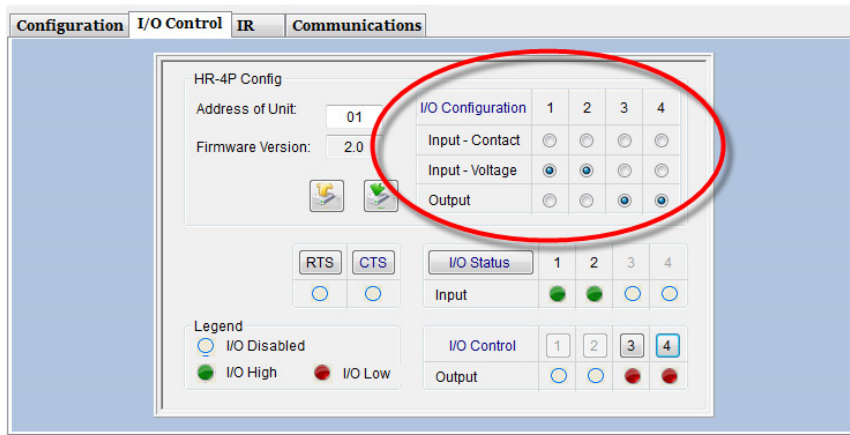


HR-4P I/O Port Configuration Modes

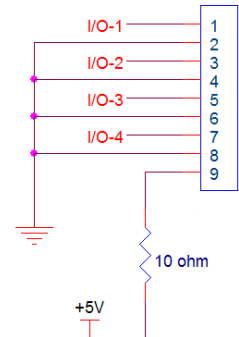
The HR-4P provides 4 I/O ports on screw terminals. There is also a corresponding Ground for each and a +5V output terminal for your convenience that can supply up to 160 ma of current.

Each of the I/O terminals can be configured to act as an **INPUT** or an **OUTPUT**.



I/O Control in GUI

I/O Terminal Block



I/O Block connections inside HD-4P

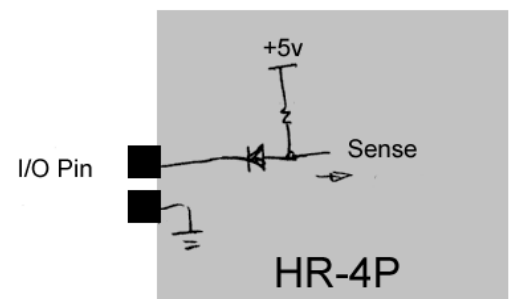
Using I/O Port as an INPUT

When an I/O is defined to be an input, you can assign an action (such as sending out a serial command) to be triggered when a high-to-low transition is sensed, and optionally a different action when a low-to-high transition is sensed.

In INPUT mode the pin can be further configured as two types INPUT-VOLTAGE or INPUT-CONTACT.

INPUT-CONTACT Configuration

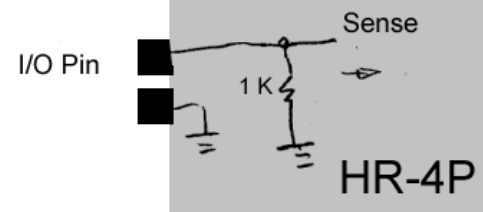
In this mode the HR 4P applies a pull-up (typically 50Kohm) to the sense signal, so when the I/O pin is left open the signal is high. If you connect an external toggle or momentary switch between the I/O terminal and the Ground terminal, then when the external switch is closed, the Sense signal is low and when the switch is open the sense signal is pulled high by the internal pull-up resistor.



INPUT-VOLTAGE Configuration

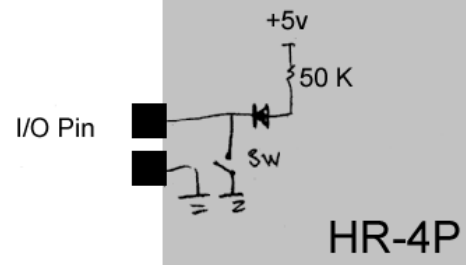
In this mode the HR-4-P applies a 1Kohm pull-down resistor to the pin. So when nothing is connected to the terminal the sense signal is low. The user can then apply a voltage to the pin to make it go high. This voltage can be from 5 to 30 volts.

The pull down resistor can be used to bleed a power supply. For example to sense the presence of 220/110 VAC power on an outlet, you can plug a 5v DC power supply to the outlet and connect the output to the I/O pin defined as Input-Voltage. Then when the power supply is off, the 1K pull down resistor will help drain the output of the power supply to ground.

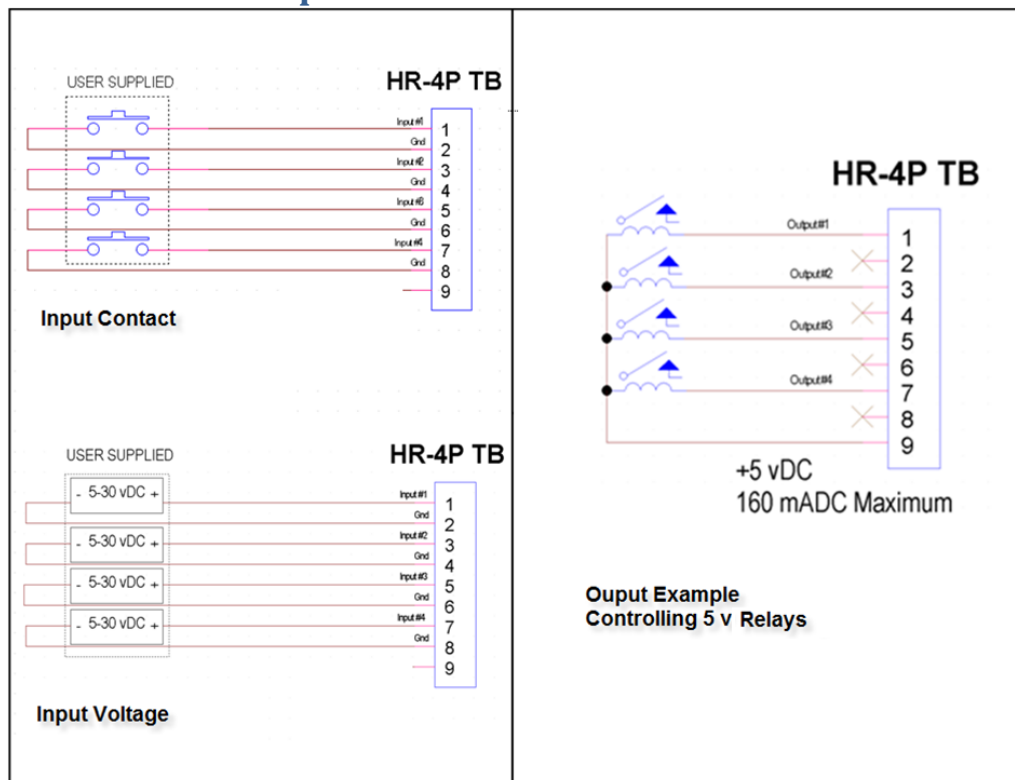


Using I/O Port as an OUTPUT

When the I/O pin is defined as an output, there is an electronic Switch (SW) to ground. This Switch can be controlled by defining an action. For example you can define an action that closes the Switch (pulls the pin low), or pulses it, etc.



Connection Examples



Example of generating repeat action while a button is pressed

In this example we want to use two buttons to control volume (up and down) of an audio amplifier with serial commands. We would also like to be able to hold the button and have the HR-4P issue the Volume command repeatedly as long as the button is pressed.

Here is the wiring diagram required (resistors and capacitors are needed).

Let's assume that we are going to use I/O port 2 to raise the Volume. We will define this pin as an Input-Voltage (so normally it is pulled low by the HR-4P). Then using an external push button switch we can pull this pin to +5v when the button is pressed.

We will then define the action for a rising edge detection to send the required command *followed by* a delay and then *followed by* a low pulse on output #1. Now when the action is done the output pin is opened and if the button is still being pressed the voltage on input will rise again. This will cause the system to detect another low to high transition, triggering the same action again!

The capacitors are 100 uf (with + terminal on the IO pin and - terminal on ground). The capacitors are needed to create a delay at the end of defined action so the HR-4P can sense another low to high transition and trigger another action.

