

BoM, for kit building assembly

| ref | value | Position X | Position Y | Orientation | Layer | Vendor | Vendor P/N | NOTE1 | NOTE 2 | QTY |
|-----|-------------------|------------|------------|-------------|-------|---------|-----------------|----------|--|-----|
| BT1 | BATT_RTC | 2.6875 | 3.0000 | 180 | Front | DigiKey | 3003K-ND | | Battery Socket | 1 |
| -- | 3V CR2032 Battery | -- | -- | -- | -- | DigiKey | P189-ND | | LR2032 Coin Battery | 1 |
| C1 | 100n | 1.5400 | 2.3350 | 180 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C2 | 100u | 1.8725 | 2.4125 | 270 | Front | DigiKey | P833-ND | | Capacitor Voltage Rating >= 16V | 1 |
| C3 | 100n | 4.0750 | 2.3375 | 180 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C4 | 100n | 3.7800 | 1.9050 | 90 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C5 | 100n | 4.7875 | 1.9050 | 90 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C6 | 100n | 5.7500 | 1.9050 | 90 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C7 | 100n | 1.5400 | 2.4500 | 180 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C8 | 100u | 2.1075 | 2.4125 | 90 | Front | DigiKey | P833-ND | | Capacitor Voltage Rating >= 16V | 1 |
| C9 | 100n | 1.4700 | 3.3075 | 180 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C10 | 100n | 2.4425 | 1.9550 | 0 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C13 | 100n | 6.6800 | 1.9050 | 90 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C14 | 100n | 3.8500 | 1.4750 | 90 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| C15 | 100n | 4.8700 | 1.4750 | 90 | Front | DigiKey | 399-5863-ND | | Decoupling capacitor | 1 |
| D1 | GRN | 3.6350 | 3.2700 | 0 | Front | DigiKey | 1080-1134-ND | | Debug LED, 3mm or 5mm LED, any Color | 1 |
| D2 | YEL | 3.9350 | 3.2700 | 0 | Front | DigiKey | 1080-1134-ND | | Debug LED, 3mm or 5mm LED, any Color | 1 |
| D3 | PWR | 3.3350 | 3.2700 | 0 | Front | DigiKey | 1080-1134-ND | | Debug LED, 3mm or 5mm LED, any Color | 1 |
| D4 | 3V3_Z | 5.3200 | 2.3375 | 0 | Front | DigiKey | 1N5226BFSCT-ND | | Zener Diode, 3.3V, for DCF77 | 1 |
| D5 | 1N4007 | 3.3850 | 2.9050 | 180 | Front | DigiKey | 1N4007DICT-ND | | Diode, for reverse polarity protection | 1 |
| K1 | PWR | 1.5400 | 2.6000 | 180 | Front | DigiKey | SAM1031-50-ND | | Header, Male, 3 pin, for PWR_SEL | 1 |
| -- | -- | -- | -- | -- | -- | DigiKey | S9341-ND | | Jumper socket for PWR_SEL K1 | 1 |
| K2 | CONN_3 | 2.8250 | 1.1950 | 90 | Front | DigiKey | SAM1031-50-ND | | Header, Male, 3 pin, for LED_ENABLE | 1 |
| -- | -- | -- | -- | -- | -- | DigiKey | S9341-ND | | Jumper socket for LED_ENABLE K2 | 1 |
| P1 | DCF77 | 5.2200 | 2.5825 | 0 | Front | DigiKey | SAM1031-50-ND | | Header, Male, 6 pin, for DCF77 | 1 |
| P5 | ANODES | 3.8000 | 1.1400 | 180 | Front | DigiKey | SAM1095-36-ND | | Header, 16x2 pin | 1 |
| P6 | KATHODES | 5.8500 | 1.1400 | 180 | Front | DigiKey | SAM1095-36-ND | | Header, 16x2 pin | 1 |
| P7 | FTDI | 1.2900 | 2.2000 | 270 | Front | DigiKey | SAM1043-50-ND | | Header, 6 pin, right angle, for FTDI | 1 |
| P13 | ISP | 3.0200 | 2.4100 | 270 | Front | DigiKey | SAM1095-36-ND | Optional | Header, 3x2 pin | 1 |
| P20 | DC_IN | 1.3275 | 2.9375 | 0 | Front | DigiKey | CP-002B-ND | | Barrel socket | 1 |
| R1 | 10k | 5.1640 | 2.8800 | 90 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| R2 | 10k | 5.5650 | 2.8800 | 90 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| R3 | 10k | 6.3650 | 2.8800 | 90 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| R4 | 10k | 5.9650 | 2.8800 | 90 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| R5 | 10k | 6.7650 | 2.8800 | 90 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| R6 | 4k7 | 3.4750 | 2.2875 | 270 | Front | DigiKey | CF18JT4K70CT-ND | | Resistor, 1/8W, 5% | 1 |
| R7 | 4k7 | 3.3750 | 2.2875 | 270 | Front | DigiKey | CF18JT4K70CT-ND | | Resistor, 1/8W, 5% | 1 |

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|-----|---------------|------------|------------|-------------|-------|---------|-----------------|-------|------------------------------|-----|
| R8 | 1k | 3.5850 | 3.0950 | 180 | Front | DigiKey | CF18JT1K00CT-ND | | Resistor, 1/8W, 5% | 1 |
| R9 | 1k | 3.8850 | 3.0950 | 180 | Front | DigiKey | CF18JT1K00CT-ND | | Resistor, 1/8W, 5% | 1 |
| R10 | 10K | 4.1850 | 3.0950 | 180 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| R11 | LDR | 4.2350 | 3.2700 | 270 | Front | DigiKey | PDV-P9007-ND | | LDR, 10k to 100k | 1 |
| R12 | 6.8E | 6.6500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R13 | 6.8E | 6.5500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R14 | 6.8E | 6.4500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R15 | 6.8E | 6.3500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R16 | 6.8E | 6.2500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R17 | 6.8E | 6.1500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R18 | 6.8E | 6.0500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R19 | 6.8E | 5.9500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R20 | 6.8E | 5.7500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R21 | 6.8E | 5.6500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R22 | 6.8E | 5.5500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R23 | 6.8E | 5.4500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R24 | 6.8E | 5.3500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R25 | 6.8E | 5.2500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R26 | 6.8E | 5.1500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R27 | 6.8E | 5.0500 | 1.4750 | 270 | Front | DigiKey | 6.8EBK-ND | | Resistor, 1/6W, 5% | 1 |
| R28 | 10k | 1.4700 | 1.3000 | 270 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| R29 | 220E | 5.4200 | 2.2375 | 0 | Front | DigiKey | CF14JT220RCT-ND | | Resistor, 1/4W, 5% | 1 |
| R30 | 4k7 | 4.1000 | 2.1675 | 0 | Front | DigiKey | CF18JT4K70CT-ND | | Resistor, 1/8W, 5% | 1 |
| R31 | 1k | 3.2850 | 3.0950 | 180 | Front | DigiKey | CF18JT1K00CT-ND | | Resistor, 1/8W, 5% | 1 |
| R32 | 10k | 2.2075 | 1.1575 | 180 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| R33 | 10k | 2.0100 | 1.1575 | 0 | Front | DigiKey | CF18JT10K0CT-ND | | Resistor, 1/8W, 5% | 1 |
| SW1 | MODE | 5.7650 | 3.1100 | 90 | Front | DigiKey | 450-1657-ND | | Right Angle switch | 1 |
| SW2 | HOUR+ | 6.1650 | 3.1100 | 90 | Front | DigiKey | 450-1657-ND | | Right Angle switch | 1 |
| SW3 | MIN+ | 5.3650 | 3.1100 | 90 | Front | DigiKey | 450-1657-ND | | Right Angle switch | 1 |
| SW4 | RST | 4.9650 | 3.1100 | 90 | Front | DigiKey | 450-1657-ND | | Right Angle switch | 1 |
| SW5 | ENTER | 6.5650 | 3.1100 | 90 | Front | DigiKey | 450-1657-ND | | Right Angle switch | 1 |
| U1 | 74HC595 | 4.3000 | 1.9050 | 180 | Front | DigiKey | 568-1484-5-ND | | IC SHIFT REGISTER 8BIT 16DIP | 1 |
| * | Socket 16 DIP | | | | | DigiKey | A100206-ND | | Socket for IC U1 | 1 |
| U2 | 74HC595 | 3.3000 | 1.9050 | 180 | Front | DigiKey | 568-1484-5-ND | | IC SHIFT REGISTER 8BIT 16DIP | 1 |
| * | Socket 16 DIP | | | | | DigiKey | A100206-ND | | Socket for IC U2 | 1 |
| U3 | ATMEGA8-P | 4.0250 | 2.6125 | 0 | Front | DigiKey | ATMEGA328-PU-ND | | IC MCU AVR 32K FLASH 28PDIP | 1 |
| * | Socket 28 DIP | | | | | DigiKey | A100210-ND | | Socket for IC U3 | 1 |

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| U4 | 74HC595 | 6.2000 | 1.9050 | 180 | Front | DigiKey | 568-1484-5-ND | | IC SHIFT REGISTER 8BIT 16DIP | 1 |
| * | Socket 16 DIP | | | | | DigiKey | A100206-ND | | Socket for IC U4 | 1 |
| U5 | 74HC595 | 5.3000 | 1.9050 | 180 | Front | DigiKey | 568-1484-5-ND | | IC SHIFT REGISTER 8BIT 16DIP | 1 |
| * | Socket 16 DIP | | | | | DigiKey | A100206-ND | | Socket for IC U5 | 1 |
| U6 | DS1307 | 2.1600 | 1.6200 | 0 | Front | DigiKey | DS1307+-ND | | IC RTC SERIAL 512K 8-DIP | 1 |
| * | Socket 8 DIP | | | | | DigiKey | A100204-ND | | Socket for IC U6 | 1 |
| U7 | UDN2981A | 4.3500 | 1.4750 | 0 | Front | Jameco | 1762681 | | Trans Darlington NPN/PNP 50 Volt 0.5A 18-Pin Plastic | 1 |
| * | Socket 18 DIP | | | | | DigiKey | A100207-ND | | Socket for IC U7 | 1 |
| U8 | UDN2981A | 3.3500 | 1.4750 | 0 | Front | Jameco | 1762681 | | Trans Darlington NPN/PNP 50 Volt 0.5A 18-Pin Plastic | 1 |
| * | Socket 18 DIP | | | | | DigiKey | A100207-ND | | Socket for IC U8 | 1 |
| U9 | 78L05 | 1.9225 | 2.6325 | 180 | Front | DigiKey | MC7805CTGOS-ND | | ONLY if V_IN > 5V. ELSE USE SHORTING LINK | 1 |
| X1 | 16MHz | 4.5200 | 2.9425 | 0 | Front | DigiKey | X908-ND | | Resonator, with capacitors, 3 pin | 1 |
| X2 | CRYSTAL | 2.0600 | 1.8850 | 0 | Front | DigiKey | 535-9034-ND | | Crystal for RTC U6 | 1 |
| PCB1 | PCB | -- | -- | -- | -- | -- | | | Main Board | 1 |

NOT USED COMPONENTS

| | | | | | | | | | | |
|-----|--------|--------|--------|-----|-------|---------|-----------------------------|----------|---|---|
| A0 | CONN_1 | -- | -- | -- | -- | -- | Break Out Pad, no component | | Arduino Port A0 | 1 |
| A1 | CONN_1 | -- | -- | -- | -- | -- | Break Out Pad, no component | | Arduino Port A1 | 1 |
| A2 | CONN_1 | -- | -- | -- | -- | -- | Break Out Pad, no component | | Arduino Port A2 | 1 |
| C11 | 22p | 4.4000 | 3.1400 | 270 | Front | DigiKey | BC1034CT-ND | Optional | if using crystal instead of resonator | 1 |
| C12 | 22p | 4.6400 | 3.1400 | 270 | Front | DigiKey | BC1034CT-ND | Optional | if using crystal instead of resonator | 1 |
| CD1 | CDOT1 | 1.6725 | 1.6200 | 90 | Front | DigiKey | 3M9515-ND | Optional | if using I2SD, rtcBoB or ChronoDot, Socket, 4 pin | 1 |
| CD2 | CDOT2 | 2.5725 | 1.6200 | 90 | Front | DigiKey | 3M9515-ND | Optional | if using I2SD, rtcBoB or ChronoDot, Socket, 4 pin | 1 |
| CD3 | CDOT3 | 1.4475 | 1.6200 | 90 | Front | DigiKey | 3M9515-ND | Optional | if using I2SD, rtcBoB or ChronoDot, Socket, 4 pin | 1 |
| D13 | CONN_1 | -- | -- | -- | -- | -- | Break Out Pad, no component | | Arduino Port D13 | 1 |
| P2 | SDA | 1.6950 | 1.3025 | 0 | Front | DigiKey | SAM1031-50-ND | Optional | Header, Male, 2 pin, Link for INT, OPEN for EXT | 1 |
| -- | -- | -- | -- | -- | -- | DigiKey | S9341-ND | Optional | Jumper socket for SCL, K4 | 1 |
| P3 | SCL | 1.6975 | 1.9425 | 180 | Front | DigiKey | SAM1031-50-ND | Optional | Header, Male, 2 pin, Link for INT, OPEN for EXT | 1 |
| -- | -- | -- | -- | -- | -- | DigiKey | S9341-ND | Optional | Jumper socket for SDL, K5 | 1 |
| P4 | CONN_1 | 1.9200 | 3.1580 | 0 | Front | -- | | | Fixing Screw for Voltage Regulator | 1 |
| P8 | CONN_1 | -- | -- | -- | -- | -- | | | Fixing Screw for Board | 1 |
| P9 | CONN_1 | -- | -- | -- | -- | -- | | | Fixing Screw for Board | 1 |
| P10 | CONN_1 | -- | -- | -- | -- | -- | | | Fixing Screw for Board | 1 |
| P11 | CONN_1 | -- | -- | -- | -- | -- | | | Fixing Screw for Board | 1 |
| P24 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P25 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P26 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |

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| P27 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P28 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P29 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P30 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P31 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P32 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P33 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P34 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P35 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P36 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P37 | DIL6 | -- | -- | -- | -- | -- | | | Prototyping area | 1 |
| P41 | STACK-L | 1.3000 | 1.5500 | 270 | Front | DigiKey | SAM1009-50-ND | Optional | Socket, 4 pin, right angle, for daisy-chaining boards | 1 |
| P42 | STACK-R | 6.7600 | 1.5500 | 90 | Front | DigiKey | SAM1043-50-ND | Optional | Header, 4 pin, right angle, for daisy-chaining boards | 1 |
| P49 | CONN_1 | -- | -- | -- | -- | -- | | | Fixing Screw for rtcBoB | 1 |
| P50 | CONN_1 | -- | -- | -- | -- | -- | | | Fixing Screw for rtcBoB | 1 |
| P51 | CONN_1 | -- | -- | -- | -- | -- | | | Fixing Screw for rtcBoB | 1 |
| P52 | CONN_1 | -- | -- | -- | -- | -- | | | Fixing Screw for rtcBoB | 1 |
| U10 | DS3231N | 2.2000 | 1.4475 | 0 | Back | DigiKey | DS3231S#-ND | Optional | IC, RTC | 1 |

GRAND TOTAL