Engineering Analysis

Second Generation Bike

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Overview

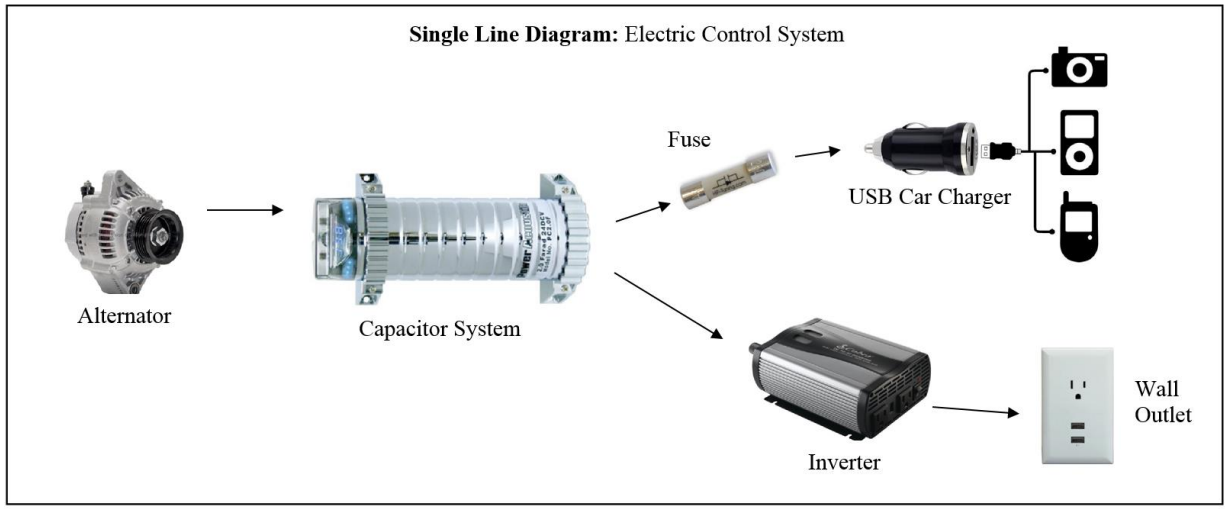
- **Electric Control System (ECS)**
  - Car Alternator - Alternative
  - Capacitor - Energy Storage and Power Stabilizer
  - Inverter – Low Power Production w/ High Efficiency

- **Interactive Display Screen**
  - Google Nexus 7
  - Arduino w/ Current and Bluetooth Sensors
  - LabVIEW for Android

- **Enclosure**
  - Ventilation Fan
  - Material and Dimensions

Electric Control System (ECS)

- Car Alternator – Built in Fail Safe that prevents high power output
- Capacitor – More efficient than batteries and can stabilize power without additional parts
- Inverter – Relatively high efficiency when power output is low
- Car Phone Chargers - Keep costs low and the design simple



ECS – Car Alternator

- Lighter, cheaper, and more rugged than conventional DC generators. Runs at 14.8VDC instead of 24VDC

- Low current running through brushes in an alternator, aides in lifespan

- Built in fail safe procedure that prevents high voltage outputs

Honda Accord 1985- 1989 Alternator

ECS – Audio Capacitors

- Acts as a power stabilizer for car audio systems
- Stores energy for short periods of time and releases the excess energy when there is an inadequate amount of power input
- Highly efficient since not much energy is stored in the device, approximately 95%
- Automatic shut-off system that is triggered when there is no power output

Power Acoustik 2.0 Farad Digital Power Capacitor

ECS - Inverter

- Approximately 80% efficiency with low power output
- Wider range of devices can be charged
- This model comes with a 5V USB plug specific to charging small electronic devices

Cobra CPI 480 400-Watt 12-Volt DC to 120-Volt AC Power Inverter with 5-Volt USB Output

Interactive Display Screen (IDS)

- LabVIEW for Android – Software for chart and graph making
- Arduino – Microcontroller for sensors
- Sensors – Bluetooth module and current sensor
- Android Tablet – Contains a touch screen and Bluetooth module

IDS – LabVIEW for Android

- Converts incoming data from Bluetooth into viewable graphics such as graphs and digital gauges

- Works with all Android devices including the Google Nexus 7

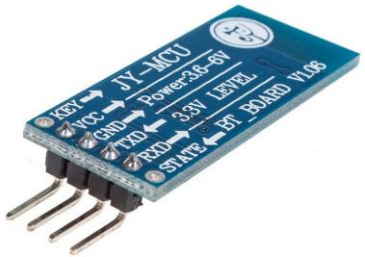
- Allows us to avoid programming a software that would create the graphs for us

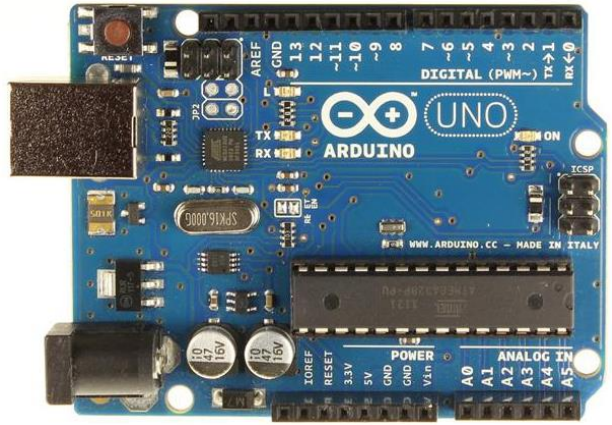
IDS – Arduino w/ Power Monitoring Capability

- Will monitor voltage, amperage, and watts per hours coming from the generator to the output.

- Will deliver data via Bluetooth to the applications on Nexus 7 tablet applications

- Will be easy to program with many tutorials found online





IDS – Google Nexus 7 Tablet

- Interactive Display Screen
- Pre-Installed operating system with easy modification capabilities.
- Applications already created for what we want
- Long battery life (approximately 10 hours)

Enclosure

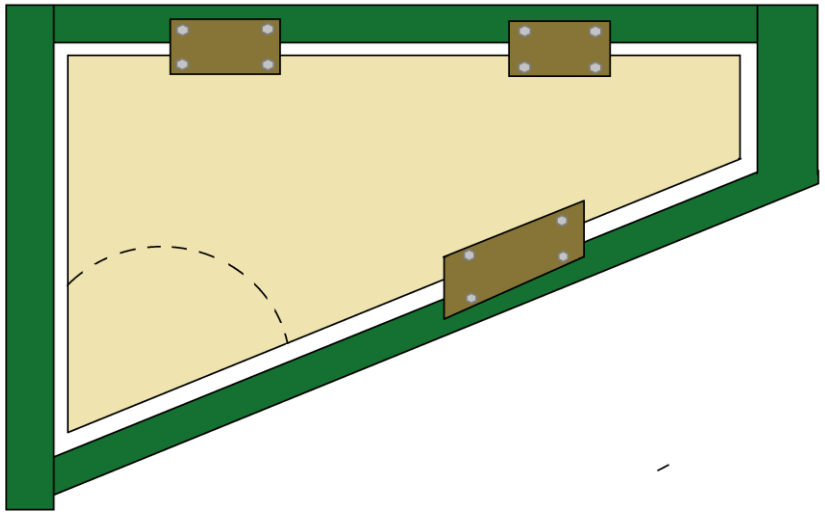
- Ventilation Fan – To prevent electrical components from overheating
- Material – Pressure-treated plywood
- Dimensions – Small enough to fit between the frames and large enough to hold all the electrical components

Enclosure – Ventilation Fan

- Used to cool the internal electrical components inside the enclosure
- Located on the side of the enclosure to prevent rain from getting inside
- Will contain a filtration device to prevent moisture and particulate matter

Enclosure – Material and Dimensions

- Made with pressure-treated plywood to prevent future rotting or insect infection.
- Will have an epoxy resin coating for water protection
- Approximately 4 inches wide for the internal width of the enclosure
- Will encompass the entire frame lengthwise



Conclusion

- **Electric Control System (ECS)**
  - Car Alternator – Better option than current DC generator
  - Capacitor – More efficient and takes the role of two individual components
  - Inverter – Relatively high efficiency when there is low power output

- **Interactive Display Screen**
  - LabVIEW creates visuals and graphs for the Tablet
  - Arduino system – will be used to measure power and transmit data
  - Google Nexus 7 – cheap with all necessary components already put together

- **Enclosure**
  - Ventilation Fan – Used to keep the internal temperatures down
  - Material and Dimensions – pressure-treated plywood

Questions or Comments