G4HUP Panoramic Adaptor Installation – TS450S and TS690 variants

These PAT installation notes are offered based on research using the Kenwood Service Manual for the TS450 and TS690 series of rigs. The feasibility of the information has not been verified on a rig by physical inspection. Please accept them in that spirit, and if you find that you need to modify anything to achieve a working installation, please feed the information back to me to improve the quality for other users.

IF's: 1st 73.05, 2nd 8.83MHz

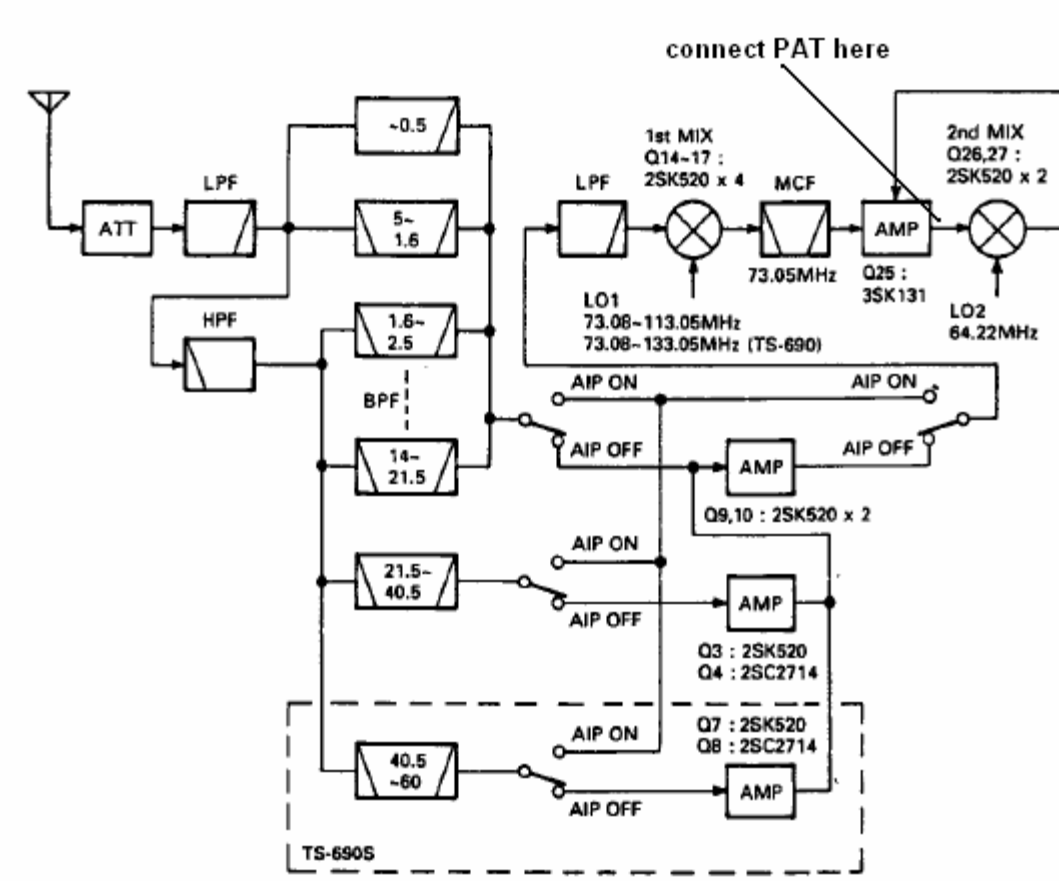

Fig 1 Block RX front end diagram – Kenwood Service Manual part of Fig 6, p12

Kenwood very thoughtfully provided a pick-up point at the output of the 1st IF amplifier – TP2- that is ideally placed for getting the PAT input signal, with minimal inconvenience and risk. The +8V power required is also accessible close by as a pad on

the upper side of the PCB – see Fig 4, below, or it could be picked up at Pin 2 of the main IF connector on the RF PCB – see Fig 3. Since the TS450/690 uses separate Rx and Tx paths in the front end, the is no need to mute the PAT on Tx..

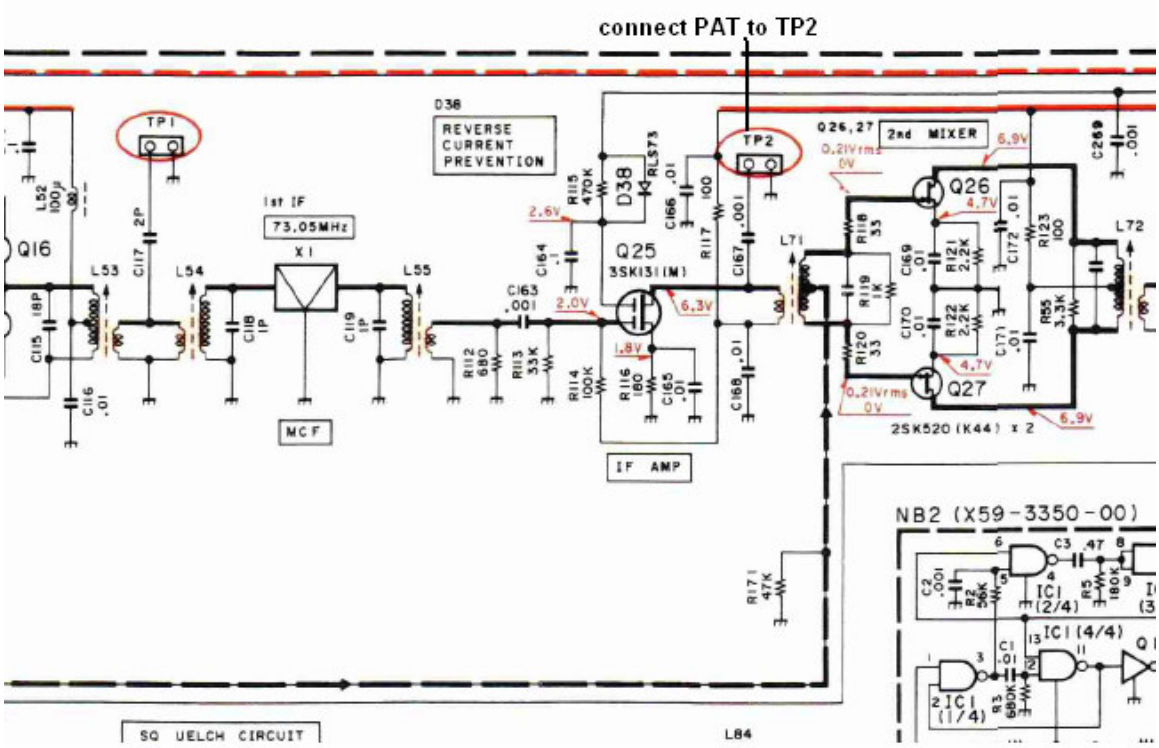

Fig 2 Rx mixer circuit diagram – extract from Service Manual p140

Item	Rating
Nominal center frequency	73.05MHz
Passband width	±7.5kHz or more at 3dB
Attenuation bandwidth	±30kHz or less at 20dB
Ripple	1.0dB or less
Insertion loss	2.0dB or less
Guaranteed attenuation	40dB or more at fo – 910kHz (Spurious : 20dB or more at fo ± 1MHz)
Center frequency deviation	Within ±1.5kHz at 3dB
Terminating impedance	2kΩ ± 10%

MCF (L71-0423-05) (RF unit X1)

Table 1 F1 Specification – extract from Service Manual p17

With the filter spec quoted by Kenwood, you should be able to see approx 50kHz of useful range in your SDR waterfall display, although the sensitivity will drop towards the edges, reflecting the shape of the filter.

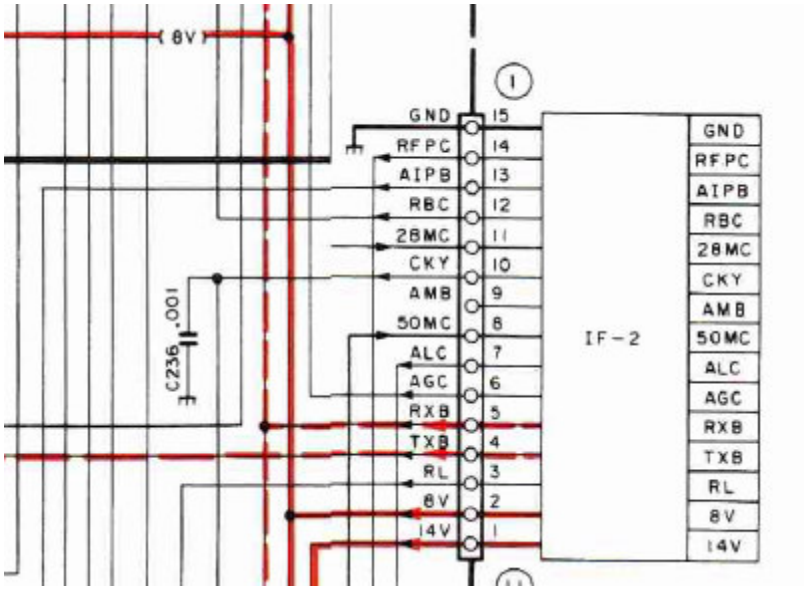

Fig 3 RF board main connector - +8V on pin 2 – extract from Service Manual p140, but a better pick up point may be as shown below.

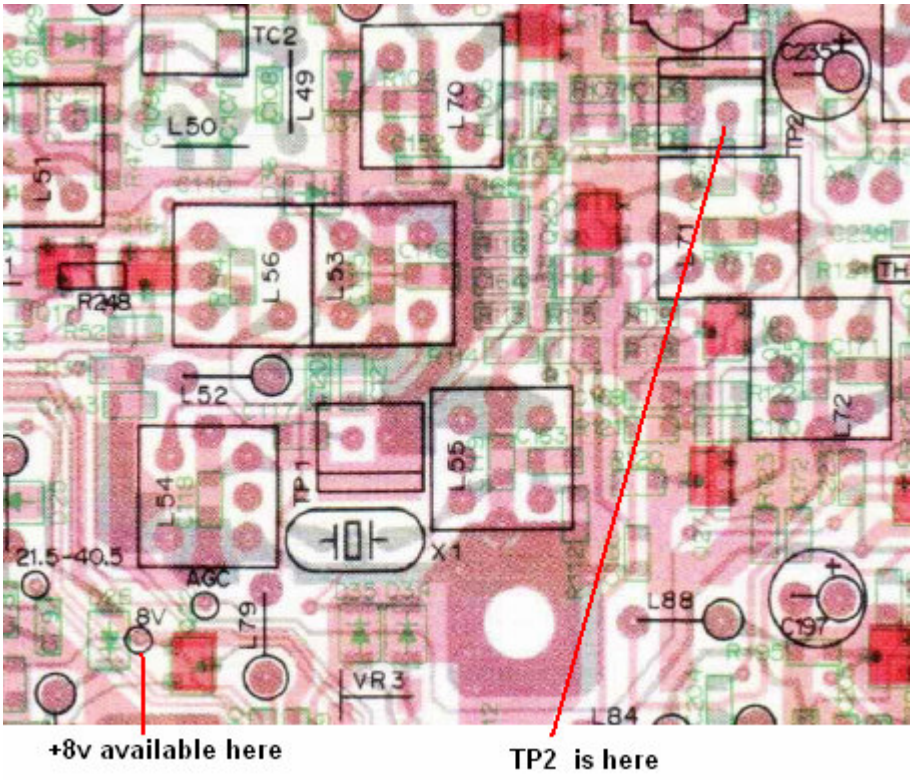

Fig 4 Parts placement on RF PCB – extract from Service Manual p134

Preferred approach to getting the IF signal out of the radio is to use the Generic Plug Kit, which has a flying RG178 lead with free SMA plug crimped to one end..

Terminating PTFE Coax cables

These instructions could be used, with suitable modification, to correctly terminate any of the PTFE coax cables, such as RG142, RG178, RG188, RG196, RG316, etc. The termination method ensures good quality RF connections up to higher microwave frequencies

Using a scalpel, cut the sheath back at the required length.
With a hot iron, tin the exposed braid fully.
With the scalpel, score around the point where the braid must end.
Use long-nose pliers to bend the end of the coax outside the score line – the braid will crack on the score line and the excess can be slid off the dielectric.
Strip the dielectric to reveal the inner.

Fig 5 shows a correctly terminated cable installed in an FT817 – follow the same principles here.

Fig 5 – Correct method of termination for the RG178 cable

Table 2 below shows the measurements recommended for the cable end preparation for the TS440 installation and Fig 6 below gives further clarification.

Cable	TS450 Connection	Sheath	Braid	Dielectric	Inner
Input	PAT	9mm	3.5mm	2mm	3.5mm
Output	PAT	9mm	3.5mm	2mm	3.5mm

Table 2 – Cable stripping details for TS450 installation

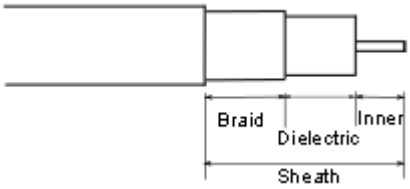

Fig 6 – Cable termination preparation details

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Fig 5, 6 and Table 2 are copyright G4HUP