ECE 560(/592): Embedded System Architecture

Project : Sharing The ADC : Report

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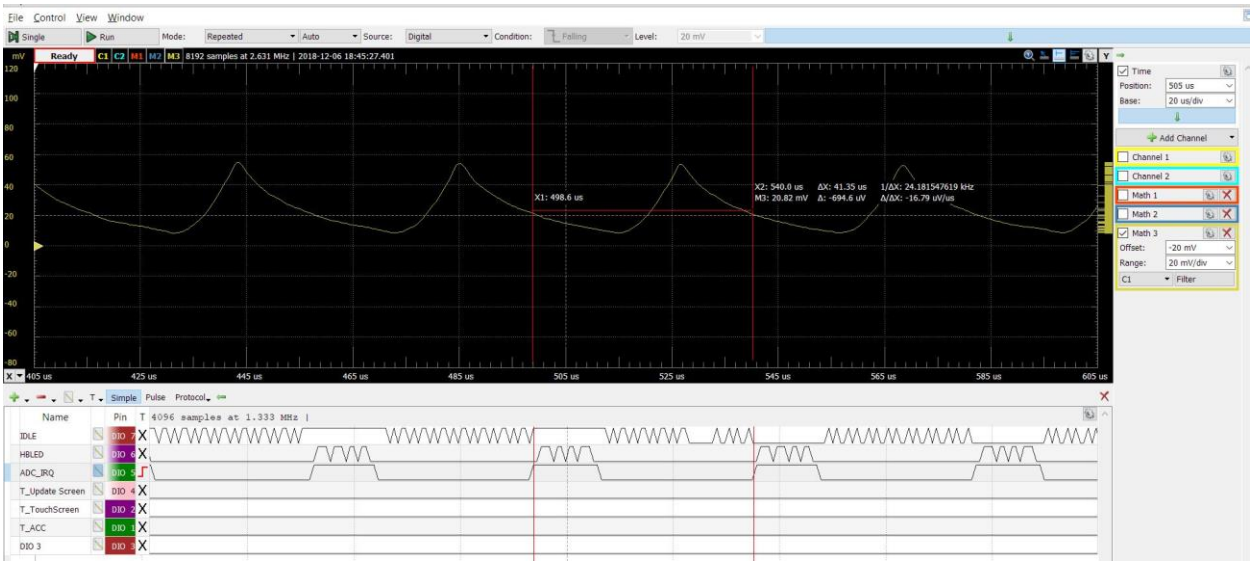
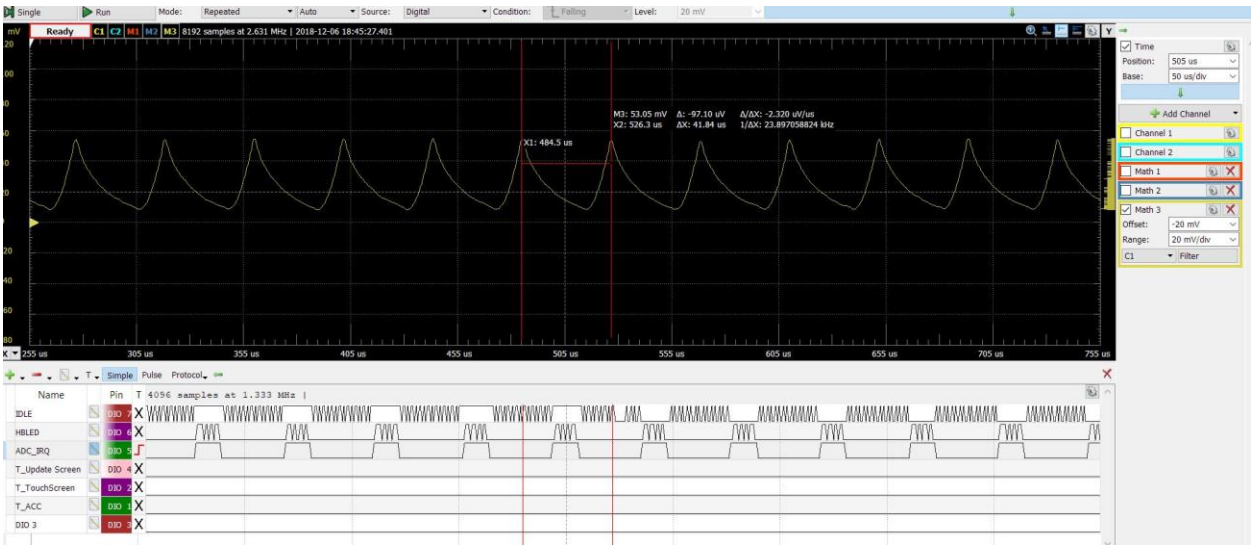
A. Control HBLED

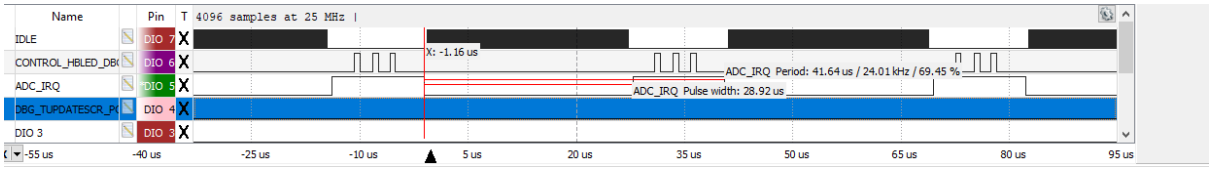
Screenshot 1: Mixed Signal





In screenshot above, from the mixed signals we can see that the ADC is centrally aligned and samples during the stable time to avoid noises at the edges. We can see from the logic diagram that the control

HBLED runs within the ISR or when the ADC conversion is complete. Here since the screen is not touched we can see ADC has not triggered any more conversions. ADC syncs with output reponse.

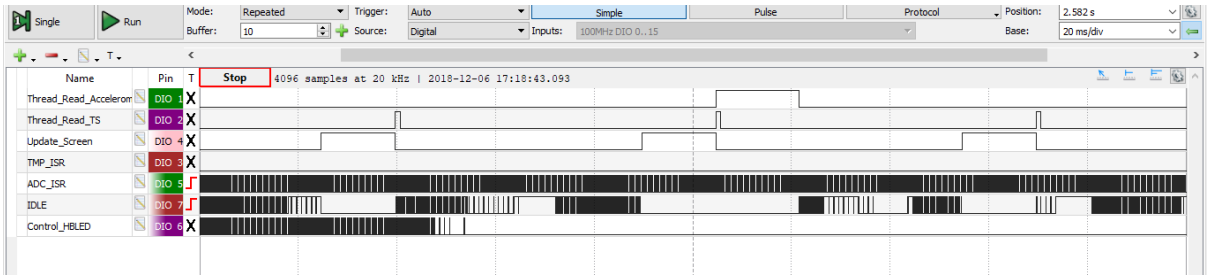


The digital response of the same shows the ISR runs with the frequency of 24KHz (frequency with which timer overflows.) Also HBLED controller toggles while executing multiplication.

B.

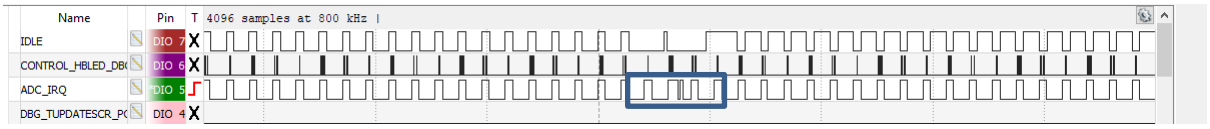
(i) Screen NOT touched

Screenshot 2: Digital response



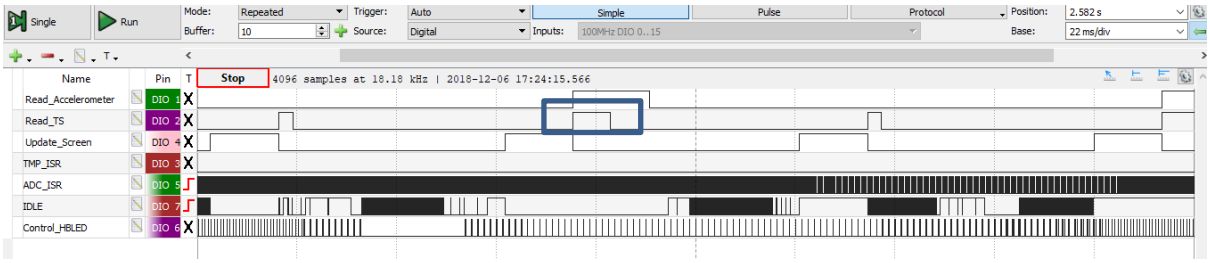
In the figure above we can see the time for which the Thread_Read_TS run is short and the function which checks if the screen is touched and conversions do not run. As the screen is not touched this function just give a check on some GPIO and exits.

(ii) Screen is touched



When the screen is touched we can see there is back to back signal for ADC conversion. This extra trigger is software trigger. These conversions do not take much of the ISR time and configure ADC according to the message queue.

(iii) Screen touched



As soon we touch the screen the ISR queues its ADC conversion for x-axis configuration and then waits for the conversion to complete then it goes on to configure the Y-axis reading and queues another ADC conversion request and then processes it as required. The highlighted portion shows the increased execution time of Read_TS.