AUDIOMETER

User Manual

Jonathan Peer
University of Maryland
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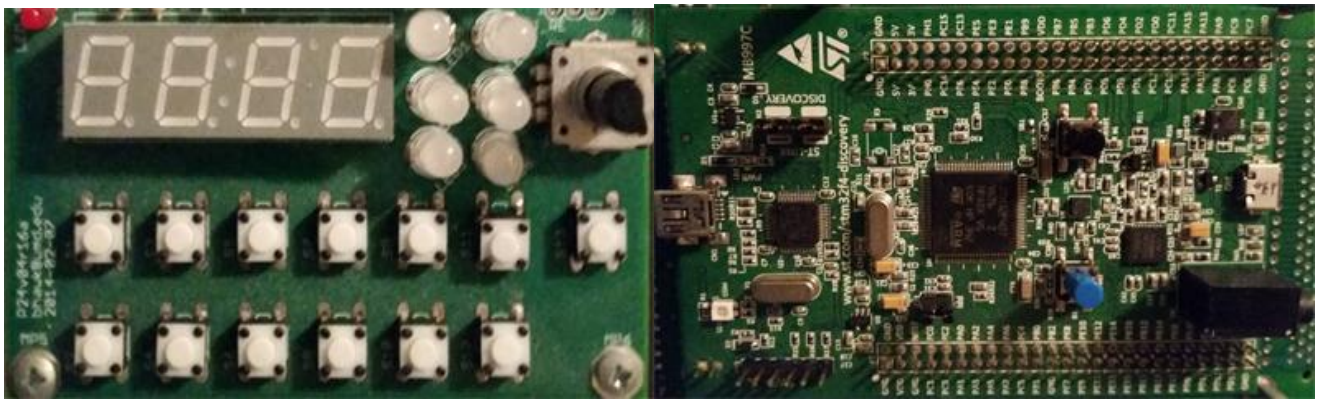
Overview

The audiometer is a hearing testing device. It allows the user to set a frequency and intensity, generate a tone, and record the points at which the user was able to hear the tone. These records can be reviewed on the board or on the computer using software accompanying the audiometer.

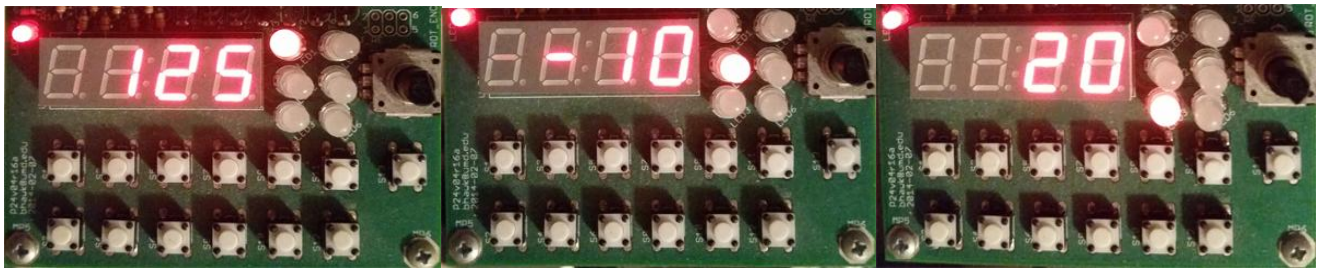


The audiometer has a four digit seven segment display, 6 LEDs, 13 buttons, and a rotary encoder. On the back side, you'll find mini USB port, a micro USB port, and a 3.5 mm audio port.

Procedures

To power the board, you need to connect the USB mini port to a computer, or an equivalent USB power source. To communicate with the board using the software provided, you need to connect the USB micro port to a computer.

The board can be in one of three states – frequency, intensity, and review mode – indicated by one of three LEDs.



Frequency Mode Intensity Mode Review Mode

Frequency Mode

In frequency mode, you can use the switches below the seven segment display to increment and decrement the digits lined up with the switch. However, you cannot go below the default frequency, 125 Hz, or above the maximum, 8000 Hz.

To go to intensity mode, press switch 10.

To go to review mode, press switch 11 for more than 1 second.

Intensity Mode

In intensity mode, you can use the rotary encoder to increment and decrement the intensity. Every detent stop corresponds to a change of 2.5 db, but the intensity is truncated to the nearest interger when put on the seven segment display. You cannot go below the default intensity, -10 db, or above the maximum, 110 db, and every time you change the frequency, the intensity will be resset to its default, -10 db.

To go back to frequency mode, press switch 9.

To play the tone, press switch 10. LED6 will blink at a rate of 3 Hz indicating that the tone is on. To stop the tone, press switch 10 again. Leaving intensity mode will stop the tone as well.

To add the current frequency and intensity to the user record, press switch 12. But please note, only 5 entries can be made to the user record. Any more attempts to add to it will be ignored. (The number is low to make testing and demonstration easier.)

To remove the most recently entry to the user record, press switch 11 for less than 1 second.

To go to review mode, press switch 11 for more than 1 second.

Review Mode

The entries in the user record will be displayed form the oldest to newest. By default, the intensity of the current entry is put on the seven segment display. If there are no entries in the record, the display will be blank.

To view the frequency associated with the current entry, hold switch 9. When you release, the intensity will again be displayed.

To go to intensity mode, press switch 10.

To iterate to the next entry in the record, press switch 12. If there are no more entries in the record, the display will go blank.

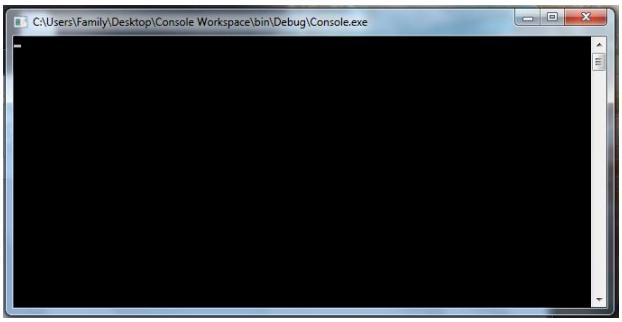
General

In any state, after holding switch 11 for 5 seconds, the reset warning light, LED5, will blink at 5 Hz. After 6 seconds, it will blink at 6 Hz, and so on. If the switch is released before 10 seconds, the warning light will turn off, and the audiometer will enter review mode. If the switch is held for 10 seconds, LED4 will turn on for 2 seconds, and then the audiometer will reset.

Upon resetting, the audiometer will be as it was when powered up. It will be in the default state, frequency mode, with the default frequency, 125, and the default intensity, -10. The user record will be empty. And the tone will be off (it can't be on in frequency mode anyway).

Software

The software provided with the audiometer is a console. It can be used to send scripts to the board, simulating user input, and retrieve the user record.



It requires that you install ST's Virtual COM Port Driver [1] which you can find a link for at the end of this manual. It also requires that the micro USB port be connected to your computer.

The console has five commands. They are case and space sensitive. Type them in exactly as they appear, and then hit enter.

Console Command: "set port"
The console will prompt you for a port name. At this point, type in "COMx" where x is the port number under which the audiometer appears on your system. If it fails to connect, the console will report an error message. Otherwise, it will report nothing and you can proceed.

Console Command: "set script"
By default, the console expects the script name to be "script.txt." But you can change it with this command. The console will prompt you for a script name. At this point, type in the script name (including ".txt" if that's the extension). But note, this just sets the script name. It won't report errors or validate the script at this point. You should just proceed.

Console Command: "set output"
The output will contain the user record. By default, the console expects the output name to be "output.txt." But you can change it with this command. The console will prompt you for the output file name. At this point, type in the file name (including ".txt" if that's the extension you want). Then proceed.

Console Command: "send script"
This will attempt to open the file pointed to by the script name and execute it. If the file doesn't exist or a command is invalid, it will be reported in the console, but the console will attempt to execute the rest of the script regardless.

Console Command: "get records"
This will create or overwrite the file pointed to by the output file name. It will retrieve the user records stored on in audiometer and print them both in the console and in output file in the format shown by the example below.

```
Frequency, Intensity
1000, 10
2000, 20
3000, 30
4000, 40
5000, 50
```

Like the console commands, there are 5 script commands, and they too are case and space sensitive. Type them exactly as they appear. To break up long scripts, you can use blank lines and comment lines, which start with two forward slashes and a space, like this: "`// this is a comment`"

Script Command: "press button <1> <2>"
<1> is the button number and can be 1-12
<2> is the number of times to press it and can be 0-255
This holds and releases a button almost instantaneously.

Script Command: "hold button <1>"
<1> is the button number and can be 1-12
You must release the button before pressing or holding it again.

Script Command: "release button <1>"
<1> is the button number and can be 1-12
The button must be held before it can be released.

Script Command: "wait <1>"
<1> is the number of milliseconds to wait and can be 1-65535
This causes the console to wait, allowing the board to run in the meantime.

Script Command: "turn rotary <1> <2>"
<1> is the direction and can be (0=CCW, 1=CW)
<2> is the number of detent stops and can be 0-255

References

[1] ST's Virtual COM Port:
http://www.st.com/web/en/catalog/tools/PF257938