

BrailleNote Service Manual V2.12

June 2003

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3 Service Policy

3.1 Service Agreement

It is envisaged that anyone using this manual, or servicing BrailleNote products is familiar with, and bound by, the distributors agreement between Pulse Data and the Servicing Company. This agreement describes the required level of service, quality and responsiveness required to meet the market expectation. The document also describes the required reporting and warranty claim procedures.

It is strongly recommended that the Servicing Company be fully conversant with the Distributors Agreement before attempting to service any Pulse Data product.

3.2 About This Manual

The approach to servicing contained within this manual is for major component replacement rather than “board level” diagnosis.

This manual does not cover every single fault that could occur with the BrailleNote products. It is intended as an introduction to the technical operation of the BrailleNote’s as well as a brief introduction to the theory of operation and basic faults.

It is intended that this manual be utilized with Technotes, which are documents that address specific technical issues to do with the product as noted below.

3.3 Level of Servicing

BrailleNote Servicing should be restricted to:

- a) The replacement of modules
- b) The correction of mechanical faults in joints, connectors and wiring.

Circuit diagrams have not been included in this manual. Faultfinding and repair at the component level requires specialized equipment and knowledge and should not be attempted.

3.4 Technotes

Technotes are documents published by Pulse Data from time to time to address issues relating to changes to products. Technotes can cover fixes to bugs, product enhancements and notification of software upgrades.

Each Technote has a description of what has happened and the reasons for the change. The Technote will also contain instructions for field upgrades (if required). Copies of all Technotes as well as copies of Service Manuals are held on the Dealers section of the Pulse Data website (<http://www.pulsedata.com/csw>). There is also a mailing list, which will advise the publication of a new Technote. To subscribe to this list, please contact support@pulsedata.com.

3.5 Dealers Section of www.pulsedata.com

The Dealers section of the <http://www.pulsedata.com/csw> website is a restricted section requiring password access. Within this site can be found copies of spare parts lists, service manuals and Technotes as well as other dealer related information.

In order to be given access to this section of the website, please contact your local Pulse Data distributor.

4 Special Precautions and Handling Procedures

4.1 Electrical Safety Requirements

WARNING

265V d.c. voltage exists in parts of the BrailleNote product. Please ensure that all normal safety precautions are taken to avoid risk of electric shock.

Ensure that the BrailleNote is unplugged from the mains adaptor before removing the cover.

If the BrailleNote is to be operated with the cover removed, extreme caution must be used because of the voltages inside.

ALWAYS REMEMBER

All applicable regulations and standards of the country where the servicing is being performed must be complied with.

Always ensure that the BrailleNotes are checked for electrical safety before returning them to the customer, regardless of what servicing has been performed.

4.2 Electrostatic Handling Procedures

WARNING

All electronic assemblies within the BrailleNote products are electrostatic sensitive and can be damaged if not handled properly.

When handling the assemblies, always ensure a properly connected wrist or foot strap is used, and that workbenches are electrostatically protected (refer to Figure 1 for examples)

When transporting electronic assemblies, always ensure that they are packed in non-electrostatic packaging. Always ensure that the packaging will not flex PCB's or cause components to come under undue stress.

Failure to follow these procedures will void any warranty on the BrailleNote product or service spare parts.

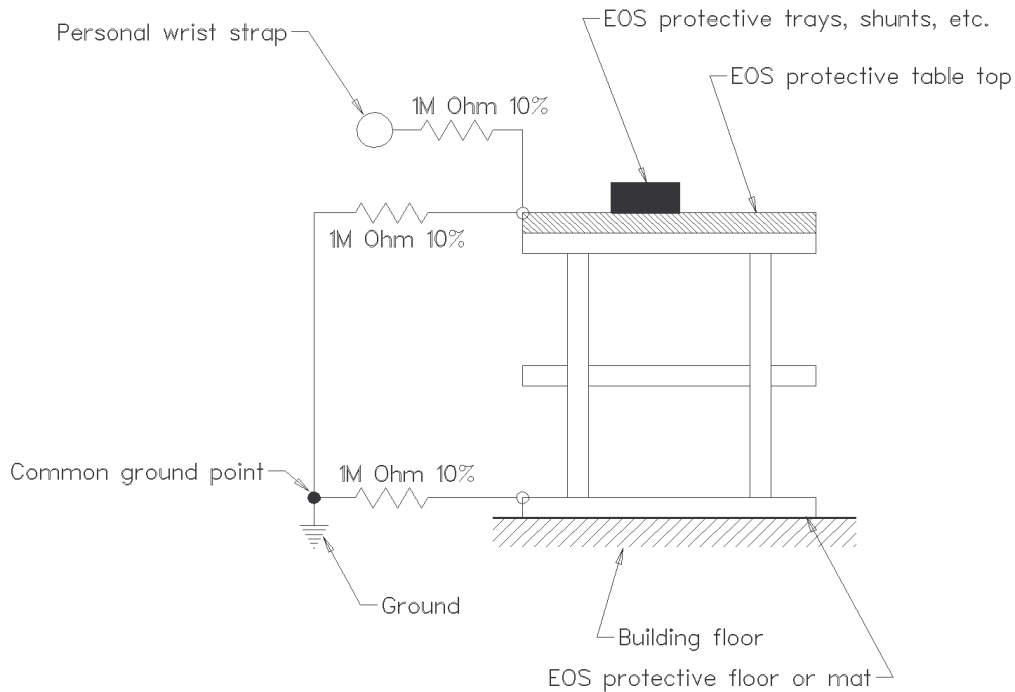


Figure 1 - Example Electrostatic Protected Work Station

4.3 Special handling precautions specific to the BrailleNote products

WARNING

Any time a power supply is used, make sure it is current limited appropriately. A maximum setting of 1.5A is recommended.

Do not disconnect the battery from the BrailleNote while the high voltage is still on. This could damage the Braille display. Always switch off the BrailleNote then wait 30 seconds. Check the voltage on the high volt test-point **TP32** is less than 1V before disconnecting the battery.

Do not disconnect the Braille display from the main board while the battery is connected to the PCB or the AC adaptor is connected to the PCB. Disconnecting the Braille display while the high voltage is on will, almost certainly, kill the display!

Switch-off the BrailleNote and check the voltage on the high volt test-point **TP32** is less than 1V. Then disconnect the battery before disconnecting the Braille display from the main PCB.

As a general procedure always measure the charging current on the units before opening the unit for repairs. Typical values with the unit switched off are, Quick charge 700ma, Top Off charge 90ma, Trickle charge 25ma.

Failure to follow these procedures will void any warranty on the BrailleNote product or service spare parts.

5 Identification of Parts

The following diagrams indicate the major parts of the BrailleNote products and their common names.

5.1 Braille Keyboard Key Identification



Figure 2 – Braille Key Identification

5.2 BrailleNote 32-Cell Braille Keyboard Case Top

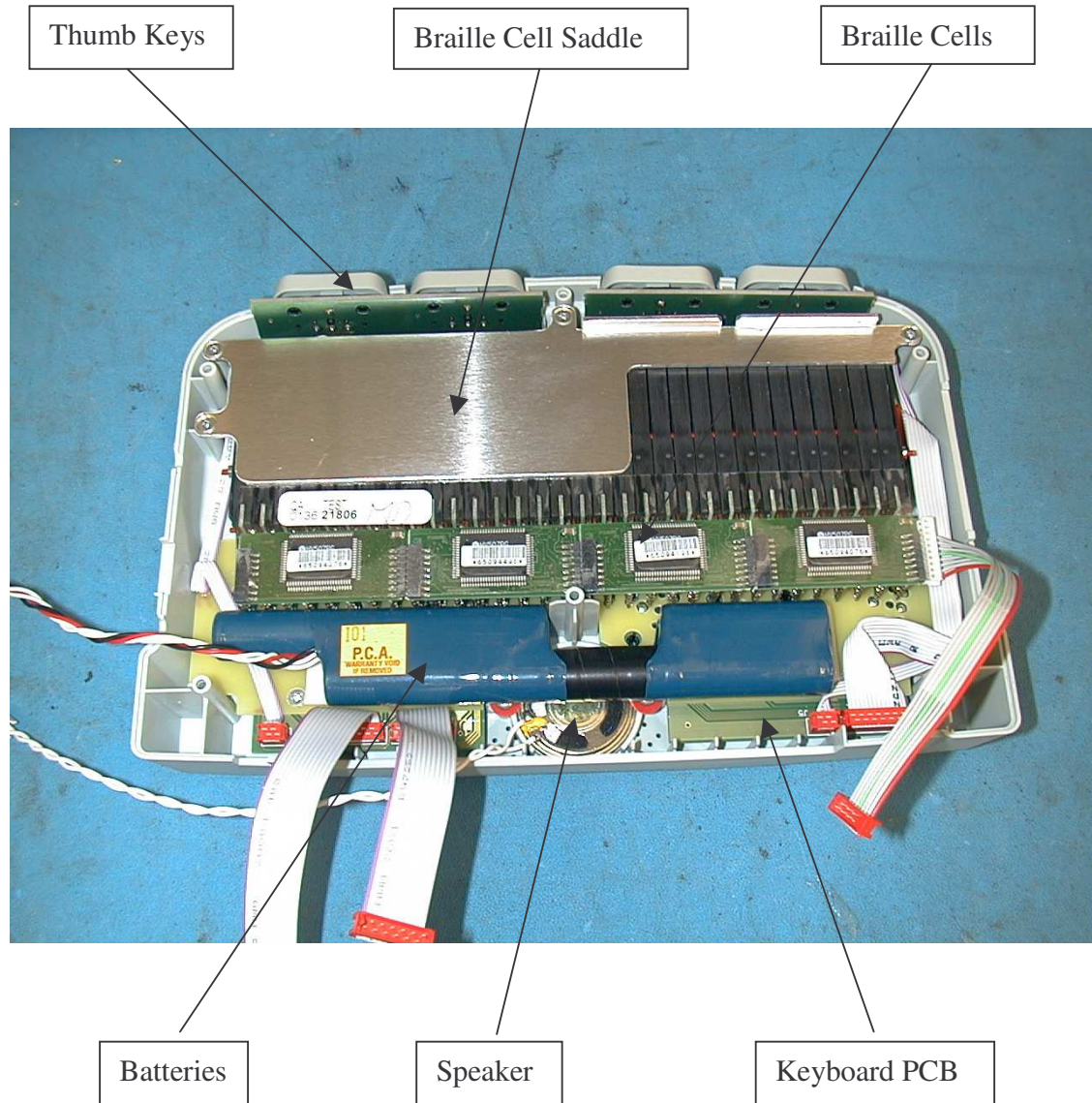


Figure 3 - BrailleNote 32 Cell Case Top

5.3 BrailleNote 32-Cell Qwerty Keyboard Case Top

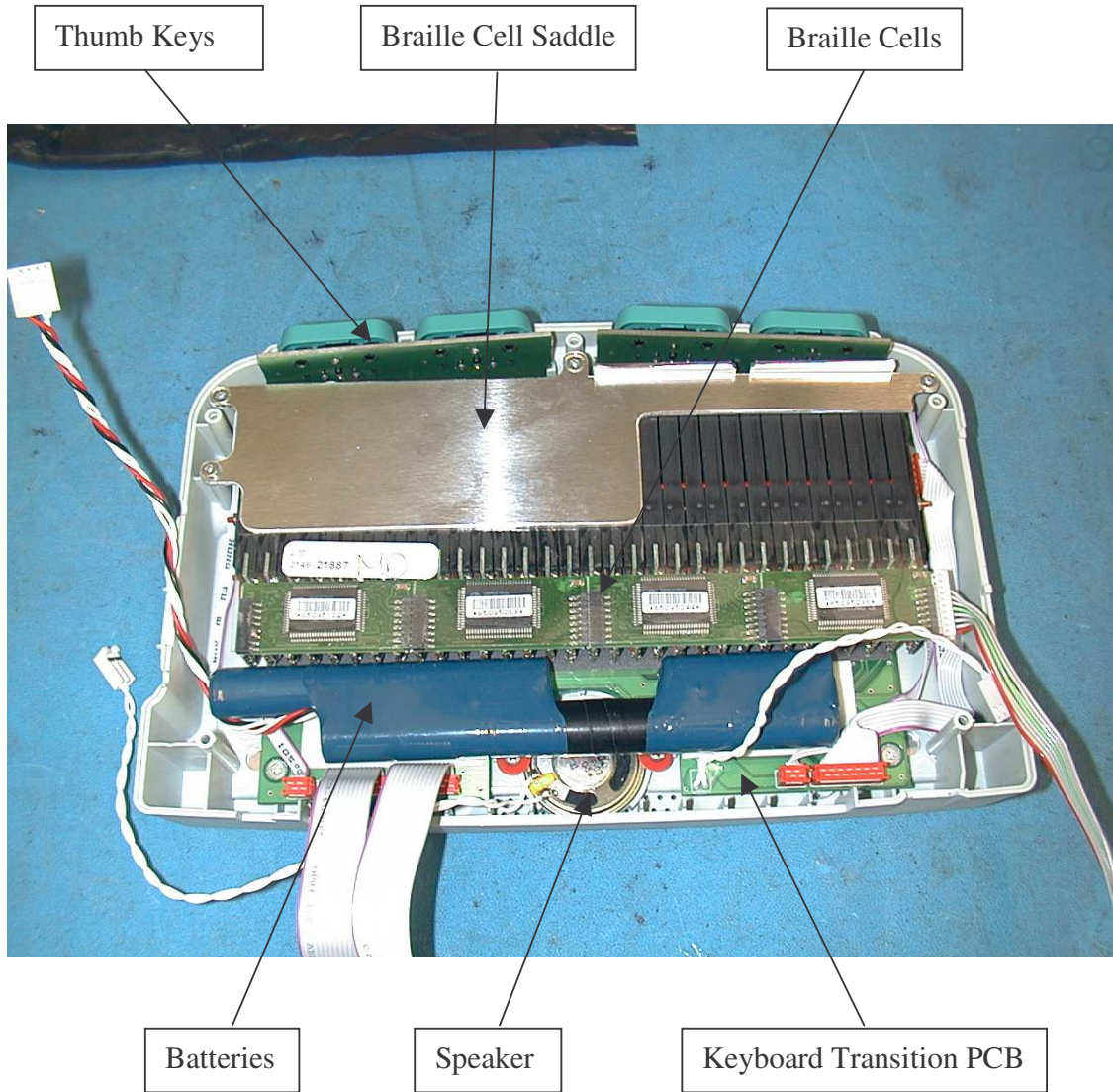


Figure 4 - BrailleNote 32 Qwerty Case Top

5.4 BrailleNote 18-Cell Braille Keyboard Case Top

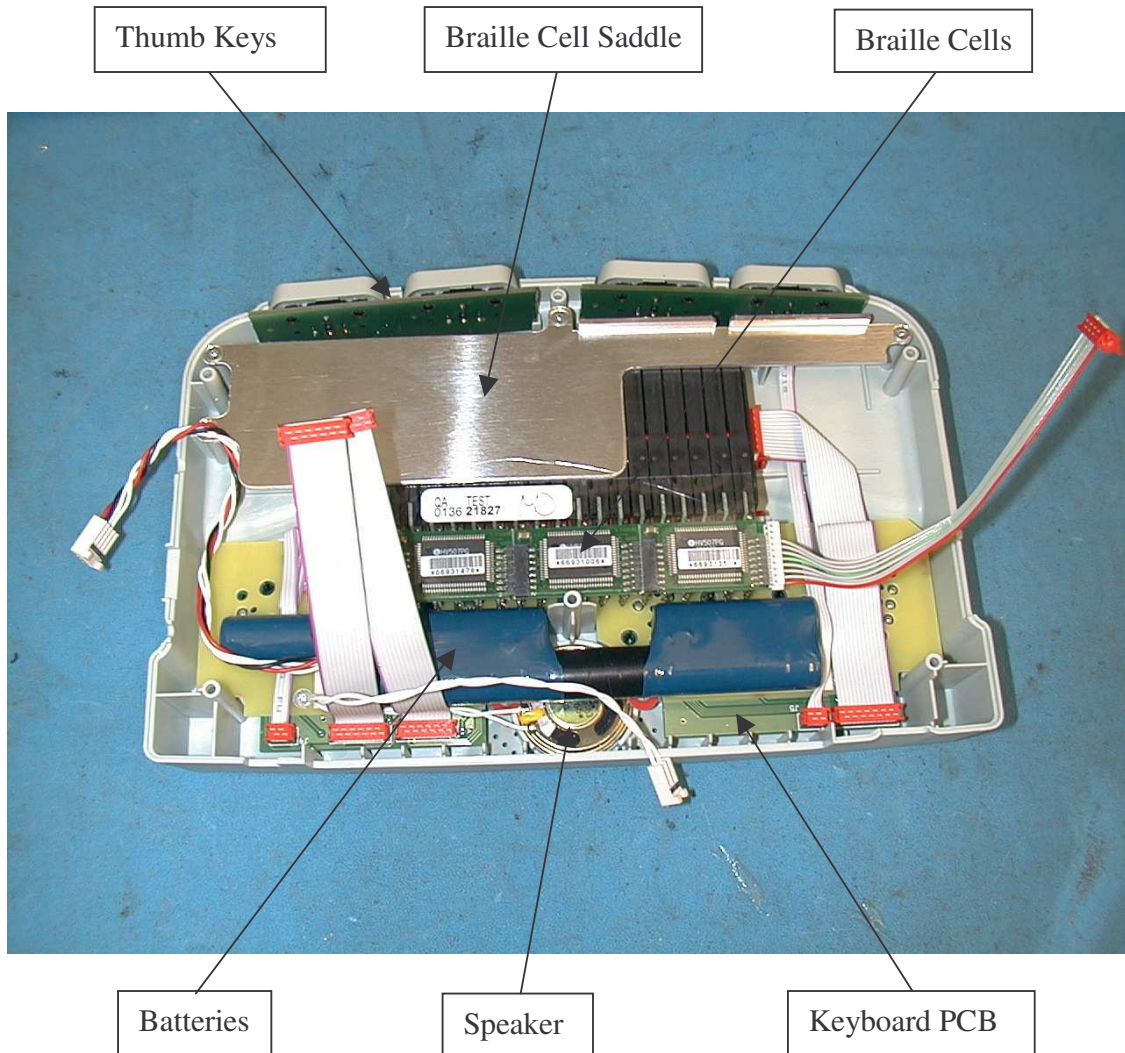


Figure 5 - BrailleNote 18 Cell Case Top

5.5 BrailleNote 18-cell Qwerty Keyboard Case Top

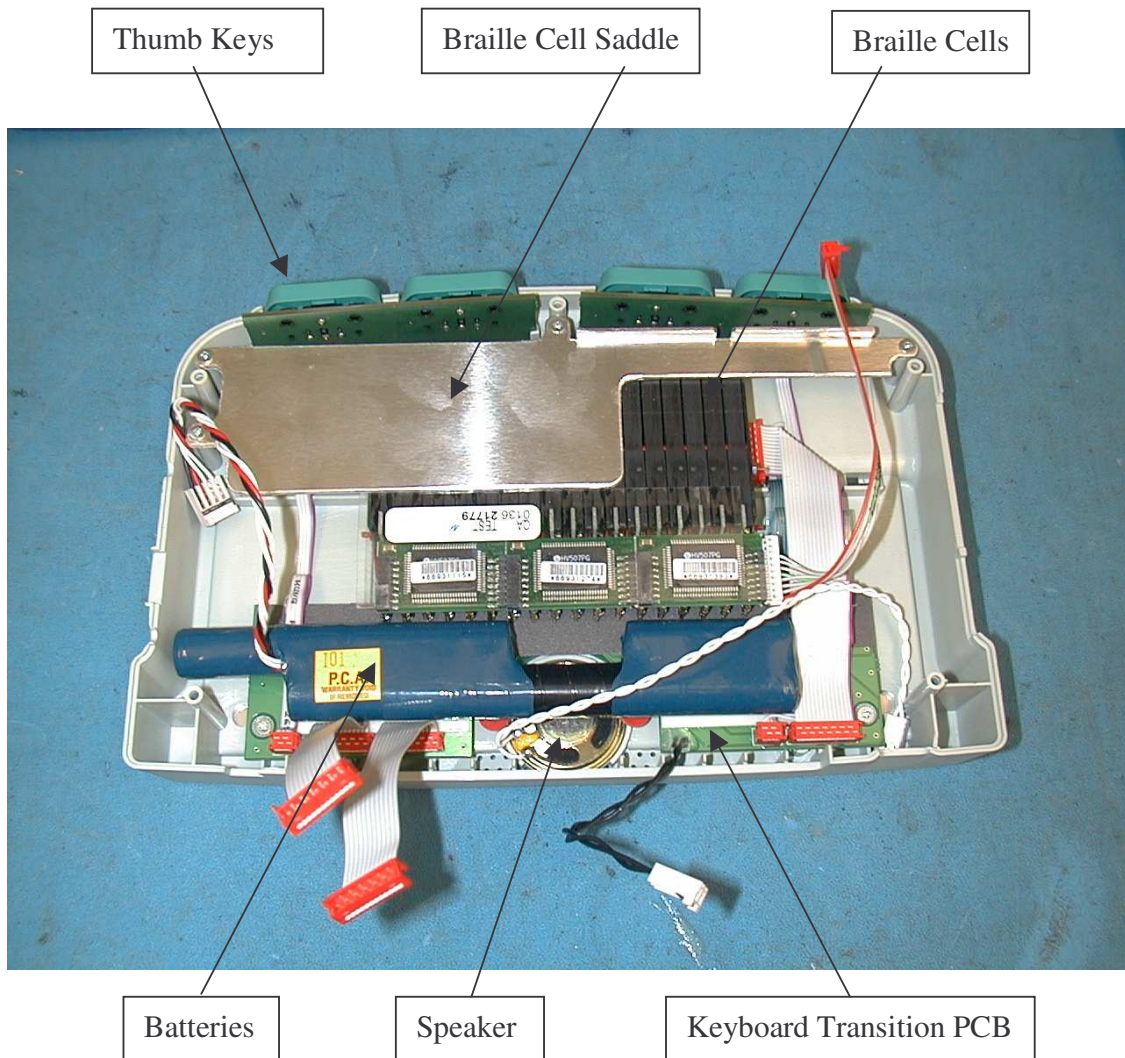


Figure 6 - BrailleNote 18 Cell Qwerty Case Top

5.6 VoiceNote Braille Keyboard Case Top

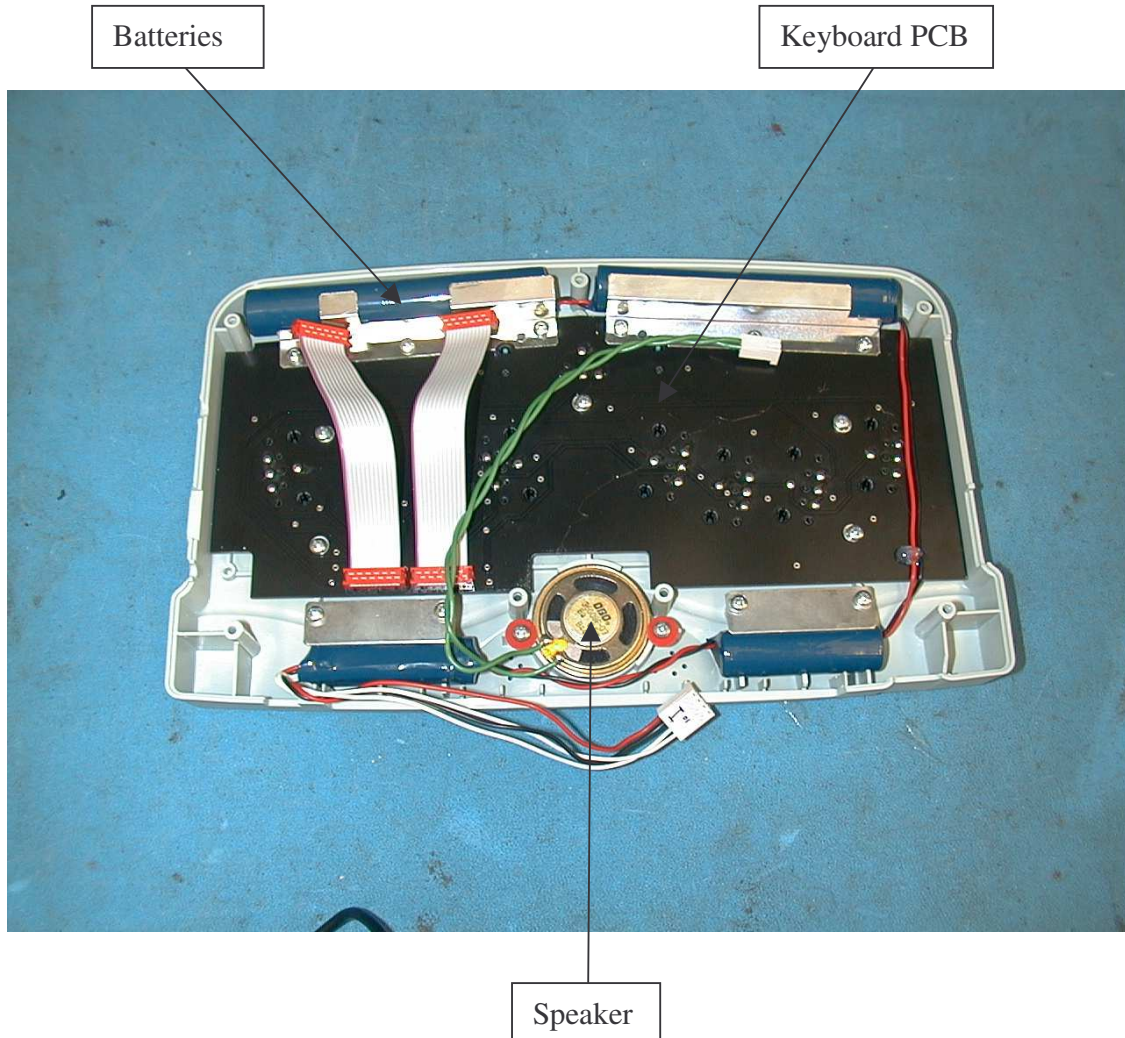


Figure 7 - VoiceNote Case Top

5.7 VoiceNote Qwerty Keyboard Case Top

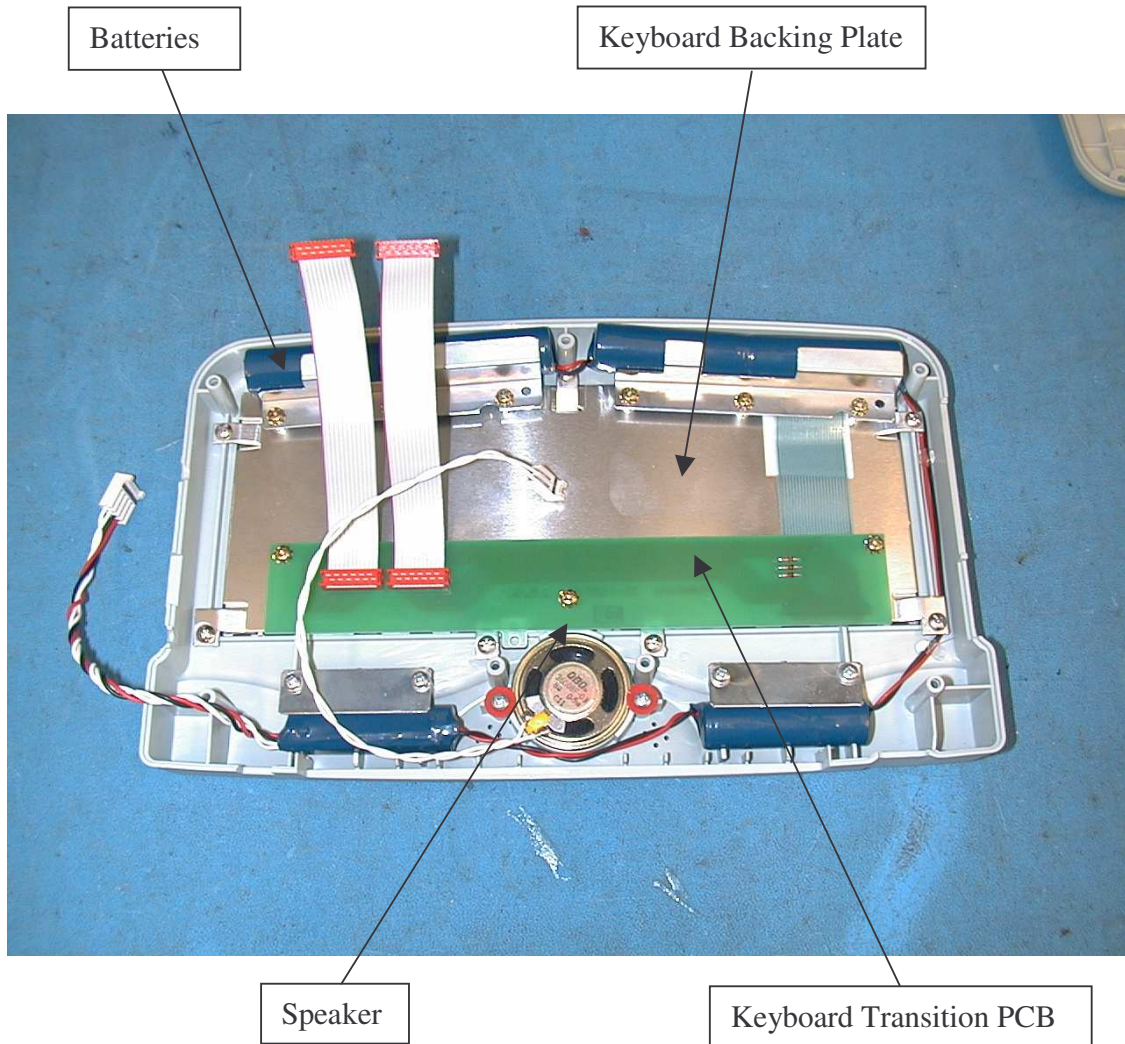


Figure 8 - VoiceNote Qwerty Case Top

6 Common Faults and Repair Procedures

6.1 Introduction

The following list of fault symptoms is given as much as to create an understanding of the operation of the BrailleNote units as it is to diagnose the “common” faults that can be found on BrailleNote products.

It is assumed that before any of the following remedies are tried, simple checks such as making sure all connections are secure are performed.

It is recommended that, where possible, the BrailleNote unit undergoing service is compared to a new “out of the box” unit. In this way, any operation can be verified against a new unit to see whether the behavior is normal.

Please note that the final quality checks noted at the end of this section must be performed after any servicing has taken place and before the unit is returned to the customer. This is to ensure that the unit performs well, is safe, and complies with the regulations applicable to the country where the BrailleNote is serviced.

6.1.1 Basic Repair Strategy and Use of This Manual

Each basic procedure in this manual has been written as a separate item. In order to be able to perform a successful repair, software upgrade or hardware upgrade, the basic repair process would be:

- 1) Back up the user’s data from the flash disk using the procedure of Section 6.3.1.
- 2) Perform the desired repair or upgrade by using the appropriate instructions. Where a repair is being performed, the instructions on opening the case and changing the appropriate parts must be followed.
- 3) Restore the user’s data from the flash disk by using the procedure of Section 6.3.2.
- 4) Perform the final checks and battery conditioning cycle as noted in the procedure of Section 7.

6.2 Specialist Tools Required for Servicing BrailleNote Products

Most tools required to service BrailleNote products should be commonly available through hardware or electronics outlets. However the following list indicates some of the tools that may not form part of a standard tool kit, or are worthy of special mention.

- **4mm Nutdriver or spanner.** Two of these nut drivers are required to disassemble Braille cells.

6.3 Backing up the user's data before repair

6.3.1 Procedure for backing up the user data from a BrailleNote before servicing commences

Note: While user files are by default saved to the Flash disk, a user could have files stored in the system disk area. User files in this area need to be backed up as they will be lost when the battery is disconnected.

There are several ways to back up the contents of the Flash disk.

1. Use the process as documented in the user manual, This allows a user to backup files to an ATA, CF or superdrive using the Utilities Backup/Restore commands
2. Copy contents of flash disk directly to PC via Active sync connection. This uses either the Serial or IR port of the Brailnote.

The second option assumes that the active sync software is installed on a suitable PC and is enabled for connecting via a Com port or IR Port.

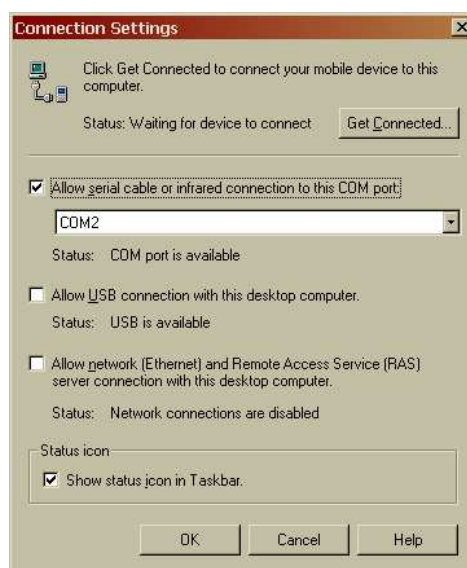


Figure 9 - Active Sync setting

On the Braillenote:

First select the method of connection – Serial or IR. Serial is default setting.

From Main Menu:

- Utilities - U (dots 1,3,6)
- Misc - M (dots 1,3,4)
- Space bar - speaks “Active Sync connection currently Serial or Infra-red”
- Press - S (dots 2,3,4) and Enter for Serial or
- I (dots 2,4) and Enter for Infra-red
- Exit (Space with E (dots 1,5)), or ESC to go back 1 menu level.

Either connect an Active sync cable between Braillenote and PC, or point the Braillenote at an IR device connected to PC

Press C (dots 1,4) to start Active sync connection on Braillenote.

On PC, the Active sync connection comes up



Figure 10 - Active Sync partnership

Select No and click on Next.

This displays the following window. One thing that needs to be done prior to copying files from the Braillenote is to turn off file conversion. This has to be done otherwise some files will not be copied, ie User Address book

Click on the Options icon, and then the conversion settings button and uncheck the convert files box



Figure 11 - Active Sync status

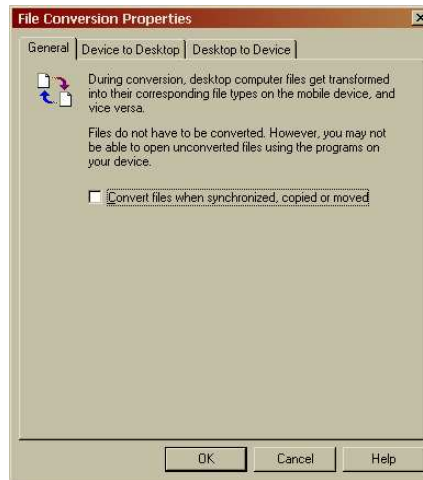
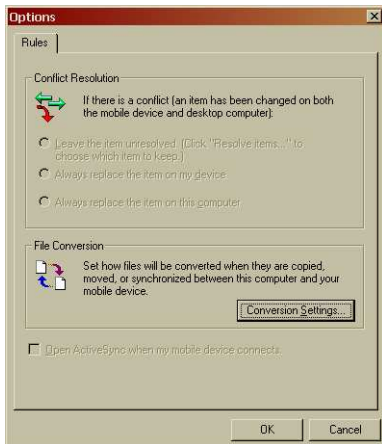


Figure 12 - File conversion

Click Ok, and Ok again.

From Windows Explorer select Mobile device and find the Flash disk, and any other user files on the Brailnote and drag them to a suitable storage location on the PC

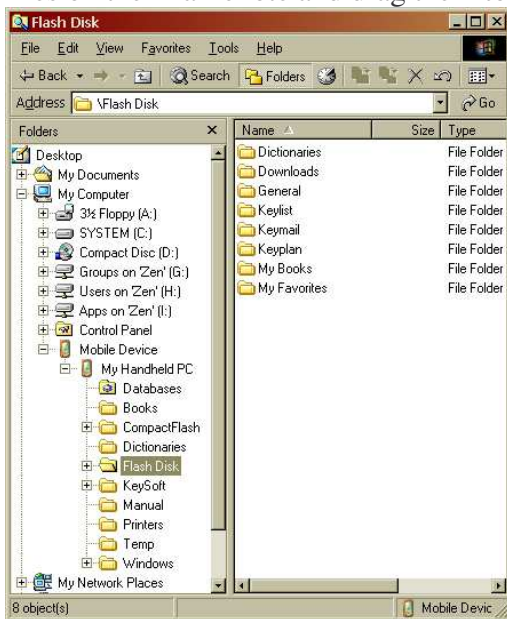


Figure 13 - Explorer View of Brailnote

6.3.2 Restoring user files onto a BrailleNote once servicing is complete

The method of restoring files depends on how the files were backed up. If the Utilities Backup / Restore option was used, then insert the Backup media and use the Restore option as described in the user manual.

If Active sync was used to transfer files to a PC, then activate ActiveSync on the PC as described in the previous section and connect to the Brailnote.

Note: Before beginning the copy process, ensure that the file conversion feature of ActiveSync on the PC is turned off. As described previously. Use Windows Explorer on the PC to select the directory where the user's files are stored.

Select all the user's files and folders, and drag them to the Flash Disk on the BrailleNote.

Note: Depending on which files the user has on their flash disk, you may be asked if you wish to copy over of a number of files. Answer NO to these questions.

Double check that all files and folders have been correctly copied from the PC to the Flash Disk.

6.4 BrailleNote Disassembly

6.4.1 Opening a BrailleNote Unit

- Make sure the unit is turned-off i.e. the power switch is in off position (portion of switch nearest back pushed in). Also ensure that the d.c. power adaptor is not plugged into the BrailleNote unit.
- Lay the unit upside down as shown in Figure 9. Remove the two rear rubber feet and remove the six screws that hold the case together.
- Hold the unit together and place it face-up with the thumb-keys facing you.
- Lift the upper half and place it face down as shown in the Figure 10. Ensure that care is taken not to strain the cables and connectors.
- If you are replacing any component(s) the battery connector has to be removed. Follow the procedure given in the next section before removing the battery connector.



⋮
Figure 14 - Underside of a BrailleNote



Figure 15 - An Open Braillenote

6.4.2 Disconnecting the Battery

- Before removing the battery connector check the voltage on test-point TP32. See Figure 16 for the location of TP32. If the voltage on TP32 is greater than 1V then wait for the voltage to discharge to less than 1V before proceeding.
Note: On the Rev H PCB's, measure the voltage on J6 pin 1 (top right corner of J6)
- If voltage on TP32 is less than 1V you may disconnect the battery from connector J8.

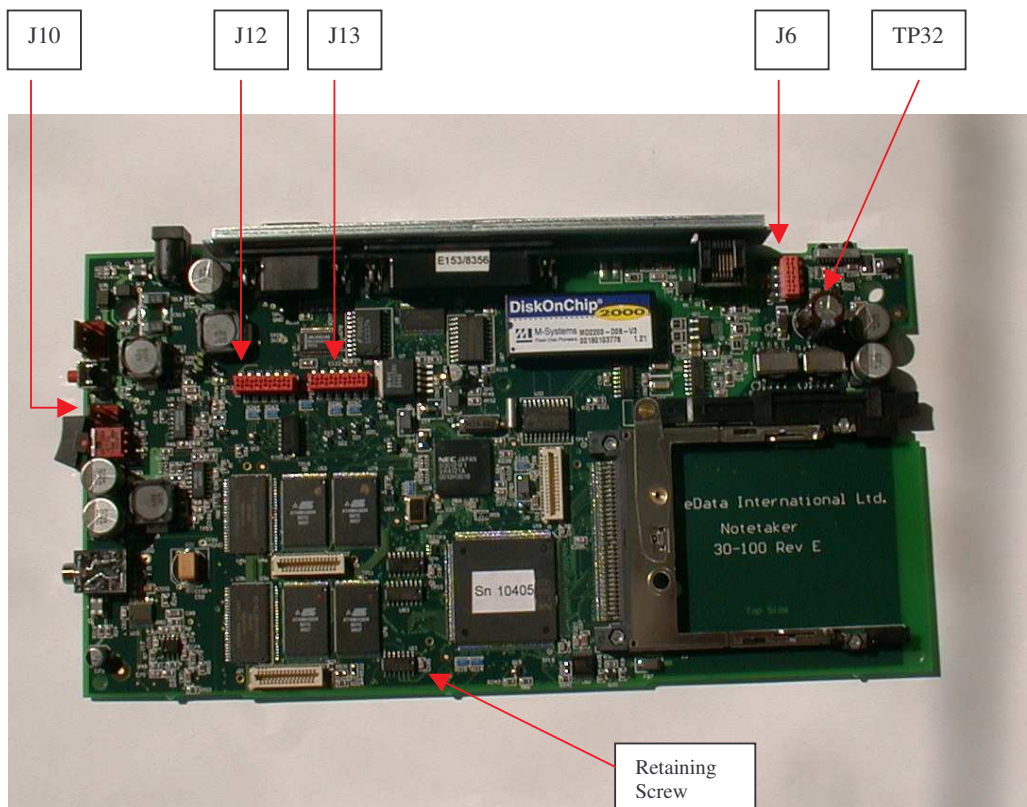


Figure 16 - BrailleNote Rev E Motherboard

6.4.3 Disconnecting Upper and Lower Halves

- Unplug the keyboard connectors from **J12** and **J13**. See Figure 16 for location of **J12** and **J13**.
- Unplug the speaker connector from **J10**. See Figure 16 for location of **J10**.

Unplug the 8-way Braille display connector from **J6**. See Figure 16 for location of **J6**

6.5 Assembling a BrailleNote

- Place the bottom case section, containing the PCB, on the table with the connectors orientated away from you.
- Stand the top of the unit on its back with the thumbkeys pointing to the top. Position the top so that it is just behind the bottom case section.
- Connect the cables between upper and lower halves
- Connect the keyboard connectors on J12 and J13 as shown in Figure 16
- Connect the speaker connector on J10 as shown in Figure 16
- Connect the Braille display 8-way connector on J6 as shown in Figure 16
- Connect the battery supply connector on J8 as shown in Figure 16
- Assembling the upper and lower halves
- Swing bottom of unit up to mate with upper half.
- Make sure cables are not pinched in case and are clear of internal mounting pillars.
- Make sure that the case halves mate cleanly.
- Replace the 6 screws on the under-side.
- Replace the two rear feet.

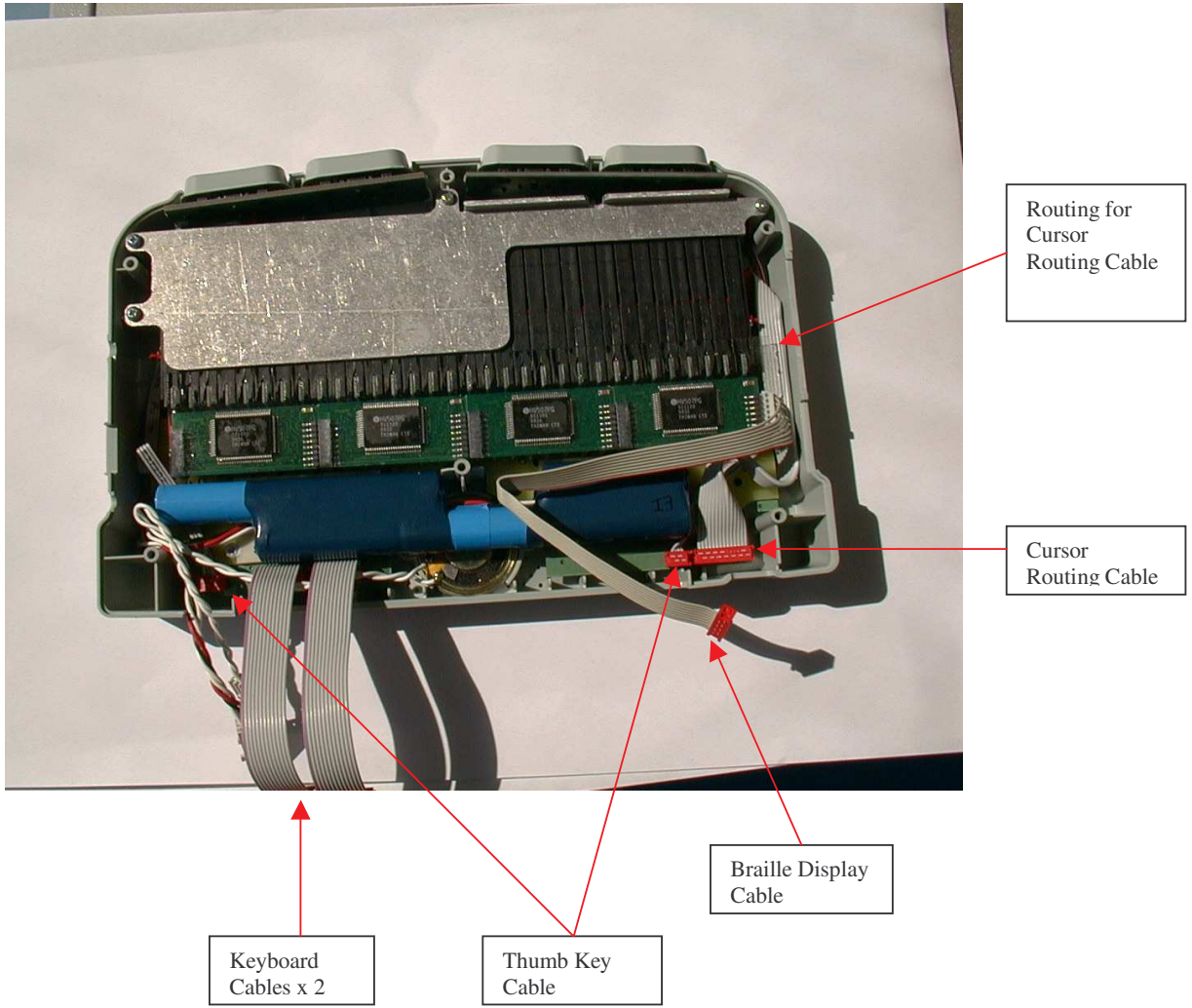


Figure 17 - Identification of internal parts in a case top

6.6 Repair Procedures

6.6.1 Replacing The Main PCB

- Open the BrailleNote as described in Section 6.4.1.
- Disconnect the battery as described in Section 6.4.2.
- Disconnect the upper-half from the lower half. See Section 6.4.3.
- Remove the screw on the main PCB.
- Make sure the PCMCIA eject plunger is pushed well inside and is not getting caught in the case.
- Lift the PCB out of the lower case by holding the rear bracket on the end away from the PCMCIA card.
- Remove the Disk-on-Chip. See Section 6.6.10
- Place the DOC on the new PCB.
- Fit the new PCB on the bottom base by gently pushing the bracket into the groove in the bottom case and making sure the PCMCIA eject plunger is in the slot in the bottom case.
- Replace the retaining screw.
- Assemble the BrailleNote. See Section 6.5.

6.6.2 Replacing a Braille Display Unit

- Open the BrailleNote as described in Section 6.4.1
- Disconnect the battery as described in Section 6.4.2.
- Disconnect the upper-half from the lower half. As described in Section 6.4.3.
- Disconnect the cursor router cable. See Figure 17 for location of the cursor router connector.
- Remove the 4 screws on the plate holding the Braille Display.
- Now the display can be lifted out from the unit.
- Make sure the cursor router keys are placed on the Braille display you are putting in the BrailleNote.
- Make sure the Braille display has the 8-way cable connected to it with the correct orientation.
- Place the assembled Braille display in the case top.
- Place the plate to hold the Braille display and replace the 4 screws to anchor the Braille display in the top half.
- Connect the cursor router connector. See Figure 17 for location of the cursor router cable.
- Assemble the BrailleNote. See Section 6.5

6.6.3 Replace individual cells on Braille Display

- Remove the display from case using the method described in the first 6 steps of section 6.6.2.
- Remove plastic insulation strip from rear of display

Starting at end of display closest to faulty cell:

- Using nutdrivers, remove nuts from the 3 retaining rods
- Remove end blanking plate
- On rear of display, remove backplane pcb(s) so that all cells from end to faulty cell are disconnected.
- On front of display remove long keycaps from end cell through to faulty cell. These just lift off.
Note: At this point do NOT turn the display over, as all the pins will fall out.
- Slide the cells off the retaining rods and remove faulty cell. It may be necessary to lift the cursor strip to provide clearance while sliding the cells off.
- Fit new cell and refit all cells back onto the retaining rods.
- On the replacement cell, remove the short key cap and fit it onto the faulty cell.
- Replace long keycaps onto all cells, ensuring that the cursor strip and rubber key strip are seated correctly under caps.
- Turn display over and refit backplanes, ensuring they are firmly seated.
Note: One Backplane segment has a short across terminals 3 and 4. This segment must be at the opposite end to the cable connector.
- Refit the end blanking plate and fasten the three nuts onto the retaining rods. Do not over tighten the retaining rods – The Backplane provides the correct spacing so the nuts should only be done up so that the cells are parallel to each other.
- Each nut should then have thread lock applied to stop them coming undone.
- Replace plastic insulation strip on rear of display, over the backplane

- Refit display as per the 7th to 12th instructions in section 6.6.2.

6.6.4 Replacing the Speaker

- Open the BrailleNote as described in Section 6.4.1.
- Disconnect the battery as described in Section 6.4.2
- Disconnect the upper-half from the lower half. See Section 6.4.3.
- Dismount the Braille display. See Section 6.6.2.
- Dismount the keyboard and the batteries as described in Section 6.6.5.
- Remove the 2 screws holding the speaker.
- Lift off the speaker from the case.
- Place the speaker with correct orientation. See Figure 3 for the correct orientation of the speaker.
- Replace the two speaker retaining screws.
- Mount the keyboard and the batteries. See Section 6.6.5
- Mount the Braille display. See Section 6.6.2.
- Assemble the BrailleNote. See Section 6.5.

6.6.5 Replacing The Keyboard

- Open the BrailleNote as described in Section 6.4.1.
- Disconnect the battery as described in Section 6.4.2.
- Disconnect the upper-half from the lower half. See Section 6.4.3
- Dismount the Braille display. See Section 6.5.2
- Detach the 2 thumb-key connectors. See Figure 11 for location of the thumb-key connectors.
- Remove the 5 screws holding the battery and the keyboard.
- Lift off the keyboard from the case.
- Place the keyboard mounted with the key caps in the keyboard slots
- Replace the 5 screws holding the battery and the keyboard.
- Mount the Braille display. See Section 6.6.2.
- Connect the thumb-key connectors. See Figure 11 for location of the thumb-key connectors.
- Assemble the BrailleNote. See Section 6.5.

6.6.6 Replacing the thumb-keys

- Open the BrailleNote as described in Section 6.4.1
- Disconnect the battery as described in Section 6.4.2
- Disconnect the upper-half from the lower half. See Section 6.4.3.
- Detach the thumb-key connectors. See Figure 17 for location of the thumb-key connectors.
- Lift off the thumb-keys from the case.
- Place the thumb-key PCB assembly in the top case half.
- Check orientation of thumb-key board. Refer to Figure 17 for correct orientation.
- Route the thumb-key cable as shown in Figure 17
- Attach the thumb-key connectors. See Figure 17 for location of the thumb-key connectors.
- Assemble the BrailleNote. See Section 6.5.

6.6.7 Replacing The Keycaps

- Open the BrailleNote as described in Section 6.4.1.
- Disconnect the battery as described in Section 6.4.2.
- Disconnect the upper-half from the lower half. See Section 6.4.3.
- If the keycaps are on the thumb-key remove the thumb-keys. See Section 6.6.6.
- If the keycaps are on keyboard remove the keyboard. See Section 6.6.5.
- Hold the keycap firmly and pull the keycap up.
- On the new keycap, make sure the torsion bar goes onto the slots of the keycap.
- Push down the keycap on the key-switch on the keyboard/thumb-key for it to lock into place.
- Check operation of key-switch. Press keycap at each end and make sure cap goes down in a parallel way. If torsion bar is not positioned correctly, cap will tend to go down on end that is pressed, but remain up at other end.
- Mount the keyboard and reassemble the BrailleNote as described in Sections 6.6.5 and 6.5.

6.6.8 Replacing The Batteries

- Open the BrailleNote as described in Section 6.4.1.
- Disconnect the battery as described in Section 6.4.2.
- Disconnect the upper-half from the lower half. See Section 6.4.3.
- Dismount the Braille display. See Section 6.6.2.
- Detach the 2 thumb-key cables.
- Remove the 5 screws holding the mounting PCB attached to the battery
- Lift off the plate along with the batteries from the case.
- Place the new battery complete with mounting PCB on the keyboard PCB. See Figure 11 for battery orientation
- Replace the 5 screws holding the battery and the keyboard.
- Mount the Braille display. See Section 6.6.2.
- Route the thumb-key cable as shown in Figure 17.
- Attach the thumb-key connectors. See Figure 17 for location of the thumb-key connectors.
- Assemble the BrailleNote. See Section 6.5.

6.6.9 Replacing the Cursor Router

- Open the BrailleNote as described in Section 6.4.1.
- Disconnect the battery as described in Section 6.4.2.
- Disconnect the upper-half from the lower half. See Section 6.4.3.
- Dismount the Braille display. See Section 6.6.3.
- Using a flat blade screwdriver, very carefully remove the caps on the Braille display. Lift up the edge closest to the touch cursor
- Lift off the cursor routing PCB strip with its cable
- Position the new cursor mounting PCB strip
- Align the rubber strip on the cursor router keys and replace the plastic caps.
- Mount the Braille display. See Section 6.6.2.
- Assemble the BrailleNote. See Section 6.5.

6.6.10 Replacing the DOC

- Open the BrailleNote as described in Section 6.3.1
- Make sure the battery is disconnected. See Section 6.4.2.
- Remove the DOC with the special chip-removing tool
- Place the new DOC in the right orientation
- Assemble the lower and the upper halves. See Section 6.5.

6.6.11 Replacing / Cleaning the Braille pins

- Dismount the Braille display. See Section 6.6.2.
- Very carefully remove the plastic caps on the Braille display.
- Remove the cursor routing strip along with the rubber strip(s).
- Pick up the cell(s) needing replacing /cleaning.
- Place the new / cleaned cells.
- Place the cursor router strip.
- Align the rubber strip on the cursor router keys and place the plastic caps.
- Mount the Braille display. See Section 6.6.2.
- Assemble the BrailleNote as per Section 6.5.

6.6.12 Unit does not start / Unit not responding

- If the BrailleNote is not responding there are a number of things listed below that you should check.
- Make sure that the Braille display and/or the speech is on.
- Make sure the unit has power and the batteries are being charged.
- Connect the AC adaptor. If the unit is in hibernate due to low battery voltage then it will respond with message “AC adaptor on”.
- If there is no response after the AC adaptor has been plugged in then toggle the power switch and press the reset switch. The unit should beep immediately. After about 10 seconds, a chime sound should be heard and the BrailleNote should speak.
- If Keysoft does not start, the BrailleNote’s memory may have been corrupted and needs to be re-initialized by a “Hard Reset”. Hold down dots 4,5,6 down and press the reset switch. The unit should beep immediately. Continue to hold down dots 4,5,6 until the BrailleNote starts to speak.
- Check the reset switch is not getting stuck. Follow instructions in the section Reset switch not responding / working.
- Check the power switch is not getting stuck. Follow instructions in the section Power switch not responding / working.
- Check the current the battery takes while charging. See Section 6.6.23.
- Test the PCB. See Section 6.6.25.
- If PCB is not working then follow the instructions given in Section 6.6.26.
- If the PCB is working then test the batteries.
- If batteries are faulty replace the batteries.
- If batteries are OK check the Braille display.

6.6.13 Short Battery Life

- Check the charging current. See Section 6.6.23 for the charging currents.
- If the unit draws a larger current then open the unit. Test the PCB. See 6.6.25.
- If PCB is not working then follow the instructions given in Section 6.6.26.
- If the PCB is working then check the batteries.
- If battery is faulty replace the batteries.
- If batteries are OK check the Braille display.

6.6.14 Headphones Not Working

- Test the unit with a different headphone set.
- If the problem is not with the headphone set then open the unit. Test the PCB. See Section 6.6.25.
- If the PCB is not working then follow the instructions given in the Section 6.6.26.

6.6.15 Braille cells not working / malfunctioning

- If the Braille display is not operating check that the Braille display is enabled. The Braille display can be enabled / disabled by pressing the right most thumb-key with the space bar.
- If some pins on the Braille display are getting stuck then the Braille pins may need cleaning / replacing. Follow instructions given in Section 6.6.11.
- If the Braille display is not operating, open the unit. See section (Opening the BrailleNote) and test the PCB. See Section 6.6.25.
- If the PCB is not working then follow the instructions given in Section 6.6.26.
- Check the Braille display.
- If the Braille display 8-way cable not working then replace this cable.
- If Braille display is not working then replace the Braille display.

- If the PCB is working check the Braille display and the 8-way cable used to connect it to the PCB.

6.6.16 Keys not recognized / malfunctioning

- Open the unit. See section 6.4.1.
- Check the keyboard connectors on J12 and J13 are properly connected.
- Confirm the problem is with the keyboard and not with the unit itself.
- Disconnect the cursor router cable. See Figure 17 for location of the cursor router cable.
- Check the working of the keys with the cursor router disconnected.
- If the keys work without the cursor route but do not work with the cursor router connected then replace the cursor router by following instructions in the Section 6.6.9.

6.6.17 Cursor routing keys not working / malfunctioning

- Make sure the problem is with the cursor router and not with the unit itself.
- Replace the cursor router by following instructions in Section 6.6.9.

6.6.18 Reset switch not recognized / working

If the problem is with the unit not responding follow instructions in Section 6.6.12.

If the reset switch is mechanically damaged, replace the reset switch.

Check that the reset switch is not getting stuck.

6.6.19 Power switch not working

If the problem is with the unit not responding follow instructions in the Section 6.6.12.

If the power switch is mechanically damaged, replace the power switch.

If the power switch is being obstructed by the case then make sure the unit is assembled properly.

6.6.20 IR not working

- Make sure the IR is enabled and configured for the being communicated with.
- Make sure the IR window in the BrailleNote is clear.
- Make sure the IR device being communicated with is within 5 m of the BrailleNote and there is nothing obstructing the IR ports of both devices.
- If possible test the IR device you are communicating with using another device (e.g. using a working BrailleNote) to ensure that the test device is working.
- If the problem appears to be in the BrailleNote then test the PCB. See Section 6.6.25.
- If the PCB is not working then follow the instructions given in the Section 6.6.26.

6.6.21 Parallel port not working

- Make sure the parallel port is enabled and configured properly.
- If possible test the device you are communicating with using another device (e.g. using a working BrailleNote) to ensure that the test device is working.
- If the problem appears to be in the BrailleNote then test the PCB. See Section 6.6.25.
- If the PCB is not working then follow the instructions given in the Section 6.6.26.

6.6.22 Flash (DOC) not seen

- Confirm that the problem is with the DOC and not with the unit.
- If problem with the DOC, replace the DOC.
- If DOC is good then test the PCB. See 6.6.25.
- If the PCB is not working then follow the instructions given in the Section 6.6.26.

6.6.23 Checking the Charging Current

- Connect the AC adaptor through a current meter and measure the charging current on the BrailleNote.
- The fast charge current is about 700 mA and the trickle current is about 90 mA with the power switch turned-off. The pulse-trickle charge current is about 25 mA with the power switch turned off. Pulse trickle charge is used to compensate for self-discharge of the battery while idle in charger.
- If the discrepancy in the charging currents is more than 30mA from the expected value then follow the instructions given in Section 6.6.25.

6.6.24 Checking the Voltages

- Make sure the Braille and the Audio are enabled
- Open the BrailleNote. See Section 6.4.1.
- Switch on the power switch
- Measure the voltage at TP28. It should be between 3.25 V 3.35V
- Measure the voltage at Pin 7 on J6 (Braille display voltage). It should be between 5V and 5.5 V
- Measure the voltage at TP29. It should be between 5V and 5.4 V. This voltage is seen only when the unit is not in hibernate
- Measure the high voltage at TP 32. The voltage should be between 265V d.c and 275V d.c.

6.6.25 Testing the Working of the PCB

IMPORTANT

These tests are to be undertaken by qualified personnel who have undergone training for testing the BrailleNote PCBs.

Remove the PCB from the BrailleNote (see Section 6.6.1) and perform the following tests:

- Short circuit check. (a) between all power supplies and (b) between all power supplies and ground. The resistance between these should be greater than 1K ohm. Test points are on the topside. See Fig 2 for location of these test points.

TP25 (GND) -- TP29 (5V0)
TP25 (GND) – TP28 (3V3)
TP25 (GND) – TP27 (2V5)
TP25 (GND) – TP13 (VBAT)
TP29 (5V0) --TP28 (3V3)
TP29 (5V0) --TP27 (2V5)
TP29 (5V0) --TP13 (VBAT)
TP28 (3V3) --TP27 (2V5)
TP28 (3V3) --TP13 (VBAT)
TP27 (2V5) --TP13 (VBAT)

Test the following voltages:

- Connect current limited (350mA) power supply at 7.2 V, through a current meter, to the battery connector on the PCB.
- Toggle the power switch.
- Measure the voltage at TP28. It should be between 3.25 V 3.35V.
- Measure the voltage at Pin 7 on J6 (Braille display voltage). It should be between 5V and 5.5 V.
- Measure the voltage at TP29. It should be between 5V and 5.4 V. This voltage is seen only when the unit is not in hibernate.

Test the following currents:

- Connect current limited (350mA) power supply at 7.2 V through a current meter to the battery connector on the PCB.
- Toggle the power switch. There should be an audible beep and the normal audio start-up message.
- Measure the standby current. The current should be less than 35mA.
- Measure the hibernate current by switching off the power switch. The hibernate current should be less than 4 mA.

6.6.26 PCB Faults

- If a short is seen between any of the power supplies or between any of the power supplies and the ground then replace the PCB.
- If the voltages measured are not within the expected range then replace the PCB.
- If the current drawn by the PCB is not within the expected current range then replace the PCB.
- If the fault is confirmed to be on the PCB but none of the above problems is seen, the fault could be due to a malfunctioning IC on the PCB. Replace the PCB.

7 Final Quality Checks After Repair

IMPORTANT

It is imperative that any technician servicing the BrailleNote product is conversant with all requirements and standards that are required to be complied with according to the regulations of the country where the servicing takes place.

No reference is made to any particular regulation or standard within this manual due to the differing regulations in all of the countries where the BrailleNote product is sold.

The following procedure is to be followed as a final quality check before returning any serviced BrailleNote to the customer. Pulse Data recommends that a different technician to the one who serviced the unit, where possible, perform these checks.

7.1 Battery capacity and charger tests:

The battery capacity is very crucial to the usability of the BrailleNote and therefore must be meticulously checked.

If the battery was disconnected or runs down totally flat, any previous learnt capacity is lost.

On reconnecting the batteries, the LMD will read 33,792 (the default value). The NAC value will be zero irrespective of the charge on the battery. The battery capacity reported is the NAC as a percentage of the LMD (i.e. $100 * \text{NAC} / \text{LMD}$).

At this point the low battery messages will be issued even though the battery is fully charged.

Connect the battery charger while checking the current it takes.

The fast charge current is about 700 mA and the trickle current is about 90 mA with the power switch turned-off. The pulse-trickle charge current is about 25 mA with the power switch turned off. Pulse trickle charge is used to compensate for self-discharge of the battery while idle in charger.

For a deeply discharged unit, fast charge will not commence until battery voltage reaches at least 5.1 V. Up until this voltage is reached the battery will be charged in Pulse-trickle mode, which takes about 25 mA with the power switch turned off.

Check the battery status to know whether the unit is fast charging or trickle charging. Once the battery is fully charged it will go into trickle charging. At this point the NAC

will be loaded with 94% of the LMD value. If you continue to charge the batteries the NAC will increase to a maximum value of the LMD and the battery capacity reported will be hundred percent.

The system has not learnt a new value yet. It has only assumed that the battery capacity is that corresponding to an LMD of 33,792.

7.1.1 Support Information

The following commands are available from the Support Information menu to determine the state of the battery and can be accessed at any time, except when a talkdown test is in progress.

From Main Menu

Go to the Options Menu (SPACE with O (dots 1,3,5), or Fn with O)

Battery capacity left % - P (dot 1,2,3,4), returns to main menu

Go to Support Information Mode (SPACE with I (dots 2,4, or READ with I)

Gauge Accurate	- A (dot 1)
Charging	- S (dot 2,3,4)
Nominal Available charge	- C (dot 1,4)
Last Measured Discharge	- D (dot 1,4,5)
End of Discharge Volts	- E (dot 1,5)
Cell voltage	- V (dot 1,2,3,6)
Last charge info	- B (dot 1,2)
Capacity Inaccurate count	- I (dot 2,4)
Battery Temperature	- T (dot 2,3,4,5)

7.1.2 Battery Talk down

To make the unit learn its battery capacity the fully charged unit must be discharged completely. For this you do a soak test described below. The battery capacity in mA hours can be calculated by dividing the LMD value by 20. So 32,000 corresponds to a battery capacity of 1600 mAhr.

The Brailnote being tested has to be fully charge (>96%) and trickle charging. Disconnect the charger from the Brailnote.

Soak test by running the Brailnote until it stops..

- (i) Go to the Options Menu with SPACE with O (dots 1,3,5) or Fn with O.
- (ii) Go to the Support Information Mode with SPACE with I (dot 2,4) or Read with I.

- (iii) Press F (dots 1,2,4) to start the Battery Discharge cycle. The unit will start talking continuously and will take 16 hours or more to discharge the battery:-
Adjust Volume – Enter and dot 1 or 4. Fn and < or > as required
Adjust Speed - Enter and dot 3 or 6. Fn and – or + as required
Adjust Pitch – Enter and dot 2 or 4. Fn and Shift and – or + as required.
- (iv) At the end of the soak test the unit will not respond until the charger is connected. Connect the plug-pack charger and the BrailleNote should come back to life and say “Battery Test completed”.
- (v) Press the spacebar once and the unit will say when the test started and how long it ran for.
- (vi) Press Exit (Space with E (dot 1,5)) or ESC to get back to Support Information menu.
- (vii) Wait approx 2 minutes then check the Battery status.
 - a) Check the LMD reads greater than 27000 for the new batteries LMD - D (dots 1,4,5)
 - b) Check the gauge says Accurate. Accuracy - A, (dot 1)
 - c) Check that the Capacity Inaccuracy Count (CPI) says one. I (dot 2,4)
 - d) Check the temperature is within 10 degrees of the room temperature.
Temperature (T (dots 2,3,4,5)

The full list of available commands is listed in section 7.1.1

IF the LMD has not updated then press RESET and then check again If the Gauge does not go Accurate, then the Charge / Discharge cycle needs to be repeated or the Battery replaced.

7.2 Final QA Tests

Check the working of the BrailleNote after shaking and vibrating the assembled unit.

7.2.1 Braille Display tests

7.2.1.1 For units running V4.01 Build 1988 or later:

The Braille cell exercise program is built into the software of the Brailnote. To run it, use the following command sequence

Go to the Options Menu (SPACE with O (dots1,3,5), or Fn with O)
Go to Support Information Mode (SPACE with I (dots 2,4, or READ with I)
Press X (dots 1,3,4,6) to start Braille display test.

Right-most thumb key speeds up display.
Left-most thumb key slows down the display.
ENTER pauses and restarts test.

Press Exit (Space with E (dots 1,5), or ESC to stop the program and return to the support Information menu

7.2.1.2 For older units – All Rev E PCBs and Rev H running 3.07 build 2175 :

You require the program “BRLTEST2.EXE” to be on a PCMCIA or compact Flash card.

To run this program, – Insert card in unit and from the Main Menu, Go:

Utilities - U (dots 1,3,6)

Run Application – A (dot 1)

Select drive – Storage Card, S (dots 2,3,4) or Compact Flash, C (dots 1,4)

Press Enter (selects root directory on card)

Press Space until BRLTEST2 is heard

Press Enter Twice.

This starts the Braille Cell exercise program. There are no controls for it. To stop it you need to press the reset button.

7.2.2 Function Tests

Copy Braille-test file

- (a) Insert card into PCMCIA slot
- (b) Go to main menu – Space 1,2,3,4,5,6
- (c) Go to File Manager – F, (1,2,4)
- (d) Select Copy File - C (1,4)
- (e) Select Storage Card - S (2,3,4) for source drive
- (f) Hit Enter
- (g) Select None Folder
- (h) Hit Enter
- (i) Use space bar to select File A
- (j) Hit Enter
- (k) Select Flash Disk as destination drive
- (l) Hit Enter
- (m) Select General
- (n) Hit Enter
- (o) Should hear 1 file copied
- (p) Remove Card

Run Braille-test file

- (a) Go to main menu – Space 1,2,3,4,5,6
- (b) Go to keyword manual - W (2,4,5,6)
- (c) Select Open a document - O (1,3,5)

(d) Select document A – enter

All six dots on each cell should be raised

Check cursor routing on each cell – dots 7,8 should raise

(e) Go to File Manager – Space F – Space 1,2,4

(f) Select Erase File – E (1,5)

(g) Select File A - Hit Enter

(h) Go to main menu – Space 1,2,3,4,5,6

Insert headphones. Check both headphones by moving through the main menu

- a) Adjust Volume - Hit 4 and ENTER to raise volume up to Volume 30
Check that there is no crackling etc at high volume

Reset the BrailleNote

- a) Switch off the BrailleNote
- b) Immediately switch it on – repeat the on off cycling 10 times. The unit should not reset while you are doing this.

Switch on the BrailleNote. Go to the options menu - Space 0 – Space 1,3,5

- a) Select Battery Percentage - Hit P (1,2,3,4) – Should be >90%

Keyboard tests. Check for any sticking keys.

- Go to Main Menu
- Press K to go to keyboard learn mode.
- Check all the keys are recognized and none stick.

Check the reset switch is free (not stuck)

Check Software Version, operating system build date and Serial Number

- a) Go to Main Menu
- b) Hit I (2,4)
- c) Space – should give build number
- d) Space – should give serial number
- e) Space – should give operating system build date number
Check the volume setting, the pitch and the rate of speech.

Double check Reset switch is free.

Double check the keyboard keys are not sticking.

Switch-off the power switch.

Connect charger (which is being shipped with it) for full charging. This tests the AC adapter being shipped with the unit.

Check the Charge current and the trickle current if not already checked after assembling the unit.

If the BrailleNote has passed all steps it is OK for shipping.

8 Software Upgrade Procedures

The Factory programmed image of the operating software is in the KeySoft system disk.

To upgrade the software, two options are possible.

The first involves using the BrailleNote Programming Module to burn the new image of the software into the KeySoft system disk.

The second involves copying the appropriate files onto the Disk On Chip. When the BrailleNote starts it will run the software on the Disk On Chip in preference to that programmed into the KeySoft System disk.

Normally software upgrades will involve the second option, and an Upgrade installation disk would be supplied to copy the files to their appropriate folders. Such upgrades will be supplied with appropriate installation instructions.

For the purposes of Beta testing of new software, usually only the KeySoft.exe file would need to be placed in the root directory of the Disk on Chip, otherwise referred to as the Flash Disk. The following procedure explains the process.

To copy the latest version of Keysoft.exe to the flash disk.

- (a) Hold down dots 1,2,3 and press the Reset switch. Release keys when BrailleNote starts to talk.
- (b) Insert ATA card with the new software into PCMCIA slot
- (c) Go to Main Menu – Space 1,2,3,4,5,6
- (d) Go to File Manager – F, (1,2,4)
- (e) Select Copy File - C (1,4)
- (f) Select Storage Card - S (2,3,4) for source drive
- (g) Hit Enter
- (h) Select None Folder
- (i) Hit Enter
- (j) Select all files using X (1,3,4,6) with space
- (k) Use space bar to select Keysoft.exe
- (l) Hit Enter
- (m) Select Flash Disk as destination drive
- (n) Hit Enter
- (o) Select None for destination folder

- (p) Hit Enter
- (q) You should hear 1 file copied
- (r) Remove Card

Hard Reset. Press the Reset switch while holding down dots 4,5,6. Release keys when BrailleNote starts to talk.

If you wish to start the BrailleNote using the Factory programmed software, hold down dots 1,2,3 then press Reset. Release keys when BrailleNote starts to talk.

9 Upgrade Procedure from Rev E to Rev H Motherboard.

Upgrade procedures from Rev E to Rev H Motherboards:

IMPORTANT:

Always take care to follow the details of the general handling procedures noted at the beginning of this manual. Always recheck the details of other procedures to ensure that the handling of parts is being performed correctly.

Failure to observe the procedures detailed in this manual will void the warranty on the BrailleNotes, as well as the service spare parts.

9.1 Background

The upgrade procedure is essentially a combination of procedures already found in this manual. Some extra detail is required as shown in this section.

The procedure is varied slightly depending on the Service Center's ability to change the serial numbers on the Motherboard. Serializing is performed with the use of a Programming Board.

Replacement motherboards are shipped with Version 3.07 software loaded as default. When placing an order for upgrade motherboards, please note the following information that will need to be provided with the order:

If the service center has a programming board, the upgrade PCB's can be ordered as normal. This is due to the need to serialize the motherboards before they have the version 4.0 software loaded. Please specify if you require the new software for the programming boards (see the important note for users of programming boards below) so the PROMS can be provided with your first order.

If the service center does not have a programming board, Pulse Data will need to be advised of the serial numbers and models of the BrailleNotes to be upgraded *when the order is placed*. Pulse Data will then perform the serializing and upgrade the software on the PCB's individually. Each PCB will be labeled with the appropriate serial number.

Important Note:

This procedure will take at least 24 hours as the BrailleNote will be required to do an overnight Battery Conditioning Cycle. This will ensure that the new Motherboard has learned the condition of the battery to provide accurate battery life indication to the user.

Important notes for users of programming boards:

- The programming boards have their own internal software burned into two PROMS (U4 and U5) which are in sockets on the PCB. A different version of software is required to run the programming boards for Rev H PCB's than for Rev E PCB's. Please advise us at the time of order if replacement PROM's are required.

With the new ROM's, the DIP switches on the programming board except the far left one should be up.

- The format for serializing is the same between Rev E and Rev H PCB's except that:
 - a) the revision at the beginning is "H1" instead of "E1"; and
 - b) the "R" number at the end should be set to "R1" to indicate that the Motherboard has been replaced.

9.2 Basic procedure if the service center has a programming board

- Back up the data on the BrailleNote to be upgraded using the procedure in section 6.3.1.
- If the user has already had the 48MB Flash Disk upgrade, the Flash Disk will need to be removed from the Rev E PCB, and fitted to the Rev H PCB. See Section 6.6.10.
- 4MB of free Flash Disk space is required to program the version 4 software onto the PCB.
- Prepare the new motherboard by serializing it (see section 9.4.4) and then loading version 4.0 software (Section 8) and modify the Motherboard for VoiceNote as shown in Section 9.4.3 (if required).

Note: It is important that the Motherboard is serialized before the new software is loaded. The software looks at the serial number to determine the model of BrailleNote. The software then loads the right manual to suit the model.

- Remove the existing BrailleNote Motherboard using the procedure detailed in Section 6.6.1.
- Modify the plastic case bottom as shown in Procedure 9.4.1.

- Install the new Motherboard using the procedure shown in section 6.6.1.
- Cut the cables from the keyboard using the procedure shown in section 9.4.2.
- Re-assemble the BrailleNote using the procedure shown in section 6.5.
- When the BrailleNote is first powered up, the message “Can’t open Unicode table file” may be given. This is OK. Press Reset and the BrailleNote should start normally.
- Restore the client’s data from the backup using procedure 6.3.2.
- Perform the battery cycling and final tests as shown in procedure 7.
- Now the upgraded BrailleNote is ready to be returned to the client.

9.3 Basic procedure if the service center does not have a programming board

- Back up the data on the BrailleNote to be upgraded using the procedure in section 6.3.1.
- Remove the existing BrailleNote Motherboard using the procedure detailed in Section 6.6.1.

If the user has already had the 48MB Flash Disk upgrade, the Flash Disk will need to be removed from the Rev E PCB, and fitted to the Rev H PCB. See Section 6.6.10.

The version 4 software will need to be programmed onto the Rev H PCB (it is stored in the flash disk that has just been removed). See Section 8 to perform the upgrade.

Note: 4MB of spare Flash Disk space is required to program the V4.0 software onto the Flash Disk.

- Modify the plastic case bottom as shown in Procedure 9.4.1.
- Install the new Motherboard using the procedure shown in Section 6.6.1.
Ensure that the motherboard being replaced matches the serial number of the unit being upgraded.
- Cut the cables from the keyboard using the procedure shown in Section 9.4.2.

- Re-assemble the BrailleNote using the procedure shown in Section 6.5.
- When the Braille Note is first powered up the message “Can’t open Unicode table file” may be given. This is OK. Press Reset and the BrailleNote should start normally.
- Restore the client’s data from the backup using Section 6.3.2.
- Perform the battery cycling and final tests as shown in Section 7.
- Now the upgraded BrailleNote is ready to be returned to the client.

9.4 Specific upgrade procedures not mentioned elsewhere in this manual

9.4.1 Plastic case modification procedure

The plastic case needs to be modified in two different ways.

- Internal ribs in the bottom part of the case need to be modified to allow clearances for components on the new motherboard. The photo below shows the locations of ribs to be removed.

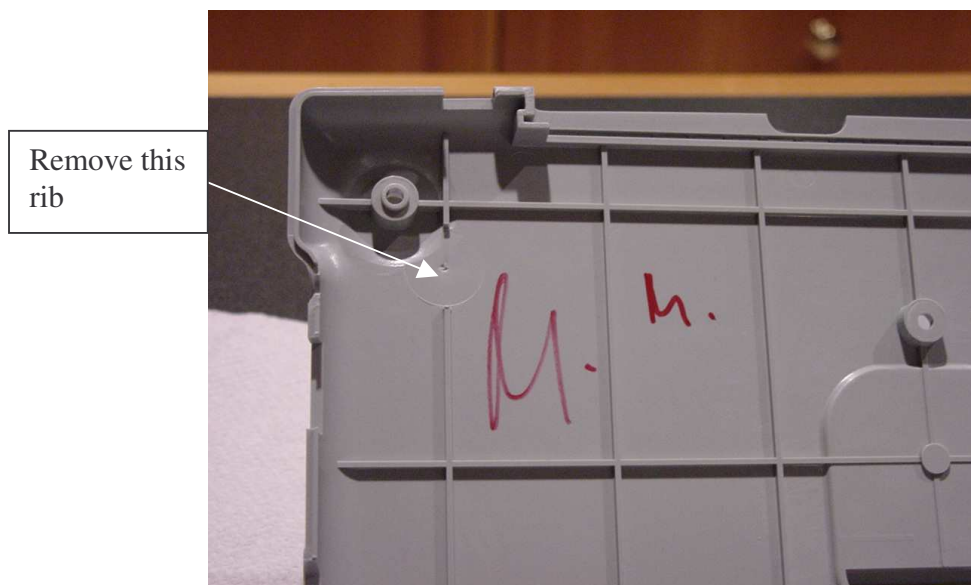


Figure 18 - Case Bottom Showing Rib Removal

The rear area where the connectors are need to be modified to allow suitable access to the connectors due to the new arrangement on the Rev H Motherboard.

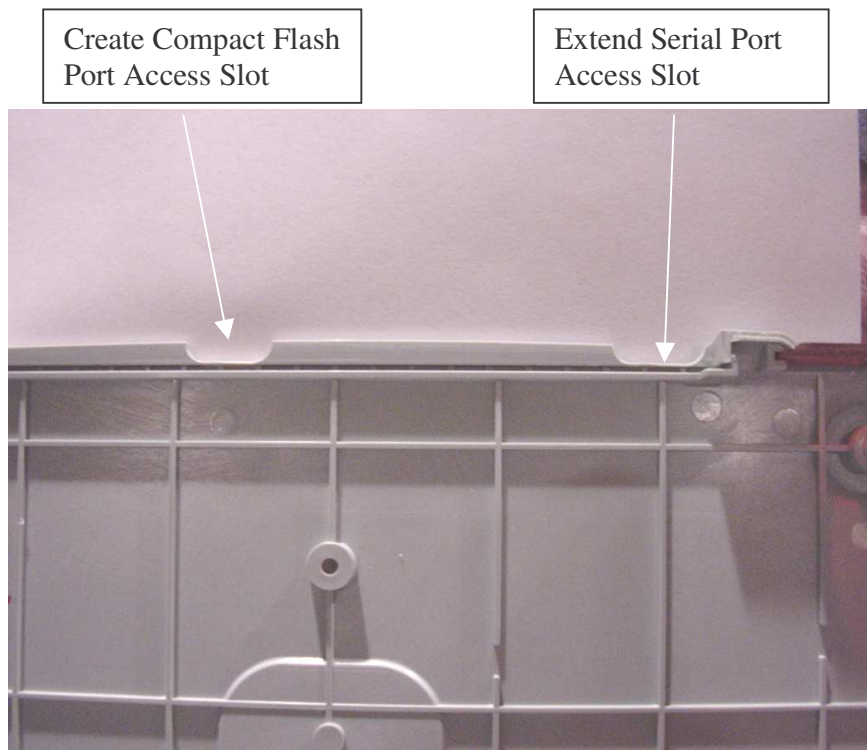


Figure 19 - Rear Case Modifications

9.4.2 Cutting the keyboard cables on the BrailleNote case top

The keyboard cables on the BrailleNote will need to have a couple of wires cut in order to prevent a short circuit across the power supply when upgrading to a Rev H Motherboard. Refer Figure 20

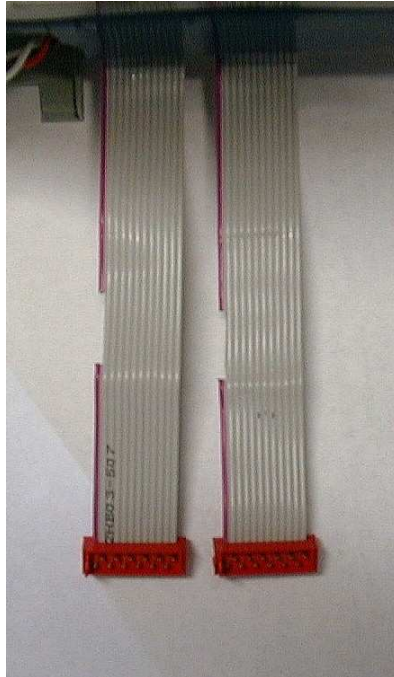


Figure 20: Keyboard cable modification

In order to do this, simply cut a 2-3mm section from the red colored wire on both the ribbon cables that come from the keyboard. Take care to ensure that none of the other conductors are cut, as this will prevent the keyboard from working properly.

This modification is backwards compatible and will still work on the Rev E Motherboards.

9.4.3 Modifications for Voicenote PCB's

- a) Remove Capacitor C46 as shown in Figure 21

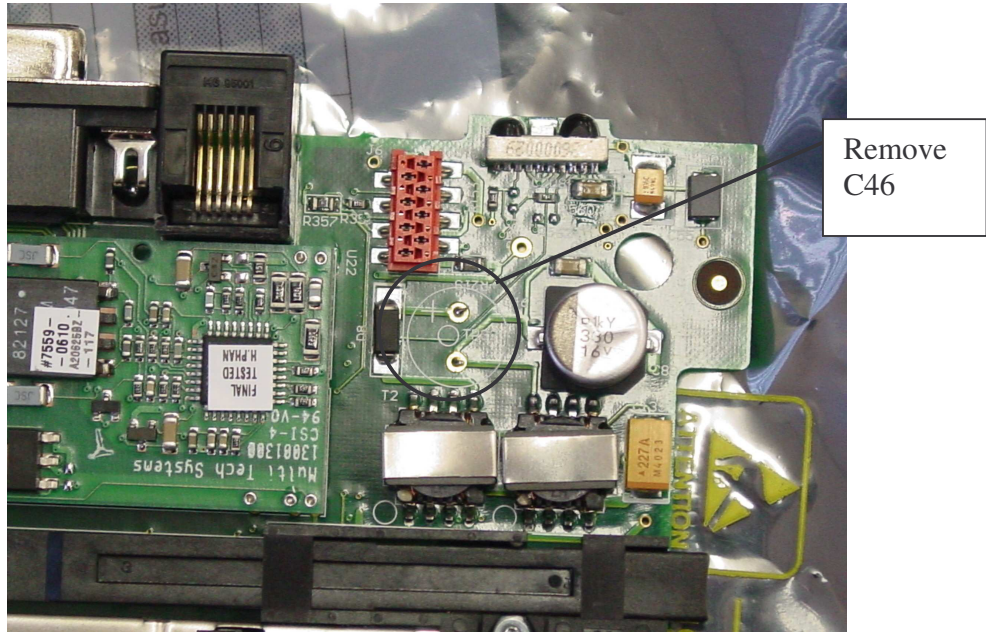


Figure 21 - Remove C46

b) Solder a "short" across the transistor Q30 as shown in Figure 22

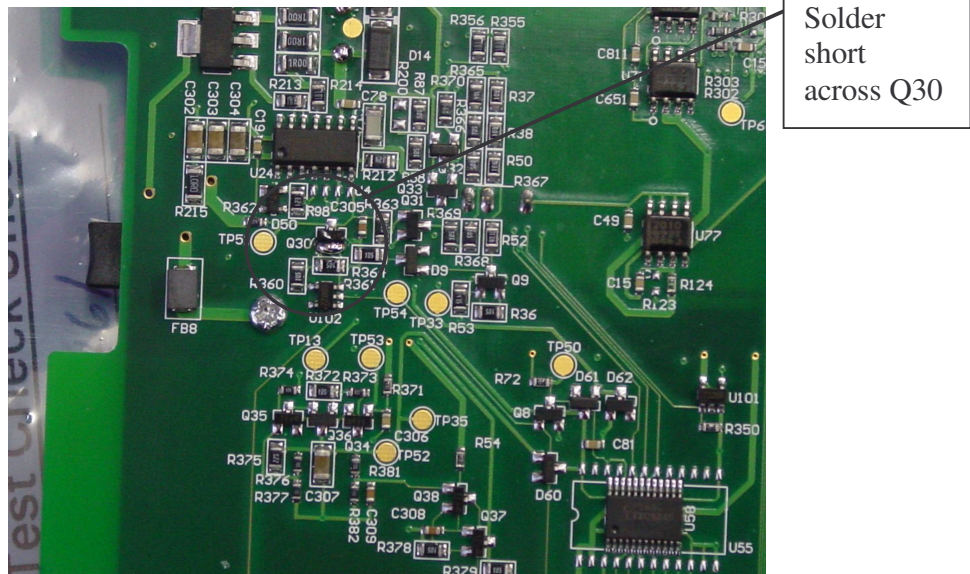


Figure 22 - Solder short Q30

9.4.4 Change the serial number using a Programming Board

Connect the programming board, with a serial connection to a PC, to the PCB requiring a serial number and power up the board. Refer Figure 23

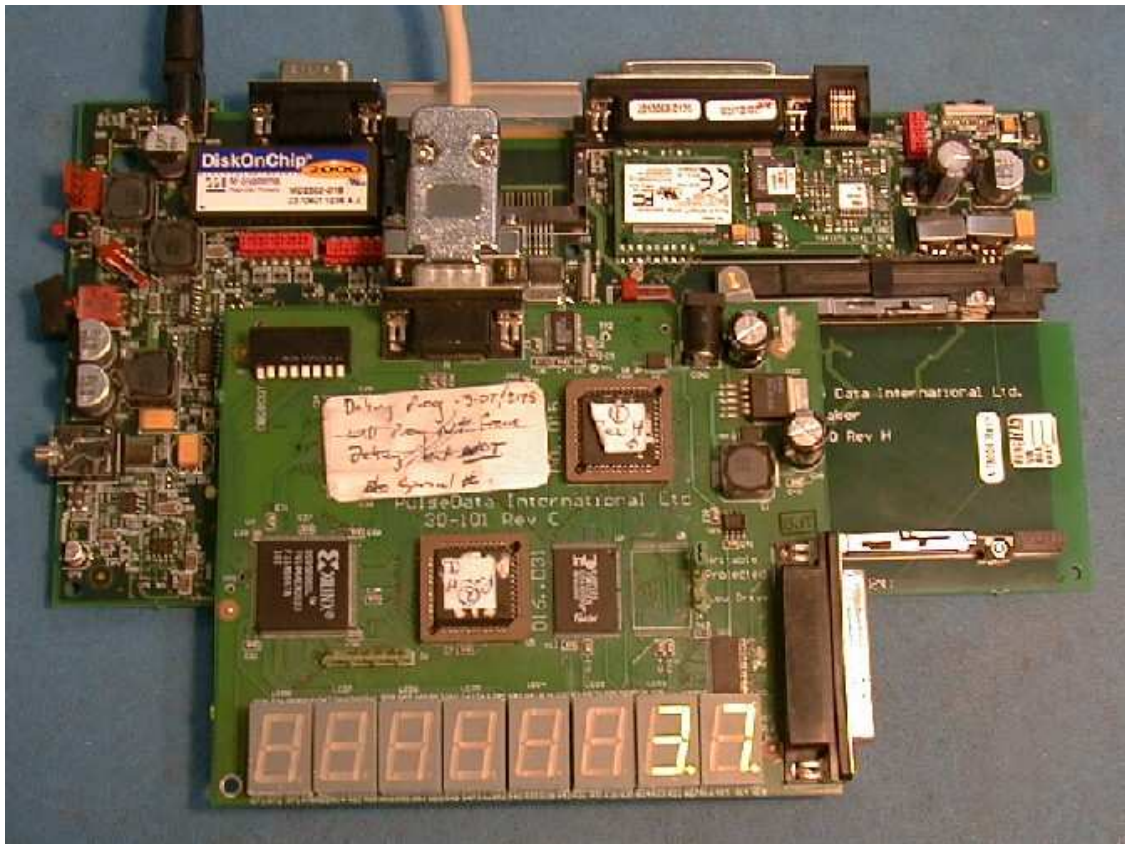


Figure 23: Programmer Board

From the menu displayed on the PC, select option 2 (Change Serial Number) and press enter. Refer Figure 24

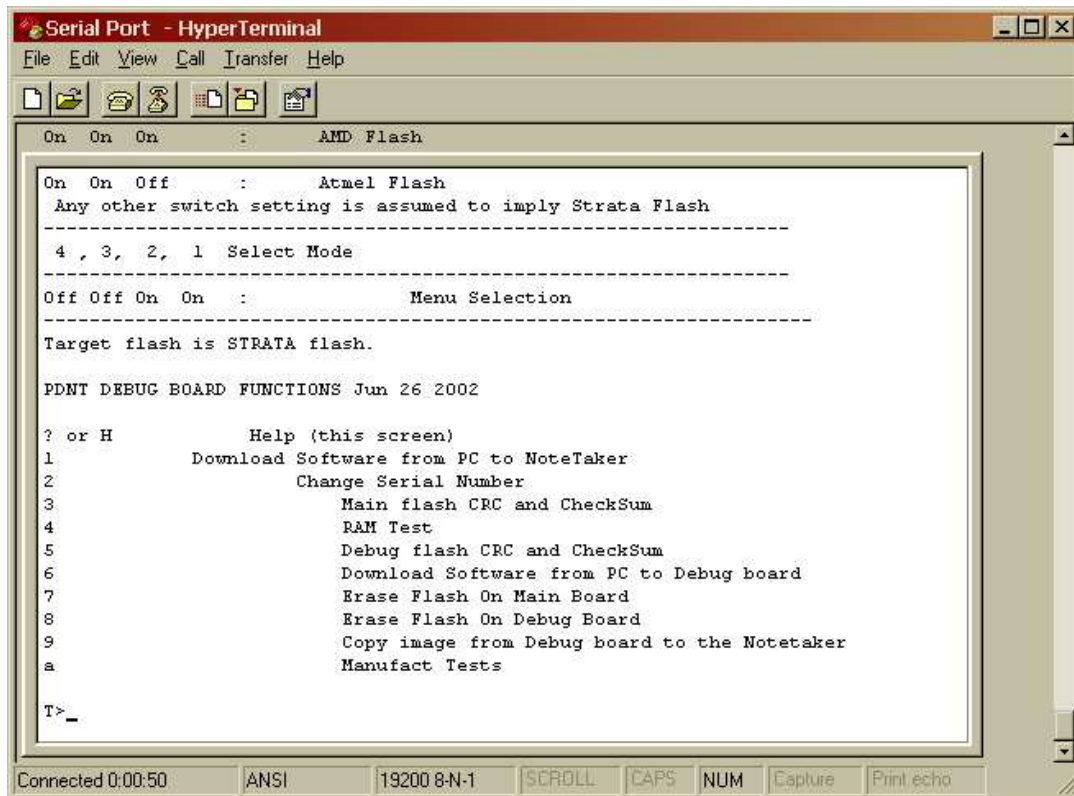


Figure 24 - Programmer Board Menu

Enter the Serial Number for the PCB in the format:

Xx, sssss-sssss-mmyy-CC, pppCC,rx

Xx = PCB hardware revision (Rev # on PCB + hand mod status e.g. H1)

Sssss = Serial number from bottom of unit

Mmyy = Date: month + year

CC = Country code (US, UK, AU, NZ, FR, DE,SE,IT,ES,NL)

Use international domain extension for the country codes.

US: United States of America

UK: United Kingdom

AU: Australia

NZ: New Zealand

FR: France

DE : Germany

SE: Sweden

IT : Italy

ES: Spain

NL: Netherlands (Dutch)

ppp = Notetaker type (VNQ (VoiceNote qwerty keyboard), VNB (VoiceNote Braille keyboard) , BNB (BrailleNote Braille keyboard) , BNQ(BrailleNote Qwerty keyboard))
Rx = Replacement board Number (R1 for the first board replaced, R2 for the second and so on.

Notes

- (i) The Rx code used only on the replacement boards.
- (ii) Ppp –if the ppp code is not entered then it implies a BNB (a BrailleNote Braille)

There is still an option of reprogramming the boards. Answer N (for No) to the prompt “Do you want to Program the board? (y/n)” . This changes the existing serial number or enters a new serial number without changing the existing program.

10 Fault Report Forms

In order to ensure that any problems in the field are understood by PDI in an effort to try and eliminate them, we request that fault repairs are routinely reported.

The following pages are copies of report forms to be used for passing information back to Pulse Data.

The Fault Report/ Service request form is for intended customers, distributors or service people notifying us of a fault and asking for help. The form is designed to collect all of the appropriate information so Pulse Data is able to provide an efficient and effective service.

The Repair Report creates a record of the repairs performed on a unit. A copy should be kept by the Service Center, and a further copy returned to Pulse Data.

Fault Report/Service Request For The BrailleNote

Date	
Customer Name	
Customer Contact Details (Phone or Email)	
Model Number	
Serial Number	
Software Version	
Purchase Date	
Dealer/Distributor	
Circumstances under which the problem occurs (i.e. relevant details of equipment settings, external connections, external environment, etc.)	
Description of the Problem (i.e. details of the symptoms of the problem or deviation from the product specifications)	

Notes.

1. Please complete as many details as possible. This will help us resolve the problems quickly since we won't have to contact you with questions.
2. The model type is based on the type of unit, i.e. 18 or 32 cell, Qwerty or Braille keyboard.
3. The Serial Number can be found on the underside of the unit.
4. The software version can be accessed via the Information menu assuming the unit is operational. From the Main Menu, press "I" or dots 2 and 4, and step through the software version, serial number using the space bar. On the models with Ver 4 or later software, press "I" and "Space" to access the information menu.
5. It is important that all relevant information about the circumstances under which the problem occurs is provided, e.g. the equipment settings, if a PC is connected to the BrailleNote and any factors about the external environment that might be relevant.

Repair Report - Pulse Data Equipment

Service Centre					
Customer					
Date Received		Date Returned			
Model Number		Serial Number			
Customer Description of Fault					
Service Centre Findings					
Action Taken					
Parts Removed			Parts Fitted		
Part No.	Description	Serial No.	Part No.	Description	Serial No.

11 Contact Information

For service enquiries, please contact your local Pulse Data dealer, or contact support@pulsedata.com.