

# Experiment 01: Tools Of The Trade - Answer Book

• Name:	Lab Date:	
• Student No.:	Day of the week:	Time:
• Name:	TA Signature:	
• Student No.:	Grade:	

## 3. Introduction to Matlab and Simulink

### 3.1 Simulating a Scope

- After you have run the simulated scope, show the TA what you have done and have the TA sign the box below.

### 3.2 Simulating a Spectrum Analyzer

- After you have run the simulated spectrum analyzer, show the TA what you have done and have the TA sign the box below.

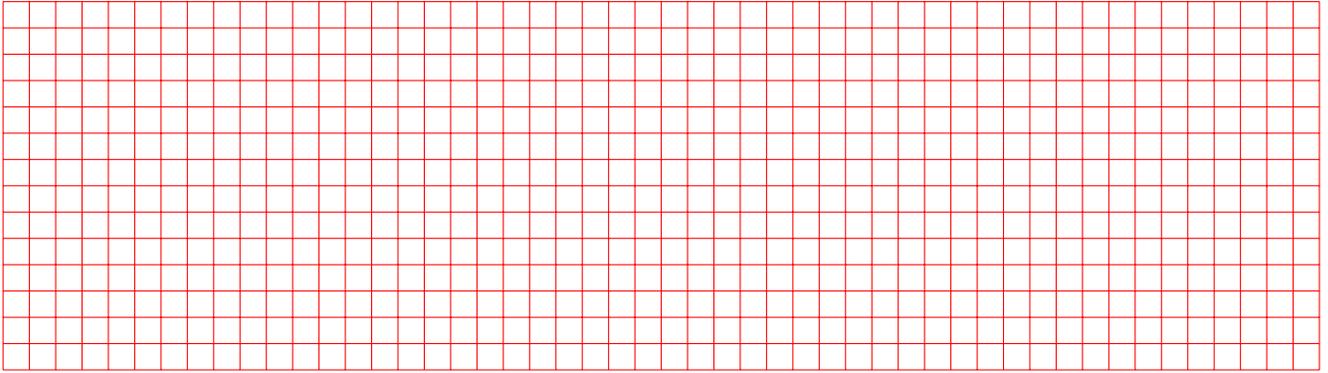
### 3.3 Simulating a Square Wave

- After you have run the simulation of a square wave, displaying it in the time domain and frequency domain, show the TA what you have done and have the TA sign the box below.

### 3.4 Multiplying Two Sinusoids

- After you have run the simulation of a multiplication of two sinusoids, displaying the result in the time domain and frequency domain, show the TA what you have done and have the TA sign the box below.

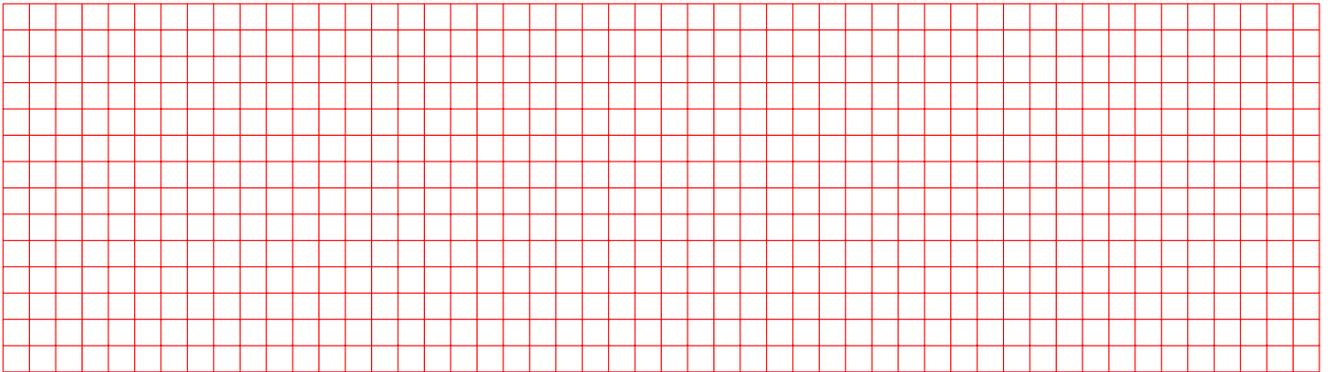
- You have a bandlimited signal, whose spectrum is flat with magnitude  $A$  between  $0$  and  $4\text{KHz}$ , and you multiply it by  $\cos(2\pi 680000t)$ . Draw the resulting frequency domain plot. If you do not specify all values and labels in the plot, your mark will be zero.



### 3.5 Adding Multiple Sinusoids

- Design a system to synthesize a square wave through the addition of multiple sinusoids. Display the result in the time domain and frequency domain, show the TA what you have done and have the TA sign the box below.

- What is preventing you from getting a perfect square wave at your output? (hint: look at your prep)



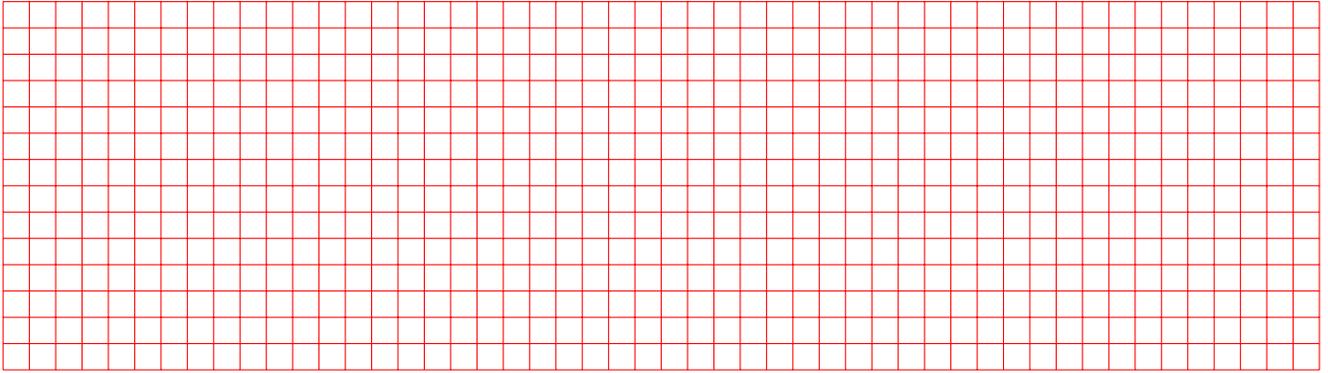
## 4. Introduction to Code Composer Studio v7.4

### 4.1 The Hardware

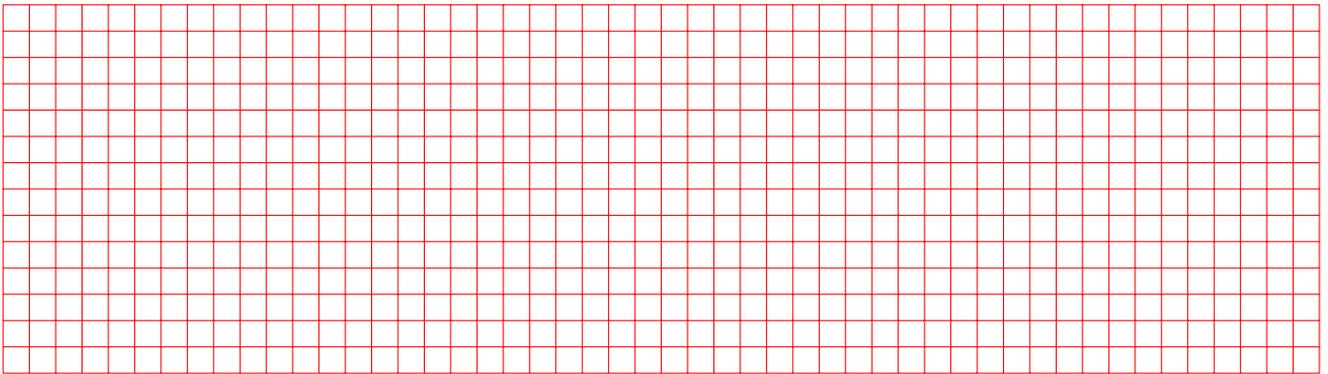
For input to the target DSP, you will use a 1KHz,  $1V_{pp}$  square wave. If you have already pressed the "play" button on CCS, your program should be running and the oscilloscope will display your output.

- After you make the system run with the correct input showing the expected output, show the TA what you have done and have the TA sign the box below.

- Why is your output a sine wave if your input is a square wave? (1pt)



- *You have two output channels displayed on the oscilloscope. If you answered the previous question, you have figured one of them out. Explain whether the second output is related to the input and if it is not, why it is not (hint: switch the input off)*



## 5. Going The Extra Mile

At this point, try to explore the files within the project you are running. A good understanding of these simple steps will give you a better idea of what is being done in every experiment, as well as a good background to delve into real-time DSP programming. This section will **not** be part of your mark.

- *You may have noticed that the core function is called from within an interrupt service routine. Why is that?*
- *What is generating the interruption? In other words, what is interrupting the process?*
- *How are the samples handled? How are the two channels separated?*