

Operational Description

Circuit description.

The channel frequency for both the transmitter and the receiver are controlled by two separate phase locked loops using a common VCTCXO reference of 14.40 MHz. The reference oscillator has a stability of +/-1ppm over the temperature range of -30 to +60 deg.C.

There is circuitry that disables the transmitter whenever the PLL is out of lock.

Maximum frequency error of the transmitter is +/-1.35KHz.

Modulation is GMSK with a BT = 0.3. The gaussian filter associated with the modulator is contained inside the modem IC (U6, type FX909AD5). The modulation level is set by digitally controlled components that are adjusted only in manufacturing.

Voice modulation is not possible.

The resulting emission bandwidth complies with FCC 90.210 mask J. for any digital sequence. Data rate is fixed at 8.0KHz.

The transmitter has a power leveling circuit to control the output power to within +/-2dB. There is no external control of the power output.

The receiver uses dual conversion with a first IF of 86.85MHz injected on the high side of the carrier.

There are no external filters associated with this product. Provision is made for the connection of an external antenna, required in normal operation.

Function of semiconductor devices.

This description is limited to the transceiver section of the unit only. Only semiconductor devices shown on sheets 6, 7, and 9 of the schematic diagram are detailed below. *See the block diagram for the location of the devices identified by circuit reference numbers.*

- VCO1 Receiver voltage controlled oscillator used as part of the RX phase locked loop to generate the first mixer injection signal. First mixer injection is on the high side.
- VCO2 Transmitter voltage controlled oscillator used as part of the TX phase locked loop. Runs at the final TX frequency.
- XTL4 Reference oscillator for both RX and TX phase locked loops. Runs at 14.4MHz.
- U16 Phase comparators and frequency dividers. Part of both the RX and TX phase locked loops.
- Q6 Second mixer injection amplifier operating at 6 times the reference frequency.
- U14 RX front end amplifier and first mixer.
- U18 RX first IF amplifier, second mixer, second IF amplifier, and demodulator. The first IF is 86.85MHz, the second IF is 450KHz and the second oscillator injection is on the low side.
- U23 Level setting of the RSSI indicator from the receiver.
- U27 TX pre-driver. Approximately 0dBm output.
- U15 TX power amplifier driver. Approximately 6dBm output.
- U9 TX final power amplifier with power control element.
- CU2 RX/TX antenna changeover switch, driven by SQ2 and SQ3.
- D1 TX forward power detector. Part of the TX power control loop.
- U17 TX directional power coupler. Part of the TX power control loop.
- U10 TX power control loop amplifier.
- Q4 TX output disable. Used for 'out of lock' disable.
- U5 TX modulation input amplifier.
- U28 Digitally controlled components preset in manufacturing.
- U5 RX demodulator buffer.