

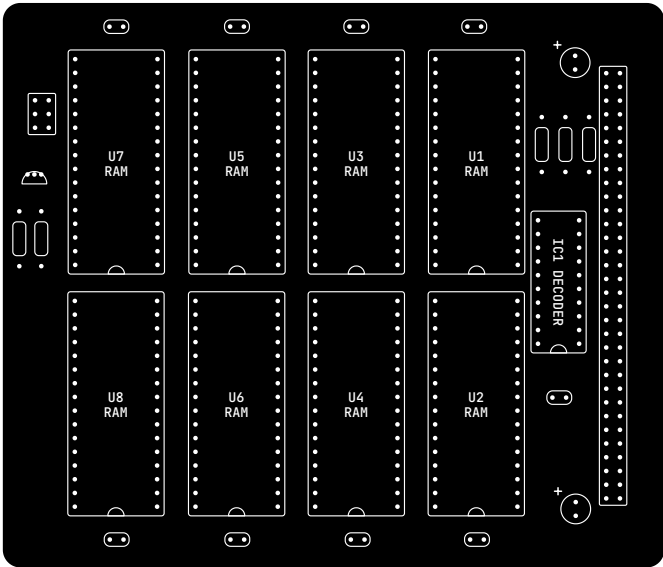


THROUGH-HOLE KIT · BUILD GUIDE

rosco_m68k

RAM expansion

Four extra megabytes of static RAM for the rosco_m68k, built by you from a bare PCB. Five soldering stages, lowest parts first, then fitting and a memory count at boot.



4 MB	8 × 512 KB	1–13 MB	122 × 104 mm
STATIC RAM	AS6C4008 CHIPS	BASE, BY JUMPER	381 SOLDER JOINTS

Before you solder		2	4	Headers, electrolytics	6
1	Resistors	3	5	Chips and jumpers	7
2	Capacitors, transistor	4	Fitting and first boot		8
3	Sockets	5	Help		8

The rosco_m68k RAM expansion is open-source hardware by Ross Bamford and contributors (rosco-m68k.com), released under the CERN Open Hardware Licence. Kit and guide by SolderDemon.

READ FIRST

Before you solder

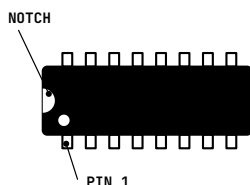
Tick the kit off against the packing list, then build in the order of this guide. Low parts go first, so the board always lies flat while you solder.

WHICH WAY ROUND

Every map shows the component side with the long bus connector **J1 on the right**. Keep your board that way and “left”, “right” and “up” in this guide always match what you see.

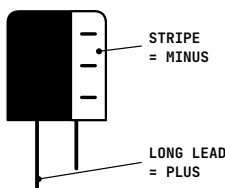
YOU NEED

Temperature-controlled iron with a fine tip, solder 0.6–1 mm, flush cutters, small pliers, multimeter, masking tape. For repairs: flux and solder wick.

THREE PARTS THAT CAN GO IN BACKWARDS

Chips and sockets

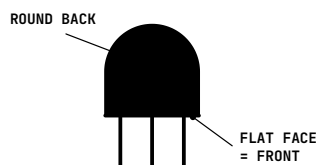
The notch marks the pin 1 end. Match it to the notch printed on the board.

Here: every notch points down.


Electrolytic caps

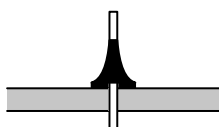
The long lead goes in the hole marked +. The stripe faces away from it.

Here: both stripes face down.

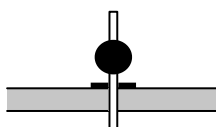

Transistor

The flat face of the body sits on the flat of the printed outline.

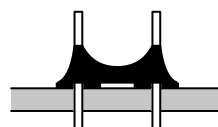
Here: the flat face points down.

EVERY JOINT

Good

A small cone that wets both the pad and the lead.


Bead on the lead

Solder never reached the pad. Add flux, reheat pad and lead together.


Bridge

Two pads joined. Draw the excess off with wick, then check the gap.

THE ROUTINE

- 1** Heat the pad and the lead together.
- 2** Feed solder into the joint, not onto the tip.
- 3** Take the solder away, then the iron. Hold still until it sets.
- 4** Trim the lead just above the cone.

STATIC

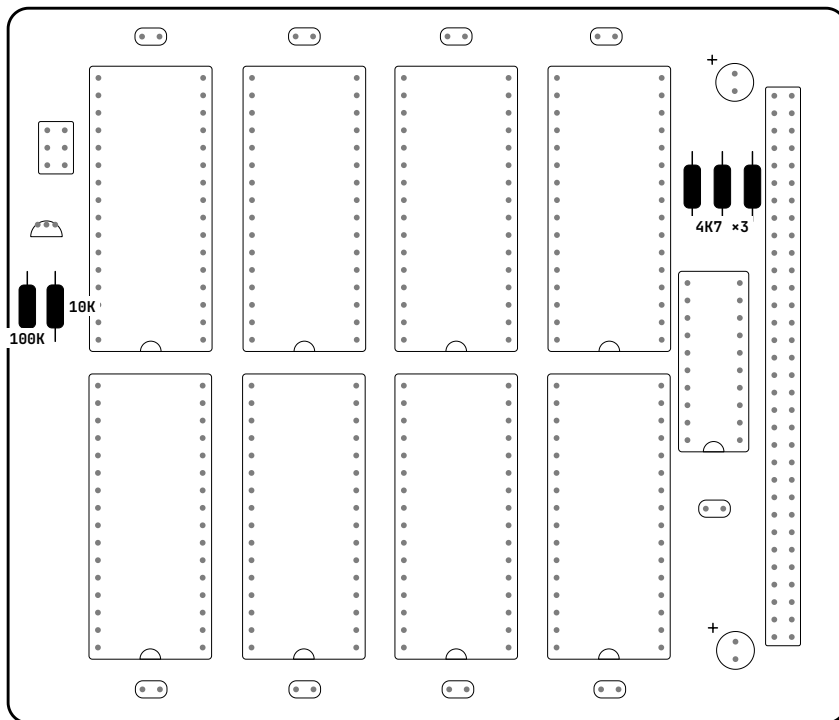
The memory chips and the decoder are static-sensitive. Leave them in their packing until stage 5 and touch something grounded before you handle them.

1

STAGE 1

Resistors

5 PARTS
10 JOINTS



☒ FIT NOW ☐ ALREADY FITTED ☐ LATER

VALUE	QTY	4 BANDS	5 BANDS	POSITIONS
☐ 4K7	3	yellow violet red	yellow violet black brown	R3-R5
☐ 10K	1	brown black orange	brown black black red	R1
☐ 100K	1	brown black yellow	brown black black orange	R2

HOW

- Resistors have no polarity. Bend both leads at the body, press the part flat on the board, solder, trim.
- Finish one value before you open the next bag.

Read the bands from the end where they are grouped. The last band, set apart, is the tolerance.

LOOK-ALIKES

10K and 100K differ only in the third band: orange for 10K, yellow for 100K. Measure both before you fit them.

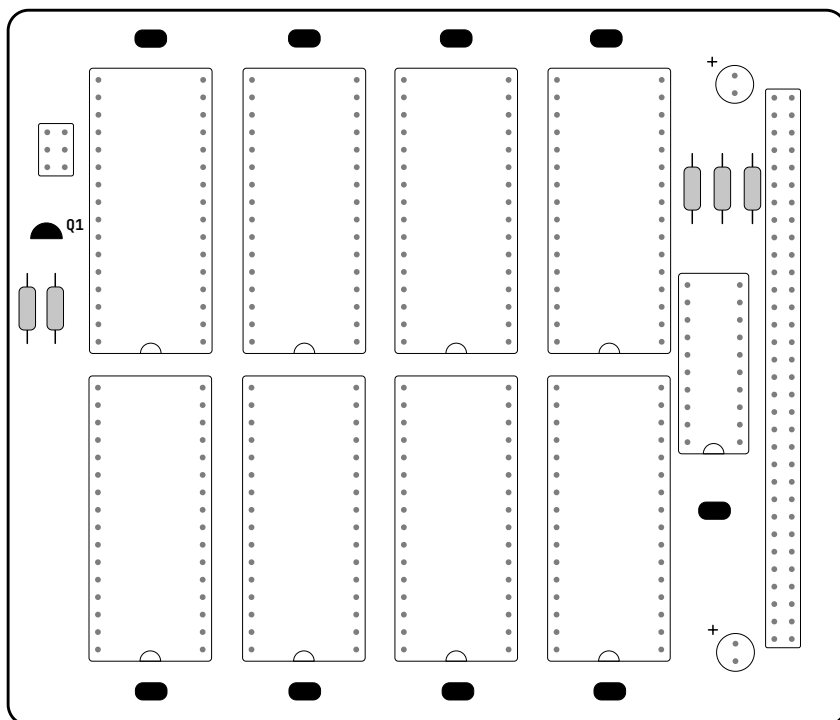
BEFORE STAGE 2 ☐ 5 resistors fitted, none left over ☐ Every lead trimmed

2

STAGE 2

Capacitors, transistor

10 PARTS

21 JOINTS



NO LABEL ON THE MAP = 100nF

PART	QTY	MARKED	POSITIONS
 100nF ceramic	9	104	C1-C9
 2N3904 transistor	1	2N3904	Q1, flat face down

HOW

- The capacitors have no polarity. Seat each one low on the board, solder, trim.
- Q1 last: flat face down, matching the printed outline. Push it down until it stands about 3 mm above the board, no lower.
- Solder the three legs of Q1 quickly, one at a time, and check for bridges: the pads are close together.

WHICH WAY

The flat face of Q1 points down, towards R1 R2. Turned round it will not work.

BEFORE STAGE 3  9 capacitors fitted  Q1: flat face down  No bridges between its legs

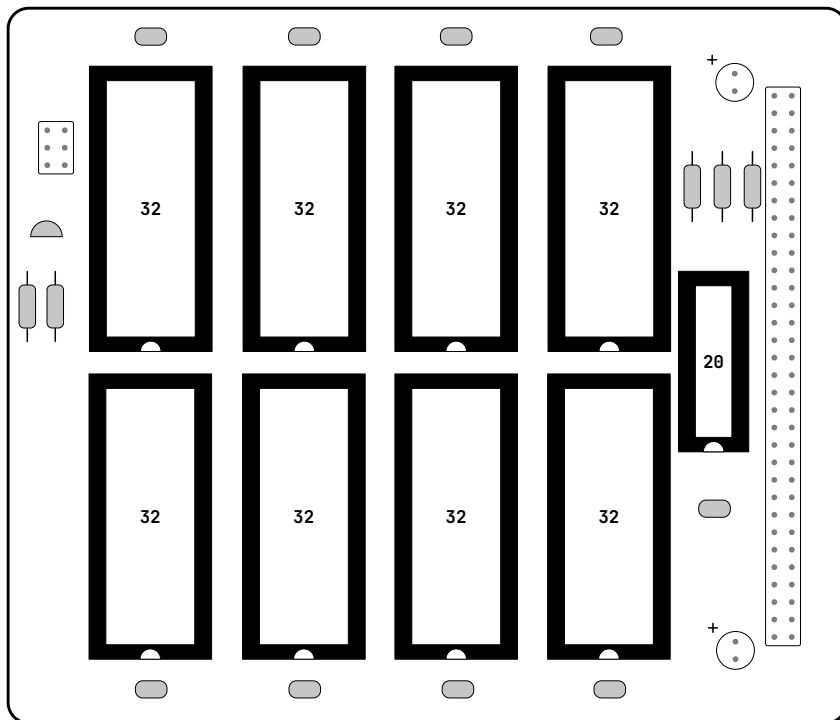
3

STAGE 3

Sockets

9 PARTS

276 JOINTS


☒ FIT NOW ☐ ALREADY FITTED ☐ LATER

NUMBER = PIN COUNT

PART	QTY	POSITIONS	WHICH WAY
☐ 32-pin socket	8	U1-U8	notch down
☐ 20-pin socket	1	IC1	notch down

HOW

- Drop the socket in, notch over the printed notch. Solder two opposite corner pins.
- Look from the side. Not flat, or notch wrong? Reheat a corner and fix it now.
- Solder the remaining pins. It is easy to skip one in a long row.

NO CHIPS YET

The sockets stay empty until stage 5. All 9 notches point down.

276 pins in this stage: take a break halfway.

BEFORE STAGE 4 ☐ 9 sockets flat, notches down ☐ No pin skipped

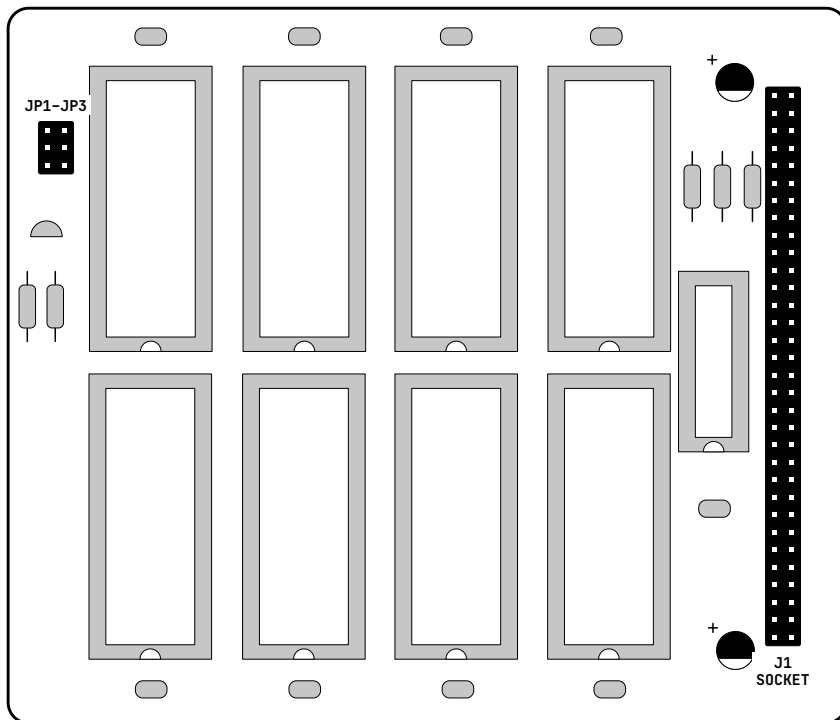
4

STAGE 4

Headers, electrolytics

4 PARTS

74 JOINTS



☒ FIT NOW
 ☒ ALREADY FITTED
 ☐ LATER
 NO LABEL ON THE MAP = 100µF

PART	QTY	POSITIONS	WHICH WAY
☐ 100µF electrolytic	2	C10 C11	long lead in + hole (up), stripe down
☐ Header 2×3	1	JP1-JP3	short pins into the board
☐ Socket 2×32 female	1	J1	component side, square to the edge

HOW

- Electrolytics first: long lead in the + hole (up), stripe down. Push flat, solder, trim.
- The 2×3 jumper header: short pins into the board. Tack one pin, check it is upright, then the rest.

J1 CARRIES THE CARD

The 2×32 socket strip goes on the component side like every other part. Tack one pin at each end, check it sits flat and square to the board edge, then solder all 64: the card hangs from them.

BEFORE STAGE 5
 ☐ 2 electrolytics: stripes down
 ☐ J1 flat, all 64 pins soldered

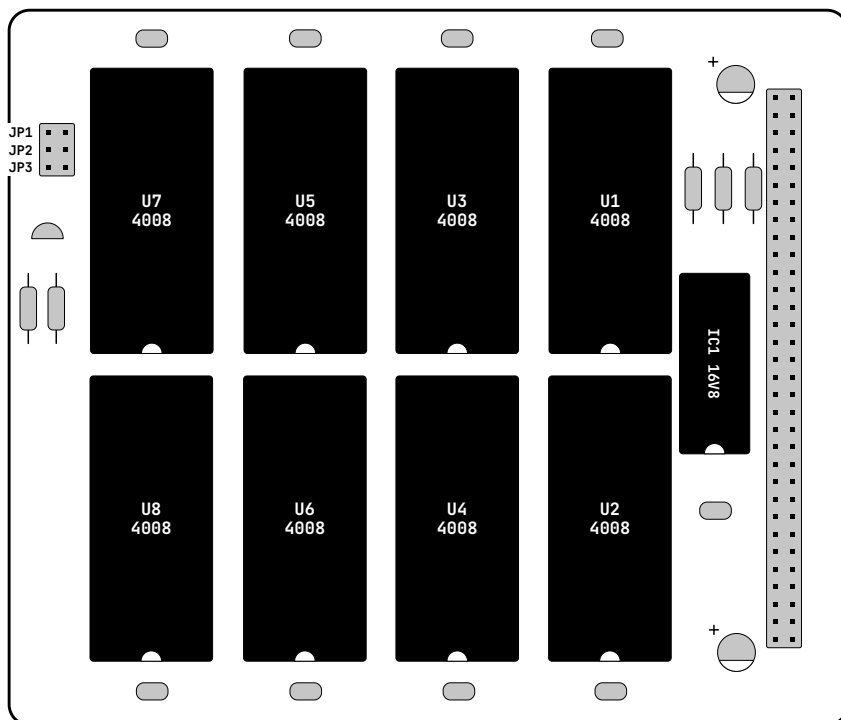
5

STAGE 5

Chips and jumpers

9 CHIPS

NO SOLDERING




POSITION AND CHIP

FIRST, WITH THE SOCKETS STILL EMPTY

- 1** Check every joint with a magnifier: beads, bridges, skipped pins.
- 2** Multimeter on continuity across the leads of C10. A brief chirp is the capacitors charging. A steady tone is a short: find it first.

THEN THE CHIPS

- 1** Press each row of legs gently against the bench until both rows are parallel.
- 2** Notch to notch (down), every leg in its hole, then press down evenly.

ALL THE SAME

The eight AS6C4008 are identical: any one fits any 32-pin socket. IC1 is the programmed ATF16V8 decoder and goes in the 20-pin socket.

ADDRESS JUMPERS

For one card on a roscos_m68k, leave JP1–JP3 open: the card then starts at 1 MB, right after the main board's memory. Other settings are on the next page.

BEFORE FITTING

- ☐
- Notches match the map
- ☐
- No leg folded under
- ☐
- JP1–JP3 open

LAST STEP

Fitting and first boot

- 1 Power off.** Unplug the main board before the card goes on or comes off.
- 2 Fit.** Turn the card component side down and push J1 onto the 2×32 pins of J3 on the main board, or of a bus board slot. Every pin in a hole, none left over at either end.
- 3 Beep test.** Multimeter on continuity. The + lead of C10 to the +5 V pin of the main board's power connector must beep, and its – lead to GND. No beep: the card is turned the wrong way. Take it off.
- 4 Power on** with a terminal on UART A, as for the main board, and read the memory count in the banner.

NEVER SKIP THE BEEP TEST

Turned the wrong way, J1 puts 5 V on an address line and can destroy chips on both boards.

ADDRESS JUMPERS

JP1	JP2	JP3	BASE
☐	☐	☐	1 MB
☐	☐	☒	3 MB
☐	☒	☐	5 MB
☐	☒	☒	7 MB
☒	☐	☐	9 MB
☒	☐	☒	11 MB
☒	☒	☐	13 MB

■ = cap fitted across that row of the header. A second card goes where the first ends: base 5 MB after a full card at 1 MB. At 13 MB only the first 2 MB of the card are used.

WHAT THE BANNER TELLS YOU

MC68010 CPU @ 10.0MHz with 5242880 bytes RAM

- | | |
|----------------|--|
| 5242880 | 1 MB on the main board plus 4 MB on the card. All good. |
| 1048576 | The card is not seen: check IC1 (notch, seating), that JP1–JP3 are open, and the joints of J1. If those are fine, check U1 U2. |
| 2097152 | The count stops at the second megabyte of the card: reseal U3 U4, look for a folded leg. |
| 3145728 | The count stops at the third megabyte of the card: reseal U5 U6, look for a folded leg. |
| 4194304 | The count stops at the fourth megabyte of the card: reseal U7 U8, look for a folded leg. |

The firmware counts memory upwards from address 0 and stops at the first gap, so the number points at the pair of chips that failed. Each megabyte is one odd and one even chip.


STILL STUCK? WE WILL HELP.

Send clear photos of both sides of the card and the full start-up banner.

solderdemon.com/docs

t.me/solderdemon_official

solderdemon.official@gmail.com