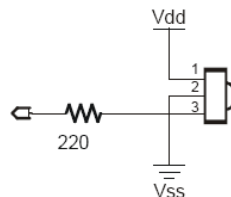Joshua Schapiro
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Infrared Remote Control Communication

Using an infrared (IR) remote control is a very easy and functional thing to add to your robotics project. All you need is a few simple items and a bit of knowledge about programming. The parts needed are as follow:

1. IR remote control programmed to work with a SONY television.
2. IR detector.
3. 220 ohm resistor.

The IR detector I have chosen is a PNA4601M series. The connection diagram is shown below. Pin 1 is connected to 5 volts, pin 2 is connected to ground and pin 3 is connected through the 220 ohm resistor to any digital input pin on your microcontroller.

The way the IR communication works is, the remote control sends its messages by blinking its IR LED for brief periods of time. The data is communicated by the amount of time each strobe lasts. The protocols for all remote controlled devices is different, this is just the protocol for a SONY television.

In order to interpret the data, the lengths of the pulses sent from the remote must be measured. The IR detectors output pin is naturally high, and when it detects an IR source it will go low. So you will be measuring the length of the low pulses. Every time a button is pressed on the remote it will stroke its LED a total of 13 times, with a delay of about 0.5ms in between. The first strobe is approximately 2.4 ms in length and is just to synchronize the remote with your microcontroller. The next seven pulses are the binary representation of the key pressed. These are sent with the least significant bit first and are either 1.2 ms long (interpreted as a 1), or 0.6 ms long (interpreted as a 0). The last 5 pulses are sent the same as the last seven, but they are just to tell the device that the remote was sending a message intended for a TV, VCR, DVD etc. If a key is held down, the same message will be sent again after a 20 to 30 ms delay.