Matx Operation Description

Operations
Matx tire monitor consists of two principal parts – sensor modules and display module.

Sensor module is mounted on each rim using metal strap. Each sensor module measures temperature and pressure inside the tire, processes measurement data and wirelessly transmits signals to the display module. Sensor module is operated by lithium 3V battery.

Display module inside the vehicle cabin receives wireless signals from sensors modules, display the information and show audio and visual alerts at user determined and pre-programmed level. The display module is supplied by vehicle power supply.

Sensor module

The sensor module consists of a RF+MCU IC, pressure sensor and very few external components for operation. The transmitter uses a 13.56MHz crystal as a reference oscillator for its phase lock loop (PLL). Antenna was printed on the PCB. No tuning is required for the unit.

Display Module

In the display module, a RF IC receives wireless signal is connected to a MCU. The MCU will processed the received signal and display in the LCD panel.

Communication

The system is operating at 433.92MHz +/- 75kHz. The sensor transmits signal to display unit utilizing frequency shift keying (FSK) at 9600 bps. It is only a one way communication system.

FSK is defined as a signal whose frequency shifts between two values to represent a digital high and low signal. In this system a digital high is a lower frequency and a digital low is a higher frequency. In other words, if the carrier frequency is 433.92 MHz and the total frequency deviation is defined as ±fdev, then a digital high is at 433.92 MHz – 75kHz and a digital low is at 433.92 MHz + 75 kHz.

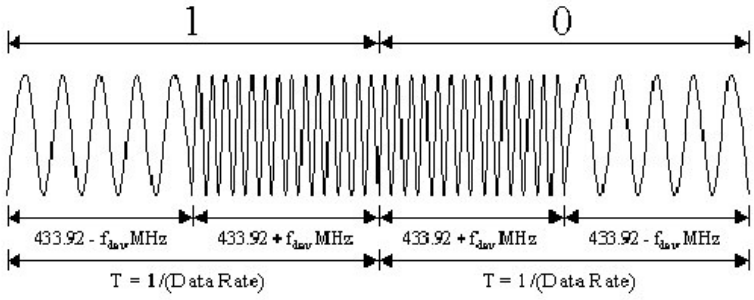

Diagram of the Carrier Wave with FSK and Manchester Encoding

The data format of the transmitted signal

Preamble	Device ID	Pressure	Temperature	Checksum	Stop Bits
16 bits	32 bits	8 bits	8 bits	8 bits	2bits