SCI Overview

Versions of iRobot® Roomba® Vacuuming Robot manufactured after October, 2005 contain an electronic and software interface that allows you to control or modify Roomba's behavior and remotely monitor its sensors. This interface is called the iRobot Roomba Serial Command Interface or Roomba SCI.

Roomba SCI is a serial protocol that allows users to control a Roomba through its external serial port (Mini-DIN connector). The SCI includes commands to control all of Roomba's actuators (motors, LEDs, and speaker) and also to request sensor data from all of Roomba's sensors. Using the SCI, users can add functionality to the normal Roomba behavior or they can create completely new operating instructions for Roomba.

Physical Connections

To use the SCI, a processor capable of generating serial commands such as a PC or a microcontroller must be connected to the external Mini-DIN connector on Roomba. The Mini-DIN connector provides two way serial communication at TTL Levels as well as a Device Detect input line that can be used to wake Roomba from sleep. The connector also provides an unregulated direct connection to Roomba's battery which users can use to power their SCI applications. The connector is located in the rear right side of Roomba beneath a snap-away plastic guard.

ROOMBA'S EXTERNAL SERIAL PORT MINI-DIN CONNECTOR PINOUT

This diagram shows the pin-out of the top view of the female connector in Roomba. Note that pins 5, 6, and 7 are towards the outside circumference of Roomba.
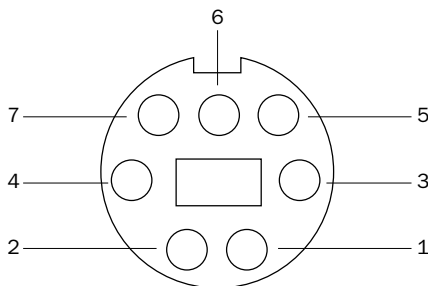
Pin	Name	Description
1	Vpwr	Roomba battery + (unregulated)
2	Vpwr	Roomba battery + (unregulated)
3	RXD	0 – 5V Serial input to Roomba
4	TXD	0 – 5V Serial output from Roomba
5	DD	Device Detect input (active low) – used to wake up Roomba from sleep
6	GND	Roomba battery ground
7	GND	Roomba battery ground

The RXD, TXD, and Device Detect pins use 0 – 5V logic, so a level shifter such as a MAX232 chip will be needed to communicate with a Roomba from a PC, which uses rs232 levels.

Serial Port Settings

57600 or 19200 (see below)
8
None
1
None

By default, Roomba communicates at 57600 baud. If you are using a microcontroller that does not support 57600 baud, there are two ways to force Roomba to switch to 19200:

METHOD 1:

When manually powering on Roomba, hold down the power button. After 5 seconds, Roomba will start beeping. After 10 seconds, Roomba will play a tune of descending pitches. Roomba will now communicate at 19200 baud until the battery is removed and reinserted (or the battery voltage falls below the minimum required for processor operation) or the baud rate is explicitly changed via the SCI.

METHOD 2:

You can use the Device Detect to change Roomba's baud rate. After you have awakened Roomba (using Device Detect or by some other method) wait 2 seconds and then pulse the Device Detect low three times. Each pulse should last between 50 and 500 milliseconds. Roomba will now communicate at 19200 baud until the battery is removed and reinserted (or the battery voltage falls below the minimum required for processor operation) or the baud rate is explicitly changed via the SCI.

Here is a Python code fragment that illustrates this method (Device Detect is connected to the PC's RTS line via a level shifter):