

Using the Remote Control Assistant

How your oscilloscope can help debug your source code

If you have wondered why your oscilloscope occasionally beeps and displays the message “Remote Control: problem detected and logged. (RCI),” then this Operating note should be of assistance to you.

The LeCroy 93XX, LCXXX, and Waverunner (LT) series of oscilloscopes and the LSA1000 embedded signal analyzers are outfitted with a feature called **Remote Control Assistant**. (Firmware levels 7.6.0 and above.) When enabled, the “RCA” will maintain a log of GPIB or RS232 remote commands received and responses issued, allowing the programmer to receive feedback on errors in his or her source code.

The RCA has several modes of operation: **Off**, **Errors only**, **Full Dialog**, and **RS232**. In Errors Only mode, the RCA will keep a log of any mistakes in the commands received, and display the error shown in Figure 1 when an error has been detected. In Full Dialog mode, all commands and responses are logged. In RS232 mode, all dialog is echoed to the RS232 port. (This mode is only active when using GPIB for remote operation. RS232 mode is not available for the LSA1000 series.) The default mode is Errors Only.

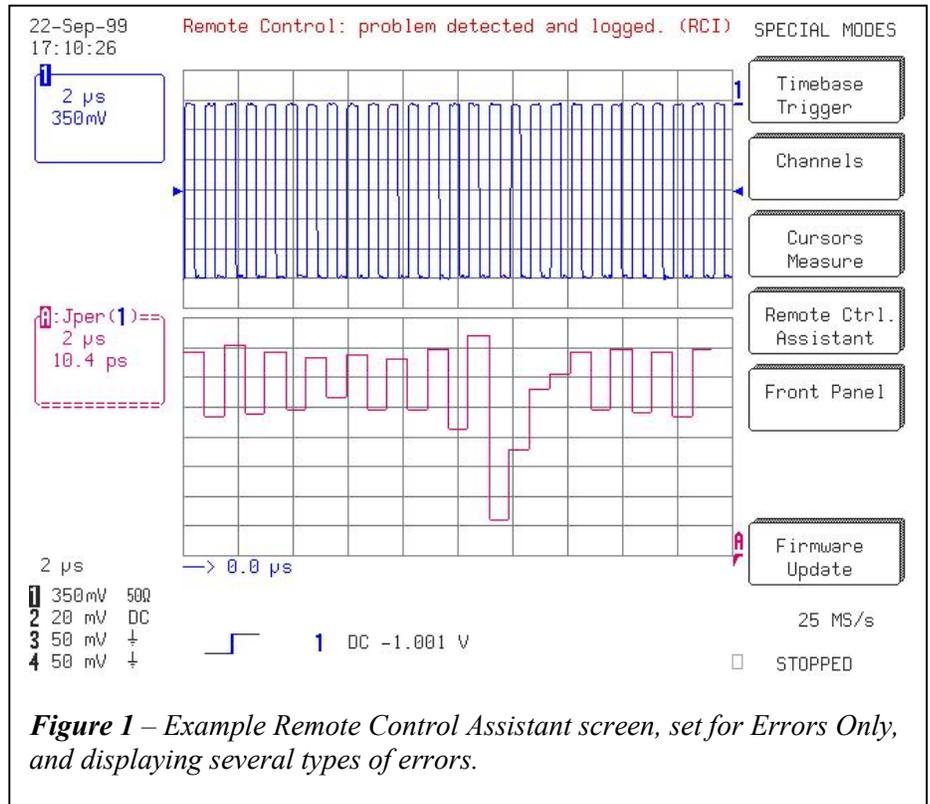


Figure 1 – Example Remote Control Assistant screen, set for Errors Only, and displaying several types of errors.

The RCA can be setup, monitored and cleared via the oscilloscope front panel or through remote control. From the front panel, press the **Utilities** button, followed by **Special Modes** and then **Remote Ctrl. Assistant** to view the Remote Control Assistant screen and menu. From this point, the logging mode can be selected, and any errors (or the entire dialog) can be viewed and cleared via a knob and button on the oscilloscope front panel. To operate the RCA by remote control, use the commands **COMM_HELP** (or its short

form: **CHLP**) and **COMM_HELP_LOG (CHL)**.

CHLP is used to setup the logging mode, and accepts an argument that determines the level: **OFF**, **EO**, **FD**, and **RS** for **Off**, **Errors Only**, **Full Dialog**, and **RS232** respectively. The remote query **CHL?** returns the contents of the log, in comma-delimited format. Use the command **CHL? CLR** to both read and clear the RCA.

The log in Figure 2 shows examples of several types of errors. For example, the line “at token <C1:VDV>: unknown



command” indicates that VDV is not recognized (in this case, VDIV is the correct command). Some of the errors in figure 2 are obvious (such as “700MVV”, which should be “700MV”), but there are many potential errors that can be harder to find. For example, the correct syntax for “MAXPT 10000” should be “MAXPTS, 10000”.

While the Remote Control Assistant is best used during the development stage of a program, users may want to utilize additional commands and registers that report remote control errors once the application is running smoothly. In this way, remote control errors caused by communications problems (faulty or noisy cables, etc.) can be detected and trapped in error-handling subroutines.

The CMR? and EXR? queries report error conditions, such that a value greater than 0 indicates that either a command or execution error has occurred. See the Remote Control manual for information on interpreting the results of these queries. SRQ users can also setup the oscilloscope such that a remote control error generates a valid SRQ condition, and notifies the GPIB controller.

Many users are surprised at the number of coding errors detected by the RCA after upgrading from previous versions of firmware that did not include

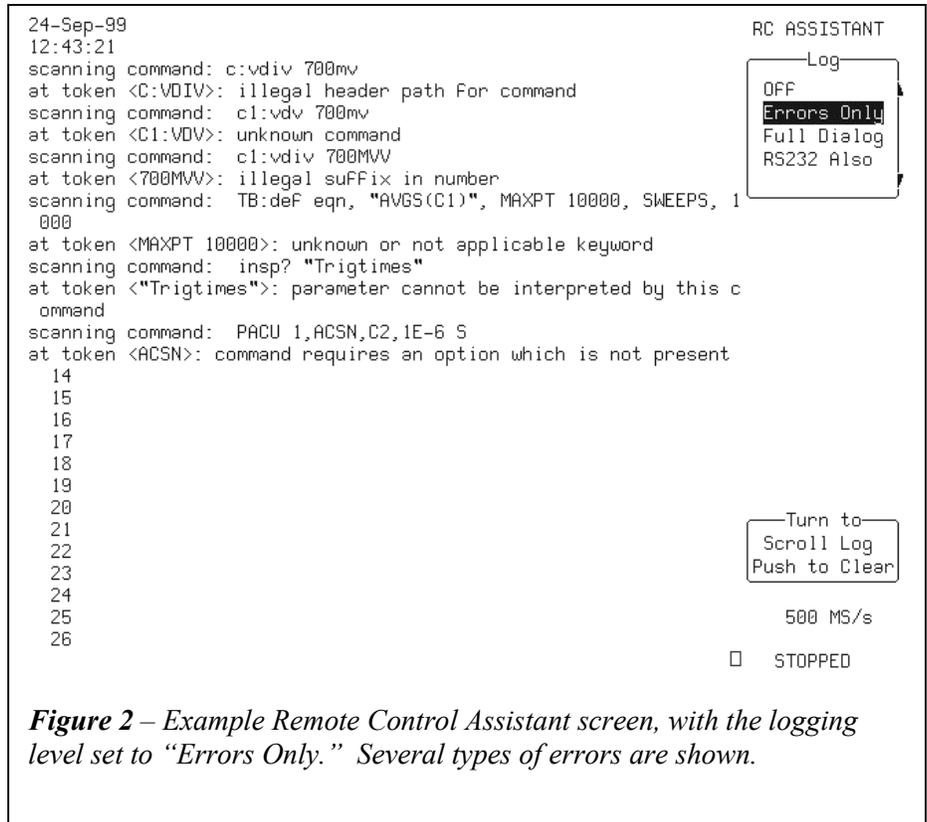


Figure 2 – Example Remote Control Assistant screen, with the logging level set to “Errors Only.” Several types of errors are shown.

this feature. Coding errors can be subtle, and commands that have been sent erroneously do not necessarily cause a user’s program to misbehave in any obvious way.

For example, if a program continually adjusts the volts per division setting with the VDIV command (perhaps to match the voltage range of a predictably changing input signal), but in one case has programmed “VDV” by mistake, the oscilloscope will still successfully trigger, perform math, transfer data, etc. If the desired change in the volts per division setting is small, then such an error might go undetected.

An error in setting the memory length via the MSIZ command can cause the oscilloscope to select a smaller sample rate than desired, with potentially undesirable consequences such as inaccurate or incorrect parameter measurements and aliasing.

Careful programming can help the user avoid the problems discussed above (i.e. through the use of subroutines and string constants). Frequently, the user is not the original programmer, and is adapting someone else’s code, or is modifying a driver written for a different instrument. In these circumstances, the value of the Remote Control Assistant is readily apparent.

