ECE411 Etch-A-Tune Test Plan

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December 4th 2025
Document Rev: 1.0
HW Rev: 1.0
SW Rev: 1.0

Part 1: Total Testing List

Unit Tests

1. Power Regulation
    a. Test power from USB (5V) power is regulated down to 3.3V
    b. Test power from the battery circuit (3.7 nominal, 18650 LiPo) is regulated down to 3.3V
2. Battery Charge Circuit
    a. Test that the battery can charge when USB (5V) power is connected
    b. Test that the discharge mosfet is open when discharging
        i. Test that the charge mosfet is closed when discharging
    c. Test that the charge mosfet is open when charging
        i. Test that the discharge mosfet is closed when charging
    d. Test that battery voltage can be sensed
3. Screen
    a. Test that the screen powers on
    b. Test that the screen can display a test image
    c. Test that the screen produces valid touch output
4. Buttons, Encoders, Switches
    a. Test that the buttons open and close the circuit after soldering
    b. Test that the encoders open and close the circuit after soldering
    c. Test that the switch opens and closes the circuit after soldering
5. Microcontroller
    a. Test that it can blink an led
    b. Test that the DAC can produce simple sine waves
        i. Test that it can have configurable voltages
    c. Test that the ADC can read input voltages

Verification Tests

1. Verify that touch is properly calibrated
2. Verify that the spectrogram to waveform function is accurate enough
3. Verify that the switch changes mode to and from drawing to audio output

4. Verify that the buttons perform their programed functions in their dedicated modes
    a. Examples: Pause, Play, Fastforward, etc.
5. Verify that drawing is displayed in real time
6. Verify that an encoder changes volume in playback mode
7. Verify that an encoder scales frequency in playback mode

Validation Tests

1. Must
    a. Device can be recharged
    b. Device can take touch screen input
    c. Device has buttons
    d. Device uses a touch screen to convert a drawing into an audio output
    e. Device is a handheld form factor
    f. Device is portable
    g. Device is able to last one hour of use on battery
    h. Device is able to produce audio signals
    i. Device is able to switch between recording and playing mode
2. Should
    a. Device allows a spectrogram to be the drawn and processed
    b. Device is smaller than 220cm^3
    c. Device weighs less than 230g
    d. Device has a volume control knob
    e. Device has a frequency scaling knob
3. May
    a. Device is comfortable to use
    b. Device has a graphical user interface
    c. Device produces CD quality audio

Part 2: Detailed Tests

Test Author: Jack McMahon						
	Test Case Name:	Microcontroller Startup			**Test ID #:**	uC-1
	Description:	*Verify that the power domain on the microcontroller has been properly and the GPIO can be programmed.*			**Type:**	☒ white box □ black box □ _____
Tester Information						
	Name of Tester:	Jack McMahon			**Date:**	
	HW/SW Version:	1.0			**Time:**	
	Setup:	*Wire the Microcontroller to power regulation circuit*				
STEP	**Action**	**Expected Result**	**PASS**	**FAIL**	**N/A**	**Comments**
1	Connect power regulator input to a current limited supply	Circuit should draw less than 10 mA (or a ~2mA more then regulator quiescent current)				
2	Test that the uC can be seen by a debug probe or programmer	CubeIDE or JLink Segger sees the uC and returns hardware ID				
3	Program blink LED program	CubeIDE should return no errors, LED should blink				
4	Power cycle uC	LED should blink				
5	Program uC with toggle LED program	CubeIDE should return no errors, LED should not blink				
6	Press 1 button	LED should turn on				
7	Press 1 button	LED should turn off				
	Overall test result:					

Test Author: Jack McMahon							
	Test Case Name:	DAC and Analog Power Domain Test				**Test ID #:**	uC-2
	Description:	*Verify that the analog power domain and DAC on the microcontroller has been properly set up and can be configured.*				**Type:**	☒ white box □ black box □ _____
Tester Information							
	Name of Tester:	Jack McMahon				**Date:**	
	HW/SW Version:	1.0				**Time:**	
	Setup:	*Power on microcontroller, connect to external measurement equipment*					
TEST	**DAC voltage ref**	**Signal Frequency**	**Expected Output**	**PASS**	**FAIL**	**N/A**	**Comments**
1	VREF+ pin (3.3V)	20Hz	1.65 Vpp signal measured at 20Hz				
2	VREF+ pin (3.3V)	20kHz	1.25 Vpp signal measured at 20kHz				
3	VREFBUFF to 2.5V	20Hz	1.25 Vpp signal measured at 20Hz				
4	VREFBUFF to 2.5V	20kHz	1.25 Vpp signal measured at 20kHz				
5	VREFBUFF to 1.8V	20Hz	0.9 Vpp signal measured at 20Hz				
6	VREFBUFF to 1.8V	20kHz	0.9 Vpp signal measured at 20kHz				
	Overall test result:						