How to use the audio data collection system:

* Make sure the two boards are properly connected (see board images below for pin designations)
* Configure the microphone board shorting blocks for automatic or manual gain (see board images below for patterns)
* Give power to the board (see board images below for where Vdd and GND pins are)
* Power LED will turn on
* Record LED will turn on and then off

*-----------------*

* *If you want to change the gain mode/values or the sync timer interval*
	+ Use the PICKit3 to Program the processor with the correct CVR and CVRR values for the desired gain and gain mode (see table below) as well as the sync time
		- The values are at the top of the “main\_full\_system\_final.c” file in the #define section as CVRval and CVRRval
		- The sync timer value is #defined as syncCounts. Every value of syncCounts corresponds to 10ms of time (e.g. syncCounts=300 is a 3 second sync time).

*-----------------*

* Put microSD in the card slot on the board (you may also do this before you give the board power if you want)
* Board is now ready to record
* Press record button
	+ Record LED will turn on
	+ Data is being recorded to microSD card in the form of unsigned 16-bit integers
* Press record button
	+ Record LED turns off, then flashes twice
* Data is done writing and file is ready for viewing

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* You may now remove the microSD (it doesn’t matter if the board has power when you remove the card)

OR

* You can press the record button again to create a new data file and begin writing to it

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* You may power off the board whenever the device is not actively recording

When microSD card is in the PC:

* Copy the desired file to the folder where the “readSoundData.m” file is located
* Open “readSoundData.m”
* Change the variables at the top of the file “readSoundData.m” to read the desired data file and name the outputted \*.wav file
* If you don’t want to make/edit the \*.wav file, change “makeWavFile” to equal 0
* If you don’t want MATLAB to output the graphical waveform and fast Fourier transform, change “makePlots” to equal 0
* Run the MATLAB script
* You now have a \*.wav file of the data
* The sample numbers where the sync markers were made are in the “markerPoints” variable
* The raw and corrected data as well as voltage and -1 to +1 normalized data arrays are written into column vectors

|  |  |  |  |
| --- | --- | --- | --- |
|  | CVRR=0 |  | CVRR=1 |
| CVR<3:0> | Voltage (V) | Gain (dB) |  | Voltage (V) | Gain(dB) |
| 0 | 0.83 | 21.6 |  | 0 |  |
| 1 | 0.93 | 13.6 |  | 0.14 | 76.8 |
| 2 | 1.03 | 5.6 |  | 0.28 | 65.6 |
| 3 | 1.13 |  |  | 0.41 | 55.2 |
| 4 | 1.24 |  |  | 0.55 | 44 |
| 5 | 1.34 |  |  | 0.69 | 32.8 |
| 6 | 1.44 |  |  | 0.83 | 21.6 |
| 7 | 1.55 |  |  | 0.96 | 11.2 |
| 8 | 1.65 |  |  | 1.1 | 0 |
| 9 | 1.75 |  |  | 1.24 |  |
| 10 | 1.86 | ACG Mode |  | 1.38 |  |
| 11 | 1.96 |  |  | 1.51 |  |
| 12 | 2.06 |  |  | 1.65 |  |
| 13 | 2.17 |  |  | 1.79 |  |
| 14 | 2.27 |  |  | 1.93 |  |
| 15 | 2.37 |  |  | 2.06 |  |

\*Don’t use the highlighted cell values

Table 1. Voltage Reference Values and Associated Gains



Figure 1. Gain Control Settings

Figure 2. Back Board Layout

Figure 3. Neck Board Layout