Circuit Description
Model 091-133T 418 Mhz Transmitter

The Unit operates from the 12 volt battery of an Ambulance or Fire Truck. A schematic for this Transmitter (Drawing # 091-133-002) is attached to this description. A Block Diagram is also provided in this submission.

Power Supply

The 12 volts enters J1-8 and J1-7, where it is regulated and filtered to +5 volts D.C. by the U1 regulator chip. This 5 volt D.C. provides power to timer U5, Encoder U3, and the transmitter module U4.

Encoder

The U3 encoder is a four channel device that converts 4 parallel data bits to a serial word for transmission. The parallel data bits are entered into U3 pins 2,3,4 & 5. The data is serially transmitted with a 5 bit address such that only a receiver with a decoder having the identical address will receive the data. This address is inputted to the encoder by a five bit DIP switch (S1) via U3 pins 11,12,13,14 & 15. The serial word is sent from U3 pin 6 to the transmitter module U4 pin 2. The encoder accepts parallel data from 3 momentary push buttons at U3-pins 5,4 and 2. This data is labeled Manual Stop (D7), Manual Open (D6), and Manual Close (D8). The fourth piece of parallel data originates at the vehicle's ignition switch. However, this is not momentary data. Timer U5 acting as a 2 second one shot multi-vibrator converts ignition switch turn on to a two second pulse which prevents continuous transmission. The output of the one-shot is labeled D9 and is routed to U3 pin 3. If parallel data is not present at D6, D7, D8, and D9, the encoder does not produce a serial word. Since the encoder serial word is digital, there is a duty cycle associated with it. In the worst case, this duty cycle was measured to be 40% maximum. This allows the allowable peak field strength to be 2.5 times the allowable average field strength.

Transmitter

The transmitter module is produced by LINX Technologies under their model Number TXM418LC. It contains all of the RF components except for the antenna, and is designed to meet or exceed all FCC requirements. The module contains a 418 MHz SAW (Surface Acoustic Wave) oscillator. The carrier is only present if serial data is present. Thus if D6, D7, D8 and D9 at the encoder do not have active data at their inputs, there is no serial word present, and the transmitter does not emit a carrier. The 40 % maximum duty cycle of the encoder serial data allows the peak field strength to be 2.5 times the allowable average field strength of 10,000 uVolts/ Meter (measured at a distance of 3 Meters), or 25, 000 uVolts/ Meter peak

Antenna and Grounding

The antenna is a 50 Ohm, 7", ¼ wavelength whip antenna whose input is fed from the pin 5 output of the transmitter via an attenuation pad consisting of R9, R10, R11. The antenna sits above a ground plane on the PC Board. This ground plane also is ground for the transmitter, the power supply, and all other PC Board components.

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