SignalCore™

PRESERVING SIGNAL INTEGRITY

Software Front Panel User Guide

20 GHz RF Signal Source

SC5510A and SC5511A   Rev 1

Made in the USA

Contents

Control

Section 1

This section consists of a set of inputs that control the frequency, power, and rf modes of the device.
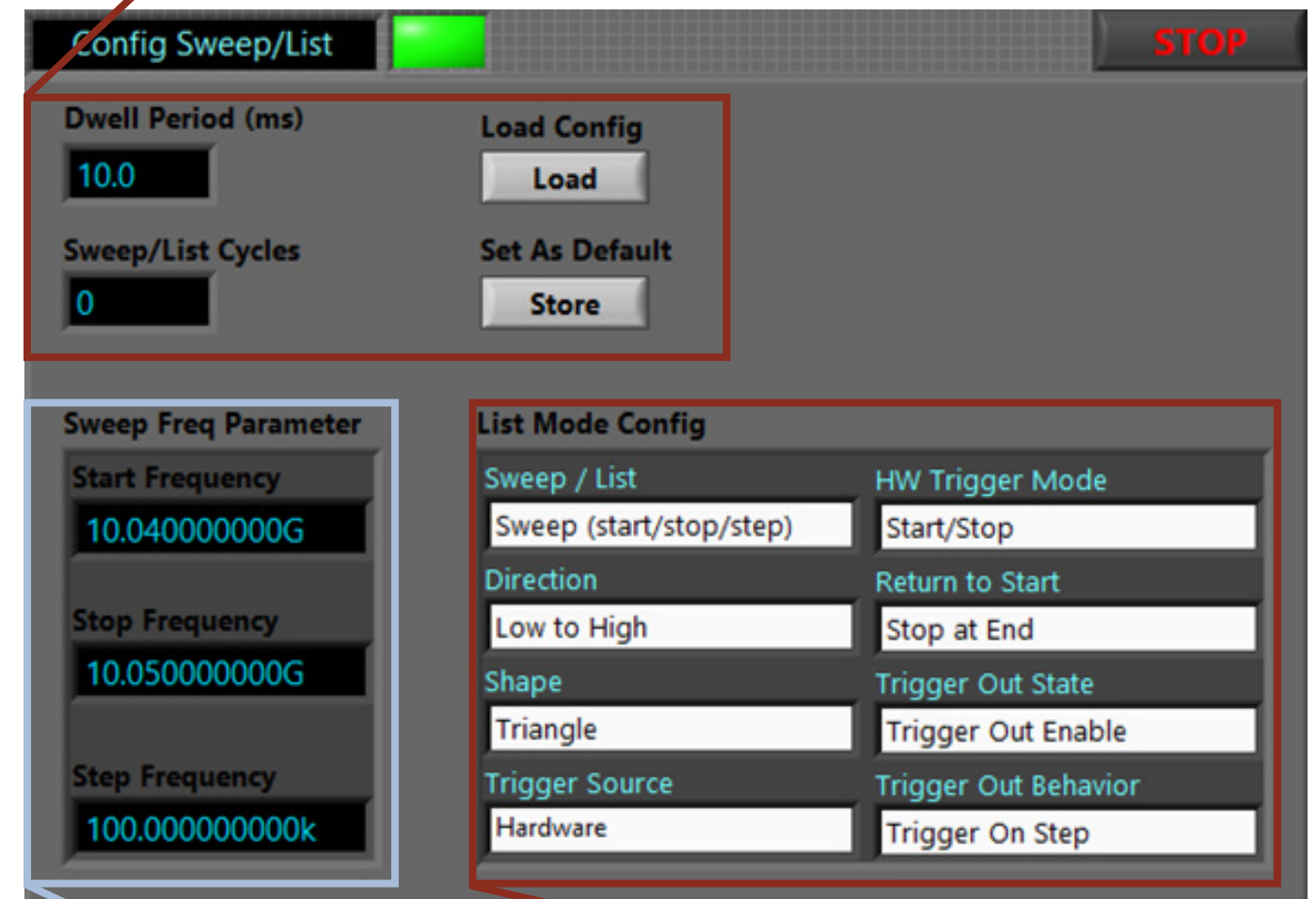

Section 2

This section consists of a set of inputs referring to the clock source and desired reference out frequency.

Section 3

The device info section consists of a set of outputs informing the user of the status of the different settings.

Configuration Sweep / List

Section 4

This section contains settings referring to the sweep/list rf mode.

Section 5

The Sweep Frequency Parameter section contains the start, stop, and step inputs for controlling the list sweep parameters.
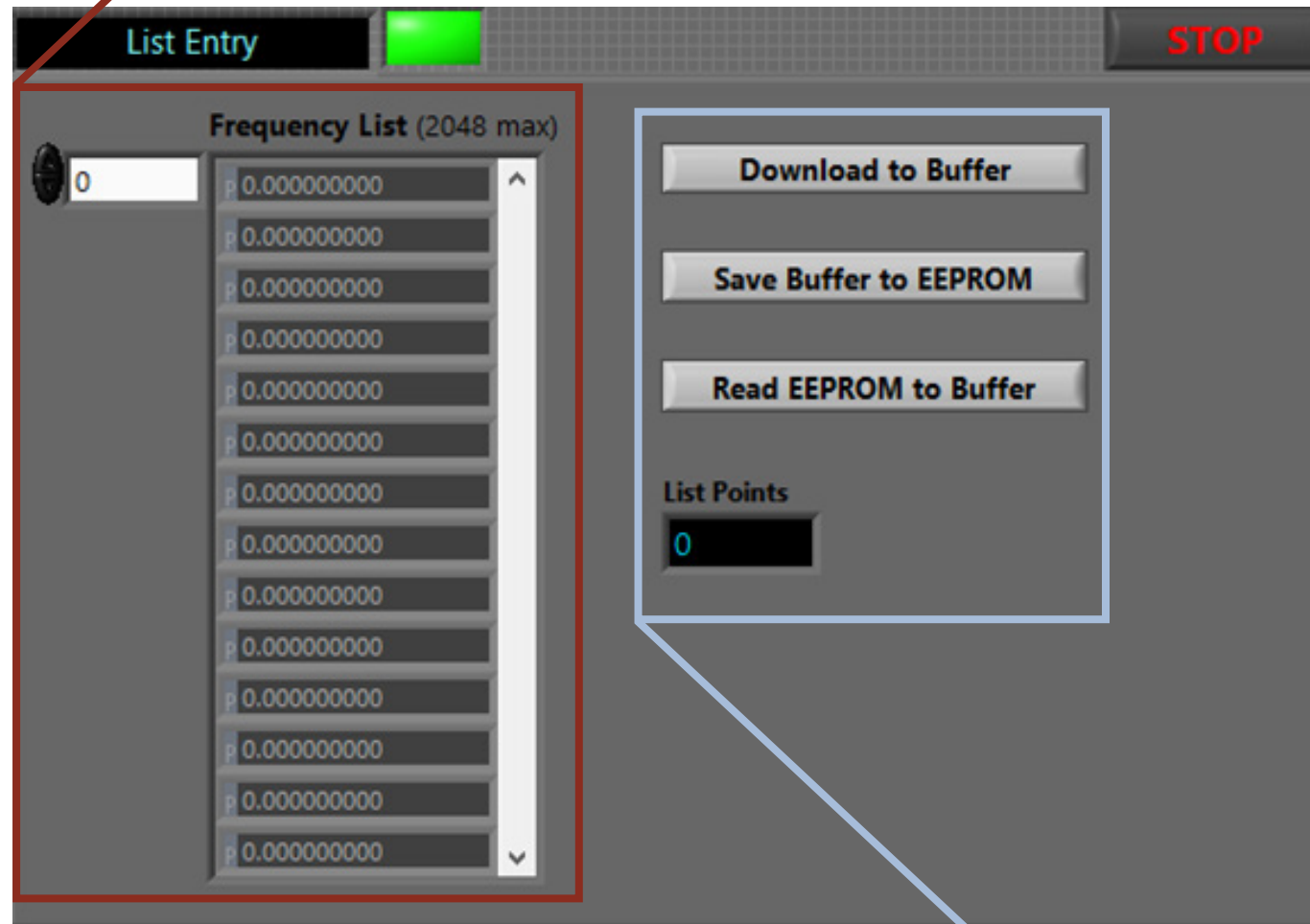
Section 6

The List Mode Configuration section contains a set of inputs referring to the list mode settings.

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List Entry

The Frequency List will show the selected frequency points.

List Entry

Frequency List (2048 max)

0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000
0.000000000

STOP

Download to Buffer

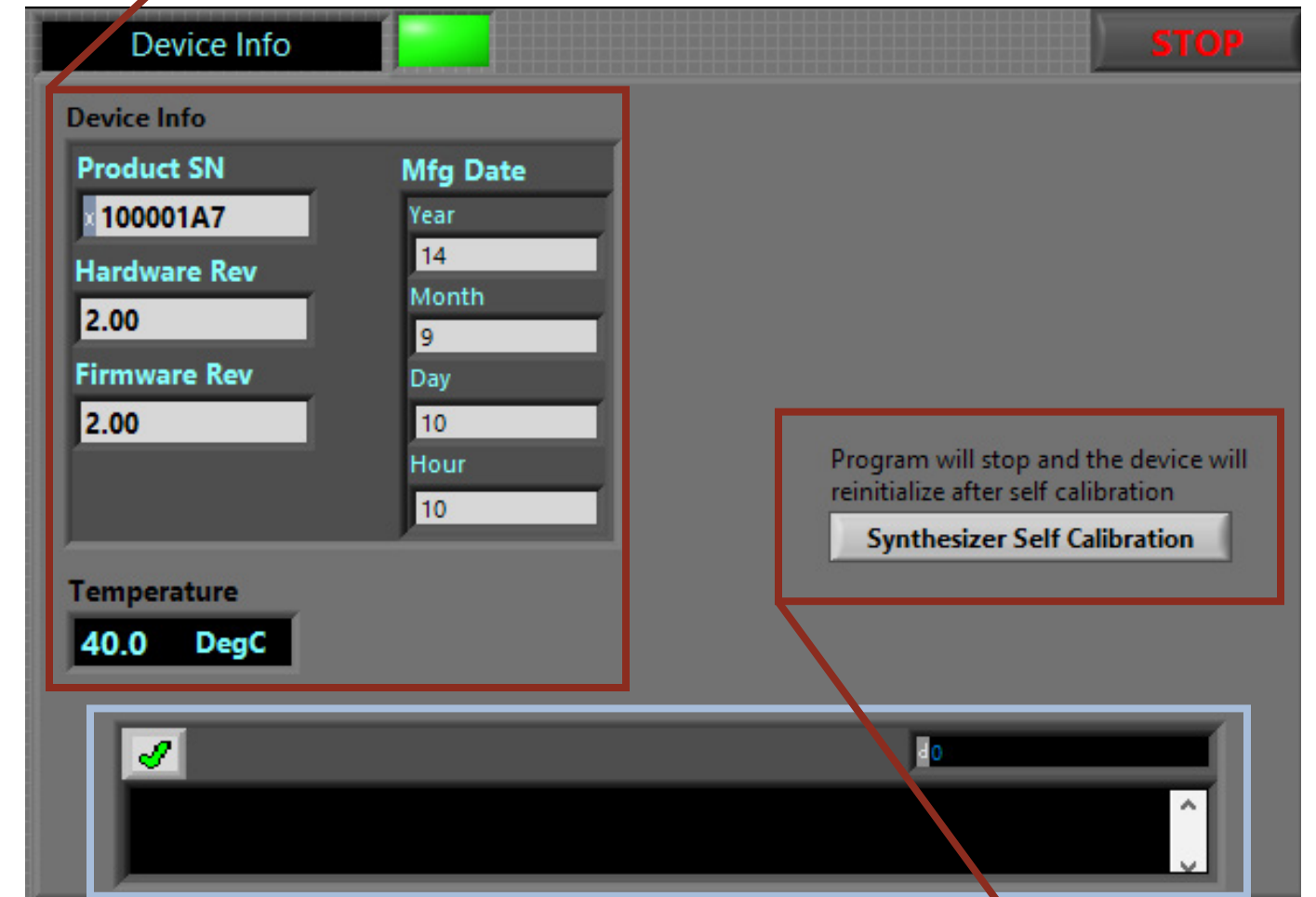**Save Buffer to EEPROM**

Read EEPROM to Buffer

List Points

0

Section 8

This section contains several buttons allowing the user to save and download the frequency list.

Device Info

The Device Info section displays information about the particular device.

Device Info

Device Info

STOP

Product SN	Mfg Date
100001A7	Year 14
Hardware Rev	Month 9
2.00	Day 10
Firmware Rev	Hour 10
2.00	

Temperature

40.0 DegC

Program will stop and the device will reinitialize after self calibration

Synthesizer Self Calibration

Section 10

This box contains any error code messages.

Section 11

This button allows the user to initiate a self-calibration on the device.

Control Panel Section 1

RF Frequency
1.1 This box gives the user the ability to adjust the frequency.

ALC Mode
1.2 ALC Mode can be changed to either Closed or Opened.

Closed	Opened
Level = Accurate Response Time = Slow	Level = Less accurate Response Time = Fast

Power
1.3 The power input will change the power level of the signal.

Tip: To switch between settings, click in the box to open the dropdown menu.

Tip: To edit number inputs, click in the box to type.

Lock Mode
1.4 Lock Mode can be set to either Harmonic Lock or Frac-N Lock.

Harmonic Lock
Uses the harmonic generator to synthesize the final RF frequency.

Frac-N Lock
Uses the fractional frequency generator to synthesize the final RF frequency.

Spur Suppression
1.5 Spur Suppression can either be Enabled or Disabled.

Enabled
Enables spur suppression.

Disabled
Disables spur suppression.

RF Mode
1.6 RF Mode can be set to either Single Tone or List/Sweep by clicking in the box to open the dropdown menu.

Single Tone
Output is one signal.

List/Sweep
This setting is programmable and sweeps between the starting and ending frequencies. When selected to enable list mode, see sections 4-6.

StandBy
1.7 When activated, StandBy powers down the RF sections of the device to conserve power.

RF Enable
1.8 RF Enable activates the RF power at RF Port 1.

Loop Gain
1.9 Loop Gain can be set to either Normal or Low.

Normal
Select normal for better close in phase noise.

Low
Select low for better far out phase noise and spur suppression.

AutoLevel
1.10 AutoLevel can either be Enabled or Disabled.

Enabled
Switching speed = Slower
Power = Leveled on frequency change

Disabled
Switching speed = Faster
Power = Not leveled on frequency change
*Suitable for frequency changes within 100 MHz range.

Trigger Start / Stop
1.11 Activates the software trigger.

Section 2

Ref. Clock Source

2.1 Ref. Clock Source can be set to Internal 10 MHz or Lock to External.

Internal 10 MHz
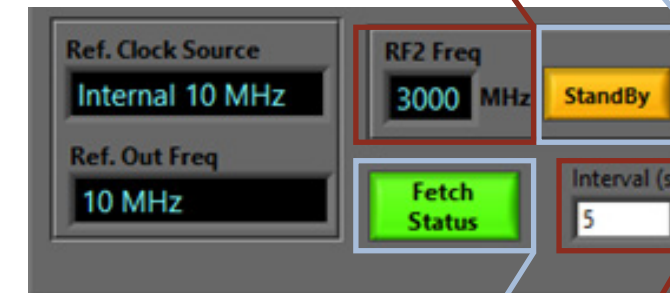Locks to an internal 10 MHz oscillator.

Lock to External
Locks to a 10 MHz external source.

RF2 Freq

2.3 The RF2 Frequency can be set to the user's preference in 25 MHz step resolution.

StandBy

2.4 StandBy will turn on when the device is on standby. When activated, it turns off the internal LO to conserve energy.

Tip: To switch between settings, click in the box to open the dropdown menu.

Tip: To edit number inputs, click in the box to type.

Interval (s)

2.5 Sets the time interval for fetching the device status.

Ref. Out Freq

2.2 Ref. Out Freq can be set to 10 MHz or 100 MHz.

10 MHz
Outputs a 10 MHz signal.

100 MHz
Outputs a 100 MHz signal.

Fetch Status

2.6 When activated, this function will fetch the status at the selected intervals.

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Section 3

RF Out

RF Out will show either Enabled or Disabled.

Enabled
Enabled will show when RF Out is active.

Disabled
Disabled will show when RF Out is inactive.

AutoLevel

AutoLevel will show either Enable or Disable.

Enable
Enable will show when the AutoLevel setting is set to Enable.

Disable
Disable will show when the AutoLevel setting is set to Disable.
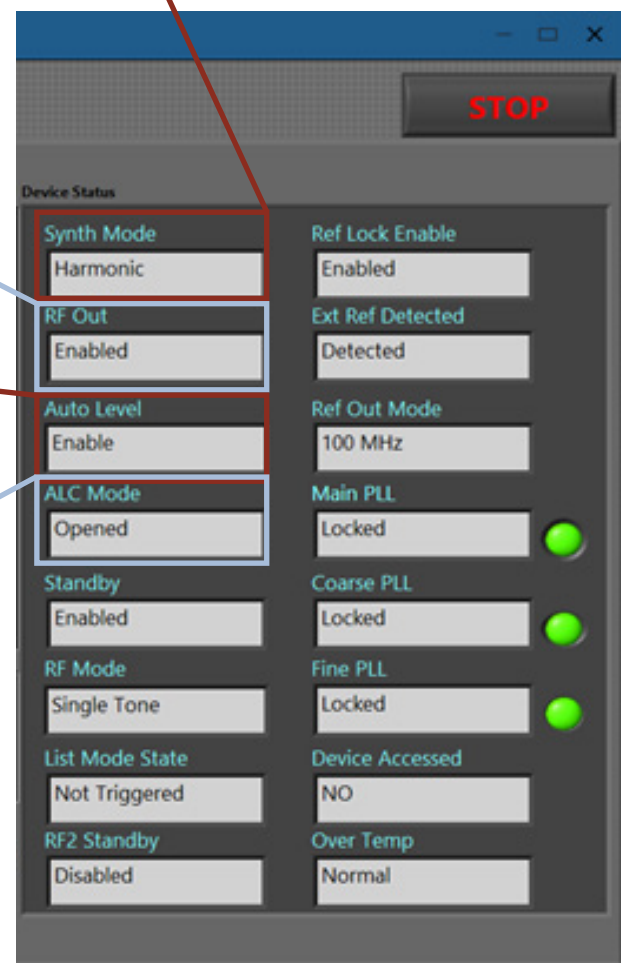
ALC Mode

ALC Mode will show either Opened or Closed.

Opened
Opened will show when the ALC Mode input is set to Opened.

Closed
Closed will show when the ALC Mode input is set to Closed.

Synth Mode

Synth Mode will show either Harmonic or FracN.

Harmonic
Harmonic will show when the harmonic lock mode is selected.

FracN
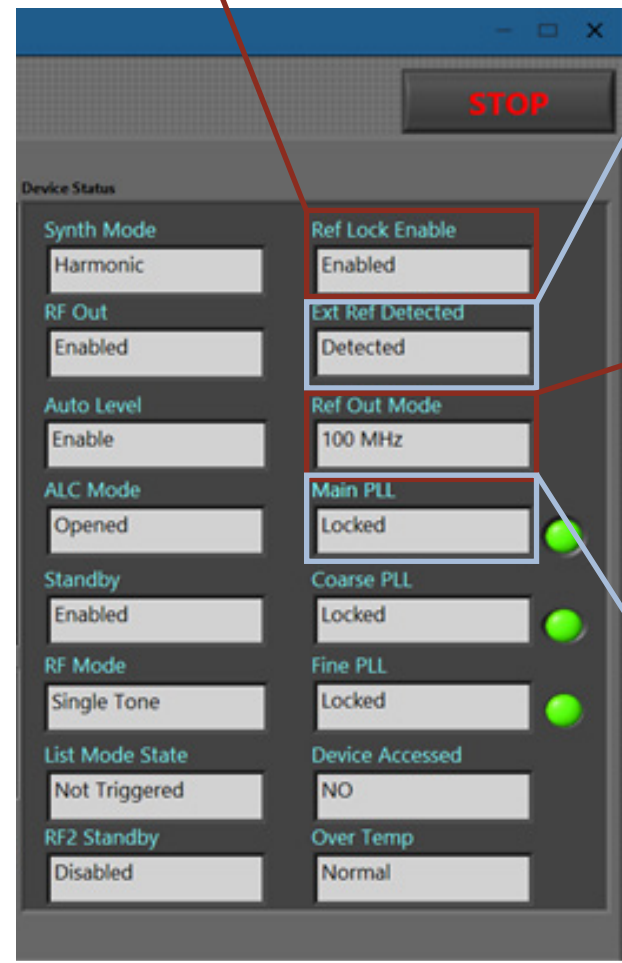FracN will show when the FracN lock mode is seleected.

Device Status

Synth Mode	Ref Lock Enable
Harmonic	Enabled
RF Out	Ext Ref Detected
Enabled	Detected
Auto Level	Ref Out Mode
Enable	100 MHz
ALC Mode	Main PLL
Opened	Locked
Standby	Coarse PLL
Enabled	Locked
RF Mode	Fine PLL
Single Tone	Locked
List Mode State	Device Accessed
Not Triggered	NO
RF2 Standby	Over Temp
Disabled	Normal

STOP

Ref Lock Enable

Reference Lock Enable will show either Enabled or Disabled.

Enabled
Enabled will show when reference lock is enabled.

Disabled
Disabled will show when reference lock is disabled.

Device Status

Synth Mode	Ref Lock Enable
Harmonic	Enabled
RF Out	Ext Ref Detected
Enabled	Detected
Auto Level	Ref Out Mode
Enable	100 MHz
ALC Mode	Main PLL
Opened	Locked
Standby	Coarse PLL
Enabled	Locked
RF Mode	Fine PLL
Single Tone	Locked
List Mode State	Device Accessed
Not Triggered	NO
RF2 Standby	Over Temp
Disabled	Normal

STOP

Ext. Ref Detected

External Reference Detected will show either Detected or Not Detected.

Detected
Detected will show when an external reference source is detected.

Not Detected
Not Detected will show when no external reference sources are detected.

Ref Out Mode

Reference Out Mode will show either 10 MHz or 100 MHz.

10 MHz
10 MHz will show when Reference Out Frequency is set to 10 MHz.

100 MHz
100 MHz will show when Reference Out Frequency is set to 100 MHz.

Main PLL

Main PLL will show either NOT Locked or Locked.

NOT Locked
NOT Locked will show when the Main PLL is not locked.

Locked
Locked will show when the Main PLL is Locked.

Section 3 | Continued

RF Mode

RF Mode will show either Single Tone or List/Sweep.

Single Tone
Single Tone will show when the RF Mode input is set to Single Tone.

List/Sweep
List/Sweep will show when the RF Mode input is set to List/Sweep.

List Mode State

List Mode State will show either Not Triggered or Triggered.

Not Triggered
Not Triggered will show when the List Mode state is not triggered.

Triggered
When triggered, list / sweep is currently active.

RF2 Standby

RF2 Standby will show either Enabled or Disabled.

Enabled
Enabled will show when RF2 standby is enabled.

Disabled
Disabled will show when RF2 standby is disabled.

Standby

Standby will show either Enabled or Disabled.

Enabled
Enabled shows when Standby is on.

Disabled
Disabled shows when Standby is inactive.
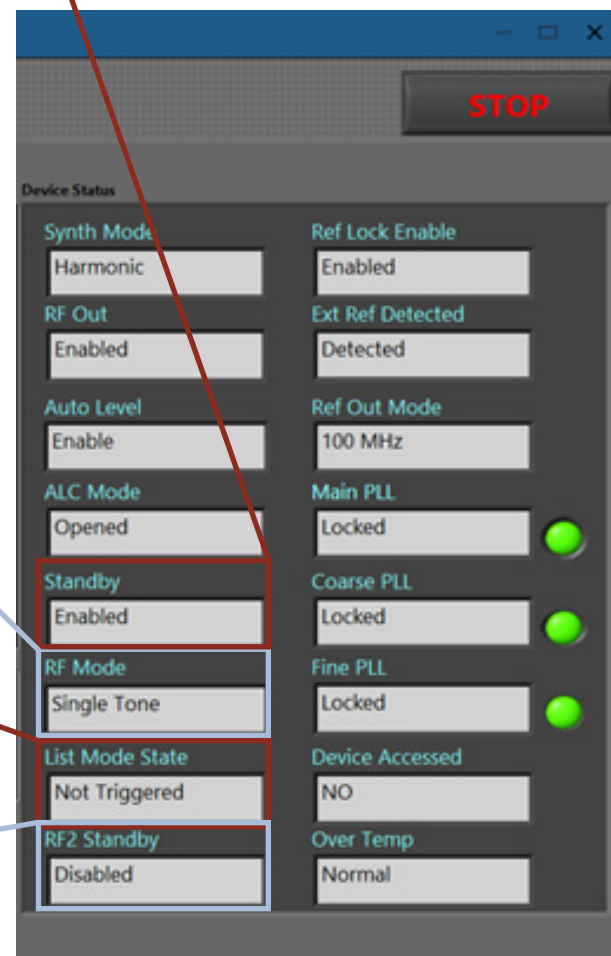
Coarse PLL

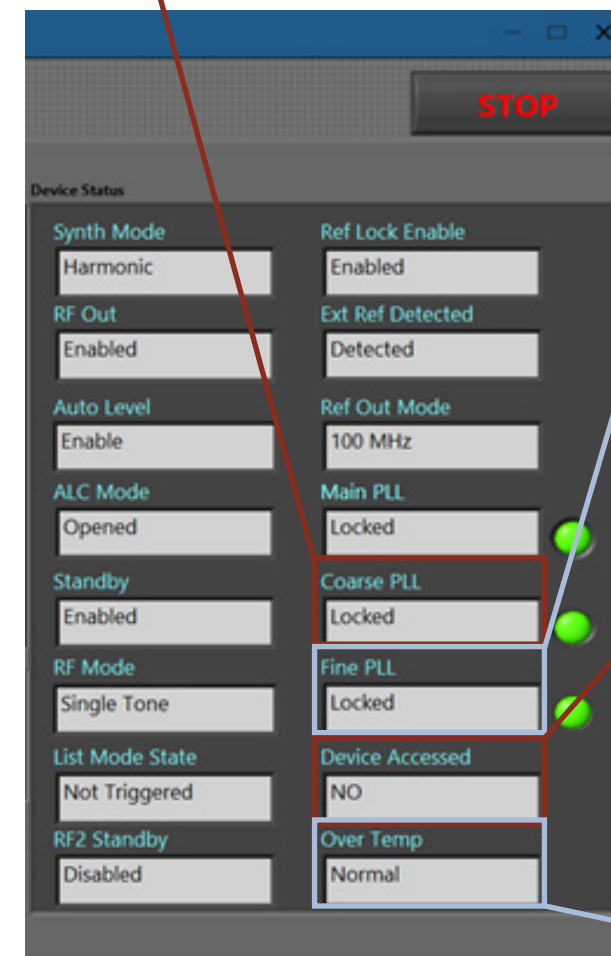Coarse PLL will show either NOT Locked or Locked.

NOT Locked
NOT Locked will show when the Coarse PLL is not locked.

Locked
Locked will show when the Coarse PLL is locked.

Fine PLL

Fine PLL will show either NOT Locked or Locked.

NOT Locked
NOT Locked will show when the Fine PLL is not locked.

Locked
Locked will show when the Fine PLL is locked.

Device Accessed

Device Accessed will show either YES or NO.

YES
YES will show when the device is opened in software.

NO
NO will show when no device is found.

Over Temp

Over Temp will show either Normal or Over Temp.

Normal
Normal will show when the device is operating at normal temperatures.

Over Temp
Over Temp will show when the device exceeds normal operating temperatures.

Configuration Sweep/List Section 4

Section 5

Dwell Period (ms)

4.1 The Dwell Period can be set to the desired amount of milliseconds (ms). It is the length of time it sits at each step frequency.
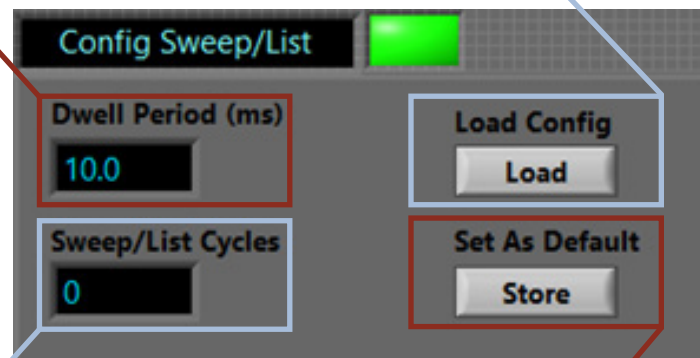
Load Config

4.4 The load configuration can be toggled on or off by clicking the "Load" button. When clicked, it will load the settings from your computer to your device.

Start Frequency

5.1 Sets the start frequency for a sweep. Start frequency should always be lower than stop frequency.

Tip: To edit number inputs, click in the box to type.

Config Sweep/List

Dwell Period (ms)
10.0

Load Config
Load

Sweep/List Cycles
0

Set As Default
Store

Sweep Freq Parameter

Start Frequency
10.040000000G

Stop Frequency
10.050000000G

Step Frequency
100.000000000k

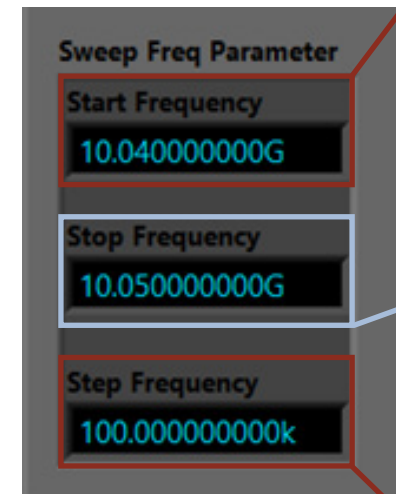### Stop Frequency

5.2 Sets the stop frequency for a sweep. Stop frequency should always be greater than the start frequency.

Sweep/List Cycles

4.2 The sweep/list cycles can be changed to the user's preference.

Set As Default

4.3 This function stores the current device configurations as the device defaults on reset or power-up. It will not perform an immediate reset.

Step Frequency

5.3 Sets the step frequency for a sweep. Step size should not exceed the difference between the start and stop frequencies.

Section 6

Tip: To switch between settings, click in the box to open the dropdown menu.

Sweep / List

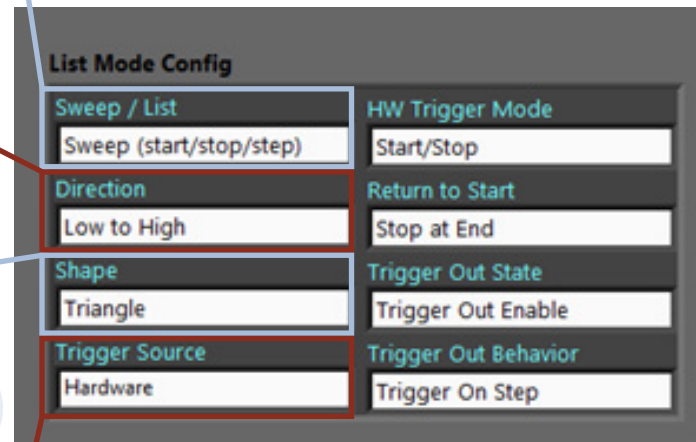**6.1** Sweep / List can be set to either Sweep (start/stop/step) or List.

Sweep (start/stop/step)
The device computes the frequency points using the start, stop, and step frequencies declared in Section 5.

List
When enabled, the device will switch to each frequency that the user has manually entered into the Frequency List in Section 7.

Direction

6.2 Direction can be changed to Low to High or High to Low.

Low to High
Starts from the lowest value frequency and sweeps to the highest.

High to Low
Starts from the highest value frequency and sweeps to the lowest.

Shape

6.3 Shape can be chagned to Triangle or Sawtooth.

Triangle
Triangular waveform. Frequency reverses direction at the end of the list and steps back towards the beginning to complete a cycle.

Sawtooth
Sawtooth waveform. Frequency returns to the beginning frequency upon reaching the end of a sweep cycle.

Trigger Source

6.4 Trigger Source can be changed to Hardware or Software.

Hardware
A high-to-low transition on the TRIGIN pin will trigger the device. It can be used for both start/stop or step-on-trigger functions.

Software
The software trigger can only be used to start and stop a sweep/list cycle. It does not work for step-on-trigger mode.
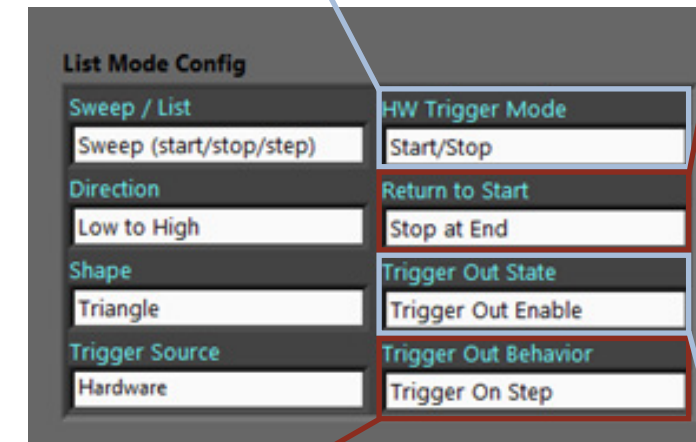
HW Trigger Mode

6.5 The hardware trigger mode can be set to either Start / Stop or Step.

Start / Stop
When triggered, the signal will start and continue until stopped.

Step
Each time the user enables the trigger pin, it will step to the next frequency.

Return to Start

6.6 Return to Start mode can be set to Return to Start or Stop at End.

Return to Start
The signal will return to the starting frequency.

Stop at End
The signal will stop at the last frequency.

Trigger Out Behavior

6.8 The trigger out behavior can be set to either Trigger on Step or Trigger On Cycle.

Trigger on Step
The trigger will pulse on each stepped frequency.

Trigger on Cycle
The trigger out pulses on each cycle completion.

Trigger Out State

6.7 The trigger out state can be set to Trigger Out Enable or Trigger Out Disable.

Trigger Out Enable
Enables the trigger signal on the TRIG OUT pin.

Trigger Out Disable
Disables the trigger signal on the TRIG OUT pin.

List Mode Config

Sweep / List	HW Trigger Mode
Sweep (start/stop/step)	Start/Stop
Direction	Return to Start
Low to High	Stop at End
Shape	Trigger Out State
Triangle	Trigger Out Enable
Trigger Source	Trigger Out Behavior
Hardware	Trigger On Step

List Mode Config

Sweep / List	HW Trigger Mode
Sweep (start/stop/step)	Start/Stop
Direction	Return to Start
Low to High	Stop at End
Shape	Trigger Out State
Triangle	Trigger Out Enable
Trigger Source	Trigger Out Behavior
Hardware	Trigger On Step

Frequency List

7.1 The frequency list is displayed on this tab. By default, 6 frequency points are set from 12 GHz to 12.05 GHz at 10 MHz step resolution.

Download to Buffer

8.1 Clicking Download to Buffer will save the frequency list to the device's RAM.
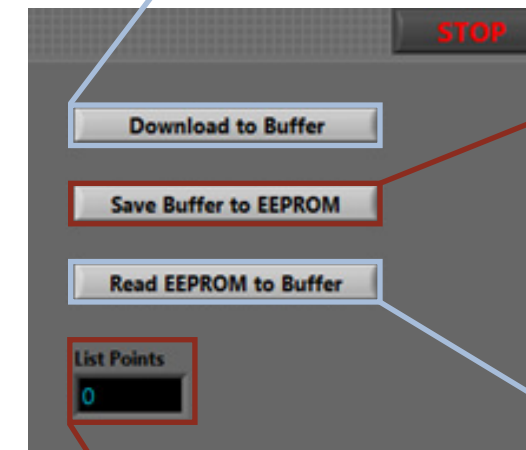
Save Buffer to EEPROM

8.2 Clicking Save Buffer to EEPROM will save the frequency list to the device's EEPROM.

Read EEPROM to Buffer

8.3 Clicking Read EEPROM to Buffer will retrieve the saved information and display it in the frequency list.

List Points

8.4 List Points displays the number of frequency points when the user selects Read EEPROM to Buffer.

Device Info Section 9

Device Info

9.1 In this tab, the Device info is listed, including the Product SN, Hardware Revision number, and Software Revision number. The Manufacturing Date is listed here as well.
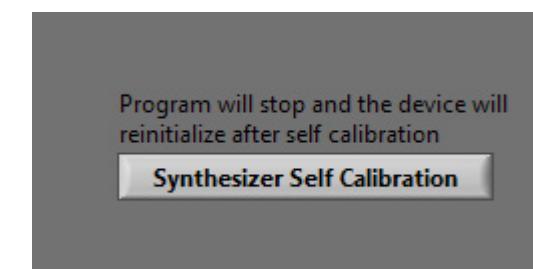
Error Codes

10.1 This box will display error codes as needed. If you have a question about an error, email support@signalcore.com.

Section 11

Temperature

9.2 This box displays the current device operating temperature.

Self-Calibration

11.1 When the Synthesizer Self-Calibration button is clicked, the device will perform a self-calibration. After calibrating, the GUI will reset and the user will need to run the executable to restart the GUI.