Viscount OB-12 Display Replacement Guide

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This guide describes the steps which may be taken to replace the LCD module of an OB-12. The guide is comprised of two parts; preparing a replacement module, and installation of replacement module. Provided one possesses a suitable replacement, the first part of the guide may be skipped. With an appropriate module, the replacement procedure is relatively simple. However, the following must be duly noted:

APPROPRIATE SKILLS, KNOWLEDGE, QUALIFICATIONS, AND LICENSES SHOULD BE HELD BY ANY PERSON ATTEMPTING TO WORK WITH OR ON ELECTRICITY OR ELECTRICAL DEVICES. PROPPER SAFETY MEASURES MUST BE ADHERED TO AT ALL TIMES. THIS DOCUMENT DOES NOT COMPRISE A SAFETY MANUAL. SAFE CONDUCT IS BEYOND THE SCOPE OF THIS DOCUMENT. NO LIABILITY IS ACCEPTED FOR DAMAGES TO PEOPLE ANIMALS OR PROPERTY FROM FOLLOWING OR FAILURE TO FOLLOW INSTRUCTIONS CONTAINED WITHIN THIS DOCUMENT.

Preparation of Replacement LCD Module

The original LCD module use in the OB-12 was a Varitronix MGLS24064-67C. A replacement module must match the specifications of the original. Some critical factors to consider, are controller type (Toshiba T6963C or equivalent), dimensions (module must fit same geometry, including thickness), logic supply voltage (+5V and ground), back lighting type (+5V LED, with integral resistor), contrast voltage (approximately 12VDC, supplied by +5VDC logic supply, and -7VDC contrast supply). Different replacements may require different preparation in order to be successfully installed in an OB-12.

The replacement module discussed, is a Brilliant Crystal brand, blue 240 x 64 pixel display, with white LED back lighting, from Futurlec. Other models may also be used, provided the specifications match those of the original display. The Brilliant Crystal module is very insensitive to contrast voltage, which has the advantage of providing good image and viewing angle, with a wide input voltage range. Some alternative replacements would require additional electronics to supply their required voltages. The module discussed here, requires the connection of leads and connectors, as well as one component to be moved from the bottom side of the PCB to the top.

Fitting main pin header

The OB-12 uses a 20 wire ribbon for power supply and control signals for the LCD module. The replacement module requires a 19 pin header to interface to the ribbon, with pin 20 not fitted. Using a standard 2 x 10 row IDC pin header, identify an orientation for pin 1, and remove the pin from the diagonally opposite corner with a pair of needle nose pliers. For identifying an appropriate orientation, the shorter end of the pin will be inserted into the bottom side of the display module

PCB, and pins one and 20 should be marked on the PCB.

With the short end of the header pins inserted in to the bottom side of the PCB, solder the protruding ends to the solder pads on the top side of the PCB.

Fig 1: LCD module showing header pin soldering

Fitting LED Back Lighting Supply Leads

Supplying LED lines to the display is most easily done by soldering one end of a two ply lead directly the LED terminals of the display PCB, and terminating the other end with a polarised crimp pin plug, to mate with the OB-12 header.

Use a colour coded two ply lead, such as red and black figure 8. Current rating of 100mA DC should be more than sufficient.

The appropriate terminals to use for supplying the LED's varies between display modules. Some modules will have more than one pair of LED terminals provided, though not necessarily connected, as one or more sets may be intended for user fitting of resistors or jumper links. On the Brilliant Crystal module being discussed, there are two solder pads corresponding to pins 21 and 22 following the pin numbering sequence of the main pin header, and current limiting power resistor is included on the PCB. These pads are convenient to use for the OB-12 display, as the lead will fit through the same access slot as the main ribbon cable.

Solder the positive (red) lead to the anode terminal (pin 21) and the ground (black) lead to the cathode terminal (pin 22).

The free ends of these leads must be terminated in a polarised female crimp pin plug. Check the pin orientation against the plug/socket alignment before crimping and soldering to the leads. A four pin plug is used, to match the OB-12 PCB header, though only two of the four pins are fitted. The positive (red) lead PIN is fitted to position 1. The ground (black) lead PIN is fitted to position 3.

Moving Back Lighting Limiting Power Resistor

In order to fit the Brilliant Crystal LCD module within the OB-12, a large power resistor should be moved from the bottom side of the module PCB to the top side. The resistor is used for current limiting to the back light LED's. As this is a through hole component, it can be easily re-fitted on the top side of the board. Simply de-solder and re-fit the resistor. The usual care and precautions must be taken for de-soldering and removing the resistor, as mal-handling can easily cause damage to the through hole plating, and break the necessary electrical connections.

Fig 2: LCD module showing power resistor fitted to top side of PCB

Installation of LCD Module

Installation of the replacement module is comprised of the following stages:

- electrical isolation
- disassembly
- fitting of replacement display module
- reassembly
- testing

Electrical Isolation

Switch off the OB-12 mains supply, and unplug supply lead from the rear of the chassis. This is to avoid electric shock during installation. Also remove any additional leads from the synthesiser.

Disassembly

Remove all knobs and slider caps from the right hand half of the OB-12, to allow access to the panel PCB housing the display module. Do not attempt to remove the button caps, as these remain integral to the PCB within the OB-12 chassis. Care must be taken when removing knobs and slider caps, not to break or bend the shafts of the components.

When disassembling the OB-12, the side cheeks will remain attached to the top panel. Thus, remove all screws retaining the bottom panel to the top panel and side cheeks, to allow the synthesiser to be opened for servicing.

The top panel of the OB-12 will be opened as a lid, as though hinged along the rear edge. There is no hinge, and no rest stop, so the synthesiser will need to be placed in front of something, against which the top panel can lean. On a floor, in front of a sofa may be convenient for this. An image of the OB-12 interior, with the top panel and side cheeks leaning against a rear support, is shown following, in Fig 3:

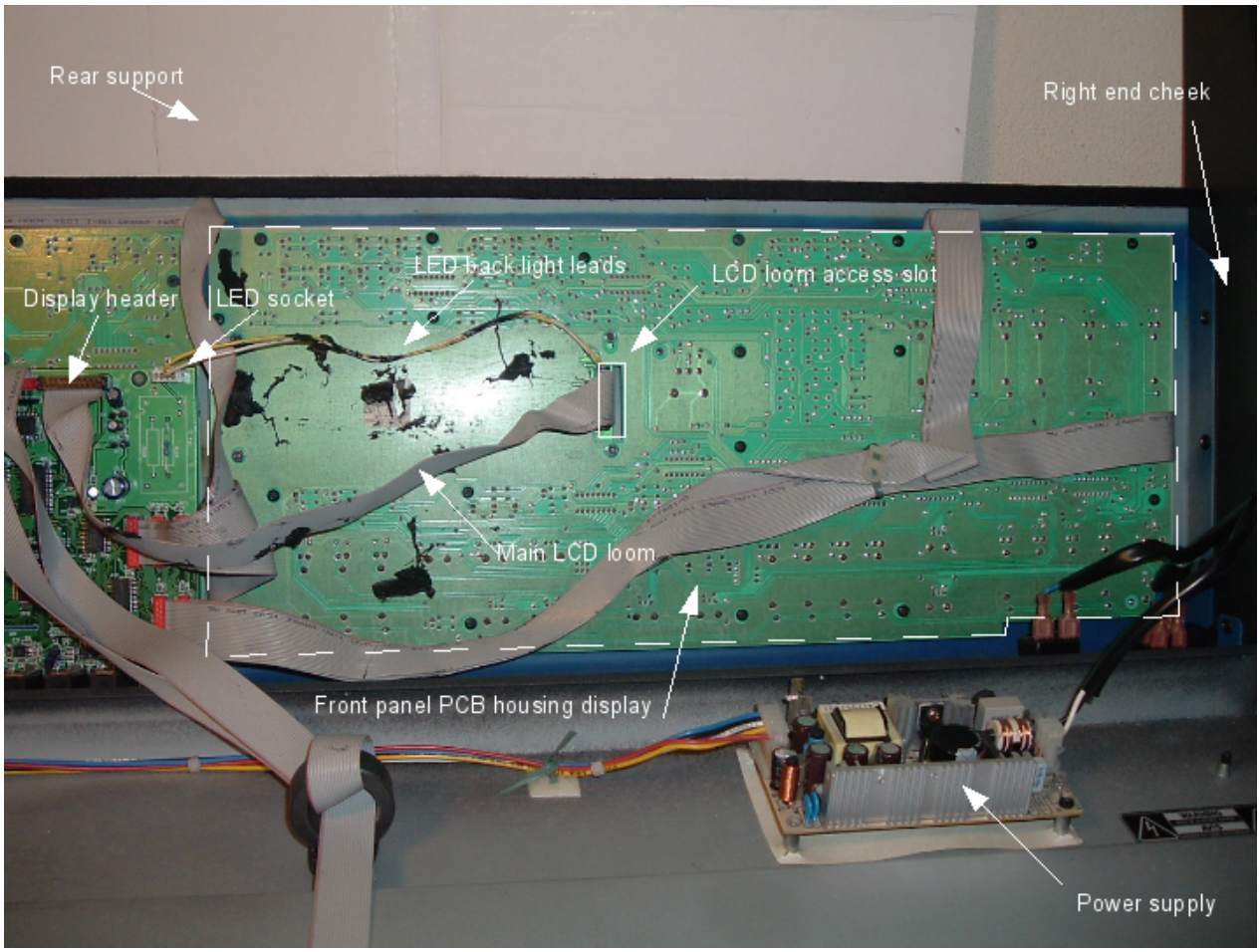

Fig 3: Interior of OB-12, shown with top panel leaning against rear support.

Once the OB-12 has been opened, take care not to make direct contact with the power supply module, as it may be retaining electrical energy. Place a clean, dry cloth over the power supply module to offer some isolation from accidental contact.

In the Fig 3, can be seen a number of deposits of black tarry adhesive paste. This material is best avoided like the plague, as it is sticky, and has its own devious way of working into places where it is least desired. Black tar on white keys, a new display, or good clothing, does not leave one with any satisfaction at all. The material should be cleanable with isopropyl alcohol, if small amounts need to be cleaned from other surfaces. The display should generally not be cleaned with any

solvents, however, so care should be taken.

Beware not to accidentally unplug any of the ribbon plugs which are not being worked on. The type of plugs used by Viscount comes away from their sockets very easily, so try to not to place undue strain on any of the ribbon looms.

Unplug the LCD module ribbon from the rear of the display. Line 1 of the ribbon should be marked with red colouration. This can be verified against the display header on the PCB on the left hand side of Fig 3. Pin one of the header should be marked on the PCB. It is worth verifying the proper alignment of the ribbon at this stage, as it is possible for the ribbon to have been installed in reverse at some stage. In Fig 3, pin one is oriented towards the bottom edge of the image.

Unplug the LED back light leads from the LED socket. This plug is polarised, so alignment is taken care of.

Remove all screws from the front panel PCB which is holding the display, as indicated in Fig 3. Be sure to remove all of the screws which are retaining the PCB to the metal front panel. There are four bolt/nut assemblies which retain the display module to the PCB; do not yet remove these at this stage. It is important to have the PCB free of mechanical retention, so as not to strain the PCB when removing it from the front panel.

Remove the front panel PCB, taking care to allow the buttons, and knob and slider shafts to slide free from the metal panel. Rest the PCB on top of the cloth which is covering the base panel/power supply, as shown in Fig 4. The button cap fittings are particularly fragile; care should be taken to not place undue force on the front panel PCB hardware fittings when removing or replacing the PCB.

Fig 4: Interior of OB-12, shown with top panel PCB resting freely on bottom panel.

The original/faulty display module may now be removed from the PCB. This can be achieved by loosening the retaining bolt/nut assemblies from its four corners. Withdraw the display, and the original LED back lighting lead.

Fitting of Replacement Display Module

The new display may now be placed in position. Leave the protective plastic cover of the display in place, ready for the final fitting. Feed the LED leads of the new display through the LCD loom access slot in the front panel PCB. Attach the main LCD loom to the pin header on the bottom side of the new display. Pin 1 of the loom (red marking) should be oriented away from the missing pin 20 of the pin header of the new display. Fit the new display with the bolt/nut assemblies, with the LED leads and main LCD loom oriented to fit within the access slot of the panel PCB. Tighten the bolt/nut assemblies to firmly retain the new display. Care should be taken not to over tighten the threads, which would strain the PCB's.

Fit the LED back light lead plug to the LED header of the PCB, shown on the left hand side of Fig 3. If the main LCD loom has come loose, be sure to re-fit in the correct orientation.

Reassembly

The front panel PCB may now be re-fitted to the metal chassis. There are several button caps, knob and slider shafts to be aligned with front panel holes/slots, so take care and re-fit the PCB gently. It may be worth practising this a few times, making sure not to work button caps free from their mounting. When ready, remove the plastic protective cover from the LCD screen, and replace the front panel PCB in the metal chassis.

Replace all front panel retaining screws, though initially just have them sitting in place, prior to final tightening. If the PCB is not properly aligned with the metal panel, the rotary encoder to the right hand side of the display can foul the chassis, and cause rough operation. Once all screws are in place, check the rotary encoder for free rotation, prior to firmly tightening the retaining screws. Again, screws should be firm without being so tight as to strain the PCB.

NO SCREWS OR OTHER METAL OBJECTS CAN BE LEFT LOOSE WITHIN THE CHASSIS – THIS COULD BE HAZARDOUS TO WELLBEING OF PEOPLE/OR AND DEVICES!

Be sure to tighten all screws, leaving none loose.

Re-check that all ribbon plugs are firmly attached to their appropriate PCB headers. These can very easily come loose while working within the synthesiser, particularly the keyboard ribbons.

Reassemble the chassis in the opposite procedure from which originally disassembled, being sure to leave no loose screws, wires, front panel fittings, or tools within the synthesiser.

Testing

Plug the mains leas into the rear power socket, and switch on the OB-12. If all went well, the LCD module should be bright and clear for operation, as shown in Fig 5 and Fig 6:

Fig 5: Oh yeah, that's how it SHOULD be!

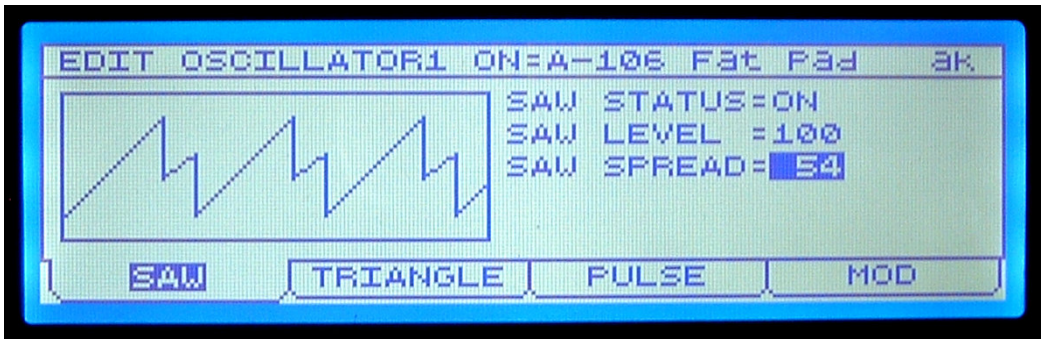

Fig 6: Oh hey, so that's what it's meant to look like; cool!

If there is any kind of problem, immediately switch off and disconnect the power. Re-read these instructions, and follow through them step by step, to ensure everything has been executed correctly. If further issues persist, feel free to contact the author at the email address provided within the title, or via the 'Friends of OB-12' Yahoo! group. Please use the subject line [OB-12 DISPLAY SUPPORT].