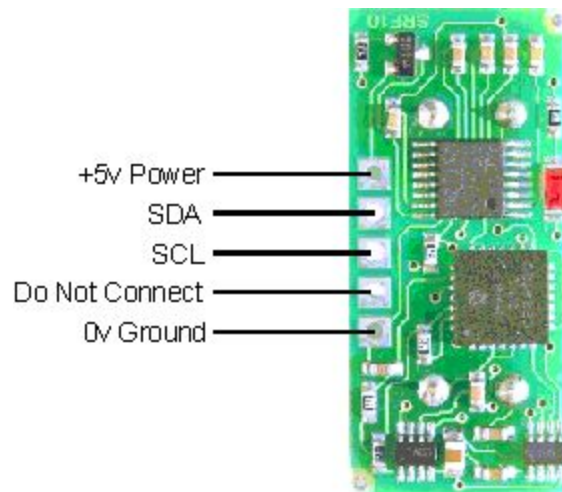


# SRF10 Sensor Manual

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Adapted from <http://www.robot-electronics.co.uk/htm/srf10tech.htm>



*Pinout of SRF10 Sensor*

## Communicating With The Sensor

The address set to the sensor must be bitshifted to the right by 1 when sending commands. Any transmission must first write the register that is to be written to or read from.

Location	Read	Write
0	Software Revision	Command Register
1	Unused (reads 0x80)	Max Gain Register (default 16)
2	Range High Byte	Range Register (default 255)
3	Range Low Byte	N/A

*Registers on the sensor*

Subsequently, the relevant command may be sent if writing to the register, or if reading, the transmission is ended and the sensor will return the value on the register. This is implemented in the SRF10 library.

## Initiating Ranging

Before the sensor data may be read, a ranging must be initiated. During this time, the sensor will not respond to any command.

To initiate a ranging, first, the command register is selected followed by the relevant command depending on the units wanted. By default, the ranging takes 65ms, but this may be modified.

Command		Action
Decimal	Hex	
80	0x50	Ranging Mode - Result in inches
81	0x51	Ranging Mode - Result in centimeters
82	0x52	Ranging Mode - Result in micro-seconds

### *Commands for the various units*

## Reading From Sensor

To read the data after a ranging, select register 2 and then request 2 bytes. Combine the high byte and the low byte to get a result.

## Setting Range

The range can be altered from the default of 11m to something more reasonable. It is worth noting that the actual maximum range of the sensor is 6m. This is done to reduce the ranging time from 65ms to allow for faster ranging. Altering gain may also be required.

Range is not persistent so it must be set on every start. The range is ((Range Register Value x 43mm) + 43mm). To set the range, write the appropriate value to the range register (0x02).

## Setting Gain

During a ranging, the gain will always start off at the minimum value of 40 and gradually increased to the maximum gain value. Maximum gain value is reached after around 100mm of range. It is not clear why this increasing is done.

The purpose of providing a limit to the maximum gain is to fire the sonar more frequently. A potential hazard with initiating ranging too often is that the second ranging may pick up a distant echo returning from the previous "ping". To reduce this possibility, the maximum gain can be reduced to limit the modules sensitivity to the weaker distant echo.

Gain is not persistent and is maximum (700) by default so it must be set on every start. To set the gain, select the gain register (0x01) and write the relevant gain value to it.

Gain Register		Maximum Analogue Gain
Decimal	Hex	
0	0x00	40
1	0x01	40
2	0x02	50
3	0x03	60
4	0x04	70
5	0x05	80
6	0x06	100
7	0x07	120

8	0x08	140
9	0x09	200
10	0x0A	250
11	0x0B	300
12	0x0C	350
13	0x0D	400
14	0x0E	500
15	0x0F	600
16	0x10	700

*Gain values table*

The appropriate gain must be determined through trial and error, it depends on the material of the surface being detected and a variety of other factors.

### Setting I2C Address

To change the I2C address of the SRF10 there must be only 1 SRF10 on the bus. Write the 3 commands 0xA0, 0xAA, 0xA5 in the correct order followed by the desired address. The sequence must be sent to the command register at location 0, which means 4 separate write transactions on the I2C bus. Note that the only allowable addresses are in the table below.

If the address is lost, power it up without sending any commands. The SRF10 will flash its address out on the LED. One long flash followed by a number of shorter flashes indicating its address.

Address		Long Flash	Short flashes
Decimal	Hex		
224	E0	1	0
226	E2	1	1
228	E4	1	2
230	E6	1	3
232	E8	1	4
234	EA	1	5
236	EC	1	6
238	EE	1	7
240	F0	1	8
242	F2	1	9
244	F4	1	10
246	F6	1	11
248	F8	1	12
250	FA	1	13

252	FC	1	14
254	FE	1	15

*Addresses corresponding to the flashes*