

# SCPI Communication Set Up Guide

Product: Power Sources

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## 1 Introduction

The objective of this document is to guide the User in interfacing the Power Source – from here on indicated as “the product” or “the device” – by presenting the available communication interfaces, how to change their settings, and the procedures to communicate.

## 2 Communication Interfaces

The product can communicate using the SCPI protocol over two different communication interfaces: RS-232 and Ethernet. To use an interface, simply plug in the corresponding cable. Only one interface at a time can be used.

### 2.1 RS-232

The RS-232 port is configured with the following parameters:

Parameter	Value
Baud Rate	9600
Number of start bits	1
Number of data bits	8
Number of stop bits	1
Parity	None

RS-232 settings cannot be changed.

To use this interface, make sure that the UART interface of the device communicating with the product is configured accordingly to the product (all parameters should correspond to those reported in the table above).

### 2.2 Ethernet

When using the Ethernet Interface, SCPI Commands are transported by the TCP/IP Protocol suite. The default TCP/IP parameters are the following:

Parameter	Value
Transport Protocol	TCP
TCP Server IP Address	192.168.0.7
TCP Server Port	5555
Network Address	192.168.0.0
Network Mask	255.255.255.0 (a.k.a. /24)
Network Gateway	192.168.0.1

The TCP Server IP Address can be changed (it can be set to any Static IP Address or to DHCP).  
The TCP Server Port can be changed.

To use this interface, make sure that the Ethernet interface of the device communicating with the product is configured accordingly to the product:

- Same Network Address, Network Mask and Network Gateway
- The TCP Server IP Address must not be already assigned to other devices on the network.

### 3 Communication Sequence

#### 3.1 RS-232

When using the RS-232 interface, the User Application sends SCPI Commands and receives replies within a few milliseconds.

#### 3.2 Ethernet

When using the Ethernet interface, SCPI commands and replies are transported in a TCP connection. The TCP/IP communication is managed by the USR-TCP232 module (inside the product), which acts as TCP Server, while the user application shall act as TCP Client. The following scheme represents the communication sequence necessary to exchange data with the product using TCP/IP:

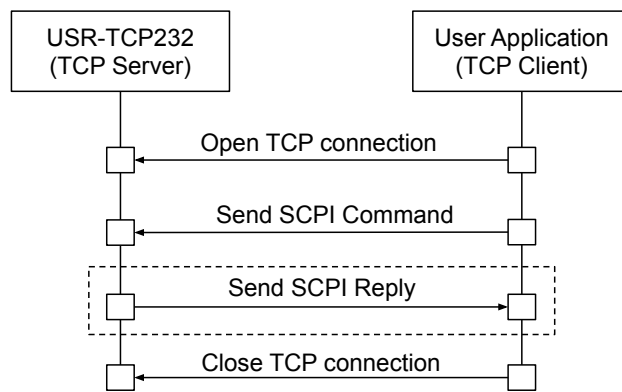


Figure 2: TCP/IP Data exchange

- The TCP Server is always listening for incoming connections on the configured <TCP Server IP Address>:<TCP Server Port>
- The TCP Client opens a connection with the server.
- The TCP Client sends a string of data (SCPI Command) on the connection.
- If the SCPI Command was a “Query”:
  - The TCP Server sends the corresponding SCPI reply over the same connection.
  - The TCP Client receives the reply and closes the connection.
- If the SCPI Command was a “Command”, there is no reply. The TCP Client can close the connection as soon as the command is sent, otherwise it can close the connection when the timeout set on the connection expires.

Alternatively, the User Application can use the same TCP Connection for multiple Command-Reply exchanges.

#### 3.3 Notes

- It is recommended to send commands with a minimum interval of 0.3 seconds, in order to give enough time to the product’s MCU (MicroController Unit) to process them.
- It is recommended to set a timeout of at least 0.5 seconds (both on RS-232 and TCP connections).
- The first “SCPI Reply” using the Ethernet interface – after having used the product with the RS-232 interface – may contain buffered data from the previous RS-232 communications. Please ignore and discard such data.

## 4 TCP/IP Configuration

The USR-TCP232 comes pre-configured by MCB Electronics, so this chapter is a reference for the User that needs to change the TCP/IP Configuration (TCP Server IP Address and TCP Server Port).

### 4.1 Login

The USR-TCP232 has a configuration page similar to a common router administration page. Type in a browser the IP Address of the USR-TCP232, then enter the following credentials and click "Sign In":

Username: admin  
Password: admin

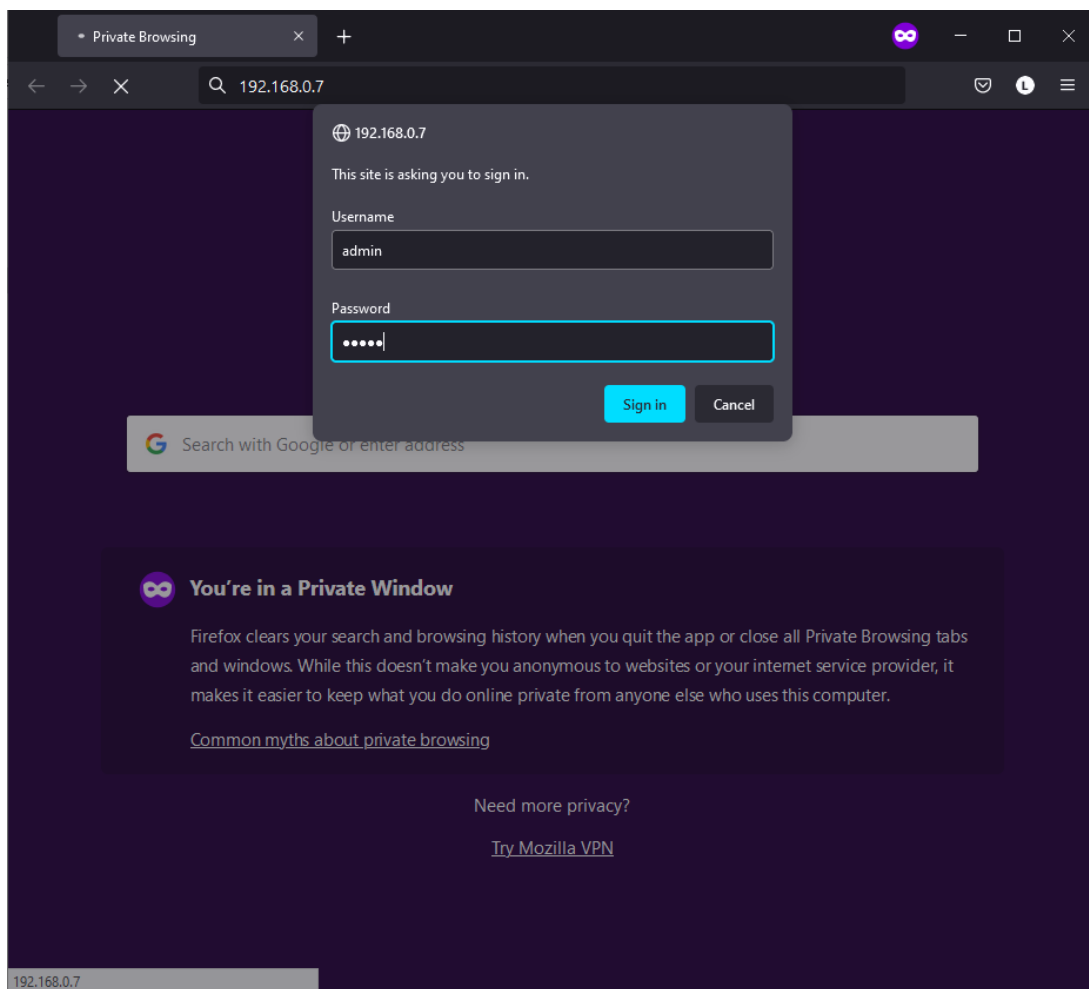


Figure 3: Login page.

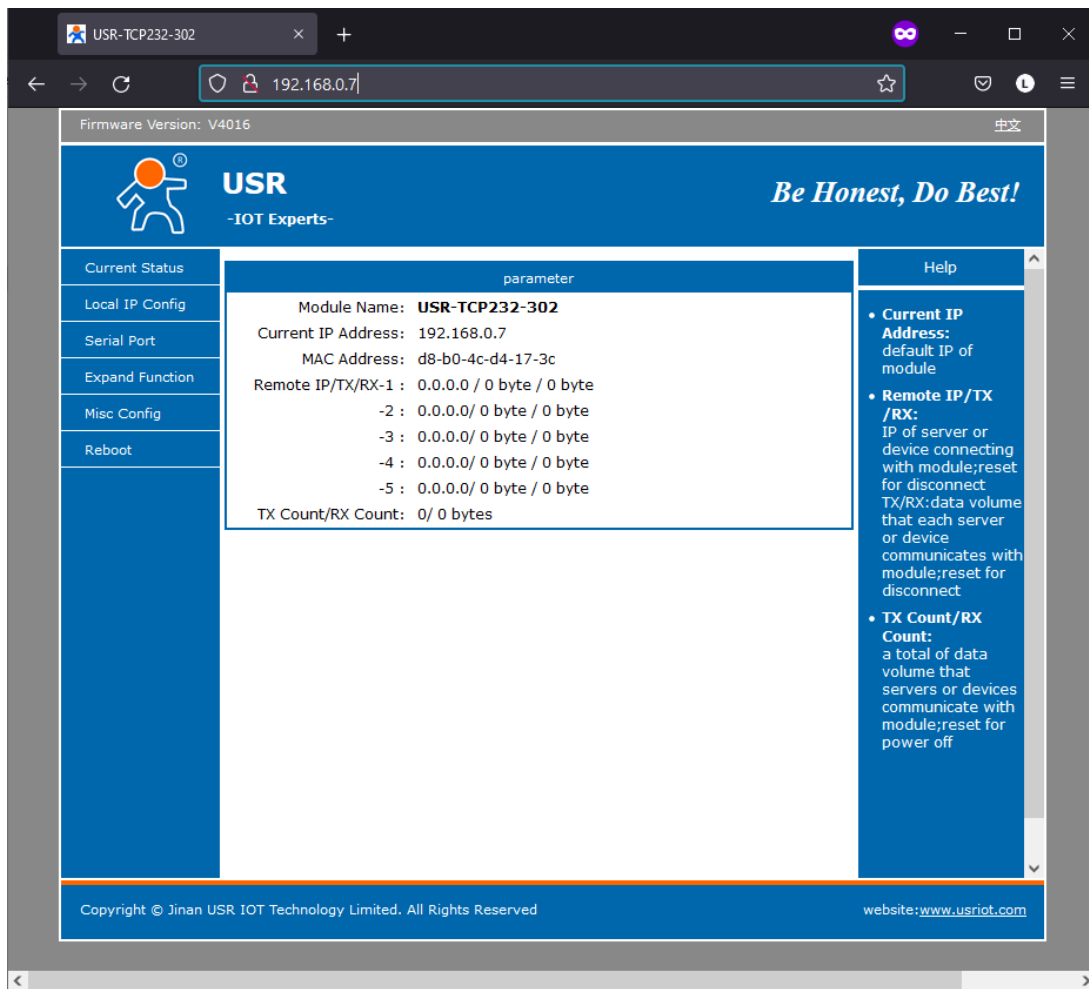


Figure 4: The “Current Status” page opens, which is a recap of the actual configuration and status.

## 4.2 Changing the TCP Server IP Configuration

To change the USR-TCP232 IP Configuration, click on "Local IP Config" (left menu), edit the network configuration, then click on "Save".

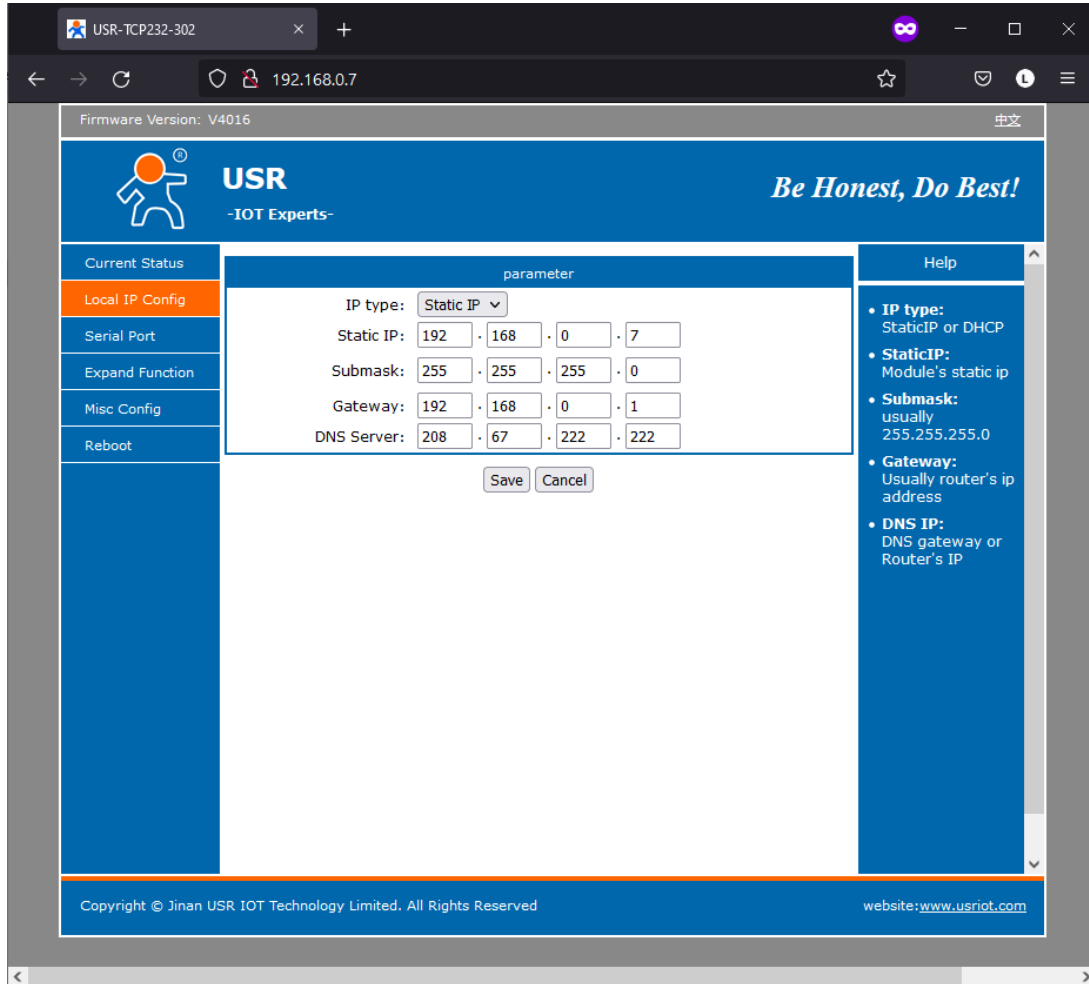


Figure 5: IP Address Configuration. Here "Static IP" is the TCP Server IP Address.



### 4.3 Applying changes

Every time the “Save” button is clicked, the USR-TCP232 asks to restart to apply changes. Click on "OK".

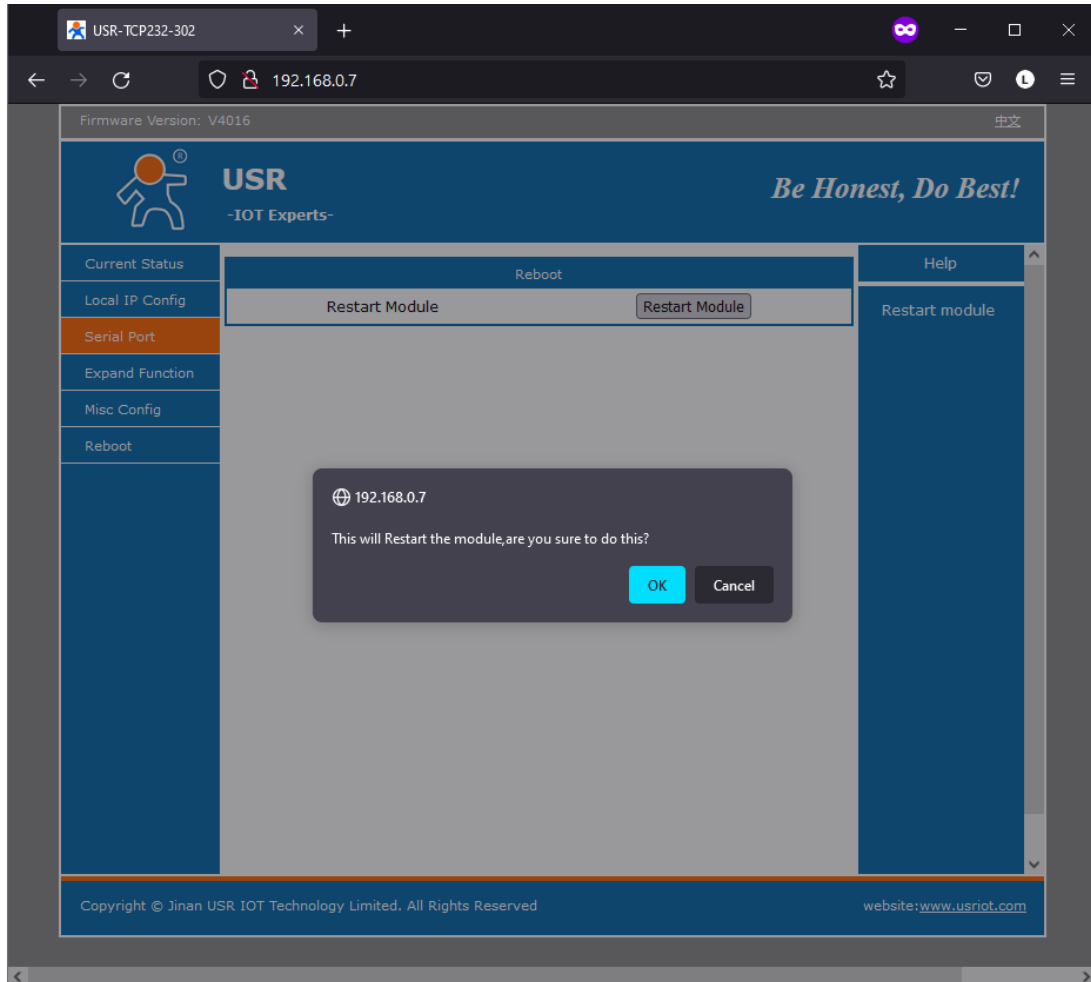


Figure 6: Restart to apply changes.

### 4.4 Changing the TCP Server Port

To change the USR-TCP232 TCP Server port, click on “Serial Port” (left menu), edit **ONLY** the “Local Port Number”, then click “Save”. Do Restart when prompted to do so.

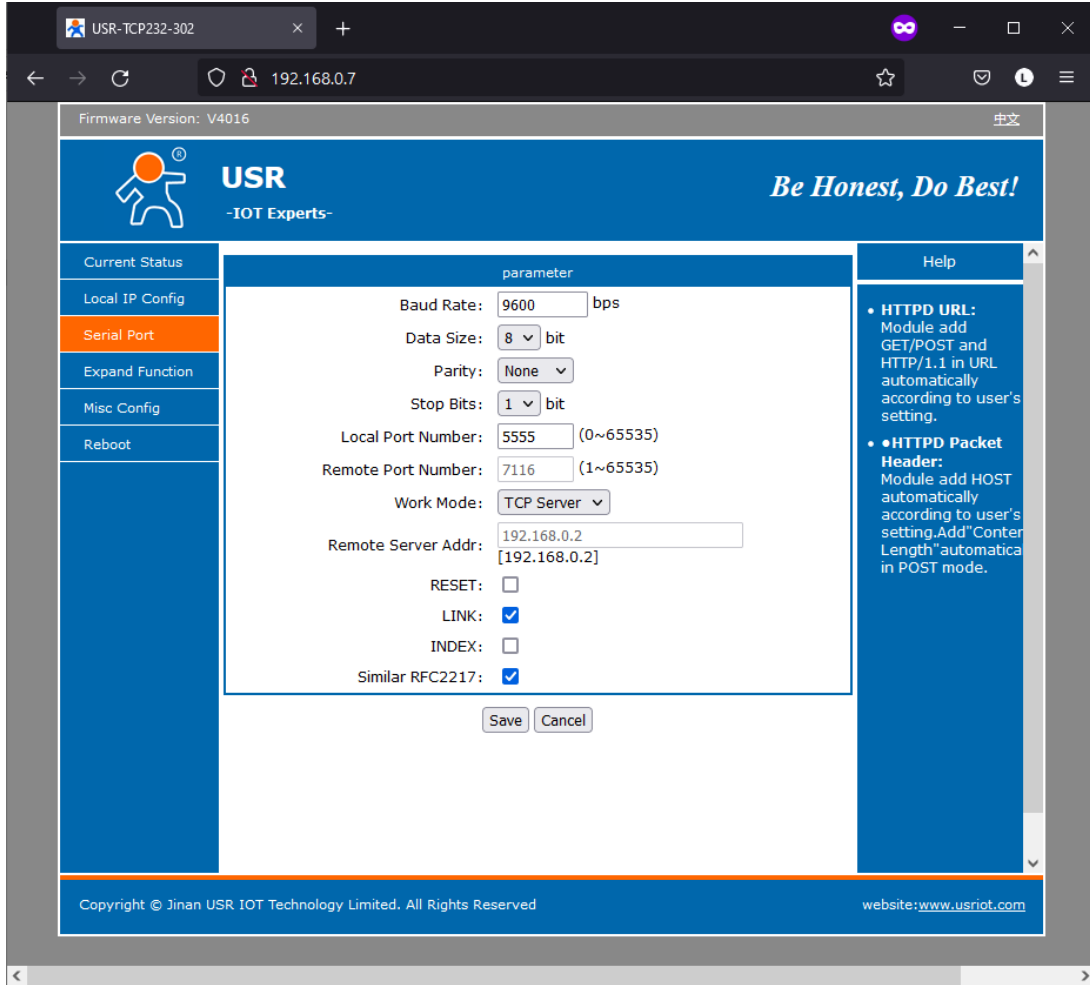


Figure 7: Setup UART and TCP.

All the other parameters should be left as in the image (default values):

- Make sure that “Baud Rate”, “Data Size”, “Parity” and “Stop Bits” are as reported in the image, otherwise the USR-TCP232 won’t be able to communicate with the MCU.
- Make sure that “Work Mode” is set on “TCP Server”, otherwise the USR-TCP232 will not accept incoming TCP connections.



**WARNING**

Other settings should not be changed. MCB Electronics is not responsible for failures due to settings different from what described above.

## 5 MCB Electronics SCPI Client

MCB Electronics developed a Windows Application to allow the User to test SCPI commands, both over TCP/IP and RS-232.

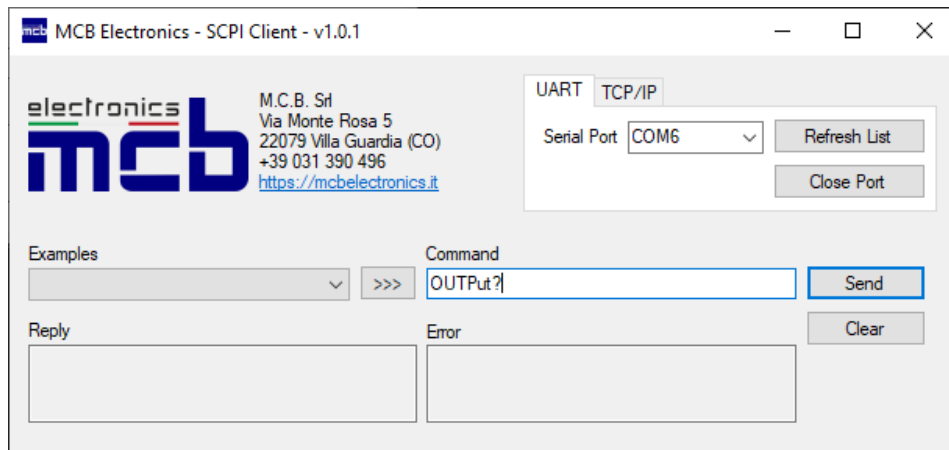


Figure 8: MCB Electronics SCPI Client

The application implements the RS-232 and TCP exchanges as described in the “Communication Sequence” chapter. The usage is intuitive:

1. Select which communication interface to use (TCP/IP or RS-232) (top-right).
2. Edit the settings for the selected communication interface as needed.
3. Write a command in the “Command” text box. Alternatively, select a command from the “Examples”: the selected text will be copied into the “Command” text box.
4. Click on the “Send” button (or press Enter) to send the command written in the “Command” text box.
5. If there is a reply, it will appear in the “Reply” text area. If not (or if there is an error), it will be communicated in the “Error” text box. It is totally fine for commands to generate a “No reply” error, because a reply is not expected after a command.

### Feedback

For any comment, question, suggestion or bug report about our SCPI documentation and implementation, please contact us at [scpi@mcbelectronics.it](mailto:scpi@mcbelectronics.it).