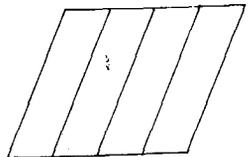


sinclair

ZX Spectrum +

UPGRADE INSTRUCTIONS



PLEASE READ THESE INSTRUCTIONS BEFORE STARTING ASSEMBLY

If, having read the instructions, you feel unable to attempt assembly of the kit, or if you get stuck halfway through doing it and can't complete it, simply pack up the kit and your existing Spectrum and return it to us c/o:

Sinclair Research Ltd
Upgrade Department
Stanhope Road
Camberley
Surrey GU15 3PS

Enclose £10, and we will complete it for you.

WHAT YOU WILL NEED

Very few tools are needed. The most important is a crosshead screwdriver with a no 1 size point. You may also need an ordinary, small screwdriver.

There is not a great deal of soldering to be done. The soldering iron you use must be fitted with a fine tip and be rated in the region of 15 to 25 watts; temperature controlled irons can have a higher wattage.

Last but not least, try to find a well-lit, uncluttered space where work can proceed uninterrupted, and where small parts will not get lost. The keyboard contacts are contained in a sealed membrane, which is unaffected by dust, but the computer circuitry must not be exposed to dirt and spilt liquids while it is out of the case. It is a good idea to provide something soft to lay the case mouldings on, to avoid them being scratched during assembly.

WARRANTY NOTE

The warranty on your Spectrum is suspended from when you dismantle it until your upgraded Spectrum + is in full working order.

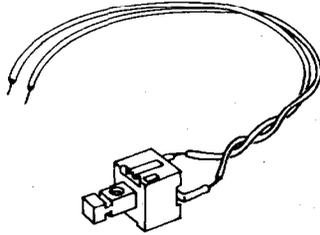
When your Spectrum + is working the warranty resumes, effective from the purchase date of your original Spectrum.

Any repairs which are required between the time your Spectrum is dismantled and your upgraded Spectrum + reaches full working order ARE NOT COVERED BY THE WARRANTY; as such they are your responsibility.

PARTS LIST

Check that you have all of the following items in your ZX Spectrum + kit *BEFORE* you start dismantling your present machine.

- 1 Fully assembled Spectrum + keyboard.

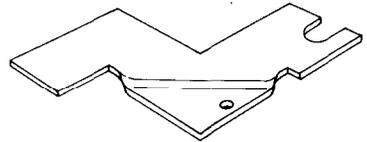


- 1 Reset switch with lead



- 1 22K resistor

- 1 Case-bottom



- 1 Heatsink



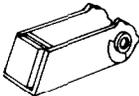
- 4 Rubber feet



- 2 Screws, pan head, 6.5mm long

- 1 ZX Spectrum + User Guide

- 3 Grey foam pads



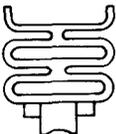
- 2 Legs



- 1 Screw, countersunk, 13mm long

- 1 ZX Spectrum + Companion Cassette

- 1 Instruction Leaflet (this)



- 2 Plastic springs



- 7 Screws, pan head, 8mm long

- 1 blank Warranty Seal

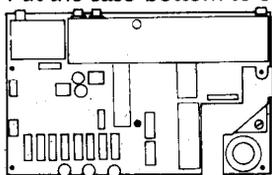
If you have a warranty seal on your ZX Spectrum please copy the number on to the enclosed blank label and stick this to the bottom of your new case.

If any of these parts are missing, please contact us on 0276 685311 and tell us what you need.

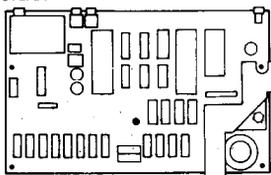
STEP Dismantling your Spectrum

- 1 Turn your Spectrum upside down. Locate and undo the five screws which hold it together. There may be a warranty label stuck over one of the screws: just peel it off – there is a new one stuck to the Spectrum + case-bottom (see Warranty Note). Turn the computer the right way up again, and carefully lift up the top. You will see two thin ribbons connecting the top and bottom halves together. These plug into two black sockets situated on the circuit-board in the bottom half; gently ease them out and put the case-top to one side.

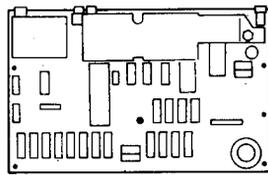
The circuit-board is held by a single screw, located in the middle of the board and about a third of the way back. Remove this screw and the board may be lifted out. Put the case-bottom to one side.



Issue 1



Issue 2



Issue 3

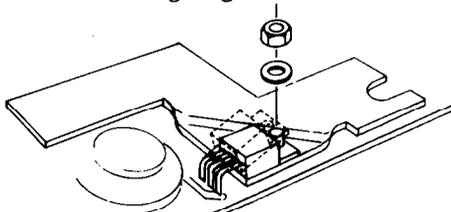
Look for your Spectrum's Issue number printed somewhere on the circuit-board. Normally it will be along the front edge of the board, but early models may have it at the back.

If your Spectrum is either an Issue One or an Issue Two you will need to exchange the existing heatsink with the one provided in the kit (see Step 2). For Issue Three and above, no modifications are necessary because the heatsink is in a different place (at the back of the board) – you should now go to Step 3.

STEP Changing the Heatsink – for Issue One and Issue Two only

2

The heatsink is the oddly shaped piece of aluminium in the bottom right hand corner of the board; it is held in by the mounting screw of the voltage regulator (the black plastic block sitting on one corner of the heatsink). To replace it simply undo this screw, taking care not to lose the nut and washer, and carefully remove the heatsink. Do not bend the voltage regulator's leads more than necessary when doing this.

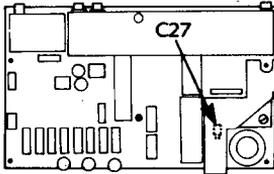


The new heatsink must now be fitted – unless you have an Issue One in which case you must fit the reset switch first, so go to Step 3. If there was a triangular card insulator between the heatsink and the board, remember to replace it (not all machines have or need this). Tighten the regulator fixing bolt firmly, do not bend the regulator leads excessively and do not run the Spectrum without its heatsink.

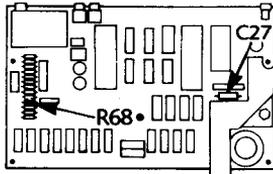
STEP Fitting the reset switch

3 The reset switch is supplied with its leads already soldered on; all that needs to be done is to connect the other end to the Spectrum circuit-board. The switch is always connected across the component labelled C27, but the position of this varies from one issue to another, and later Spectrums have a place already set aside for connecting the switch.

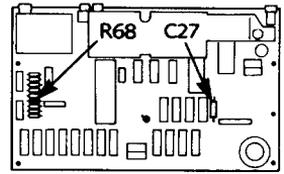
Find the connection points relevant to your computer by referring to the appropriate diagram, and carefully solder the bare ends of the reset switch leads either to the wire ends of C27 itself, or to the 'pads' provided on the board. If you cannot solder, get someone who can to help you, or simply omit the reset switch altogether. *Do not* wind the ends of the wire round C27's leads without soldering; if they come loose later on the computer could easily be damaged. *It is important that you do not let solder spread across the circuit board.* If the silver 'tracks' on the circuit board are connected by the solder the computer may not work properly, because part of the circuitry is shorting out.



Issue 1



Issue 2



Issue 3

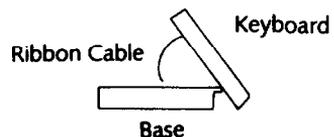
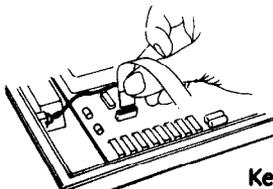
Note: If you have an Issue One you should now fit the new heatsink (see Step 2)

STEP Testing the keyboard

4 You can now test the computer. Place the circuit-board on the working surface, which must be non-conducting to prevent short circuits. If you are not sure if the surface you are working on is non-conductive, put three or four sheets of newspaper down first. There are no dangerous voltages present on the Spectrum board, so it is quite in order to run it whilst out of its case.

The circuit-board should be positioned so that the connecting plugs are facing away from you. Take the Spectrum + keyboard and place it on its edge in front of the circuit-board so that the keys are facing you and the ventilation grill is uppermost.

Look over the top of the keyboard at the circuit-board. The two ribbons from the keyboard need to be plugged in. The ribbons have a short section at the end which is stiffened by a plastic sheet to make them easier to insert – your original Spectrum keyboard may not have had these. Hold each ribbon at the point where the stiffened section ends, and plug it into the socket on the board in the same way that the original ribbons were connected. Notice that one ribbon has five stripes and goes in the left hand socket, while the other has eight stripes and goes in the right hand socket. With the case-top the right way round each ribbon should fall directly in line with the appropriate socket.



Keyboard not shown for clarity.

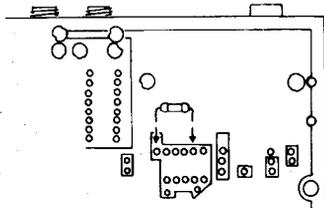
Connect the computer to a television and power supply in the usual way (this is described in the Spectrum + User Guide). Use the power supply originally supplied with your Spectrum; a new one is not needed.

Try *all* the keys, especially STOP (hold down SYMBOL SHIFT and press A). If the word STOP does not appear on the screen, the following modification will be necessary (see Step 5). If STOP does appear you should go to Step 6.

STEP Attaching the 22K resistor

- 5** Disconnect the computer from the power supply and television, unplug the keyboard ribbons and locate part R68 on the circuit-board. The position of this component varies with different issue numbers; find it using the diagrams which show the reset switch connections. Solder the resistor across it, being extremely careful to avoid solder splashes and short circuits.

Note: Issue Ones do not have a part R68. If you have an Issue One you must attach the resistor to the *underside* of the board. The diagram shows the connection points. Attach the resistor so that it lies as flat against the board as possible.

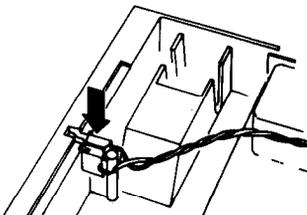


Now reconnect the keyboard and circuit board, plug in and try *all* the keys again. When they are all working, disconnect the power and TV leads. Carefully pull the ribbon cables out of their sockets and put both the circuit-board and keyboard to one side.

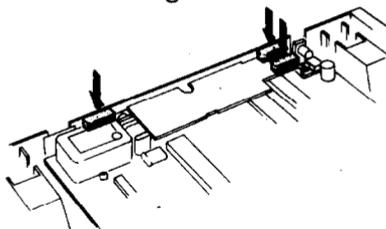
STEP Case-bottom assembly

- 6** Place the case-bottom wrong way up on your working surface (so that you are looking at the underneath). Press and twist the four rubber feet (conical head first) into the large round holes in the underside of the case-bottom. Turn the case-bottom the right way up again with the grill nearest you, and lay the circuit-board inside. The sockets should line up with their respective holes in the back of the case, and the board should be located on the moulded bosses on the bottom. The two fixing screws, 6.5mm pan head, are screwed into the bosses on the front corners.

The reset switch is simply pressed into the recess provided for it in the left hand side-wall of the case. Ensure that the leads are not trapped behind the support post.

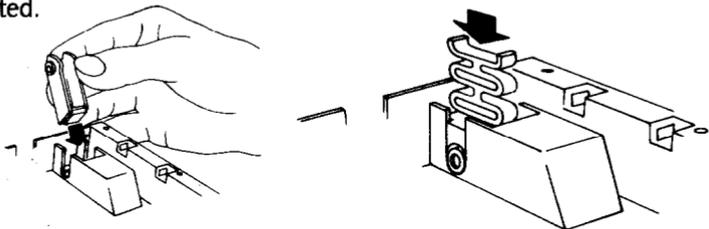


The three grey foam pads are fitted to the board to protect the connector ribbons from chafing. One always goes on top of the modulator – the large metal box which carries the TV socket. On Issue Three and above the other two are placed on the heatsink as shown in our drawing.



If you have an Issue One with 48K of RAM fitted, the additional memory will be on an extra board situated at the back of the main board, in the same position as the heatsink on later issues. In this case, the two pads should be fitted to the RAM board instead, in the positions shown. There is no need to fit these two pads on Issue Twos, just the one on top of the modulator.

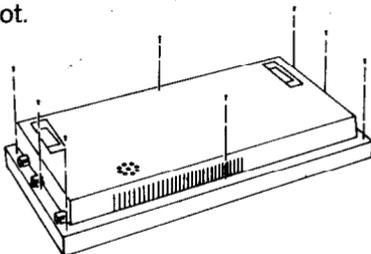
The folding legs are fitted by sliding the legs into their slots in the case-bottom. The moulded plastic springs simply sit on top of the leg pivots. Do not worry if things seem rather loose at the moment, they will all be clamped in when the case-top is fitted.



Plug the keyboard ribbons in again and position the case-top on the case-bottom. Make sure that the keyboard ribbons and reset switch lead are not trapped between the two halves.

IMPORTANT: The keyboard ribbons must *never* be creased – this can damage the printed tracks and affect the operation of the computer. This happens, for instance, if the left hand ribbon is allowed to lie over the modulator when the 48K Spectrum (not the Spectrum +) is assembled; the ribbon is pinched between the modulator and case-top when the two halves are screwed together.

The computer can now be given one last test, and if all is well, the top and bottom may be screwed together. The remaining screws are used for this: the seven 8mm pan heads go round the "overhang" of the case-top; the last remaining screw should be the 13mm countersunk; this goes in the bottom of the case, at the back next to the expansion slot.



Your ZX Spectrum + is now complete – we hope that you will enjoy using it.

PROBLEM PAGE

Problem

Cannot separate top and bottom of old Spectrum

Parts are missing

None of the keys work

STOP key does not work

Random pattern appears on screen instead of copyright message

Computers works for a while, then cuts out

Board will not fit in case-bottom

Legs are still loose when case-top is fitted

Legs are stiff or jammed

Answer

Have you removed all five screws?

Contact 0276 685311

Check ribbons are plugged in properly

Ensure R68 is properly fitted (see Step 5)

Check reset switch is fitted properly, and not shorting out

Have you removed the heatsink for modification? Was it replaced? Check the regulator bolt is firm

Check issue number; modify heat-sink if necessary

Check springs are fitted correctly

Check legs and springs are fitted correctly