between ground and **TP701** and on 10 Volt Range; Key the transmitter and adjust L702 to give 4.0 Volts at TP701.

B: Connect DC Voltmeter between ground and **TP101**. On 10 Volt Range.

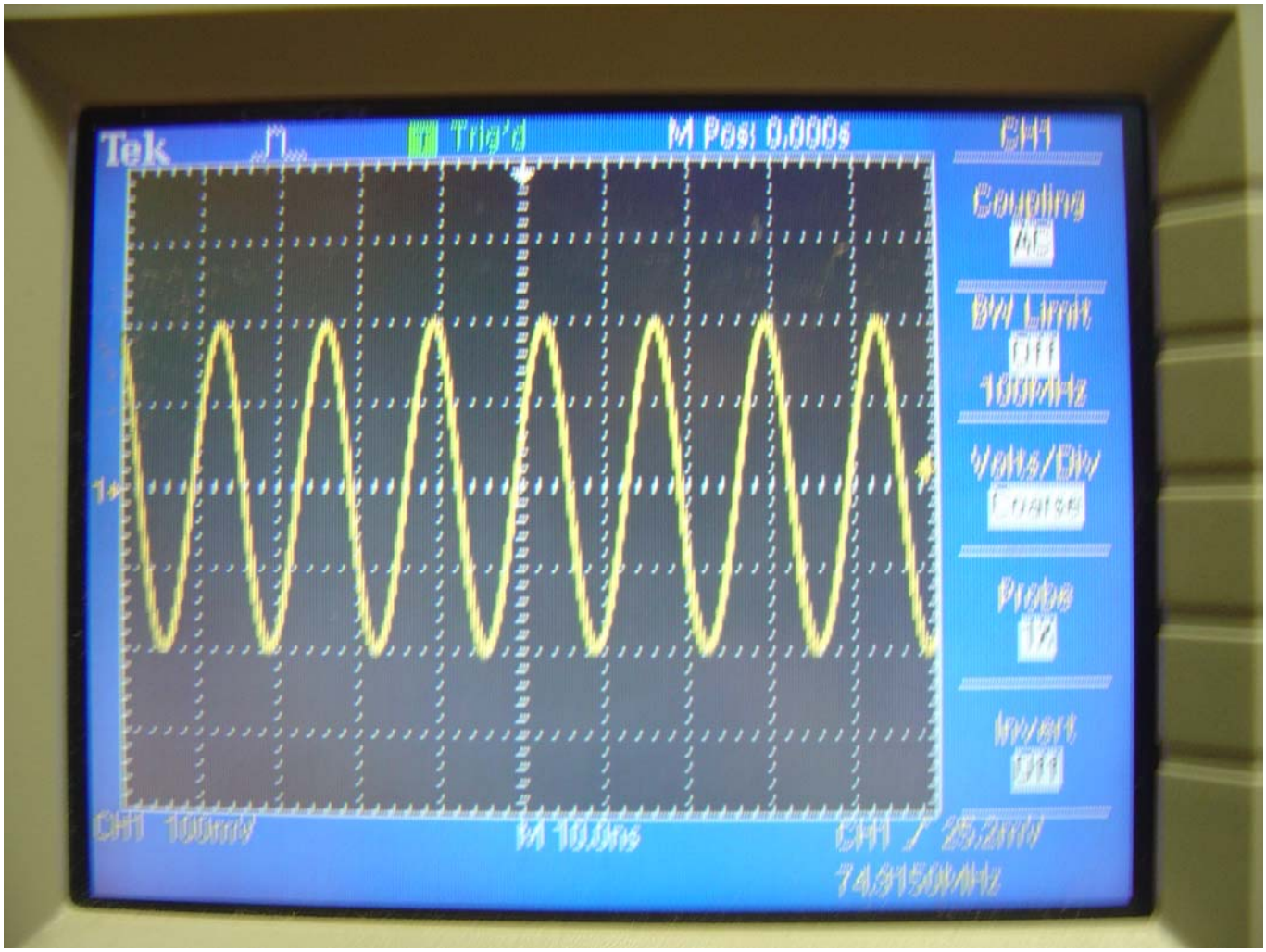
With the correct alignment tool on all ferrite cores adjust the ferrite cores – the ferrite slugs are easily broken.

Operate the PTT button. Check the voltage at **TP101** and re-adjust L107 for a voltages around 4.5V for the TX channel. Release the PTT button.

4: **Transmitter Driver Alignment:**

Connect a DC voltmeter to pin 2 of **CM101.** Set channel to center frequency. Ie. **channel 48** [53.225Mhz].

Adjust CV102 for a dip between two peaks.



Receiver Local Oscillator output from J365.