

FIL-T-3C CIRCUIT DESCRIPTION

The FIL-T-3C transmitter unit is part of the I C E M Enterprises, Inc. Aquamatic Filling system for automatic filling of mobile vehicles. It sends information by digital coded radio frequency at 418 MHZ from the mobile vehicle to a receiver control unit.

Below is a description list of the circuits & parts that make up the FIL-T-3C transmitter unit:

1) MICRO CONTROLLER (S1) This computer controls the sampling of all sensor circuits and the battery voltage. It then digital codes this information for transmitting. The computer also controls the blinking of an LED indicator. The computer codes this information into 4 word 10 bit packets (1 start bit, 8 bits data, 1 stop bit). Each bit has a duration of 400 usec . The first 2 words represents a unique serial number for identifying the unit. The next word identifies the information. The last word is data if data is available for that particular packet. The computer samples all sensors every second. It then determines if any of these samples should be digital coded and sent to the controller receiver. The battery voltage is sampled every 10 minutes and transmitted. Temperature & pressure is sent every 5 minutes if these optional sensors exist. If either of these sensors do exist & the temperature or pressure changes by a determined amount, then this information is transmitted right away.

2) 3.3 VOLT REGULATOR (S14, C1A) Supplies 3.3v to 418MHZ transmitter chip

3) 5 VOLT REGULATOR (S3, C1B) Supplies 5.0 v to the micro controller, LED indicator & water sensor circuit

4) 5 VOLT SWITCH REGULATOR (S2, C2A) This regulator is switched on & off by the micro controller, when measurements are made. It supplies 5 v to the pressure sensor circuitry & temperature sensor circuitry.

5) 418MHZ TRANSMITTER (S4, C3A, C3B, I1, I2, L1, R2A) This transmitter transmits 00k digital signal to the controller receiver. One bits are sent as RF transmission. Zero's bits are sent as no RF transmission. During no packet transmission, the transmitter is put in sleep mode by the micro controller to save battery power.

6) 200 KHZ RESONATOR (RES, C3C, C3D) Supplies the clock frequency to run the micro controller.

7) LOW VOLTAGE DROPOUT SWITCH (S6, R1E) If the 5 volt supply drops below 4.5 volts it stops the micro controller from running

8) LED INDICATOR (D2, R9A) Blinks 4 times when a fresh battery is installed to show that the transmitter unit is running properly . It also blinks 2 times, when the water sensor is tripped to show a full water tank condition.

9) 9V BATTERY& CIRCUITRY (9V, C1C, D3) Replaceable alkaline battery supplies power to run the transmitter for about 6 months.

10) WATER OVERFLOW SENSOR CIRCUITRY (R9, R6B, C2B, L3, L4, M2F)
Supplies bias current & conditions the signal of the water tank overflow sensor. When an overflow condition exists, this information is transmitted by the micro controller.

11) BATTERY VOLTAGE MEASUREMENT CIRCUITRY (R1A, R1B, R1C, R1D, T1, T2) This circuit is switched on to measure battery voltage condition by the micro controller for radio transmission of this information .

12) PRESSURE SENSOR AMPLIFIER CIRCUITRY (S5A, PS1, R1G, R1H, R1J, R10A, R10B) Differential amplifier amplifies the optional pressure sensor signal & then supplies this voltage signal to an A/D input of the micro controller for measurement.

13) PRESSURE SENSOR A/D ADJ. VOLTAGE REFERENCE SOURCE(P1, R2B, R3) Calibration reference source for measuring the pressure sensor amplifier output by the micro controller A/D circuitry.

14) TEMPERATURE SENSOR AMPLIFIER CIRCUITRY(S5B, L2, L5, L6, M4F, P2 R4, R5, R7, R8) Amplifies the signal from the optional temperature water sensor & supplies this voltage signal to an A/D input of the micro controller for measurement. It also has a offset temperature adjustment for calibration purposes.

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