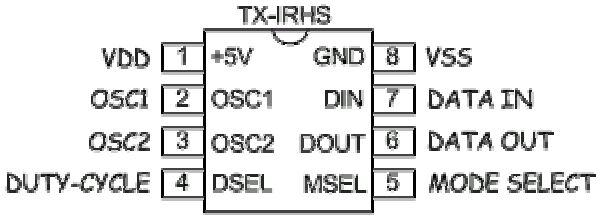
TX-IRHS 8-Pin Programmable High-Speed Infrared Transmitter IC



Introduction

The TX-IRHS is an 8-pin infrared modulator/transmitter IC designed for High-Speed [up to 19,200bps] infrared serial data links, and remote control applications. Data present on DIN is regenerated on DOUT modulated at ~455KHz. Duty cycle and input logic modes are pin-programmable using MSEL [Mode Select], and DSEL [Duty-Cycle Select].

DIN & DOUT

DIN acts as a logic switch that controls the 455KHz [four hundred fifty five thousand cycles per second] modulated data output on DOUT. The logic that will activate DOUT is dependent on the mode select or MSEL pin as explained below.

MSEL Options

The logic level present on MSEL at power up determines the input logic levels applied to DIN that will control the modulated data output on DOUT. This feature allows the TX-IRHS to be used for High-Speed infrared serial communications with TRUE or INVERTED serial modes, and simple push-button switch remote control applications. Knowing the "idle" state of the device sending serial data to the TX-IRHS is important since this logic level during non-transmit or idle periods will hold the DOUT carrier in the off state.

- **MSEL = 0**; Data Input Mode = TRUE
- Logic 0 on DIN Activates Modulated Data Carrier on DOUT

- **MSEL = 1**; Data Input Mode = Inverted
- Logic 1 on DIN Activates Modulated Data Carrier on DOUT

DSEL Options

The DESEL pin selects the 455KHz carrier frequency "high" duty-cycle.

- **DSEL = 1**; Carrier Duty-Cycle on DOUT = 45%
- **DSEL = 0**; Carrier Duty-Cycle on DOUT = 27%

Note: MSEL and DSEL options must be set before applying power. All inputs MSEL, DSEL and DIN must connect to Vcc or ground. Do not allow these pins to float.

Hardware Requirements

The TX-IRHS requires a 455KHz infrared photo module such as the Vishay TSOP7000. For best results with the TSOP7000, we recommend an 870nm infrared LED. The TSOP7000 peak sensitivity is in the 870nm region, and an infrared LED matching this wavelength will help to increase the overall operating range of the wireless link.

The 20MHz oscillator is a critical component of the TX-IRHS transmitter circuit. Generating *four hundred fifty five thousand cycles per second* for the data carrier requires a precision oscillator in order to maintain precise timing. Use the 20MHz ceramic resonator or crystal oscillator circuits shown below, and in the sample schematics with the TX-IRHS IC for best results.

We have sample TX-IRHS application schematics available for download at the following location: http://www.rentron.com/Files/TX-IRHS.pdf

TX-IRHS Applications

- High-Speed Infrared Serial Communications
- Infrared Object Detection Systems
- Infrared Remote Control Applications
- High-Speed Robotics Communications & Control

Specifications:
TX-IRHS IC: Microchip PIC12F6xx PIC™ Microcontroller
Power Requirements: Well Regulated 5 VDC
DOUT Max Output Drive Current: Sink or Source 25mA
DIN Max Input Data Rate: 19,200 bps [19200 Baud]
Oscillator Frequency: 20MHz
Idle Current: ≅ 2mA @5 VDC

For detailed device specifications or to download the datasheet for the PIC12F6xx PIC microcontroller used for the TX-IRHS IC, please visit the Microchip corporate web site at: http://www.microchip.com

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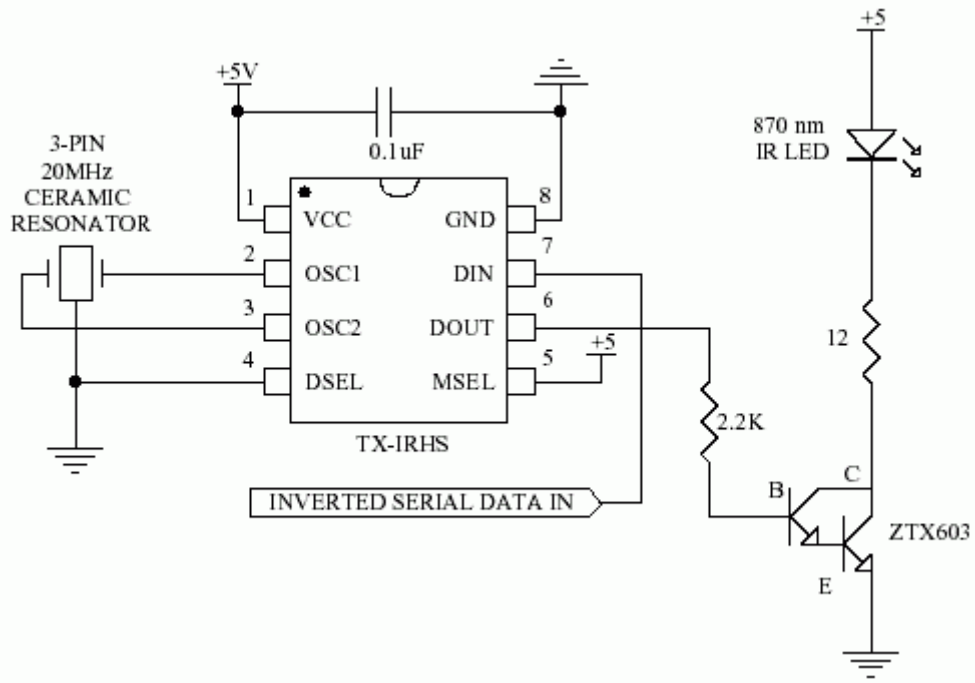
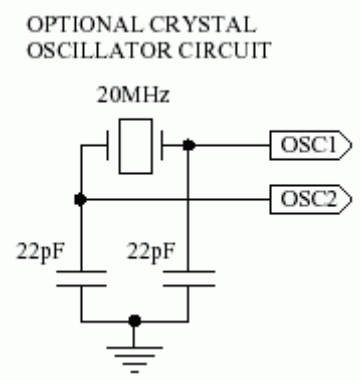
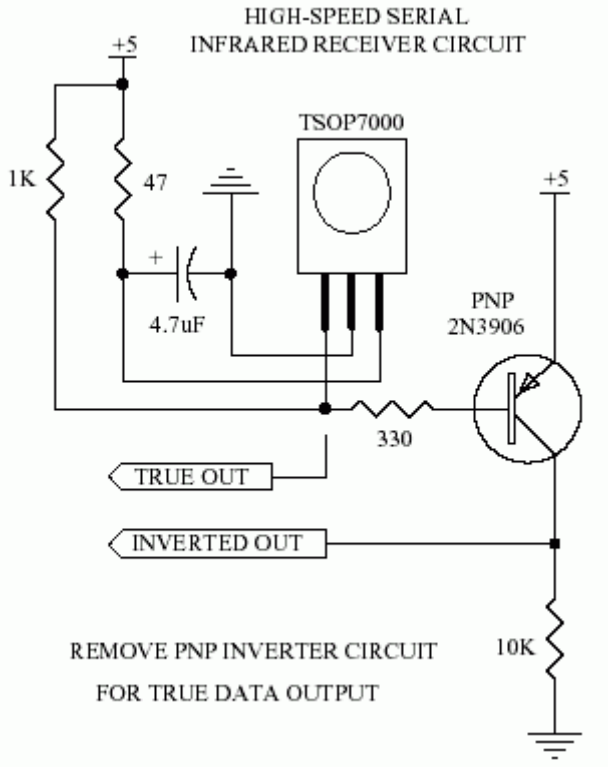


Example Transmitter Circuit With 3-Pic Ceramic Resonator w/ Internal Capacitors



Optional Crystal Oscillator Circuit

The TX-IRHS IC, are available in our remote control store at:
http://www.rentron.com/PicBasic/RemoteControl.htm



Example High-Speed Receiver Circuit

Note: The example receiver circuit shown above will provide TTL level inverted serial data. This circuit works well for interfacing to embedded controllers like the BASIC Stamp or PICMicro. For PC applications with RS232 signal levels, use a MAX232 or equivalent RS232 level converter IC.

For applications requiring true serial data, remove the 330Ω resistor, PNP transistor, and 10KΩ resistor. True serial data will be available directly from the TSOP7000 data output pin as shown above.

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