

FITTING INSTRUCTIONS

**IMPORTANT** Before unpacking chips the following precautions **MUST** be taken against static electricity.

1. Unplug all leads from Spectrum.
2. All work must be carried out on a suitable static-free surface (away from the television). A normal stainless-steel kitchen sink is ideal or alternatively a sheet of cooking foil laid on a table is quite adequate. Please note that these precautions must be taken whenever the chips are handled. If the chips are removed from the Spectrum at any time they should be stored in position in the original (anti-static) packing.
3. Rinse hands under the cold water tap and dry before commencing work.

FITTING

1. Turn your Spectrum upside-down and remove the 5 screws from their recesses in the bottom of the Spectrum.
2. Holding the two halves of the case together by hand turn the Spectrum back the right way up and the right way round as for normal use. NOTE that the keyboard half of the case is now attached to the rest by two fragile ribbon cables.
3. Taking care not to strain the ribbon cables move the keyboard half of case towards you to expose four of the eight empty sockets for the memory chips and the four empty sockets for the memory control chips.
4. Move these eight chips from their positions on the packaging to the corresponding sockets on the Spectrum circuit board (see section entitled 'Hint and Tips' for advice on insertion of chips into sockets). Be sure to keep them the same way round (Note that all the chips have an indentation at the end of the chip body and that these should be at the same end as the indentation on the chips already in the Spectrum)

**SP48 note:** Please note that on the SP48 pin no 11 of the chip which fits nearest to the back of the Spectrum has been removed.

**SP80 note:** Please note the three control chips on the SP80 which are wired together and the red LED soldered to one of them. Note the positions of these chips before removing from packing and take care not to break the connections. Note that one of the pins on the chip with the LED and four of the pins on the chip marked 74LS00 have been cut or bent and do not insert into the socket.

5. Now move the keyboard half of the case away from you (don't strain the ribbon cables) to expose the four vacant sockets for the remaining four memory chips. Place the chips in their sockets as before.
6. Place the keyboard half of the case back into position. Before replacing the five screws Test as follows.

**WARNING:** Always take precautions against static electricity when handling chips.

#### SP48 TESTING

1. Connect up the Spectrum as for normal use. When powering on you should notice that the screen remains black for somewhat longer than before (this is because the computer has more memory to check through than before).
2. If the computer fails to operate normally it is almost certain that you have inserted one or more chips incorrectly. Check through as follows:
  - (i) Check for correct positioning of chips
  - (ii) Full insertion of chips into sockets (if in doubt about this compare with chips already in sockets on Spectrum).
  - (iii) Bent pins - this is sometimes very difficult to detect without extracting chip.

If the computer is working normally then type:

PRINT PEEK 23733 which should give the answer 255 at the top of the screen. Should a lesser number appear you should check through as described above.

If you are finally convinced that you have done everything correctly and the Spectrum still fails to operate correctly then please return the goods with a note for refund or replacement.

#### SP80 TESTING

1. Carry out testing as for SP48 above. Red LED should be off.
2. Type OUT 5407,0 which should cause Page 1 to be switched out and Page 2 to come in. The Spectrum should reinitialise itself the first time this is done (ie screen goes black for a second or two). The red LED should go on indicating that the second 32K page is now in use.
3. Type PRINT PEEK 23733 The answer 255 indicates that Page 2 is working correctly.
4. Type OUT 49023,0 The red LED should go off. Page 1 is now back in use.

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Hints and Tips on insertion and extraction of chips to and from sockets.

**General note:** Because the memory chips are sensitive to static electricity it is good practice to avoid touching the pins at any time. The wearing of natural fibres (eg cotton) rather than synthetics (eg nylon) is also advisable while handling chips.

**Insertion of chips into sockets:**

Take your time.

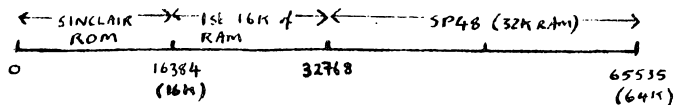
The chip should be placed in the socket (the right way round!) with the pins located in the holes in the socket (but not yet fully into the socket). It can then be jiggled into place keeping a close watch for caught pins which are starting to bend.

If the pins are not aligned with the socket holes it is possible to bend them into alignment by grasping the chip firmly by the ends between thumb and forefinger and pressing a row of pins flat down on the working surface being careful to avoid sudden slips.

**Extraction of chips from their sockets:**

Again take your time. The danger is that you are exerting a lot of force and suddenly one side or end of the chip comes away bending the remaining pins drastically. For this reason it is a good idea to lever the chip out with a screwdriver thus avoiding sudden movement. Care should be taken when levering not to damage the tracks under the socket (if the socket is of the open type). It is usually possible to actually lever on the socket. Note that the chip body is extremely rugged - it is the pins which are fragile and which will only stand so much bending to and fro.

**SP48 Memory Map:**



**SP80 Memory Map:**

