

# Modifications to the FL200B Yaesu Musen Transmitter

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Since obtaining this transmitter about 3½ years ago the author has learnt much about the art of SSB and in particular about this particular variety of transmitter. The modifications described are a mixture of necessities and personal choices.

THE lay-out of the audio input from the microphone socket to the grid of the microphone pre-amplifier is quite poor. The mic. socket is right alongside the mains on-off switch and the whole of the audio input lead of about 4 inches is unshielded. In my transmitter this resulted in hum modulation of my signal. To overcome this, the lead was shielded and a shield tube was made out of tinfoil to go completely over the mic. socket, which cured this fault.

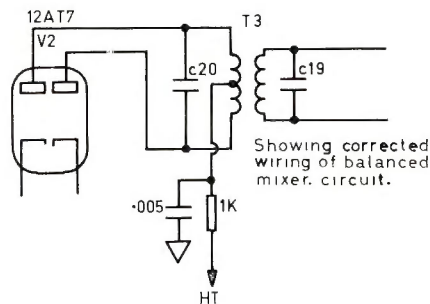
It is most disconcerting on vox operation to hear the relays clanking in and out, and as well, it meant that the vox had to be desensitised as the noise of the relays operating caused the transmitter to cut in and out of operation. To overcome this fault I rubber-mounted the two relays. The one in the p.a. cage I mounted on a grommet which fitted into an enlarged hole in the side of the cage. For the relay on the rear apron of the chassis, I cut small rubber washers which were fitted on both sides of the chassis wall. The original screw would not fit (too short) so a couple of nuts were soldered to the relay and some longer screws used to mount the relay. By doing this, the noise of relays was considerably reduced, so making vox operation easier.

I had much trouble on c.w. with the key contacts fouling up. This was so bad that I had to clean the contacts after every QSO, and boy that should not be necessary, and is a sign of rather poor design. The reason for this poor performance lies in the fact that when the key is depressed it shorts out some of the grid blocking bias system, which is a very effective method of keying, but the key in this case directly shorts out C43, C58, C67 and C98, which means the key discharges these capacitors in microseconds from a voltage of about —120 volts to zero. This adds up to 0.065  $\mu$ F.

To reduce this sparking and fouling of the key contacts two 1K resistors are fitted in series with the capacitors in a particular way. One resistor is fitted in the vertical line at the extreme right of the circuit and the other is fitted in the bias line immediately above the caption "V8 12BY7A" on the circuit. By inserting these two resistors the operation of the keying circuit is unaffected but the peak keying current across the key contacts is reduced to 300 mA, and continuous key down current is 8 mA. The value of these resistors is not critical but I would not go below the value I used.

I fitted these resistors, one on the tag strip by the p.a. tube bases, there is a

spare lug. The white wire is the lead that is cut to fit the resistor. The other resistor is fitted near the 6CB6 V7. Once again there is a spare lug. There are three white wires with blue traces. The one coming from the centre part of the transmitter chassis is broken to fit the resistor.



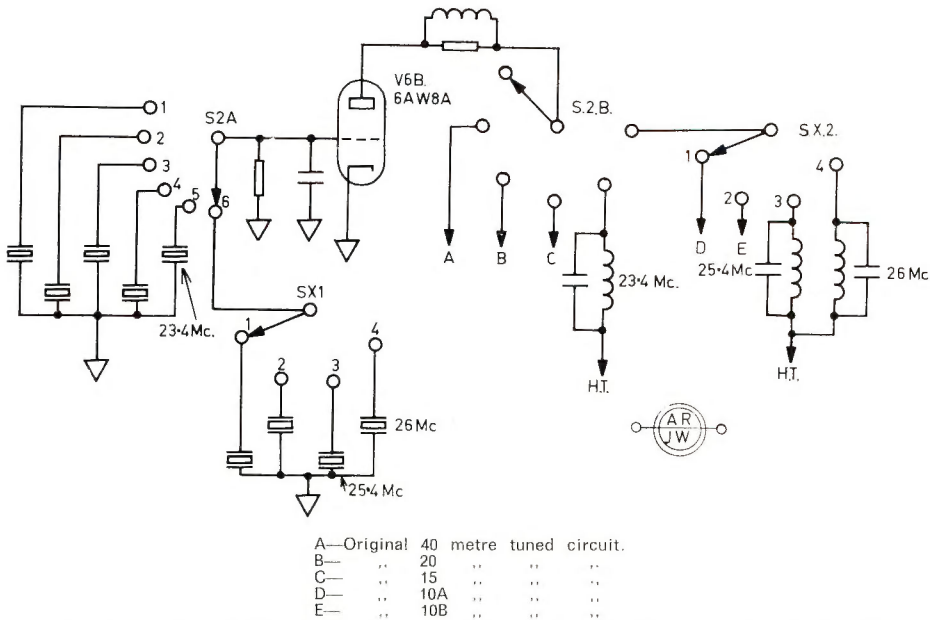
I had trouble with vox and keying circuit giving unreliable operation and traced this to R31, a 1 watt 50K resistor. This resistor had succumbed to its overload so two 82K ohm 1 watt resistors in parallel were fitted, making this section much more reliable. The 50K, or 47K as it was marked, was dissipating nearly two watts. Bad design I feel.

Should you ever burn out a 6BM8 voltage regulator consider fitting a 6GV3 as it has a much higher heater-cathode rating. The 6BM8 has only 100 volts

rating and in the voltage regulator it has 150 volts between these two elements. See my article on voltage regulators in "A.R.," Dec. 1969.

Much to my surprise, one day I observed the 12BY7A driver glowing red hot. I immediately thought that something was wrong and started to delve into the works, but on going through the valve voltage chart I found all voltages to be normal. However, when I checked the ratings of the valve I found that in this circuit it is being overrun by about 60%. The screen voltage, for instance, is 280 volts, whereas data on the valve indicates a maximum of 190 volts. I did quite a bit of experimenting about this stage, but found that it worked best with the circuit as is. The valves must be rugged as I haven't blown one yet. I can't say I am happy with the valve being overrun like this, but it seems to keep going quite okay.

This transmitter has rather limited coverage of 10 metres, only going from 27.9 to 29.1 MHz. To overcome this I have thought of fitting an extra switch to bring in other crystals when the band switch gets to position 10B. The 10A position could be used for the 11 metre (26.96 to 27.23 MHz.) band. As per accompanying diagram, at least another two h.f. bands would be achieved with little problem. The switch could be fitted on the front panel in much the same way as done for the

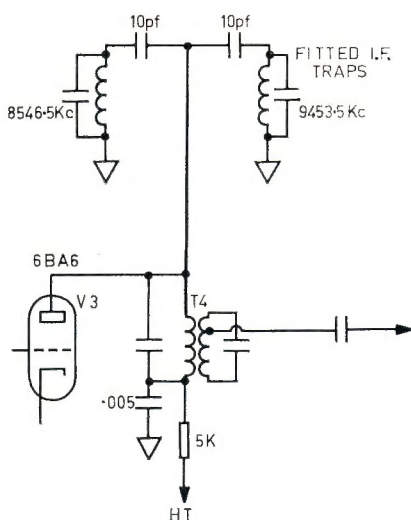


S2 will now read: 80-40-20-15-11-10. SX1 will read 10A, 10B, 10C, 10D, so covering all 10 metres. In the plate circuit of V6A (6AW8A) the wiring would be altered as for S2b and SX2, but the tuned circuits would tune for 11 metres 32.4 MHz.. 10 metres C 34.4 MHz.. and 10 metres D 35 MHz.

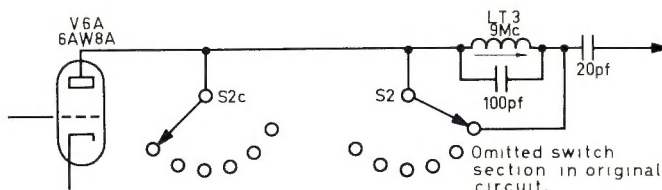
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I have fitted three other traps to the transmitter in addition to the ones already fitted. In the plate circuit of the 6BA6 9 MHz. i.f. amplifier, I fitted



The traps are tuned to the following frequencies: LT1 6.8 MHz., LT2 9 MHz., LT3 9 MHz. LT3 is not mentioned in the alignment data of the transmitter



The 9 MHz. i.f. is heterodyned with a 10.4 MHz. crystal to give 19.4 MHz. which is then heterodyned with, say, the v.f.o. at 5.15 MHz. to give  $19.4 - 5.15$ , giving 14.250. But the weak 9 MHz. signal in the plate circuit can also beat with 5.15 MHz. and give  $9 + 5.15 = 14.15$  MHz. So it can be seen why these traps are in there.

I would suggest that the balanced modulator be tuned up listening on a receiver to the transmitted frequency. There will be a small whistle if the balanced modulator is not quite balanced. Adjust the trimmer and pot alternatively for minimum whistle. It should be possible to virtually eliminate the carrier altogether and all you will be left with will be some mushy 50 and 100 cycle sounds and their harmonics.

The Yaesu Musen transmitters are renowned for their excellent carrier suppression. I doubt that even the so-

In conclusion, I might comment that I have learnt a great deal about side-band from working on this and one or

Have fun with the rig, I have. It is not perfect, but then what rig is, and if it was, we wouldn't learn very much about it because nothing would go wrong, and Murphy's Law has not been disproved yet!!!

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