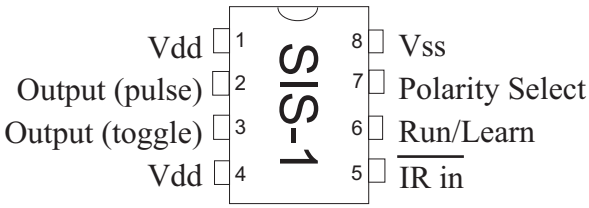
Universal IR Remote Control Receiver Switch (SIS-1)

General Description:

The SIS-1 makes it simple to implement an IR remote controllable switching solution for a wide variety of applications. When used with an inexpensive IR receiver module, The SIS-1 receives and recognizes a specific, user-selected button press from an infrared (IR) remote control and sends a switching signal to the application of choice.

Works with over 99% of IR remotes, both universal and dedicated types.
IR code is easily "taught" by user with a simple button press on the IR remote.
IR code is stored in non-volatile, re-programmable memory.



Vdd (with respect to Vss): 2-5.5V
Max current on I/O pins: 25 ma
Pulse width out from pin 2: 100ms
Current consumption (Vdd=5V): < 2mA

IR in from IR module: No signal = Vdd, Pulses = Vss
IR code is stored in non-volatile, re-programmable memory.
Package: 300mil wide Plastic DIP

Programming an IR code

1. Select a button on your IR remote control.
2. Momentarily pull pin 6 low, until pin 3 goes high, indicating that learning mode is active.
3. Aim the IR remote at the IR receiver and press your button of choice on the remote control.

Using the SIS-1 Once an IR Code is Programmed

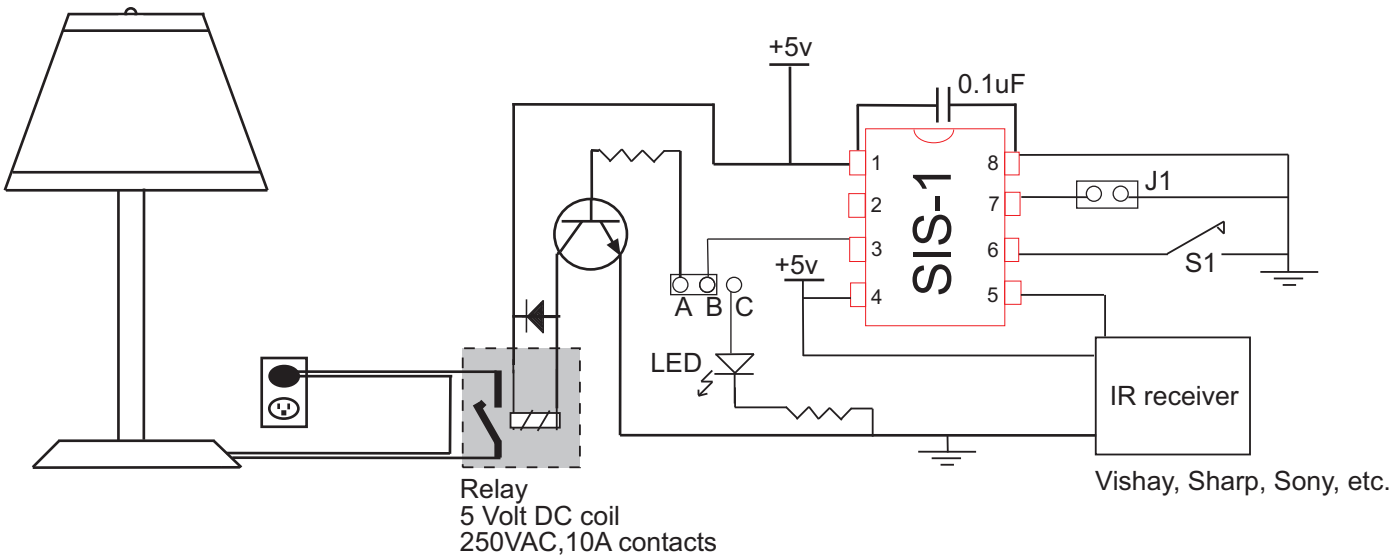
The output of pin 3 will toggle each time the button on the IR remote control is pressed. This is useful for switching and on/off circuits.

The output of pin 2 is normally high impedance, and will deliver a 100ms pulse when an IR code is recognized. This is useful for interfacing a microcontroller or other external controls.

The initial logic levels of output pins 2 and 3 at power-up are set with pin 7.

For more details, see "Considerations Using the SIS-1" following the application example.

Application Example: Lamp On/Off switch



In the example above, assume that we want to be able to turn the lamp on/off using a button from a universal remote. First, we must find a button on the remote that is not being used for anything else. For the purposes of this example, let's say that there is a VCR mode on the universal remote that is not being used, therefore, we decide to use the VCR mode's "pause" button to control the lamp.

Now we are ready to"teach" the SIS-1 the VCR pause button:

1. Referring to the diagram above, we first place a jumper on pins B&C. This connects the LED, which will give visual confirmation that the button was properly learned.

2. Momentarily press S1 so that the LED glows.

3. Aim the universal IR remote at the IR receiver, and press the VCR pause button. The LED should go off.

4. Test that the button is properly learned by repeatedly pressing the VCR pause button. The LED should toggle each time the button is pressed, if not repeat the steps above.

Once the button has been learned by the SIS-1, move the jumper from pins B&C to pins B&A for normal operation of the lamp.

(Note that the double relay design above was chosen as a convenient all-5v-design. There are several solid-state designs that will give better space\power performance.)

Considerations Using the SIS-1

Delay Between Repeated IR Remote Button Presses

There is a minimum of a half-second delay between consecutive IR code recognition. This is designed to prevent unwanted toggling of the output if the user presses the IR remote button a little too long.

Setting Polarity Select (Pin 7)

When **Polarity Select** is tied low:

Pin 3 output will initially be low, and will change to the opposite polarity each time the IR code is detected.
Pin 2 will be normally open and pulse high for 100ms when an IR code is detected.

When **Polarity Select** is tied high:

Pin 3 output will initially be high, and will change to the opposite polarity each time an IR code is detected.
Pin 2 will be normally open and pulse low for 100ms when an IR code is detected.

Because pin 2 is normally open, it can be connected to an external, shared or multiplexed control line, as long as pin 2 is not allowed to source or sink more than 25ma of current.

Incompatible IR Remotes

The SIS-1 is known to work with over 99% of existing IR remotes. However, it has not been tested with Bang & Olufsen, high-frequency remotes, and is assumed not to work.

IR Receiver Modules

The vast majority of IR receiver modules are use negative logic -- the output from the receiver is high when no IR signal is being detected. The SIS-1 requires a negative logic signal on pin 5. If you choose to use a positive logic IR receiver module, simply use an inverter between the receiver's output and pin 5 of the SIS-1.

Universal vs Original IR Remotes

Some universal remote controls output a longer initial pause signal than the original remote. This means that while **the SIS-1 will always respond to the remote that it was programmed with**, it may not recognize a different model of remote that claims to put out the same IR codes. The simple solution is to always program the SIS-1 with the same model of remote that will be used to trigger the SIS-1 -- regardless of whether the remote is universal or the original.

SIS-1 Triggering from More than 1 Button

Some IR remotes have substantially longer codes than others. This can result in the SIS-1 triggering on more than just the key that it was "taught." Fortunately, there is a solution. To illustrate, consider the lamp on/off example on the previous page. Let's say that you program the SIS-1 to trigger on the "VCR pause" button of your remote. Then, later you discover that the SIS-1 not only triggers on "VCR pause", but also with the "VCR play" button.

To solve this, the SIS-1 can be put into Long Recognition Mode (LRM). LRM will allow the SIS-1 to recognize the whole IR code, and thus ensure unique triggering. To enter LRM, place the jumper on B&C so that the LED is connected. Then press and hold S1 until the LED blinks several times. LRM is now set. Lastly, replace the jumper back onto A&B for normal operation. Now only the button that you programmed originally will be recognized, here the "VCR pause" button.

Note: Holding pin 6 low for more than a couple of seconds will toggle the SIS-1 from short recognition mode (SRM) to long recognition mode (LRM), and back. The LED will blink several times when entering LRM, and will blink once when entering SRM.

(You may be wondering why we didn't just design the SIS-1 to automatically filter out all buttons but the one programmed by the user. The answer is that some IR codes are long enough that a considerable delay is noticed between pushing the button on the IR remote and the code being recognized. This can be unsatisfactory in some applications. Fortunately, the first parts of most IR codes are unique enough that one button press it discernable from any other. The default mode of the SIS-1 (short recognition mode - SRM) is such that only the first part of the IR code is recognized. SRM gives the fastest IR code recognition and trigger time, and is ideal for most applications. However, for those infrequent situations as described above where only recognizing the first part of the IR code is not enough, the SIS-1 is capable of being configured to recognize the whole code (long recognition mode - LRM). The triggering response time may be longer, but unique triggering is insured.)

Programming the SIS-1 for Remotes that Use Toggle Codes

Some IR remotes alternate between two different codes each time a given button on the remote is pressed. If you program the SIS-1 using the instructions on page 1 with toggle type remote, the SIS-1 will only recognize every other button press. To remedy this, it is necessary to have the SIS-1 learn both toggle codes.

To programming the SIS-1 for toggle type remotes:

1. Connect pin 4 to ground, Vss.

2. Momentarily pull pin 6 low until pin 3 goes high, indicating that learning mode is active.

3. Aim the remote at the IR receiver and press the button that you want the SIS-1 to learn. When pin 3 goes low, release button 1.

4. Pin 3 will go back high after about 2 seconds. Repeat step 3 three more times.

(Note: You should have pressed the remote button a total of 4 times in the above steps.)

After the above steps are completed, pin three will pulse several times, then remain high. This indicates that the SIS-1 has learned the both IR codes for the button.

The SIS-1is now ready for normal use.

If you have a problem or questions regarding the SIS-2, contact us: SUPPORT@SIMEREC.com