19200Bps with the T7F

Modification

The modification is easy. You have to change three components. Replace the first IF-filter FI1 by a 21U30A and the second IF-filter FI2 by a CFUS450BY. Both have 30kHz bandwith instead of 15kHz of the original filters. Finally C78 must be changed to 330pF.

Tuning

You need a signal generator which can be modulated with sine and rectangle waveforms. At first make sure that the reference oscillator is exactly on 20.95MHz. Apply a 70cm signal to the transceiver which is modulated with 1kHz sinewave and 3kHz deviation. Adjust L9 to minimum distortion of the demodulated signal at the RX output. A value of below 1% THD should be achieved. Then switch from a sine to a rectangle signal, same frequency and deviation. Now adjust C70 to an optimum rectangle shape at the RX output. The trimmer position is critical, please see the figures for the correct tuning.

In principal the transmitter section does not need a special tuning for 19k2-mode. Nevertheless is does not hurt if you double check the modulation. Therefore apply a 100Hz rectangle signal with an amplitude of 400mVpp to the modulation input. With a test receiver check the demodulated signal for best rectangle shape. By using a sine signal the frequency response shall be flat within 1dB between 2Hz and 10kHz.

Experience

The RX sensitivity degrades a little bit because of the higher IF bandwith if you measure with 3kHz deviation. If you double the deviation everything is as before. In 25kHz distance the adjacent channel response is of course considerably worse. If you work in a 25kHz channel spacing environment you get troubles if there is a signal in the adjacent channel.

Anyway the data throughput is tremendous. In a test setup with two T7F in 20km distance with omni antennas and G3RUH compatible modems I achieved a mean data rate of 14kBps. There were nearly no retries.

Technical support

For help on building up or operation please send an e-mail by internet (df2fq@amsat.org) or packet radio (df2fq@db0pv.#bay.deu.eu).

Holger Eckardt, 2.11.99

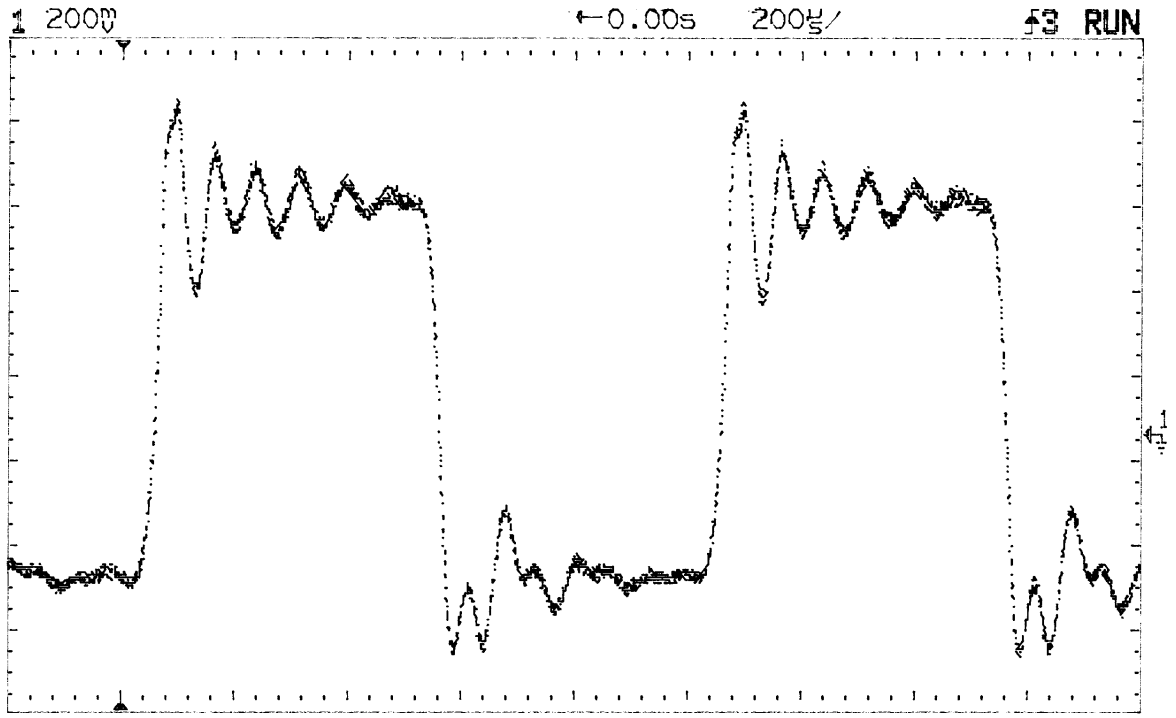

Fig 1, C70 wrong position

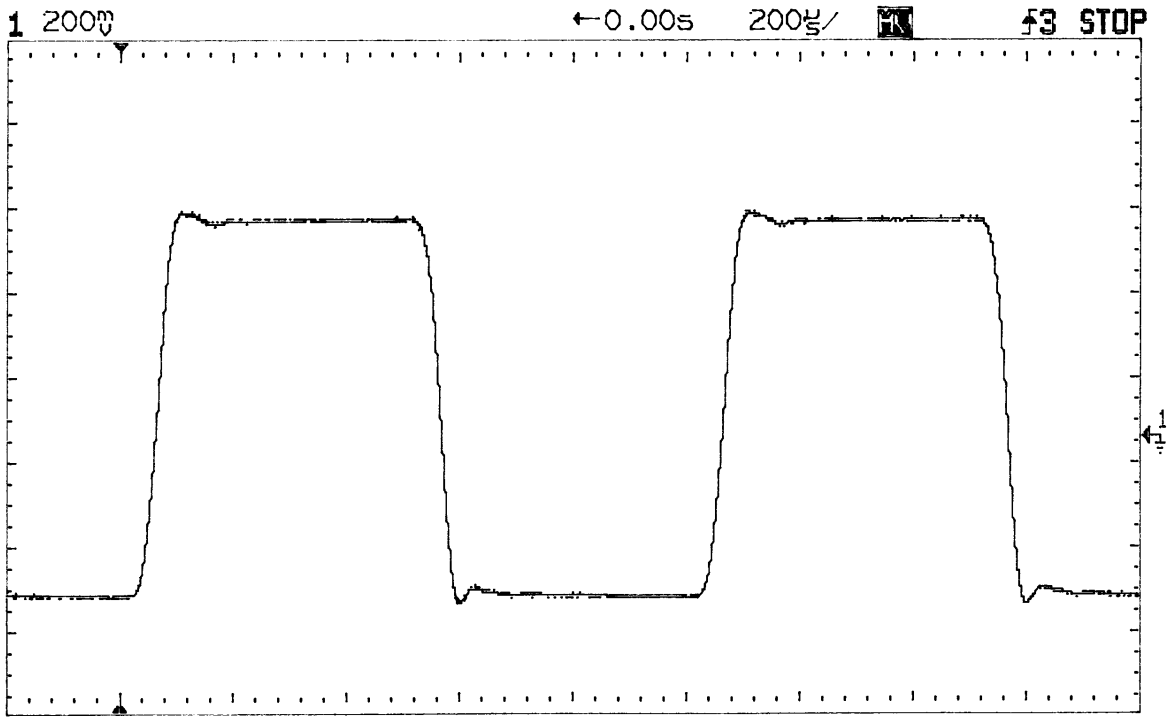

Fig 2, optimally tuned