

## Description

This application note describes the process for converting and importing a waveform to use in a RI8508 RF Modulated Source on a Cassini test system.

## Resources

Microsoft Excel

MATLAB - the waveform is normalized and resampled using a MATLAB script.

## Waveform Conversion

To use a user-defined waveform on Cassini, the file must be converted to a .csv, using Excel, Matlab, or a similar program. The format requirement of the .csv file is two column, with Inphase data in the first column and Quadrature data in the second column as shown in Figure 1. The amplitude values of the waveform should be normalized to less than  $\pm 1.0$  in both the inphase and quadrature signal components. The sample rate of the waveform must also be equal to one of the available sample rates on the selected instrument:

RI8508: 1MHz, 10MHz, 20MHz, 32MHz, or 40MHz.

RI8594: 100kHz, 1MHz, 10MHz, 20MHz, 32MHz, or 40MHz

If the original waveform is not one of these rate, it must be resampled.

**NOTE:** *Waveform amplitude on the inphase and quadrature components of the signal greater than 1.0 will result in erroneous output data from the waveform generator's DAC.*

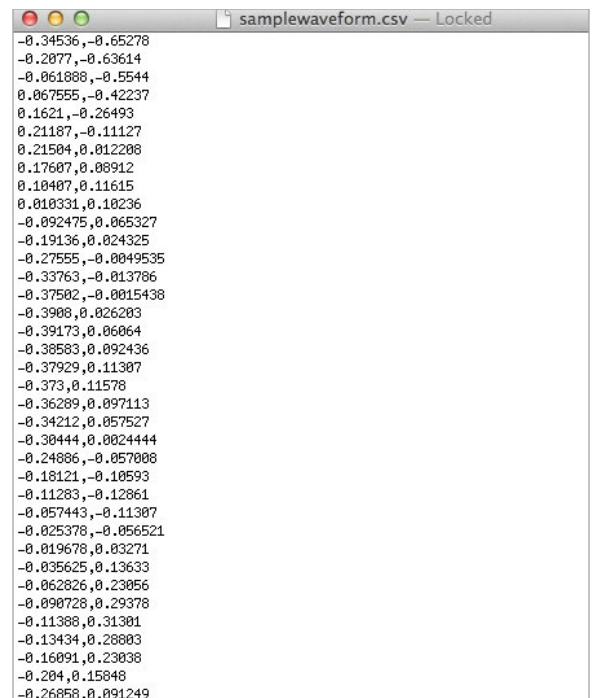


Figure 1

### Importing into Guru

Before a waveforms can be loaded onto an instrument, the file must be imported into Guru.

**NOTE:** Save the waveform file onto one of Guru's networked drives or a USB key inserted into the Cassini instrument controller TIM to access the file on the tester's local file system.

From the Apps tab on the right side for the home screen, select the Guru Importer tool as shown in Figure 2.

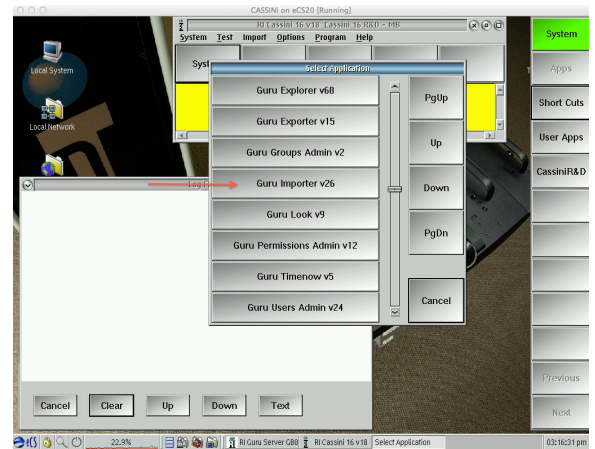


Figure 2

Within the Guru Importer tool, select the Import RI waveform tab located at the bottom of the window as shown in Figure 3.

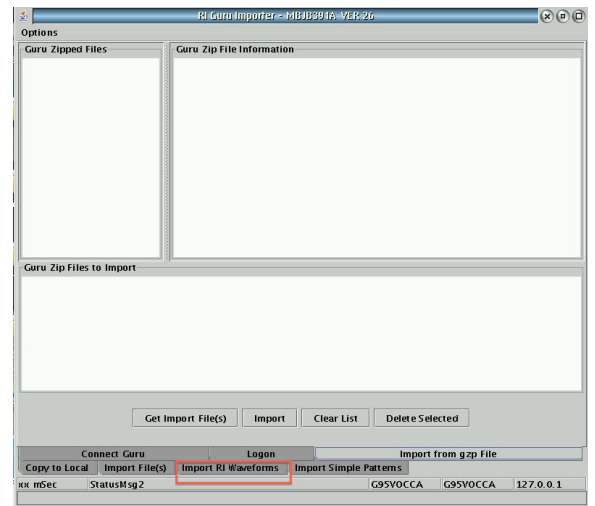


Figure 3

To open the tester's drive directory search, select the 'Get Waveform File(s)' button. In the pop-up file directory window, locate and select the waveform of interest by left clicking to highlight the file. Select the 'Import' button to add the selected file to the import list as shown in Figure 4. This step can be repeated to add multiple waveforms to the import list.

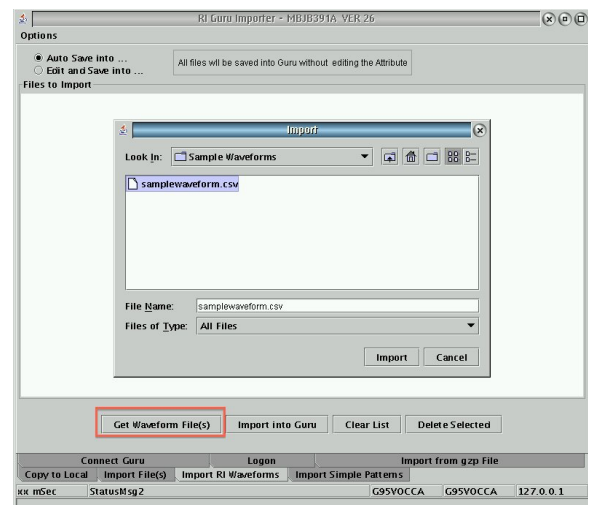


Figure 4

Use the default 'Auto Save into...' option at the top left hand corner of the screen, making the waveform visible in Guru to all users. Once all of the desired waveforms are in the Files to Import list, select the 'Import into Guru' button as shown in Figure 5. A status bar of the import progress is displayed along the bottom of the importer window. Once the importing process has completed, the Guru Importer tool can be closed.

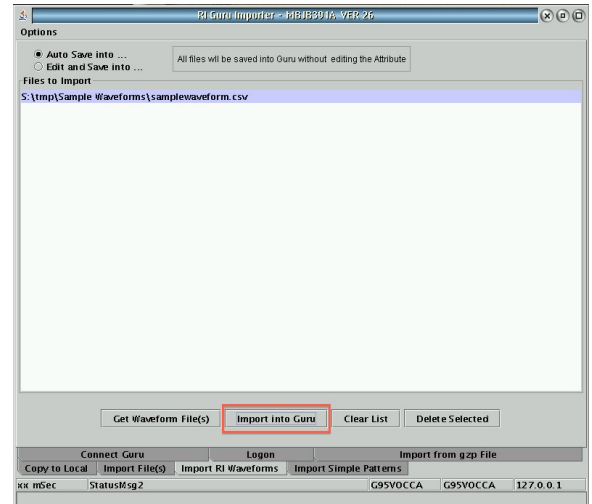


Figure 5

### Loading a Waveform

With the waveform file now stored in Guru, the data must be loaded into an instrument's on-board memory. The RI508 RF Modulated Source can modulate the user-defined baseband signal onto a carrier signal, and the RI594 Waveform/Measure TIMs can output the waveform as a baseband signal.

The following outlines the process for loading waveforms into a Cassini instrument, using the RI508 RF Modulated Source as an example. The process is identical for the waveform instrument in the RI594 TIM.

From the Main Cassini window, select the 'System' button and then the 'Tester' button to access the list of available instruments as shown in Figure 6.

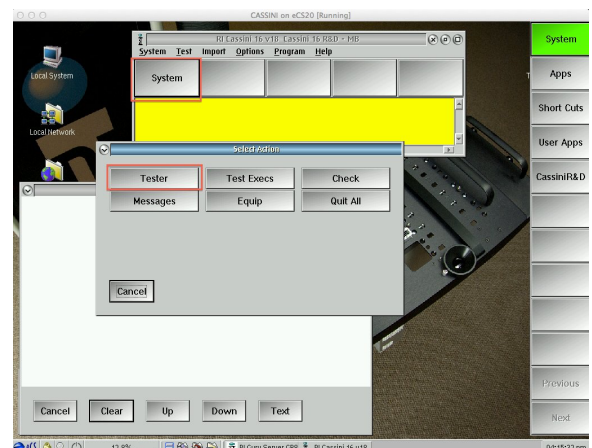


Figure 6

Select the instrument that will be used to output the waveform from the list at the top of the window, and then left button mouse click on the 'push' command within the Edit Patterns button as shown in Figure 7.

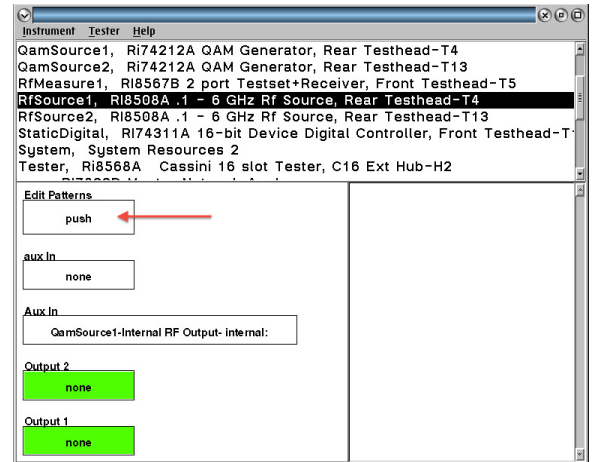


Figure 7

The Patterns selection window will open as in Figure 8. Select 'Pattern' and then 'add from guru' menu option as shown in Figure 8. This will open a 'Choose a waveform to load' pop-up window with a list of all waveforms that have been loaded into Guru. Left mouse button click the waveform to select, and click the 'select' button to proceed. Two subsequent pop-up windows will allow the user to select a name and then a sample rate of the selected waveforms. These name selection will be displayed in test plans or test plan editors when using the waveform.

**Note: These selections will NOT alter the original waveform name in Guru or affect the signal's sample rate. They are for test plan/UI display only.**

Once the waveform or waveforms have been loaded into the instrument's local memory, they will be displayed in a list on the left pane of the window as shown in Figure 9. The user can left mouse button click to select the waveform from the list, displaying the waveform information in the right pane of the window. This can be used to check that the file was imported correctly by verifying the Samples, Sample Rate, and Peak Magnitude fields.

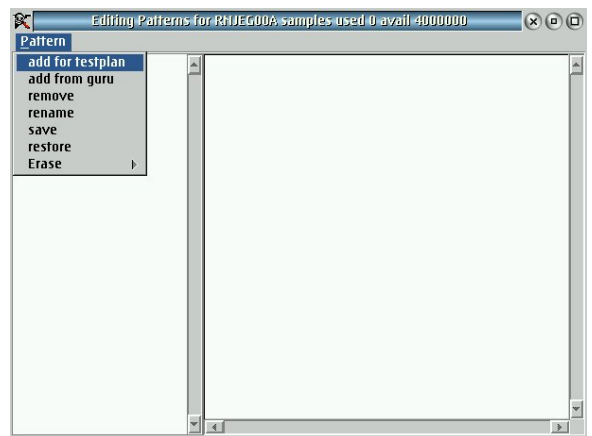


Figure 8

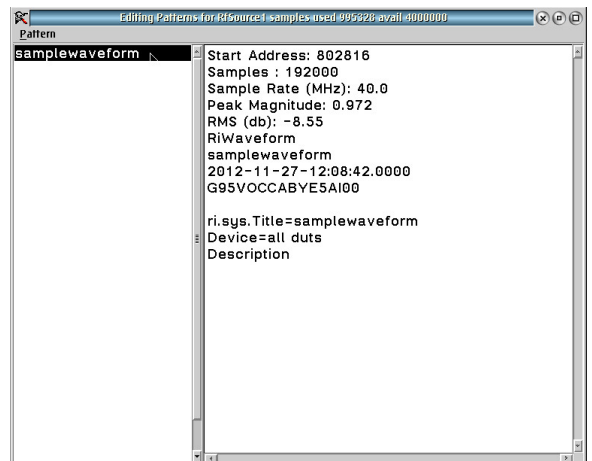


Figure 9

### Using Waveforms in Testplans

Once the waveform has been stored on an instrument, it can now be utilized in a testplan by following the steps below:

Within a test panel, select 'Tester' and then 'View' from the menu options to open a test editor panel as shown in Figure 10.

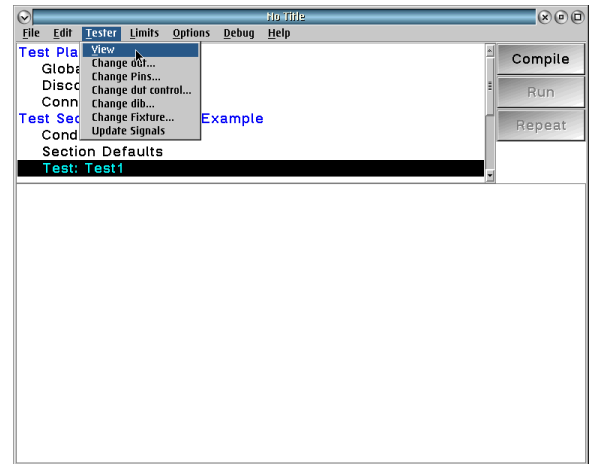


Figure 10

Within the test editor panel, select the instrument that will output the waveform from the list on the left hand side as shown in Figure 11. Then select the 'waveform' control option from the middle panel. This will show the available instrument control buttons that can be inserted into a test plan. Within the waveform option, the Sample Rate, Type, and Pattern buttons are used for configuring the RI8508 for outputting a user-defined waveform signal. In the 'Source state' or 'RF Control' instrument options, the Modulation button controls the source mode to outputting CW or modulation.

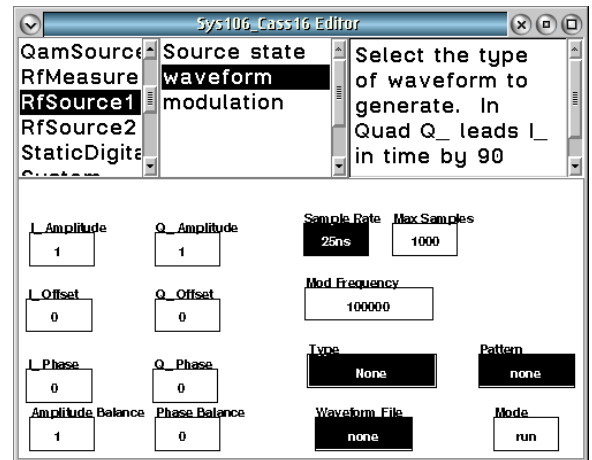


Figure 11

Drop these buttons within a test panel as shown in Figure 12. Set the Type button to 'Pattern' and from the Pattern button, select the waveform that was loaded onto the instrument. Set the Sample Rate button to match the sample rate of the waveform from the options provided: 12.5ns, 25ns, 31.25ns, 50ns, 100ns, and 1µs corresponding to 80MHz, 40MHz, 32MHz, 20MHz, 10MHz, and 1MHz. Set the Modulation button to 'ON'.

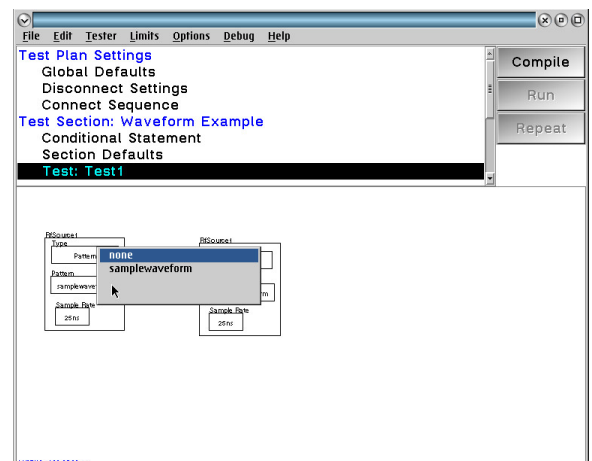


Figure 12