Tektronix®

Multitone Plug-in Application

Printable Help Document

077-1211-01

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Multitone
Plug-in Application

Printable Help Document

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077-1211-01

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Supports Multi-tone Plug-in application Version 1.1.x and above.

Help part number: 076–0392–00

PDF of Help system part number: 077–1211–01

Contacting Tektronix

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For product information, sales, service, and technical support:

- In North America, call 1-800-833-9200.
- Worldwide, visit www.tek.com to find contacts in your area.

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Welcome

The Multitone plug-in is a waveform creation application to create multitone or continuous chirp waveforms.

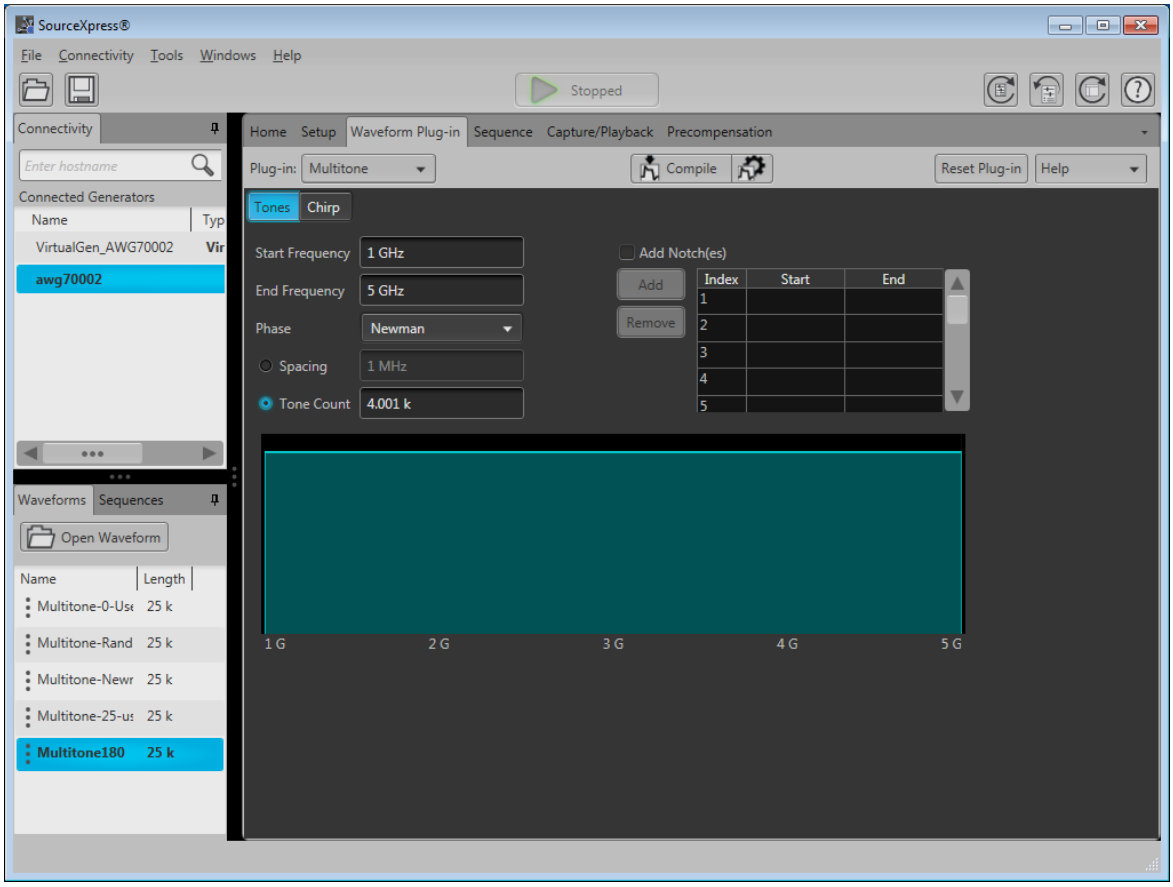
Multitone waveforms can be used to perform many tests, such as Noise Power Ratio, Inter Modulation Distortions, and measure Bandwidth of Components.

The continuous chirp waveforms are useful in creating test signals for such applications as automotive radars.

The Multitone plug-in is designed to integrate and operate seamlessly as an enhancement to the SourceXpress waveform creation software application or to an AWG70000A series arbitrary waveform generator.

Once installed, the Multitone plug-in becomes available as another waveform plug-in application.

This illustration shows the Multitone plug-in viewed from the SourceXpress application. The plug-in is identical whether it is used from SourceXpress or from an AWG70000A series instrument.



Documentation

In addition to this application Help system, the following documentation is available for the software.

All documentation is available on the Tektronix Web site (www.Tektronix.com/manuals).

To read about	Use these documents
SourceXpress operation and user interface help	Access the SourceXpress application help from the Help menu for information on all controls and elements on screen. The SourceXpress help system is also available in PDF format, available on the Tektronix web site.
Connected instrument operation and user interface help	For operation and interface help of a connected instrument, refer to the instrument's documentation. This is available with the instrument or on the Tektronix web site

Support information

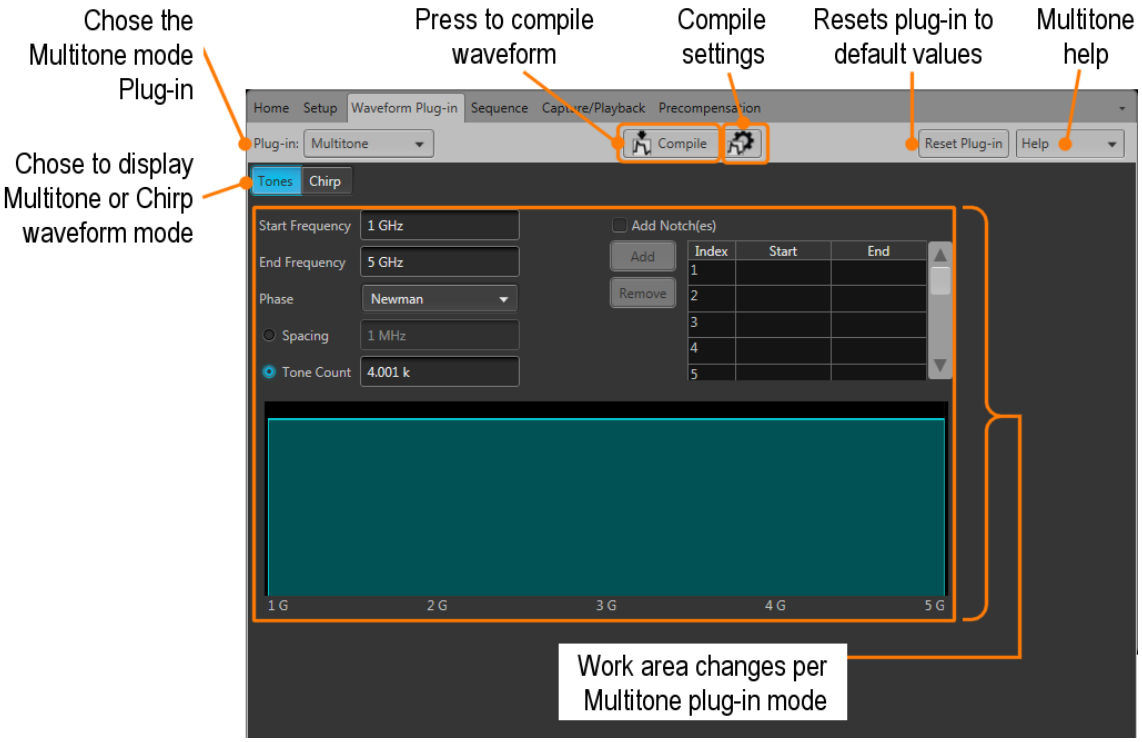
Tektronix offers the following services in support of their products:

- **Technical Support**. For application-related questions about a Tektronix product, contact us by telephone or email).
- **Service Support**. For service-related questions about a Tektronix product, contact us by telephone or email).

Tektronix also offers extended warranty and calibration programs as options on many products. Contact your local Tektronix distributor or sales office.

Elements of the display

The main areas of the application window are shown in the following figure.



Plug-in selection

Use the Plug-in pull-down menu to select the Multitone plug-in application. The plug-in pull-down menu varies depending the installed applications.

NOTE. *Multitone requires a license to create waveforms.*

Refer to *Licensing (see page 15)**.*

Waveform mode selection

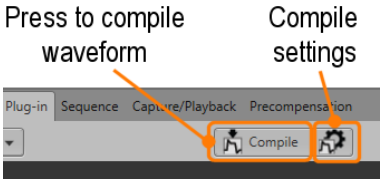
The Multitone plug-in provides the capability to create either multitone waveforms or chirp waveforms.

Select either the Tones or Chirp mode buttons to change the working area.

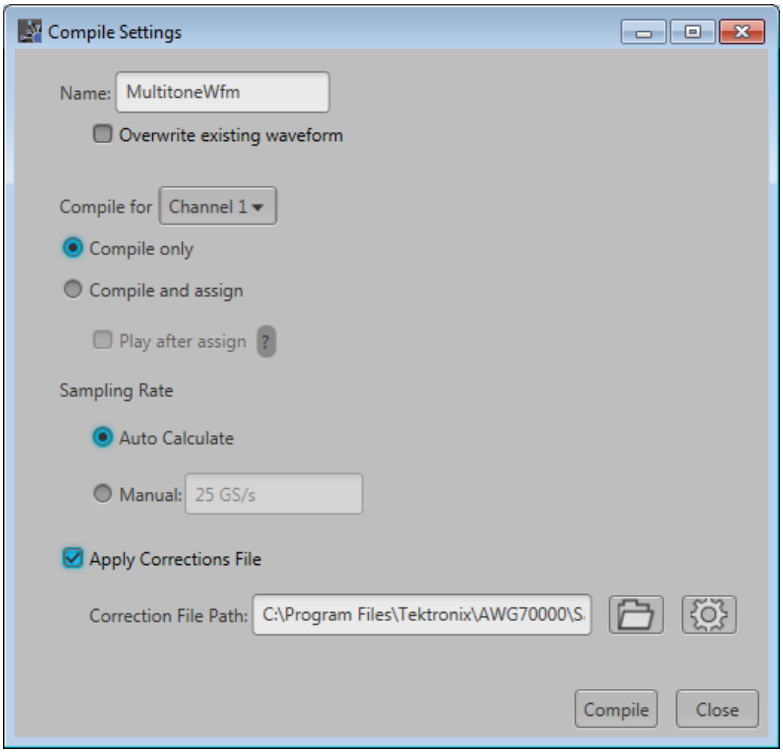
Compile button

Use the Compile button to create the waveforms (Tones or Chirp) and place the waveforms into the Waveforms list of the host application.

Use the Compile settings button to edit the compilation settings.



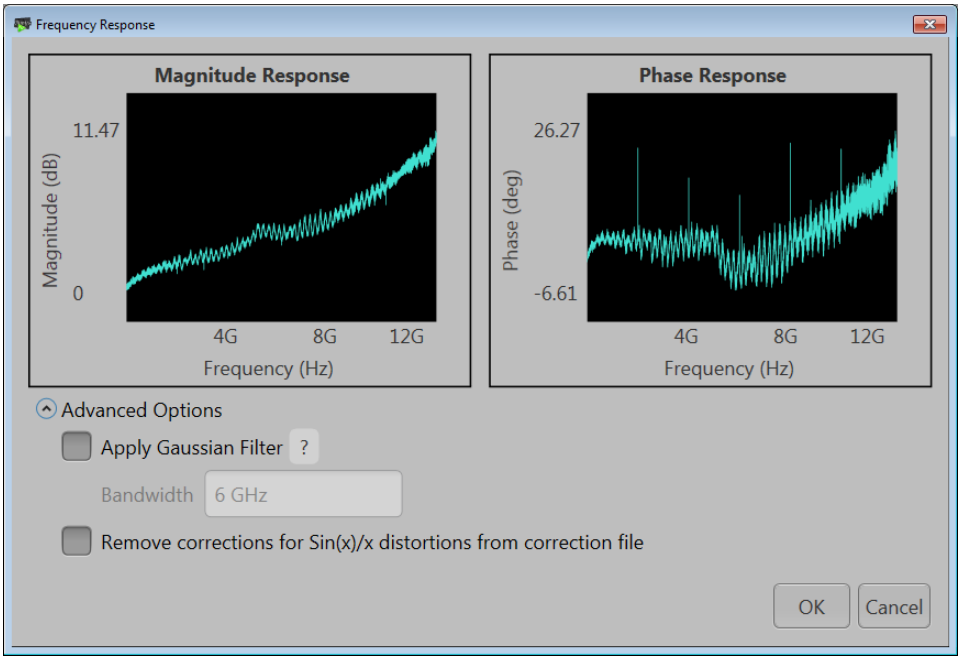
Compile settings



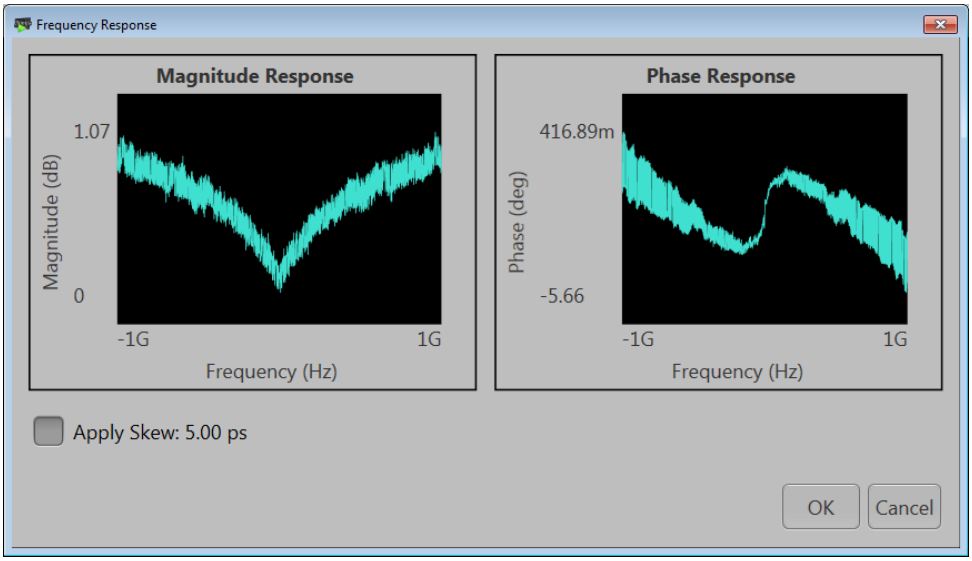
Item	Description
Name	The application provides a base name for compiled waveforms. You can edit the field with a name of your choice. The waveform is added to the Waveforms list. If the name already exists, the name is appended with a numerical value (unless the overwrite option is selected). The Reset Plug-in button resets the Name field to the default name.
Overwrite existing waveform	If checked, a waveform with the same name (in the waveforms list) is overwritten with no warnings.
Compile only	The compiled waveforms are simply entered into the Waveforms list.
Compile and assign to	The compiled waveforms are entered into the Waveforms list and automatically assigned to a selected channel.
Play after assign	If checked, the waveform starts to play out immediately after compiling.
Sampling Rate	
Auto Calculate	This is the default method to set the sampling rate. The application creates a sampling rate based on the settings chosen for the waveform.
Manual	Select to enter a specific sampling rate.
Apply Corrections File	You can apply a correction file directly to the waveform when compiling.
Correction file Path	When applying a correction file, navigate to the location of the file. Use the browse folder icon to navigate to a saved correction file. Once a valid file path is entered, the Correction Settings icon is enabled. Select to display the Frequency Response screen (see page 5).
Compile	Compiles the waveform.

Correction file frequency response

If applying an RF correction file, the Frequency Response screen shows plot information and provides Advanced options to apply a Gaussian filter and remove Sin(x)/x distortions.



If applying an I/Q correction file (to a pair of I and Q waveforms), the Frequency Response screen shows plot information and provides the option to apply a skew.



Reset Plug-in button

Returns the plug-in to the Tones mode and returns all settings (for both Tone and Chirp modes) to their default values.

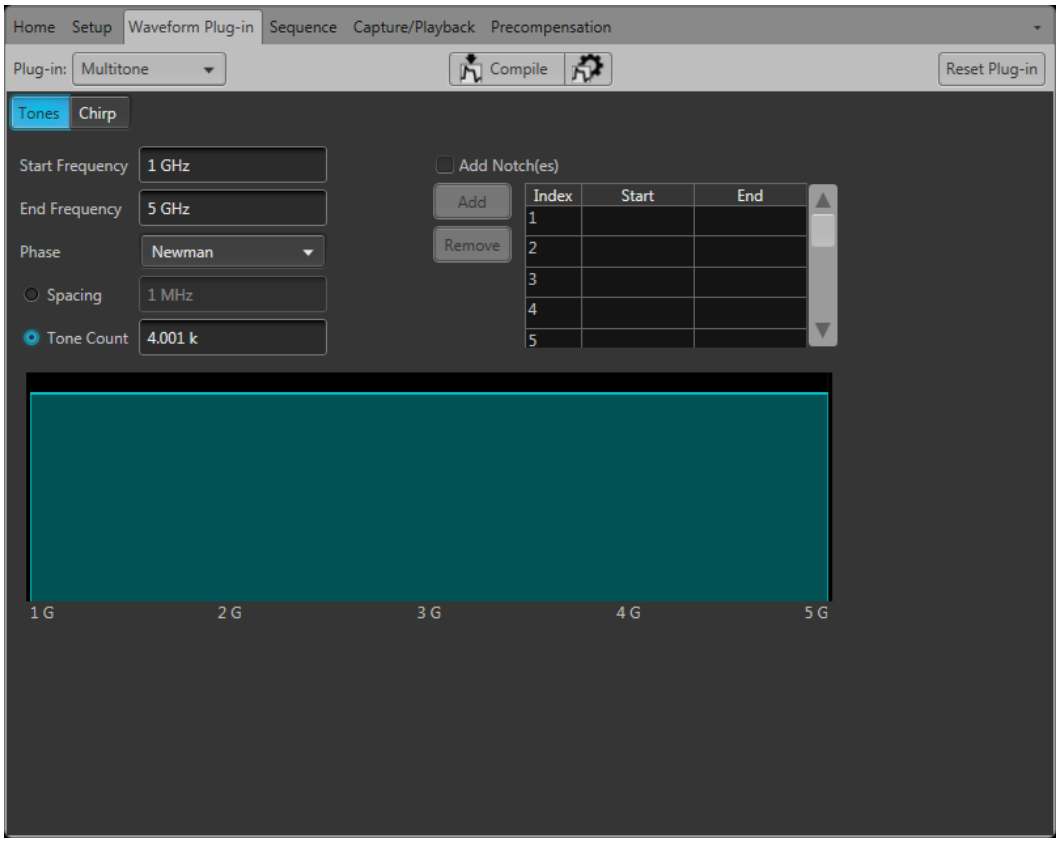
Help button

Help button: Provides links where you can obtain additional product help and documentation.

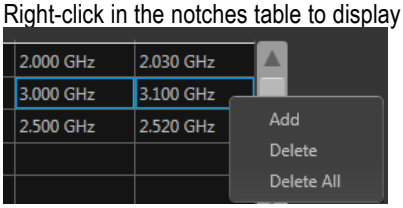
Item	Description
User manual	Opens the plug-in help system.
About ...	Provides you with information about your plug-in application. This information is helpful when contacting Tektronix about your application.

Tones mode

Select the Tones mode to change the workspace to generate multitone waveforms.

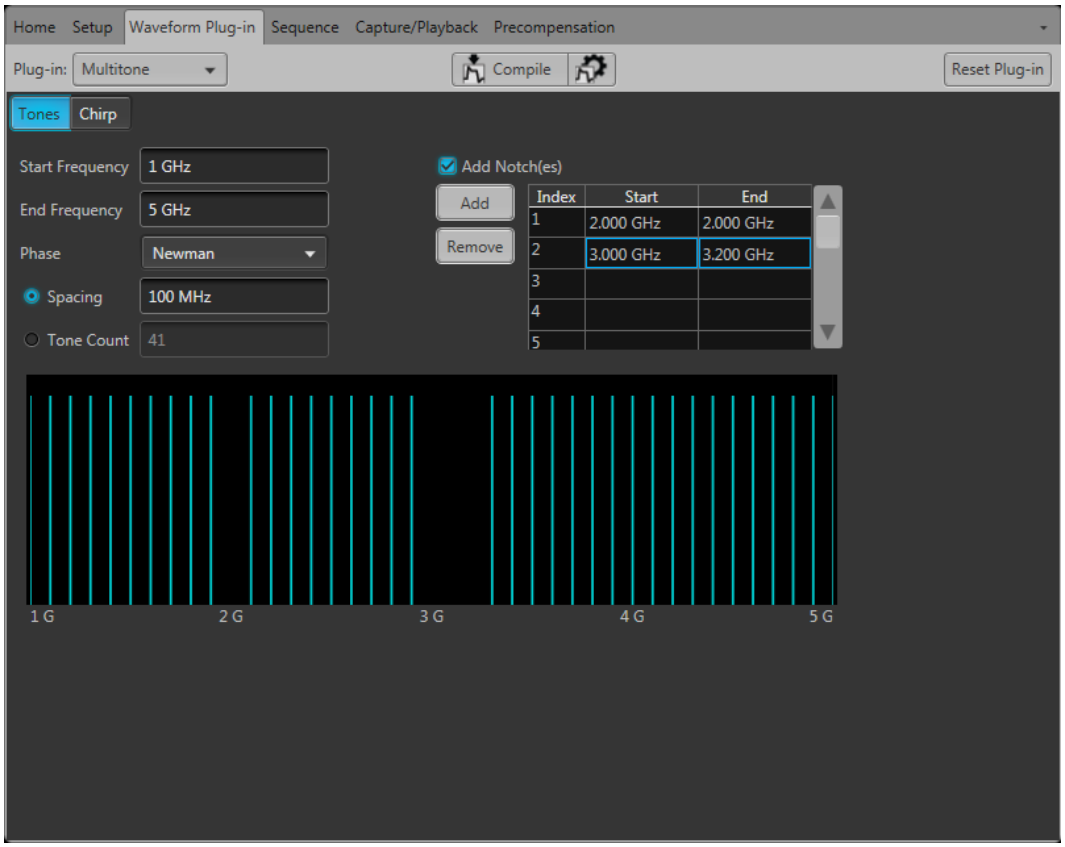


Item	Description
Start Frequency	Used in conjunction with the End Frequency, this sets the frequency range of the waveform.
End Frequency	Used in conjunction with the Start Frequency, this sets the frequency range of the waveform.
Phase	Selects the method of applying the phase shift. The selections include: • Random: The application applies a random phase shift to each of the tones. • Newman: The phase shift is based on the Newman phase calculations. • User Defined: Select a specific phase shift in degrees to apply to each of the tones.
Spacing	Selects the number of tones by defining the spacing between tones. Entering a spacing value automatically creates the number of tones (Tone Count) within the set frequency range.

Item	Description
Tone Count	Selects the number of tones by defining the number of tones within the frequency range. Entering a tone count automatically sets the Spacing between tones.
Add Notch(es)	Use the check box to enable adding notches to the waveform. When enabled, you add up to 16 notches. Use the Add button to enter additional notches. Additional notches are always added to the end of the current list. Use the Remove button to delete notches. The Remove button only deletes the selected notch. You cannot delete multiple notches. Right-click in the notches table to display a menu of additional actions.  ***NOTE.*** *Notches do not have to be entered in a sequential order. The application places the notches according to their values.*

The following illustration represents the following Multitone settings:

- Frequency range is from 1 GHz to 5 GHz.
- The Phase type is set to use the Newman method.
- The tones are spaced at 100 MHz. Because of the frequency range, this produces a Tone Count of 41 tones.
- Two notches have been added. One directly at 2 GHz and one at 3 GHz to 3.2 GHz.


Home
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Start Frequency
1 GHz
End Frequency
5 GHz
Phase
Newman
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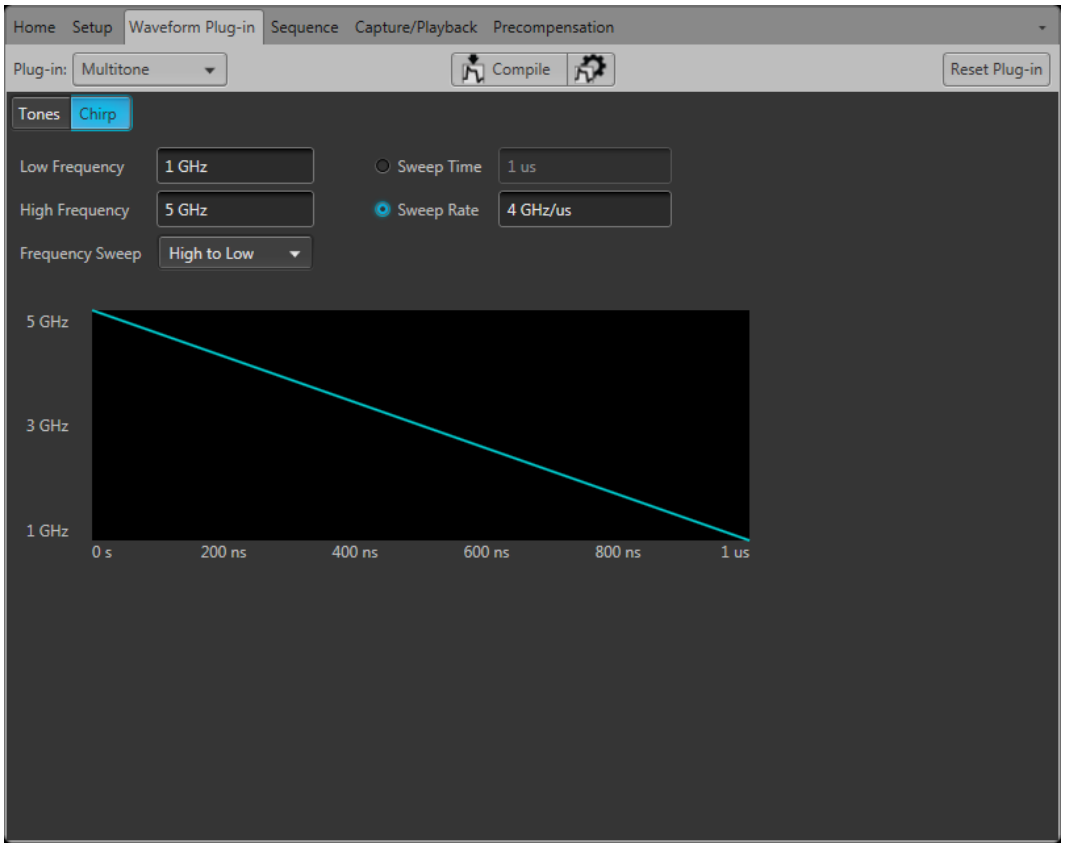
100 MHz
Tone Count
41
Add Notch(es)
Add
Remove
Index
Start
End
1
2.000 GHz
2.000 GHz
2
3.000 GHz
3.200 GHz
3
4
5
1 G
2 G
3 G
4 G
5 G

Chirp mode

Select the Chirp mode to change the workspace to generate continuous chirp waveforms.



Item	Description
Low Frequency	Used in conjunction with the High Frequency, this sets the frequency range of the waveform. 1 Hz is the minimum frequency.
High Frequency	Used in conjunction with the Low Frequency, this sets the frequency range of the waveform. The High frequency is always greater than the Low frequency by at least 1 Hz. The maximum frequency is dependent on the instrument's maximum sampling rate.
Frequency Sweep	Choose to create a waveform that sweeps from the low to high frequency settings or from the high to low frequency settings.

Item	Description
Sweep Time	The Sweep Time is computed by the application based on the Low and High Frequency settings and the Sweep Rate. $Sweep\ Time = \frac{High\ Frequency - Low\ Frequency}{\text{Sweep Rate}}$ Select the Sweep Time radio button to directly enter the waveform's sweep time. The Sweep Rate field automatically adjusts to accommodate the Sweep Time setting.
Sweep Rate	Select the Sweep Rate radio button to directly enter the waveform's sweep rate. The Sweep Time field automatically adjusts to accommodate the Sweep Rate setting.

Licensing

A license is required for this plug-in to become operational. The plug-in must be licensed for use with the host application from where you want to use the plug-in.

For example, to use the plug-in from SourceXpress, SourceXpress must have a license. To use the plug-in from an instrument, the instrument must have a license.

Refer to the application help (for either SourceXpress or the AWG70000A series instruments) for complete information about obtaining and installing license files.

Error codes

The following table lists error codes and messages that are unique to the Multitone plug-in.

Error code	Error message
7400	Notch Error. Maximum number of notches. The maximum number of notches has been reached.
7401	Notch Error. Unable to delete, invalid index.
7402	Notch Error. Unable to delete, notch does not exist.
7410	Compile Error. Internal error during compilation of signal.
7411	Compile Error. Number of samples required to create the signal is more than instrument supported maximum length.
7412	Compile Error. Number of samples required to create the signal is less than instrument supported minimum length.
7413	Compile Error. Waveform length required to create the signal does not meet the granularity of instrument waveform length.
7414	Compile Error. Sampling rate required to create the signal exceeds the maximum sampling rate supported by the instrument.
7415	Compile Error. Sampling rate required to create the signal is less than the minimum supported by the instrument.
7416	Compile Error. The sampling rate is not sufficient to create the signal. Increase the sampling rate.

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