

Q-Bot Operational Description

The Q-Bot is a hand-held pager type device. It is capable of bi-directional communication via either infrared or ISM band radio. The user interface consists of an LCD display, two, two-way push buttons, a vibratory motor and a sounder.

The Q-Bot contains two PCB's. The top PCB is the Display Processor Board, which carries the main processor (a Texas Instruments MSP430F148 microcontroller), the LCD, a set of buttons, and an infrared device. The bottom PCB is the RF interface board, which carries the RF sub-system, the power supply, the vibratory motor and the sounder.

The main processor receives incoming messages from either the infrared device or the RF Interface board, and drives the user interface as required. It also generates responses when necessary, which are transmitted via either the infrared device or RF interface.

The RF sub-system is based around a Texas Instruments TRF6900a. A detailed description of the operation of this device may be found in the accompanying T.I. datasheet "trf6900a.pdf". A Texas Instruments MSP430F147 microcontroller controls the TRF6900, and performs baseband processing on the 19,200 bps synchronous data stream.

The RF transmit and receive lines from the TRF6900 are connected through an RF switch to a small loop antenna. The transmitter output also passes through a harmonic filter to remove any carrier harmonics that may be present.

The RF transceiver operates with synchronous data at 19,200 bps. The modulation method used is standard FSK, with marks and spaces transmitted at carrier plus or minus 30 KHz respectively. The carrier frequency used can be factory programmed in the range 903 MHz to 927 MHz. The transmitter and receiver are normally set to operate with different carrier frequencies.

The infrared transceiver operates with asynchronous data at 9,600 bps. The modulation method used is standard 3/16 pulse shaping.