Trio TK-701S Ex-PMR Conversion

Dave Coomber G8UYZ shows how to get the Trio TK-701S VHF ex-PMR transceiver going on 2m in this follow-up article to the HRT TK-801S conversion

The VHF 'sister set' to the Trio TK-801S UHF mobile (featured in the May 94 issue of HRT) is the TK-701S, which can be modified to run on 2m. There is also rumoured to be a TK-501S on about 4m, but these have not often been seen in the UK and response to a WWW on packet radio has yet to indicate anything different anywhere else.

The conversion requires the careful installation of extra ceramic capacitors (size = 2.54 pitch), on parts of the TX/RX board. It may also be possible to change the existing capacitors, replacing with the correspondingly higher value. Board construction (and your skills), may make this a bit difficult. Tuning up is basically the same procedure as for the TK-801S, it is important you have the tuning details of the 801S to hand.

Before converting your rig, make sure the set is working and that the IFs and discriminators are aligned as they should be if the set has come out of service. If this is not the case, align or repair the set on its existing frequencies before carrying out any modifications.

Removing the TX/RX board

This is not an easy board to remove (there are several active devices bolted to the chassis, which also forms part of the heat sink). You should have a multi-section box in which to keep *all* the screws (they are *not* all the same).

Remove the front panel, complete, then remove the diecast cover from the TX/RX board (watch where there are *long* screws). Remove the screws in the PCB and the ones retaining the active devices; IC U17, U16, Q3, Q4 and Q6. Double check these as it is very easy to break something! Remove the screws retaining the aerial output socket, then unsolder and remove the aerial connector (keep these!). Disconnect J21 and J22. Lift the board out, keeping it straight up for at least 12mm before moving forward, as there are multiple connectors connecting to the PLL board. See the components list for details of component changes.

The MON and AUX switches

Now is a good time to look at the connections to the MON switch. Remove C 25 (between the switches). Ensure that JU2001 is open circuit. Cut the earth track on the centre contact of the inside change-over so (you can use it to switch the earth on the repeater LEDs, in which case, check that it is a good solid earth connection, it may require an extra wire).

Re-fitting the PCB

When re-fitting the board, make sure that the connectors are in alignment. The board should be a good fit to the diecast case *before* you do any screwing down! Warning: PA transistors are not cheap (some of the ICs are tricky to get as well). Don't forget to re-fit the aerial connector (you can fit either an 'N' type or an SO239, both will fit the chassis). If the board has gone in smoothly, re-fit all the screws. You may now think about doing the tuning up.

Tune-up procedure

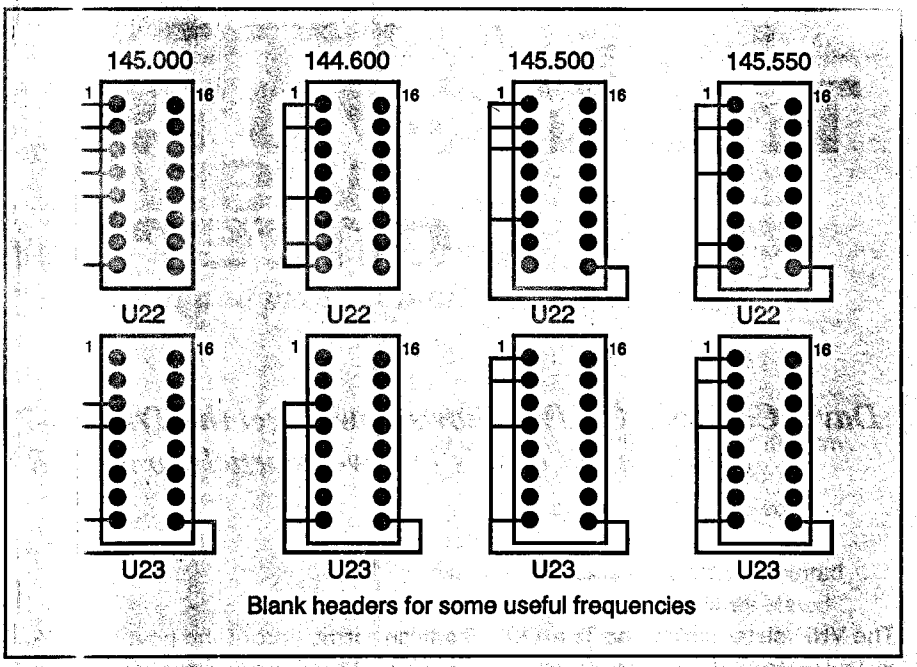
The PLL is set up the same way as for the TK-801S, with the following exception: TX PLL C903 should be adjusted for the lowest voltage consistent,with operation at both ends of the band, i.e. about 3 - 3.5V (you might get it down to 2.5V, but it may depend upon how good you are at installing the extra components!). The RX PLL is exactly the same.

Receiver alignment

The [illegible] and requirements are exactly the same procedure; set for a channel in the middle of the band.

Tune for maximum received signal strength, tuning in the following order; L20, L21, L23, L24, L25, L18, L19. Reduce the signal generator input and repeat, several times, until no further improvement can be heard. Adjust L30 for best signal to noise figure.

This bit is only needed if the AF response leaves a bit to be desired; adjust L32 for maximum AF output, L29 and L26 for minimum distortion, in that order. You should get better than 0.5µV for 17dB (0.2µV is not impossible). The squelch threshold is adjusted the same way as for the TK-801S.

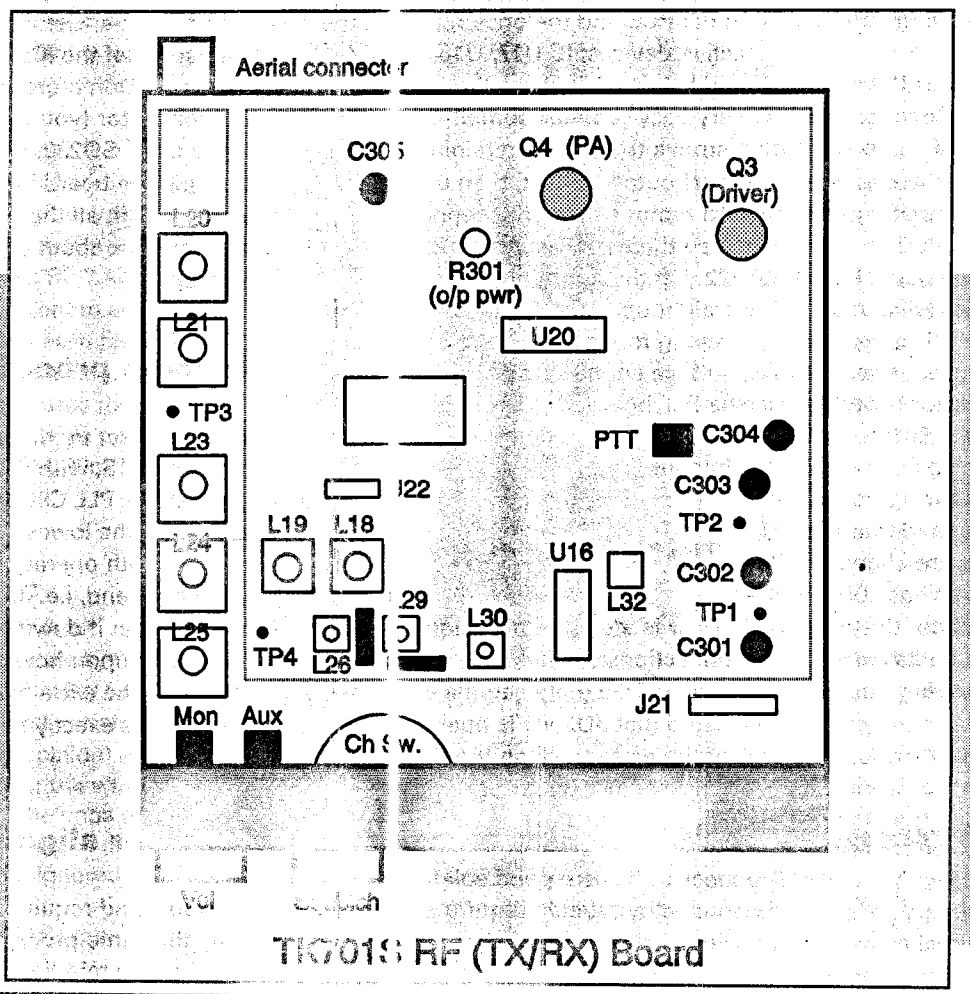


Blank headers for some useful frequencies

Transmitter alignment

I assume that the radio worked before you started modifying it! You will need the same equipment as for the TK-801S, but the tuning tool is hexagonal.

Connect the PSU, ammeter (if external), the dummy load/Wattmeter and the microphone. Set RV301 fully clockwise before continuing. Tune the following, in this order; C301, C302, C303, C304 and C305 for maximum RF output. Repeat several times, finally tuning for the 'dip' in consumed current



TK701S RF (TX/RX) Board

Some useful channel codes

Ch	Freq.	N	Binary N	A	Binary A
28	144.5000	461	1011001110	40	000101
2A	144.5250	461	1011001110	46	011101
2C	144.5500	461	1011001110	52	001011
2E	144.5750	461	1011001110	58	011101
30	144.6000	462	0111001110	0	000000
31	144.6125	462	0111001110	3	110000
32	144.6250	462	0111001110	6	011000
33	144.6375	462	0111001110	9	100100
34	144.6500	462	0111001110	12	001100
35	144.6625	462	0111001110	15	111100
36	144.6750	462	0111001110	18	010010
37	144.6875	462	0111001110	21	101010
38	144.7000	462	0111001110	24	000110
50	145.000	463	1111001110	32	000001
52	145.025	463	1111001110	38	011001
54	145.050	463	1111001110	44	001101
56	145.075	463	1111001110	50	010011
58	145.100	463	1111001110	56	000111
5A	145.125	463	1111001110	61	101111
5C	145.150	464	0000101110	4	001000
5E	145.175	464	0000101110	10	010100
60	145.200	464	0000101110	16	000010a
62	145.225	464	0000101110	22	011010
64	145.250	464	0000101110	28	001110
66	145.275	464	0000101110	34	010001
68	145.300	464	0000101110	40	000101
6A	145.325	464	0000101110	46	011101
6C	145.350	464	0000101110	52	001011
6D	145.3625	464	0000101110	55	111011
6E	145.375	464	0000101110	58	011101
6F	145.3875	464	0000101110	60	001111
70	145.4	465	1000101110	0	000000
71	145.4125	465	1000101110	3	110000
72	145.425	465	1000101110	6	011000
73	145.4375	465	1000101110	9	100100
74	145.45	465	1000101110	12	001100
75	145.4625	465	1000101110	15	111100
76	145.475	465	1000101110	18	010010
77	145.4875	465	1000101110	21	101010
78	145.5	465	1000101110	24	000110
79	145.5125	465	1000101110	27	110110
7A	145.525	465	1000101110	30	011110
7B	145.5375	465	1000101110	33	100001
7C	145.55	465	1000101110	36	001001
7D	145.5625	465	1000101110	39	111001
7E	145.575	465	1000101110	42	010101
7F	145.5875	465	1000101110	45	101101
80	145.6	465	1000101110	48	000011
81	145.6125	465	1000101110	51	110011
82	145.625	465	1000101110	54	011011
83	145.6375	465	1000101110	57	100111
84	145.65	465	1000101110	59	110111
85	145.6625	465	1000101110	62	011111
86	145.675	466	0100101110	2	010000
87	145.6875	466	0100101110	5	101000
88	145.7	466	0100101110	8	000100
89	145.7125	466	0100101110	11	110100
8A	145.725	466	0100101110	14	011100
8B	145.7375	466	0100101110	17	100010
8C	145.75	466	0100101110	20	001010
8D	145.7625	466	0100101110	23	111010
8E	145.775	466	0100101110	26	010110
8F	145.7875	466	0100101110	29	101110
90	145.8	466	0100101110	32	000001

commensurate with maximum RF output power (50W out, about 10A consumption, they get greedy and hot at 60W out!).

Reduce RV301 fully anti-clockwise and adjust C303, C304 and C305 *only* for the maximum output RF power, tuning for the 'dip' in consumed current commensurate with the required RF output power. It should be possible to adjust between 15W and 55W output, using RV301. I found that 25W is ideal for most operations, including packet radio. Note that the duty cycle is rated at 20% for transmit on full output, so reducing and careful tuning will improve this figure.

Tune L15 for the exact required transmit frequency. Adjust RV901 for correct deviation and RV902 for appropriate microphone gain (usually well up).

EPROM conversion

The EPROM conversion to these sets is exactly the same as the TK-801 (although the data in the EPROMs is of course different). If you'd like a ready-made source of EPROMs for the TK-701, contact Kev Graham G8ZWU, 670 Stafford Rd., Fordhouses, Wolverhampton WV10 6NW for details, please don't forget to enclose a stamped addressed envelope for reply.

If you have any queries on this conversion 'follow-up', you may contact the author, enclosing an SAE for reply, to; *Dave Coomber G8UYZ, 14 Francis Green Ln., Penkridge, Staffs ST19 5HF.*

Capacitor Additions Required;

Receiver

C61, 63, 65, 69, 76, 80, 83	+2p2
C38, 41	+10p
C40, 43	+4p7
C42	+5p6

Note; the above should all be fitted directly underneath the PCB, with the shortest possible leads, and should be soldered to lie flat .

Transmitter

C6, 20, 38, 41	+10p
C12	+12p
C18, 42	+5p6
C23, 24, 28	+33p
C29	+18p
C30, 40, 43	+4p7

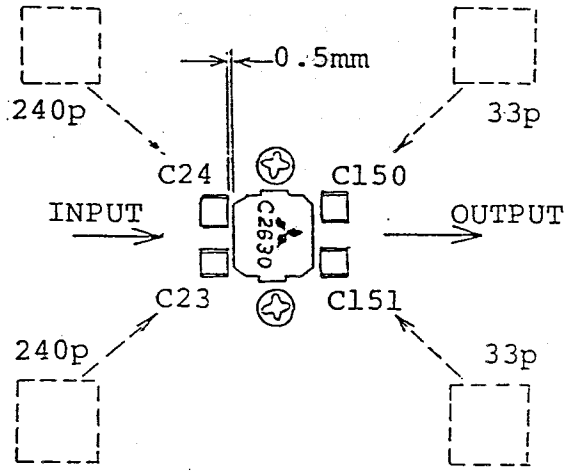
Note; The above may all be soldered on the component side, across existing components mounted vertically, again use the shortest possible lead lengths.

FIT EXTRA CAPACITORS IN POSITIONS SHOWN

KENWOOD GENUINE PARTS NOTE REVISED VALUES FOR C24/C2

TK-701S Final TR Q4.....2SC2630

Note 1. Automatically raplace these chip capacitors when removing or replacing this transistor. (Follow the picture)



	Parts Number
Q4	2SC2630
C23	CM73F2H241J (240p)
C24	CM73F2H241J (240p)
C150	CM73F2H330J (33p)
C151	CM73F2H330J (33p)

Thank you.
DEC. 25, 1985

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