

Bulletin 4

FM1200 control board Type 4, sub-version 3513 0 1673

Due to a hardware difference between control board Type 4 and its predecessor Type 2, after modification there is a problem with the transmitter power output level. The problem manifests itself as almost instant reduction to zero of the transmitter output power when the PTT button is pressed. This happens at all transmitter power levels (FNC-1 function).

The above behaviour of FM1200 transceivers containing a Type 4 control board is indicative of erroneous action of the (excellent) transmitter PA protection circuit, whose function is to reduce transmitter output power to a safe value if too much reflected RF power is detected ('bad SWR'). On closer investigation, this is indeed the cause of the problem. Fortunately, the problem is simple to solve without extra components.

As shown in **Figure 1**, on Type 2 boards the output voltage of the internal SWR meter is applied to input A5 of the ADC, via pin 6 of socket SKT-B.

By contrast, on Type 4 boards pin 6 of SKT-B is used to get a POCSAG digital signal across to the analogue board, while the A5 input of the ADC is held at a fixed level of approx. 2.5V by means of a voltage divider; see **Figure 2**. Consequently the new control software will invariably read a bad SWR condition via the ADC. The problem is simple to resolve by hardware-modifying the Type 4 board in such a way that it gets the same functionality as a Type 2 board. POCSAG not being too much of an issue to radio amateurs it needs to be sacrificed.

The circuit diagram of the modification for Type 4 control boards is given in **Figure 3**.

Description of extra modification on Type 4 control board

Note: with the pin connectors at the long side of the control board towards you, and the SMD parts visible, SKT-B is the rightmost of the two pinheaders. Pin 6 is the third pin from the left in the lower row of pins (pin order, left to right: 2, 4, 6, 8, 10, 12).

For the modification described below it is not necessary to remove the control board from the transceiver chassis.

1. Remove the 10k SMD resistor (print: 103) found in the right-hand upper corner of the board, near the yellow '4'.
2. Carefully remove the 10k resistor indicated by the arrow in Figure 4. Re-mount this resistor, this time vertically, with the lower end soldered to the nearby 10k resistor.
3. connect a wire between the upper terminal of the vertically fitted resistor and pin 6 of SKT-B.

If the 10k SMD resistor is damaged or lost, solder a regular-size 10k resistor between the square solder pad on the track to pin 6 of the MC145040 ADC (IC301) and pin 6 of SKT-B.

After this extra modification, transmitter power should come up normal and respond to level changes performed via key command FNC-1. The power level should be adjustable between about 0,2 W and >25 W or >6 W, depending on the transceiver-version. With the 6-watt UHF version (rare in the UK, type FM1200 STM23 or SU023) the TX power readout supplied by the STAT menu will unfortunately be incorrect as the software is based on 25-watts RF PA modules only. Transmit power on the 6-watt radio should be limited to a safe value, i.e., < 8 watts. This is easiest done by not exceeding about half the length of the TX power bar indicator (FNC-1).

(Drawings on next page)

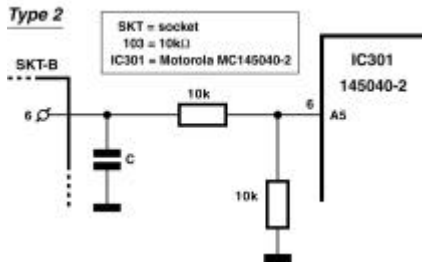


Figure 1

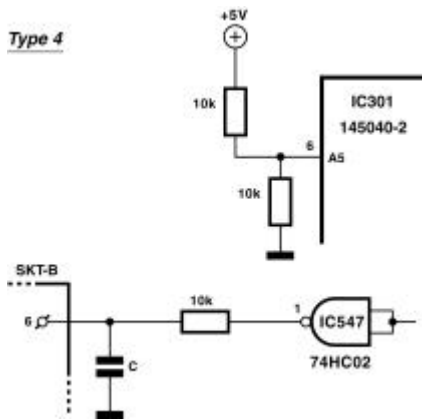


Figure 2

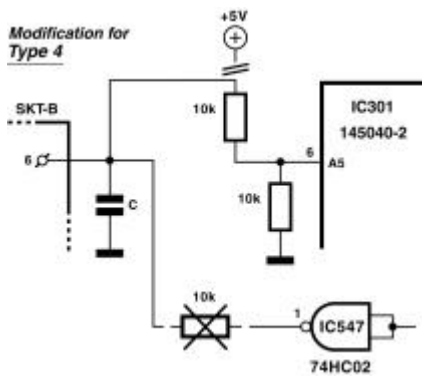


Figure 3

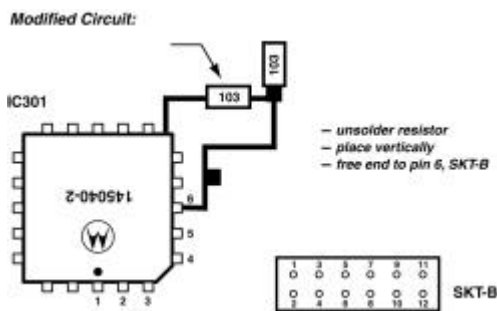


Figure 4

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