FIR- FFT Project

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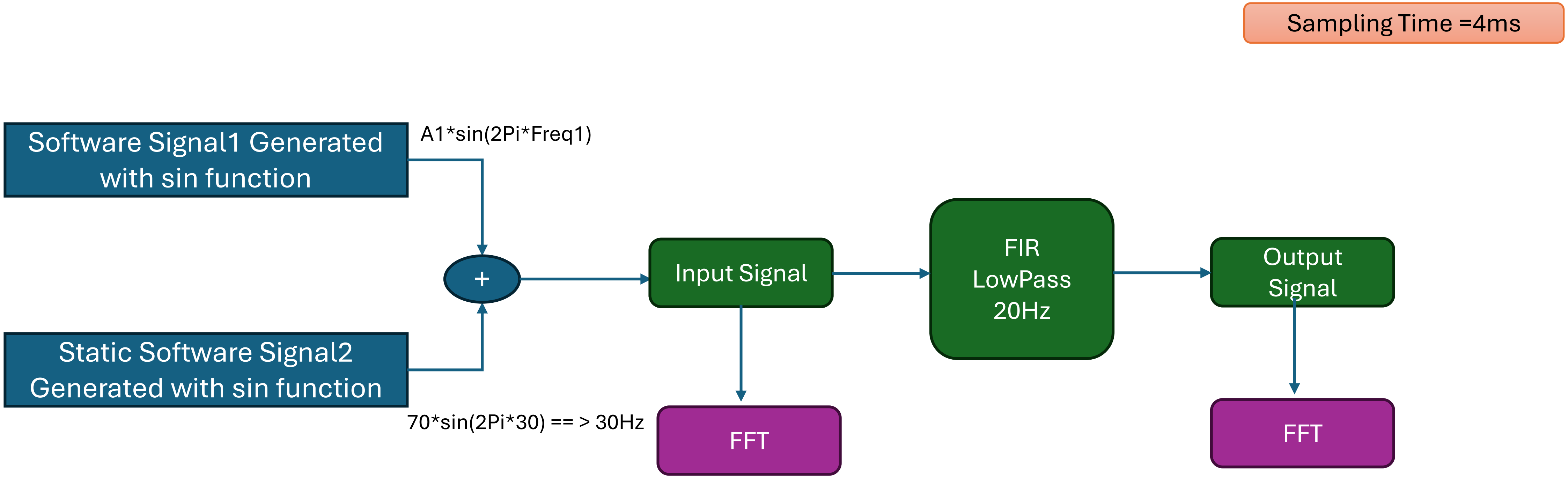
2024

Toolchain & Tools

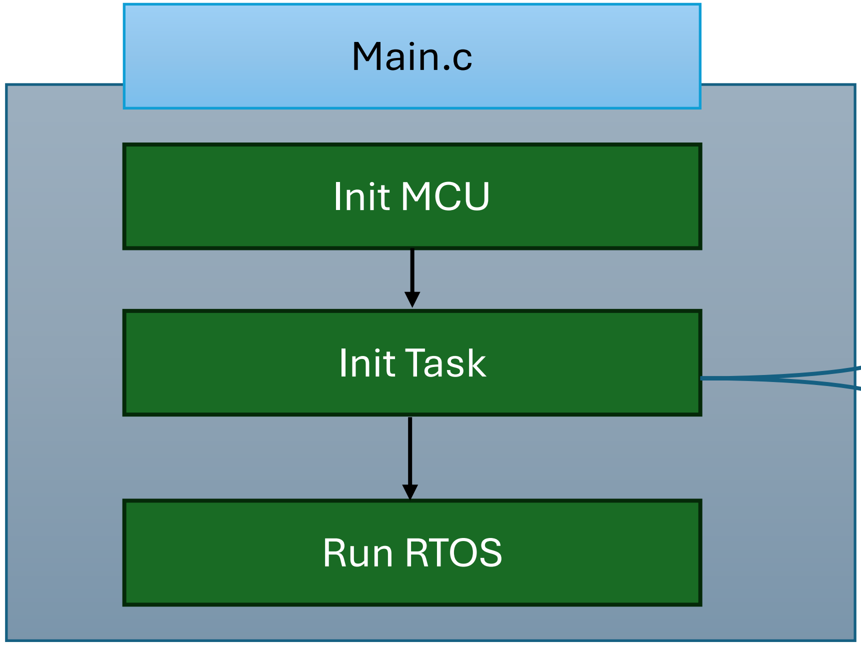
IDE : STM32CubeIDE 1.15
TouchGFX : 4.24.0

Project Description



Software Description

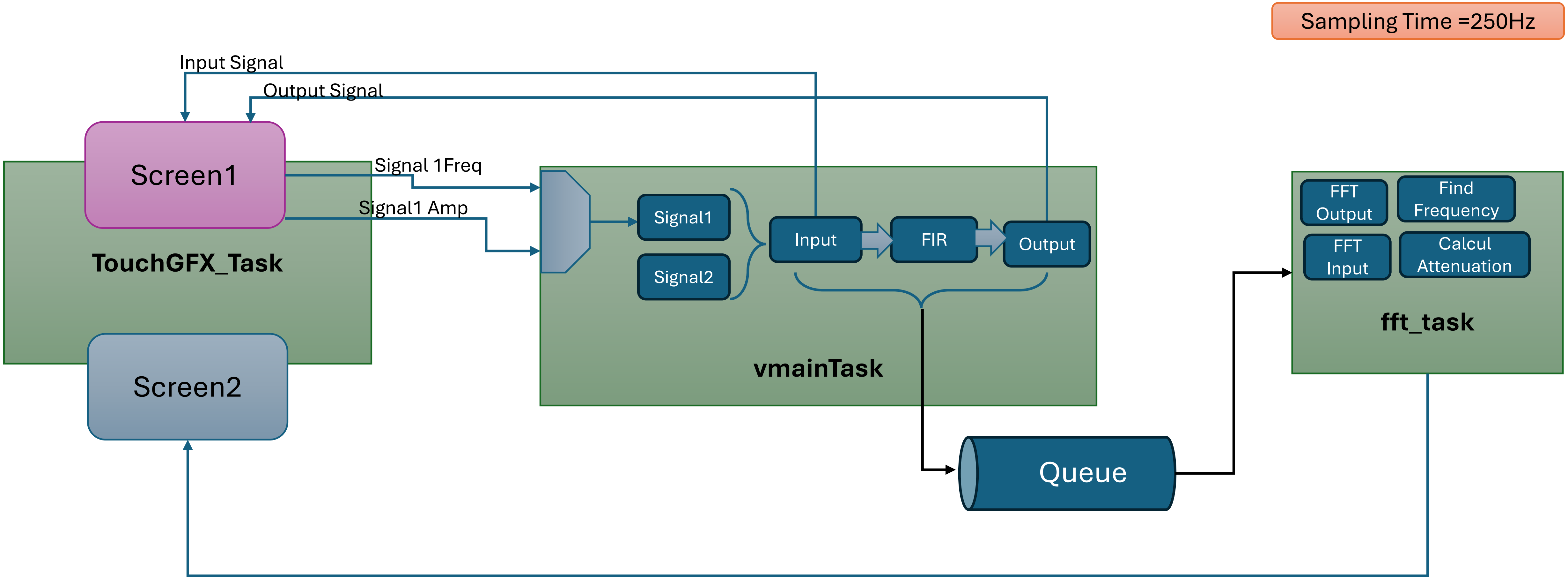
Sampling Time =4ms



Configure 3 Tasks :

- **TouchGFX_Task** : managing the ScreenView
- **vmainTask** :generate input Signal& apply fir filtre
- **fft_task** : produce fft for both input & output

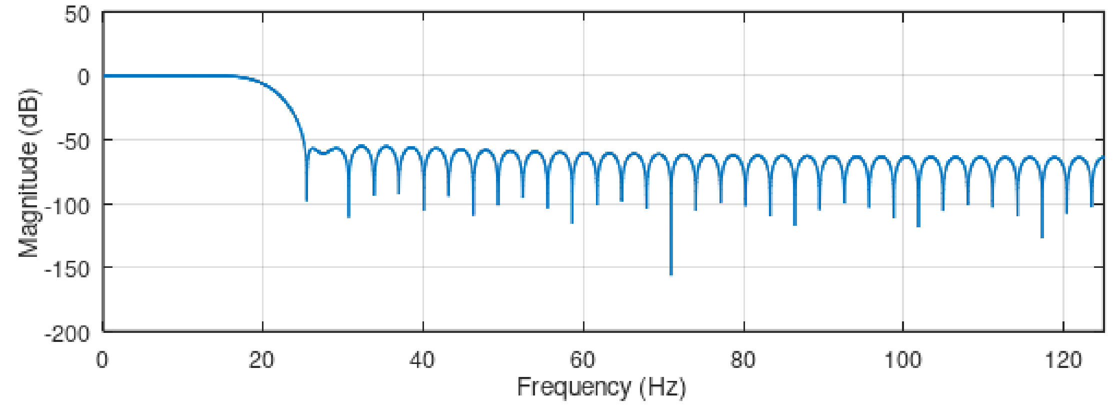
Software Description

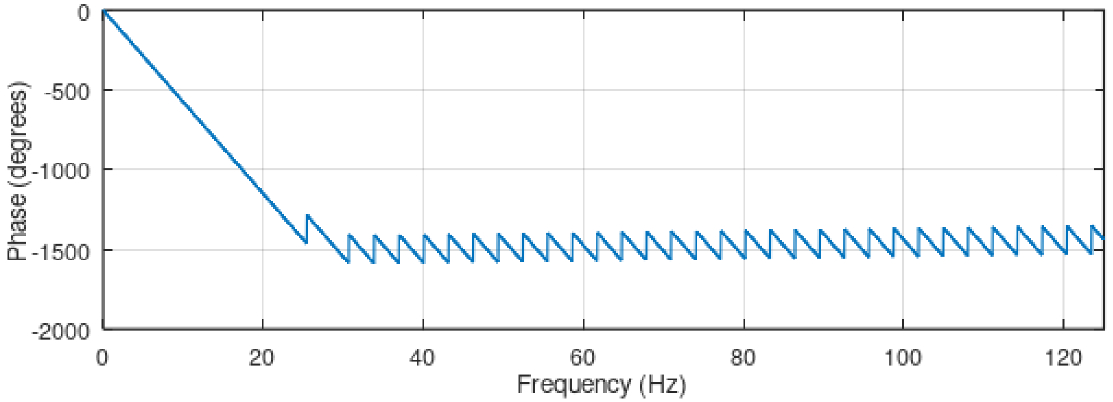


FIR Octave Script

```
close all;
clear all;
clc;

pkg load signal


%FIR1
fs=250;
fc=20; %20Hz
wc=fc/(fs/2);   % normalized frequency

b=fir1(80,wc);  % Low pass filter

figure;
stem(b);

freqz(b,1,2^12,fs);   %frequency response of filter
[H,f]=freqz(b,1,2^12,fs);
figure;
plot(f,abs(H));
xlabel('Frequency Hz');
ylabel('Freq Response');
box off; grid on; axis tight;
```

After executing this script fir_filtre.m
Call the function stm32f4_fir_coeffs(b), it will generate a new FIR coef





FIR Octave Script

After executing this script fir_filtre.m with octave

```
>> stm32f4_fir_coeffs(b)
enter filename for coefficients fir_coef.c
>>
```

```c
/*
  ******************************************************************************
  * @file         fir_coef.c
  * @brief        This file provides
  * @Author       mhanzout
  * @date         Jul 10, 2024
  ******************************************************************************
  ******************************************************************************
                             EMBEDDED LOW LEVEL SOFWARE
  ******************************************************************************
  ******************************************************************************
 */
#include "myfir.h"

#if 1

// fir1_250hz_20hz   fc=20Hz   fs=250hz
float Fir_FiltreCoeff[NUM_TAPS] = {
5.7727E-04,3.9416E-04,9.6552E-05,-2.8467E-04,-6.8991E-04,-1.0243E-03,
-1.1672E-03,-1.0016E-03,-4.5991E-04,4.2780E-04,1.5037E-03,2.4880E-03,
3.0329E-03,2.8175E-03,1.6649E-03,-3.5509E-04,-2.8766E-03,-5.2712E-03,
-6.7751E-03,-6.6906E-03,-4.6180E-03,-6.5020E-04,4.5350E-03,9.7343E-03,
1.3445E-02,1.4226E-02,1.1116E-02,4.0118E-03,-6.1110E-03,-1.7209E-02,
-2.6454E-02,-3.0750E-02,-2.7399E-02,-1.4761E-02,7.2378E-03,3.6882E-02,
7.0812E-02,1.0452E-01,1.3315E-01,1.5233E-01,1.5909E-01,1.5233E-01,
1.3315E-01,1.0452E-01,7.0812E-02,3.6882E-02,7.2378E-03,-1.4761E-02,
-2.7399E-02,-3.0750E-02,-2.6454E-02,-1.7209E-02,-6.1110E-03,4.0118E-03,
1.1116E-02,1.4226E-02,1.3445E-02,9.7343E-03,4.5350E-03,-6.5020E-04,
-4.6180E-03,-6.6906E-03,-6.7751E-03,-5.2712E-03,-2.8766E-03,-3.5509E-04,
1.6649E-03,2.8175E-03,3.0329E-03,2.4880E-03,1.5037E-03,4.2780E-04,
-4.5991E-04,-1.0016E-03,-1.1672E-03,-1.0243E-03,-6.8991E-04,-2.8467E-04,
9.6552E-05,3.9416E-04,5.7727E-04
};
```