



Saber

Hand Wind Audio Player



Maintenance Guide

25 October 2010

<http://globalrecordings.net/saber>

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1. Introduction

Global Recordings Network has produced the Saber Hand Wind Audio player in response to demand from missions and churches for a compact reliable audio player that is not dependent on external power sources.

The purpose of this maintenance guide is to provide the necessary technical information to those who will be doing in-service repairs on the Saber players.

For general users, please consult the Saber user guide for the most up to date information on how to use your player.

1.1 Other information currently available

- Saber User Guide
- SaberCopy Instructions

Visit our website for the latest updates: <http://globalrecordings.net/saber>

2. Equipment Necessary for Maintenance

Basic Equipment:

- Pozi drive number 1 screwdriver (or Phillip's head number 1 screwdriver)
- Long nose pliers
- External SD memory card (loaded with audio files)
- External DC power (example: AC/DC plug pack)

Other useful items include:

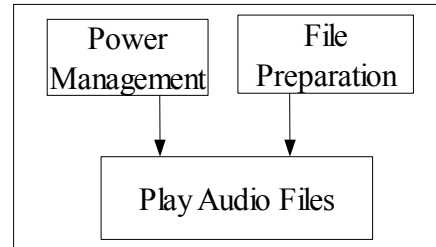
- USB cable
- Access to a computer to download audio files to player.
- Saber Maintenance Pack
- NiMH Battery Pack. *Part No: C413* (optional, if battery replacement is necessary)
- Small amounts of grease

3. Troubleshooting Procedure

The key to identifying and repairing electronic devices is to have a logical approach to troubleshooting and fault diagnosis. The first step is to examine carefully all the symptoms of the fault, and to identify the problem areas. This guide is designed to assist you in identifying the fault, and the steps needed to repair the player.

The three major areas of troubleshooting the Saber player are:

- Power. Generator, external DC, and Battery issues.
- Audio file preparation. How to download, and setup playback of audio files.
- The use of the Player to play audio files.



3.1 Power Management

All electronic devices require power to operate. The Saber is designed specifically to be able to use the built in hand-wind generator as well as external power to charge the internal battery to allow the player to function.

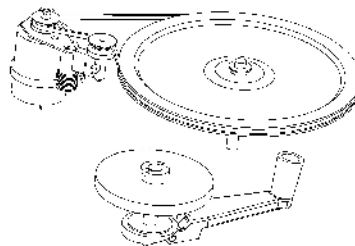
We can divide the power into 4 categories:

Hand-Wind Generator, External DC power, Internal battery, power management circuit.

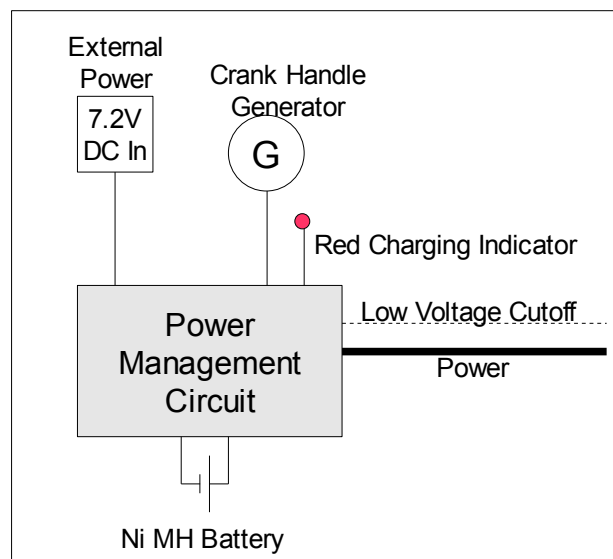
3.1.1 Hand-Wind Generator

The onboard generating unit contains the only moving part in the player. It consists of:

- Crank handle
- gears and pulley wheel
- belt
- idler arm
- generator
- Red light



If the red light does not light when turning the crank handle in a clockwise direction, further investigation steps need to be taken. This will require the opening of the player and possible replacement of parts. Please follow the assembly instructions on page 15 in this manual, and check that the belt, gears and generator are working correctly, and replace any parts that are preventing the reliable running of the hand-wind generator subsystem.



Powering the player using the hand-wind generator

The player is designed to be powered by the hand-wind generator. It is recommended that you should **turn the handle ALL THE TIME while the player is playing**, if no other external DC power source is available.

We recommend that you turn the crank handle for 1 minute before starting the player, and continuously during the start up phase of the player, where the green light is fast flashing.

3.1.2 External DC power

All external DC power is connected using the 2.1mm DC power socket on the side of the player. The voltage needs to be between 6 to 8 Volts DC, and a current rating of at least 350mA with the centre pin positive (+). If the input voltage is too high it may result in components on the circuit board burning out, requiring the expensive replacement of the circuit board.

DO NOT connect a Saber player directly to a 12 volt battery as this will permanently damage the player. There is an optional voltage adaptor available to allow connection to car batteries.

External power supplies, solar panels and external battery packs that will meet the Saber player requirements are available from GRN.

When using external DC power, disconnect the power once the red light has gone out, indicating that the player is fully charged.

External Power:
- 2.1mm DC plug
- Centre pin positive (+)
- DC (direct current) supply
- Input: 6 to 8 Volts
- Minimum 350mA current

3.1.3 Internal Battery

The purpose of the internal battery is to store energy that is provided by the generator and external DC power. The 3.6V 750mAh Nickel Metal Hydride (NiMH) battery pack has been chosen, as it is robust, cost effective and requires minimal maintenance in the field. These batteries are designed for years of service, with a minimum of 500 full charge / discharge cycles before starting to degrade. They cope with partial charge / discharge cycles and have minimal memory effect.

NOTE: These batteries self discharge over time.

- At a temperature of 20°C the self leakage discharge is 20% per month.
- At a temperature of 40°C the self leakage discharge can be over 40% per month.

If you have an external power source, it is recommended to charge the player if the unit has not been used for a number of weeks. If you do not have an external power source available, it is recommended that you turn the crank handle for a minute before turning on the player, and to continue turning the crank handle while the player is being used.

We recommend that the players are recharged every 90 days, using any available charging source. (External DC, Generator, solar panel.)

Battery Type
Nominal 3.6V
750mAh capacity
Nickel Metal Hydride
(NiMH)
(3*AAA battery type)

Battery Maintenance

If you follow these simple guidelines, you will have years of service from the player:

- Recharge the player every 90 days, using any available charging source. (External DC, Generator, solar panel.)
- Keep the player out of direct sunlight. (all batteries will lose capacity if they get hot. If using solar panels to charge a player, make sure the player itself is in the shade)
- Do not remove or substitute the internal battery pack. These have been specifically designed to work together within the player and damage may occur if changes are made.
- If battery replacement is necessary, please contact Global Recordings Network to discuss the best method of obtaining the right battery.

Indications that the battery needs replacing

The internal battery of the Saber player is based on a NiMH construction for years of maintenance free use. We recommend that the Saber is charged every 90 days, using any available charging source (External DC, Generator, solar panel) to keep the battery in good condition. We expect to get about 10 hours of audio playing from the internal battery, when it is fully charged.

If poor battery life is experienced, please follow these steps:

- Charge the player completely. (eg using AC power adapter or 12V battery adaptor) Record the time the red light stays on, indicating the charge.
- Turn on the player and let it play until the battery is flat.
- Recharge the player completely (eg using AC power adapter or 12V battery adaptor) Record the time the red light stays on, indicating the charge.
- Turn on the player and let it play until the battery is flat.
- Recharge the player completely (eg using AC power adapter or 12V battery adaptor) Record the time the red light stays on, indicating the charge.

The battery should now be in peak performance. The player should play for about 6 – 12 hours at near to full volume.

If the red light goes off in less than 1 hour during the charging cycle, this indicates that the battery is not accepting the charge correctly. A possible remedy is to charge the player at a lower external DC voltage of between 5 and 5.5 V for a longer period of time of between 10 and 15 hours.

3.1.4 Power management circuit

Technical information

The internal battery charging system is very efficient. For external DC input. The player detects maximum voltage, change in voltage, change in temperature, and total duration to optimally charge the battery. The Saber player's red light slowly flashes 4 times before starting to charge the battery when external DC power is supplied.

The hand-wind generator provides the maximum amount of charge by using a separate maximum voltage detection circuit, which means that every time the crank handle is turned, the maximum amount of power is transferred into the player.

Do not make changes to the way the player charges the internal battery. If there is a problem identified with this circuit, please replace the circuit board.

What happens when low voltage occurs: The reduced volume effect

The player's main amplifier is used to produce high volume levels. At these high levels, the power draw is large, and causes small spikes which can momentarily drop the supply voltage. When the internal battery is nearly flat, these spikes can stop the audio chip from working. As a precaution at low battery levels the volume automatically reduces to 60% to provide protection against these spikes, with the side effect of slightly extending playback time.

3.2 Audio file preparation: How to download, and setup playback of audio files

The player uses onboard internal memory and SD Cards to store the audio files that will be played. It is important that the audio files are played back in the correct order, and that the next file and previous folder buttons work as desired.

To achieve the correct sequencing of the files, it is necessary to remove the mp3 tag “title”, and place the files in sequential order. The recommended naming convention is explained below.

It is recommended that the SaberCopy utility is used where possible, as this will assist with following the correct naming conventions, placing the audio files in the correct sequence, and removes the mp3 tag “title”. This utility is explained further below in section 3.2.3.

3.2.1 Manual Audio folder and file management

The player uses 2 levels, folders and files, to manage the audio files, where the first 6 characters are significant. It is important that these characters are used to place the files in the correct sequence so that the files are played in the correct order.

Manual MP3 tag removal

Every mp3 audio file has the ability to contain “tags” embedded into the file. These tags are often useful to allow author and copyright information to be associated with the audio file for easy reference. Our player however needs the ID3 “Title” tag removed from each mp3 file, otherwise the play order of the audio files will be incorrect.

There are different ways of editing mp3 audio file tags. It is possible inside the Windows XP and Vista operating systems to right click on the file, select “Properties”, select “Summary” tab, select “Advanced >>” and change the Title description. There is general software that will assist with this process, an example being <http://www.mp3tag.de>

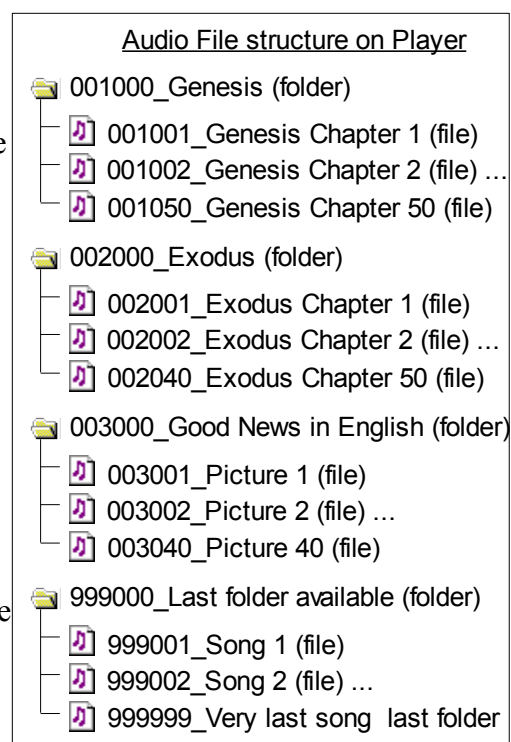
Manual Folder naming format

It is recommended that the folders use the following standard “001000_name of folder” where the first 3 digits “001” is the folder name and “000_” is placed after the last digit. The folders are then sorted by these digits so folder 001000_ will be the first folder, and 002000_ will be the second folder played.

Manual File format

It is recommended that the file naming format is: “001001_name of file” where the first “001” is the folder number, and the second “001_” is the file number order in that folder. The “_” is placed after the last digit.

Files will then play in the order of the number given. Example 001001_ file will be played, and then file 001002_ will be played.



Space for internal playlist

The player creates an internal play list which it uses to play the files when the unit is first powered on after changes are made by the computer. It is recommended that 20Mb of space is left available on the internal memory for this playlist. If the space is not left, the player will turn on, and the green light flashes at high speed, but will then turn off.

3.2.2 Manual connecting and transferring audio files onto player

Audio files can be manually transferred to the internal onboard memory by using the USB connection.

- 1) Turn player off (before connection is made to the computer)
- 2) On the computer start “Windows Explorer” and view “My Computer”. Identify the existing drives on the computer.
- 3) Connect the player to the computer using a 5 pin Mini B USB cable.
 - If the USB locking firmware has been installed on the player, please refer to the Saber Lock Pack documentation for advice on the connection to the computer.
- 4) About 5 to 50 seconds after the USB connection is made, 2 new “removable disk” drives will appear. The first of these new drives will be the internal onboard memory inside the player. The second drive will be the SD Card on the Saber player.
- 5) Delete any audio files on the player that are no longer necessary.
- 6) Copy the audio folders and files (following the naming convention explained previously) onto the player, onto either the internal onboard memory, or the SD card drive.
- 7) Once completed, disconnect the USB cable from the player and computer.
- 8) Turn on the player, and confirm that the audio files work as expected.

3.2.3 Benefits of using the provided SaberCopy utility

The SaberCopy utility is Windows based software that assists with the correct sequencing and copying of audio files on to the Saber. It is recommended that you read the SaberCopy usage instructions as this describes the steps necessary to prepare the folders and files required before using the SaberCopy utility.

Please refer to our website for the latest version of SaberCopy utility. The user guide is included in the help section. <http://globalrecordings.net/topic/sabersupport>

- Audio file name sequences are looked after so mp3 files are played in desired sequence.
- MP3 “Title” tags are deleted so mp3 files continue to play in the desired sequence.
- Copy process: The option of deleting files is easily available.
- Copy process: The copying of files onto single or multiple players is easier to execute.
- Final Capacity check: Confirms that there is at least 20Mb of free space left, to allow the player to create the play list.

3.2.4 SD Memory Cards

When a SD Memory card has been inserted into the player, the onboard internal memory will be disconnected and not able to be used for playing. The folder and file format on the SD memory card needs to follow the same folder and file convention as for the internal memory described above. Due to the file system needing to be FAT16, it is not possible to use cards with greater capacity than 2Gigabytes.

It is recommended that SD memory cards are only inserted and pulled out after the player has been turned off.

3.2.5 Precautions and steps to connect the player to the computer

- Turn player off (before connecting to the computer)
- Connect the player to the computer.
- Transfer the audio files with the folder and file name format as explained in section 3.2 above.
- Confirm that there is 20 Mbytes free on the internal memory, to allow the player to create its own playlist files.
- Disconnect from Computer.
- Turn player on to rebuild the playback list. Check that audio is heard correctly.

3.2.6 Advice on audio announcements

To assist users with navigation, it is recommended to place audible prompts at the start of each file indicating the folder (example: “Genesis”, “Exodus”) and indicating the file (example: “Genesis Chapter 1”, “Exodus Chapter 2”)

It can also become confusing knowing where you are if there are many folders and files. To assist getting to the first file of the first folder, press and hold the “Previous Folder” button.

It is also suggested that a list is printed out showing the folder listing to allow users to navigate through the available folders to find specific items. SaberCopy can help in this.

Example printout of folder listing:

Folder	Description	Language Name
001000_	Good News	Mongolian
002000_	Words of Life	Mongolian
003000_	The Jesus Story 1 of 2	Mongolian
004000_	The Jesus Story 2 of 2	Mongolian
005000_	Words of Life	Mongolian: Elute

3.2.7 Technical information on how the player talks to the computer

The player is set up to look like two “USB mass storage devices”. Later computers, including Windows 2000, XP, Vista, Mac OS 9, Mac OS X, and Linux from about 2001 provide support for these types of devices. The first “mass storage device” will be the internal onboard memory inside the player, and the 2nd will be the SD Card port. The 2nd port will still appear even without an SD Card, and will produce a prompt to “Please insert a disk into drive x:” (where x is any appropriate drive letter) if you attempt to view the drive.

3.2.8 Player Firmware

The functionality of the player is defined by special binary software that has been installed onto the player. It may be possible in the future to have updates to this firmware made available for the player. There will be specific software necessary for this task, and the connection will be made via the USB port. Please refer to section 6 Firmware Updates for steps to upgrade firmware.

3.2.9 Player Boot Sequence and Reset button

When the player turns on, the green light flashes fast indicating that it is reading the firmware, and building the play list. Both these functions are very important, and require steady power. If for some reason, there is not a reliable supply of power, it is possible to corrupt the firmware files. This will prevent the player playing audio files. If this problem was to occur, it is often seen that the green light flashes quickly, and then the player turns off straight away without playing any audio. If this fault occurs, please:

- press the recessed reset button and retest.
- Connect the player to a computer. Delete the following hidden files:
 - MUSIC.LIB
 - MUSIC.SEC
 - SETTINGS.DAT
 - TEMP.DAT (if file exists on the player)
 - TIME.DAT (if file exists on the player)
 - These files are hidden files. If you use Windows Explorer and you can't see the files you will need to change the attributes of the files. Go to Tools - Folder Options. Click on the View button. Select **Show hidden files and folders** and unselect **Hide protected operating system files**. You should now be able to see the hidden files
- Format the Saber internal memory to FAT32. This can be achieved via the SaberCopy utility. **NOTE:** This will delete the audio files on the player. Audio files will need to be reloaded onto the player after this is done.
- If these options do not work, it is necessary to reload the firmware. Contact Global Recordings Network at saber@globalrecordings.net for further instructions and for the latest firmware.

How to prevent Boot Sequence problems

Especially when the players are used out in a village situation, there is a real possibility that the batteries are low. If the users can be taught to turn the handle for a short time before turning the machine on this should put enough charge in the batteries to prevent the player turning off before the index is built. It is important for the people to continue turning the handle when the player is playing. If there is access to power or solar they can charge the batteries on a regular basis.

Reset Button:

If the controller halts and is not responding to any button control, the reset button will help to restart the controller back to normal. The button is not designed for everyday use, but may assist with the

actions above if a problem was to occur within the circuitry.

3.2.10 Saber Locking Options

There are three optional ways for locking down access to the Saber player. All three are distributed by Global Recordings Network in “Saber Lock Packs”. These options are outlined below:

Tamper-Proof Screws

There are tamper-proof torx screws available that hinder the opening of the Saber case and side panel. The Lock Pack includes sufficient screws to lock 50 players.

USB Port Lock

This feature prevents computers from adding or modifying the file contents on the player. It is implemented by installing special firmware onto the player. This can be manually overridden by a special key sequence. This information will only be supplied to the purchaser or an authorised person.

SD Card Reader Lock

This feature prevents the SD Card slot from being used for the playing of audio. It is implemented by installing special firmware onto the player. This can be manually overridden by a special key sequence. This information will only be supplied to the purchaser or an authorised person.



3.3 The use of the Player to play audio files

3.4 The Keypad





The Saber keypad controls all functions of the device.

The buttons are raised, and of different sizes, so that the player can be used in low light or by vision impaired users.

The buttons perform the following functions:

Power /Pause		<p>Before turning on the machine, first turn the handle clockwise for 30 seconds. Then press and hold this button until the green light flashes. (It will take 6-20 seconds to power on.) Continue to turn the handle until the machine starts to play.</p> <p>To pause during play press this button once. The green light will flash slowly. To resume play press this button once again.</p> <p>To turn off the machine, press and hold this button until the green light turns off.</p>
Forward File		<p>Press once to go on to the next file, which may represent an individual message, chapter or song.</p>

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		Press and hold to go fast forward (cue).
Back File		Press once to go back to the previous file, which may represent an individual message, chapter or song. Press and hold to rewind (review).
Forward Folder		Press once to go on to the next folder, which may represent a whole program, book or album. Press and hold to go to the last folder.
Back Folder		Press once to go back to the previous folder, which may represent a whole program, book or album. Press and hold to go to the first folder.
Volume		Press the top button (+) to make the sound louder. Press the bottom button (-) to make the sound softer.

3.5 Indicator lights

The Saber has two lights, one green and one red. The lights indicate the state of the player and battery.

Indicator	Meaning	Action
Green light flashing quickly	The player is getting starting up	Wait until player starts playing
Green light on steady	The player is playing normally	Press buttons on keypad to pause, skip, adjust volume or stop
Green light flashing slowly	The player is paused	Press Power/Pause button briefly to resume playing
Red light on steady	The player is charging	Continue to charge until the red light goes out
Red light flashing	The battery is getting low	Recharge the player by turning the handle or plug in an external power device

3.5.1 Maintaining the player

- Keep the player out of direct sunlight. (Batteries lose capacity if they get hot.) If using solar panels, make sure the player itself is in the shade.
- Every 90 days charge the player with any available power source.
- Do not remove or substitute the internal battery pack.
- If using external DC power, disconnect the power once the red light has gone out, indicating that the player is fully charged.
- Keep the side cover screwed onto the player to keep dust and moisture out.
- After longterm storage (e.g over a month), charge the player fully using external power before use.
- Keep the crank handle folded away when not in use.
- This player will survive for a long time, if simple precautions are taken to minimise exposure to dust, moisture, shock and direct sunlight.
- Do not apply excessive pressure to the user buttons
- Keep external power input between 6 – 8 Volts DC.

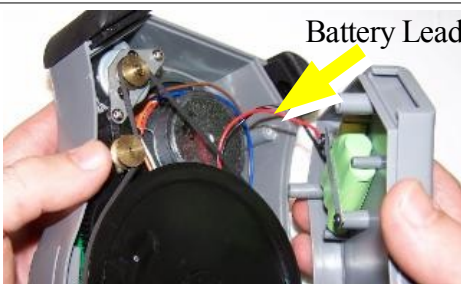


3.5.2 Automatic Power Off

- The player will automatically power off if the unit is left in pause mode for 30 minutes.
- When the player has finished playing the last audio file in the last folder, the unit will go into paused mode.

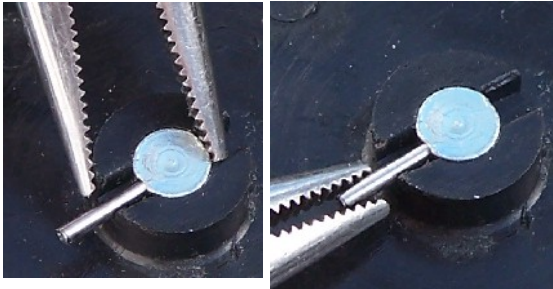




4. Steps to Disassemble and Reassemble the Saber

The below steps explain how to disassemble and reassemble the player. Please follow the steps as far as necessary to fix the faulty part. It is not necessary to completely disassemble the player, if for instance the belt is broken.



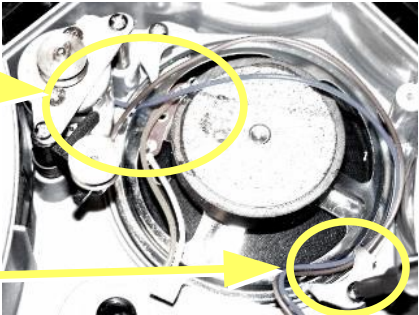

4.1 Disassembly Steps

<p>Remove Back Case</p>	<p>Remove side cover. Turn player over. (Keypad closest to user) Remove 4 back screws. Take cover off, and place to right of player being careful of the battery lead</p>	
<p>Remove Pulley Wheel and shaft</p>	<p>Take off Belt. On top of the big black pulley wheel there is a washer. Remove this washer. Take off black pulley wheel. Take off washer below the pulley wheel. Pull out the metal shaft that was holding the pulley wheel. (This is called the pulley wheel shaft.)</p>	
<p>Disconnect Battery</p>	<p>Disconnect battery from circuit board</p>	



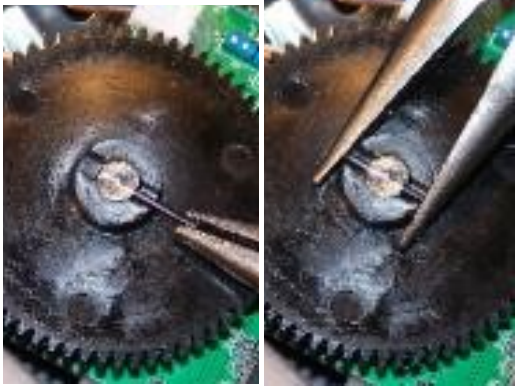
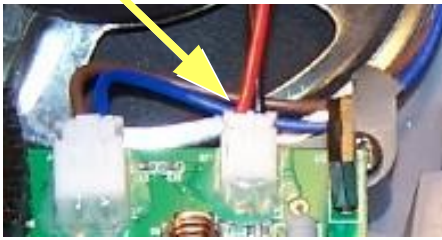

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<p>Remove Crank Handle</p>	<p>Remove roll pin from black gear wheel using long nose pliers by: a) place 1 arm of long nose pliers on pin end, the other on the black gear on opposite side of the gear, and squeeze pin out as shown in the photo. b) with long nose pliers, grab the pin and pull out. Remove black gear wheel. Remove handle.</p>	
<p>Remove circuit board and pushers</p>	<p>Disconnect the generator lead (at the circuit board) Disconnect the speaker (at the circuit board) Remove the 5 PCB screws Remove circuit board. This is best done by lifting up on the left hand side, and slightly pushing the DC socket (as per photo) Remove 1 black “reset” pusher Remove 7 black buttons called “switch pushers”</p>	 
<p>Remove Speaker</p>	<p>Remove 2 screws and speaker clamps. Remove speaker.</p>	
<p>Remove Generator and Idler Arm</p>	<p>Remove 2 screws holding plate to the body of the player. Holding back the idler arm, remove generator assembly. Take off idler arm, and take off spring.</p>	





4.2 Reassembly Steps

<p>Assemble generator and Idler arm</p>	<p>Place spring onto idler arm</p> <p>Place spring and idler arm into the body of the player.</p> <p>One arm of the spring should be on the black rubber, while the other bent spring arm will be pushing the idler arm towards the generator.</p>	
	<p>Holding the idler arm away, locate the generator sub assembly onto the brass posts as shown.</p> <p>Secure the generator using the two screws.</p>	
<p>Speaker assembly</p>	<p>Put the speaker in the player. Turn the speaker so that the terminals on the speaker are opposite the generator (as shown in photo)</p> <p>Tighten speaker clamp screws.</p> <p>Under the bottom clamp, run the 2 generator wires as shown in photo.</p>	
<p>Circuit board and black pushers</p>	<p>Locate the “reset pusher” in the case.</p> <p>Locate 7 black buttons, called “switch pushers” in the case.</p> <p>Make sure each button turns freely in their holes.</p>	

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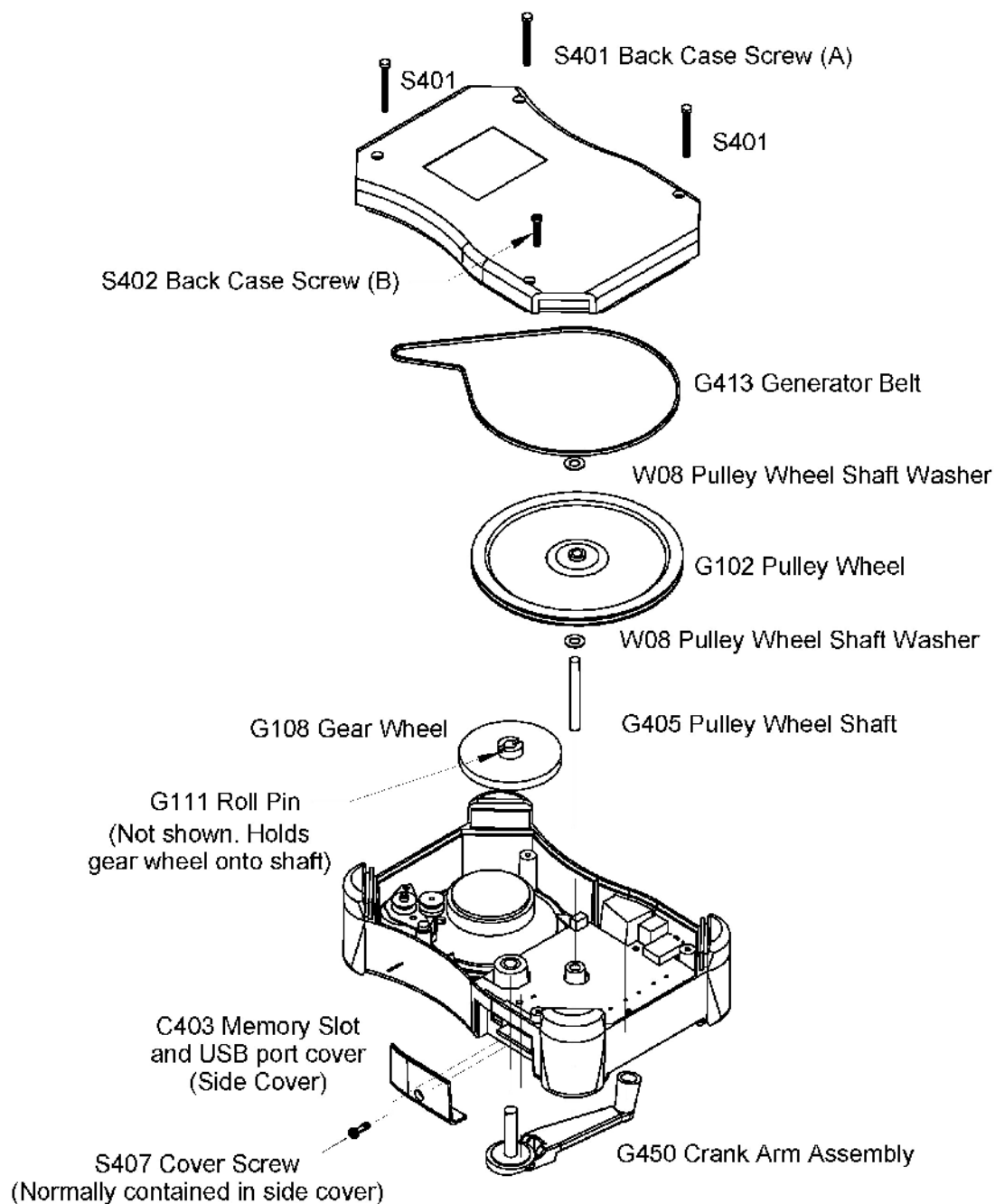
	<p>Insert green circuit board as shown in the photo. (Tilt board so DC and audio sockets touch the case first.) Screw 5 screws into circuit board. Connect speaker wire into the left connector on the circuit board. Connect the generator wire into the middle connector on the circuit board.</p>	
<p>Board Test</p>	<p>If possible, insert SD memory card and connect an external DC power. (If no DC power is available, connect battery) Turn on the Saber player. Make sure all 8 buttons work by pressing each button and listening for the appropriate change in the audio program. (If a button doesn't work, please replace the switch pusher)</p>	
<p>Crank handle</p>	<p>Place a small amount of grease on the shaft of the crank handle. Locate the handle in the front of the Saber player. Place the black gear on the crank handle shaft. Using long nose pliers, place roll pin into the hole in the handle as shown in the photo. Make sure the wires are not impeding or touching the black gear.</p>	
<p>Connect Battery</p>	<p>Connect the battery wires into the right connector on the circuit board.</p> 	

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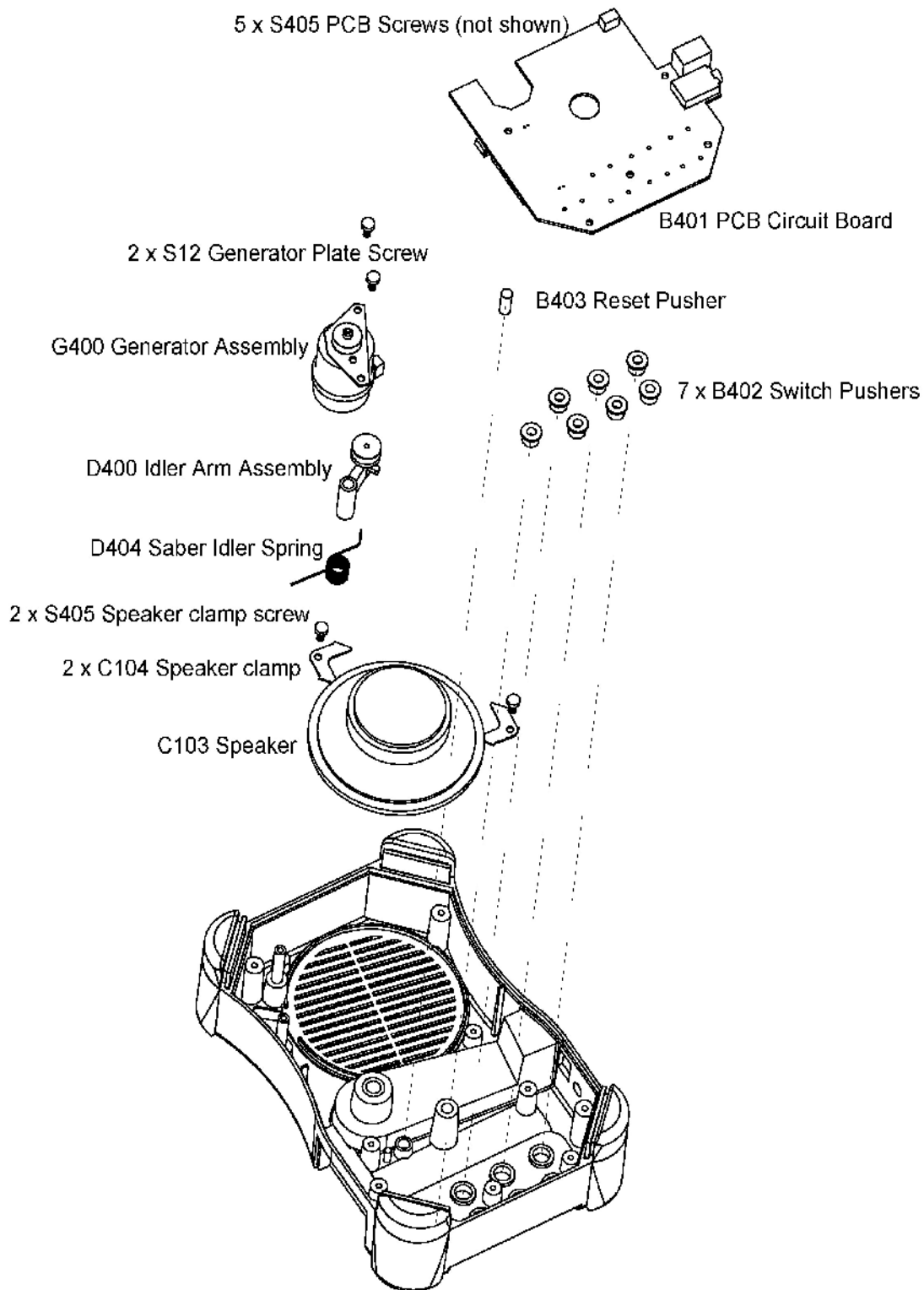
<p>Pulley wheel and belt</p>	<p>Insert pulley wheel shaft into hole. Turn shaft until the flat on the shaft is mating correctly in the hole. Add washer to pulley wheel shaft. Place a small amount of grease on the pulley wheel shaft. Add pulley wheel. Add washer to pulley wheel shaft above the pulley wheel.</p>	
	<p>Add belt. Belt goes around black pulley wheel, idler arm and generator as shown in the picture.</p> <p>Turn crank handle and check that the belt runs freely without twists, and that the red light comes on.</p>	
<p>Back case</p>	<p>Place back onto the front case. Make sure the battery wire sits near the speaker, and stays away from the mechanical gear.</p> <p>Screw 4 screws into back case. (Short back screw S402 goes in the bottom left corner, near side cover) Screw in the side cover.</p>	
<p>Final test</p>	<p>Turn crank handle. Check that there is no unnecessary noise being made and that the motion is smooth. Check that the red light comes on indicating the generator is charging the battery. Turn on the player. Make sure audio is heard. Make sure all the buttons work correctly.</p>	

5. Player Diagrams and Part sheets

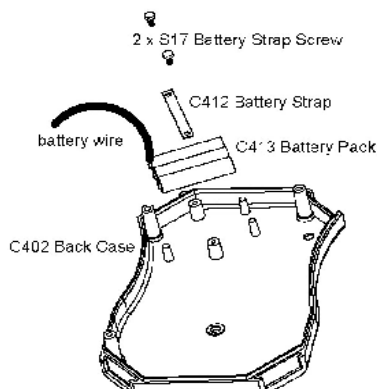
5.1 Drawing 1: Mechanical drawing of parts in the player



5.2 Drawing 2: Internal parts of player



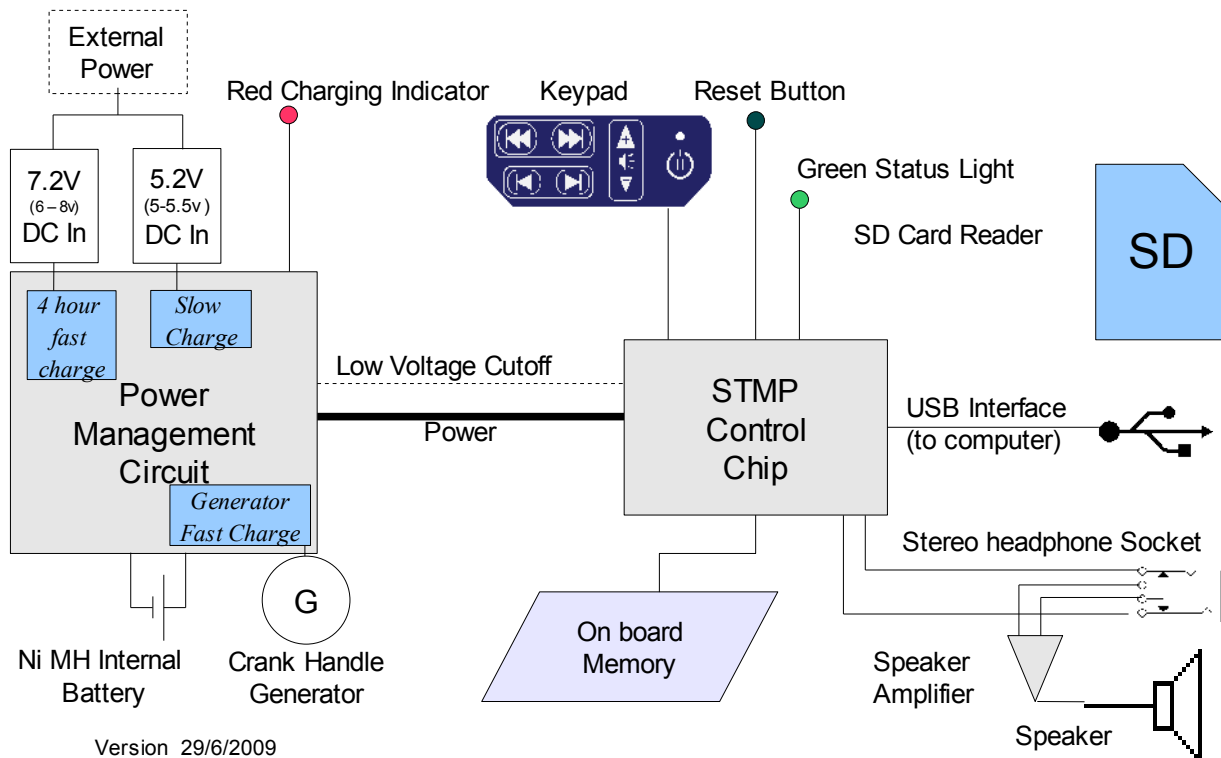
5.3 Diagram 3: Back case and battery



5.4 Part List for player:

<u>Part No:</u>	<u>Quantity</u>	<u>Part Description</u>	<u>Spare Parts Availability</u>
C401	1	Plastic Front Case	Please discuss with GRN
C402	1	Plastic Back Case	Please discuss with GRN
C403	1	Memory Slot and USB port cover (Side cover)	In maintenance pack
C404	4	Rubber Corner Protector	In maintenance pack
S407	1	Side cover Screw	In maintenance pack
S401	3	Back case Screw (A)	In maintenance pack
S402	1	Back case Screw (B)	In maintenance pack
C103	1	Speaker	In maintenance pack
C407	1	Speaker lead and plug	In maintenance pack
C104	2	Metal speaker clamp	In maintenance pack
S405	2	Speaker clamp screw	In maintenance pack
D400	1	Idler Arm Assembly	In maintenance pack
G400	1	Generator Assembly	In maintenance pack
S12	2	Generator Plate Screw	In maintenance pack
G102	1	Plastic Pulley Wheel (large)	In maintenance pack
G405	1	Metal Pulley Wheel Shaft	In maintenance pack
W08	2	Pulley Wheel Shaft Washer	In maintenance pack
G108	1	Plastic Gear Wheel (small)	In maintenance pack
G111	1	Metal Roll Pin	In maintenance pack
G450	1	Crank Arm Assembly	In maintenance pack
G413	1	Generator Belt	In maintenance pack
B401	1	PCB Circuit Board	Please discuss with GRN
S405	5	PCB Screw	In maintenance pack
B402	7	Plastic Switch Pusher	In maintenance pack
B403	1	Plastic Reset Pusher	In maintenance pack
C412	1	Metal Battery Strap	In maintenance pack
S17	2	Battery Strap Screw	In maintenance pack
C413	1	NiMH Battery Pack	Due to limited shelf life, this is available as a separate item

5.5 Electronic Diagram



6. Firmware Updates

6.1 Firmware Update Procedure

These instructions outline an efficient method of upgrading and confirming correct operation of Saber players.

Tools needed:

Saber AC charger
Windows XP computer
Saber firmware update program
SaberCopy and MP3 Audio files on the computer
USB cable
Screwdriver to open USB cover

Step 1: Charge

Turn the generator handle for 5 minutes.

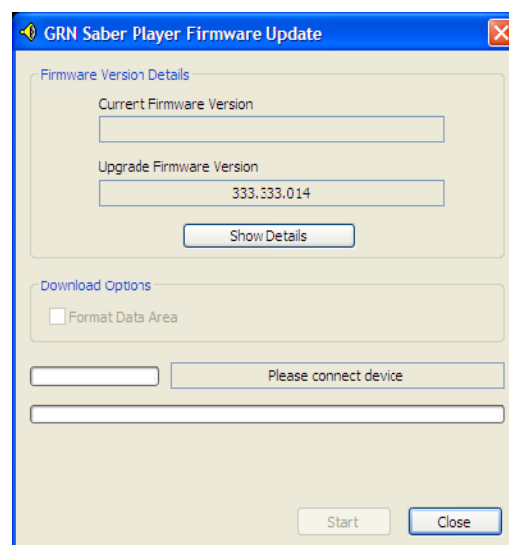
Place Saber on charge for 4 hours, using AC adapter.

Red light should flash 4 times and then be steady on for up to 4 hours to indicate charging.

Step 2: Firmware Upgrade of the Saber

For Saber units that have a serial number less than 108000 and have not previously had a firmware upgrade, or have security firmware loaded, please upgrade the firmware by:

- Download the “Saber firmware update014.exe” program onto your computer from www.globalrecordings.net/files using Access Code provided by saber@globalrecordings.net
- Start the “Saber firmware update014.exe” program.
- Connect the Saber to the computer using the USB cable
 - When the Saber is connected, the status indicator will change from “Please connect device” to “Ready” in about 20 seconds. If this does not happen, please check the USB cable. If this still does not work, it is possible that the player has security firmware installed. Please refer to the documentation that comes with the security firmware or contact saber@globalrecordings.net for instructions on how to connect the Saber to the computer.
- Select “Format Data Area” check box. This will remove all existing audio files from the player.
- Once connected, select “Start” button.



The update utility will now run. This will take about 1 to 2 minutes. Please do not disconnect the player before the update is completed, as this may corrupt the player. If you have other audio software loaded on your computer (itunes etc) you may get requests to load new software or restart your computer. Please ignore these requests and cancel them.

- At completion of the update, this message will appear:

“The firmware update has completed and the device has been reset. The internal database must be initialised to transfer protected content. To do so, disconnect the player after it has completed booting.”

This is an information notification only. There is no need to disconnect the player. Proceed to the next step.

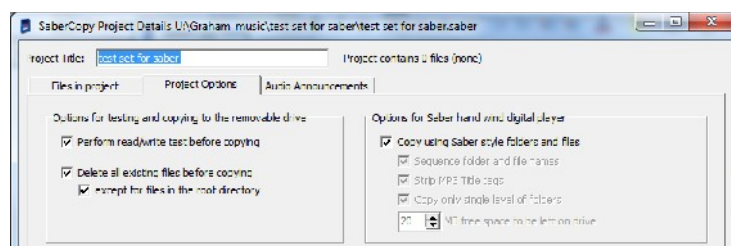
- Place updated instruction sticker on player (if available)



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Step 3: Load audio files

- Start SaberCopy.
- Connect Saber to computer.
- Wait 30 seconds. Disconnect Saber and test player. If no audio is heard:
 - Reconnect Saber to computer.
 - In SaberCopy, Project Options tab, make sure the “Delete all existing files before copying” and “Copy using Saber style folders and files” are selected.
- Load audio files onto Saber.



Latest SaberCopy software is available from: <http://globalrecordings.net/topic/sabersupport>

Step 4: Test player

- Start player: Wind handle for 30 seconds, press and hold the  button until the green light appears (usually 4 seconds), and then continue to wind until the green light becomes steady green.
- Make sure all buttons work on player, and that the correct sound is heard. Make sure the generator is smooth in operation and the red light is displayed when turning.

Step 5: Test battery

First, follow the steps above. Specifically make sure you turn the generator for 5 minutes, and then place the player on charge for 4 hours. Upgrade the firmware and load new audio files. Plug in the AC power into the player, and turn the player on. Once the player is playing audio through the speaker, remove AC power from the player. If the player abruptly stops playing and all lights go out, replace the battery.

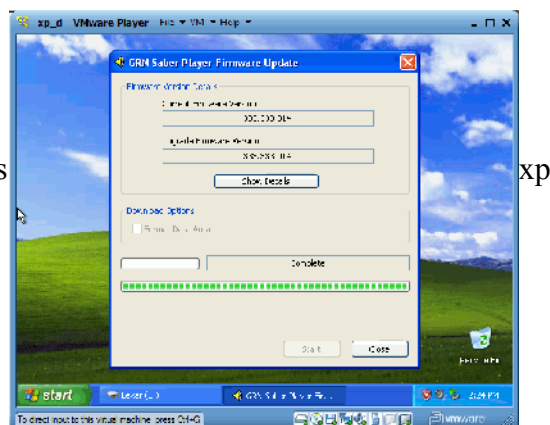
Batteries: The most common cause of battery failure is when the player is not regularly charged. After three months without use, the batteries can reach a critically low charge and may be permanently damaged. Where possible, use an external power source to completely charge the player each month.

6.2 Saber Firmware update on a Windows 7 computer

It is not possible to directly update the Saber firmware on a Windows 7 computer due to Operating System differences.

It is possible to upgrade Saber firmware running windows 7 by using an xp virtual computer software called “vmware player”. The “vmware player” software itself is available at no cost, but requires its own windows license which needs to be obtained.

Note: “XP mode” available in windows 7 professional does not allow Saber firmware to be upgraded.



7. Troubleshooting: Common Symptoms and Remedies

7.1 Power supply problems

Symptom	Possible Remedies
Turning the crank handle doesn't produce the red light	<ul style="list-style-type: none"> - Turn the crank handle in a clockwise manner - Check the belt is working correctly. - Check the pulley wheel, idler and gear are okay. - Check the wire from the generator is connected correctly to the green circuit board. - Check the generator is working correctly. - Replace the internal battery and retest <p>NOTE: These steps require the opening of the player. Please follow the instructions in the section page 15 above.</p>
The red light is not lit when plugging in external DC power	<ul style="list-style-type: none"> - Check external DC power is working correctly and is turned on. - Disconnect and reconnect the power to the Saber player and wait 10 seconds. Observe if the red light comes on. - Check the polarity of the external power. Centre pin should be positive(+). - Check that external DC voltage is within the range of 6 to 8V DC. - Replace the internal battery and retest

7.2 Internal Battery life

The internal battery of the Saber player is based on a NiMH construction for years of maintenance free use. We recommend that the Saber is charged every 90 days, using any available charging source (External DC, Generator, solar panel) to keep the battery in good condition. We expect to get about 10 hours of audio playing from the internal battery, when it is fully charged.


If poor battery life is experienced, please follow these steps:


- Charge the player completely. (eg using AC power adapter or 12V battery adaptor) Record the time the red light stays on, indicating the charge.
- Turn on the player and let it play until the battery is flat.
- Recharge the player completely (eg using AC power adapter or 12V battery adaptor) Record the time the red light stays on, indicating the charge.
- Turn on the player and let it play until the battery is flat.
- Recharge the player completely (eg using AC power adapter or 12V battery adaptor) Record the time the red light stays on, indicating the charge.

The battery should now be in peak performance. The player should play for about 6 – 12 hours at near to full volume.

If the red light goes off in less than 1 hour during the charging cycle, this indicates that the battery is not accepting the charge correctly. A possible remedy is to charge the player at a lower external DC voltage of between 5 and 5.5 V for a longer period of time of between 10 and 15 hours.

7.3 The Saber will not turn on

To turn on the player you press and hold the  power button, until the green light switches on. (Make sure the SD Memory Card is removed)

Symptom	Possible Remedies
The Green light does not appear (The light does not show at all)	<ul style="list-style-type: none"> - Charge the player. Turn the crank handle for 5 minutes. (The red light should indicate charging. If the red light is not seen, refer above to section 7.1 Power supply problems). - If possible, plug external DC power in player. - Attempt to turn on on the player: press and hold the  power button, until the green light switches on, which should occur in 4 to 7 seconds. Continue to turn the crank handle. - If the green light does not appear even briefly, continue to turn the crank handle for another 5 minutes and retest. If there is still no green light appearing, replace the internal battery. - Replace power switch pusher. (Small black button)
The Green light only appears when connected to external DC power	<ul style="list-style-type: none"> - Check the internal battery wire is correctly connected to the green circuit board - Check the internal battery condition. Please follow the instructions in the Battery section on page 5.
The green light flashes briefly then goes out.	<ul style="list-style-type: none"> - Continue to apply charge to the player by turning the crank handle while during the start up sequence. - Make sure the power button is not held down too long. (Continuously holding down the power button too long will turn off the player) - Confirm that there is a minimum of 20Mb of available (free) space in the internal memory available for the play list. - It is possible that file corruption may have occurred due to insufficient power being available. <ul style="list-style-type: none"> • Reformat the internal memory of the Saber player to FAT32 by connecting it to a computer, using the computers format command. NOTE: This will delete all the audio files on the player. - Replace power switch pusher. (Small black button)
The green light appears, and keeps flashing at high speed.	<ul style="list-style-type: none"> - Check that the correct audio files are loaded onto the player - The player can take up to 4 minutes to start.
The green light appears. It then flashes at high speed. The green light then becomes steady. (No audio is heard)	<ul style="list-style-type: none"> - Turn up volume. - Check the correct audio files are loaded onto the player - Reload the audio files onto the Saber player - Check that there is no headphone connected to player - Check the speaker is connected to the green circuit board - Press the reset button (recessed on the front panel)

7.4 File Corruption Issues

It is possible for file corruption to occur during the start up phase of the player. To minimise the possibility of file corruption:

- Turn the crank handle for at 1 minute before turning on the player.
- After pressing the power button, continue to turn the crank handle while the player is in the start up phase. (This is indicated by the fast flashing green light.)

If file corruption has previously occurred, when you turn on the player, the green light will flash at a fast rate as normal during the start up phase. After completing the start up phase (of about 30 seconds) **the player will then abruptly turn off.**

If file corruption occurs, please take the following steps:

- Firstly, on a computer, confirm that there is a minimum of 20Mb of available (free) space in the internal memory of the Saber. If there is not enough space, remove some files and retest.
- On a computer, use the included format program, format the internal Saber drive to FAT32. NOTE: This step will delete all the audio files on the player.
- Reload audio files and retest.
- If these options do not work, it is necessary to reload the firmware. Contact Global Recordings Network at saber@globalrecordings.net for further instructions and for the latest firmware.

7.5 Folder and File and volume buttons will not work

These buttons control which audio file is to be played, and the audio level being played.

Symptom	Possible Remedies
Forward or reverse file or folder button doesn't work	- Replace button pusher for the problem button and retest. - Replace all button pushers.
Audio level doesn't work. Audio too loud or too soft and doesn't change when pressing buttons.	- Replace both volume level button pushers. (Small black buttons)

7.6 The Saber will not work with an SD Card

Turn player off. Insert SD Memory Card correctly into player and turn on player.

Symptom	Possible Remedies
Audio being played is not that on the SD memory card.	- Turn off player. Pull out and reinsert SD Memory Card. - Change SD Memory Card and reload audio files. - Confirm that the Optional SD Card Lock feature has not been loaded onto the player. - Suspect faulty SD Card reader on the PCB circuit board.
The green light appears at turn on.	- Check the audio files on the SD Memory Card are loaded

Symptom	Possible Remedies
It then flashes at high speed. The green light then becomes steady.	correctly. - Change SD Memory Card and reload audio files.

7.7 The Saber has problems when connected to a computer by the USB Connection

The USB port is used to download files to the player from the computer. Before using the USB port, **make sure that you:**

- Turn player off (before connecting to the computer)
- Connect the player to the computer.
- Transfer the audio files with the folder and file name format as explained in section 3.2 above.
- Confirm that there is 20 Mb of available (free) space on the internal memory, to allow the player to create its own playlist files.
- Disconnect from Computer.
- Turn player on, and check that audio is heard correctly.

7.8 Further help

If you are unable to successfully identify or rectify a problem with the player, please contact us at the email below. To assist us in helping you, please be as specific as possible with the problem you are having.

Please include the serial number of the unit, problem description, when the problem started to occur, and any other specific information describing the fault and how it occurred.

Our email address is: saber@globalrecordings.net

7.9 Contact Details

Postal Address: Global Recordings Network
 Locked Bag 9019
 Castle Hill NSW 1765
 Australia

Phone: +61 2 9899 2211

Email: saber@globalrecordings.net

Further information and updates to this document can be obtained from:

Web address: <http://globalrecordings.net/saber>

8. Saber Specifications

Audio file formats: MP3 or WMA

Onboard memory: 1GB

Memory expansion: Slot for SD memory card up to 2GB

File system: 2 level FAT32 folders and files

File transfer: USB 2.0 through five-pin Mini-USB Series B socket

Built in amplifier: Mono, 400mW typical, 8 ohm speaker

Stereo 1/8" headphone socket, 32 ohm

Internal battery: 3.6V 750mAH rechargeable NiMH

Battery life: Each full charge cycle of the rechargeable battery provides approximately 10 hours at high volume

Hand wind generator requiring 1 minute winding for every 4 minutes of playing

External power: 2.1mm DC power socket centre pin positive (+) . 6-8Volt input, 320mA.

Display: Green LED for player state, and Red LED for battery condition

Dimensions: 180mm x 123mm x 51mm

Weight: 630g