

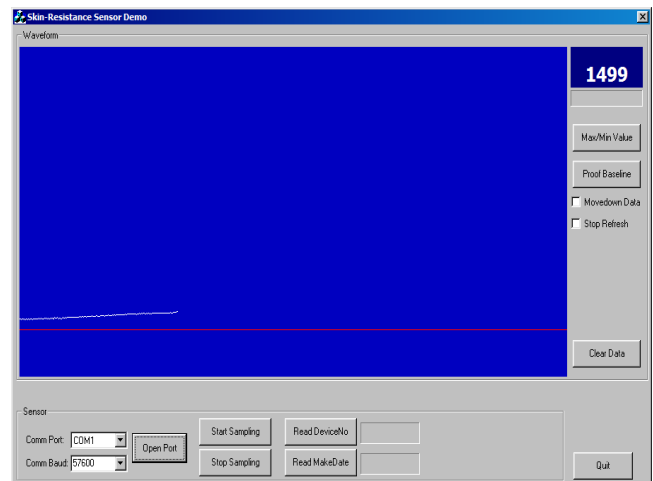
Rui Skin Resistance Sensor (RSRS-11C)

User Manual

Abstract

Rui Skin Resistance Sensor (RSRS-11C) is a light, precise sensor for Skin Resistance, or Skin Conductivity, which varies depending on the amount of sweat-induced moisture on the skin. Skin conductance is used as an indication of psychological or physiological [arousal](#). Therefore RSRS-11C can be used as an indicator during Neurofeedback sessions, so that it helps therapists to find out the optimized training methods, training frequency and training positions. The manual includes the followings:

- Function and parameter of RSRS-11C
- Installation guideline of RSRS-11C
- How to use RSRS-11C during Neurofeedback sessions
- Trouble shooting





1. Function of RSRS-11C

RSRS-11C skin resistance sensor measures people body skin resistance change signal with external current incentives. The sensor uses a precision operational amplifier, and outputs the high precision physical skin resistance change. It is small and convenient. It can be widely used in various skin resistance analysis systems.

1.1 Technical Parameters

Physical connection: USB

Power: USB powered

Value Range: 100KiloOhm -2.5 MegaOhm (!!! Attention, the unit here is not microsimense)

Accuracy: 2.5K

Error: +/- 2%

Sampling frequency: 50Hz

Communication Baud Rate: 57600

Interface: full-duplex serial communication interface, a start bit, 8 data bits, 1 stop bit, no parity

2. Software Installation Guideline

Rui_SRS_11C_Package.zip includes all drivers and the display program, unzip it to your hard disk, suppose to the directory "Rui_SRS_11C_Package". In the document, we will refer paths from the directory "Rui_SRS_11C_Package".

2.1 For Windows XP, Windows 2003, Windows Server, Windows Vista and Windows 7 (32bits or 64 bits)

- Step 0: Plug RSRS_11C into a USB slot of your PC.
- Step 1 : Run the Setup program with the administrator right:
Rui_SRS_11C_Package/CP210x_VCP_Win_Xp_S2K3_Vista_7_Setup.exe.
Follow the instructions of the setup, the drivers of RSRS_11C will be installed.
- Step 2: Start Device Manager, a new device "Silicon Labs CP210x USB to UART Bridge (COMx) " under Ports (COM&LPT) will be found. This is RSRS_11C. See diagram 1. Click the device, the properties of the device will show up, in the tab "port Settings", set the baud rate to 57600. See Diagram 2. Click the "Advanced" button, check the port number. If the port number is not between COM 1 to COM16, change it to an unused port between 1 and 16 (because the RSRS-11C display program accepts only port number from 1 to 16). See diagram 3.

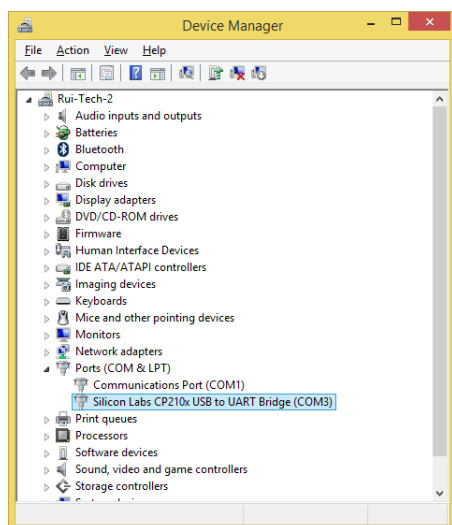


Diagram 1: RSRS-11C in the Device Manager

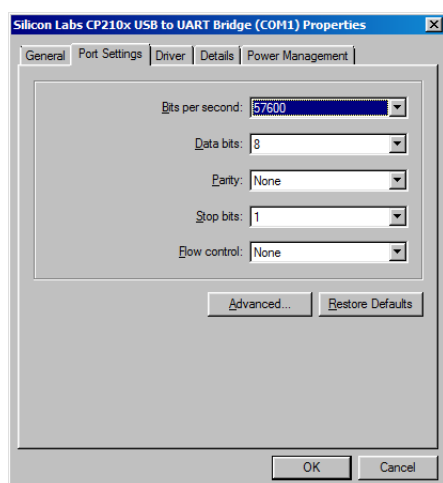


Diagram 2: Set baud rate of RSRS-11C

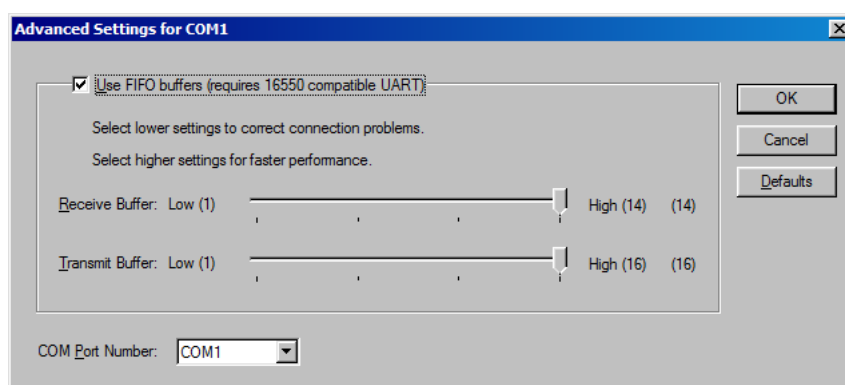


Diagram 3: change port number to a number between COM1 and COM16.

- Step 3: Run the display program
Rui_SRS_11C_Package\En_Demo\SRDemoEn.exe, Select the Baud Rate and port number set by the setp 2. Click “open port” button, then click

“start sample”. Because no contact to fingers, the value “1” (means upper limit) shows up.

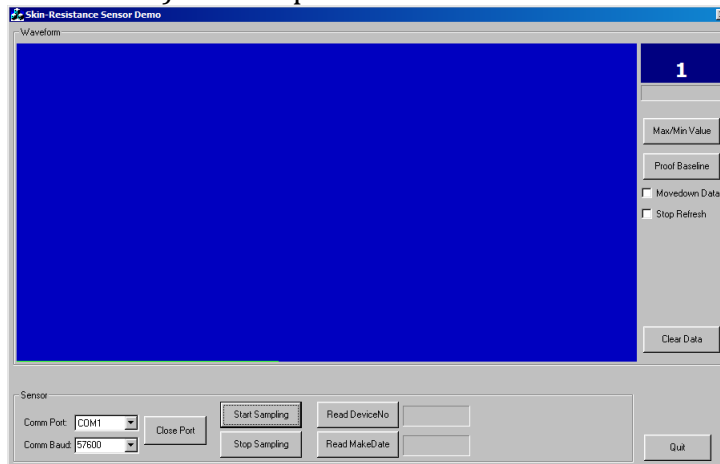


Diagram 4: start to measure skin resistance

4. Clean the index finger und middle finger, put the clips on the two fingers, the Skin resistance shows up in the window.



Diagram 5: Clip index and middle finger to measure

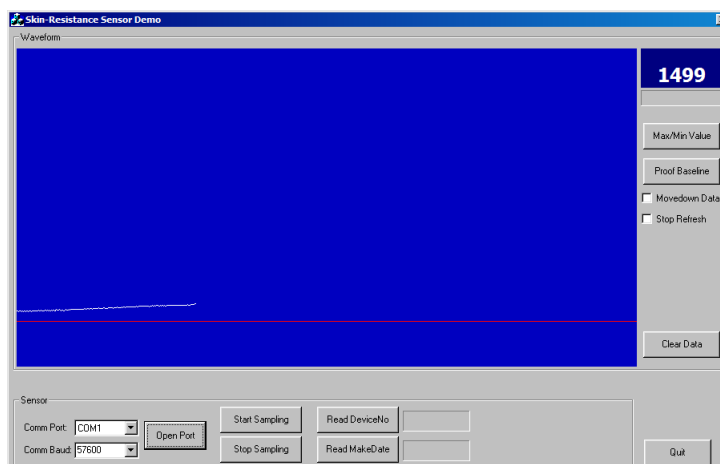


Diagram 6: Measure Skin Resistance (with Baseline)

2.2 For Windows 8

- Step 0: Plug RSRS_11C into a USB slot of your PC.
- Step 1: install USB Drivers
 - For 32-bits Windows 8, run
Rui_SRS_11C_Package/USB_Drivers/Driver_8/CP210VCPInstaller_x86.exe.
 - For 64-bits Windows 8, run
Rui_SRS_11C_Package/USB_Drivers/Driver_8/CP210VCPInstaller_x64.exe.

Just follow the instructions of the setup program, the driver will be installed.

- Step 2 – 4: Set baud rate, port number and start display program, same as chapter 2.1.

3. Use RSRS-11C During Neurofeedback Sessions

3.1 Arousal level and Skin Resistance

Skin conductance, also known as galvanic skin response (GSR), electrodermal response (EDR), psycho galvanic reflex (PGR), skin conductance response (SCR), or skin conductance level (SCL), is a method of measuring the electrical conductance of the skin, which varies depending on the amount of sweat-induced moisture on the skin. Sweat is controlled by the sympathetic nervous system, so skin conductance is used as an indication of psychological or physiological arousal. If the sympathetic branch of the autonomic nervous system is highly aroused, then sweat gland activity also increases, which in turn increases skin conductance. In this way, skin conductance can be used as a measure of emotional and sympathetic responses. It is used as an indicator of arousal level for the Neurofeedback sessions.

Skin conductance (GSR or EDR) widely uses microsiemens as unit, Skin Resistance measured by SRS-11C has the following relationship with skin conductance:

Skin Resistance = $1 / \text{Skin Conductance}$

Skin Resistance has unit kilo Ohm.

Skin Conductance has the unit micro Siemens.

Arousal level	Skin Conductance	Skin Resistance
Normal arousal level	1 -10 Micro Siemens	1000 - 100 Kilo Ohm
High arousal level	10 -25 Micro Siemens	100 – 40 Kilo Ohm
Very high arousal level	25-100 Micro Siemens	40 - 10 Kilo Ohm



3.2 When & How should skin resistance be measured

We recommend the following:

- Use RSRS-11C for the clients who could not describe their feelings during sessions, or for the clients who do not like to be interrupted during sessions.
- Use RSRS-11C when Neurofeedback training method, training frequency, training position or the feedback are changed. By watching the skin resistance, therapists know whether or not the training does as they expected. For example, Alpha training should bring a client into relax status, the skin resistance of the client should go up --- the value shown in RSRS-11C display program should go up. The low beta training on prefrontal or frontal should make the skin resistance slight down.
- When Neurofeedback training method, training frequency, training position or feedback are changed, click “proof baseline” button in the display program. Then a baseline will be drawn, therapists can easily see the change trendy of skin resistance against the baseline. See diagram 5.

4. Trouble Shooting

4.1 The display program SRDemoEn.exe does not run

SRDemoEn.exe needs mscom32.ocx. Please follow the steps to register the ocx.

- Step 1: start command prompt with admin
- Step 2: In the command prompt, change the directory to Rui_SRS_11C_Package\En_Demo
- Step 3: Run setup.bat (This batch file registers mscom32.ocx).

Then start SRDemoEn.exe again.

4.2 The display program shows value “1”

“1” means too big resistance to handle. The normal reason is that no good contact to the sensor, too dry skin. This can be easily solved by wiping fingers and contact sheet with wet tissue.