

EE442/EE592 Real-Time Digital Signal Processing

Laboratory 1: Introduction to the Development Environment & Simple (Non Real-Time) Programs

1 Opening

1.1 Documentation

Note the documentation available for the assembler (CD) and debugger. Please do not remove the documentation from the lab.

1.2 PC Development Station

Overview of the Debugger, Notepad++, and DOS desktop shortcuts. Location of the DSP board's audio in and out jacks. Location of the sound card's audio in and out. Location of audio cables. Warning about feeding only low-level signals to the DSP board. Request for keeping volumes low.

2 Debugger

The debugger used in this class is Domain Technologies', Debug-56K. To begin, launch the Debug-56K.

2.1 Overview of Debugger Windows

Note the various windows for P-, X-, and Y-memory; registers, command window. Pressing F2 will switch between viewing values in binary, fractional, hexadecimal. Windows can be rearranged and configured as desired.

3 Interacting with the DSP Board

3.1 Entering Numerical Values

Numerical values can be directly entered into accumulators, registers, and memory. Try typing in a value and pressing enter. Note that values cannot be entered into external memory until `pass.cld` (see Section 4) is loaded.

3.2 Entering Instructions via a File

The alternate method for entering instructions (and the only practical method for a long set of instructions) is through an assembled file.

STEP 1: Using the editor of your choice [Notepad, Notepad++ etc...] type the following lines into a file (be sure to indent at least one space before each line):

```
org p:$100
move    #$400000,x0 ;0.5 -> x0
move    #$200000,a  ;0.25 -> a
add     x0,a        ;0.75 -> a
```

Save the file as `simple.asm`:

STEP 2: Assemble the simple program in a DOS window by using the DSP56300 Macro Assembler

```
asm56300 -a -b -l -g simple.asm
```

or (if a batch file `asm.bat` is present)

```
asm simple.asm
```

or (if a batch file `a.bat` is present)

```
a simple.asm
```

Assembling the source file will produce two files: `simple.cld` (downloadable object code) and `simple.lst` (the listing file). You may wish to examine `simple.lst` in an editor.

STEP 3: Download the object code to the DSP board, by selecting Load from Debugger menu, and selecting `simple.cld`

STEP 4: Next, you must set the program counter (PC) to address \$100 so the DSP knows where to execute the instruction. Enter:

```
change pc $100
```

STEP 5: Now, tell the DSP to execute (step) through the instructions which start at location P:\$100.

```
step  
step  
step
```

or

```
step 3
```

4 Simple Programs

Complete Programs 1, 2, and 3 in Chapter 4 of the textbook.