SANTA CLARA UNIVERSITY
Electrical and Computer Engineering Department

Real-Time Embedded Systems - ECEN 121
Extra Credit

USB Music Player Additional Features

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Rules:

You can add one or both extra features to your music player for extra credit. You need to demo to Dr. Wolfe. It needs to completely work. No lab report.

Feature 1 (20 points)

Peak VU (volume) meters are used during recording to make sure the music levels are within the range of volumes that can be recorded without distortion. During playback, they can be used to make sure the volume is not too loud (which would also cause distortion).

We do not need either since we are not recording and we have designed the system so that the volume can not be turned up to a distorting level – put peak meters are still cool.

A peak meter displays the signal volume (its maximum level). Usually it continuously displays the volume, but when the volume hits a locally maximum level it retains that value on the display for a fraction of a second so you can see it better. Some displays just lock at peak value during that time. Some more recent LED-based displays will lock only the top LED while letting the remaining LEDs display in real time.

You can see an example of the first type here and the second type here starting at about a minute in. It is traditional to make the lowest levels green, higher levels yellow (may distort) and the highest levels red (will distort). Ours won't distort – but that would still be cool.

First decide whether you want to display the raw signal (before the volume control) or the output signal (after the volume control). Next hook up the LED strip like before. Then make it do a cool VU meter thing like in the videos. Make it look good.

Feature 2 (20 points)

Get a special USB stick from Dr. Wolfe that has 35+ song files on it. Each file will have a different name. The songs are all in the root directory.

Modify your program so that it begins by reading the 35 file names into a playlist. Next, start playing the first song. When it is done, play the next one. Keep going. (You don't need to demo the entire 2 hours of music) The song clock should time each song individually.

Now make it so that when you press the right arrow button on the remote, it skips to the next song at the beginning of the song and starts playing. The song clock should restart as well.

Feature 2+ (15 more points)

After you have implemented feature 2, make it so that each time a new song starts, the long file name of the song is scrolled across the LCD display for the first few seconds of the song. The font is a little weird.