

# ABACUS ELECTRICS

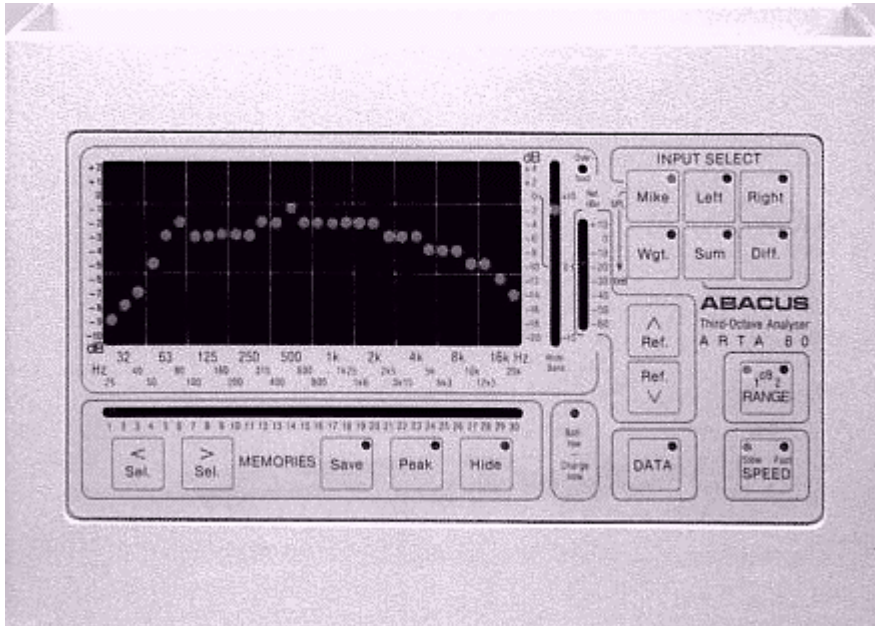
# ARTA 80 Audio Spectrum Analyser

## Disassembly Instructions

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## Introduction

This document explains how to dismantle and reassemble the ARTA 80 audio analyser. Usually the analyser will be returned to the factory for service or upgrade. Sometimes however return will be impractical and disassembly in the field will be mandatory. Disassembly may be occasionally required for a number of reasons:

- To replace the battery. The expected life of the lead-acid battery is approximately five years, after which time it may be need to be replaced.
- To improve functionality. From time to time new features may be incorporated into the analyser software. To obtain the improvements a factory supplied EPROM integrated circuit containing the new firmware must be fitted.
- To add a hardware option. Some accessories for the ARTA 80 analyser, for example the reverberation timer (A80rv), are fitted internally.

## Disclaimers

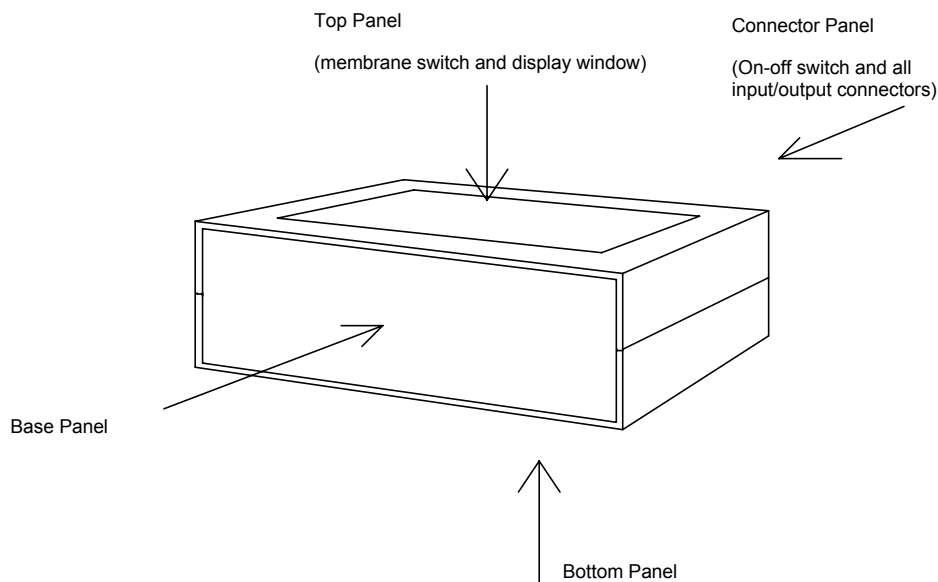
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## Procedure

Before disassembling the ARTA 80 analyser *please* read all the following instructions and study the diagrams to get a "full picture" of the procedure. The following tools are required:

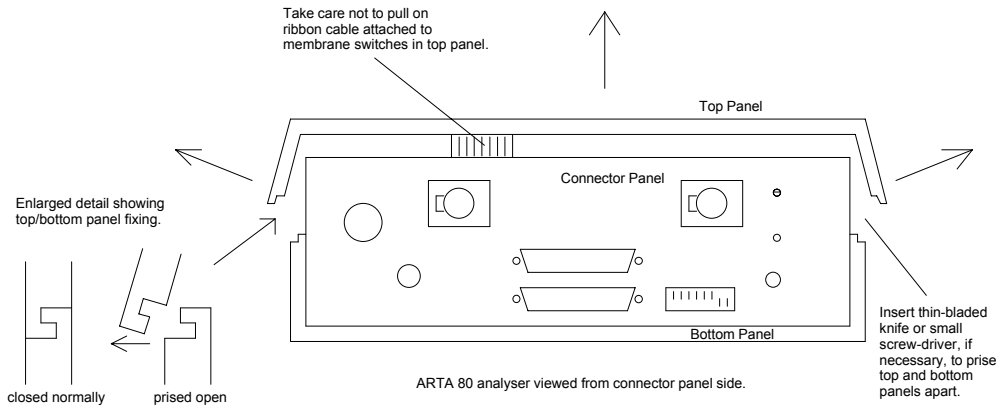
- Small bladed "pocket" screwdriver
- Screwdriver - for M3 bolts
- Tweezers - for removing and gripping bolts
- 7mm box spanner - for Noise Output knob
- Cross head screwdriver (Philips No. 1) - for Printer connector screws (early models) or
- 5mm box spanner - for Printer connector screw-lock pillars (later models)

**!!! SWITCH OFF THE ARTA 80 BEFORE DISASSEMBLY !!!**



### Remove ARTA 80 from carry case

The ARTA 80 is supplied with a protective leather-style carry case. When in use it is recommended that the analyser always be left inside the case. The analyser must first be removed from the carry case. This is not easy, as the fit is intentionally tight. The analyser must be "eased" out - do not use grips or pliers to pull on the analyser, as this will damage the plastic casing. Pressing on the base panel face of the carry case (face opposite the connector panel) helps to "push" the analyser out.



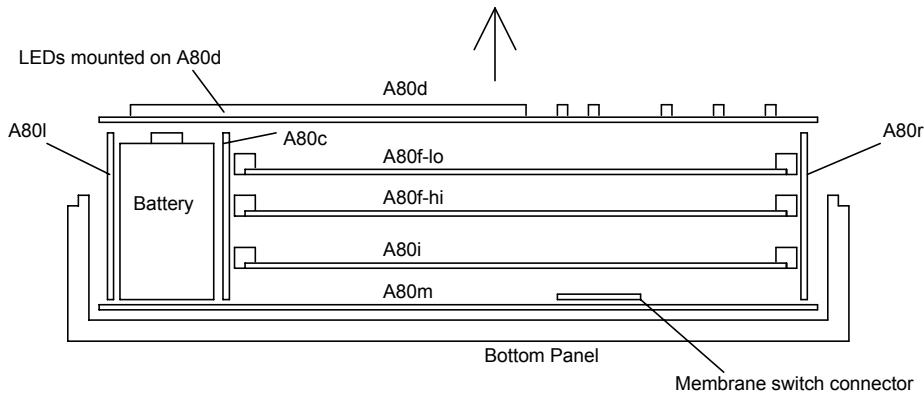
**Remove top and base panel**

Place the ARTA 80, bottom panel downwards, on a firm surface. Prise the sides of the top panel away from the bottom panel first on one side and then on the other. If necessary insert a thin bladed knife or small screwdriver between the top and bottom panels in order to aid separating them. When both sides are free slide the top panel upwards until it is clear of the connector and base panels.

The top panel remains connected to the rest of the ARTA 80 by way of the ribbon cable to the membrane switch assembly. **DO NOT PULL OR STRESS THIS CABLE!**

Holding the top panel out of the way the base panel may be slid upwards (removed) from its keyway in the bottom panel. Put the base panel safely aside.

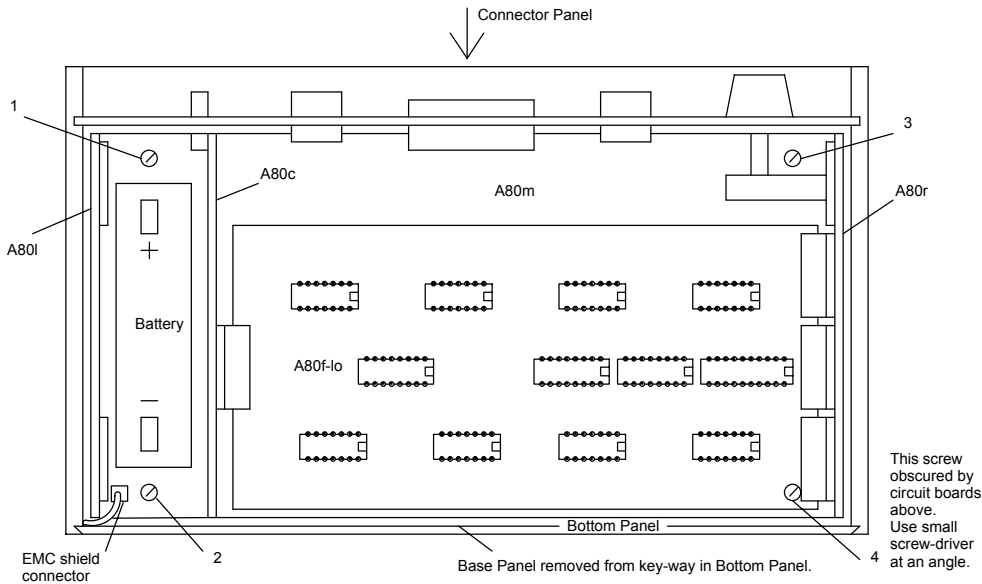
The membrane switch ribbon cable may now be unplugged from its connector on the A80m circuit board. On later analysers an EMC shield is fitted. This is a flexible plastic sheet metalized on its outer surface. To access the membrane switch connector more easily gently fold the EMC shield out of the way. The top panel is now free and can be put safely to one side.



ARTA 80 analyser viewed from base panel side, with top and base panels removed.

**Remove A80d display circuit board**

In later analysers two 'E' shaped glass-fibre clamps slide over the edges of the stack of circuit boards. Remove these clamps. The A80d display board may now be unplugged from the A80l and A80r boards by gently pulling it vertically away from the rest of the analyser.



ARTA 80 analyser viewed from top panel side, with top panel, base panel, and A80d circuit board removed.

### **Remove lead-acid battery**

Unclip the battery leads and remove the battery. If a new battery is to be fitted ensure that packing foam is fixed to the top of the battery (between the terminals). If the replacement battery has been supplied by ABACUS ELECTRICS it will already be in place. If the battery has been obtained locally then transfer the foam from the old battery. Appendix 1 lists a number of suitable batteries.

If only the battery is to be replaced the analyser can now be re-assembled. If the analyser is to be upgraded or repaired then proceed as below.

### **Remove A80I circuit board**

Before unplugging the A80I circuit board mark the top so that it may be re-inserted the correct way up.

### **Remove bottom panel**

Remove the four M3 screws (nylon or plated brass) that fix the A80m circuit board to the bottom panel. Screw no.4 is obscured by the circuit boards above it and so a small (pocket) screwdriver must be used at an angle. Retain the screws and shake-proof washers for re-use.

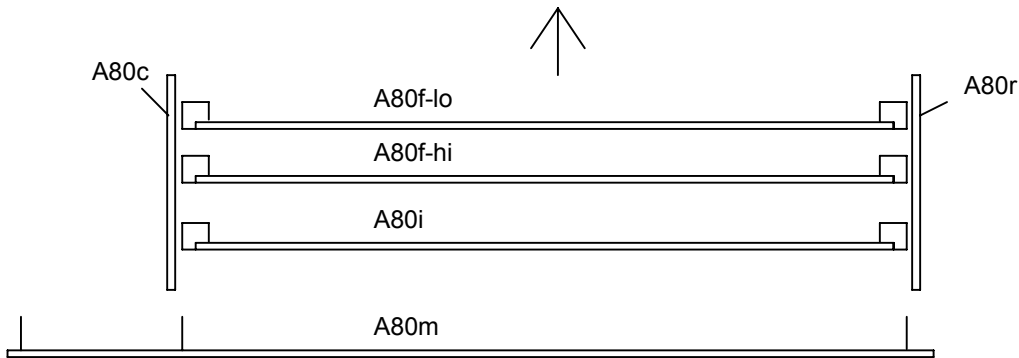
If an EMC shield is fitted then its earthing strap should first be unplugged from the A80m circuit board. Now the ARTA 80 board assembly and connector panel may be removed from the bottom panel. The connector panel slides in a keyway in the bottom panel.

### **Remove the connector panel**

Remove the Noise Output level control knob. The knob is a collet knob; removing the cap reveals the fixing nut.

On the connector panel remove the two screws (screw-lock pillars on later analysers) on either side of the Printer socket. Store these screws safely. The connector panel may now be removed.

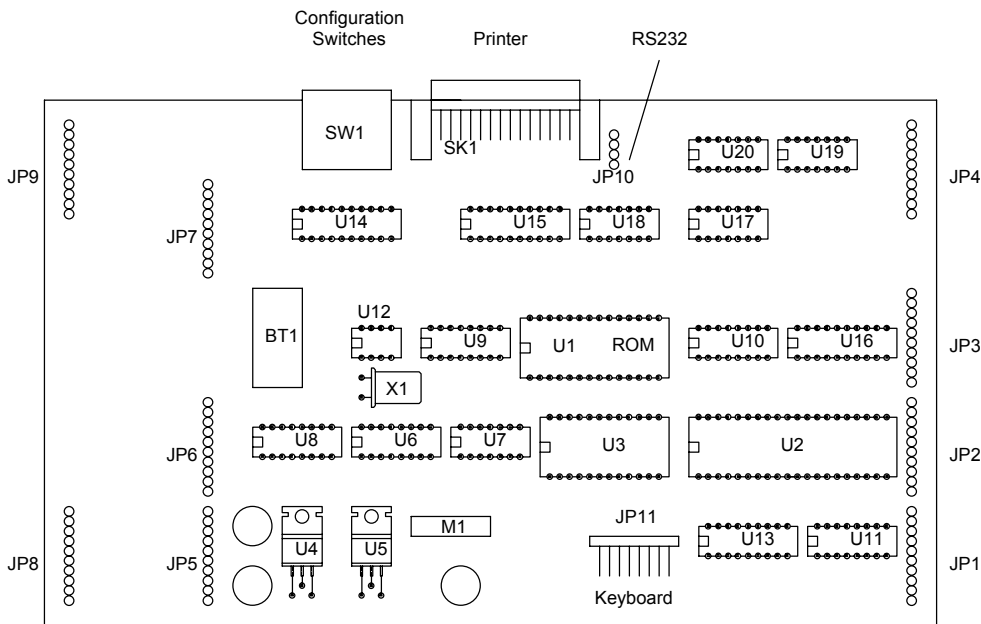
The cableforms attached to the connector panel must be unplugged; make a note of their destination and orientation so they may be correctly re-plugged.



The A80i/A80f-hi/A80f-lo/A80c/A80r assembly un-plugs from the A80m circuit board.

**Detach A80m circuit board**

The A80i/A80f-hi/A80f-lo/A80c/A80r assembly may now be unplugged from the A80m circuit board. The ARTA80 is now sufficiently disassembled to replace the EPROM.

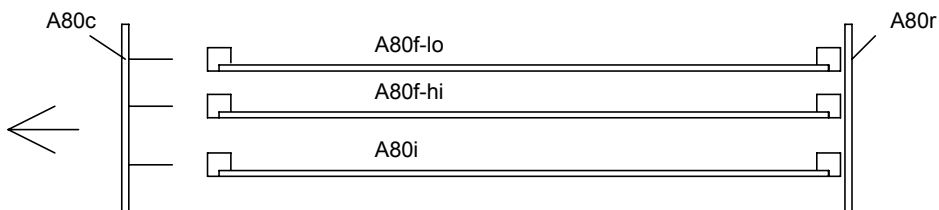


**Replacing the firmware EPROM integrated circuit**

The firmware EPROM (ROM) is in the centre of the A80m circuit board and fitted in a socket. It should carefully be removed by levering up one end at a time using a small screwdriver. Do not scratch the circuit board with the screwdriver as the printed wiring may be damaged. One end of the device has an identifying "notch" and the orientation of this should be carefully noted as the upgrade EPROM must be fitted the same way round. The upgrade EPROM should be carefully plugged into the now empty socket ensuring that none of the circuit's legs are bent but all are properly pushed into the socket. The firmware upgrade is now complete and the analyser may now be re-assembled.

**Installing the A80rv reverberation timer (RT<sub>60</sub>) option**

The A80rv reverberation timer option comprises a circuit board that is fitted in place of the A80r board. To install it further disassembly is required.



The A80r board unplugs from the A80f-hi, A80f-lo and A80i circuit boards.

**Detach A80i, A80f-lo, and A80f-hi circuit boards**

Gently unplug the A80c circuit board from the A80i and both A80f boards. The A80i and A80f boards may now be individually unplugged from the A80r board.

The A80r board is now set aside as the A80i and A80f boards will be plugged into the A80rv reverberation timer board instead.

**First time installation of the A80rv circuit board**

If the A80rv board is being fitted for the first time one corner of the A80i circuit board will need to be 'snipped off'. A small pair of side-cutters will be suitable for the job. First plug the A80i board into the A80rv and note where the corner of the A80i touches components on the A80rv before the boards are fully mated. Unplug the A80i again and remove the corner so that next time the boards fully mate without obstruction. If the A80rv reverberation timer circuit board was factory fitted then the corner of the A80i will have been removed already.

## Reassembly Procedure

Before re-assembling the ARTA 80 analyser *please* read all the following instructions and study the drawings carefully.

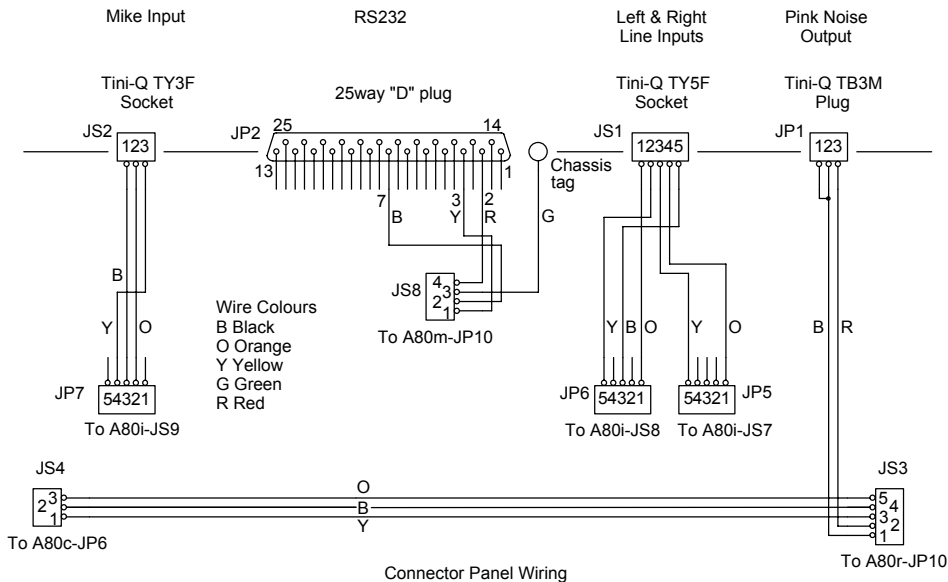
**Note:** The 10-way inter-PCB connectors (Molex KK series) are not fitted with locating pegs so great care must be taken to ensure the boards are not plugged in out of step.

### Reassembling the A80i/A80f-hi/A80f-lo/A80c/A80r boards

The A80i, A80f-hi, and A80f-lo boards should be plugged, one at a time, into the A80r (or A80rv) circuit board. Although the three boards will physically plug into any position it is important the correct order is maintained. The A80c board should now be plugged into the other ends of the A80i, A80f-hi, A80f-lo boards.

### Re-plug the A80m circuit board

The A80i/A80f-hi/A80f-lo/A80c/A80r assembly may now be re-plugged into the A80m circuit board. Ensure that the pins on the A80m fit into the correct holes in the A80c/A80r sockets, as there are no keys fitted to prevent misalignment.



### Refit the connector panel

The connector panel must now be positioned so that the ON/OFF switch, Pink Noise control spindle, Printer socket, and Configuration Switches correctly protrude. Once the panel is precisely located the two Printer socket screws, or screw-lock pillars, are fitted to hold the panel in place.

The cableforms attached to the connector panel can now be re-plugged into the A80m, A80i, A80r and A80c circuit boards. Using the wire colours as a key, the drawing above shows the orientation of the connectors.

The Pink Noise knob should now be refitted.

### Replace bottom panel

The ARTA 80 board assembly and connector panel may now be reinserted into the bottom panel. The connector panel slides in a keyway in the bottom panel. In later analysers, where an EMC screen is fitted, a screwdriver blade should be used to tuck the short flap of the shield in behind the connector panel just as it is pushed fully into place in the bottom panel. The three larger flaps of the EMC shield should be outside the circuit board assembly. The inside surface of the EMC shield is non-conducting plastic. The outer surface conducts and would cause short-circuits if inadvertently folded in.

Use the four brass or nylon screws, along with the original four shake-proof washers, to fix the A80m circuit board to the bottom panel. Screw no.s 1 and 2 are easy to fit. Screw no.3 needs to be positioned using a pair of tweezers as the Pink Noise control obstructs clear access. Screw no.4 is obscured by the circuit boards above. It should be gripped and positioned using tweezers and tightened with a small screwdriver held at an angle.

If an EMC shield is fitted then its earthing strap should first be re-plugged into the A80m circuit board.

#### ***Replace battery and A80l circuit board***

Reinsert the A80l board ensuring that it is the correct way up and not plugged into the A80m board out of position. Replace the battery but do not reconnect it. Ensure that the bottom of the battery is resting on the A80m board.

### **ENSURE THAT THE ON/OFF SWITCH IS SWITCHED OFF! (TOGGLE UP).**

Now re-clip the battery leads.

#### ***Replace A80d display circuit board***

The A80d display board may now be re-plugged into the A80l and A80r boards. Make sure the connectors are exactly aligned and pressed firmly home.

If the two 'E' shaped glass-fibre clamps were supplied now re-install them by sliding them over the edges of the stack of circuit boards. The clamps are colour coded red and green and the A80d circuit board is marked accordingly.

#### ***Replace top and base panel***

First the top panel should be loosely placed on top of the A80d circuit board so that the ribbon cable is correctly positioned. The membrane switch ribbon cable can now be re-plugged into its connector on the A80m circuit board without twisting or stressing it.

Holding the ribbon cable out of the way the base panel may be reinserted by sliding it into the keyway in the bottom panel. If present, ensure the EMC shield is tucked inside as the base panel is slid into place. Slide the top panel into position along its two keyways (connector panel and base panel). Do not trap a loop of the ribbon cable between the top and base panels - tuck it inside the case if it does not automatically tuck itself. Press the top and bottom panels together; they should click into position on both sides.

#### ***Verification of correct assembly***

Before the ARTA 80 is replaced in its carry case it should be checked.

Switch on the analyser. The first time the analyser is powered up after a firmware upgrade the words "New ROM" appear on the display. If this is not seen or the analyser does not seem to power up correctly then switch it off immediately. Disassemble the unit and check carefully for an assembly error such as connectors re-plugged out of alignment.

If the new EPROM was fitted only to revise the 'Personalisation' and has the same firmware revision then the "New ROM" message will not appear. The analyser should function normally as soon as it is switched on.

If the words "New ROM" are seen then switch the ARTA 80 off and then on again whilst pressing the SPEED button. A self-test as described in the handbook will be executed.

If the analyser is functioning correctly it should be replaced inside its carry case for protection during use.



## **Appendix 1 - Replacement Lead-Acid Batteries**

The internal power source for the ARTA 80 audio analyser is a rechargeable Lead Acid battery. The typical life for this battery is about five years after which time it must be replaced. Towards the end of its life its charge holding capability may be reduced.

The battery may be obtained from ABACUS ELECTRICS (stock code BATT80) however it is a standard type and compatible units are available worldwide from a number of manufacturers. Nominally measuring 54.9mm high, 97.3mm long and 25.5mm deep the battery is 6 volts with 1.2Ah capacity. The table below lists the stock codes of a number of manufacturers and stockists.

The Yuasa battery is functional and may be used if no other type is available. However, it is not recommended and if fitted should be replaced as soon as possible. When replacing the battery the adhesive foam on the top face of the battery should be transferred to the new battery.

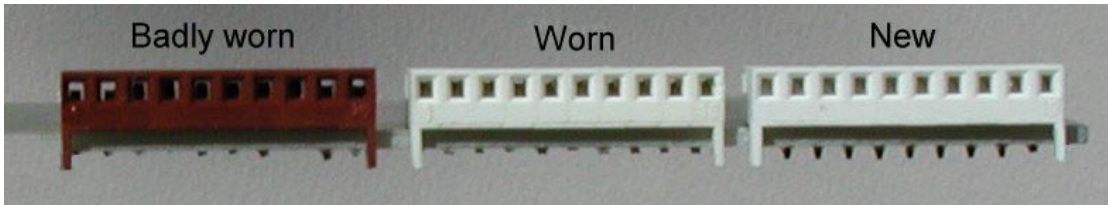
<b>Manufacturer</b>	<b>Stock Number</b>		
Sonnenschein	dryfit A506 1,2S	RS Components:	919-774
		Farnell:	463-360
Power-Sonic	PS-612		
Panasonic	LCR6V1.3P		
Kobe	HP1.2-6(6M1.2)		
FIAMM-GS	FG10121		
PORTALEC	PE6V1.2		
HARIO	HR 6V 1.3P		
Winner	6-1.2(6V-1.2AH)		
CSB	GP613		
Yuasa	NP 1.2-6		
CARTRONIC	Series 2000 6V 1,2AH		

## Appendix 2 – Replacing Molex Connectors

The circuitry of the ARTA 80 analyser is designed to be reliable and stable with time. Electronic faults are rare. The most common causes of problems are with mechanical parts; switches and connectors.

Within an ARTA 80 analyser are eight printed circuit boards that are linked together using 10-way Molex KK series connectors. If the analyser has had a severe knock it is possible that the connectors may 'pop' apart. Pushing the boards back together may cure a problem.

More likely, however, is that after several years of travelling, knocks, and vibration the spring contacts in the female Molex connectors may become permanently deformed. The contacts then become intermittent and the only remedy is to replace the connectors.



In the photograph above female Molex connectors (sockets) are shown in perfect, fair and worn condition. In a new connector no gap can be seen in the housing above the spring contact. In a worn connector the gap is clearly visible. The male Molex connectors (headers or plugs) do not suffer significant wear and may only need to be replaced if they become deformed after significant 'impact' damage.

Replacing Molex connectors is not trivial. The A80d, A80m, A80i, A80f-lo, A80f-hi and A80rv printed circuit boards all use plated-through-hole technology making component removal difficult. As always, care must be taken as over-zealous use of de-soldering tools can damage the circuit boards by causing printed tracks and pads to 'lift'. Once the worn socket is removed from a board the holes must be fully cleared so that the replacement connector is correctly positioned.

### **Molex connectors:- KK series, 0.1" contact spacing:**

10-way socket part number 38-00-1340	RS Components:	296-5167
	Farnell:	143-156
10-way header part number 22-03-2101	RS Components:	467-582
	Farnell:	143-138