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RE : Circuit Description for MP Series Transmitter

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Users interface with the transmitter through a keypad on the front of the transmitter. By pressing a button on the keypad a signal is sent to the microprocessor. That signal in turn is converted into a number that is compiled with an address code, that is pre-selected and set by jumpers. This compiled number is then sent serially at 2.4KB/s to the Linx Technologies transmitter module (tx module). This signal is then processed by the tx module and radiated at 921.3 Mhz at a level not to exceed FCC standards. The radiated signal is modulated at the 2.4KB/s rate in a Frequency Shift Modulation manner.

The unit is battery powered and is controlled by an on/off switch. The battery voltage is obtained from 4 "AA" batteries that are converted to 5 VDC by a "boost/buck" DC-DC converter. This converter operates at 19Khz (approx.) and should not radiate any detrimental signals. Low battery conditions are indicated by a LED mounted in the case of the transmitter. The indicator will flash red when a button is pushed on the transmitter keypad. Under normal operation the LED will be a constant green indication.

The following is an excerpt from the Linx Technologies datasheet for the employed TX module.

The HP3 Series transmitter is a high-performance, multi-channel RF transmitter capable of transmitting both analog (FM) and digital (FSK) information. FM / FSK modulation offers significant advantages over AM or OOK modulation methods, including increased noise immunity and the receiver's ability to capture in the presence of multiple signals. This is especially helpful in crowded bands, such as the one in which the HP3 operates.

A precision 12.00MHz Voltage Controlled Crystal Oscillator (VCXO) serves as the frequency reference for the transmitter. Incoming data is filtered to limit the bandwidth, and then used to directly modulate the reference. Direct reference modulation inside the loop bandwidth provides fast start-up, while allowing a wide modulation bandwidth and near DC modulation capability. This also eliminates the need for code balancing.

The modulated 12.00MHz reference frequency is applied to the Phase-Locked Loop (PLL). The PLL, combined with a 902 to 928MHz VCXO, forms a frequency synthesizer that can be programmed to oscillate at the desired transmit frequency. An on-board microcontroller manages the PLL programming and greatly simplifies user interface. The microcontroller reads the channel selection lines and programs the on-board synthesizer. This frees the designer from complex programming requirements and allows for manual or software channel selection. The microcontroller also monitors the status of the PLL and indicates when the transmitter is ready to transmit data by pulling the CTS line high.

The PLL-locked carrier is amplified to increase the output power of the transmitter and to isolate the VCO from the antenna. The output of the buffer amplifier is connected to a filter network, which suppresses harmonic emissions. Finally, the signal reaches the single-ended antenna port, which is matched to 50 ohms to support commonly available antennas.