ENGI 301 Project Proposal
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“Wakey Wakey” - Alarm Clock

Updates:

- Description of button plan added to “Proposal” as a new paragraph/table
- Buttons added to component list
- USB hub added to component list
- Step-up 5V regulator added to component list
- GPS Module changed to a module with a USB 2.0 connection
- WiFi Module changed to a module with a USB 2.0 connection
- Bluetooth Module changed to a module with a USB 2.0 connection
- Power diagram and block diagram updated

Proposal:

For my ENGI 301 project, I would like to design an alarm clock that has more functionality than the alarm clocks you might find in most people’s houses. Like any other alarm clock, the alarm will be able to have a time set for the alarm to go off, a speaker that will play the alarm out loud, and “Off” and “Snooze” buttons for the user to control the alarm. I would like for the alarm clock to be able to take in audio files from the user so that the user can choose to make the alarm any sound that they would like. The user will be able to hear their custom alarm sound being played through a Bluetooth speaker (so that the user does not have to keep the entire circuit near their bed), which will talk to the PocketBeagle through a Bluetooth module. The alarm clock will also have the ability to connect to WiFi and geolocate itself using WiFi and GPS modules to get information about the weather in its current location, which it would read aloud to the user after they turn the alarm clock off.

One crucial part of this project is the user’s ability to be able to interface with the alarm clock. This will be accomplished by pressable buttons that will be integrated into the project. I have a list of buttons and their functions below:

	Button Function for Different Modes			
Button #	**Neutral**	**Alarm**	**Set Alarm**	**Set Music**
1	Turn on “set alarm”mode	N/A	Confirm time input	Confirm music input
2	Refresh data	Turn alarm off	Change minute value	Toggle upwards in menu
3	Turn on :set music” mode	Snooze alarm	Change hour value (including AM/PM)	Toggle downwards in menu

Links to Existing Projects:

Unfortunately, there were very few prior alarm clock projects done with a PocketBeagle that I could find. There were none on GitHub or Hackster - the ones I found were from open Google searches. This means I’ll be among the alarm clock pioneers for the PocketBeagle development platform!

- https://beagleboard.org/p/peter-venema/ece434-blynk-alarm-clock-4a99b0
  - This project was based on PocketBeagle which makes it an attractive one to inspect, but it is simpler than what I’d like to do. I think the LCD display is nice, but a bit overkill.
- https://beagleboard.org/p/manoj-kurapati/ece497-project-alarm-with-remote-speaker-5eae5d
  - What’s impressive about this project is that it can connect wirelessly to a Bluetooth speaker, it has physical buttons that can be used to manipulate the alarm clock (turn it off, snooze it, etc.), and it has LEDs that light up when the alarm is going off.
- https://www.hackster.io/brandmooffin/alarm-tec-671d33
  - This is the Alarm-Tec, a project based on an Arduino and LinkIt One system that in addition to playing an alarm, can tell you about the daily weather, traffic, and top news headlines. Utilized a GPS and WiFi module.

What Improvements to Make:

In my project, I would like to include major aspects of the projects I found online, while still making some sizable improvements. While the GPS, WiFi, and Bluetooth functionality are all elements that have been implemented and documented in the projects above, the alarm clock’s capability to have custom alarm sounds from the user will be a new feature that could not

be found in any of the existing projects. With this improvement, the user will be able to play any sound they want, from anywhere in the room.

System Block Diagram:

NOTE: The block diagrams are definitely going to be items that I will need to improve going forward - I am very new to this and pretty clueless about how to create these diagrams and what all of it means (especially with the system block diagram). I tried to set things up so that they can easily be improved upon going forward once I get a better understanding of it all. Please go easy on me this first time around!

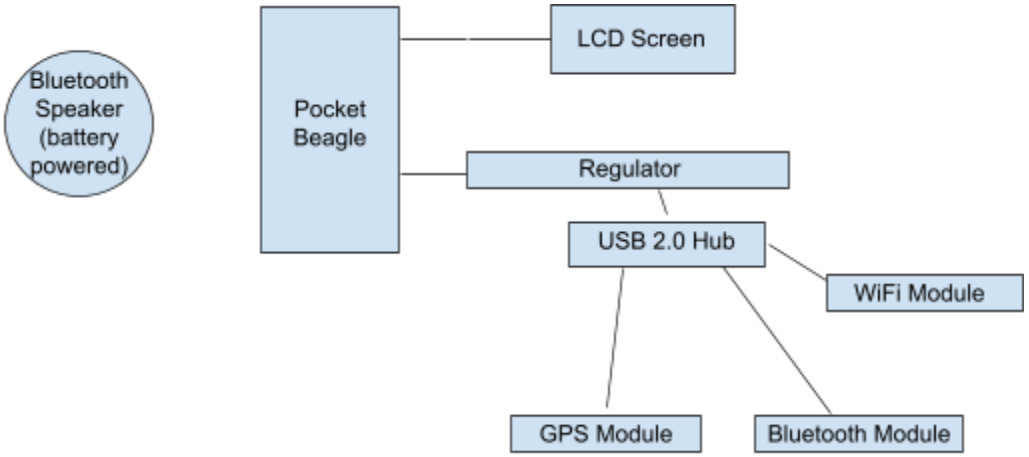

Figure 1: Wakey Wakey System Block Diagram

Power Block Diagram:

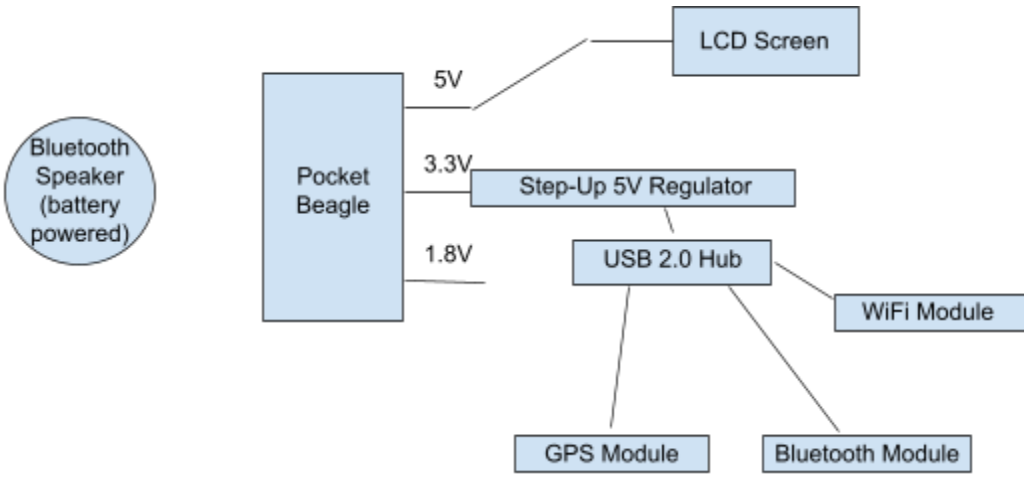

Figure 2: Wakey Wakey Power Block Diagram

Components/Budget:

Components	Need to Buy?	Cost
128x64 Graphic LCD Module	Y	$27.84
Mini USB WiFi Module	Y	$11.95
HiLetgo VK172 G-Mouse USB GPS/GLONASS USB GPS Receiver for Windows	Y	$12.99
TP-Link USB Bluetooth Adapter for PC	Y	$9.99
Small Bluetooth Speaker	Y	$17.99
4-Port SABRENT USB 2.0 Hub	Y	$6.99
5V Step-Up Regulator	Y	$3.56
Micro Push Buttons with 2 Pins	Y	$0.99