

Bracelet Transmitter

Circuit Description

Prepared by: J. Chris Defant

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The bracelet transmitter schematic consists of two pages, a digital page and an RF page.

Digital description

The heart of the digital section is a TI MSP430 microprocessor (U1). The TI part was chosen because of its low current drain. The processor has built-in memory where the bracelet transmitter software program resides. The processor program performs the following tasks:

1. Periodically enables CR1 through Q2, Q4, Q5, & Q9. This generates an inferred pulse that is intended to pass along a fiber optic strap. The processor looks for these IR pulses from U6 through Q1.
2. Periodically turns on the regulator for the oscillator (U2), the RF_VCC (Q3). Once the RF section has been powered on, the phase lock loop (PLL) is programmed to a specific frequency and then data is transmitted.
3. Periodically, the processor monitors the battery voltage.

The processor is programmed through the J-TAG connector J2.

U3 is an exclusive OR gate that can be used to invert the data before it is transmitted.

RF Description

The reference oscillator (U4) is designed to operate at 10 MHz. The reference oscillator is modulated by the transmitter data by pulling the reference oscillator off frequency \pm 8 KHz. This is accomplished by switching out capacitors C13 and C14 with Q6.

The signal (10 MHz) is fed to the programmable PLL U5. The VCO circuit consists of D1 and Q7.

The FM output signal from the PLL is fed through an attenuator (R24, R25, & R26) and is amplified by Q8.

L4 and C34 impedance match the built-in antenna to the 50ohm output of Q8.