

# Application Note

## SCPI Console Overview for Use with the Radian RX Xytronic Standard

Link to download SCPI Console:

[http://www.radianresearch.com/upgrade/Scpi\\_Console.zip](http://www.radianresearch.com/upgrade/Scpi_Console.zip)

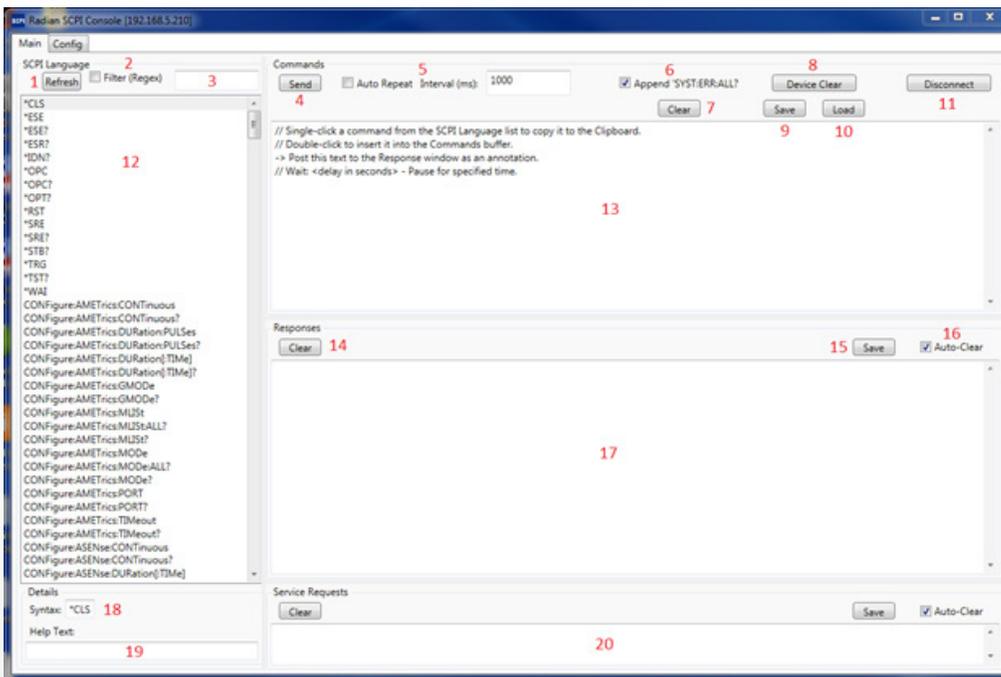
1

Standard Commands for Programmable Instruments, or SCPI, is a defined standard syntax and set of commands used to control and program measurement devices. SCPI is an extension of the IEEE 488.2 and IEEE 488.1 standards. Radian's RX Xytronic Reference Standards have been designed around the use of SCPI and its associated syntax.

The SCPI Console is a Windows application that is useful for learning and experimentation with the SCPI interface on the RX Xytronic Reference Standards. The SCPI Console presents the entire list of SCPI commands supported by the attached reference standard, with corresponding help text. A sequence of commands with parameters can easily be composed and sent to the reference standard. The responses from the reference standard are displayed.

### SCPI Console Overview

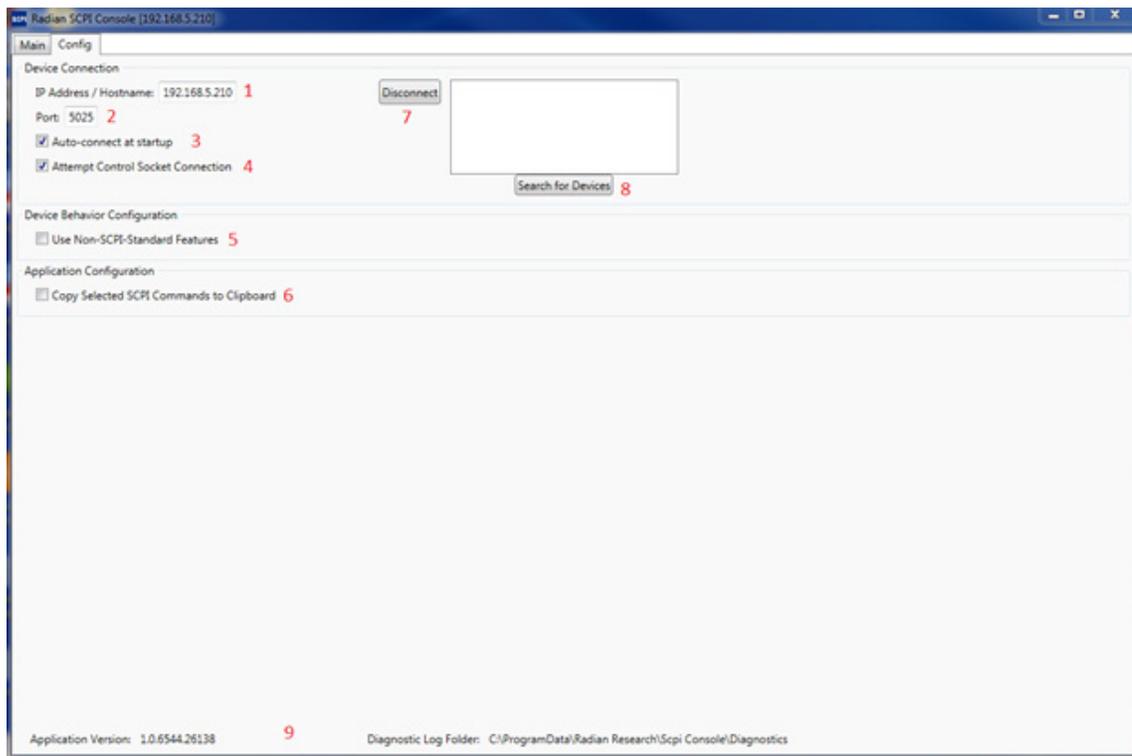
#### Main Tab



1 – Refresh Button – Refreshes the SCPI Language Window (12).

- 2 – *Filter (Regex) Check Box* – When selected, the SCPI Language Window will only show commands that contain the text pattern in the SCPI Language Filter Text Box (3).
- 3 – *SCPI Language Filter Text Box* – Text or characters entered into this field with the Filter (Regex) Check Box (2) selected will only show commands that contain the pattern of characters entered. The pattern is specified as a regular expression.
- 4 – *Send Commands Button* – Sends the commands entered into the Commands window (13) to the connected RX.
- 5 – *Auto Repeat* – When selected, the console will continuously repeat the Send command at the interval designated.
- 6 – *Append 'SYST:ERR:ALL?' Check Box* – When checked, automatically adds the “SYST:ERR:ALL?” query to the end of the Commands window, querying the SCPI Error Queue after all of the commands are sent.
- 7 – *Commands Clear* – Clears the Commands Window (13).
- 8 – *Device Clear* – Performs a Device Clear on the RX. The status of the Device Clear is shown in the Responses Window (17). Device Clear can be used to “break out of” a query that is taking too long (e.g., a measurement FETCh command where the measurement may not ever be triggered).
- 9 – *Save Commands* – Allows the user to save the commands written in the Commands Window (13) to a text file for later use.
- 10 – *Load Commands* – Allows the user to load commands into the SCPI Console from a text file.
- 11 – *Connect/Disconnect Button* – Connect or disconnect from the RX as designated under the Config tab.
- 12 – *SCPI Language Window* – Contains all commands that the RX will recognize. By double clicking on a command, it will be inserted into the Commands Window (13).
- 13 – *Commands Window* – Contains all information that will be sent through the SCPI Console to the RX when the Send Commands Button (4) is pressed.
- 14 – **Clear Responses Button** – Clears the Responses Window (17).
- 15 – *Save Responses Button* – Allows the user to save the contents of the Responses Window (17) to a text file.
- 16 – *Auto-Clear Check Box* – When checked, the Responses and Service Requests windows will clear upon sending a new set of commands to the RX.
- 17 – *Responses Window* – Contains all responses sent from the RX.
- 18 – *Syntax Text Box* – Shows the detailed syntax of the selected command from the SCPI Language Window (12).
- 19 – *Help Text Box* – Shows a description of the selected command in the SCPI Language Window (12). Note that the “Use Non-SCPI-Standard Features” check box under the Config tab must be checked for the help text box to populate.
- 20 – *Service Requests* – Lists any Service Requests (SRQs) sent by the RX. Also used to note Device Clear operations.

## Config Tab



1 – IP Address/Hostname Text Box – The IP Address of the RX that the SCPI Console will attempt to communicate to when requesting to connect.

2 – Port Text Box – The port that the SCPI Console will use to communicate. This must be set to “5025” when communicating to the RX.

3 – Auto-Connect at Startup Check Box – When checked, SCPI Console will automatically attempt to connect to the RX standard specified upon launching SCPI Console.

4 – Attempt Control Socket Connection Check Box – When checked, allows a secondary socket to listen for Service Requests (SRQs) and to implement Device Clear operations. It is recommended to keep this checked when communicating with the RX.

5 – Use Non-SCPI-Standard Features Check Box – When checked, SCPI Console will allow you to perform functions that are associated only with the RX and SCPI Console (i.e. populating the Help Text Box under the Main tab when selecting a command). It is recommended to keep this checked when communicating with the RX.

6 – Copy Selected SCPI Commands to Clipboard Check Box – SCPI Console will automatically copy any selected commands to the Clipboard when this is checked, allowing the user to paste commands after selection.

7 – Connect/Disconnect Button – Connect or disconnect from the RX associated with the IP Address and Port defined.

8 – Search for Devices Button – Uses a UDP broadcast message on the local network to identify and list available RX reference standards.

9 – Additional Information – Shows the Application version and the location of Diagnostic Logs associated with the SCPI Console.

## Syntax Overview

For the RX, making a measurement using SCPI revolves around three main operations which must be performed in a specific order.

- CONFigure – Configures a port/metric/operation in preparation to perform a measurement
- INITiate – Initiates a measurement
- FETCh – Acquire the result of the measurement started by the Initiate command

\*You can also use a “READ” command, which combines the INITiate and FETCh commands into one operation.

The SCPI-99 standard is available from the IVI Foundation. It can be found at the following link:

<http://www.ivifoundation.org/SCPI/Default.aspx>

## Additional SCPI Console Syntax Hints and Tips

- » On the left side of the SCPI console, you will see a list of possible commands for the RX. A command noted with a “\*” symbol represents a IEEE 488.2 Common Command. A command lacking this symbol is a command specific to the RX.
- » Some commands contain a “?” at the end of the command. This indicates that the command will generate a result after being executed, which will display in the Responses section of the main window.
- » The characters “->” are used to output text to the Responses section of the SCPI console. For example, if a user wrote “-> Hello” into the Commands section, the word “Hello” would appear in the Responses section.
- » To comment code written in the Commands section, add two slashes “//” before the written line.
- » To reset the RX reference standard to a state optimized for programmatic control, use the “\*RST” Common Command. To reset the RX reference standard to a state optimized for manual control through a graphical user interface (i.e. Instantaneous Metrics measurement is in Continuous ON mode), use the “SYSTem:PRESet” command.
- » Multiple commands can be run in a single string, but they must be separated by a semicolon “;” to function as intended (see the SCPI standard document for details).
- » As defined by the SCPI standard, the SCPI language accepted by the RX is case-insensitive. Also, as specified in the standard, the RX accepts either SCPI Long Form or Short Form mnemonics – the Short Form is indicated by the capitalized portion of the SCPI mnemonic indicated. For example, “CONFigure:AMETrics:DURation:PULSes?” and “conf:amet:dur:puls?” are the same command.
- » As specified by the SCPI standard, a numeric value of “9.91e37” represents “Not a Number” (NaN).

---

<sup>1</sup> The pattern of upper and lower case (e.g., “CONFigure”) illustrates the SCPI Long and Short Form mnemonics, as described below.

- » The characters “->” are used to output text to the Responses section of the SCPI console. For example, if a user wrote “-> Hello” into the Commands section, the word “Hello” would appear in the Responses section.
- » o comment code written in the Commands section, add two slashes “//” before the written line.
- » To reset the RX reference standard to a state optimized for programmatic control, use the “\*RST” Common Command. To reset the RX reference standard to a state optimized for manual control through a graphical user interface (i.e. Instantaneous Metrics measurement is in Continuous ON mode), use the “SYSTem:PRESet” command.
- » Multiple commands can be run in a single string, but they must be separated by a semicolon “;” to function as intended (see the SCPI standard document for details).
- » As defined by the SCPI standard, the SCPI language accepted by the RX is case-insensitive. Also, as specified in the standard, the RX accepts either SCPI Long Form or Short Form mnemonics – the Short Form is indicated by the capitalized portion of the SCPI mnemonic indicated. For example, “CONFigure:AMETrics:DURation:PULSes?” and “conf:amet:dur:puls?” are the same command.
- » As specified by the SCPI standard, a numeric value of “9.91e37” represents “Not a Number” (NaN).

## Limited resources or need a solution quickly?

If you need additional information about your project just contact us, we are here to help. We can support you at any level from telephone support, or on-site solutions for a reasonable price. Contact us at [radian@radianresearch.com](mailto:radian@radianresearch.com) or call 765-449-5500. Be assured that we want to be your partner in success!