

University of Central Florida

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

EEL 4914: Senior Design 1

Initial Project Document - Divide and Conquer

Project: IntelliDate

Team members:

Tyler Claitt - Computer Engineering

Kyle Dennis - Computer Engineering

Kory Marks - Electrical Engineering

Dat Tran - Electrical Engineering

Instructors:

Dr. Samuel Richie

Dr. Lei Wei

September 15, 2020



1. Project Description, Motivation, and Goals

Description:

IntelliDate is a low-cost, wall-mounted, central hub/LCD display panel for common calendar applications utilized by the customer.

The panel will display a monthly, weekly, or daily calendar view, combining all events from the customer's linked calendar applications into one wall-mounted display (Google Calendar, iCloud, Outlook). To maintain a low production cost, the panel will not include touchscreen capabilities, but will instead be paired with the IntelliDate mobile/desktop application that the customer will utilize to interact with the panel.

Motivation:

After using a dry-erase whiteboard calendar for several years, common complaints have always been: the lack of space in each day-block for multiple events, the never-ending monthly task of reupdating the calendar's dates, and past-month history being lost upon erasing the whiteboard's contents.

Having a wall-mounted calendar is much more present than a mobile application yet lacks the ease of update and maintenance that software calendar applications provide. Another issue with the software calendar applications stems from the wide variety of software available, including but not limited to Gmail, iCloud, and Outlook. Though these applications provide methods of linking events between them, the events still reside on an application only viewable with a mobile or desktop device.

As Computer and Electrical Engineering students, we believe this topic will be a perfect project for Senior Design, incorporating Electrical Engineering topics for design and manufacture of the panel, and Computer Engineering topics for design and integration of the display contents and paired application.

Goals:

Our goal is to design and manufacture a low-cost display panel that the customer can sync with all calendar applications currently in use. Along with manufacturing the hardware, we will also design and integrate a software application that will be used to communicate with the display (e.g. changing views (monthly, weekly, daily), linking other calendar applications, setting panel brightness level, connecting panel to Wi-Fi network, etc.).

Potential Marketing:

Aside from personal use in the home, we believe this product would be useful for many other areas of life, including but not limited to restaurant staff scheduling, office-space meetings and due dates, and classroom activity management/communication.

Other companies ([DAKboard](#)) have manufactured products like this, but require a premium cost for a simple home appliance. We plan to offer a product that provides a solution to issues raised in our motivation for a more realistic price to average customers.

3. Engineering Requirement Specifications

Table 1: Engineering Requirement Specifications

Specification Number	Specification Description
1	User will utilize sister application on PC and/or mobile device for communication with panel.
2	Display will have a resolution no greater than 1920x1080 pixels. Display will utilize LCD format.
3	Calendar view will update, automatically, upon the addition of events by user and natural transition of month, day and week. Upon the manual addition of an event, panel will take no longer than 10 seconds to display the updated contents.
4	Panel will be battery powered with the option to power/recharge via wall-plug.
5	Panel will have the option to be wall-mounted.
6	Panel will connect to Internet through Wi-Fi network.
7	Inner components will communicate with display through HDMI and USB ports.
8	Final product will cost no more than \$200 to produce.
9	Display size will lie in the range of 20" to 40"
10	Battery life of panel will be displayed through green, yellow, and red LEDs (Green: 100%-80%; Yellow: 79%-40%; Red: 39%~0%).
11	Sister application will allow user to set a custom brightness level, as well as set routine times for certain brightness levels to activate.

4. Project Block Diagrams

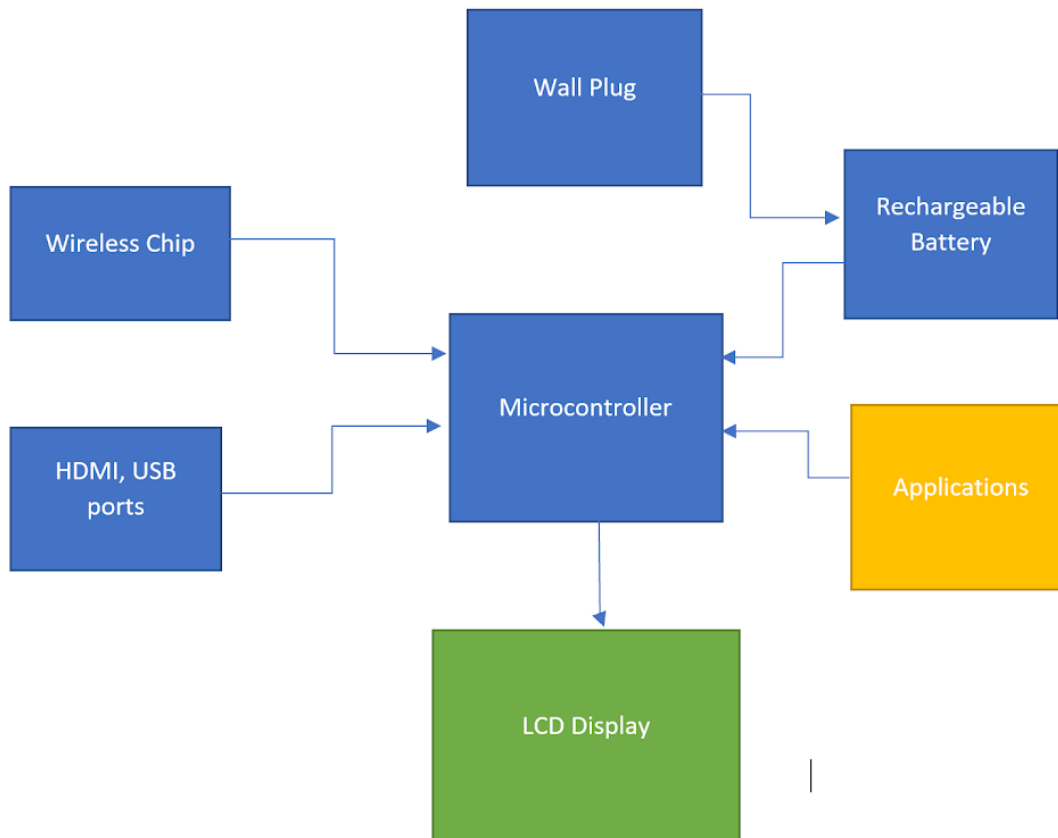


Figure 1: *Project Block Diagram (Technical Components)*

Kory and Dat will oversee the tasks in the blue boxes, while Kyle and Tyler will work on the yellow box which is an application to connect the calendar with devices. Green box indicates final touch where everyone will work together for the final product.

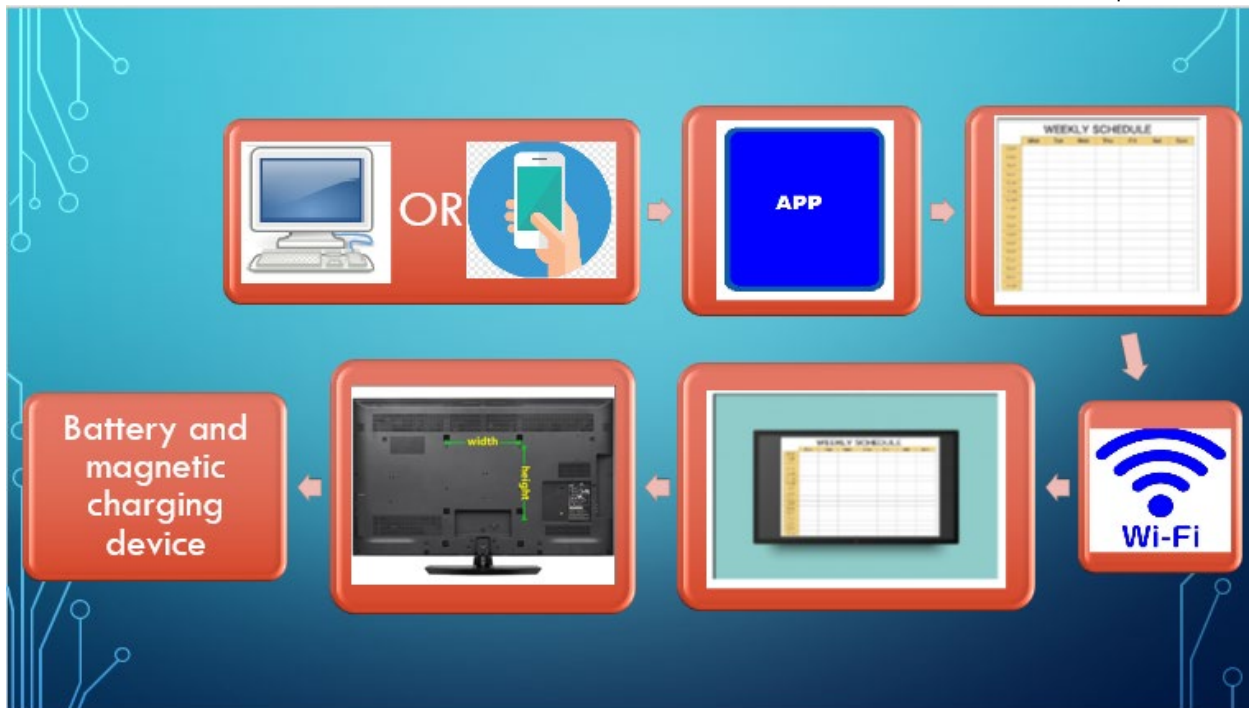


Figure 2: *Project Block Diagram (Functional Components)*

Team Member Responsibilities:

Kyle Dennis & Tyler Claitt (CpE)

- Design software application for PC and mobile device
- Configure panel networking capabilities
- Implement customizable brightness setting for display panel
- Design calendar layouts to be displayed on panel
- Integrate other features as they arise (ex. Insertable “Notes” section)

Kory Marks & Dat Tran (EE)

- Physical component design and configuration
- Implement power supply with rechargeable battery
- Integrate battery power level LED indicators

5. Estimated Project Budget and Financing

Table 2: *Parts List with costs and lead time*

Part	Price	Lead Time
LCD Screen	Free-Already have one \$50 on ebay	0 Days 30-60 days
Processor -MSP430FR6989	Free-Already have one	0 Days
-ATMEGA328P-AU	\$2.01+\$7.99 shipping mouser	1-5 Days
- Atmel SAM3X8E ARM Cortex-M3 CPU	\$40.30 \$1.76 + \$7.99 shipping mouser	1-5 Days
12v 3A power supply	Free-Already have one	0 Days
Wifi Adapter	\$6.65 + \$7.99 shipping	1-5 Days
Ethernet Adapter	\$1.24 + \$7.99 shipping	1-5 Days
Wall mount	\$10	0 Days
PCB		
HDMI Ports	\$2.61 + \$7.99 shipping	1-5 Days
VGA Ports		
18650 Battery	Free-Already have one	0 Days
Lipo Battery	Free-Already have one	0 Days
BMS	Free-Already have one	0 Days
LED's		
Capacitors/Resistors	\$10	1-5 Days
Total		

6. Initial project milestones for both semesters.

Senior Design I - Fall 2020

September 2020

- Submit project idea D&C outline (9-18)
- Review and reshape project outline with Dr. Wei (9-23)

October 2020

- Design digital layouts for various calendar views (monthly, weekly, daily)

November (1st half) 2020

- Define concrete parts list
- Explore options for pairing-application (platform, web-based, etc.)
- Identify possibilities for syncing events from mainstream calendar applications (Google, iCloud, Outlook, etc.) with a self-made calendar application

November (2nd half) 2020

- Begin ordering parts
- Begin pairing-application development

December 2020

- Submit 120-page report
- Be prepared for development

Senior Design II - Spring 2021

- Design and produce display panel with components
- Complete pairing-application development
- Link pairing-application with panel