KENBAK-1 — my µKENBAK-1

Bill of materials · Adwater & Stir µKENBAK-1 kit, version 2.5 (spares, repairs and a second board)

Revision: A **Date:** 2026-11-03 **Lines:** 29 **Source:** iconic-machines.fubsypoly.com/kenbak-1/vol-13/

I have ordered the µKENBAK-1 kit, and the kit supplies everything, so this list is for spares, repairs and building a second board from a bare one. It follows Volume 13's bill of materials, which starts from the assembly booklet's parts list (rev. 2.5): the processor, shift registers and modules, the passive parts, the panel and switches, and the case and hardware. Volume 13 explains each line. Stock and prices change daily; part numbers are examples that meet the specification.

Tick **Ord** when ordered, **Have** when it is in hand and checked against the part number, **Fit** when it is installed. Write the vendor, order number and price on the last page. Alternates for obsolete (EOL) parts are in **bold**.

Same The supplied part is still a standard catalogue item; buy it as listed. **EOL** The supplied part is obsolete or no longer the usual one; a replacement is needed.

Spec The parts list does not say enough to buy it (no value, rating or part number), or the part needs a check. **Conflict** The parts list, the board and the photographs disagree.

Choice A change or addition chosen for this build, not in the kit.

ORD	HAVE	FIT	QTY	REF. DES.	PART / SPECIFICATION	PART NUMBER	ALTERNATES / SUBSTITUTES	WHERE TO BUY	TAG	NOTES
Semiconductors and modules										
☐	☐	☐	**1**	U, 28-pin socket	**ATmega328P, pre-programmed** 28-pin DIP; needs the firmware and the Arduino Uno bootloader	`Microchip ATmega328P-PU`	Not the ATmega328-PU (no P): different signature, needs a changed board definition	Mouser www.mouser.com Digi-Key www.digikey.com	**Spec**	Keep the supplied chip as the master. A blank chip runs nothing until loaded (Volume 13, 'Rebuilding the Firmware').
☐	☐	☐	**1**	16-pin socket	**74HC595 shift register (data lamps)** DIP-16	`TI SN74HC595N`		Mouser www.mouser.com Digi-Key www.digikey.com	**Same**	
☐	☐	☐	**2**	16-pin sockets	**74HC165 shift register (keys)** DIP-16; HC, though the silk screen says 74LS165	`TI SN74HC165N`		Mouser www.mouser.com Digi-Key www.digikey.com	**Conflict**	Parts list and photographed chips are HC; fit HC.
☐	☐	☐	**1**	J1	**DS3231 RTC module, 5-pin** Raspberry Pi 5-pin pinout: +, D, C, NC, −		Not the large ZS-042 type (different pinout; does not fit)		**Spec**	Check the backup cell's marking: rechargeable or primary.
☐	☐	☐	**1**	J2	**USB-to-UART TTL module, micro-USB, 6-pin, 5 V type** Pin order +5V, GND, TXO, RXI, DTR, 3V3	`CP2102 or CH340 module`	Any 5 V module with this pin order drops in; another order must be wired by hand		**Spec**	
☐	☐	☐	**12**	Front, lamps	**5 mm LEDs: 8 white, 4 yellow** Diffused or clear to taste				**Same**	Long lead right (Volume 9). Buy the eight data lamps from one batch.
Passive parts										
☐	☐	☐	**2**	RN1, RN4 (lamp resistors)	**2.2 kΩ isolated SIP array, 10-pin** Marked 10X-2-222LF; five isolated resistors	`Bourns 4610X-102-222LF`		Mouser www.mouser.com Digi-Key www.digikey.com	**Same**	Fits either way round.
☐	☐	☐	**1**	RN5 (lamp resistors)	**470 Ω isolated SIP array, 10-pin** Marked 10X-2-471LF	`Bourns 4610X-102-471LF`		Mouser www.mouser.com Digi-Key www.digikey.com	**Same**	

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☐	☐	☐	**3**	RN2, RN3, RN6 (key pull-downs)	**10 kΩ bussed SIP array, 6-pin, black** Five 10 kΩ to one common pin	`Bourns 4606X-101-103LF`		Mouser www.mouser.com Digi-Key www.digikey.com	Same	Dotted common pin in the square pad.
☐	☐	☐	**1**	Y1	**16 MHz quartz crystal** HC-49/US; standard 18–20 pF load				Same	No load capacitors on the board.
☐	☐	☐	**1**	RTC module + and − pins	**0.1 µF 50 V X7R ceramic (addendum fix)** Addendum says '.01uF (104)'; 104 is 0.1 µF				Conflict	Fit only if the clock resets to 12:00 at power-on.
☐	☐	☐	**1**	ATmega pins 7–8, underneath	**0.1 µF 50 V X7R ceramic, short leads** Decoupling retrofit; not in the kit				Choice	Optional; kits run without it.
☐	☐	☐	**1**	D7 (pin 13) to GND (pin 8)	**10 kΩ ¼ W (addendum fix)**				Same	Only for kits bought before 24 August 2021 whose Store key sometimes does nothing.

Panel and switches

ORD	HAVE	FIT	QTY	REF. DES.	PART / SPECIFICATION	PART NUMBER	ALTERNATES / SUBSTITUTES	WHERE TO BUY	TAG	NOTES
☐	☐	☐	**15**	Keys	**12 × 12 mm through-hole tactile switch** Square stem that takes the kit's caps				Spec	Match the stem to the cap; caps must not bind (Volume 9).
☐	☐	☐	**15**	Key caps	**Square caps: 8 black, 7 white**			Adwater & Stir adwaterandstir.com/kenbak/	Same	Generic 12 mm caps vary in size.
☐	☐	☐	**1**	SW16, power	**Miniature toggle, SPDT on-on** 6 mm bushing; two of three pins used	`MTS-102`			Same	
☐	☐	☐	**1**	Front panel	**Screen-printed brushed aluminium panel**			Adwater & Stir adwaterandstir.com/kenbak/	Same	Made for the kit; no other source.

Case and hardware

ORD	HAVE	FIT	QTY	REF. DES.	PART / SPECIFICATION	PART NUMBER	ALTERNATES / SUBSTITUTES	WHERE TO BUY	TAG	NOTES
☐	☐	☐	**1**	Case	**Steel case, two folded halves**			Adwater & Stir adwaterandstir.com/kenbak/	Same	
☐	☐	☐	**2**	Ends	**Milled aluminium ends**			Adwater & Stir adwaterandstir.com/kenbak/	Same	Masking tape under a loose end, per the booklet.
☐	☐	☐	**6**	Panel standoffs	**M3 × 40 mm nylon hex standoff, female-female**				Same	
☐	☐	☐	**6 / 6 / 4**	Screws	**M3 pan-head 12 mm and 8 mm; M3 flat-head 14 mm** Parts list gives lengths only				Spec	Check one supplied screw's thread before buying.

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☐	☐	☐	**4**	End fixings	**M3 brass knurled nuts**				Same	
☐	☐	☐	**6**	Spacers	**4 mm white nylon spacers, M3 clearance**				Same	Hold the panel off the LEDs while soldering.
☐	☐	☐	**1**	USB to case wall	**Panel-mount micro-USB extension, male to female** Two M3 screw ears, to suit the case-wall cutout				Spec	
☐	☐	☐	**1**	J1 header	**5-pin male header, 2.54 mm**				Same	
☐	☐	☐	**1**	J2 header	**4-pin long-pin male header, 2.54 mm, ~19 mm overall** Holds the USB module clear of the ATmega				Same	
☐	☐	☐	**3 / 1**	IC sockets	**DIP sockets, machined (turned-pin): 16-pin; 28-pin narrow (0.3 in)** Machined (turned-pin) only: better contact and retention, robust through re-seating; fit them in place of any stamped kit sockets				Same	
☐	☐	☐	**4**	Feet	**Self-adhesive rubber feet**				Same	
☐	☐	☐	**1**	USB cable (not supplied)	**USB-A to micro-USB data cable** Data, not charge-only				Spec	A charge-only cable lights the machine but no serial port appears.

Orders

VENDOR	ORDER NO.	DATE	TOTAL	RECEIVED	LINES / NOTES

Build total: _____ **Started:** _____ **First power-up:** _____

Notes