

Workflow for analogue capture and digital transfer of MD/Hi-MD recordings

Ubiray Rezende - IGS0037 (28-02-2006)

Let us consider first the specifications of the equipment items I worked with and then think of the possibilities available to transfer audio data to the computer.



A) The audio-recorder device used is a Sony Hi-MD, Model No. MZ-RH910 (similar models: MZ-RH1; MZ-M200) which has the following inputs and outputs:

1. Mic (PLUG IN POWER) jack
2. LINE IN (OPT) jack
3. Earphones jack (there is not a LINE OUT)
4. USB cable connecting jack
5. DC IN 3v jack

Alternative power source: This Hi-MD model uses a nickel metal hydride rechargeable battery and/or an LR6 (size AA) alkaline dry battery.



Discs: Hi-MD unit uses 1GB Hi-MD discs and it is also compatible with 60/74/80-minute standard discs.

On Sony Software supplied with the Hi-MD unit - SonicStage:

It can be used to transfer data from the Hi-MD to a computer or the opposite, from a computer to the Hi-MD, and also to edit the data transferred to the computer. I used SonicStage version 3.0, which does not work on Macintosh environment. Recently, Hi-MD model MZ-M200 includes software for PC and Mac.

Talking about recording modes available on Hi-MD, Linear PCM (Pulse Control Modulation) records uncompressed audio data with CD quality, *i.e.* 44,100 kHz/16-bit, which are the minimal recommended standards for archival needs. Linear PCM mode allows you 1 hour and 34 minutes of recording time on a 1GB Hi-MD disc and only 28 minutes on an 80-minute standard disc. That is the problem with uncompressed data, they use a lot of disc space. Hi-SP mode uses a proprietary compression system called Adaptive Transform Acoustic Coding - ATRACT3plus without loss in sound quality. In Hi-SP mode you have 7 hours and 55 minutes of recording time on a 1GB disc and 2 hours and 20 minutes on an 80-minute disc. Hi-LP recording mode is not suitable

for archival purpose at all. Although it also uses ATRACT3plus, its compression ratio is much higher than in Hi-SP mode.

NOTE: As Hi-MD and Net MD products are generally produced to fulfil the consumers' wish of storing many hours of music to take along with them, we have to take care before choosing our equipment, because many of the models available are not provided with an input that is indispensable for the linguists work: **external microphone input**. Many of these minidisks recorders do not have even a built-in microphone.

B) About the notebook used (Sony Vaio VGN-FS570):

1. Notebook inputs:

USB port

Mic jack (there is not a LINE IN)

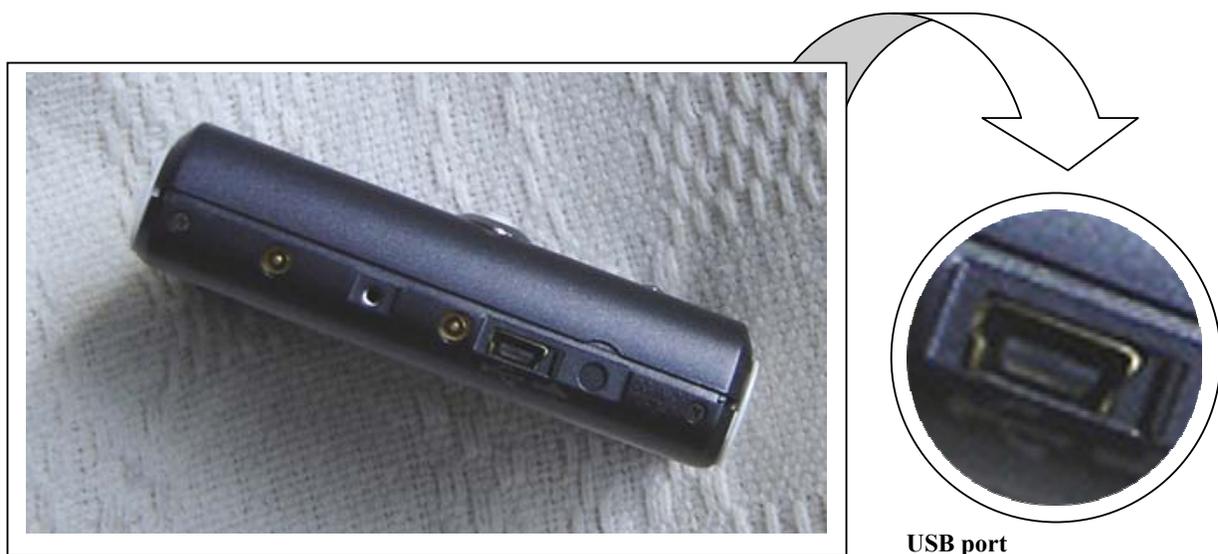
FireWire port (also called IEEE 1394 or Sony iLink)

2. Assume we have the necessary sound capturing/editing software programme already installed on the computer. Depending on our choices, we can use SonicStage (Sony software supplied with the Hi-MD unit – about 23MB) or Audacity (a good-quality open-source software downloadable for free on the web and that works with PC and Mac – about 3 MB) or still other commercial software as Audition (by Adobe – about 16MB, at a cost of about US\$300) or Sound Forge (Sony proprietary software – 40 MB, about US\$300). Bear in mind also the computer and the operating system minimum requirements not mentioned here in order to complete the software installation successfully.

When we intend to test equipment functions or data capture/edition for the first time, it is recommended to prepare a file sample to work with as a precaution against unforeseen failures, running the risk of destruction of the data. Furthermore, when working with original data files transfer/edition, we have to protect and keep them safe for possible future use.

Considering the conditions stated above, we have two possibilities to transfer an audio file from the Hi-MD to the computer:

i) One possibility is to use the USB cable and the SonicStage software supplied with the Hi-MD – Digital transfer.



At first, we have to take into account that only audio files recorded in Hi-MD mode (and not the files recorded in MD mode) can be transferred to *My Library* of SonicStage 3.0 on the computer hard drive and that files can be transferred only once. As Hi-MD walkman devices generally are used to store music, they limit the number of times data files can be transferred due to copyright restrictions. Besides, on the manual supplied they recommend that we do the editing of long audio files recorded in Linear PCM mode on the Hi-MD unit itself before transferring them to the computer. They explain that editing long audio tracks in *My Library* of SonicStage on the computer may take a long time. But as linguists who want to preserve data for future use, it is strongly recommended that we keep the original data file for archival purpose.

Turning back to SonicStage follow the steps below to make digital transfer:

1. Insert the recorded minidisc into the Hi-MD and connect the device to the computer using the supplied USB cable. Do not use a USB hub; connect the cable direct to the USB port on the computer. In this case, Hi-MD unit is powered directly through the USB port. Check if the cable is firmly connected.

2. Make sure the Hi-MD unit is on a stable and free-vibration place.

3. Before start working on data transfer, disconnect any other external devices and close any other applications on the computer.

4. Open SonicStage already installed on the computer.

5. Check the SonicStage for Settings:

We have two options when transferring data to the computer:

- transfer data while keeping the original on the minidisk (default setting) or
- transfer data while deleting the original file

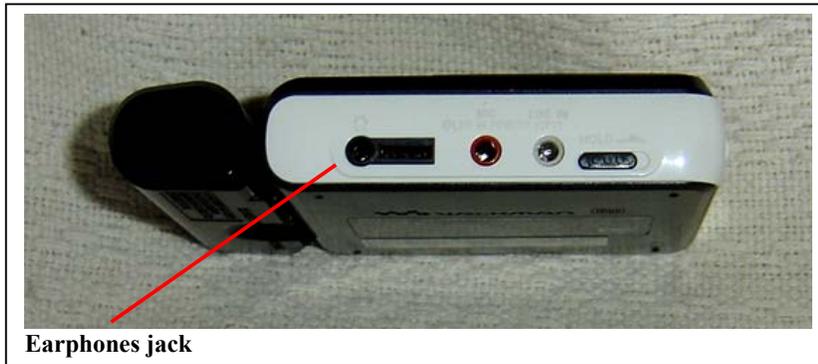
Certainly we want to keep the original file, so the default dialogue box at SonicStage Settings has to be checked.

6. Then, click on transfer button. Computer will recognize Hi-MD device as an external drive. Select the file to be transferred and specify the audio storage format recommended, *i.e.* WAV, and the destination folder as necessary. It takes just a few seconds for data transfer to be completed depending on the file size and the computer capabilities.

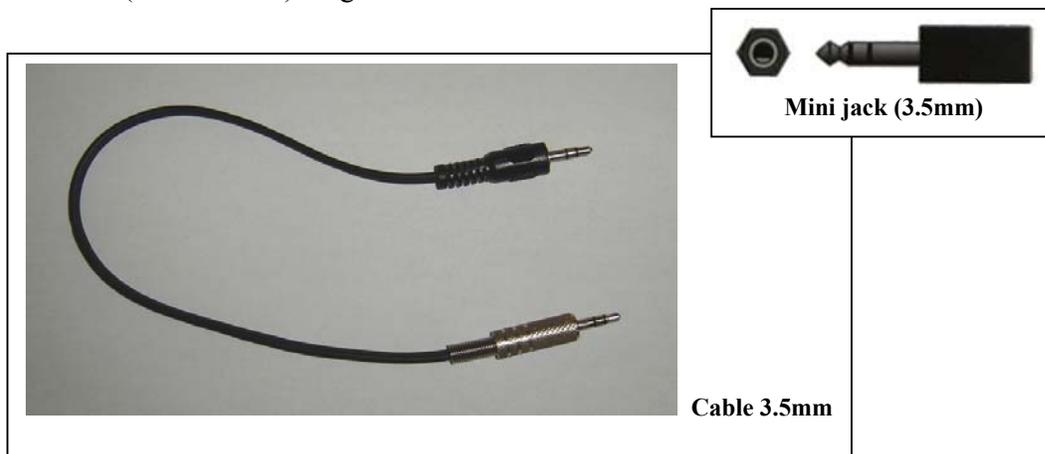
7. After finishing data transfer, to disconnect the USB cable from the computer or to remove the disc, make sure you do it safely to prevent data from damage or loss: click on the device icon on the desktop toolbar next the clock to allow the device to be removed safely or follow the instructions in your Hi-MD manual to eject the disc.

8. Then, import the sound file as WAV to Audacity (or other software) in order to do sound editing (combine or divide data). If you prefer, you can actually edit sound using SonicStage. You do not need to move the audio file to other software application. You also have the option to record the file transferred directly from *My Library* of *SonicStage* to a CD-R/RW. However, we have to take into consideration compatibility aspects for data access as SonicStage is proprietary software.

ii) Another way to transfer audio data to the computer is to use a short male-to-male cable connected to the Hi-MD earphones jack and to the notebook mike input – Analogue capture. Computer has to have a sound card. Sound capturing/editing software is also need. Differently from the digital transfer process presented above, this is a real time capture.



You have to arrange for a 3.5mm stereo male-to-male patch cable of only about 30 centimetres (11.81 inches) long.



We have to monitor audio input volume level so that the average of the louder sounds is around -12dB and -3db. To avoid distortion the peaks in audio must not exceed 0dB. If sound peaks exceed 0dB, we have to decrease volume level. The software I used, Audacity 1.2.4, has an audio-level meter that shows peak markers. A red line kept at the end of the meter indicates that a distortion has occurred. If distortion occurs as a result of any kind of sound other than human voice, just release the line with a mouse click. But in case of distortion caused by human voice peak, reduce the volume level. We can turn the volume down on the Hi-MD unit and/or on the operating system sound mixer.

Thus, we have to play the whole audio file first in order to adjust volume level before starting the recording process. After setting the optimum volume level, we can press the record button. Then, the first thing we will be asked about is sample and bit-depth rates. I chose 44,100 kHz and 32-bit rate (float), trying to follow the minimum recommended. Generally, the software will work at 32-bit resolution and save at 24 bits. After that, you say OK and recording starts. Press the play button on the Hi-MD unit. When the source finishes, press stop button. Press stop button when the source finishes. Then, check the bit-depth rate you want and save as WAV file. Make sure to disconnect the Hi-MD unit correctly.

Note that the safest option to prevent sound distortion would be to connect one end of the male-to-male cable to the Hi-MD Line-OUT and the other end to the Line-IN of the notebook if those output/input were available.

Following this process of analogue capture, you can transfer data to the computer an unlimited amount of times even if you have made digital data transfer (using USB connecting cable) previously, as long as you have kept the original file obviously.

In relation to the Hi-MD power input during digitisation, I have chosen battery power instead of DC power (house current through the supplied AC power adaptor) so as to prevent the risk of an electrical fault and as a result, preventing transfer failures such as sound distortion or destruction of audio data. But battery has to be fully charged. When using the USB cable, Hi-MD unit is powered directly through the USB port on the computer, but as a precaution against power failures use also a fully charged rechargeable battery. And before starting data transfer, disconnect and close any other applications.

Final Remarks:

Considering our work as linguists, there are more limitations on the use of USB interface than on the analogue interconnection. In addition, data transfer/capture through USB cable is not so secure. Although it takes more time to make analogue capture, in the environment I have presented here, I would rather to use a 3.5mm cable and good quality open-source software like Audacity than make a digital data transfer by using the USB cable and the Sony's proprietary software supplied with the Hi-MD. That is because throughout analogue capture I can control sound input onto the computer so as to select the highest sound volume without clipping (distortion), *i.e.* around -12 dB

and -3dB never exceeding 0dB. Besides, even files recorded in MD Mode (standard operation mode) can be transferred to the computer when using sound editing software other than SonicStage and more than only once. Additionally, if we can count on Line-OUT and Line-IN ports, analogue capture will be even safer than digital transfer via USB port and will provide a better sound quality without having to make any adjustment to the audio volume level. However, the second option (ii) of using a 3.5 mm cable to upload audio data to the computer is a re-recording process and we do not know exactly its consequences related to audio quality. A solution would be to use a Hi-MD recorder with a FireWire port, but such a unit is not produced by manufacturers at the moment. In this case, your computer would also have to be fitted with a FireWire interface.

One of the advantages of Hi-MD recorders worth to take notice is that it can also be used to make copies of our old cassette-tape recordings onto Hi-MD discs, by connecting a cassette player/recorder to its Line-IN (OPT) jack through a Line Cable. Besides, Hi-MD can store not only audio data but also texts and images. In terms of recording format, Hi-MD can record audio data in uncompressed Linear PCM format at CD quality and can store them in WAV format. It also gives the possibility to record in Hi-SP mode using the ATRACT3plus technology claimed to be a lossless compression format according to the Hi-MD manual. However, considering what have been stated here in terms of audio data transfer, Hi-MD is still not fully appropriate. Bearing in mind that Hi-MD device is an advance from the earlier MD format, it might also be improved and become more suitable for language documentation purposes in the future.

References:

Audacity - A Free, Cross-Platform Audio Editor Version 1.2.4 Help (2005)

CASTLE, Tom (2006). *Analogue Device to PC Digitisation*. MS, Endangered Languages Archive / SOAS, University of London.

Sony Corporation (2005). *Sony Hi-MD Walkman Portable MD Recorder MZ-RH910 Operating Instructions*.

WOOTTON, Cliff (2005). *A Practical Guide to Video and Audio Compression: From Sprockets and Rasters to Macro Blocks*. Focal Press Elsevier