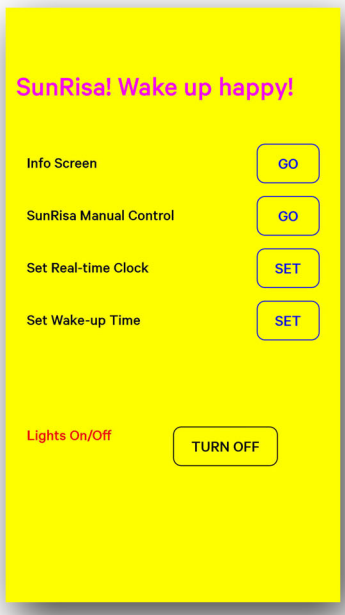




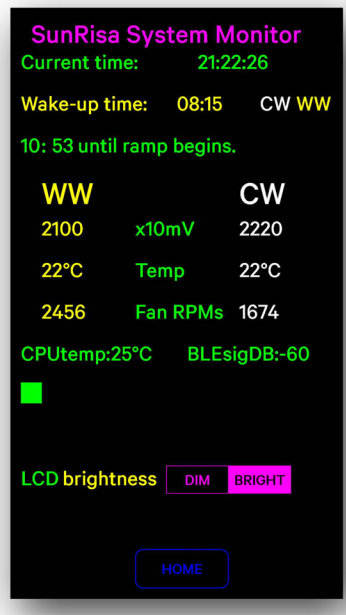
Building SunRisa: Software

Prof. Steve M. Potter @SteveMPotter steve.potter@gmail Dublin Maker 2017

Home screen



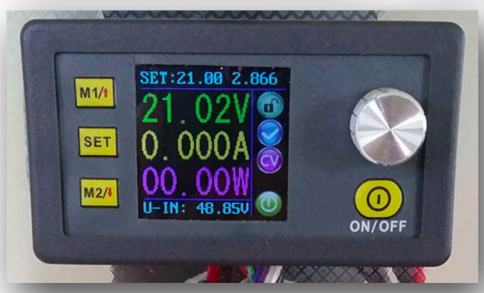
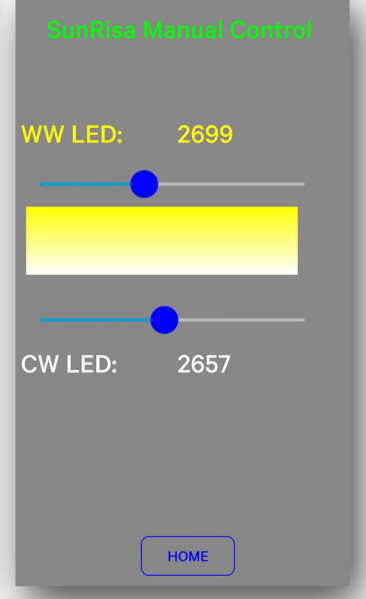
Info screen



Example code for creating app screens

```
SunRisa3.2 | Arduino 1.8.0
SunRisa3.2 SunRisa_logo70.h
1638
1639 //////////////////////////////////////////////////// INFO_SCREEN ////////////////////////////////////
1640
1641 void createInfoScreen() // to allow debugging without using a computer and the serial monitor window.
1642 {
1643   Serial.println("Creating Info Screen.");
1644   SimbleeForMobile.beginScreen(BLACK);
1645   // LINE 0:
1646   SimbleeForMobile.drawText(titleLeftMargin, titleTopMargin, "SunRisa System Monitor", MAGENTA, TITLE_TEXT_SIZE);
1647   // LINE 1:
1648   SimbleeForMobile.drawText(leftMargin, (lineSpacing * 1), "Current time: ", GREEN, InfoTextSize);
1649   NowTextID = SimbleeForMobile.drawText(180, (lineSpacing * 1), "00:00:00", GREEN, InfoTextSize);
1650   // updateText(NowTextID, TimeText);
1651   // LINE 2:
1652   SimbleeForMobile.drawText(leftMargin, (lineSpacing * 2), "Wake-up time: ", YELLOW, InfoTextSize);
1653   WakeTextID = SimbleeForMobile.drawText(160, (lineSpacing * 2), "99:99", YELLOW, InfoTextSize);
1654   CWonID = SimbleeForMobile.drawText(240, (lineSpacing * 2), "CW", WHITE, InfoTextSize);
1655   WwonID = SimbleeForMobile.drawText(275, (lineSpacing * 2), "WW", YELLOW, InfoTextSize);
1656   // SimbleeForMobile.setVisible(CWonID, true/false);
1657   // SimbleeForMobile.setVisible(WwonID, true/false);
1658   // updateText(CWonID, " Neither LED set!");
1659   // LINE 3:
1660   // LEDs Ramping UP
1661   RampFirstNumID = SimbleeForMobile.drawText(leftMargin, (lineSpacing * 3), 20, GREEN, InfoTextSize);
1662   Slash_colonID = SimbleeForMobile.drawText(leftMargin + 20, (lineSpacing * 3), "/", GREEN, InfoTextSize);
1663   RampSecondNumID = SimbleeForMobile.drawText(leftMargin + 30, (lineSpacing * 3), 30, GREEN, InfoTextSize);
```

Control Warm White and Cool White LEDs manually



RuiDeng DP50V5A buck converter: up to 50VDC and 5A; I hacked it for control by Simblee (Arduino)

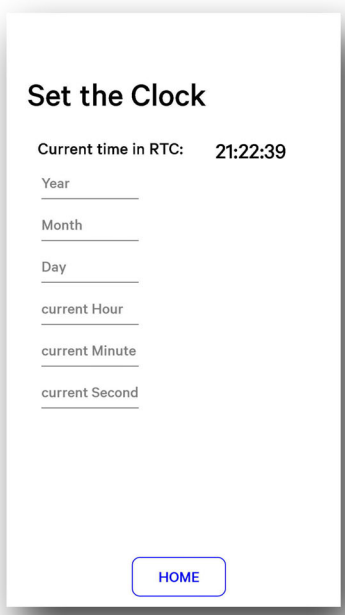
Arduino and Bluetooth all in one small board: SIMBLEE

Code for setting RuiDeng LCD screen brightness

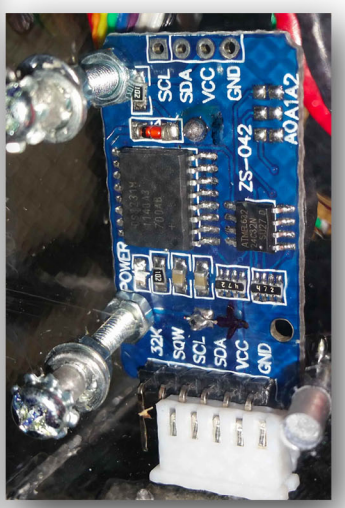
```
PottersRuiDengAutomator | Arduino 1.8.0
PottersRuiDengAutomator $
685 void LCDbright(boolean LCDmax)
686 {
687   // Turn the LCDs to max or min brightness.
688   // There are 6 steps (0-5) so I could use a selector instead. 0 is dim, not off.
689   Serial.println("Changing LCD brightness. ");
690
691   // DPS50V5A:
692   DPS50V5A_Set(2);
693   DPS50V5A_DownArrow(5);
694   DPS50V5A_REpush(1);
695   if (LCDmax) DPS50V5A_REclockwise(6);
696   else DPS50V5A_REccw(6);
697   DPS50V5A_Set(2);
698   DPS50V5A_REstate = digitalRead(DPS50V5A_RESTATEIN); // put the knobs in HIGH state if need be.
699   if (DPS50V5A_REstate == LOW)
700   {
701     digitalWrite(DPS50V5A_REB, HIGH);
702     digitalWrite(DPS50V5A_REA, HIGH);
703   }
704
705   // DPS5015:
706   DPS5015_Set(1);
707   DPS5015_DownArrow(5);
708   DPS5015_REpush(1);
709   if (LCDmax) DPS5015_REclockwise(6);
710   else DPS5015_REccw(6);
711   DPS5015_Set(2);
712   DPS5015_REstate = digitalRead(DPS5015_RESTATEIN); // put the knobs in HIGH state if need be.
713   if (DPS5015_REstate == LOW)
714   {
715     digitalWrite(DPS5015_REB, HIGH);
716     digitalWrite(DPS5015_REA, HIGH);
717   }
718 } // end LCDbright()
719
```

27 GPIO lines ARM Cortex M0 processor Bluetooth® Smart Stack BLE 3ms BLE connection time! 128KB of Flash 24KB of RAM 32KHz precision crystal Integrated Antenna User LED & Button FTDI Programming header

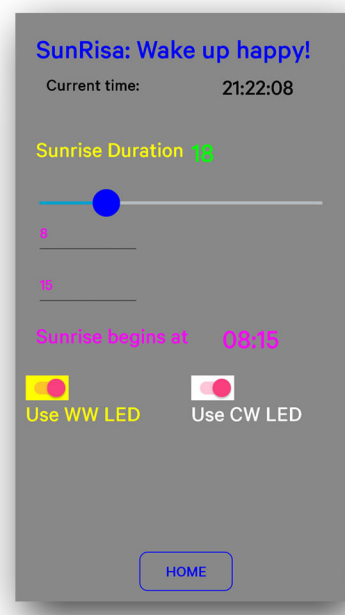
One sketch in the Arduino IDE does everything: It controls the DPS5005, and creates the user interface for the app on my phone that I use to control SunRisa. It also talks to the Real-time Clock (RTC) that keeps time for SunRisa. My sketch is currently about 2000 lines.



Real-time Clock with battery backup



App screen for setting wake-up



Code that processes user input from smartphone to set Wake-up parameters

```
SunRisa3.2 | Arduino 1.8.0
SunRisa3.2 SunRisa_logo70.h
1486 //////////////////////////////////////////////////// WAKE_EVENTS ////////////////////////////////////
1487 This actually has to do with waking up humans, not microprocessors! Dream interrupts.
1488 //
1489 void handleSetWakeScreenEvents(event_t &event)
1490 {
1491   printEvent(event);
1492   if (event.id == AwakeHourID)
1493   {
1494     AwakeHour = atoi(event.text); // converts a numerical const char* to an integer.
1495     AwakeHourStr = event.text;
1496     char TimeBuffer[5];
1497     sprintf(TimeBuffer, "%02d:%02d", AwakeHour, AwakeMinute);
1498     if ((AwakeHourStr != "") && (AwakeMinuteStr != "")) WakeUpTimeSet = true;
1499     if (SimbleeForMobile.screen == SETWAKE_SCREEN) SimbleeForMobile.updateText(AwakeTimeTextID, TimeBuffer); // show th
1500     Serial.println("Wake time set to ");
1501     Serial.println("Wake time set to ");
1502     WakeUP = false;
1503     LEDs Ramping UP = false; // If you changed this, you reset any ramp in progress.
1504   }
1505   else if (event.id == AwakeMinID)
1506   {
1507     AwakeMinute = atoi(event.text);
1508     AwakeMinuteStr = event.text;
1509     char TimeBuffer[5];
1510     sprintf(TimeBuffer, "%02d:%02d", AwakeHour, AwakeMinute);
1511     if ((AwakeHourStr != "") && (AwakeMinuteStr != "")) WakeUpTimeSet = true;
1512     if (SimbleeForMobile.screen == SETWAKE_SCREEN) SimbleeForMobile.updateText(AwakeTimeTextID, TimeBuffer); // show th
1513     Serial.println("Wake time set to ");
1514     Serial.println("Wake time set to ");
1515     WakeUP = false;
1516     LEDs Ramping UP = false; // If you changed this, you reset any ramp in progress.
1517   }
1518   else if (event.id == SunriseDurationSliderID)
1519   {
1520     SunriseDuration = event.value;
1521
```

Email me for source code: steve.potter@gmail