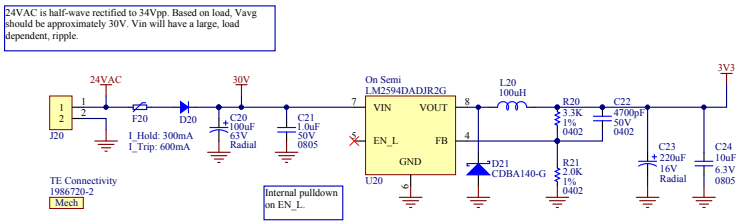
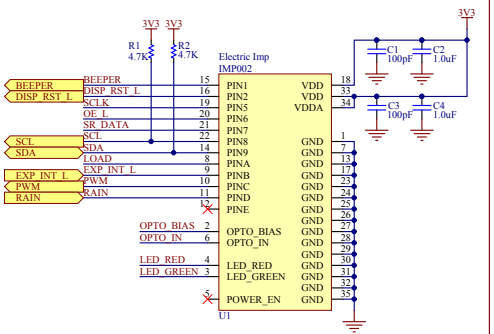
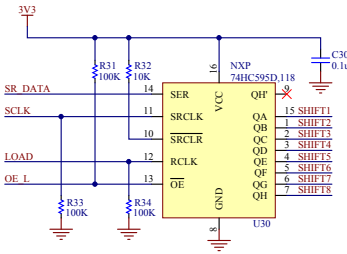
## Rectifier and 3V3 Supply



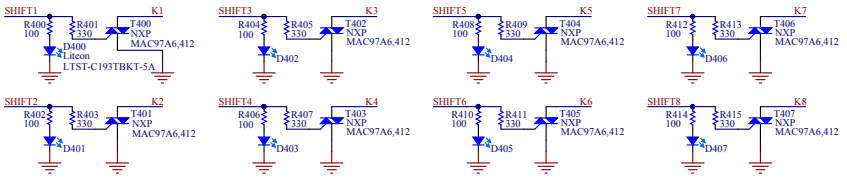

## Imp Module



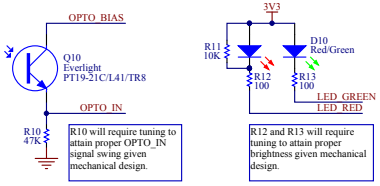

## Shift Register



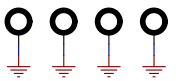

## Triacs and Indicator LEDs



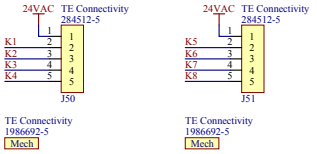

## BlinkUp




## Mounting Holes



## Terminal Block Outputs






| | | | |
|---|---|---|---|
| Design: Impee Janice | Rev: 2.0 | Electric Imp<br>5050 El Camino Real, #221<br>Los Altos, CA 94022 | electric imp |
| Sheet: 1 of 2 Date: 8/19/2014 Time: 10:06:02 AM | | | |
| File:Z:\ei-hardware\impee-janice\impee-janice.SchDoc | | | |

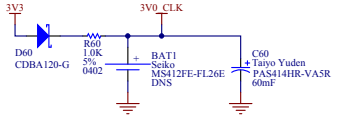
# Optional Features

Each large block is an independent feature which may be included independent of others. See the notes in each sub-block for details on feature implementation.

## Battery-backed Scheduling

Include this block for battery-backed scheduling. Either the rechargable lithium-ion secondary cell or supercap can be used as the standby power supply (do not populate both). The real-time clock can keep time during an outage, allowing the sprinkler to resume scheduled watering when power is restored even if WiFi is not also restored. The EEPROM is used to store the watering schedule, as contents are preserved even if a power outage occurs.

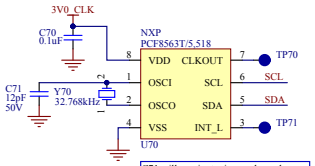
### RTC Battery Backup




Populate EITHER BAT1 or C60 to provide backup power supply for RTC.

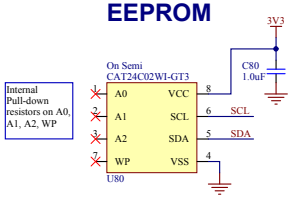
BAT1 will preserve RTC function for approximately 4000 hours, while C60 will preserve RTC function for approximately 100 hours.

### Real-Time Clock




C71 will require tuning, and may be ommitted completely if clock frequency is sufficiently accurate.

### EEPROM

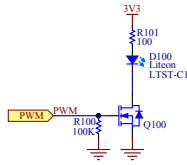



Internal Pull-down resistors on A0, A1, A2, WP

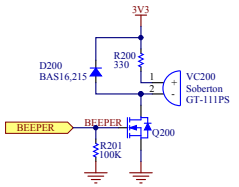
## User Interface Options

Include elements of this block as needed for optional physical user interface on the sprinkler controller itself. The status LED and Beeper and independent user interface options. Connector J300 can be used to interface with the impee-janice-display I2C display and 5-button subassembly.

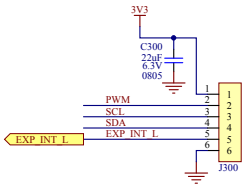
### Status LED



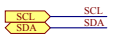

### Beeper




### Ext. Display / Button Subassembly Connector

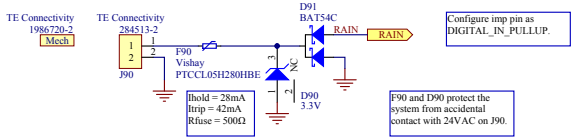



## I2C from Required Sheet




## Rain Sensor Input

This feature requires testing and validation with worn-in rain sensors that have been experienced prolonged use.




Configure imp pin as DIGITAL_IN_PULLUP.

Ihold = 28mA
Itrip = 42mA
Rfuse = 500Ω

F90 and D90 protect the system from accidental contact with 24VAC on J90.



| | | | |
|---|---|---|---|
| Design: Impee Janice Opt. Features | Rev: 2.0 | Electric Imp<br>5050 El Camino Real, #221<br>Los Altos, CA 94022 | electric imp |
| Sheet: 2 of 2 Date: 8/19/2014 Time: 10:06:03 AM | | | |
| File:Z:\ei-hardware\impee-janice\impee-janice-optionalfeatures.SchDoc | | | |

impee-janice.PrjPcb
Bill of Materials
Electric Imp, Inc
2.0
8/19/2014 10:06:15 AM

| # | Designator | Quantity | Description | Manufacturer | Manufacturer Part Number | Manufacturer 2 | Manufacturer Part Number 2 | Supplier 1 | Supplier Part Number 1 | Supplier Price 1 | Supplier 2 | Supplier Part Number 2 | Supplier Price 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | C1, C3 | 2 | CAP,C0G,100pF,5%,50V,0402 | Yageo | CC0402JRNP09BN101 | Samsung | CL05C101JB5NNNC | Digi-Key | 311-1024-1-ND | 0.00324 | Digi-Key | 1276-1025-1-ND | 0.00324 |
| 2 | C2, C4, C80 | 3 | CAP,X5R,1.0uF,10%,6.3V, 0402,# | Murata | GRM155R60J105KE19D | Samsung | CL05A105KQ5NNNC | Digi-Key | 490-1320-1-ND | 0.0087 | Digi-Key | 1276-1010-1-ND | 0.009 |
| 3 | C20 | 1 | CAP,ALUM,100uF,20%,63V,8mm DIA,RADIAL | Panasonic | ECA-1JM101 | | | Digi-Key | P5193-ND | 0.10412 | | | |
| 4 | C21 | 1 | CAP,X7R,1.0uF,10%,50V,0805 | Taiyo Yuden | UMK212B7105KG-T | Kemet | C0805C105K5RACTU | Mouser | 963-UMK212B7105KG-T | 0.039 | Mouser | 80-C0805C105K5R | .079 |
| 5 | C22 | 1 | CAP,X7R,4700pF,10%,50V,0402 | Yageo | CC0402KRX7R9BB472 | Samsung | CL05B472KB5NNNC | Digi-Key | 311-1418-1-ND | 0.00363 | Digi-Key | 1276-1125-1-ND | 0.00363 |
| 6 | C23 | 1 | CAP,ALUM,220uF,20%,16V, 6mm DIA,RADIAL | Kemet | ESH227M016AE3AA | | | Digi-Key | 399-6566-ND | 0.05336 | | | |
| 7 | C24 | 1 | CAP,X5R,10uF,10%,6.3V,0805,# | Yageo | CC0805KKX5R5BB106 | Taiyo Yuden | JMK212BJ106KD-T | Digi-Key | 311-1459-1-ND | 0.03399 | Digi-Key | 587-1304-1-ND | 0.0408 |
| 8 | C30 | 1 | CAP,X5R,0.1uF,10%,6.3V, 0402,# | TDK | C1005X5R0J104K | Murata | GRM155R60J104KA01D | Digi-Key | 445-1266-1-ND | 0.0066 | Mouser | 81-GRM155R60J104KA1D | 0.007 |
| 9 | C60 | 1 | CAP, SUPER, POLYACENE, 0.06F, 3.3V, COIN, SMD | Taiyo Yuden | PAS414HR-VA5R | | | Digi-Key | 587-2158-1-ND | 0.4305 | | | |
| 10 | C70 | 1 | CAP,X7R,0.1uF,10%,25V,0603,# | TDK | CC0603KRX7R8BB104 | Yageo | CC0603KRX7R8BB104 | Digi-Key | 311-1341-1-ND | 0.00543 | Digi-Key | 311-1341-1-ND | 0.00543 |
| 11 | C71 | 1 | CAP,C0G,12pF,5%,50V,0402# | Yageo | CC0402JRNP09BN120 | Murata | GRM1555C1H120JZ01D | Digi-Key | 311-1016-1-ND | 0.00324 | Digi-Key | 490-1279-1-ND | 0.00525 |
| 12 | C300 | 1 | CAP,X5R,22uF,20%,6.3V,0805,# | Samsung | CL21A226MQCLQNC | AVX | 08056D226MAT2A | Digi-Key | 1276-2412-1-ND | 0.0561 | Digi-Key | 478-3647-1-ND | 0.0561 |
| 13 | D10 | 1 | LED, Red and Green, 2/2V, 631/571nm, 25/35mcd, SMT | Liteon | LTST-C195KGJRKT | | | Digi-Key | 160-1452-1-ND | 0.1206 | | | |
| 14 | D20 | 1 | DIODE, 1000V, 1A, AXIAL | On Semi | 1N4007G | | | Digi-Key | 1N4007GOS-ND | 0.04238 | | | |
| 15 | D21 | 1 | DIODE, Schottky, 1A, 40V, DO-214AC | Comchip Technology | CDBA140-G | | | Digi-key | 641-1015-1-ND | 0.06838 | | | |
| 16 | D60 | 1 | DIODE, Schottky, 1A, 20V, DO-214AC | Comchip Technology | CDBA120-G | | | Digi-key | 641-1014-1-ND | 0.0567 | | | |
| 17 | D90 | 1 | ZENER, 3.3V, 5%, 250mW, SOT23 | NXP | BZX84-C3V3,215 | NXP Semiconductors | BZX84-C3V3,215 | Digi-Key | 568-1675-1-ND | 0.03245 | Mouser | 771-BZX84-C3V3-T/R | 0.032 |
| 18 | D91 | 1 | DIODE, Schottky, 200mA, 30V, Dual, Common Cathode, SOT23 | Fairchild | BAT54C | | | Digi-key | BAT54CFSCT-ND | 0.03986 | | | |
| 19 | D100, D400, D401, D402, D403, D404, D405, D406, D407 | 9 | LED, Blue, 2.8V, 470nm, 15mcd, 0603 | Liteon | LTST-C193TBKT-5A | | | Digi-key | 160-1827-1-ND | 0.09450 | | | |
| 20 | D200 | 1 | Diode, 100V, 215mA, SOT23 | NXP | BAS16,215 | | | Digi-Key | 568-1596-1-ND | 0.02688 | | | |
| 21 | F20 | 1 | PTC, 300mA hold, 60V, 2.1 ohm, TH | Bourns | MF-R030-2 | | | Mouser | 652-MF-R030-2 | 0.158 | | | |
| 22 | F90 | 1 | PTC, 28mA hold, 42mA trip, 265V max, 200mA max, 500 ohms, TH | Vishay | PTCCL05H280HBE | | | Digi-Key | BC2316-ND | 0.33979 | | | |
| 23 | J20, J90 | 2 | Terminal Block, Socket with Male Pins, Right Angle, 2-pos | TE Connectivity | 284513-2 | | | Digi-Key | A98401-ND | 0.34855 | | | |
| 24 | J50, J51 | 2 | Terminal Block, Socket with Male Pins, Right Angle, 5-pos | TE Connectivity | 284512-5 | | | Digi-Key | A98399-ND | 0.75861 | | | |
| 25 | J300 | 1 | HDR, 1x6 Pin, 2.54mm Pitch, Gold Flash, Vertical, Through Hole | 4UCON | 00808 | FCI | 68000-406HLF | 4UCON | 00808 | 0.0138 | Digi-Key | 609-3263-ND | 0.10818 |
| 26 | L20 | 1 | IND, 100uH, 20%, 466 mOhm, SMT | Taiyo Yuden | NRS6045T101MMGK | | | Digi-Key | 587-2947-1-ND | 0.26126 | | | |
| 27 | MECH20, MECH90 | 2 | Terminal Block, Plug with Female Sockets, Cage/Tension Clamp, 2-pos | TE Connectivity | 1986720-2 | | | Digi-Key | A104394-ND | 1.04954 | | | |
| 28 | MECH50, MECH51 | 2 | Terminal Block, Plug with Female Sockets, Cage/Tension Clamp, 5-pos | TE Connectivity | 1986692-5 | | | Digi-Key | A104373-ND | 3.16436 | | | |
| 29 | Q10 | 1 | Phototrans, Clear, Top View, 940nm, 0.4V, 0.6mA, 0603 | Everlight | PT19-21C/L41/TR8 | | | Digi-Key | 1080-1384-1-ND | 0.07101 | | | |
| 30 | Q100, Q200 | 2 | NFET, 60V, 360mA, SOT23 | NXP | 2N7002P,215 | | | Digi-Key | 568-5818-1-ND | 0.02781 | | | |
| 31 | R1, R2 | 2 | RES,4.7k,5%,0.063W,0402,# | Yageo | RC0402JR-074K7L | ROHM | MCR01MRTJ472 | Digi-Key | 311-4.7KJRCT-ND | 0.00237 | Digi-Key | RHM4.7KCECT-ND | 0.00352 |
| 32 | R10 | 1 | RES,47k,5%,0.063W,0402 | Yageo | RC0402JR-0747KL | ROHM | MCR01MRTJ473 | Digi-Key | 311-47KJRCT-ND | 0.00237 | Digi-Key | RHM47KCECT-ND | 0.00352 |
| 33 | R11, R32 | 2 | RES,10k,5%,0.063W,0402,# | Stackpole | RMCF0402JT10K0 | ROHM | MCR01MRTJ103 | Digi-Key | RMCF0402JT10K0CT-ND | 0.00256 | Digi-Key | RHM10KCECT-ND | 0.00352 |
| 34 | R12, R13, R101, R400, R402, R404, R406, R408, R410, R412, R414 | 11 | RES,100 Ohm,1%,0.063W,0402,#, RES,100 Ohm,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,#, RES,100,1%,0.063W,0402,# | Yageo | RC0402FR-07100RL | ROHM | MCR01MRTF1000 | Digi-Key | 311-100LRCT-ND | 0.0027 | Digi-Key | RHM100CDCT-ND | 0.0048 |
| 35 | R20 | 1 | RES,3.3K Ohm,1%,0.063W,0402 | Rohm | MCR01MRTF3301 | Yageo | RC0402FR-073K3L | Digi-Key | RHM3.3KCDCT-ND | 0.00247 | Digi-Key | 311-3.30KLRCT-ND | 0.0027 |
| 36 | R21 | 1 | RES,2.0K,1%,0.063W,0402 | Stackpole | RMCF0402FT2K00 | Vishay | CRCW04022K00FKED | Digi-Key | RMCF0402FT2K00CT-ND | 0.00384 | Digi-Key | 541-2.00KLCT-ND | 0.0174 |
| 37 | R31, R33, R34, R100, R201 | 5 | RES,100k,5%,0.063W,0402,# | Stackpole, Stackpole, Stackpole, Samsung, Samsung | RMCF0402JT100K, RMCF0402JT100K, RMCF0402JT100K, RC1005J104CS, RC1005J104CS | ROHM | MCR01MRTJ104 | Digi-Key | RMCF0402JT100KCT-ND, RMCF0402JT100KCT-ND, RMCF0402JT100KCT-ND, 1276-4424-1-ND, 1276-4424-1-ND | 0.00256, 0.00256, 0.00256, 0.0023, 0.0023 | Digi-Key | RHM100KCECT-ND, RHM100KCECT-ND, RHM100KCECT-ND, HM100KCECT-ND, HM100KCECT-ND | 0.00352, 0.00352, 0.00352, 0.00233, 0.00233 |
| 38 | R60 | 1 | RES,1k,5%,0.063W,0402,# | Yageo | RC0402JR-071KL | ROHM | MCR01MZPJ102 | Digi-Key | 311-1.0KJRCT-ND | 0.00237 | Digi-Key | RHM1.0KJCT-ND | 0.00384 |
| 39 | R200, R401, R403, R405, R407, R409, R411, R413, R415 | 9 | RES,330,5%,0.063W,0402 | Yageo | RC0402JR-07330RL | Panasonic | ERJ-2GEJ331X | Digi-Key | 311-330JRCT-ND | 0.00237 | Digi-Key | P330JCT-ND | 0.0048 |
| 40 | T400, T401, T402, T403, T404, T405, T406, T407 | 8 | Triac, 400V, 0.6A, TO92-3 | NXP | MAC97A6,412 | | | Digi-Key | 568-3744-ND | 0.10005 | | | |
| 41 | U1 | 1 | Module, Electric Imp Solder Down with Antenna | Electric Imp | IMP002 | | | | | | | | |
| 42 | U20 | 1 | IC, DC/DC Buck, Adjustable Output, 0.5A, 4.5V - 40V in | On Semi | LM2594DADJR2G | | | Digi-Key | LM2594DADJR2GOSCT-ND | 0.3795 | | | |
| 43 | U30 | 1 | IC, Shift Register, 8-Bit, Output Enable, SOIC16 | NXP | 74HC595D,118 | Fairchild | MM74HC595MX | Digi-Key | 568-1483-1-ND | 0.13228 | Digi-Key | MM74HC595MXCT-ND | 0.15995 |
| 44 | U70 | 1 | IC, RTC/Calendar, I2C | NXP | PCF8563T/5,518 | | | Digi-Key | 568-6650-1-ND | 0.5208 | | | |
| 45 | U80 | 1 | IC, EEPROM, 2KBit, I2C, 400kHz | On Semi | CAT24C02WI-GT3 | | | Digi-Key | CAT24C02WI-GT3CT-ND | 0.11021 | | | |
| 46 | VC200 | 1 | VOICE COIL MAGNETIC 5V 12MM 2.048KHZ TH | Soberton | GT-111PS | | | Digi-Key | 433-1023-ND | 0.26128 | | | |
| 47 | Y70 | 1 | XTAL, 32.768KHZ, 20ppm, 12.5PF THRU | Abracon | AB26T-32.768KHZ | | | Digi-Key | 535-9032-ND | 0.098 | | | |