TRAINING

SUBJECT: SpO2 Fault Diagnosis

The following procedure is primarily for use by "Repair" personnel – this procedure is to be used in conjunction with other relevant, specific Operating Procedures (where applicable).

The equipment required is as follows:

D.V.M., Soldering Iron, Solder, Wire Stripper, Flush Cutter, Snipe Nosed Pliers, Helping Hands, 1 Set of Jewel Screwdrivers, Dremel tool, Clear Silicone, White Silicone, Superglue, Primer (loctite 770), Drying Rack.

Refer to the relevant Operating Procedure (or technical drawing) for the wiring diagram.

N.B. Due to the age and design of a probe it may be advisable to replace the components with compatible Viamed components in order to ensure that the probe will outlast any warranty.

Any parts to be reused should be cleaned thoroughly with isopropyl alcohol, or cleaned in the "Ultrasonic Cleaner".

Section 1 – Repair Actions

1. Remove any damaged parts, and / or faulty components. If replacements are available, then use those to re-assemble the clip, with the existing good parts having been cleaned, using the process laid down in "Stage 4 – Clip Assembly – Section 1 – Stages 2 & 3".

2. If there are no replacement parts available the clip will have to be completely re-built from new, as per the above mentioned stages. In this case, clean and retain the good component parts from the original clip, for re-use at a later time on other probes (store in Non-conforming area).

3. Where any component parts are overly dirty, and cannot be cleaned by the use of a toothbrush, then these must be cleaned in the "Ultrasonic Cleaner".

4. At all relevant stages during repair of the probe, it will require testing as per "SpO2 Testing and Q.C. – Stage 4 – Section 3". If it passes, then complete the assembly of the repair, fill in the appropriate sections on the paperwork, and forward it to Q.A. for full testing.

5. If it fails and requires further repair work, then proceed again as stated in the following sections.

Section 2 – Dismantling of Clip

1. With the cable cut off to the strain relief, remove the pads from the shells using a small jewel screwdriver (Fig 1.1). Remove the spring from around the pads (Fig 1.2). Remove the two side buttons and separate the shells (Fig 1.3 & 1.4). Thoroughly clean all parts that are to be re-used, with isopropyl alcohol.

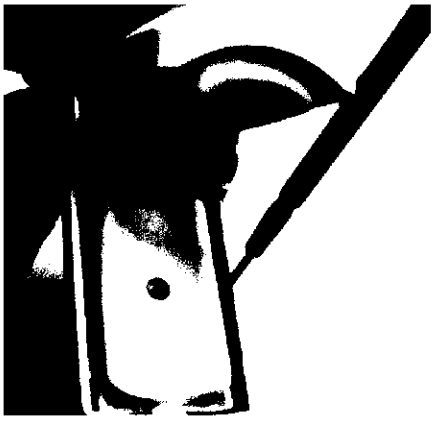


Fig 1.1

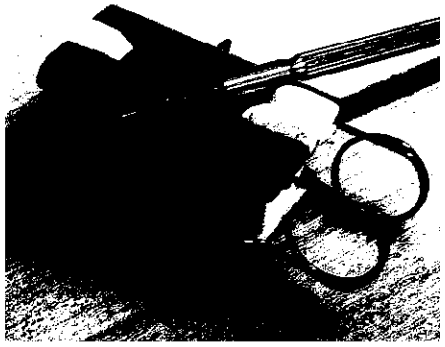


Fig 1.2

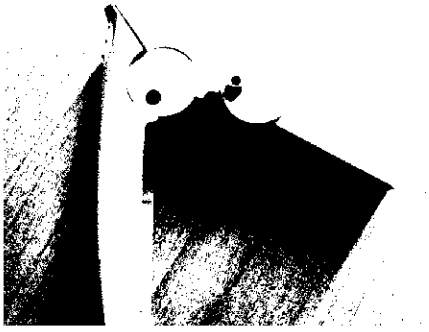


Fig 1.3

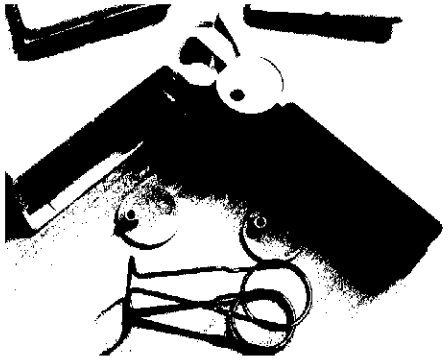


Fig1.4

2. Cut the Emitter and the Detector wires, approximately "1cm" from the pad housing (Fig 1.5). Then, using snipe nosed pliers, cut the components from within the silicone window (from the rear) - note that this should be done delicately so as not to damage the surface of the window. (Fig 1.6).

Fig 1.5

3. Clean excess silicone from components, using Isopropyl Alcohol, ensuring that the contacts are as clean as possible. De-solder the old wiring from components. Test the component using the "Test box" and external leads.

Section 3 – Repair of Connector

1. Remove any damaged component parts.

Connector:

1.

TRAINING

SUBJECT: SpO2 Fault Diagnosis

The following procedure is primarily for use by "Repair" personnel – this procedure is to be used in conjunction with other relevant, specific Operating Procedures (where applicable).

The equipment required is as follows:

D.V.M., Soldering Iron, Solder, Wire Stripper, Flush Cutter, Snipe Nosed Pliers, Helping Hands, 1 Set of Jewel Screwdrivers, Dremel tool, Clear Silicone, White Silicone, Superglue, Primer (loctite 770), Drying Rack.
Refer to the relevant Operating Procedure (or technical drawing) for the wiring diagram.

Switch on the soldering iron and ensure that it is set at 240°, and clean the tip.

At all times the Quality of the soldering must be as per: SpO2 Testing & QC – Stage 4 – Section 1.

N.B. Due to the age and design of a probe it may be advisable to replace the components with compatible Viamed components in order to ensure that the probe will outlast any warranty.

Any parts to be reused should be cleaned thoroughly with isopropyl alcohol.

Section 1 – Initial Check

1. Lay the Probe on the workbench, and read the paperwork to ascertain whether there is any indication, noted of the possible fault to the item.

2. If the paperwork indicates a possible fault, then address that area first. In all other cases follow the procedure detailed below.

Determination of Fault:

3. First, visually check for the following:

    i) Physical damage to the clip.
    ii) Physical damage to the cable.
    iii) Physical damage to the connector.

    Physical damage can be such as: cracked or broken shells, torn or scarred pads, cuts or kinks to the cable, cracked or broken connectors, bent or broken connector pins.
    If any of the above is found however, an electrical check still needs to be performed as per "Sub-section 4" below. If there is no damage to the connector, it can be reused.
4. Then, using the Test box, check for the following:

i) Intermittent or non-existent component connection.
ii) Intermittent circuitry at points of strain i.e. clip and connector strain-relief.
iii) Break in cable.
iv) Low, High or intermittent readings on the relevant SpO2 Monitor.

5. When testing for electrical faults use the testing process as detailed in "Section 2" below.

Section 2 – Component / Probe Faults Testing

Prior to any testing, the operative / QA must ascertain their individual human finger reading using the "Standard Test Finger Probe" with the Nellcor N200 Monitor.

1. Attach the connector to the QA Test box in the relevant socket (Fig 1.1 "example").

2. Switch on the Test box and the Oscilloscope. If the Led is being tested then, the Red Switch must first be rotated to position "1" (red Light) and then to position "2" (infrared). If the Detector is being tested then the Red switch must be rotated to the "DET" position (sensor).

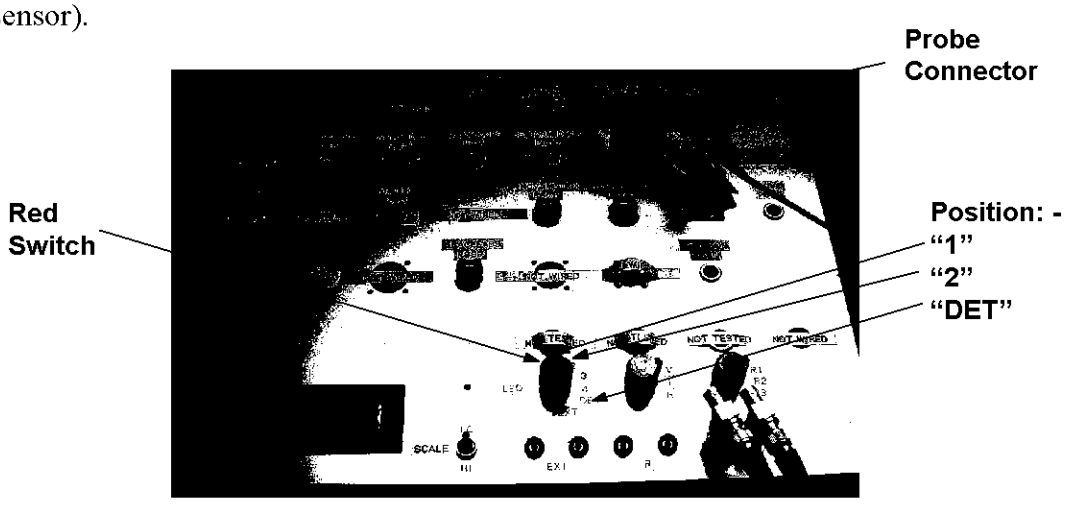


Fig 1.1

3. In all instances, in "Item 2" above, the trace should read as per: "Fig's 1.2, 1.3 & 1.4 respectively. With the trace showing on the Oscilloscope, the relevant component pad must be jiggled with the thumb to check full bonding of the wire and track (the trace should remain constant). The full cable length should also be checked between the component and the connector (the trace should remain constant).


Fig 1.2


Fig 1.3


Fig 1.4

Red Trace **I/R Trace** **Sensor Trace**

4. If there are any anomalies at this stage – i.e. the trace wobbles or disappears altogether, then they should be logged down under the relevant fault found section on the paperwork.

5. With the probe having passed the Test box test, it must now be tested using the DL3000. Select the correct Monitor for the probe (see chart), switch on and, insert the connector to the socket. First test the Clip on Human Finger and record the readings.

6. The Standard readings to be found for all makes of Finger Clip are:
% SpO2: 96 to 99
B.P.M.: 80 (as an average)

7. Situate the clip onto the DL3000 Dummy finger, the LED must be to the underneath (Fig 1.2a & b)

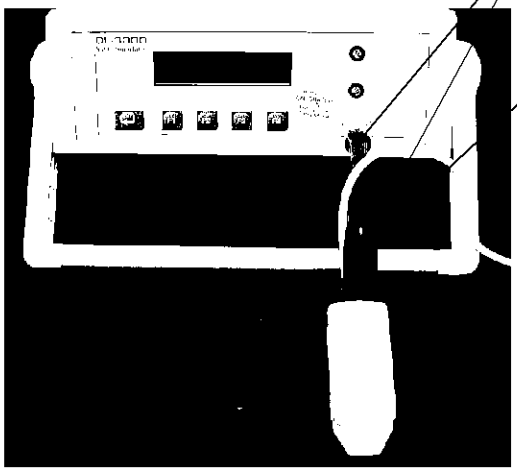


Fig 1.2a

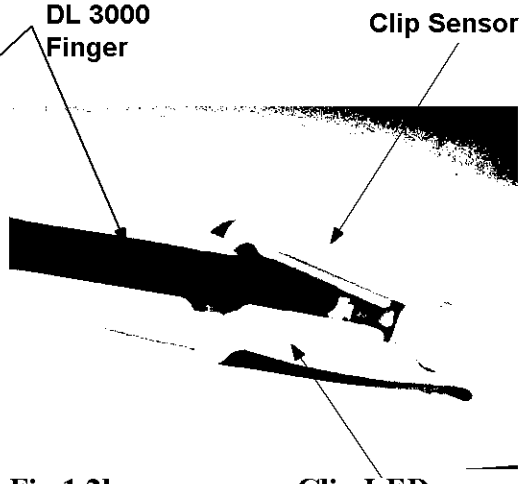


Fig 1.2b

8. On the DL3000, depress button "F1" until the required monitor is displayed on the top line, accept with the "Enter" button. Depress the "F1" button until the appropriate monitor model is displayed on the top line; accept with the "Enter" button. Depress the "F1" button for the Simulation readings.

9. Using the "F1" & "F2" buttons adjust the readings to those quoted on the test sheet, they should be as follows.

[redacted]

10. Check the monitor readings against the simulated readings and note as appropriate. If it fails at this stage then they should be logged down under the relevant "fault found" section on the paperwork, and then it will be cause for repair.

11. Wherever practicable, "service cable assemblies" must be used as part of the repair process to expedite flow through of jobs.

12. Repair of the probe is as per the individual repair procedure.

13. When the probe has been repaired, it must be re-tested as per "Items 1 – 9" above. Once it has passed the above tests, it must be passed to Q.A. for full testing and inspection.

Section 3 – Repair of Clip

1. Remove any damaged parts, and / or faulty components. If replacements are available, then use those to re-assemble the clip, with the existing good parts having been cleaned, using the process laid down in "Stage 4 – Clip Assembly – Section 1 – Stages 2 & 3".

2. If there are no replacement parts available the clip will have to be completely re-built from new, as per the above mentioned stages. In this case, clean and retain the good component parts from the original clip, for re-use at later time on other probes.

3. Where any component parts are overly dirty, and cannot be cleaned by the use of a toothbrush, then these must be cleaned in the "Ultrasonic Cleaner"

Section 4 – Dismantling of Clip

1. With the cable cut off to the strain relief, remove the pads from the shells using a small jewel screwdriver (Fig 1.1). Remove the spring from around the pads (Fig 1.2). Remove the two side buttons and separate the shells (Fig 1.3 & 1.4). Thoroughly clean all parts that are to be re-used, with isopropyl alcohol.

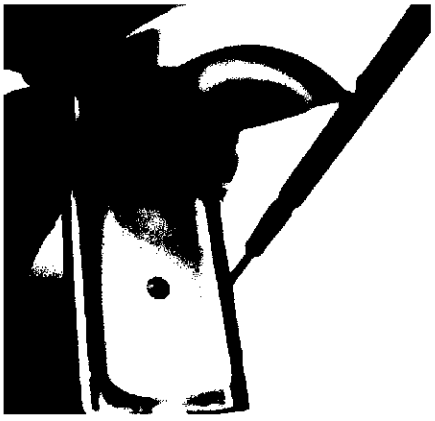


Fig 1.1

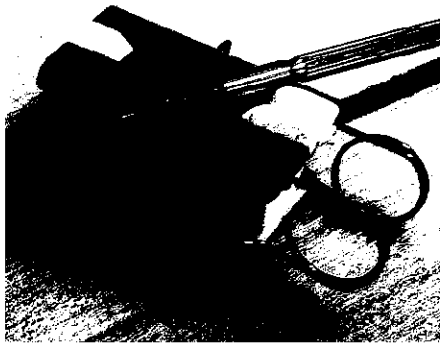


Fig 1.2

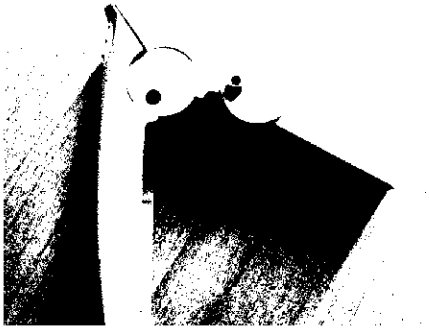


Fig 1.3

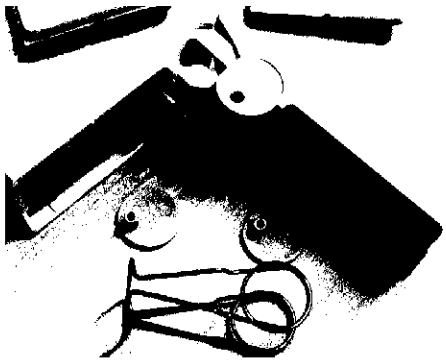


Fig1.4

2. Cut the Emitter and the Detector wires, approximately "1cm" from the pad housing. Then, using snipe nosed pliers, cut the components from within the silicone window (from the rear) - note that this should be done delicately so as not to damage surface of window. (Fig 1.5).

Fig 1.5

3. Clean excess silicone from components, ensuring that the contacts are as clean as possible. De-solder the old wiring from components (Fig 1.6).

Section 5 – Repair of Connector

1. Remove any damaged component parts.

Connector:

1.

TRAINING

SUBJECT: SpO2 Connector Assembly

The following procedure is primarily for use by "Production" personnel – this procedure is to be used in conjunction with other relevant, specific Operating Procedures (where applicable).

The equipment required is as follows:

D.V.M., Soldering Iron, Solder, Wire Stripper, Flush Cutter, Snipe Nosed Pliers, Helping Hands, 1 Set of Jewel Screwdrivers, Dremel tool, Superglue, Primer (loctite 770).

Refer to the relevant Operating Procedure (or technical drawing) for the wiring diagram.

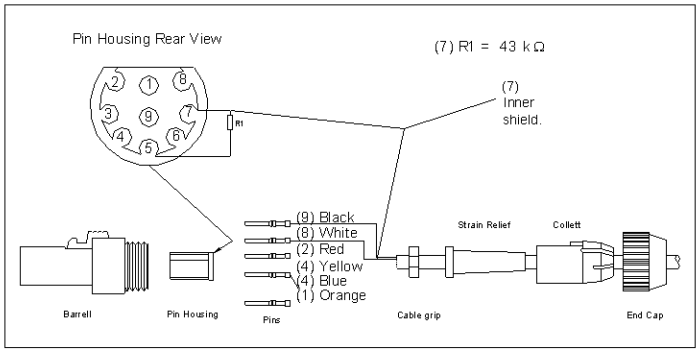
Switch on the soldering iron and ensure that it is set at 240°, and clean the tip.

At all times the Quality of the soldering must be as per:- SpO2 Testing & QC – Stage 4 – Section 1.

Hypertronics Assembly

PICTORIAL and SCHEMATIC REPRESENTATIONS

N.B. Connectors are also other colours than black (usually grey)



1. Feed ∅6 x 43mm (clear) heat shrink, end cap, collett, strain relief, ∅6 x 10mm (black) heat shrink and cable grip onto the cable.
2. Strip 20mm off the outer jacket of wire and cut all the packing to the base.
3. Reveal the black and white wires, which are covered by the inner shield. Trim the inner shield to approximately 20mm long.
4. Strip the jacket of every wire 2mm to reveal the copper core. Apply a small amount of solder to the ends of each wire and shield.
5. Trim one of the legs of the resistor to 4mm long and the other to 15mm long.

6. Cover the resistor in ∅1.6mm heat shrink and solder each leg into the rear of 2 separate pins and push pins firmly into correct locations.
7. Solder the shield to pin 7, covering it with ∅1.6mm heat shrink, and the remaining wires to the rear of 4 separate pins and push/pull firmly into correct locations.
8. Clamp the cable grip approximately 2mm from the outer jacket end.
9. Place ∅6 x 10mm heat shrink over the cable grip and the beginning of the wires and heat to shrink firmly around.
10. Push the strain relief up to the cable grip, collett over the strain relief up to the pin housing, and into the barrel and finally screw the end cap onto the barrel.
11. Test the

Fault Determining.

Take the next ducket off the shelf. The most urgent duckets are usually ORANGE duckets. If there are no orange duckets, then the RED duckets should be taken. If there are no red duckets, take the BLUE ducket that is on the lowest shelf and furthest to the right.

Take the first probe out of the bag.

Read the photocopied paperwork, and heed any special instructions from the customer, and any customer's fault description.

Check probe for any visual damage; any damaged parts will have to be replaced. Remove the components from the clip, and test that they function as per the diagrams in the manual. If the clip is to be replaced, then follow clip replacement procedure. If the components do not function, then the probe is unable to be repaired.

If the probe appears to have no visual damage, then test the circuitry using the test box in conjunction with the repair manual. Use any test cables necessary.

If the circuitry appears to be damaged, then test for any intermittent circuits at the strain reliefs, by flexing the cable at these points. Any intermittent circuitry at these points can usually be remedied by slightly shortening the cable and rewiring beyond the point at which the break occurs. Any intermittent circuitry through the length of the cable, i.e. between the strain reliefs, must be remedied by replacing the cable- rewire the probe with the new cable according to the procedure. If the circuitry is not intermittent at these points, then open the connector, and check the integrity of the contacts inside- if any wires have become broken off from the contacts, then they can usually be remedied by simply resoldering the wires to the contacts as per the repair manual. If the circuitry is not damaged at this point, then open the finger clip, and check the integrity of the contacts at this point- if any wires have become broken off from the contacts, then they can usually be remedied by resoldering the wires to the components as per the repair manual.

If the circuitry appears to be undamaged, then test the probe on the oximeter for which it is manufactured. Look out for a regular, smooth waveform(if shown), and for regular readings of SpO2 and pulse rates. An erratic waveform, or irregular SpO2 readings, can usually be remedied by rewiring the connector, as per the repair manual, making sure that there is no shorting between components.Look also for onscreen messages.

If the probe appears to work well on the monitor, then test using the DL3000 simulator in conjunction with the monitor. Test at 97%, 90%, and 80% SpO2 levels, at 80 bpm. If the probe works well on the DL3000 simulator, then there is No Fault Found- follow the appropriate procedure. If the probe has inaccurate readings, i.e. >3% difference between simulated and actual readings, or if the probe cannot pick up the simulated SpO2 levels, then the probe is out of spec, and cannot be repaired- see the appropriate procedure.

Repeat the procedure for every probe in the ducket

z/main/repfault

QA PROCEDURE FOR NO FAULT FOUND PROBES

Check probes for cleanliness (Including cable and connector), also check for damage or cracks. Check the required stickers are on the probe in the right order and distance from the connector. Ensure all paper work is with the probe and that all appropriate paper work is filled in.

Plug probe into the test box and check for the required traces on the oscilloscope, as compaired to the diagram in the repair manual. Check for any breaks or connections in the length of the cable and at the clip and connection ends (including any extension cables).

Plug probe into original monitor and place probe clip on finger. Check the trace on the monitor, making sure that it is regular and is not erratic. Record the SpO2 reading from the monitor into the appropriate QA box on the probe repair sheet. Take the probe off finger and place on the *DL3000* finger. Set the *DL3000* to the required setting (ie, to correspond to the monitor being used). With the Bpm set at 80 take readings of the Spo2 at settings : 97, 90, 80. These results should also be recorded on to the probe repair sheet in the appropriate boxes, then recorded onto the computer. This is done by clicking on the 'DL3000' box the screen will change to the DL3000 result screen which can then be filled in with the relevant information. Once completed the previous sheet can be brought back by clicking on 'Back to repair sheet'.

If any faults are found with the probe they should be noted on to the repair sheet and the probe along with the paper work should be returned to the engineer who undertook the repair.

Working probes should have a Mylar tag attached and should be placed in a repair service box, making sure a repair service sticker has been placed on the box. The box should have a small amount of silicone polish sprayed under the lid, which should then be wiped off with kitchen roll. Probes for the company ENVITEC should not be boxed.

The information which was recorded on to the repair sheet should now be recorded on to computer, ensuring all sections are filled including the probe information if any.

The repair code should be filled in "No Fault Found".

A repair certificate should then be printed out, on Viamed headed paper, which should be signed and placed with the probe and original paper work.

The working probe should then be signed out of the repairs folder by dating and initialling against the probe's repair number.

The probe and its paper work should then be returned to its original ducket. The ducket, when completed, should be placed on the repaired probes shelf.

z/main/qanff

Probe Repairs - Goods In

Revision Date 24/02/99- surpasses Document: Epic/proc/goodin1.sam

Goods In

Switch on Goods In computer.

Load REPMAIN.apr if not already loaded

Select REPAIRS IN

Open Post

Keep all paperwork supplied with each probe with each probe

Check that all the information on the paperwork is correct, i.e. that the right number and type of probes are on the paperwork- inform the office manager of any discrepancies, which should be followed up immediately

Place contents of each package (probes, paperwork, any other items) in a single ducket as follows:

UK hospitals/ agencies in BLUE duckets
URGENT UK hospitals/ agencies in RED duckets
EXPORT repairs in ORANGE duckets

Locate customer file number

Date stamp paperwork

Enter all relevant information into goods in book- date in, carrier, e.g. post, DHL, etc, tracking number if any, number of boxes, physical damage (either YES or NO), type of product (probe repairs), supplier (name of hospital/ agency), destination (w/s), booked in by (your initials). Leave the last two sections, completed by and w/s-o/n-r/n, blank for the time being

Enter details into computer

Enter your initials
Enter order number (from customer paperwork)
Enter customer file number
Check details of hospital (name and address) are correct
Enter contact name (from customer paperwork)- if no contact name, enter "Sir/Madam"
Enter department TO WHICH THE EQUIPMENT SHOULD BE DELIVERED (from customer paperwork)
Enter serial number
Enter cable type
Enter probe type i.e. manufacturer/ oximeter (if different), e.g. "Nellcor", "MCI Datex", etc.
Enter Viamed equivalent- if no equivalent, enter "Unavailable"
Enter originators tracking number, if any (any numbers found anywhere on probe or accompanying paperwork)
Enter customer's description of fault, if any
Enter condition of probe from list
Enter date sold if applicable
Enter previous repair number if applicable, checking that the previous repair details tie up
If probe is under Viamed's from new warranty, i.e. sold within last 12 months, click on "Warranty From New"- an "x" should appear in the corresponding box
If probe is under Viamed's repair warranty, i.e. repaired within last 6 months, click on "Repair Warranty"- an "x" should appear in the corresponding box
Read and act on any information brought up by computer
Click on "Browse," click "Find," and enter the repair number of the probe in the repair number field (this makes printing of the worksheet faster)
Click on "Print", which should print the worksheet
Check that all the information on the worksheet is correct
Fold the worksheet into three, place in a probe repair bag with the probe, and attach a "Customer Repair" label to the bag

Repeat the above steps for every probe in the box

When the box has been completed, the customer file number and the date should be written on the front of the ducket with a dry-wipe marker

Stamp the paperwork with the accepted stamp, add your initials, the date, and the repair number(s) to the paperwork.
Photocopy the paperwork, placing the photocopy in the ducket
Place the original paperwork at the front of the probe repair file for UK hospitals/agencies
Place the original paperwork in the appropriate lettered section, i.e. ENVITEC paperwork goes in section E, in the European Epic repair file for export repairs
Enter the repair numbers, date, probe type, quantity, serial numbers (if space is short, add "see w/s" to this section) and name of hospital/agency, to the sheet at the front of the repair file for UK hospitals/ agencies
Enter the repair numbers, date, probe type, quantity, serial numbers (if space is short, add "see w/s" to this section) and name of agency, to the sheet at the front of the European Epic repair file for exports

z/main/goodsin1

Add the repair numbers to the "w/s-o/n-r/n" section of the goods in book, and enter your initials in the "completed by" section.
When every probe in the ducket has been booked in and given a repair number, the ducket should be sent to the workshop for repair.

If there is no order number supplied with the probes for repair;
check the repair file- orders are occasionally sent ahead of equipment, so the official order may be in this file- if an order can be tied up with the equipment, then it should be taken from the file and used as the original paperwork, stamped, dated, signed, etc, **and the ducket can be sent to the workshop for repair,**
if the probe is in warranty, enter "warranty" as the order number, **and the ducket can be sent to the workshop for repair,**
if the probe is out of warranty,and there is no order in the repair file, **or if the paperwork asks for a quote before repair,** leave the order number blank- a standard letter will be printed, relevant to the specific probe- this should be signed on behalf of P.Lamb, and can be faxed (if a fax number hes been supplied), or posted to the customer, **and then the ducket should be placed on the hold shelf with the other duckets awaiting order numbers-** no probe should be repaired without an order number or a warranty to cover the repair.

If the order for the work has the wrong price on, for example, sometimes the order will say "please repair 1xprobe @ £10-", etc, **or if the paperwork asks Viamed to phone with a quote**, then the probe and paperwork should be given to the office manager, who should then contact the hospital direct to obtain an order number over the phone.

At the end of the day, when all probe repairs have been entered, hit F2, which will print out a list of the probes entered that day. This list should then go at the front of the probes QA book in the workshop.

Repaired

If the probe has been determined as having been repaired, then the engineer should:

Clean the probe- any dirt or stains should be removed from the cable, clip and connector parts, as far as is humanly possible, using isopropanol, foam cleaner, silicone polish or foam polish. Any iodine stains may be impossible to remove, but any dirt that can be removed should be removed.

Label the probe- if the probe type has a specific "DO NOT THROW AWAY" label, then one of these should be attached to the cable approx 3" from the connector.

If the probe type does not have a specific "DO NOT THROW AWAY" label, then a generic, orange coloured label should be attached to the cable approx 3" from the connector- if the probe is from a customer/ agency outside the UK, the multi-lingual

"DO NOT THROW AWAY- Nicht Wegwerfen-Ne Pas Jeter"

label should be used. If the probe is from a hospital or agency within the UK, the English

"DO NOT THROW AWAY- Intended for multiple use"

label should be used. Probes for the company ENVITEC should have the generic multi-lingual label, rather than any specific label.

If the probe is for a hospital within the UK, then a silver

"CALL VIAMED - PROBE REPAIR"

label should be placed on the cable approx 5" from the connector. If the probe is for a hospital outside the UK, or for an agency, then the silver sticker is not needed.

The above labels should be orientated so that when the cable is held upright, with the connector hanging below, the labels are the right way up and can be read easily.

A repair label should be filled in- alongside "REPAIR" the repair number should be written, and alongside "S/N" the probe's original serial number should be written, if known. This label should then be fastened to the cable approx 7" from the connector.

The probe should then be tested by the engineer, on the test box, original monitor (if available), and DL3000 simulator (if available). The probe should also be checked for superficial damage that may have been missed the first time around.

If the engineer is happy that the probe works, then the probe should then be returned to the ducket with all paperwork appropriately filled in.

When completed the ducket should be placed on the QA shelf.

z/main/repair

QA PROCEDURE FOR UNREPAIRED PROBES

Check the probe to make sure all the parts are with it.

Read the engineers description of the reason that the probe cannot be repaired, and as far as possible verify, i.e. if the engineer states that the components are not functioning, test the components using the test box.

When it has been verified, call up the appropriate repair number on the computer, and fill in all the appropriate information, going so far as to test the probe on the test box, monitor and DL3000 if the probe's condition will allow it.

Fill in the date, initials of the repair engineer and the time taken(which can both be found on the worksheet), and enter your own initials in the "Tested by" field.

Fill in the results of any tests on the computer and on the worksheet, sign and date the worksheet, and in the section marked "Probe information/ reason unrepairable," fill in the reasons that the probe cannot be repaired, making sure to enter this information in complete and concise sentences, as this information will go to the customer.

Fill in the repair code as "Unable to repair."

Click on the "Print Customer Letter," field.

Attach a red "Unrepaired" sticker to the probe, around the clip or cable.

Sign and date the worksheet. Return the probe to the bag with the signed and dated worksheet.

If the probe is in warranty, an internal letter will be printed, on Viamed headed paper, this should be placed in the bag.

If the probe is out of warranty, a customer letter will be printed, on Viamed headed paper, which should be signed by the engineer on behalf of D.Lamb.The letter should be returned to the bag.

The completed probe should be placed in the ducket.

The completed probe should then be signed out of the repairs folder by dating and initialling against the probe's repair number.

The ducket, when completed, should be placed on the repaired probes shelf.

z/main/QAunrep

Clip Replacement.

For components with contacts on their face,e.g. Ohmeda

Pad and diode preparation.

If original clip is cracked, broken and unusable remove the diodes (LED/IR and Photodetector) and dispose of the broken clip. Test the component function.

Desolder the diodes to leave clean contacts.

Check that the diodes will fit into the led and sensor pads accordingly. If the diodes are too large to fit into the space provided the pads will have to be modified using a knife (Taking care not to cut through the face of the pad).

Cable preparation.

Feed the cable through the MCI strain relief and leave approximately 3" of cable to work with. The protective casing of the cable can now be removed. Once removed the cable shield will be visible this should also be removed. This should leave 4 wires visible as well as a separate protective cover which contains a black wire and a white wire plus another shield. The 4 wires should be:

Red
Orange
Yellow
Blue

Any unnecessary wires should be removed, and the remaining wires should be cut down to 1.5cm and tinned.

The second protective cover and the shield surrounding the black and white wires should be removed 1.5cm from its end. The black wire and the white wire can then be tinned.

Clip Assembly.

The wires should now be soldered to the appropriate diodes using the wiring diagrams. Once the diodes have been wired, the diodes should be glued to the 'H' shaped pad support, making sure the actual emitter part/ detector part of the components are directly below where the window will be. Superglue around the edge of the rubber pad, placing it onto the pad support, and holding gently in place until the pad is fixed. Carefully introduce silicone rubber through the window onto the component, until the cavity is filled. Take off any excess silicone, using the tip of a screwdriver, leaving a smooth flat surface.Repeat the process for the other component, then leave to air dry, usually overnight.

The spring can now be attached, ensuring the wires to the photo-diode are not trapped underneath it.

z:\main\ repclip2

On the inside of the LED shell a 'V' shaped groove should be cut into the plastic ridges to leave a channel for the photodiode wires.

The pad supports can then be placed into the shell along with the strain relief (in the appropriate place). Each corner of the support pads should be pushed down until they click into place behind their retainers.

The side tabs and strain relief can now be glued into place and the clip should then be wiped clean.

Clip Assembly.

The wires should now be soldered to the appropriate diodes using the wiring diagrams. Once the diodes (which are already set into the pads) have been wired, up the pads can be glued onto the pad supports.

The spring can now be attached, ensuring the wires to the photo-diode are not trapped underneath it.

On the inside of the LED shell a 'V' shaped groove should be cut into the plastic ridges to leave a channel for the photodiode wires.

The pad supports can then be placed into the shell along with the strain relief (in the appropriate place). Each corner of the support pads should be pushed down until they click into place behind their retainers.

The side tabs and strain relief can now be glued into place and the clip should then be wiped clean.

Clip Replacement.

For components with contacts on their reverse, e.g. Datex

Pad and diode preparation.

If original clip is cracked, broken and unusable remove the diodes (LED/IR and Photodetector) and dispose of the broken clip. Test the component function.

Desolder the diodes to leave clean contacts.

Check that the diodes will fit into the led and sensor pads accordingly. If the diodes are too large to fit into the space provided the pads will have to be modified using a knife (Taking care not to cut through the face of the pad).

Apply non corrosive clear silicone on to the face of one of the diodes and place face down into the pad, (This will leave the contacts visible from the back of the pad). The silicone will start to seep out of the window on the face of the pad. Holding the pad flat at eye level, use a screw driver to remove the excess silicone. This can be achieved by gently touching the silicone (which is seeping out of the pad window) with the end of the screw driver and slowly drawing it away. The silicone will stretch away with the screw driver and eventually break free from the screw driver, it will then slowly return to the pad window. This process should be repeated until the silicone is flush with the pad. (Care must be taken to ensure no silicone sticks to the face of the pad itself). Lifting the pad above eye level the diode can be seen through the window of silicone, at this stage the diode can be adjusted to ensure it is straight in the pad.

This process should then be repeated with the second diode. Once complete the pads can be left to dry over night.

Cable preparation.

Feed the cable through the MCI strain relief and leave approximately 3" of cable to work with. The protective casing of the cable can now be removed. Once removed the cable shield will be visible this should also be removed. This should leave 4 wires visible as well as a separate protective cover which contains a black wire and a white wire plus another shield. The 4 wires should be:

Red
Orange
Yellow
Blue

Any unnecessary wires should be removed and the remaining wires should be cut down to 1.5cm and tinned.

The second protective cover and the shield surrounding the black and white wires should be removed 1.5cm from its end. The black wire and the white wire can then be tinned.

z:\main\ repclip1

Viamed
SpO2 Finger Probe Service Kit
(white pads)

Part number: 0010100

Kit consists of:

1 x 0030110 Top shell (white).
1 x 0030111 Bottom shell (white).
1 x 0030130 Top pad (white).
1 x 0030131 Bottom pad (white).
1 x 0030140 Spring.
1 x 0030150 Strain relief.
2 x 0030160 Pad mounting.
2 x 0030180 Button.
1 x 0030500 *Cable clamp.

* 0010501 Crimp tool available separately.

Viamed Ltd.
15 Station Road, Cross Hills, Keighley,
WestYorkshire BD20 7DT, United Kingdom
Tel: +44 (0) 1535 634542 Fax: +44 (0) 1535 635582
E-mail: info@viamed.co.uk

Please contact Viamed if quantity packs of individual kit parts are required. Other original or ompatible components, connectors, glues & silicones etc. are available for Viamed, original and compatible probes.

Viamed Probe Repair Manual
Index

Viamed Extension Cables Repair Manual

z:\main\INDEX\SPOrepair 07 June 1999

Index

Setting up a Repair Department for SpO2 Probes

The repair function requires:

Procedure

- Each incoming probe requires cleaning and decontaminating to prevent cross infection This can be achieved using Alcohol wipes and anti-bacterial soaps etc. Facilities such as disposable gloves, and hand washing are essential. The cleaned probes should be bagged.
- The probe may also be contaminated inside and require the use of an Ultrasonic bath.
- Each probe usually has a serial number but some have batch or lot numbers only. It is therefore essential to ensure a fool proof system of logging in and traceability.
- Cross infection in Hospitals caused by probe repair will kill the exercise.

Clean Area

- A relatively clean area is required for repair. The complete repair is time consuming requiring re-gluing of components and re-potting of components.
- To be efficient more than one probe will always be in the process of repair. It is therefore essential that a system is used that completely separates individual repairs at all times.

Technicians

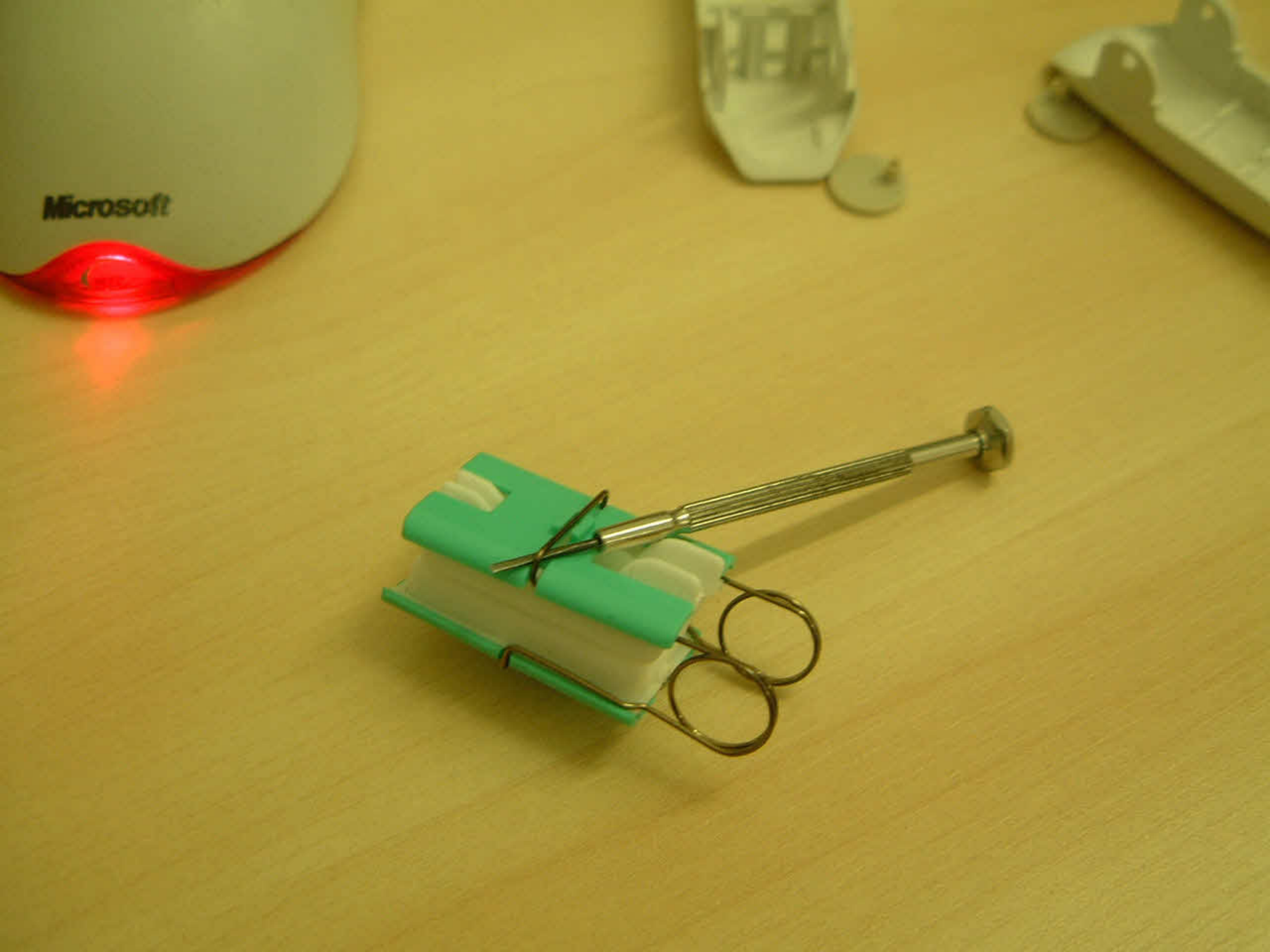
- The technicians do not need to be Electronic engineers but do need to be trained in probe repair and capable of ; soldering, using small electronic hand tools such as wire cutters , knives, jewelers screwdrivers, glue guns, and competent with adhesives.
- The re-assembly requires care and attention .

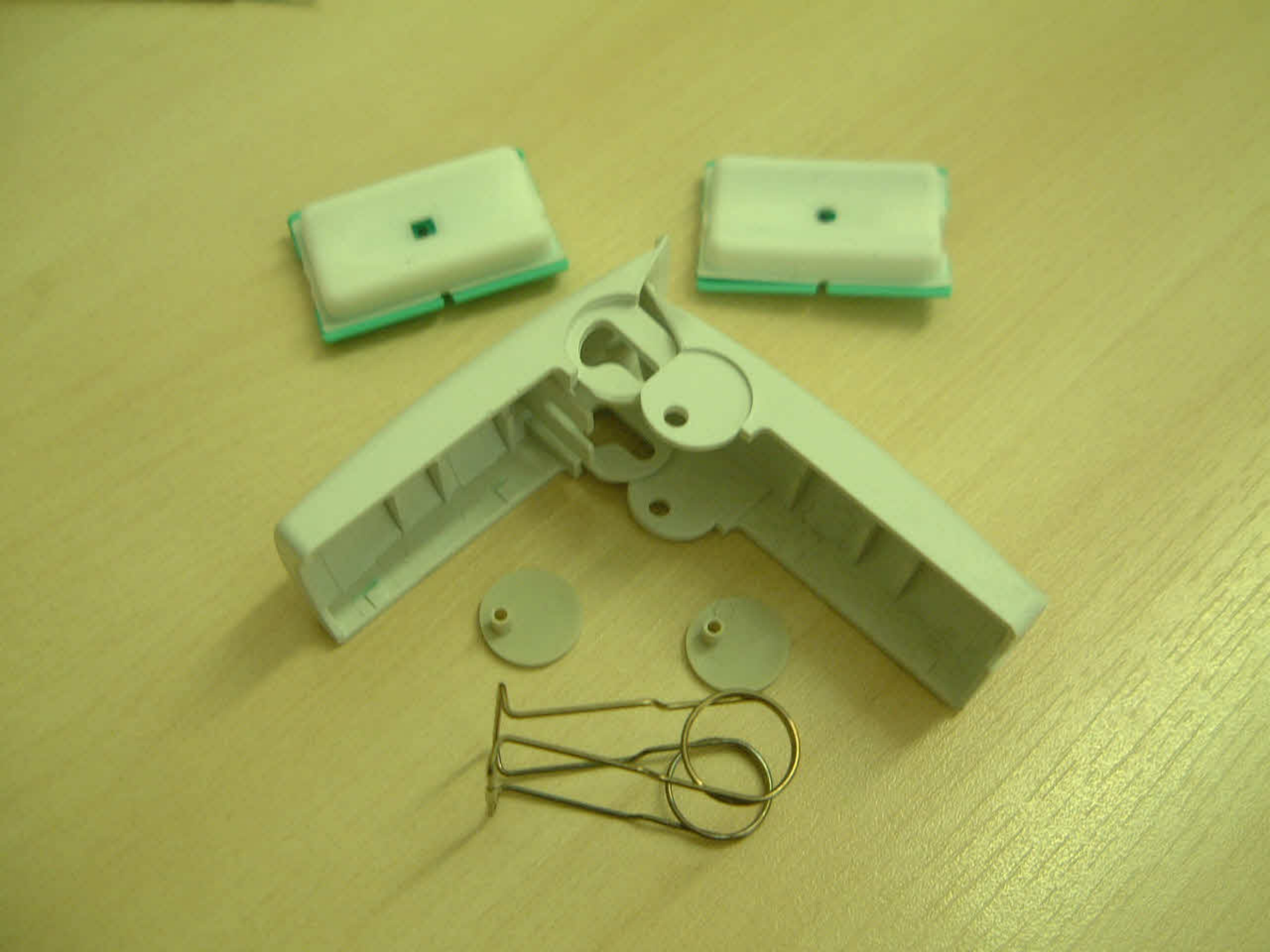
Test Equipment

- OEM Pulse Oximeters for each type of probe repaired is essential ato ensure the probe actually works.
- Many many macturers use Nellcor technology so a Nellcor SpO2 and interface cables can be used.. However a minimum of Nellcor : Ohmeda : Datex: Criticare: (CSI) Critikon: Physiocontrol :Minolta: Sensormedics: Kontron: Datascope: BCI: Novametrics: Simed: Nonin
- It is also important to have a simulator of some description. Nonin Fingers: Bio-Tek Index or our own DL3000 which are used in conjuntion with the original equipment.A curve tracer is also valuable in the checking of the Diodes.

Parts

- Parts including: Cable: Finger clip shells , strain relief etc have to held in reasonable quantities.


Microsoft



SpO2 Finger Probe Re-Cycle programme Yes / No

We are now seeing the introduction of EEC legislation regarding re-cycling of waste . Our service promotes re-cycling. We are now able to repair most probes although some moulded connectors are still problematical.

Our object is to re-cycle as much as possible of the existing finger probe . Where required new parts will be fitted. We do not replace the LED's or Detectors. Viamed is ISO9002/EN46002 certified and all repairs will be carried out in accordance with these procedures. Before despatch every re-cycled probe is tested electronically and on Pulse Oximeters. Six months warranty on all repairs. If we cannot repair a probe a service replacement will be offered at the repair price. All returned probes should be accompanied by a repair order for £80. If the probe is found to have no fault it will be cleaned and fully tested for a fixed charge of £20. VAT & Carriage to be added.

The probes should be decontaminated before they are returned to us in accordance with the official recomendations.

Please complete and return with your next probe repair order

If your probe/s is/are not repairable please advise us which of the following actions we should take

1) Supply an equivalent reconditioned

service replacement probe

2) Supply an equivalent new probe at 20 % discount off the current list price

3) Where no direct replacement is available from Viameds' range of probes you may wish to apply the above offers to another type of probe, if so, please state Viameds' part number if known or the origional manufacturers' name and part number.

4) Return the faulty probe and cancel the repair order
(Note: we may have had to dismantle the probe to investigate the fault and it is not economically feasible to reassemble it.)

5) Do the above answers apply just to this one shipment of probes or to all future shipments (until an updated form

is supplied by yourselves)