Finding the Parts

As usual, a high quality printed circuit board for the project can be purchased from the Silicon Chip on line shop (www.siliconchip.com.au). The microcontroller (a Microchip PIC32MX250F128B-I/SP) can also be purchased pre-programmed from the Silicon Chip on line shop along with some other components (the voltage regulator and inductor).

Alternatively a blank PIC32MX250F128B-I/SP can be purchased direct from Microchip (www.microchip.com) or RS Components (part 768-0836). Note that if you purchased the microcontroller from other than Silicon Chip you will need a programmer (such as the PICKit 3) to install the firmware (the hex file is available on the Silicon Chip website).

The voltage regulator (Microchip MCP16301T-I/CHY) can also be bought on line from Microchip or RS Components (part number 770-9476P). As at the end of 2013 this component was in short supply and may be hard to find. In that case you could use the Microchip MCP16301T-E/CH with no change to the circuit or the Linear LT1933ES6 which requires that a second 27K resistor be wired in parallel with the current 27K resistor (so that the combined resistance is 13.5K). Both have been tested and work fine.

The 15µH choke and 10µF SMD capacitors can both be purchased from RS Components (part numbers 540-8538 and 758-8093 respectively) and many other suppliers.

The UP501 GPS module can be purchased from RS Components (part 716-5283) or Element14 (part 2113837). If you prefer to use the EM-408 module this can be purchased from Altronics (part K 1131) and many on line shops.

Parts List

1 PC board, 138mm x 68mm
1 ABS Box 80x150x30 mm (Altronics H0218, Jaycar HB-6034)
1 GPS Module UP501 or EM-408
1 8MHz Crystal
1 15µH 2.1A choke (Panasonic ELC09D150F)
1 SD (Secure Digital memory card) connector (Altronics P5720)
1 USB B Type Socket PCB mounting (Jaycar PS-0920, Altronics P1307, Element14 1696537)
1 28 pin SDIP IC Socket
1 3 way Header Connector (male), PCB mount , 0.1 inch
1 6 pin Header Socket, PCB mount, 0.1 inch
1 Micro Tactile Push Button Switch
1 2 way Terminal Block. PCB mount 5.08mm.
4 M3 metal thread screws (or self tappers) 4mm long

Semiconductors

1 Microchip PIC32MX250F128B-I/SP microcontroller (IC1)
1 Microchip MCP16301T-I/CHY (IC2)
1 MOSFET (IRF540, STP16NE06 or PT3055V) TO-220 package
1 1N4745 16V 1W Zener Diode
1 1N4004 or general purpose silicon power diode (D1)
2 IN5819 Schottky diode
1 1N4148 silicon diode
2 Green LED, 3mm
1 Red LED, 3mm

Capacitors

2 22pF Ceramic
5 100nF Monolithic
4 10µF 25V Ceramic SMD 1206 package
1 1 Farad 5V Super Capacitor, PCB mount 5.08mm

Resistors (0.25W 5% unless specified)

1 10Ω 1W
1 47Ω
3 82Ω
1 8.2KΩ (1%)
3 10KΩ
1 27KΩ (1%)