Portable power for the TCS

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A couple of years ago I acquired a TCS-9 transmitter and TCS-12 receiver to add to my collection. Although I got a remote control unit and an antenna loading coil in the deal, there was no power supply. Unfortunately, I could not locate a genuine TCS power supply in the UK and shipping prices from America were prohibitive for such a heavy item. This article describes my approach to adapting the Heathkit HP-13 mobile power supply for this purpose.

General considerations

I set about looking for a supply design and came across the article by Ken Brooks in Issue 35 of the VMARS News Letter. Ken used a slightly modified Heathkit HP-23 power supply for the heart of his power unit and so I looked around for such an item. The HP-23 was used with several Heathkit SSB transceivers, the HW-101 being a good example. I advertised for a HP-23 on the VMARS Members Group and had a response from Iain G0OZS who didn't have a HP-23 but did have a HP-13, the 12 VDC mobile version of the power supply, which was working.

Consulting the circuit diagram of the HP-13 (figure 1), I could see that the power supply developed about 800 V for a transmitter and 250 V for a receiver on a low tap setting, with a negative bias supply for the transmitter linear PA and a 12 V outlet for transceiver heaters and control relays.

The TCS transmitter power requirement is 400 V at 182 mA for full power on CW and the receiver needs 225 V at 95 mA maximum. The corresponding ratings for the HP-13 are 750 V at 250 mA and 250 V at 150 mA, which I felt should mean that the HP-13 would not be overloaded, unless very long 'overs' on AM were contemplated.

Circuit alterations

The DC HT supplies are obtained from a pair of voltage doublers and so I removed all the silicon diodes from the 800 V supply, linked the pair of red lines from transformer T1 to a 600 V rated bridge rectifier and took the negative output of the bridge to ground. The bridge was mounted on the power supply lid to give some heat dissipation. This modification produced 400 VDC with about 13 V on the supply battery. The 250 V supply, although slightly high for the TCS receiver at 25 V over nominal, was left unmodified and set to the 'low' tap on the circuit board. The bias supply was set to its lowest value by the bias adjustment pot and not used.

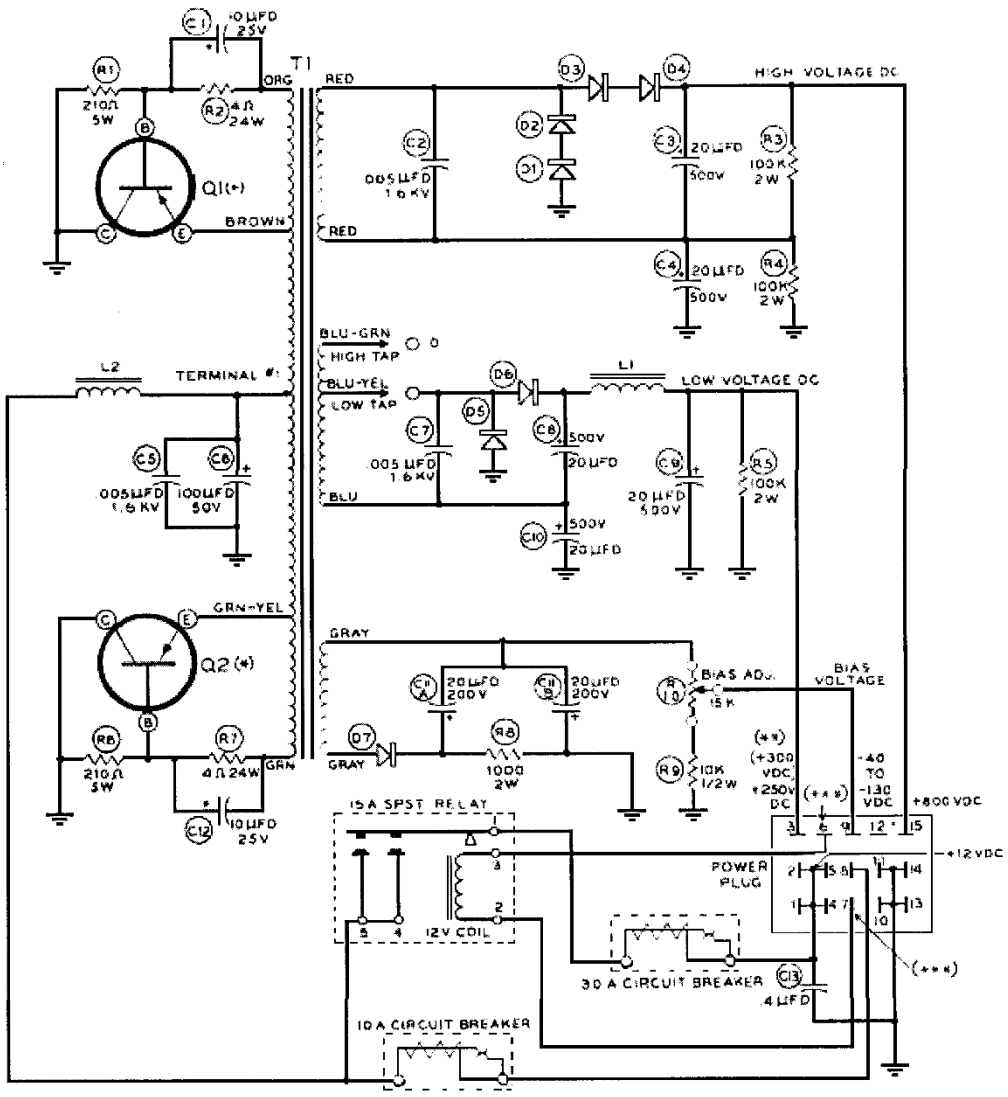

Figure 1. Circuit diagram of the Heathkit HP-13

Connecting to the TCS

The original TCS range of power supplies used a set of sockets that match the receiver, transmitter and remote controller sockets, giving reversible power leads and providing interconnections between the three peripherals to perform functions like receiver muting, power switching, etc. I had also failed to get a set of leads with my TCS and so bought three pairs of cable plugs and a set of three sockets from Robert Downs WA5CAB in Houston. These were all new connectors and that made for easier soldering when I came to make up the cables.

As the HP-13 has little free space inside, mounting the sockets and a relay for transmitter power switching was going to need some sort of junction box, so I bought an off-the-shelf black ABS box from Maplin that nicely matched the TCS paint job and mounted the sockets on the bottom of the box, with the HP-13 output lead connected through a cable gland in one side. Internal wiring and links were made to terminal blocks screwed to the lid of the box. I used the circuit diagram of the TCS 12 V type 21181 dynamotor supply shown in drawing MM-1057 of the TCS-13 manual (figure 2), which is available on line. This drawing shows all the links between sockets and also the start relay for the TX power, which I duplicated but used it to switch only the transmitter heater supply *via* the front panel power switches on the transmitter and remote control. The final addition was a switch to apply 12 VDC to the HP-13 start relay, which powers up the inverter and also the heater and keying relay supplies.

Conclusion

The HP-13 does not appear to be a common device but they do turn up on auction sites occasionally and at a little over 2 kg are not heavy to ship, In use, I noticed no inverter whine on transmit and it was only audible on the receiver if the RF gain was turned down very low. The use of an inverter supply means that one still has to carry a car battery for field use but the weight of a car battery and supply is less than the original mains and rotary supplies by a good margin. The HP-13 has generous heat-sinking but is probably best placed in a cool spot if operating portable.

Acknowledgement

The author is grateful to Don Peterson, of Data Professionals, California and copyright owner of Heathkit manuals, for permission to reproduce the circuit of the HP-13 as in figure 1.

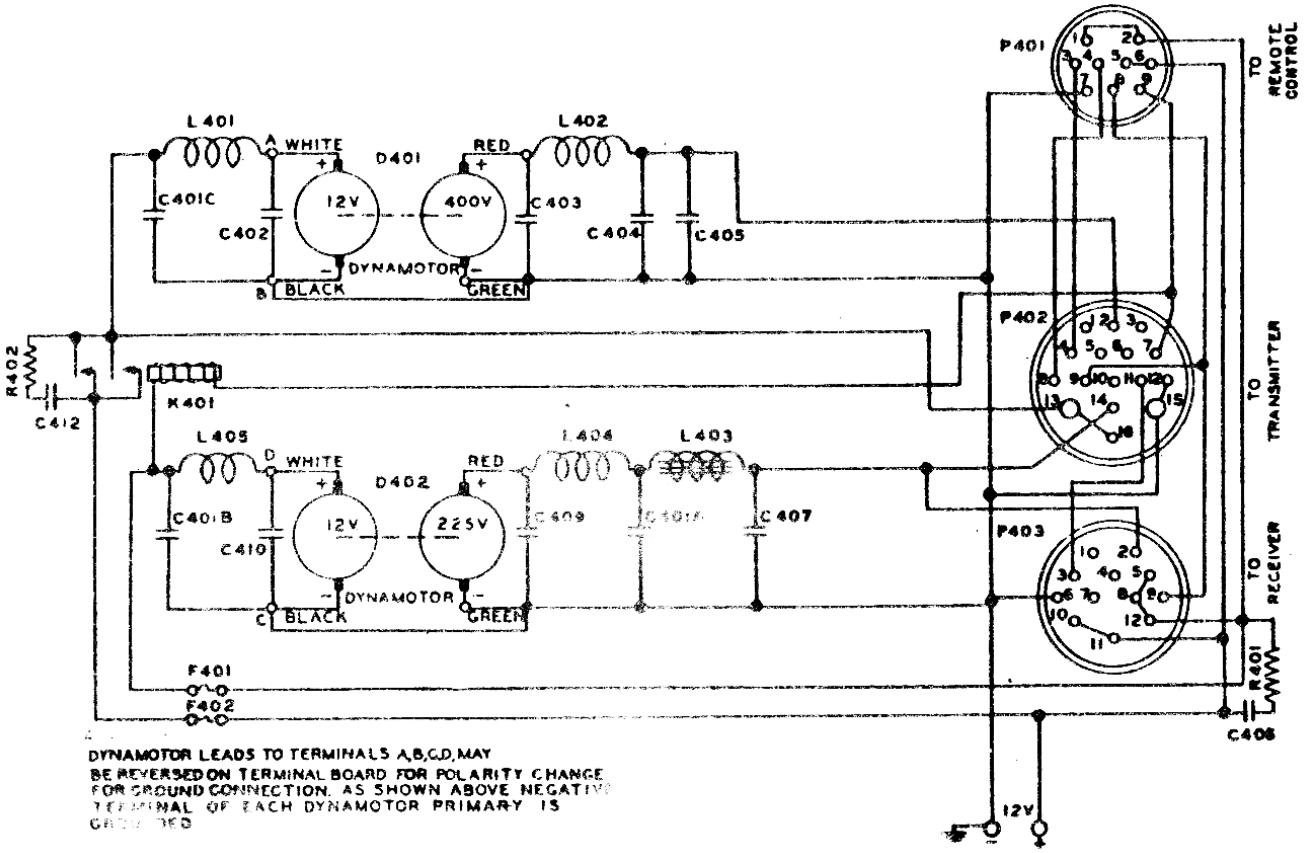

Figure 2. Circuit diagram of the rotary power supply for the TCS13

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