DO NOT EVER PLUG IN ANYTHING TO THE PROGRAMMING OR SERIAL INTERFACES WHILE THE 240VAC SUPPLY IS CONNECTED.
Use standard XBee module. XBee Pro or other high-power models probably won't work.

For 120VAC use (USA etc.) change C13 from 2.2 uF to 4.5 uF
(NOT YET CHECKED AND OFFICIALLY SUPPORTED)

All resistors and capacitors are 0805 SMD unless otherwise noted.

IC2: OPA340NA Rail-rail opamp	OPA340NACT-ND
IC3: MCP9701A Temperature sensor	MCP9701A-E/TO-ND
ZD1, ZD3: BZX384-C3V6 3.6V Zener	568-8044-1-ND
Q1, Q3: 2N7002P N-Ch MOSFET	568-5818-1-ND
LED1: Red LED, 0805	475-1278-1-ND
LED2: Yellow LED, 0805	754-1135-1-ND
LED3: Green LED, 0805	475-1410-1-ND
R1: PDV-P8103 (CdS LDR)	PDV-P8103-ND
IC5: ATmega328-AU	ATMEGA328-AU-ND
Q2: 8 MHz crystal, 4-SMD	887-1452-1-ND
All 100 nF 50V SMD 0805 ceramic caps	311-1361-1-ND
C8, C9: 27 pF 50V SMD 0805	311-1104-1-ND
C7: 22 uF 6.3V SMD 1206 ceramic	490-1824-1-ND
IC4: LD1117S33 voltage regulator	497-1241-1-ND
D2: PMLL4148L (SOD80C)	568-1749-1-ND
R20: 10 milliohm shunt (through-hole) (rated for at least 2W)	989-1097-ND
RY1: G5Q-1A4DC12 240VAC 10A, 12V coil, 720 ohm (16.7 mA)	Z223-ND
C6: 470 uF 25V Through-hole alu, 8mm dia, 3.5mm pitch.	565-1678-ND
D1: CGRM4004-G, SOD-123	641-1329-1-ND
ZD2: 3SMAJ5928B, 13V Zener, DO-214AC Power rating of at least 3W	3SMAJ5928B-TPMSCT-ND
R14: 150 ohm 5W (large wirewound)	UB5C-150-ND
R16-R18: 680k, 1/4W 1% SMD 1206	311-680KFRCT-ND
C13: 2.2 uF 250+VAC Large through-hole, X2 class polyester	P10738-ND

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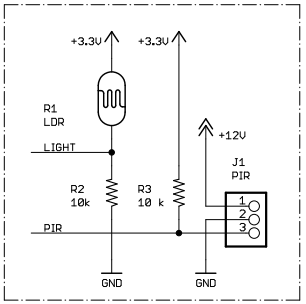
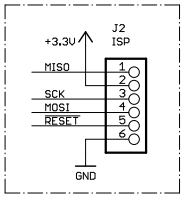
REMOVE XBEE MODULE BEFORE CONNECTING PROGRAMMING INTERFACE.
Supported PIR module: Sparkfun SEN-08630

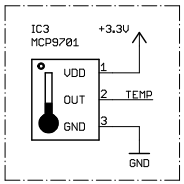
LDR and PIR connector



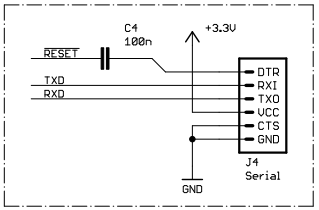
ISP interface



Temp. sensor

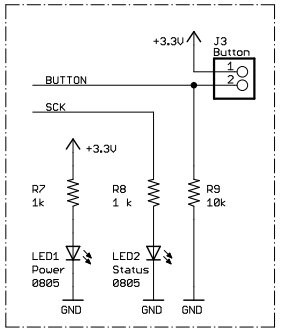


NON-isolated serial interface

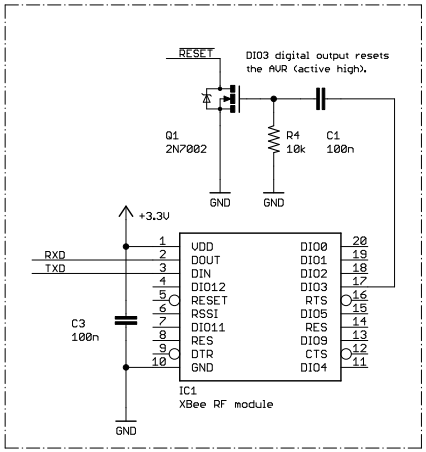


Button and LEDs

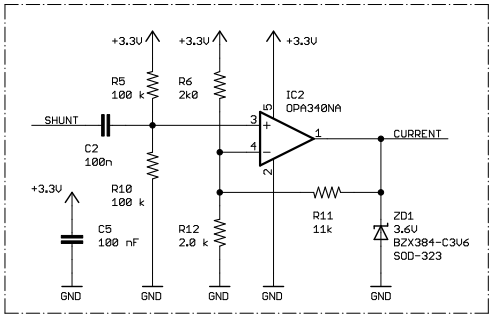
J3 = 4-pin header for ext. button and LED.



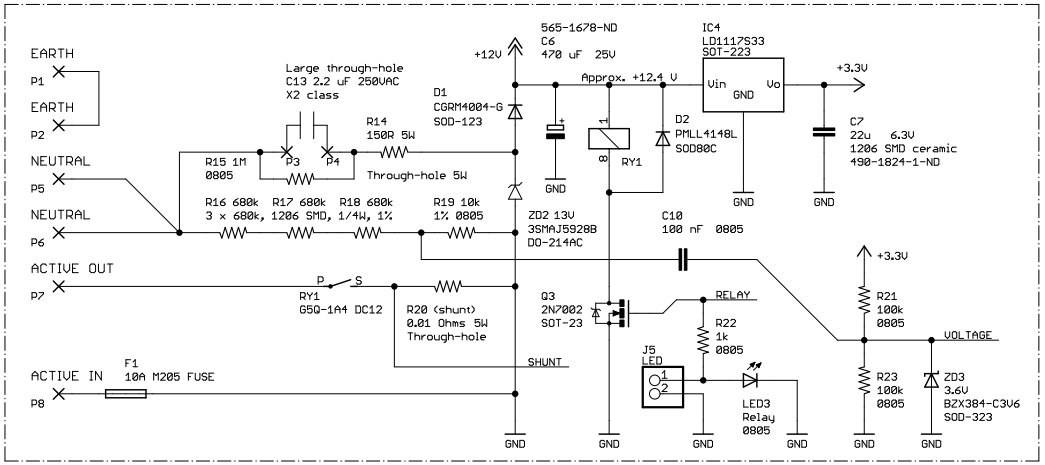
XBee 802.15.4 module



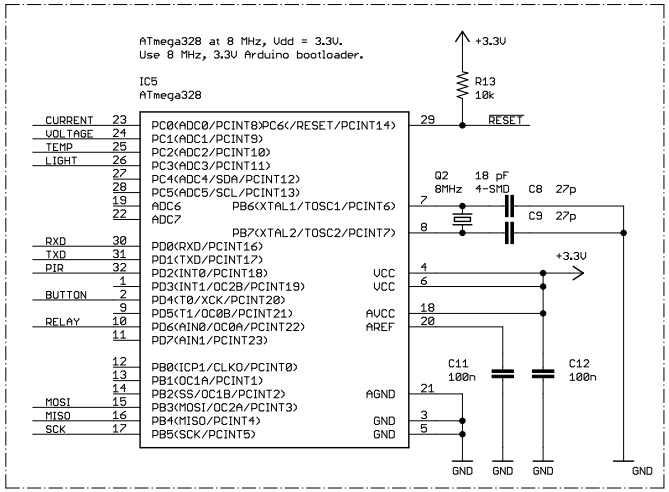
Current waveform amplifier



Transformerless power supply and voltage/current interfaces



Microcontroller



UNTESTED PRELIMINARY EXPERIMENTAL HARDWARE. THIS IS NOT SUPPORTED IN ANY WAY BY ANY PERSON. IT MIGHT FAIL SPECTACULARLY.

Single-channel, single-phase plug-in smart energy appliance

smartenergygroups.com

Hardware design by Luke Weston, 2011-2012

github.com/lukeweston/SEGplug

FOR YOUR SAFETY PLEASE READ ALL DOCUMENTATION WELL BEFORE USE.
DANGER - ALL PARTS OF CIRCUIT ARE AT MAINS POTENTIAL.
TRANSFORMERLESS NON-ISOLATED, FLOATING POWER SUPPLY
MAXIMUM LOAD CURRENT = 10 A

open hardware

SEGPlug v0.5 Preliminary	
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