

# SCULLCOM HOBBY ELECTRONICS - ELECTRONIC DC LOAD

## Full Parts List – Version 9.3 (updated 26<sup>th</sup> April 2018)

- 1 of Arduino Nano V3.0 ATmega328P CH340 5V 16MHz (U3)
- MCP3426A0-E/SN - MICROCHIP 16 bit ADC, SOIC (Farnell order code 1825012) (rsonline stock no. 703-7958) (U6)
- MCP4725A0T-E/CH -MICROCHIP 12 bit DAC, SOT-23 (Farnell order code 1578449) (rsonline stock no. 669-6290) (U5)
- AD8630ARZ - ANALOG DEVICES Quad OP Amp, SOIC, 14 Pins (Farnell order code 1078275) (U7)
- LM35DT/NOPB - TEXAS Temp. Sensor IC, TO-220 (Farnell order code 1469235) (rsonline stock no. 535-9458) (U4)
- LM7812ACT – FAIRCHILD Linear Volt Reg, TO-220AB-3 (Farnell order code 2451064)(rsonline stock no. 704-4029)(U1)
- LM7805ACT - FAIRCHILD Linear Voltage Regulator, TO-220-3 (Farnell order code 2296047) (U2)
- MCP79410-I/SN - MICROCHIP I2C Real Time Clock + EEPROM, SOIC-8 Package (Farnell order code 1823155) (U8)
- ICL7660CPAZ - INTERSIL DC/DC Adj. Charge Pump Voltage Converter, DIP-8 (Farnell order code 1018170) (U12)  
or LTC1046CN8 - DC/DC Adjustable Charge Pump Voltage Converter see schematic (Farnell order code 9560742)
- REF5040AIDG4 - TEXAS INSTRUMENTS 4.096V Ref., SOIC-8 (Farnell order code 1439624) (U9)
- OPA277PA - TEXAS INSTRUMENTS Single Op Amp., DIP (Farnell order code 1470394) (U13)
- 4N25 Optocoupler (VISHAY), Transistor Output, 1 Channel, DIP 6 Pins (Farnell order code 1612453) (U10)
- 74LVC2G14 Inverter, Schmitt Trigger (TEXAS SN74LVC2G14DBVR) , SOT-23-6 (Farnell order code 1470884) (U11)
- LM431ACZX - Voltage Reference, Shunt - TO-92-3 (Farnell order code 2451028) (U14)
- 4 of NXP BUK956R1-100E MOSFET Transistor, N Channel, (Farnell order code 2254218) (Q2, Q3, Q4, Q5)  
(See Note 1 below for alternative Power Mosfets)
- 1 of TIP122 FAIRCHILD Darlington NPN, (Farnell order code 1467910) (rsonline stock no. 903-4437) (Q1)
- 4 of PN2222A (NPN Transistor) (Q6, Q7, Q8, Q9)
- 1 of 2N3904 (NPN Transistor) (Q10)
- 1 of MBR41H100CTG - Schottky Rect., 100V, 40A, Dual Common Cathode(TO-220) (Farnell order code 1431070)(D5)
- 1 of 1N4007 Diode (D2)
- 1 of UF5408-E3/54 - VISHAY Fast/Ultrafast Power Diode (Farnell order code 9551735) (D3)
- 2 of 1N4148 Small Signal Diode (FAIRCHILD) (Farnell order code 9843680) (D1, D4)
- 1 of Blue Serial IIC/I2C/TWI 2004 20x4 LCD Display Module for Arduino (LCD1)
- 1 of 12mm Shaft Rotary Encoder Switches Dia 6MM (20) (SW1 Rotary Encoder)
- 1 of GRAYHILL Rotary Control Knob (Farnell order code 2292926)
- 1 of 200 ohm Vertical 25 turn preset BOURNS (RV4)
- 2 of 10K Vertical 25 turn preset BOURNS (RV3, RV5)

- 1 of 20K Vertical 25 turn preset BOURNS (RV2)
- 1 of 500KΩ 500mW ±10%, Trimmer Pot (BOURNS 3296W-1-504LF) 25 Turns (Farnell order code 9353313) (RV1)
- 4 of 100Ω ±1% 0.6W or 0.25W metal film resistor (R5, R9, R15, R21)
- 1 of 909 ohm ±0.1% 0.25W metal film resistor (Farnell order code 9503030) (R14)
- 3 of 1K ±1% 0.6W or 0.25W metal film resistor (R3, R8, R45)
- 5 of 2.2K ±1% 0.6W or 0.25W metal film resistor (R30, R35, R36, R37, R38)
- 1 of 4.7K ±1% 0.6W or 0.25W metal film (R18)
- 10 of 10K ±1% 0.6W or 0.25W metal film resistor (R1, R2, R4, R7, R11, R16, R19, R20, R28, R29)
- 1 of 9K ±0.1% 0.125W metal film resistor (Mouser part number 71-PTF569K0000BYEK) (R6)
- 2 of 20K ±0.1% 0.25W metal film resistor (Farnell order code 9501061) (R13, R31)
- 5 of 47K ±1% 0.6W or 0.25W metal film resistor (R10, R12, R26, R27, R32)
- 1 of 100K ±1% 0.6W or 0.25W metal film resistor (R42)
- 1 of 270K ±1% 0.6W or 0.25W metal film resistor (R43)
- 1 of 330K ±1% 0.6W or 0.25W metal film resistor (R41)
- 1 of 470K ±1% 0.6W or 0.25W metal film resistor (R44)
- 2 of 1M ±0.1% 0.25W or 0.25W metal film resistor (Farnell order code ) (R33, R34)
- 1 of 1.8M ±1% 0.6W or 0.25W metal film resistor (R39)
- 1 of 4.7M ±1% 0.6W or 0.25W metal film resistor (R40)
- 4 of - 0.1 ohm (or 0.47 ohm) 5% 3W or 5W Axial Wirewound Resistor (R22, R23, R24, R25)**
- 1 of BOURNS PWR220T-35-R100F Through Hole Current Sense Resistor, 0.1 ohm, TO-220, 35 W, ± 1%, PWR220T-35 Series, Thick Film (Farnell order code 2101746) (rsonline 796-2595) – RS at half price £2.79 (R17)
- 2 of 10pF 5% 50V 2.5mm Ceramic Disc Capacitor (rapidonline Order Code: 08-0040) (C22, C23)
- 1 of 100pf capacitor (optional C3 see schematic for details)
- 1 of 1nf 100V 5mm Polyester Box Capacitor (rapidonline Order Code: 10-3240) (C19)
- 13 of 100nF 63V 5mm Kemet Polyester Box Capacitor (rapidonline Order Code: 10-3260) (C2, C5, C7, C9, C11, C12, C15, C16, C17, C18, C21, C27, C29)
- 1 of 1μF 63V Polyester (C28) - (Farnell order code 9750932 or 2429339) or use similar
- 1 of 1μF 16V or 25V Tantalum (C24)
- 3 of 10μF 16V or 25V Tantalum (C25, C4, C26)
- 4 of 10μF 16V or 25V electrolytic (C10, C13, C14, C20, C30)
- 2 or 100μF 16V Tantalum (optional if C3 is also fitted with ICL7660) (C4, C26 see schematic for details)
- 1 of 47μF 16V or 25V electrolytic (C8)
- 1 of 220μF 25V or 35V electrolytic (C6)
- 1 of 470μF 35V electrolytic (C1)
- 1 of 32.768 kHz Crystal, ABRACON AB38T-32.768KHZ, **12.5 pF**, 20ppm, AB38T Series (Farnell code 1611828) (Y1)
- 6 of JST XH 2.54mm 0.1" - 2 Pin PCB Plug and Socket (eBay purchase) (J2, SW2, J6, J8, J13, J15)  
<https://www.ebay.co.uk/itm/272253345370>
- 1 of JST XH 2.54mm 0.1" - 4 Pin PCB Plug and Socket (eBay purchase) (LCD1)
- 1 of JST XH 2.54mm 0.1" - 5 Pin PCB Plug and Socket (eBay purchase) (SW1 Rotary Encoder)
- 2 of Fuseholder Clip, PCB Mount, 250V, 10A, 5mm, Solder (Farnells order code 2762089) (F1)
- 1 of 5 Amp 20mm Antisurge Ceramic Fuse (F1)
- 1 of Project Box - Sourcingmap® 245mm X 190mm X 110mm Metal Enclosure Project Case (eBay purchase)  
<https://www.ebay.co.uk/itm/222521185161>

1 of 16 KEY 4x4 SCM MATRIX EXTERNAL EXPANSION KEYPAD CONTROL BOARD (eBay purchase)

<http://www.ebay.co.uk/itm/272059892793> (KP1)

**OR**

1 of 20 KEY 5x4 MATRIX KEYPAD (eBay purchase) (KP1)

<https://www.ebay.co.uk/itm/401388255271>

1 of Large Heat Sink For Power Transistors/MOSFET's (250mm x 90mm x 30mm) – eBay purchase

<https://www.ebay.co.uk/itm/231197009289>

2 of Cliff CL1505 Black 4mm Terminal ([www.rapidonline.com](http://www.rapidonline.com) - Order Code: 17-0245) (P6)

2 of Cliff CL1506 Red 4mm Terminal ([www.rapidonline.com](http://www.rapidonline.com) - Order Code: 17-0230) (P5)

1 of Miniature toggle DPDT switch On-On ([www.rapidonline.com](http://www.rapidonline.com) - Order Code: 75-0087)

2 of Miniature push buttons (for Load On/Off and Trigger buttons)

1 of 2.1mm DC Power Jack for Power plug Adaptor (Farnell order code 2646488 or 1216726)

1 of 75 Ohm BNC Bulkhead Socket ([www.rapidonline.com](http://www.rapidonline.com) - Order Code: 16-0112)

1 of 6 pin DIP Socket (TE CONNECTIVITY) IC & Component Socket (Farnell order code 2445619)

2 of 8 pin DIP Socket (TE CONNECTIVITY) IC & Component Socket (Farnell order code 1077344)

2 of 15 Way Single Row PCB Socket 2.54mm Pitch ([www.rapidonline.com](http://www.rapidonline.com) - Order Code: 19-0086)

1 of Single Row Header 36-Way (PCB) Plug ([www.rapidonline.com](http://www.rapidonline.com) - Order Code: 22-0545)

(cut to size – 2 of 15 pins for Arduino Nano connections [may come with Nano] and 2 pins for J1 (scope test))

6 of TO-220 Power Transistor Mica Insulator and plastic bush washer (for Q2, Q3, Q4, Q5, D5 and U4)

(kits available from Farnell order code 520214)

2 of TO-220 small heat sinks for U1 and U2 voltage regulators ([www.rapidonline.com](http://www.rapidonline.com) - Order Code: 36-0115)

#### **Sundries:**

Heat sink compound

Nylon standoffs for PCB

Nuts and bolts.

#### **Note 1: POWER MOSFET ALTERNATIVES TO BUK956R1-100E (Q2, Q3, Q4 and Q5)**

PHP79NQ08LT	Nexperia
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STP80NF55L-06	STMicroelectronics
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RFP12N10L	Fairchild
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STP55NF06L	STMicroelectronics
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(In order of preference)