

# RA8 FFT PoC Test Signal Generation

## Requirements:

To use this script, you must have Python 3 installed, as well as the following packages:

1. Numpy
2. Matplotlib
3. Scipy

## Summary:

The “signal\_generator.py” script is used for the following:

1. Generating signal data for use in the FFT PoC.
2. Generating a representation of the simulated signal data that can be easily copied into the PoC code.
3. Generating low-pass filter coefficients.
4. Running a simulation of the FFT and filtering.
5. Reading in data that is generated from the PoC.
6. Plotting both the simulated data and the real data from the PoC.

By default, the script generates 1024 sine wave samples at a sample rate of 20 kHz. The parameters for this generation are defined at the top of the script as “num\_samples” and “sample\_rate”. The output wave is a combination of two waves, a 1 kHz component, and a 5 kHz component.

The low-pass filter coefficients are created by the “create\_lpf\_coefficients” function. This function takes two inputs: the number of filter taps, and the cutoff ratio.

The sine wave samples and the filter coefficients can be easily printed and copied into the PoC with the “print\_c\_array” function. You can uncomment the usage of this function at the end of the script to output them to the terminal.

The simulation and real data from the PoC are plotted using the “matplotlib” library. Two figures are being created. Each figure contains the same four plots. Figure 1 displays the simulated data and figure 2 displays the real data. The four plots are the input signal plot, the FFT of the input signal, the filtered signal, and the FFT of the filtered signal.

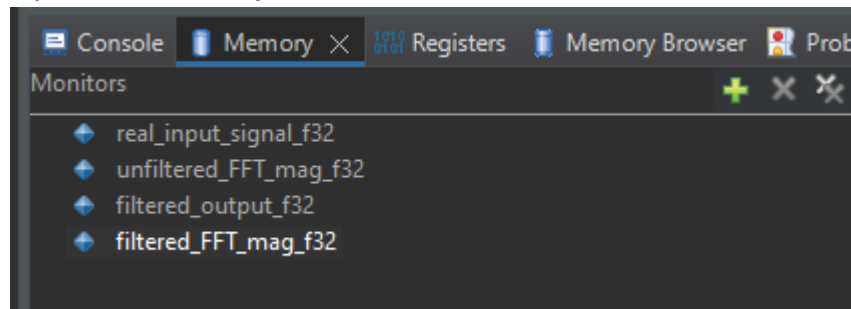
## Usage Instructions:

Gathering the input data:

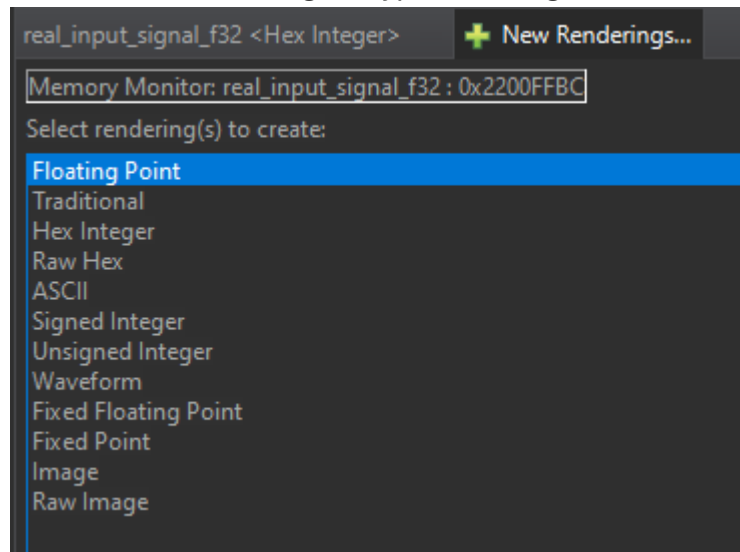
1. Build and flash the PoC project in e2 studio. Set a breakpoint at the end of the main loop.

```
154  
155     fft_cycle = ts_fft > ts_0? ts_fft - ts_0 : ~(ts_0 - ts_fft);  
156     filter_cycle = ts_filter > ts_fft? ts_filter - ts_fft : ~(ts_fft - ts_filter);  
157     fft2_cycle = ts_fft2 > ts_filter? ts_fft2 - ts_filter : ~(ts_filter - ts_fft2);  
158     total_cycle = ts_fft2 > ts_0? ts_fft2 - ts_0 : ~(ts_0 - ts_fft2);  
159  
160     APP_PRINT("FFT input signal clock cycle: %d\n", fft_cycle);  
161     APP_PRINT("Filter input signal clock cycle: %d\n", filter_cycle);  
162     APP_PRINT("FFT filtered signal clock cycle: %d\n", fft2_cycle);  
163     APP_PRINT("Total clock cycle: %d\n", total_cycle);  
164
```

2. Open the “Memory” tab and add monitors for the buffers.



3. Add a “New Rendering” of type “Floating Point”



4. Select and copy the data that you wish to plot. In this case, we are copying 1024 samples.

| real_input_signal_f32 <Hex Integer> | real_input_signal_f32 : 0x2200FFBC <Floating Point> | New Renderings... |              |              |              |              |              |
|-------------------------------------|---|-------------------|--------------|--------------|--------------|--------------|--------------|
| 0x000000002200FFBC                  | -8.054578E-1  | -8.054578E-1      | -8.127106E-1 | -8.207692E-1 | -8.288278E-1 | -8.376923E-1 | -8.465568E-1 |
| 0x000000002200FFD8                  | -8.554212E-1  | -8.642857E-1      | -8.723443E-1 | -8.804029E-1 | -8.884615E-1 | -8.965201E-1 | -9.045787E-1 |
| 0x000000002200FFFA                  | -9.118315E-1  | -9.190843E-1      | -9.255311E-1 | -9.319780E-1 | -9.400366E-1 | -9.464835E-1 | -9.529304E-1 |
| 0x0000000022010010                  | -9.585714E-1  | -9.650183E-1      | -9.714652E-1 | -9.771062E-1 | -9.827473E-1 | -9.891941E-1 | -9.948351E-1 |
| 0x0000000022010020                  | -1.000476E0   | -1.006117E0       | -1.011758E0  | -1.016593E0  | -1.021429E0  | -1.026264E0  | -1.031099E0  |
| 0x0000000022010048                  | -1.035934E0   | -1.040769E0       | -1.045604E0  | -1.050440E0  | -1.054469E0  | -1.057692E0  | -1.062527E0  |
| 0x0000000022010064                  | -1.065751E0   | -1.069780E0       | -1.073004E0  | -1.077839E0  | -1.081062E0  | -1.085092E0  | -1.089121E0  |
| 0x0000000022010080                  | -1.092344E0   | -1.096374E0       | -1.098791E0  | -1.102820E0  | -1.105238E0  | -1.109267E0  | -1.111685E0  |
| 0x000000002201009C                  | -1.114908E0   | -1.117326E0       | -1.119744E0  | -1.122161E0  | -1.124579E0  | -1.127802E0  | -1.130220E0  |
| 0x00000000220100B8                  | -1.132637E0   | -1.134249E0       | -1.135861E0  | -1.139084E0  | -1.140696E0  | -1.143919E0  | -1.146531E0  |
| 0x00000000220100D4                  | -1.147949E0   | -1.149560E0       | -1.151172E0  | -1.153590E0  | -1.155201E0  | -1.156813E0  | -1.158425E0  |
| 0x00000000220100F0                  | -1.160037E0   | -1.160842E0       | -1.163260E0  | -1.164872E0  | -1.165678E0  | -1.168095E0  | -1.168095E0  |
| 0x000000002201010C                  | -1.169707E0   | -1.170513E0       | -1.172125E0  | -1.172125E0  | -1.173736E0  | -1.175348E0  | -1.176154E0  |
| 0x0000000022010128                  | -1.177765E0   | -1.178571E0       | -1.179377E0  | -1.180989E0  | -1.181795E0  | -1.182601E0  | -1.183407E0  |
| 0x0000000022010144                  | -1.185018E0   | -1.185018E0       | -1.185824E0  | -1.186630E0  | -1.187436E0  | -1.189048E0  | -1.190659E0  |
| 0x0000000022010160                  | -1.192271E0   | -1.193077E0       | -1.193883E0  | -1.194689E0  | -1.195494E0  | -1.197106E0  | -1.197106E0  |
| 0x000000002201017C                  | -1.198718E0   | -1.199524E0       | -1.200330E0  | -1.201136E0  | -1.201941E0  | -1.202747E0  | -1.203553E0  |
| 0x0000000022010198                  | -1.204359E0   | -1.204359E0       | -1.205971E0  | -1.205165E0  | -1.205971E0  | -1.206776E0  | -1.206776E0  |
| 0x00000000220101B4                  | -1.207582E0   | -1.207582E0       | -1.209194E0  | -1.208388E0  | -1.208388E0  | -1.209194E0  | -1.209194E0  |
| 0x00000000220101D0                  | -1.209194E0   | -1.209194E0       | -1.210000E0  | -1.210000E0  | -1.210000E0  | -1.210806E0  | -1.210806E0  |
| 0x00000000220101EC                  | -1.210806E0   | -1.211612E0       | -1.211612E0  | -1.210806E0  | -1.212418E0  | -1.211612E0  | -1.212418E0  |
| 0x0000000022010208                  | -1.212418E0   | -1.212418E0       | -1.213223E0  | -1.213223E0  | -1.214029E0  | -1.214029E0  | -1.214029E0  |
| 0x0000000022010224                  | -1.214029E0   | -1.214029E0       | -1.214835E0  | -1.214835E0  | -1.215641E0  | -1.214835E0  | -1.215641E0  |
| 0x0000000022010240                  | -1.215641E0   | -1.215641E0       | -1.216447E0  | -1.215641E0  | -1.216447E0  | -1.216447E0  | -1.216447E0  |
| 0x000000002201025C                  | -1.216447E0   | -1.216447E0       | -1.216447E0  | -1.216447E0  | -1.217253E0  | -1.217253E0  | -1.218059E0  |
| 0x0000000022010278                  | -1.217253E0   | -1.218059E0       | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218864E0  |
| 0x0000000022010294                  | -1.218059E0   | -1.218059E0       | -1.218059E0  | -1.218059E0  | -1.218864E0  | -1.218059E0  | -1.219670E0  |
| 0x00000000220102B0                  | -1.218864E0   | -1.218864E0       | -1.218864E0  | -1.218864E0  | -1.218864E0  | -1.218864E0  | -1.219670E0  |
| 0x00000000220102CC                  | -1.219670E0   | -1.219670E0       | -1.219670E0  | -1.219670E0  | -1.218864E0  | -1.218864E0  | -1.218864E0  |
| 0x00000000220102E8                  | -1.219670E0   | -1.219670E0       | -1.219670E0  | -1.219670E0  | -1.219670E0  | -1.219670E0  | -1.220476E0  |
| 0x0000000022010304                  | -1.219670E0   | -1.219670E0       | -1.219670E0  | -1.220476E0  | -1.220476E0  | -1.219670E0  | -1.220476E0  |
| 0x0000000022010320                  | -1.219670E0   | -1.219670E0       | -1.219670E0  | -1.219670E0  | -1.220476E0  | -1.219670E0  | -1.220476E0  |
| 0x000000002201033C                  | -1.220476E0   | -1.220476E0       | -1.220476E0  | -1.220476E0  | -1.220476E0  | -1.220476E0  | -1.220476E0  |
| 0x0000000022010358                  | -1.220476E0   | -1.220476E0       | -1.220476E0  | -1.220476E0  | -1.220476E0  | -1.220476E0  | -1.221282E0  |
| 0x0000000022010374                  | -1.220476E0   | -1.221282E0       | -1.221282E0  | -1.221282E0  | -1.221282E0  | -1.221282E0  | -1.222088E0  |
| 0x0000000022010390                  | -1.221282E0   | -1.221282E0       | -1.221282E0  | -1.221282E0  | -1.221282E0  | -1.221282E0  | -1.222088E0  |
| 0x00000000220103AC                  | -1.221282E0   | -1.222088E0       | -1.221282E0  | -1.222088E0  | -1.221282E0  | -1.221282E0  | -1.222088E0  |

5. Paste the data into a text editor such as Notepad++.

|    |                    |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
|----|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1  | 0x000000002200FFBC | -8.054578E-1 | -8.054578E-1 | -8.127106E-1 | -8.207692E-1 | -8.288278E-1 | -8.376923E-1 | -8.465568E-1 | -8.554212E-1 | -8.642857E-1 | -8.723443E-1 | -8.804029E-1 | -8.884615E-1 | -8.965201E-1 | -9.045787E-1 |
| 2  | 0x000000002200FFD8 | -9.255311E-1 | -9.319780E-1 | -9.400366E-1 | -9.464835E-1 | -9.529304E-1 | -9.585714E-1 | -9.650183E-1 | -9.714652E-1 | -9.771062E-1 | -9.827473E-1 | -9.891941E-1 | -9.948351E-1 | -1.000476E0  | -1.006117E0  |
| 3  | 0x000000002200FFFA | -1.011758E0  | -1.016593E0  | -1.021429E0  | -1.026264E0  | -1.031099E0  | -1.035934E0  | -1.040769E0  | -1.045604E0  | -1.050440E0  | -1.054469E0  | -1.057692E0  | -1.062527E0  | -1.065751E0  | -1.069780E0  |
| 4  | 0x0000000022010010 | -1.073004E0  | -1.077839E0  | -1.081062E0  | -1.085092E0  | -1.089121E0  | -1.092344E0  | -1.096374E0  | -1.098791E0  | -1.102820E0  | -1.105238E0  | -1.109267E0  | -1.111685E0  | -1.114908E0  | -1.117326E0  |
| 5  | 0x0000000022010020 | -1.132637E0  | -1.134249E0  | -1.135861E0  | -1.139084E0  | -1.140696E0  | -1.143919E0  | -1.146531E0  | -1.147949E0  | -1.149560E0  | -1.151172E0  | -1.153590E0  | -1.155201E0  | -1.156813E0  | -1.158425E0  |
| 6  | 0x0000000022010048 | -1.164728E0  | -1.165678E0  | -1.168095E0  | -1.168095E0  | -1.169707E0  | -1.170513E0  | -1.172125E0  | -1.172125E0  | -1.173736E0  | -1.175348E0  | -1.176154E0  | -1.177765E0  | -1.178571E0  | -1.179377E0  |
| 7  | 0x0000000022010064 | -1.182601E0  | -1.183407E0  | -1.185018E0  | -1.185018E0  | -1.185824E0  | -1.186630E0  | -1.187436E0  | -1.189048E0  | -1.189854E0  | -1.190659E0  | -1.192271E0  | -1.193077E0  | -1.193883E0  | -1.194689E0  |
| 8  | 0x0000000022010080 | -1.197106E0  | -1.197106E0  | -1.198718E0  | -1.199524E0  | -1.200330E0  | -1.201136E0  | -1.201941E0  | -1.202747E0  | -1.203553E0  | -1.204359E0  | -1.205165E0  | -1.205971E0  | -1.206776E0  | -1.206776E0  |
| 9  | 0x000000002201009C | -1.209194E0  | -1.209194E0  | -1.209194E0  | -1.209194E0  | -1.209194E0  | -1.209194E0  | -1.209194E0  | -1.209194E0  | -1.209194E0  | -1.210000E0  | -1.210000E0  | -1.210000E0  | -1.210806E0  | -1.210806E0  |
| 10 | 0x00000000220100B8 | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  | -1.212418E0  |
| 11 | 0x00000000220100D4 | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  | -1.215641E0  |
| 12 | 0x00000000220100F0 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 13 | 0x000000002201010C | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 14 | 0x0000000022010128 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 15 | 0x0000000022010144 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 16 | 0x0000000022010160 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 17 | 0x000000002201017C | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 18 | 0x0000000022010198 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 19 | 0x00000000220101B4 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 20 | 0x00000000220101D0 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 21 | 0x00000000220101EC | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 22 | 0x0000000022010208 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 23 | 0x0000000022010224 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 24 | 0x0000000022010240 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 25 | 0x000000002201025C | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 26 | 0x0000000022010278 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 27 | 0x0000000022010294 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 28 | 0x00000000220102B0 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 29 | 0x00000000220102CC | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 30 | 0x00000000220102E8 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 31 | 0x0000000022010304 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 32 | 0x0000000022010320 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 33 | 0x000000002201033C | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 34 | 0x0000000022010358 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 35 | 0x0000000022010374 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 36 | 0x0000000022010390 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 37 | 0x00000000220103AC | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 38 | 0x00000000220103C0 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 39 | 0x00000000220103DC | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 40 | 0x00000000220103F0 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 41 | 0x000000002201040C | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 42 | 0x0000000022010428 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 43 | 0x0000000022010444 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 44 | 0x0000000022010460 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 45 | 0x000000002201047C | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 46 | 0x0000000022010498 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 47 | 0x00000000220104B4 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 48 | 0x00000000220104D0 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 49 | 0x00000000220104EC | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 50 | 0x0000000022010500 | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 51 | 0x000000002201051C | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.218059E0  | -1.2180      |              |              |              |              |

- Select and delete the first column of memory addresses using “Shift + Alt” to select.

|    |                    |              |              |              |
|----|--------------------|--------------|--------------|--------------|
| 1  | 0x000000002200FFBC | -8.054578E-1 | -8.054578E-1 | -8.127106E-1 |
| 2  | 0x000000002200FFFC | -9.255311E-1 | -9.319780E-1 | -9.400366E-1 |
| 3  | 0x000000002201003C | -1.021429E0  | -1.026264E0  | -1.031099E0  |
| 4  | 0x000000002201007C | -1.089121E0  | -1.092344E0  | -1.096374E0  |
| 5  | 0x00000000220100BC | -1.134249E0  | -1.135861E0  | -1.139084E0  |
| 6  | 0x00000000220100FC | -1.164872E0  | -1.165678E0  | -1.168095E0  |
| 7  | 0x000000002201013C | -1.182601E0  | -1.183407E0  | -1.185018E0  |
| 8  | 0x000000002201017C | -1.198718E0  | -1.199524E0  | -1.200330E0  |
| 9  | 0x00000000220101BC | -1.209194E0  | -1.208388E0  | -1.208388E0  |
| 10 | 0x00000000220101FC | -1.212418E0  | -1.211612E0  | -1.212418E0  |
| 11 | 0x000000002201023C | -1.215641E0  | -1.215641E0  | -1.215641E0  |
| 12 | 0x000000002201027C | -1.218059E0  | -1.218059E0  | -1.218059E0  |
| 13 | 0x00000000220102BC | -1.218864E0  | -1.218864E0  | -1.218864E0  |
| 14 | 0x00000000220102FC | -1.219670E0  | -1.220476E0  | -1.219670E0  |
| 15 | 0x000000002201033C | -1.220476E0  | -1.220476E0  | -1.220476E0  |
| 16 | 0x000000002201037C | -1.221282E0  | -1.221282E0  | -1.221282E0  |
| 17 | 0x00000000220103BC | -1.222088E0  | -1.221282E0  | -1.222088E0  |
| 18 | 0x00000000220103FC | -1.222088E0  | -1.221282E0  | -1.222894E0  |
| 19 | 0x000000002201043C | -1.222894E0  | -1.222088E0  | -1.222894E0  |
| 20 | 0x000000002201047C | -1.222894E0  | -1.222894E0  | -1.222894E0  |
| 21 | 0x00000000220104BC | -1.222894E0  | -1.223700E0  | -1.222894E0  |
| 22 | 0x00000000220104FC | -1.223700E0  | -1.224505E0  | -1.224505E0  |
| 23 | 0x000000002201053C | -1.226117E0  | -1.226117E0  | -1.226923E0  |
| 24 | 0x000000002201057C | -1.230146E0  | -1.230146E0  | -1.230146E0  |

- Repeat steps 3 through 6 for each of the memory buffers.
- Save the files with whatever names you find appropriate. You will need to input these file names in the first section of the script.

```
def main():
    #####
    # Define input file paths here

    real_signal_path = 'real_signal_out.txt'
    real_signal_data = read_data(real_signal_path)

    fft_input_path = 'unfilt_fft_mag_out.txt'
    fft_input_data = read_data(fft_input_path)

    filter_input_path = 'filter_out.txt'
    filter_input_data = read_data(filter_input_path)

    fft_filter_input_path = 'filt_fft_mag_out.txt'
    fft_filter_input_data = read_data(fft_filter_input_path)

    #####
```

9. Now you can run the script with “python.exe signal\_generator.py”.

On-Chip Data

