Team 57: Music Player

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We plan to create an iPod-like music player, with a recursive menu system for song selection and playback, and a custom storage format for the music.

Materials

- Tiva LaunchPad
- Orbit Booster Pack
- Electronic Speaker

Music

Music will be played as a sequence of notes, using square waves of fixed frequency. Additional features could include:

- Playing multiple notes at once
- Inserting raw wave sequences
- Smoothly changing wave frequency (what are those called again?)
- Adding percussive and other non-tonal sounds
- Speech generation ;) ;)

Playback

There will be pause and play buttons. Features could also include:

- Rewinding
- Progress bar through the song
- Volume changes
- Frequency and speed changes
- Displaying song name (marquee scrolling the name would be interesting)

Navigation

Our menu will be stored as a tree, and the menu system will be fully recursive. This permits logical groupings of songs. A non-leaf node in the menu system is a submenu, and a leaf node is a song. This could be controlled with a single up/down toggle, with a down toggle opening the "folder" (the child node) or song (if it is a leaf node), and an up toggle going up to the containing "folder" (the parent node).

Storage

We will create a custom format to encode the frequency and duration of our notes, as well as encode the additional features above that we implement. To get this data onto the Tiva, this format would be processed by a script (probably written in Python) into a C file as a set of arrays and structures, which could be compiled onto the Tiva (which has 256kb of EEPROM). Additional features could include:

- Reading a custom simple format from a USB mass storage device
    - This may involve using Tiva C rather than Energia code, but is possible (the board is capable of being either usb host or slave)
- Processing MIDI, WAV and perhaps MP3 file formats