

party+hat+network

take the now famous netl party (hard) hat and make a bunch of them, then connect them with a xbee mesh network and sync the lights. WIN!

Basic idea is to build a simple low-cost board that has the mcu (xmega), connector for the xbee module and some darlington arrays to drive the leds (rest of the pins broken out), exact led configuration and extra peripherals are left to builder consideration but a basic minimum set of functionality and protocol needs to be agreed upon.

Adding a simple lipo-charging IC has also been proposed (powered from mini/microusb port).

see also: <http://www.thingiverse.com/thing:33325>
<http://www.flickr.com/photos/netlcom/7639700776/in/pool-hlt>

Animations triggered over XBee: <http://www.youtube.com/watch?v=EIru0xmfsWs>

~~Rambo has parts for 7 partyhatwork boards (sans XBee/Xmega) (sold out), ~10EUR each,~~

TODO:

- open a github repo
 - <https://github.com/HelsinkiHacklab/partyhatwork>
- design a board
 - first revision gotten from china:
<https://picasaweb.google.com/117987945710555324615/Photoblog#5822589179809438898>
- write basic software
 - See <http://kirjoituslusta.fi/hacklab-xmega> for compiling and flashing
 - We need some sort of lightweight library that will take care of the following
 - UARTs (setting them up, reading data on interrupts, sending data in the background)
 - Timing (delays helpers and keeping track of system time, think millis() and delay() from Arduino)
 - Simple task-manager
 - http://bleaklow.com/2010/07/20/a_very_simple_arduino_task_manager.html
 - Power-control
 - The idle-task should sleep the processor (woken by timer or serial activity)
 - The board has sense-resistors for battery voltage (PB1) and enabling high-current charge (drive PB0 LOW)
 - USB-Serial profile ? (For debugging, and request 500mA current for high-current charge)
 - And an example main program that will
 - Example implementation of the baselevel XBee communication protocol
 - Time sync
 - Animations (fades etc)
 - Reports some board ID/Name when queried
 - global LED PWM adjust based on battery voltage sense ? (to keep brightness consistent and allow sizing the current-limiting resistors for lower than full-battery voltage)

- This can be avoided (at cost of higher battery drain) by populating the SOT223 regulator and using SJ2 to choose 3.3V instead of battery voltage for driving LEDs
- XBee watchdog that will reset the XBee (drive PD4 LOW) if the network master cannot be contacted (repeater-mode Xbees seem to be slow to reconnect)
- Detect dumb charger or high-current enabled USB connection and enable charge current accordingly (see above)
- test it (@hsf13)
- "encourage" as many people as possible to take part

HAT SPECS:

- at least one rgb led visible to all directions
 - signal: r,g,b(direction)?
- Idea - fortune-cat attached on helmet!