



# ADSANTEC

Ultra High-Speed Mixed Signal ASICs

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## ASNT\_FS8151 Frequency Synthesizer **USER GUIDE**





## Overview

The ADSANTEC Inc. ASNT\_FS8151 frequency synthesizer can be used for test applications, design verification, and R&D environments. It contains three outputs which cover three different frequency ranges. The main output ranges from 4 to 32GHz. There is a sync output for trigger of the equivalent time sampling oscilloscope. The main output clock amplitude is adjustable over an approximate 3:1 amplitude range, up to approximately 200mV differentially at 32GHz. Outputs are K-type/SMA compatible female connectors. All operation and adjustment controls are accessed by a GUI controlled interface connected through a USB port.

## Getting Started









Connect the provided +5V AC/DC adapter to the unit. Power the unit on by turning the rocker switch on the back panel to the “ON” position. Observe a green light on the front panel labeled PWR illuminate and the fan starting up. Next connect the provided USB cable to the computer and the unit. The USB connection on the back panel is a USB-B jack. Observe a green light illuminate on the front panel labeled USB when the USB cable is connected to the computer and unit.



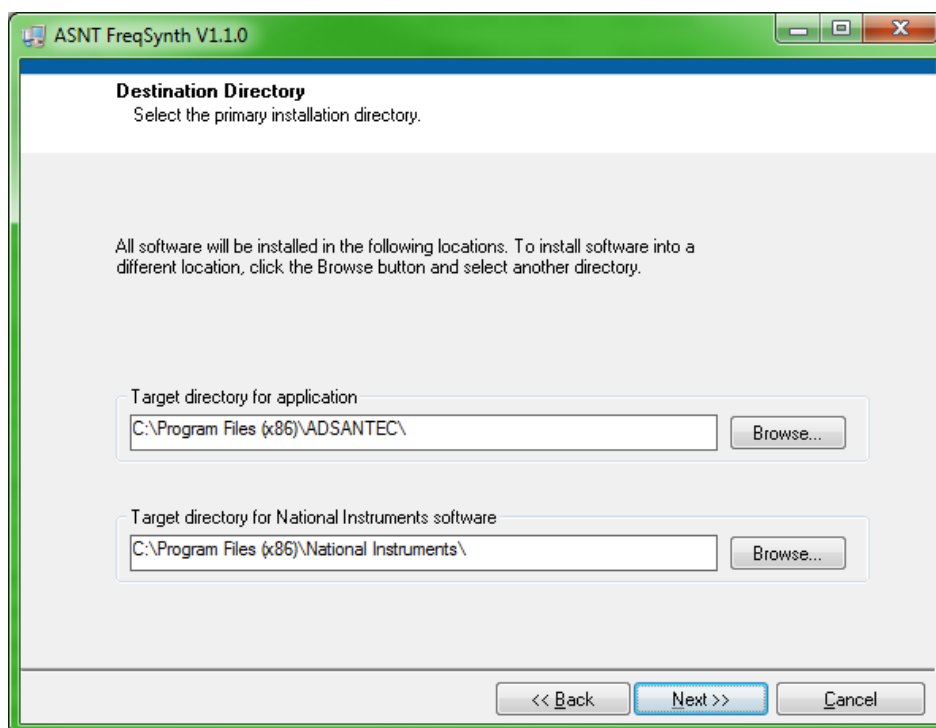
## 1.0 Software

If the software has already been installed go to **1.8**

**1.1** Locate the installation files given as shown below. Double left-click on *setup.exe*

 bin	4/8/2014 1:32 PM	File folder	
 license	4/8/2014 1:32 PM	File folder	
 supportfiles	4/8/2014 1:33 PM	File folder	
 CDM v2.10.00 WHQL Certified.exe	4/8/2014 12:09 PM	Application	1,913 KB
 dp.pmf	4/8/2014 1:33 PM	PMF File	1 KB
 nidist.id	4/8/2014 1:33 PM	ID File	1 KB
 setup.exe	10/7/2013 4:35 PM	Application	1,394 KB
 setup.ini	4/8/2014 1:33 PM	Configuration sett...	5 KB

**1.2** Select Target directory for the location of the installation files that will be installed, then left-click on *Next*.





1.3 Left-click on *Next*.

1.4 Wait for the files to be installed.

1.5 Left-click on *Finish*

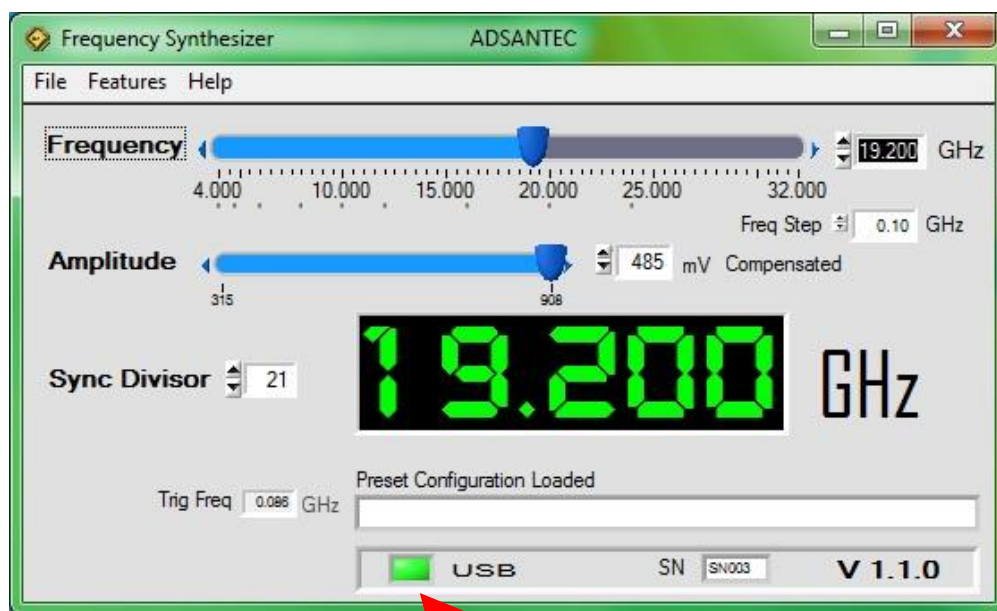
1.6 Left-click on *Restart* if requested.

1.7 Double left-click on the “CDM v2.10.00 WHQL Certified.exe” to install USB drivers. This file can be found in the same directory as the setup file used earlier to install software.

bin	4/8/2014 1:32 PM	File folder	
license	4/8/2014 1:32 PM	File folder	
supportfiles	4/8/2014 1:33 PM	File folder	
CDM v2.10.00 WHQL Certified.exe	4/8/2014 12:09 PM	Application	1,913 KB
dp.pmf	4/8/2014 1:33 PM	PMF File	1 KB
nidist.id	4/8/2014 1:33 PM	ID File	1 KB
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1.8 Double left-click on the icon *ASNT\_Freq\_Synth Vx.x.x* on the desktop to open the control software.

1.9 Wait until the USB indicator has turned **green**. This indicates that the software is connected to the ASNT\_PRBS45. If the **green** indicator does not appear, then the USB drivers may not be installed correctly or the USB cable may need to be re-inserted. Make sure that both LED's on the front panel are illuminated.





## Front Panel Connections



### Clock Output

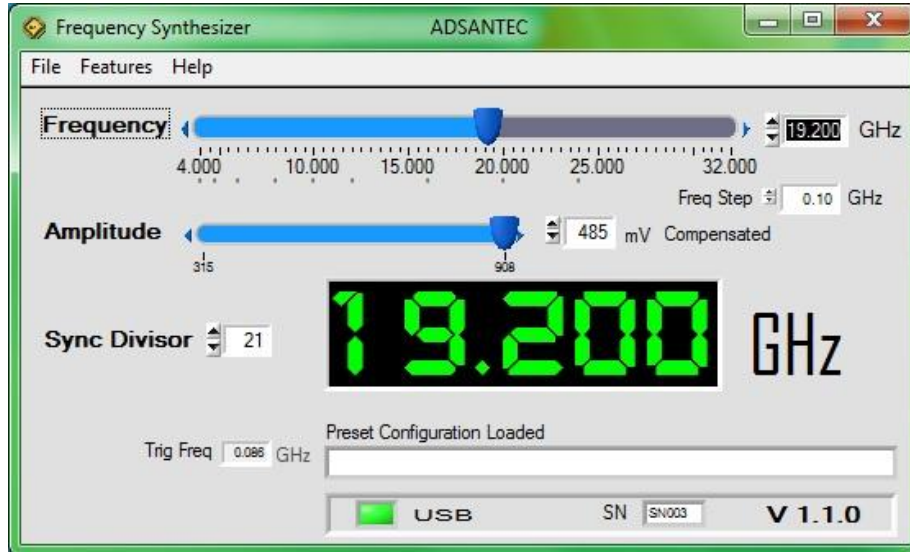
The Clock Out differential female K-type outputs are AC coupled inside the unit; therefore no external DC block is required. If not using an output,  $50\Omega$  terminate it.

### Sync

The Sync output is AC coupled inside the unit; therefore no external DC block is required. The connector is a female SMA connector. The Sync output is used to synchronize the data with an oscilloscope.

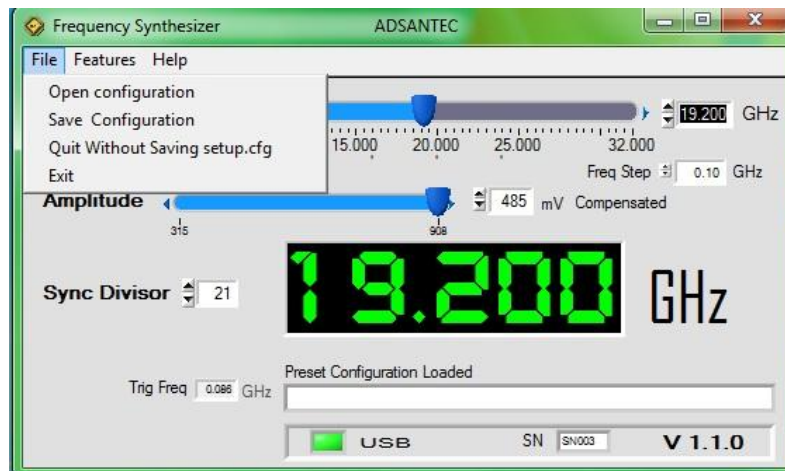


## Operation



The GUI provides control of the unit. The output frequency can be modified through the use of the frequency slider, or directly entering numbers into the highlighted field on the upper right, or through the use of the buttons to the left of it, with the box below specifying the increment that the buttons will change the output frequency. The output amplitude is controlled through the slider labeled **Amplitude**. The range of this amplitude adjustment may differ with output frequency. Note that the sync divisor may be automatically adjusted when changing output frequency to ensure proper output.

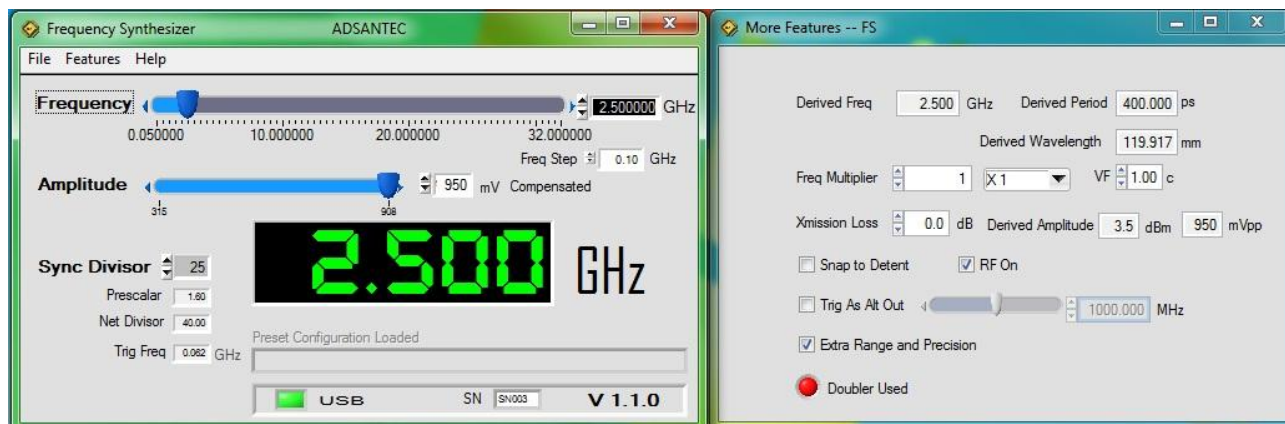
The primary frequency range of 4GHz to 32GHz can be achieved through the basic use of this GUI. Additionally, settings can be saved and loaded through the use of the File Menu, and selecting “Save configuration” or “Open configuration” as shown below.





## Extended Range Mode and Additional Features

The Features menu brings up an additional panel, with various options and features. Down at the bottom is “Extra Range and Precision”, which impacts the main GUI panel by allowing additional frequency range and providing additional details regarding the trigger frequency.

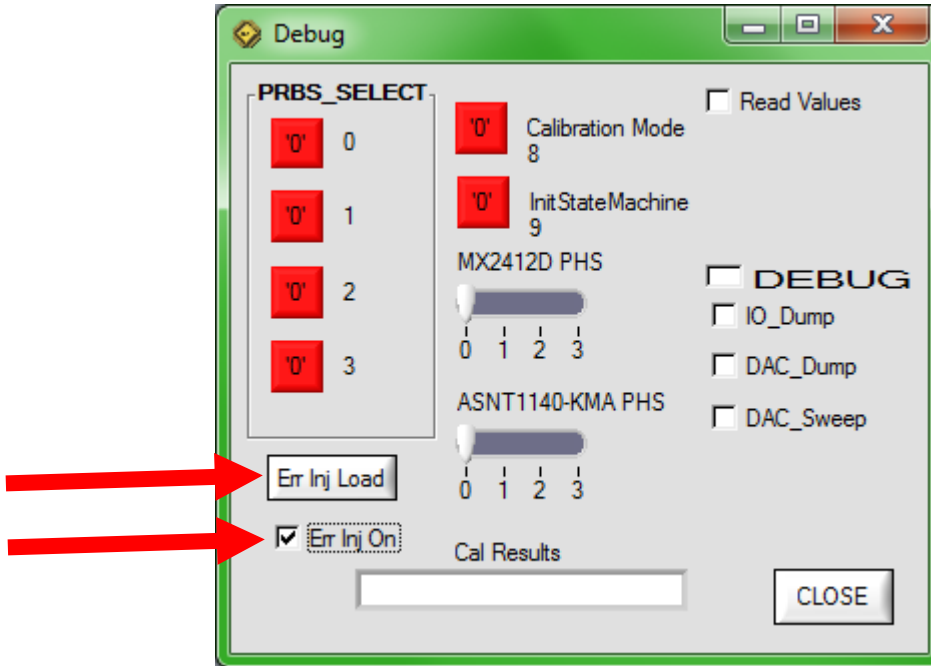


The Extra Range and Precision mode allows the lower end of the frequency range to extend all the way to 50MHz. Note that some frequencies within this extended range may have additional jitter or an imperfect duty cycle. Unchecking the “Extra Range and Precision” option restores basic functionality within the main GUI panel.

The additional options within the Features panel also allow for additional amplitude control, and use of the Sync output as an alternate output, with its own slider providing additional frequency range beyond the typical frequencies output during basic operation. Additionally,

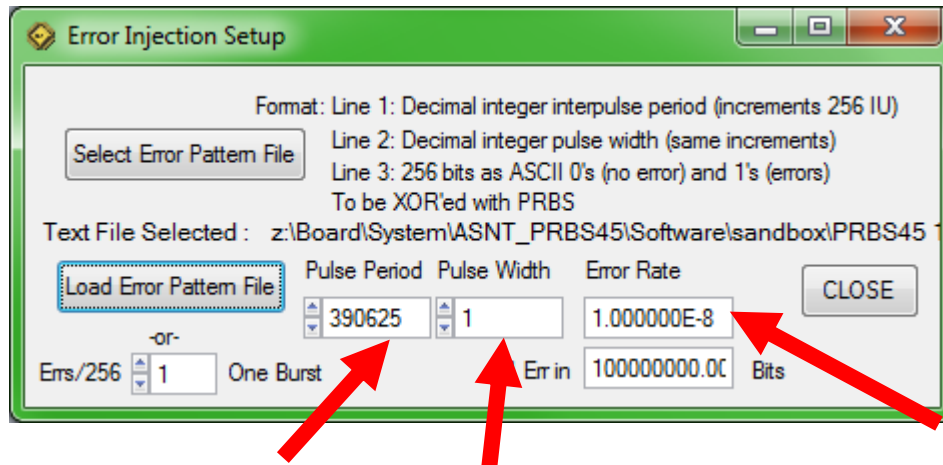


## Debug Panel



### Through GUI

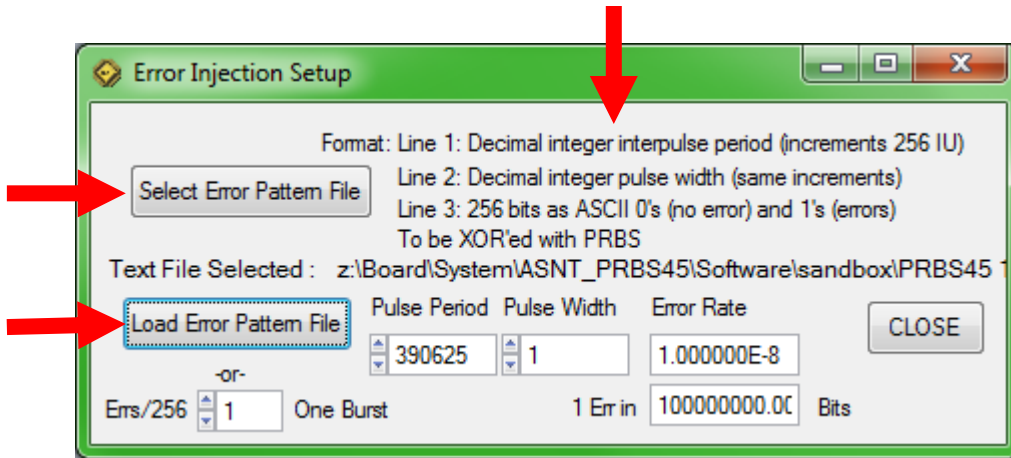
Here the Pulse period, Pulse width and error rate can be specified. It will provide a burst of errors based on the settings selected.



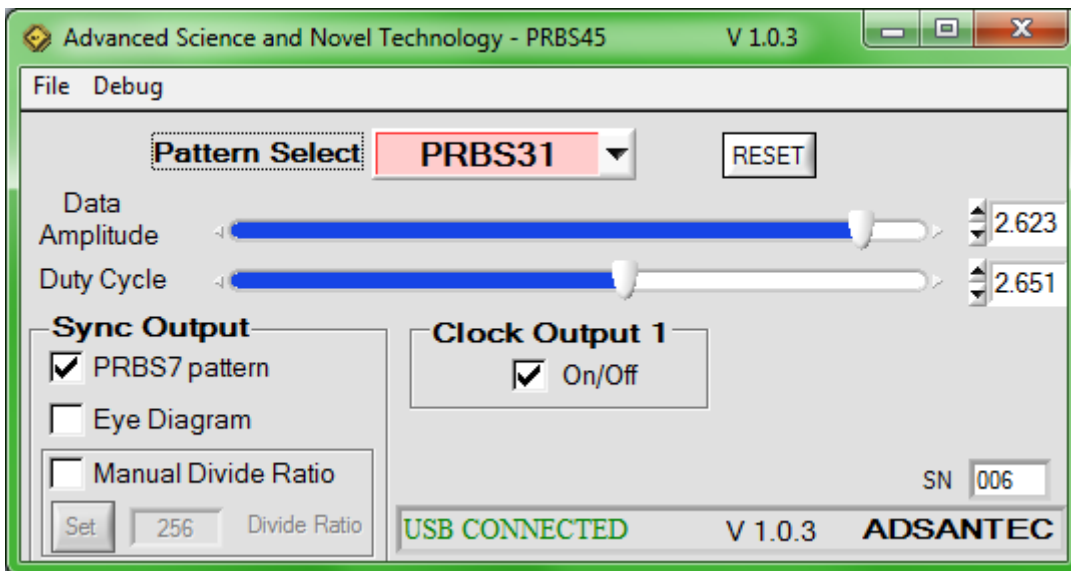




## Through Text File Import



Error injection can also be achieved through the use of an error pattern file (text file), where the settings are configured as specified within the above window, with the first line specifying the pulse period, the second line specifying the pulse width, and the remainder of the file specifying the 256-bit error burst pattern. Zeroes (ASCII) denote no error and ones denote errors. When the text file is formatted and configured as desired, it can be selected through the “Select Error Pattern File” button, followed by “Load Error Pattern File”, which can give greater control and allow the location of errors to be specified within each 256 bits.



When error injection is enabled, the PRBS selection dropdown menu will change in color to warn that the pattern being generated is not exact.



## DLL

The 32-bit DLL is compiled from CVI Labwindows. Its functions are in C style arguments and they return integers. The DLL can be used as an alternative to the GUI. This is useful for using the unit to automate control. A python example is provided as an example on how to use the DLL. The DLL may be used by any program that can deal with C type functions. The DLL and python example file can be found in the installation directory of the GUI. **Note: 32-bit version of Python must be used.**

### **int usb\_init(void)**

Description: Finds USB device. Must be called first in program.

Argument: none

Returns: '1' USB is connected, '0' USB is not connected

### **int usb\_close(void)**

Description: Closes USB devices. Must be called to clear USB handle so that another program can control the unit.

Argument: none

Returns: '1' USB closed, '0' Error (handle may be closed already)

### **int set\_divide\_ratio(int divide\_ratio)**

Description: Set Sync Output divider from 4 to 1024. Output Sync divide ratio = divide\_ratio \* 4

Argument: integer 1 to 256

Returns: '1' write successful, '0' write unsuccessful

### **int ClockOutput1(int ONoff)**

Description: Turn clock output 1 ON or OFF

Argument: integer 1 or 0

Returns: '1' write successful, '0' write unsuccessful

### **int set\_dutycycle(float voltSetting)**

Description: Adjust output data duty cycle

Argument: float 1.8 to 3.3

Returns: '1' write successful, '0' write unsuccessful

### **int set\_amplitude(float voltSetting)**

Description: Adjust output data amplitude

Argument: float 1.8 to 2.7

Returns: '1' write successful, '0' write unsuccessful



## int prbs\_select(int prbsSetting)

Description: Select output data PRBS pattern

Argument: integer

1 = PRBS7

2 = PRBS9

3 = PRBS11

4 = PRBS15

5 = PRBS17

6 = PRBS20

7 = PRBS23

8 = PRBS29

9 = PRBS31

10 = Half-Rate Clock

Returns: '1' write successful, '0' write unsuccessful

## int RST\_PRBS(void)

Description: Resets PRBS generator. Note: **This functions needs to be called whenever input clock frequency is changed. This includes turning on the unit or removing/applying a clock input.**

Argument: none

Returns: '1' write successful, '0' write unsuccessful



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## REVISION HISTORY

<b>Revision</b>	<b>Date</b>	<b>Changes</b>
1.0.2	07-2019	Updated Letterhead
1.0.1	01-2017	Initial Release