## ECE 18-316 INTRO TO DATA STORAGE FALL 98 <u>INSTRUCTION SHEET: LAB # 1: Waveform Capture</u> **Due Friday, 9/3/98** In Class or To Jie Zou Before Start of Lab Section (1:30 PM)

Late submissions will not get credit

## Purpose:

The purpose of this lab is to familiarize students with the capture of waveforms in the HHA104, and the use of equipment and procedures that will be relevant in future labs. Furthermore, it will familiarize students with the operation of Matlab for converting file types and plotting results.

## In Class:

1) Organize yourselves into groups of three (at most) students and find a lab bench for your group to work at.

2) Hook up the function generator to the oscilloscope and turn both instruments on.

3) Set the function generator to the following settings:

shape	sine
freq:	1kHz
amp:	0.5 V (p-p)
offset:	0 V
output termination:	High Z (Menu D: Sys; Submenu 1: Out Term)

4) Adjust the scope to show two periods of the waveform on the screen for this first case, and to be properly triggered.

5) Using the Operating Instructions Summary (OIS) provided for this lab on capturing and plotting waveforms, download, save, convert and plot these waveforms using Matlab. Label the axes in the plotting program.

\*\*\*\*\* YOU DO NOT NEED TO PRINT AT THIS TIME. \*\*\*\*\*

6) Save this data to your AFS space for future incorporation into your write-up.

Number	shape	freq	amp	offset	f.g. output termination	# periods shown
		Hz	V (p-p)	V	Ohms	-
1 (done)	sine	1000	0.5	0	High Z	2
2	sine	2000	0.5	0	High Z	4
3	sine	5000	0.5	0	High Z	10
4	sine	100	0.1	0.05	High Z	2
5	sine	200	0.1	0.10	High Z	4
6	sine	300	0.1	0.15	High Z	6
7	square	100	0.5	0	High Z	4
8	square	1000	0.5	0	High Z	4
9	square	10000	0.5	0	High Z	4
10	sine	1000	0.5	0	50 Ohm	5

7) Repeat the above steps for the following cases:

## Write-up:

1) Make the following plots and include them in your write-up according to the format given on the course web-site.

a) Files 1, 2, and 3 on one graph, files 4,5, and 6 on a second graph, and files 7, 8, and 9 on a third graph, all on one page.

b) Files 1 and 10 on one graph, on a separate page.

2) Answer the following questions:

a) Why does the apparent voltage change when you change the output termination setting of the function generator? Draw diagrams as necessary, and refer to the graph from 1b), above.

b) What is the minimum voltage setting that the function generator supports.

c) How big is the noise on the signal, relative to the signal at this lowest setting? How is this changed by using different types of coupling on the scope?