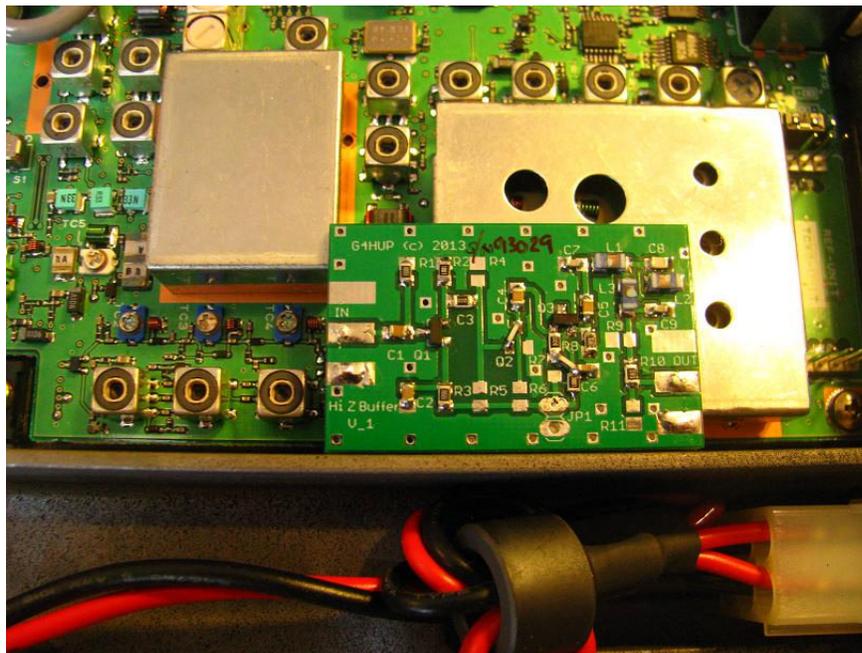


## G4HUP Panoramic Adaptor Installation – FT897

These instructions cover installation of the PAT board in the 1st IF of the FT897 (68.33MHz), and also for installation to serve a second independent receiver function. Note that these options are mutually exclusive – one PAT board can be an IF tap OR a 2<sup>nd</sup> Rx only! See my Second Rx document if you are not sure about the differences.

The FT897 uses a common IF for transmit and receive, so some care is needed in the connection point to avoid the possibility of high level signals into your SDR during transmit. Following the connections given here will avoid that risk.

- 1 Build and test the PAT kit – use an 8 to 10v supply and you should measure a gain of approx 1dB at 70MHz. For 2<sup>nd</sup> Rx use, omit the LPF and replace L1 and L3 with 0R link resistors.
- 2 Remove top cover from FT897 (8 screws).
- 3 There is no convenient location for a socket on the rear panel without some metal work. I chose to locate an SMA socket (2 hole type) mounted vertically across a ventilation slot – see section below.
- 4 The PAT board mounts conveniently on top of the PLL Unit - see Fig 1. From this position, the input and output connections are just a short run, and no internal adjustments are obstructed by the mounting position.



**Fig 1 – Mounting position of the PAT board in FT897 – note that the PAT input is to the left in this picture**

- 5 The PAT board is held in place by double sided tape, so can easily be removed should it become necessary. It is recommended to use DS tape to hold a layer of card to the screening can, then a second piece of DS tape to hold the PAT board in place.

- 6 For 1<sup>st</sup> IF use, the RF input to the board comes from output side of the IF filter, after the diode T/R switch. The actual connection is taken from the centre connection of T1026 secondary – see Figs 2 and 3. This is outside the common T/R path, so only Rx signals should be present at this point.

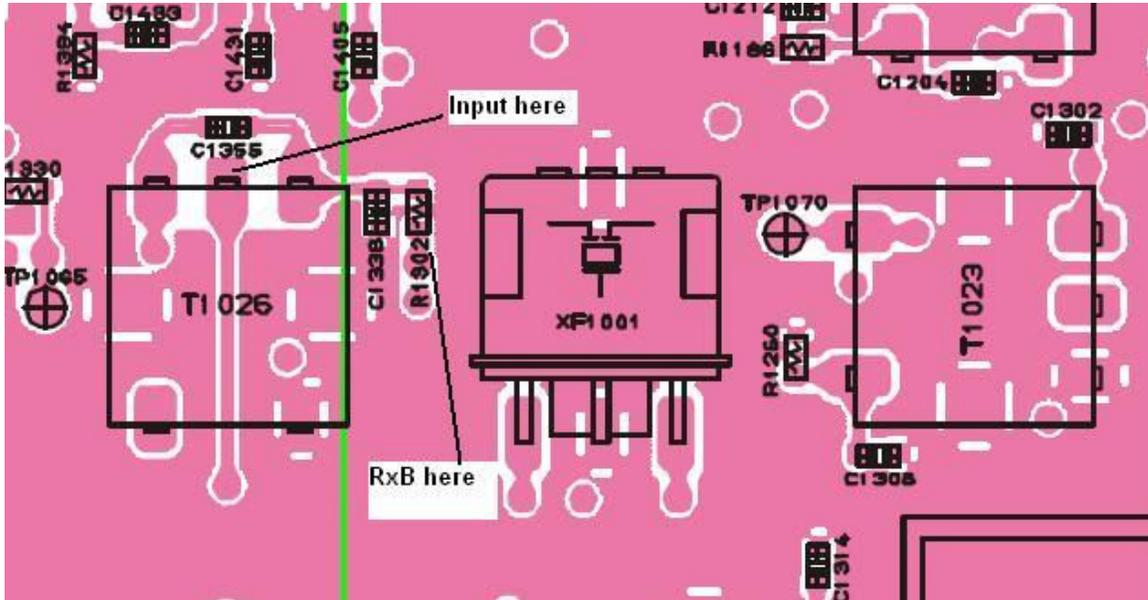


Fig 2 – Connection points for RF input and RxB – extract from FT897 Service Manual

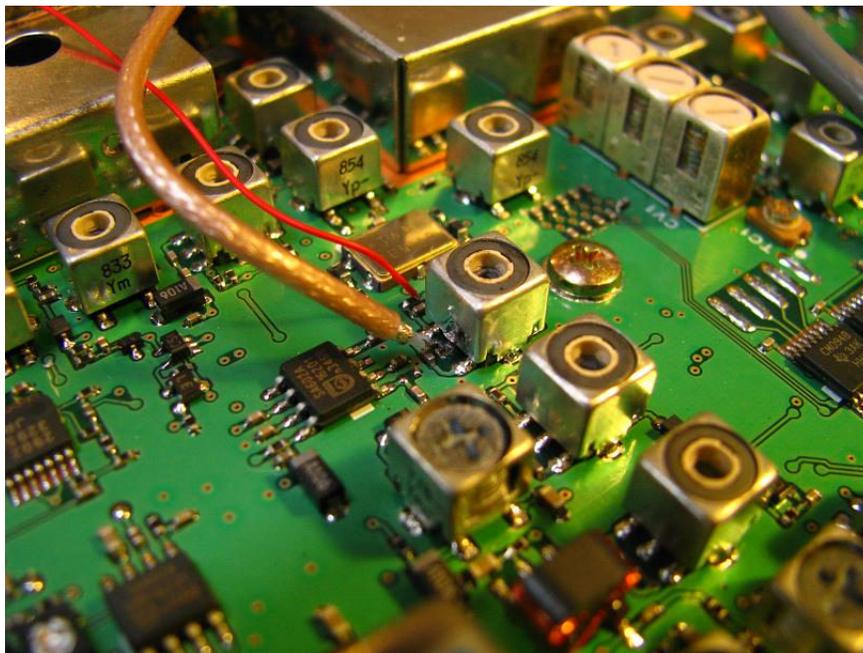
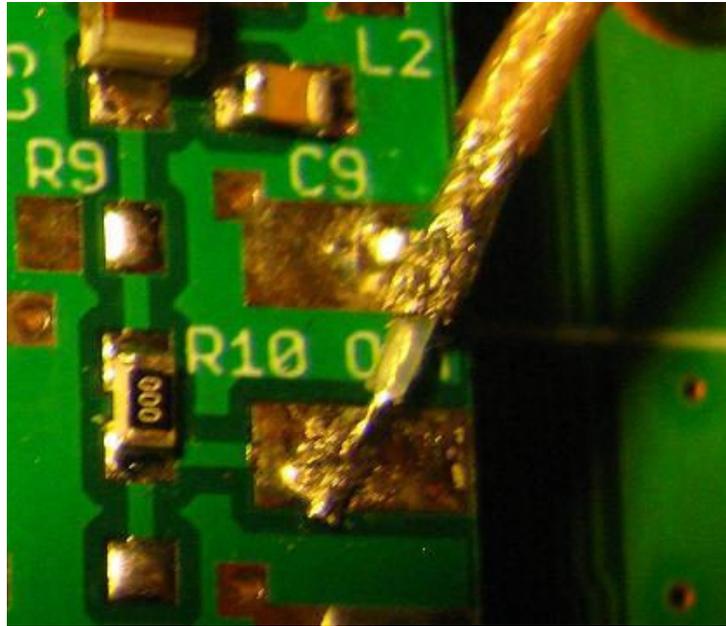


Fig 3 – connection of RG178 coax to centre pin of T1026. Note that braid is not connected, and filter layout is different to the Manual information.

- 7 Prepare a 7cm length of RG178 cable to make the connection between T1026 and the PAT input, and a 9cm length to make the output connection to the SMA socket, using the dimensions given in Table 1 and Fig 9. Do not pigtail the ends, but make them off as in Fig 4. See also details at the end of this note.



**Fig 4 – RG178 cable termination**

Hold the SMA socket in place with a self tapping screw in the lower mounting hole. Temporarily remove the Optional Reference Unit if installed.

Connect the end of the output cable to the centre of the SMA, and solder the braid to the solder tag.

Loop the cable round and terminate on the output connections of the PAT board, as in Fig 4.

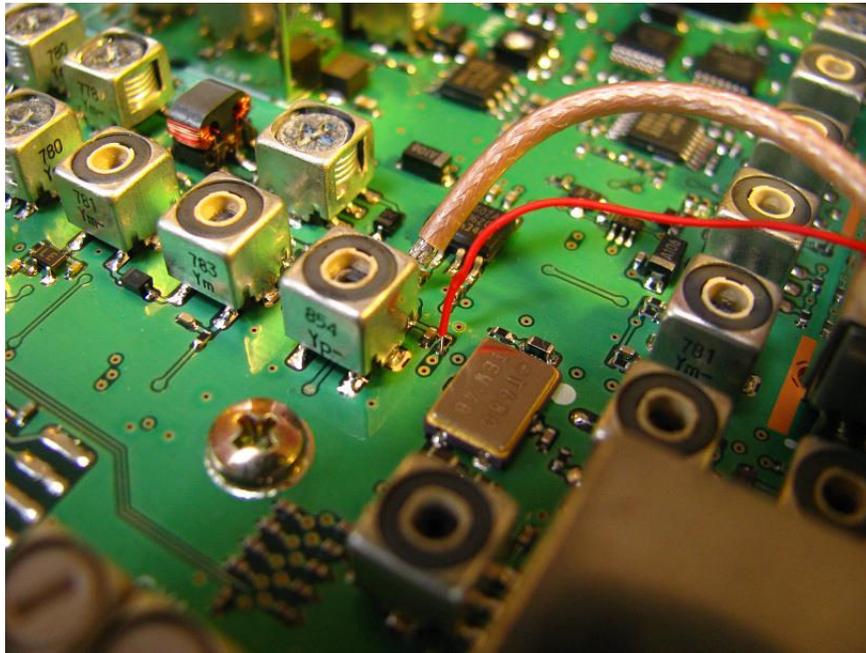
Take the input cable and carefully solder the free end to the centre connection on T1026 – this is on the rearward facing side of the screening can of T1026. Care is needed as the can will very easily take solder, with the potential for inadvertent short circuits!

Loop the cable round and terminate on the input of the PAT board.

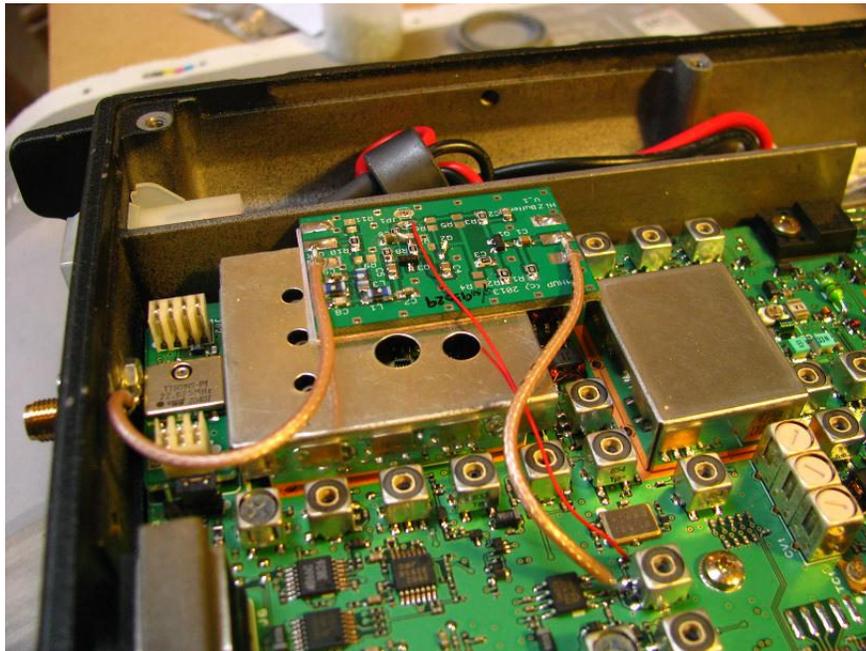
Strip 1mm (or less) off the ends of the 65mm red wire. Solder the free end to the end of R1302, as shown in Fig 2 to pick up the switched 8v RxB supply. You can see a picture of this in Fig 5. It is easier to connect to the end of the resistor, rather than try to solder to the via. DO NOT connect to the via that appears by itself slightly forward of R1302 – this does not carry RxB!

Fig 6 shows the completed installation, with the PAT PCB mounted on top of the PLL Unit, and with the 1<sup>st</sup> mixer in the can to its right. To the left of the PLL Unit is the High Stability Reference option, which only just clears the PAT output connections in this instance.

- 8 Replace the cover, connect and test.



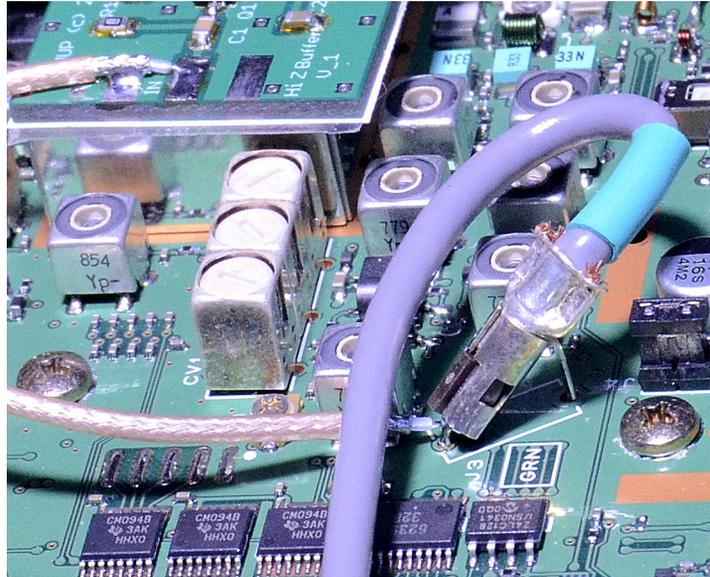
**Fig 5 – RxB connection at R1302**



**Fig 6 – Completed installation for 1<sup>st</sup> IF tap**

For Second Receiver Function, install as above, except for the connection to the FT897 signal path. This should be connected to the main RF Rx feed into the Main Unit, at J3 in the centre of the PCB – see Fig 7 below. Be careful not to short circuit the connector or damage the grey coax lead while soldering. Note that the outer of the PAT input coax is not grounded at the J3 end.

Note that for full coverage when using the 2<sup>nd</sup> Receiver function, the PAT board must not have its LPF present (L1-3, C7-9), or you will not be able to display the 2m and 70cm bands on the SDR. Remove the LPF (if fitted) and replace L1 and L3 with 0R resistors or short wire links.



**Fig 7 – Connection detail for the PAT input for Second Receiver Application.**

### ***Installing an SMA socket on the FT897 Rear Panel***

There are two ventilation slots between the power connector and the CAT socket at the top of the rear panel. An SMA, or similar small socket, fits neatly across the slot, and passes through for a connection to be made from inside the rig. This exercise needs care, as you will have to drill into the rear panel – take precautions to avoid swarf falling into the rig.

The best location for the socket is about half way across the second slot – not where I have it in Fig 8 below! The Reference Oscillator option is located immediately behind the panel as I have it marked out, and a much better location for the socket is in the right hand slot, just a little to the right of where the ground symbol is shown.

The upper hole can be drilled M2.5 clear (drill No 39 US) right through the panel. The lower hole aligns with the internal chassis casting, and so will be blind. A shorter M2.5 screw is supplied in the installation kit. Drill a blind hole using M2.2 or M2.3 drill (No 44 US). This hole needs to be approx 4mm deep, but greater depth will not be an issue. The screw will then cut its own threads into the relatively soft aluminium of the panel casting.

Once the mechanical work has been completed, ensure that all swarf and metallic dust is cleared from the radio, and fit the socket. On the inside of the panel, fit a solder tag under the nut.



**Fig 8 – Rear panel marked ready for drilling**  
note - it is recommended that you place the socket about half way across the second slot as this makes the internal connection easier.

### ***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 9 shows a correctly terminated cable installed in an FT817, and you can see another example in Fig 4 above.

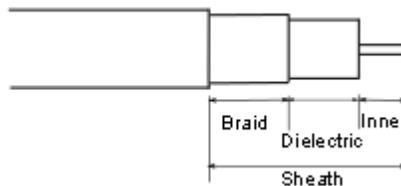


**Fig 9 – Correct method of termination for the RG178 cable**

Table 1 below shows the measurements recommended for the cable end preparation for the FT897 installation and Fig 10 below gives further clarification.

Cable	FT897 Connection	Sheath	Braid	Dielectric	Inner
Input	T1026	4 mm	1mm	2mm	1mm
Input	PAT	8mm	3.5mm	2mm	3.5mm
Output	PAT	8mm	3.5mm	2mm	3.5mm
Output	SMA	14mm	11mm	1mm	2mm

**Table 1 – Cable stripping details for FT897 installation**



**Fig 10 – Cable termination preparation details**

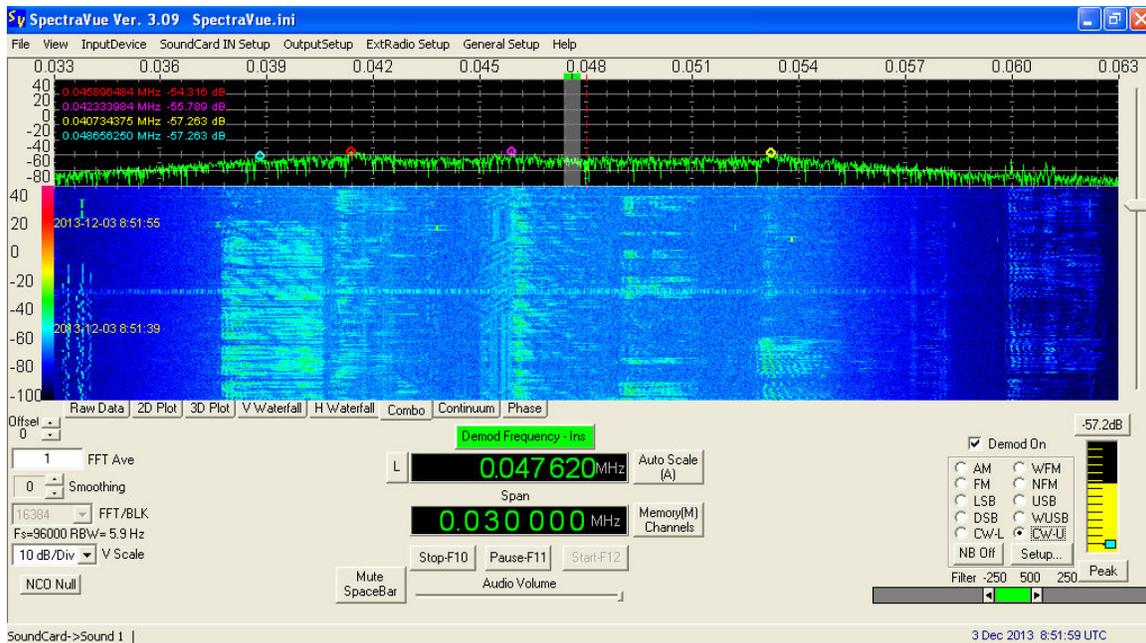


Fig 11 – Screen shot of SSB activity on 40m – IF Tap

The screen shot in Fig 11 was taken via a Funcube Dongle Pro and FCHiD03 using the PAT board in the FT897 as a tap on the 1<sup>st</sup> IF connected to a vertical antenna. Note that the centre of the 30kHz displayed range is plainly the most sensitive, useful information is visible out to the edges of the full range. The SDR is set to a frequency of 68.33MHz via FCHiD03.

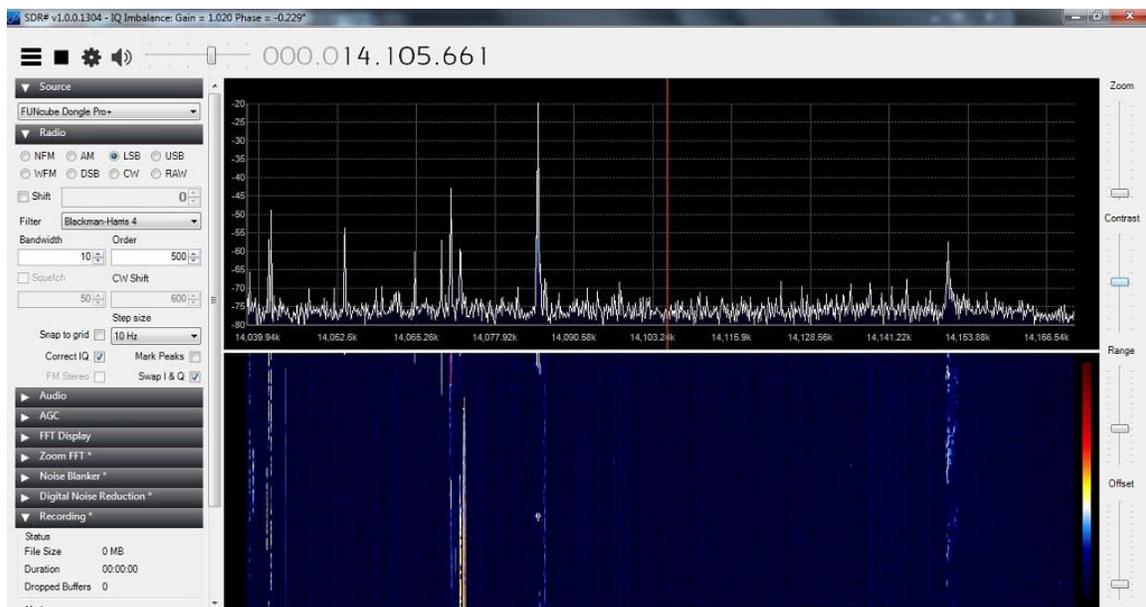


Fig 12 – Screen shot of 20m band (partial) – second receiver function

Fig 12 shows as screen shot typical of the Second Receiver application for the PAT board. In this case, part of the 20m band is shown (on a quiet weekday afternoon). The shot was captured using the Funcube Dongle Pro Plus and SDR# software. Note that in this use, the SDR frequency

must be set to the band being monitored. On the FT897, due to the block band pass filters that Yaesu have used in the Rx path, you can monitor 30, 20 or 17m on the SDR, at the same time as being on any of those bands with the rig – and of course, using the SDR you can demodulate any of those signals too.