Icom ICB1050 and JWR M2

These rigs use an MC145106P programmable PLL frequency synthesis IC to control the VCO frequency. A 10.24 crystal feeds the IC to provide a reference frequency of 10 kHz. Two more crystals provide references of 16.50625 MHz for RX and 16.96125 for TX.

The VCO output is divided in the IC according to the binary code supplied by the channel switch (see chart). It is a relatively simple matter to convert the operating frequencies of the rig once you know that each increment of "1" in the code will increase the frequency by 10 kHz.

If you compare the standard binary codes with those required to produce the range 29.30 to 29.69 MHz you will note that pins 10 and 11 must be held high: pin 17 is unchanged and can remain connected to the channel switch: pin 16 requires an invertor in the line from the channel switch (except when repeater shift during TX is required). Finally, pins 12, 13, 14 and 15 bear no obvious relationship but, in fact, there is an increase of 1 0 1 0 for 10 metre operation (or an increase of 1 0 0 0 for repeater shift).

Incrementing by this amount can be performed by a "4008" 4 bit binary adder IC. The inversion of pin 16 can be done with a "4077" quad exclusive NOR IC, with gates left over for additional functions.

Since repeater shift will be required only on the top channels, we can prevent accidental out-of-band TX by reverting to normal operation (even if repeater shift is switched on) by detecting the switch codes on the green and blue wires. If either of these is high, repeater shift is inhibited.

As an aid to setting-up, a spare gate can be used to drive an LED when the Lock Detect output from the PLL IC is high. This gives a visual indication that the VCO adjustment is correct. Once the VCO has been adjusted, the LED gate connection can be removed from pin 8 of the PLL IC and connected to point "X" to indicate when repeater shift is actually happening. The LED can be fitted permanently in the front panel of the rig.

The repeater shift wire is taken from point "S", via a switch, to pin 4 on the mic socket.

Note that the violet wire from the channel switch must be disconnected and pins 10 and 11 linked to pin 1 of the PLL IC. The brown and the pink wires are left in place.

T202, the VCO coil, is adjacent to the PLL IC and its core must be freed from wax (carefully !) and unscrewed until the VCO locks on RX (pin 8 will be high). Adjust the VCO similarly for TX and ensure that it remains in lock for channels 1 and 40 on TX and RX. The VCO core can then be rewaxed. Little or no output will be evident on TX until you adjust T209, T301, T303 and T307. To optimise RX sensitivity adjust T101 and T102.

If you check the frequency you will find an error which can be corrected by adjusting CT202 for TX and CT201 on RX. To increase the deviation, rotate RV303 clockwise.

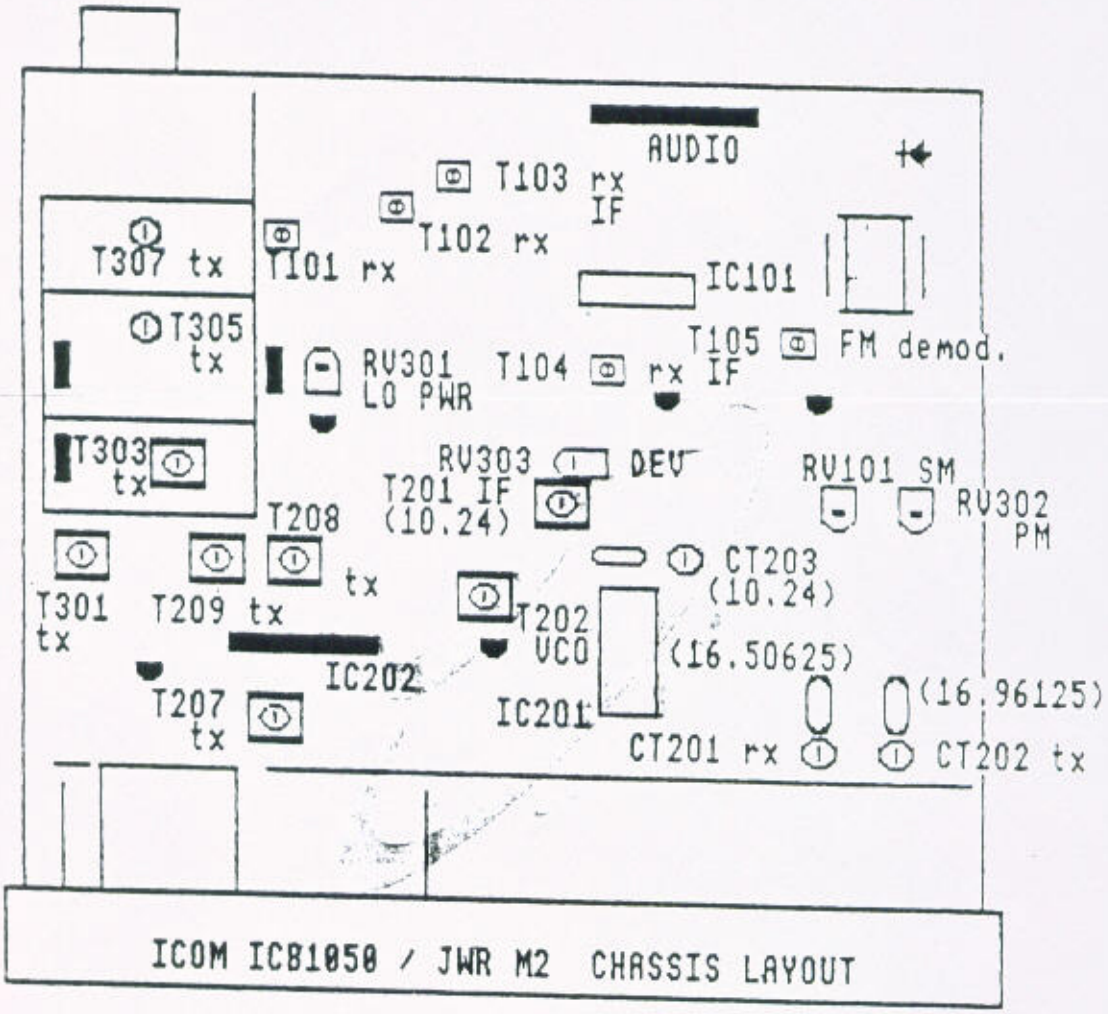
NOTES:

The RF gain varies with the squelch setting. If you remove the diode from beneath the board you might find operation more satisfactory.

T101 has a nasty habit of going open-circuit, making the rig extremely deaf, to say the least! Replace it with a Toko 113CN2K159DZ from CIRKIT.

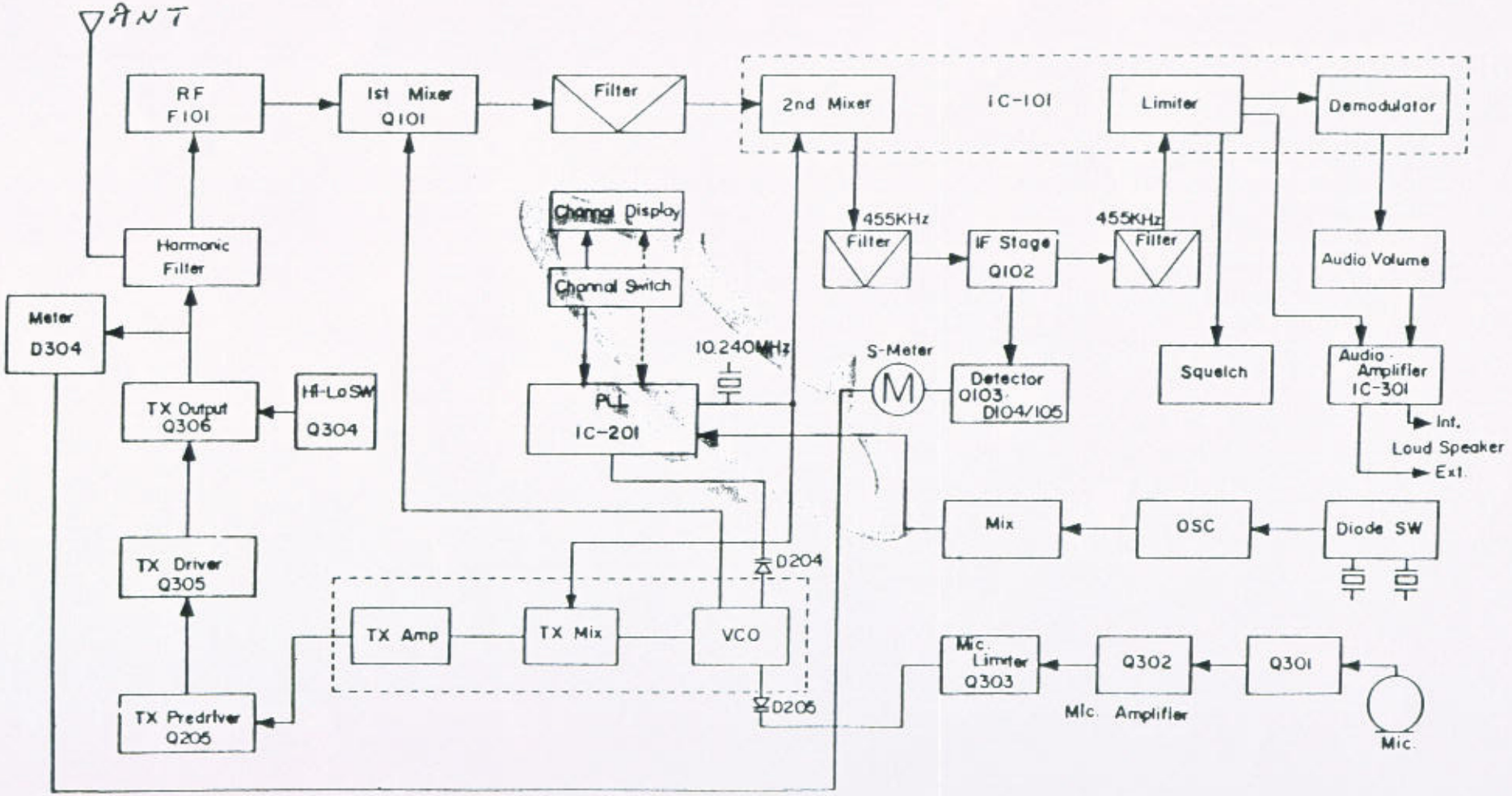
Replace C103 (100pF) with 33pF and C106 (22pF) with 10pF and retune to improve receiver performance.

Replace CF101 with a 10.695 crystal filter from P.R. Golledge to improve I.F. selectivity.

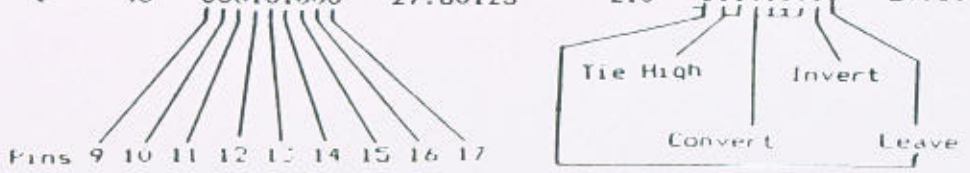


ICOM IC-1050 / JWR M2 CHASSIS LAYOUT

BLOCK DIAGRAM

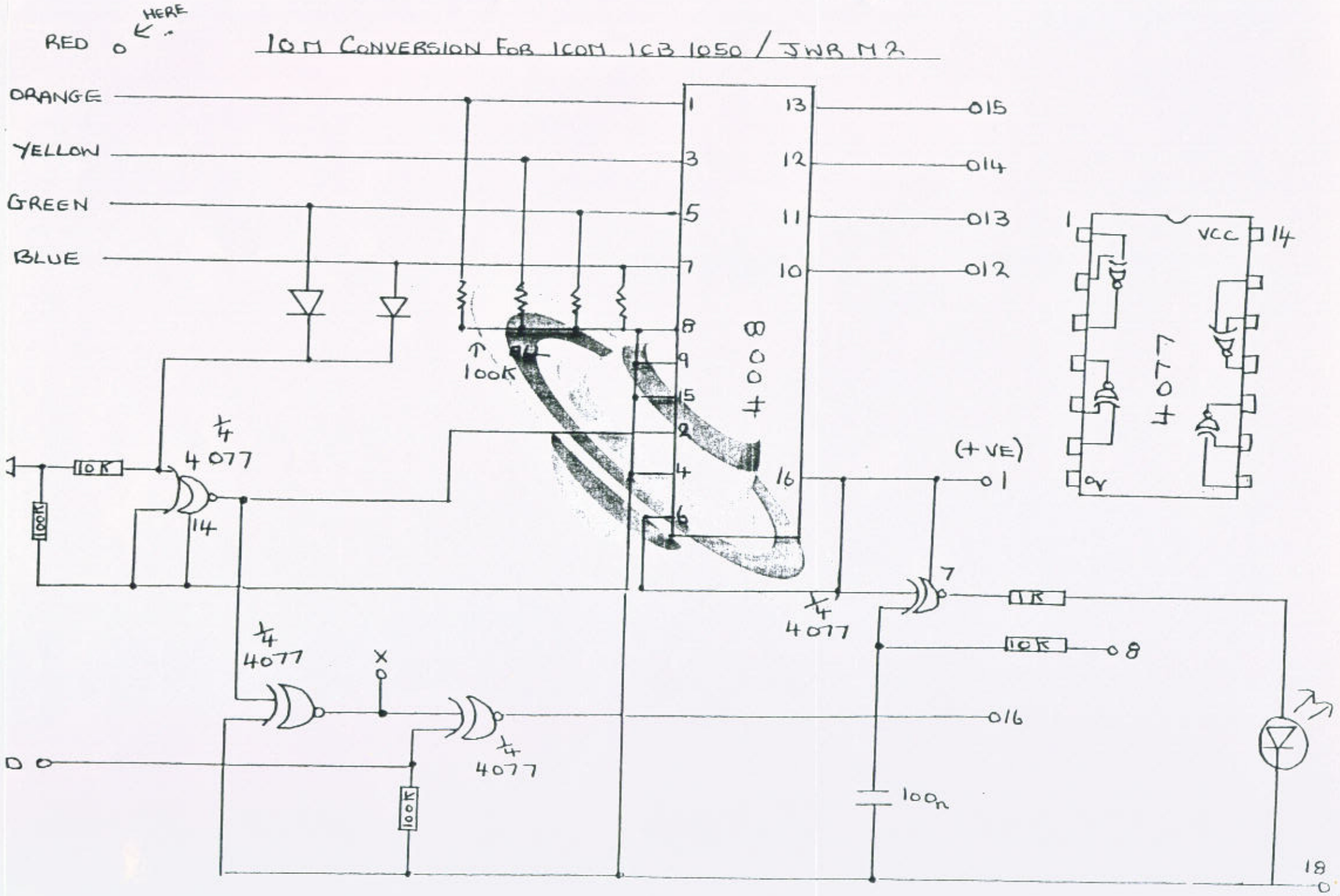


	Standard			10 metre			TX only	Repeater	
CHAN									
40	79	001001111	27.99125	249	011111001	29.69	239	011101111	29.59
39	78	001001110	27.98125	248	011111000	29.68	238	011101110	29.58
38	77	001001101	27.97125	247	011110111	29.67	237	011101101	29.57
37	76	001001100	27.96125	246	011110110	29.66	236	011101100	29.56
36	75	001001011	27.95125	245	011110101	29.65	235	011101011	29.55
35	74	001001010	27.94125	244	011110100	29.64	234	011101010	29.54
34	73	001001001	27.93125	243	011110011	29.63	233	011101001	29.53
33	72	001001000	27.92125	242	011110010	29.62	232	011101000	29.52
32	71	001000111	27.91125	241	011110001	29.61	231	011100111	29.51
31	70	001000110	27.90125	240	011110000	29.6	230	011100110	29.5
30	69	001000101	27.89125	239	011101111	29.59	229	011100101	29.49
29	68	001000100	27.88125	238	011101110	29.58	228	011100100	29.48
28	67	001000011	27.87125	237	011101101	29.57	227	011100011	29.47
27	66	001000010	27.86125	236	011101100	29.56	226	011100010	29.46
26	65	001000001	27.85125	235	011101011	29.55	225	011100001	29.45
25	64	001000000	27.84125	234	011101010	29.54	224	011100000	29.44
24	63	000111111	27.83125	233	011101001	29.53			
23	62	000111110	27.82125	232	011101000	29.52			
22	61	000111101	27.81125	231	011100111	29.51			
21	60	000111100	27.80125	230	011100110	29.5			
20	59	000111011	27.79125	229	011100101	29.49			
19	58	000111010	27.78125	228	011100100	29.48			
18	57	000111001	27.77125	227	011100011	29.47			
17	56	000111000	27.76125	226	011100010	29.46			
16	55	000110111	27.75125	225	011100001	29.45			
15	54	000110110	27.74125	224	011100000	29.44			
14	53	000110101	27.73125	223	011011111	29.43			
13	52	000110100	27.72125	222	011011110	29.42			
12	51	000110011	27.71125	221	011011101	29.41			
11	50	000110010	27.70125	220	011011100	29.40			
10	49	000110001	27.69125	219	011011011	29.39			
9	48	000110000	27.68125	218	011011010	29.38			
8	47	000101111	27.67125	217	011011001	29.37			
7	46	000101110	27.66125	216	011011000	29.36			
6	45	000101101	27.65125	215	011010111	29.35			
5	44	000101100	27.64125	214	011010110	29.34			
4	43	000101011	27.63125	213	011010101	29.33			
3	42	000101010	27.62125	212	011010100	29.32			
2	41	000101001	27.61125	211	011010011	29.31			
1	40	000101000	27.60125	210	011010010	29.30			



Icom ICB1050 and JWR M2

10M CONVERSION FOR ICOM ICB 1050 / JWB M3



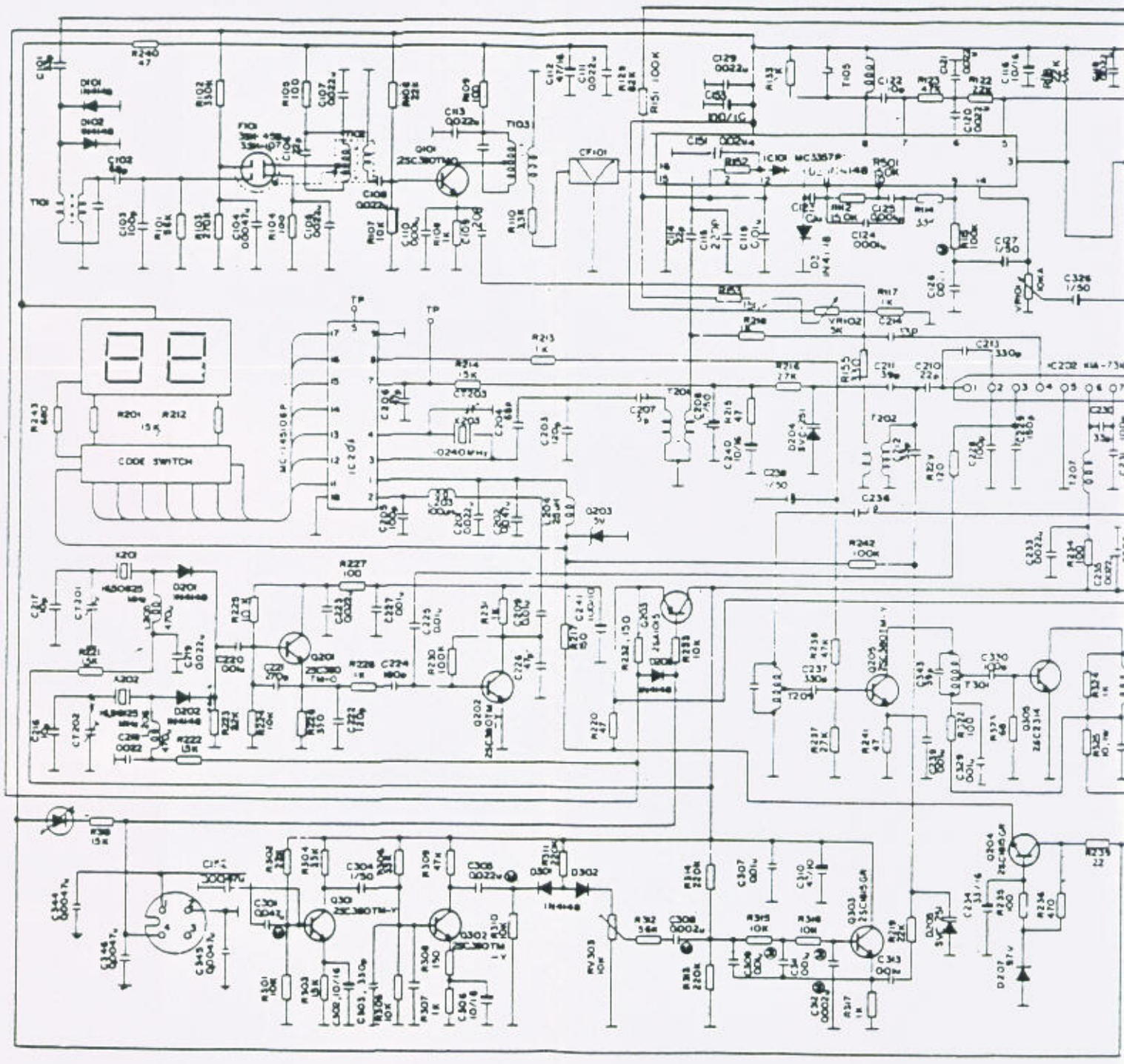
THE SIMPLE METHOD

CONNECT TOGETHER THE SOLDER PADS OF PINS 10,11,12 ON THE MC 145106 PLL IC,VIA A 10K RESISTOR CONNECT THE COMBINED PINS TO PIN 1 OF THE SAME CHIP WHICH HAS A PERMANENT VOLTAGE. THIS WILL NOW ALLOW THE SET TO BE RETUNED TO OPERATE IN THE 29MHz RANGE. WITH CHANNEL 25 BEING 29.600.

TO INCREASE COVERAGE DOWNWARDS FROM CHANNEL 25 THE GREEN LEAD FROM PIN 13 MUST BE DISCONNECTED AND DISCARDED, UNSOLDER THE VIOLET LEAD FROM PIN 11 AND TRANSFER TO VACANT HOLE AT PIN 13.THIS WILL ALLOW 10KHz STEPS FROM CHANNEL 40 TO 9, BETWEEN 1 AND 9 THE CHANNELS WILL DUPLICATE AND CAN BE IGNORED AS THEY ARE ALREADY COVERED. RETUNING OF THE SET WILL BE NEEDED.T202 IS THE VCO CAN,T209,301,303 AND 307 OPERATE THE TX STRIP WHILE T101 AND T102 COVER RECEIVE.SLIGHT OFFSET ON THE FREQUENCY CAN BE CURED BY CT202 ON TX AND CT201 ON RX.

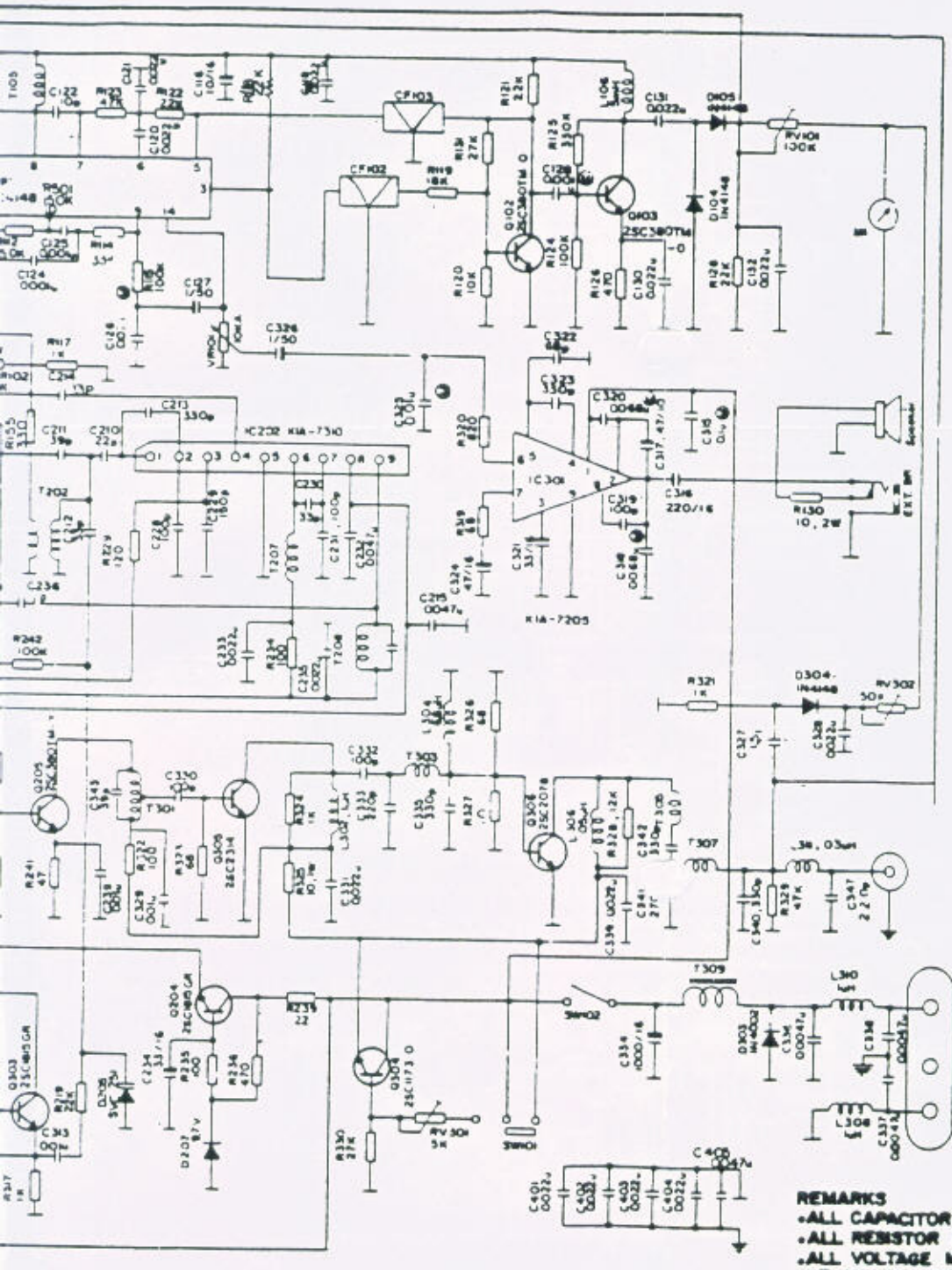
REPEATER SHIFT CAN BE OBTAINED BY SWITCHING A 16.861 CRYSTAL IN PLACE OF THE 16.961 IN THE TX MODE.

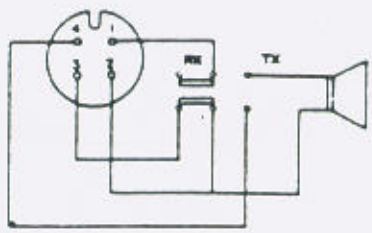
SCHEMATIC DIA

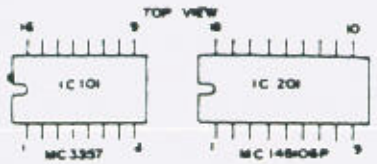


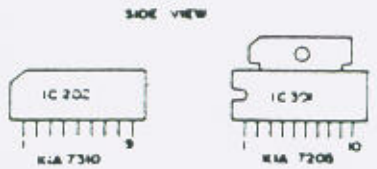
SCHEMATIC DIAGRAM

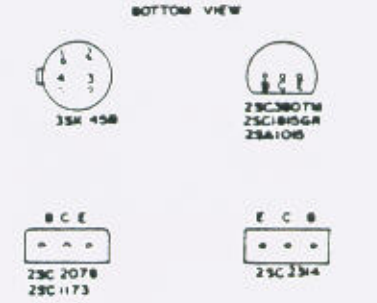
ICOM 1050











SCHEMATIC DIAGRAM

REMARKS
- ALL CAPACITOR IN FARAD
- ALL RESISTOR IN OHM
- ALL VOLTAGE MEASUREMENT AGAINST GROUND
- AT MIN VOLUME AND SQUELCH