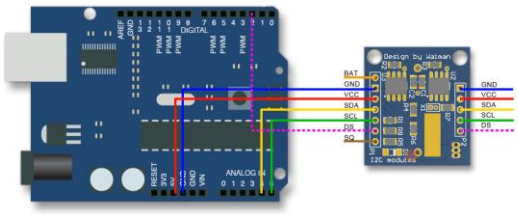
Function of the SolarSystem controller:

The SolarSystem controller is a standalone device designed to control the SolarSystem LED grow lights.

The hardware consists of an Arduino Uno mated with the Adafruit 2.8" TFT touchscreen (Adafruit PRODUCT ID: 1651). The Arduino serial port is connected to a standard RS-232 interface that sends the signals to the SS550. In addition, the Arduino is connected to a battery backed-up RTC to keep track of time. Arduino to RTC connection as follows:



The function of the controller is to set the lights to a specific color setting throught the day. Grow rooms typically need 18 hours of light vs 6 hours of darkness (every 24 hr period) during the vegetative phase of growth and 12 hours of light vs 12 hours of darkness during the flowering phase. In addition, growers may wish ot simulate sunrise and sunset to softly turn the lights on for the light period and then softly dim them for the dark period. In addition, depending on the crop, users may wish to use a certain light recipe which calls for a certain amount of red, blue and white light throughout the day and then throughout the season.

The controller will be designed to store a 24 hour light program. The settings will be limited to 20 setting changes per day. Here's an example of 5 setting changes:

08:00AM	R: 50 W: 75 B: 90
10:00AM	R: 60 W: 75 B: 80
12:00PM	R: 99 W: 99 B: 99
04:00PM	R: 90 W: 75 B: 75
08:00PM	R: 00 W: 00 B: 00

Minimum one spectrum change per day is required. Default setting is 99:99:99 (on full blast.)

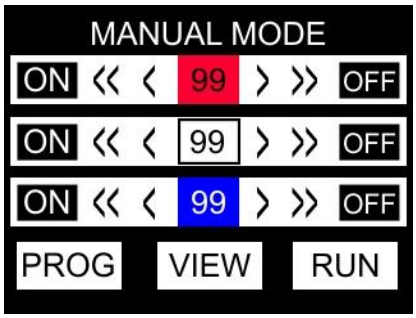
Controller screen functions and user interface

Master ON/Off Button

When On, always go to previous mode.

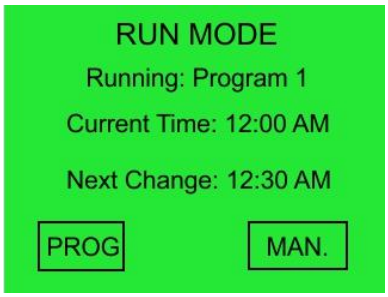
Three Modes: Manual, Program and Run

- Manual: Similar to our current interface (see Arduino sketch)
    - Includes a View mode



ON: Sets channel to 99
OFF: Sets channel to 0
>> Increments channel by 10
> Increments channel by 1
< decrements channel by 1
<< decrements channel by 10
PROG: Switches to program mode
VIEW: Upon Click, sets Red to 0, WHT to 99, Blu to 0. Click again to go to preview settings
RUN: Switches to run mode

- **Run Mode:** Needs to have a green background. For a grow room environment, this is essential.



PROG: Go to Prog mode
MAN: Go to Manual mode

- **Program Mode**
  - Set Clock
  - Setup Program

    Screen look TBD. Need to have RUN and MANUAL buttons.

Program Mode:

Set Clock

Set Transition Time: in Minutes (0-60). This variable will be used to transition from one setting to the other. If set to 0, then the transition is abrupt (i.e. single transition). If set to 1-60 minutes then the transition is done in 10 isochronal intervals. For example if transitioning from R20 to R30 and transition time is set to 10 (min) then the transition is done in 10 x 1 minute intervals of 1 increment each.

Duration: HH:MM. This is an over-ride that controls the light on time for a 24 hr cycle, regardless of any other spectrum changes. Typically this set to 18:00 for Veg and 12:00 for bloom. So if there's only one spectrum change then you transition to that spectrum then transition back to 00:00:00 by the end of the duration.

Up to 20 Scheduled spectrum changes per day.

Only one Spectrum change is mandatory, default is 99, 99, 99. The rest of the schedule changes are optional.

Save a schedule under a program name. Edit Program Name.