

Acorn Electron ULA - MAX 10 Board - V1.03  
Bill of Materials

Note: This board can only be fitted to a PGA68 socket on the Electron board. This requires that the original ULA and socket are removed and replaced with a turned pin PGA68 socket. This can be made from turned pin headers which is included in the BOM below

Tips

- 1. Fit the ULA socket pins last (16)
- 2. Soldering the MAX 10 FPGA - Place a small amount of solder paste on the large central pad and then place the chip accordingly with gel flux applied to the pads as per point 3. Drag solder the pins first and then heat the chip from the other side of the board with a hot air gun to hopefully melt the solder paste. I'm not sure this is the correct technique but thats the process I used.
- 3. I recommend using a gel like flux for the SMD chips. Run plenty along each row of pads and then align the chip correctly, the gel helps keep the chip in place. Tag each corner by soldering one or two pins and then drag solder the rest. See guide below
- 4. All the passives (capacitors, resistors), comparator and regulator etc are best done with solder flux and a hot air gun. I would avoid doing this to the SW1 switch however as it may melt it. The switch is best done with the soldering iron

Excellent drag soldering guide here "https://www.youtube.com/watch?v=nyele3CIs-U"

Id	Designator	Package	Quantity	Designation	Description	Supplier and ref
1	R29,R28,R27,R26	R_0603_1608Metric_Pad1.05x0.95mm_HandSolder	4	4.7K Resistor	Pullups for Keyboard input	
2	D2,D1	D_SOD-323_HandSoldering	2	Schottky Diode	BAT54	<a href="https://www.digikey.co.uk/product-detail/en/on-semiconductor/BAT54HT1G/BAT54HT1GOSCT-ND/917809">https://www.digikey.co.uk/product-detail/en/on-semiconductor/BAT54HT1G/BAT54HT1GOSCT-ND/917809</a>
3	U10	TSSOP-14_4.4x5mm_P0.65mm	1	74HCT125D	Quad Buffer	<a href="https://www.digikey.co.uk/product-detail/en/nexperia-usa-inc/74HCT125PW_118/1727-4087-1-ND/1965389">https://www.digikey.co.uk/product-detail/en/nexperia-usa-inc/74HCT125PW_118/1727-4087-1-ND/1965389</a>
4	R25,R20,R24,R23,R22,R21,R19,R18,R17,R16,R15,R14,R13,R12,R11,R10,R9,R8,R7	R_0603_1608Metric_Pad1.05x0.95mm_HandSolder	19	10K Resistor		
5	SW1	SW_DIP_SPSTx04_Slide_Copal_CHS-04B_W7.62mm_P1.27mm	1	SW_DIP_x04	Configuration Switch	<a href="https://www.digikey.co.uk/product-detail/en/nidec-copal-electronics/CHS-04TB/563-1008-1-ND/948417">https://www.digikey.co.uk/product-detail/en/nidec-copal-electronics/CHS-04TB/563-1008-1-ND/948417</a>
6	J1	PinHeader_1x02_P2.54mm_Vertical	1	Conn_01x02	5V Power Input Normal Square Pins	
7	JTAG1	PinHeader_2x05_P2.54mm_Vertical	1	Conn_02x05_Odd_Even	JTAG Pins Normal Square Pins	
8	C29,C27,C25,C23,C22,C21,C19,C18,C13,C12,C10,C8,C6,C4,C9,C7,C5,C3,C2,C11,C16,C30,C17,C15,C14,C1	C_0603_1608Metric_Pad1.05x0.95mm_HandSolder	26	0.1uF Capacitor		
9	X1	Crystal_SMD_7050_4Pads	1	Oscillator	16Mhz Oscillator	Not required unless Electron 16Mhz signal is very poor. FPGA will require an update to use the on board 16Mhz signal
10	C28	C_0805_2012Metric_Pad1.15x1.40mm_HandSolder	1	10uF Capacitor Tantalum		
11	U8	SOT-223	1	AP2114H-3.3TRG1	Regulator	<a href="https://www.digikey.co.uk/product-detail/en/diodes-incorporated/AP2114H-3.3TRG1/AP2114H-3.3TRG1DICT-ND/4505142?utm_adgroup=PMIC%20-%20Voltage%20Regulators%20-%20Linear&amp;utm_source=google&amp;utm_medium=cpc&amp;utm_campaign=Google%20Shopping_Integrated%20Circuits%20%28ICs%29&amp;utm_term=&amp;productid=4505142&amp;gclid=EAlaIqobChMkoq-teuO6rIVC4myCh0O7woeEAQYASABEgIpyID_BwE">https://www.digikey.co.uk/product-detail/en/diodes-incorporated/AP2114H-3.3TRG1/AP2114H-3.3TRG1DICT-ND/4505142?utm_adgroup=PMIC%20-%20Voltage%20Regulators%20-%20Linear&amp;utm_source=google&amp;utm_medium=cpc&amp;utm_campaign=Google%20Shopping_Integrated%20Circuits%20%28ICs%29&amp;utm_term=&amp;productid=4505142&amp;gclid=EAlaIqobChMkoq-teuO6rIVC4myCh0O7woeEAQYASABEgIpyID_BwE</a>
12	C20,C26,C31	C_0805_2012Metric_Pad1.15x1.40mm_HandSolder	3	0.1uF Capacitor		
13	R2,R1,R5,R4,R3	R_0805_2012Metric_Pad1.15x1.40mm_HandSolder	5	10K Resistor		
14	U1	EQFP	1	10M08SCE144C8G	Intel MAX 10 FPGA	<a href="https://www.digikey.co.uk/products/en?keywords=10M08SCE144C8G">https://www.digikey.co.uk/products/en?keywords=10M08SCE144C8G</a>
15	U5,U7,U3,U6,U4,U2	TSSOP-24_4.4x7.8mm_P0.65mm	6	74LVC4245APW	Octal Transceiver	<a href="https://www.digikey.co.uk/product-detail/en/nexperia-usa-inc/74LVC4245APW-118/1727-4308-1-ND/2209918">https://www.digikey.co.uk/product-detail/en/nexperia-usa-inc/74LVC4245APW-118/1727-4308-1-ND/2209918</a>
16	U9	ULA Socket Pins - 1x40 - 2.54mm Pin Headers	2	PGA 68 Pin Layout	ULA Socket Pins Turned Pin Type	<a href="https://hobbycomponents.com/connectors/439-01-254mm-40way-sil-turned-pin-m-m-headers-pack-of-5">https://hobbycomponents.com/connectors/439-01-254mm-40way-sil-turned-pin-m-m-headers-pack-of-5</a>
17	CMP1	SOT-23-5	1	MIC7221YM5-TR	Comparator	<a href="https://www.digikey.co.uk/product-detail/en/microchip-technology/MIC7221YM5-TR/576-2901-1-ND">https://www.digikey.co.uk/product-detail/en/microchip-technology/MIC7221YM5-TR/576-2901-1-ND</a>
18	R6	R_0805_2012Metric_Pad1.15x1.40mm_HandSolder	1	100R Resistor		
19	Turned pin socket headers to make ULA socket for Electron circuit board	ULA Socket for Electron circuit board	1		Pack of 5 x 40 pin	<a href="https://hobbycomponents.com/connectors/392-01-254mm-40way-sil-turned-pin-m-f-headers-pack-of-5">https://hobbycomponents.com/connectors/392-01-254mm-40way-sil-turned-pin-m-f-headers-pack-of-5</a>