



Theory of Operation: Universal Four Button Transmitter

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Microcontroller

The microcontroller U1 supervises and controls all circuits. It will spend most of its time in low-power sleep, waking only on the interrupt-on-change signal generated by one of the two switches.

Test points TX and RX provides UART access for development and requires soldering of wires to those points.

Indicator LEDs

Two high efficiency LEDs (D1, D2) located at the upper left corner are provided for the indication of a button activation and programming states. The microcontroller can configure pins RA2 and RA3 as output logic low to activate LEDs when the buttons are pressed. All the LEDs have current limiting resistors optimized for luminous intensity.

Buttons

Four buttons are connected to pins RB3, RB4, RB5, and RA0. All buttons will wake up the microcontroller from its low-power sleep by generating an interrupt-on-change (IOC) signal at one of the pins when the respective button is pressed.

Power Supply

Power is supplied by a CR2032 battery and routed to an analog input on microcontroller U1, transmitter U3 and to bias the LEDs.

Transmitter

The transmitter U3 is a SMBus slave device managed by microcontroller U1. All configuration and baseband data generation are done in the microcontroller. Pull-up resistors R1 and R2 are implemented to maintain SCL and SDA bus stability. C8, C9 and C11 provide bypass capacitance to the U3 supply. The transmitter IC has an internal oscillator. U3 has a dedicated shutdown pin driven by the microcontroller that places the transmitter into a low-power state whenever it is not in use.

U3 has a differential antenna port with an internal variable capacitor that feeds a capacitively tapped loop antenna. C1 in conjunction with the transmitters output capacitance resonates with the antenna inductance at the center frequency. The internal capacitance is optimized for radiated power across the band. The transmitters open drain output are biased through inductor L1, along with harmonic filter capacitor C2.

Technology - Band Class	Frequency (MHz)
Remote Control Device	303
Remote Control Device	310
Remote Control Device	315
Remote Control Device	318
Remote Control Device	360
Remote Control Device	372.5
Remote Control Device	380
Remote Control Device	390
Remote Control Device	412