

ELEC 361 Measurement and Analysis

Using ARB to generate custom waveforms (in 3 easy steps)

1. Save your custom waveform as a txt file using MATLAB

You need to generate your desired waveform in MatLab and write it out to a .txt file.

In the Near-Field Communicator lab you will modulate a snippet of voice. You can either have ARB generate the snippet of voice (and use FGEN to perform the modulation), or make the amplitude modulated waveform in MatLab (using ammod361.m) and have ARB generate the modulated signal.

The following code gives an example of writing a simple sine wave out to a .txt file in a format that can be read by the ELVIS waveform editor.

```
fs = 44.1e3;           % sampling frequency
dur = .2;             % duration in seconds

samples = dur*fs;    % number of samples in waveform

f = 2e3;              % frequency of sine wave

t = linspace(0,dur,samples);
wf = sin(2*pi*f*t); % generate the waveform

plot(t,wf)           % may as well plot the waveform

fid = fopen('2kHzsine.txt','wt'); % open file for writing
fprintf(fid,'%i\n',wf);          % write file
fclose(fid);                    % close file
```

The MatLab commands for writing the data to text file is available in a function called `writetxt` . It can be called by:

```
writetxt(waveform, 'filename.txt');
```

The MatLab function `importdata` is useful for reading data in from a text file. In particular, you can skip the header lines in data files saved by ELVIS tools.

2. Convert to WDT format

Open ARB from the ELVISmx Instrument launcher and launch the waveform editor. Select File > Open and open the text file you just generated in MatLab. Look at the waveform preview, ensure that tab delimiting is selected and that the number of samples is correct. After you have clicked OK, enter the correct sample rate and duration. Now go to File > Save and Save your waveform as a .wdt file.

3. Generate your wave form with the Arbitrary Waveform Generator

Close the waveform editor. Now, back in the Arbitrary Waveform Generator. You can open your waveform and assign it to an analogue output channel.