NAGRA-SD

USER MANUAL

Software version V1.2.0.10

1 GUARANTEE

Audio Technology Switzerland certifies that this instrument was thoroughly inspected and tested prior to leaving our factory.

We guarantee the products of our own manufacture against any defect arising from faulty manufacture for a period of two years from the date of delivery.

This guarantee covers the repair of confirmed defects or, if necessary, the replacement of the faulty parts, excluding all other indemnities.

All freight costs, as well as customs duty and other possible charges, are at the customer's expense.

Our guarantee remains valid in the event of emergency repairs or modification being made by the user. However we reserve the right to invoice the customer for any damage caused by an unqualified person or a false manoeuvre by the operator.

We decline any responsibility for any and all damages resulting, directly or indirectly, from the use of our products.

Other products sold by Audio technology Switzerland S.A. are covered by the guarantee clauses of their respective manufacturers.

We reserve the right to modify the product, and / or the specifications without notice.

2 DELIVERED WITH

The package includes:

- 1 NAGRA-SD
- 1 USB cable
- 1 USB memory key (manual)
- 1 Working case
- 1 Carrying strap
- 1 SD card 2 GB
- Plastic machine support stand
- Mono microphone input cable with XLR plug

Optional accessories:

- 2070 120 000   Standard Stereo Cardioid clip-on microphone (red)
- 7070 121 000   High quality Omni Directional Mono clip-on microphone (blue)
- 7070 125 000   High quality stereo Cardioid clip-on microphone (green)
- 7070 122 000   High quality Cardioid Mono clip-on microphone (white)

- 2070 005 000   Tripod for table top use

- 7070 123 000   Stereo microphone input cable with XLR plugs
- 7070 127 000   Mono line input cable with XLR plug
- 7070 128 000   Stereo line input cable with XLR plugs

3 PANEL DESCRIPTION

3.1 Front panel key functions

1 VIEW key
- Swaps between different data displays (default display or file / rec format, date & time).
- If pressed when the directory of the memory is on the display, all details of the selected file will be shown (File format, date, time etc.)

2 CUE key
- Press to enter cue points during record, or to select the cue mode during playback.

3 FILES / MENU key
- A short press selects the directory (folders), a long press selects the menus.

4 A◯B key
- To enter 2 markers for a playback loop.

5 DELETE key
- Deletes the selected index.

6 POWER key
- To turn on or off the Nagra-SD (Must be pressed for 3 seconds to avoid accidental operation).

7 DOWN key ▼
- Stops a recording or playback.
- To move downwards in the directory or menus.

8 LEFT key ◄
- Rewinds during playback when pressed and held.
- Skip backwards during stop or play.
- In the menus, shifts to the left or quits them.
- Selects left channel sensitivity adjustment in stereo mode.

9 UP key ▲
- Starts a playback.
- Put the playback or record in pause mode.
- In the menus or directory, moves upwards.

10 RIGHT key ►
- Forwards during playback when pressed and held.
- Skip forwards to the next index during stop or play.
- In the menus, moves to the right.
- Selects right channel sensitivity adjustment in stereo mode.

11 RECORD key (centre key)
- Put the recorder in standby / EE mode (LED starts blinking slowly).
- Second press starts a record. (LED continuously on).
- Create a new file seamlessly while recording.
- Executes a selection in the menu mode.

12/13 INPUT LEVEL keys
- Decreases (12) or increases (13) the input sensitivity.
- In combination with the ◄ or ► key, adjusts left or right input sensitivity in the stereo mode.

14/15 OUTPUT LEVEL keys
- Increases (14) or decreases (15) the output level for the speaker or the headphone output.

16 PEAK LED
- Lights up when input clipping occurs.

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3.2 Rear side

1 MIC GAIN switch
- Selects high or low sensitivity for the microphone input.

2 FILTER switch
- Turns the low cut filter on or off.

3 AGC switch
- Turns the automatic gain control on or off.

4 FILE TYPE switch
- Selects a mono or a stereo file type.

5 MIC POWER switch:
- Turns on or off the 3V for Electret power.

6 QUALITY switch
- Selects one of the two templates named "High" or "Low" previously stored in the memory.

7 HOLD switch
- Locks or unlocks the keyboard during all modes, including power off.

8 SPEAKER
- Build-in speaker for playback monitoring (automatically disconnected when using headphones)

9 BATTERY COVER
- Slide down to open.

3.3 Left side

1 USB CONNECTOR
- For transferring files or external power.
- Software update.

3.4 Right side

1 SD slot

2 HEADPHONE / LINE output

3.5 Top face

LINE input
- Dual 3.5 mm stereo jack for line / mic inputs with mechanical fixings.

4 INSTALLING BATTERIES

Insert 2 "AA" batteries taking care of the correct polarity and close the cover. Rechargeable batteries (NiCd or Ni-mH) can also be used but they cannot be charged inside the NAGRA SD. The battery type used can be selected in the menu mode to give the correct battery reserve readings.

5 FIRST POWER ON

Push and hold the "**Power**" key (6) for 3 seconds, the machine turns on and shows the "**STOP**" window display, from where all the internal menu settings can be accessed and modified if necessary. Press the "centre" key (11) to move to the "**PRE-RECORD**" window, the led starts blinking slowly.

Note: An SD card must be installed for the "STOP" window to be displayed.

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6 RECORD WINDOW DESCRIPTION

Swapping between the 2 displays A & B is done via the VIEW key (1).

6.1 View

Area that indicates the name and function of the selected display

6.2 Input type

Indicates the currently selected input status (external microphone "EMIC" or line "LINE" input).

6.3 Input / record level

This sub-window is shown when pressing one of the input level keys (see third picture).
The record level for microphone input can be adjusted with the keys 12 & 13 in steps of 0.5 dB from +118 dB to +74 dB (45 dB range). Line from -29 dB to 15 dB.

6.4 AGC status

Indicates if the Automatic Gain Control is turned ON or OFF. The letters AGC appear inside the pre-record and record icon when active.

6.5 Output volume

The output volume level for headphones, line output or internal speaker (play mode) can be adjusted with the keys (14 & 15). The output volume
bar appears when pressing either of the keys.

6.6 VOR status

The Voice Operated Recording settings are made in the record settings menu. When turned on, the main pre-record display shows pause instead of stop. The letter "P" is also shown inside the pre-record icon. The AGC is automatically disabled in VOR mode.

6.7 Modulometer

Full scale from -50 dB to 0 dB with peak hold indicator for left and right channels.

6.8 Play / Record file name

The name of the current file during record or playback.

6.9 Play / Record counter

Display in hours, minutes & seconds since the playback or recording was started.

6.10 Total file / Free record time

Play progress Bar. In playback the counter shows the duration of the current file and in record it shows the remaining SD capacity left.

6.11 Cue counter, Cue position

The left counter indicates the total number of recorded files. The right counter indicates the number of the file ready to be played back. During record, the right counter increments every time a cue point is entered.

6.12 Run status

■ Stop
○ Monitoring (EE) mode (pre-record buffer)
● Record
▶ Play
▶▶ Forward
◀◀ Rewind
II Pause
AGC AGC active
P Pause VOR mode
VOR VOR recording

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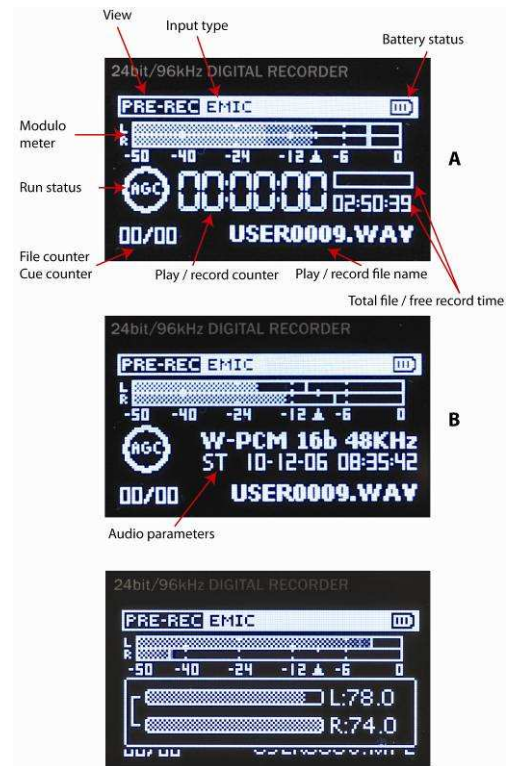
6.13 Audio parameters

This area shows (left to right), the current file type, the bit rate, the sampling frequency followed by date and time.

6.14 USB status

A sub window appears when the machine is connected via USB to a PC / MAC (selection of transfer or USB power).

6.15 Keyboard status

A sub window appears when the keyboard is locked by means of the hold key on the rear side.

6.16 Battery status

3 stripes inside the icon indicate full capacity. A fully charged set of dry cells should power the Nagra SD for 10 hours or more.

7 USING THE NAGRA-SD

Basic Introduction and General Information.

The NAGRA-SD is designed as a flexible hand-held recorder for a variety of applications. It can perform many functions, which are all covered in this manual. The operating concept is designed around a system of 2 pre-set TEMPLATES in which all the required operating modes are stored. The user can choose different parameters of the machine and these personalised settings are stored in a template for future quick access. If no specific user Template profiles are stored then the NAGRA-SD will operate using the "default" factory settings.

To access the menus of the recorder, press (and hold for 2 seconds) the FILES / MENU key.

This introduction covers various important global subjects. More complex operations can be understood by studying the different menus in detail. The topics covered are:

- Recording in the field
- Playback a previous recording
- Storing settings in a template
- Downloading to a computer

7.1 Recording in the field

General preparation:

Before making a recording the type of recording (file format, mono/stereo, input device etc.) need to be chosen. Two different "set-ups" can be pre-selected and stored in the HIGH and LOW templates in the menu mode. These templates correspond to the position of the QUALITY switch on the rear panel. So, for example, it may be decided that the HIGH position of the switch corresponds to 96kHz, PCM linear Stereo recordings, and that the LOW position corresponds to MPEG 1Layer II mono at 64kbits/sec. If nothing is set in the templates prior to the first recording, then the "default" settings will be adopted.

The default settings are as follows:

For the LOW quality position: MPEG 1 Layer II, Stereo at 256 kbits/s, 48 kHz sampling.
For the HIGH quality position: PCM-WAV, 16 bits Stereo at 48 kHz sampling.

To change either (or both) of these templates enter the menu mode by pressing and holding the FILES/MENU key. Enter the RECORD SETTINGS menu followed by the TEMPLATES then select either HIGH or LOW. All the desired settings for each position can now be selected.

Once completed, the Input device (external microphone / line input) for the recordings needs to be selected. This is also done in the RECORD SETTINGS menu.

When ready, press the centre key (11) and the NAGRA-SD will go to the "**PRE-REC**" mode where the audio input can be heard on the headphones and the levels seen on the display and adjusted using the level keys as necessary. If the AGC is turned off, the microphone input gain can now be adjusted in 0.5 dB steps using the keys (12 / 13), and the value is shown in a sub-window on the display.
The centre LED starts blinking slowly. In this mode the Pre-record buffer, when turned on (max. 3 seconds), is also active.

To begin recording, press the centre key once more (11). The red LED will stay red and the record symbol is shown on the display. The levels can be seen on the display and adjusted during recording as necessary, assuming the AGC is not activated.

To enter markers, during record, press the "**CUE**" key.

Attention: Cues can NOT be entered when recording RAW files.

To stop recording, simply press and hold the "**STOP**" key (7) for 3 seconds (until the time line in the sub window is filled up).

Pressing the REC key again while recording will create a new file seamlessly, and the file number will be incremented accordingly. Each new recording will be given a file name made up of 8 digits. This file will be stored in the work directory.

Note: Although a new file is created seamlessly, there will be a "gap" in the audio if played back on the SD, however if the files are downloaded to a PC there will be no gap. This gap is caused by the processing time needed to open the next file while playing back, which is limited in the recorder.

7.1.1 Adjusting input levels

The input levels can be adjusted using the + or – input level keys (12 & 13) in steps of 0.5 dB from 118 dB to 74 dB for microphone or from 15 dB to -29 dB for line input.

To adjust the stereo balance, press the + or – input level key momentarily to show the sub-window indicating the levels for both channels followed immediately by pressing momentarily the ◄ or ► arrow key (selects left or right sensitivity). Press directly the + or – input level key to adjust the selected input sensitivity.

Once the sub-window disappears both channels will be adjusted simultaneously while maintaining the delta between the channels.

7.1.2 The Automatic Gain Control (A.G.C)

The AGC is not an audio limiter. It operates in the digital domain and allows the operator to make recordings without under / over modulating when the audio levels are unpredictable.

It makes recording in the field easier and guarantees that a respectable level will be recorded. Automatic adjustment systems are rarely "better" than the manual modes, but can be considered "safer" in certain circumstances. It is also strongly recommended to switch on the low cut filter when using the AGC for recordings in noisy environments (example: Street noise).

7.1.3 Cue points during record

If during a recording, cue points need to be inserted, simply press the CUE key to enter a position. The lower left corner of the main display shows the number of cue points entered. In this example 2 cue points are already stored (02/02).

Beware that no cue points can be stored in RAW file types.

7.2 Playback of a previous recording

The NAGRA-SD can playback files irrespective of the current file format mode selected. To playback the last recorded file, press "**PLAY / PAUSE**" and the machine starts playback immediately. To stop the playback, press the "**STOP**" key. To pause the playback, use the "**PLAY / PAUSE**" key.

If the recording was made with markers (cue points), during the playback, first press the Cue key ("M" for markers appears on the display) briefly press the "**RIGHT**" or "**LEFT**" keys to jump to the next or previous marker position respectively.

To playback another file, cancel the Cue ("M" removed), briefly press the "**RIGHT**" or "**LEFT**" keys to scroll through the recorded files available. Once "**PLAY**" is pressed, the new file will be played immediately.

During a playback of a file, the full "**PLAY PROGRESS BAR**" corresponds to the total length of the file.

When a new file has been selected for playback, the "**TOTAL TIME**" counter will indicate its full length and the "**PLAY TIME**" counter starts incrementing once the playback begins.

During playback, to "**REWIND**" press and hold the "**LEFT**" key, to go "**FORWARD**" press and hold the "**RIGHT**" key.

Note: When playing back consecutive files, there will be a "gap" in the audio at the junction of the two files, if played back on the SD. However, there is no actual gap in the recording and if the files are downloaded to a PC there will be no gap between the files when read with an audio player. This gap is caused by the processing time needed to open the next file while playing back, which is limited in the recorder itself.

7.2.1 Adjusting playback levels

In playback additional boost of 1 to 12 dB is available (steps of 1 dB). This value is also shown on top of the display (HP followed by a number).

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In record or pre-record, the output volume level can be adjusted by the "**+ OUTPUT LEVEL -**" buttons in steps of 0.5 dB from -64 dB up to 0 dB.

7.3 Cue point selection during play

If a file contains cue points, it will be shown in the lower left corner of the main display.
In this example, it shows 00/04, meaning that the play position is actually before cue 1, (00) and that 4 cue points are present in this file (04). Before starting or during playback, press the CUE key once (the letter "M" is shown on the display). This permits to jump from one cue point to the next using the ◄ or ► keys.

7.4 Storing settings in a template (High, Low Quality)

Two templates are used to store the settings for the NAGRA-SD. These templates contain the file format to be recorded.

Templates: 2 templates are available (HIGH & LOW) and each can store the desired file type, sampling frequency and bit rate.
Note: the selection between the two templates is made using the switch (6) on the rear side of the machine.

To go to the programming position, in "**STOP**" mode, press and hold the "**FILES / MENU**" until the menus appear on the display. Select "**RECORD SETTINGS**" and press the right key. Select "**TEMPLATES**" and press the right key. Select one of the 2 templates and press the right key. Select the type of file format and press the right key, also chose the "**SAMPLE RATE**" and "**BIT RATE**". To quit the menus, press the left key several times.

Once completed, the desired template can be selected on the rear side of the NAGRA-SD by selecting the "**HIGH**" or "**LOW"** QUALITY as well as the type of recording ("**MONO**" or "**STEREO"** FILE TYPE).

7.5 Deleting an audio recording rapidly

Any audio file can be selected from the "**STOP**" mode. Press the "**LEFT**" or "**RIGHT**" keys to locate the desired audio file. Once the corresponding file is shown on the display, press the "**DELETE**" key and confirm to delete the file.

7.6 Downloading to a computer

Two methods can be used:

- Remove the SD card from the machine and insert it into a computer (PC or Mac). Use the Explorer to view the SD card and open the folder (default folder is "RECORD") to show the recorded files.
- Or turn on the Nagra-SD, connect it to a computer (PC or Mac) with a USB cable, select "Connection" on the Nagra-SD, and press EXE (11). The Nagra-SD shows "USB connected" on the display. Use the Explorer to view the external memory device and open the folder (default folder is "RECORD") to show the recorded files. Files can then be "dragged and dropped" to the computer as desired.

8 FILES & WORKING FOLDER

Pressing the Files/menu key for a short moment shows the audio files of the working directory.

The above pictures show several files or folder names and the actions that can be taken.
The up ▲ ▼ keys permit to scroll between the different audio files or folders.
Pressing the centre key on the folder icon or pressing the ► key (shows sub-menu) gives access to the different existing folder(s) present on the SD card.
Pressing the centre key on an audio file starts / stops the playback of the highlighted file.
Pressing the ► key (shows sub-menu) permits to select Play or Stop or Delete the selected file. If deleting is selected, a confirmation is requested.

Additional folders can only be made with Windows Explorer (or Mac) by connecting the NAGRA-SD to a PC (or by inserting the SD card in a PC).

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The working folder is by default the "RECORD" folder. If other folders are created by PC or Mac, any of them can be selected as a working folder as follows:

- From the main menu, by pressing Files / menu, select Files.
- Keep the folder icon highlighted and press the ► key. A sub-window appears showing "Up level". Press the EXE key and the different available folders will be shown.
- Highlight the folder that needs to become the working folder and press the ► key.
- Select in the sub-window "W. folder" to validate. The working folder is marked with a small triangle just below the folder icon (see last picture above).
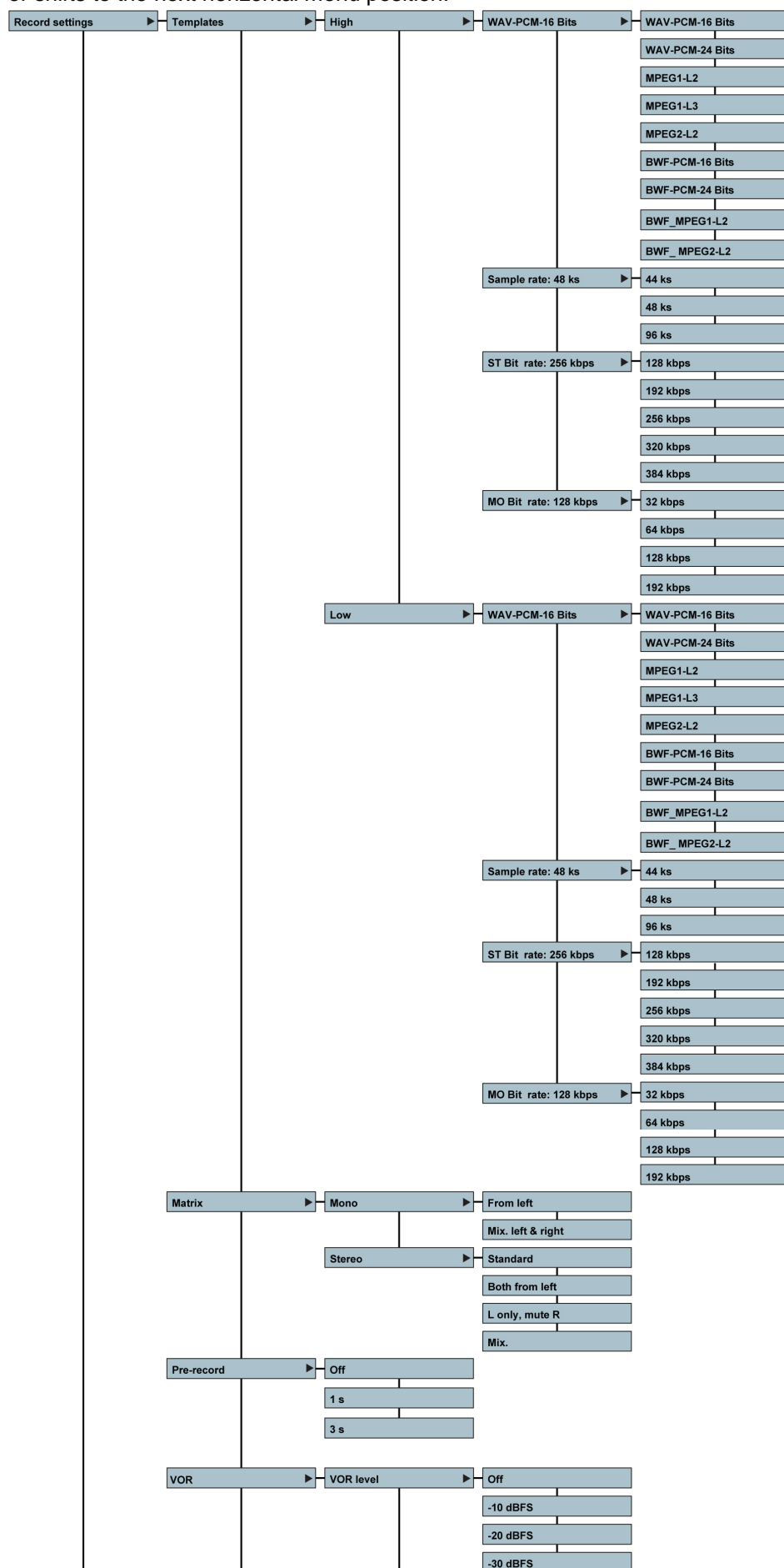
Once a file is highlighted, pressing the View key, the display shows all the information of the specific file.

Most of the settings and parameters of the NAGRA-SD are made through a selection of Menus.
Press the "**FILES** / **MENU**" key and a sub-menu appears giving access to the "**RECORD SETTINGS**" and "**SYSTEM SETTINGS**". The "**UP**" or "**DOWN**" keys will highlight the different choices and the "**EXE**" key (11) or "**RIGHT**" key (10) executes or shifts to the next horizontal menu position.

Record settings ▶	Templates ▶	High ▶	WAV-PCM-16 Bits ▶	WAV-PCM-16 Bits
				WAV-PCM-24 Bits
				MPEG1-L2
				MPEG1-L3
				MPEG2-L2
				BWF-PCM-16 Bits
				BWF-PCM-24 Bits
				BWF_MPEG1-L2
				BWF_MPEG2-L2
			Sample rate: 48 ks ▶	44 ks
				48 ks
				96 ks
			ST Bit rate: 256 kbps ▶	128 kbps
				192 kbps
				256 kbps
				320 kbps
				384 kbps
			MO Bit rate: 128 kbps ▶	32 kbps
				64 kbps
				128 kbps
				192 kbps
		Low ▶	WAV-PCM-16 Bits ▶	WAV-PCM-16 Bits
				WAV-PCM-24 Bits
				MPEG1-L2
				MPEG1-L3
				MPEG2-L2
				BWF-PCM-16 Bits
				BWF-PCM-24 Bits
				BWF_MPEG1-L2
				BWF_MPEG2-L2
			Sample rate: 48 ks ▶	44 ks
				48 ks
				96 ks
			ST Bit rate: 256 kbps ▶	128 kbps
				192 kbps
				256 kbps
				320 kbps
				384 kbps
			MO Bit rate: 128 kbps ▶	32 kbps
				64 kbps
				128 kbps
				192 kbps
	Matrix ▶	Mono ▶	From left	
			Mix. left & right	
		Stereo ▶	Standard	
			Both from left	
			L only, mute R	
			Mix.	
	Pre-record ▶	Off		
		1 s		
		3 s		
	VOR ▶	VOR level ▶	Off	
			-10 dBFS	
			-20 dBFS	
			-30 dBFS	

Menu tree

- VOR mode ► Pause
  - Split
- VOR delay ► 5 s
  - 10 s
  - 30 s
  - 1 m
  - 2 m
  - 3 m

- Input Device ► Mic
  - Line in
- Prefix name — U S E R / OK / Cancel
- **System settings** ► Time & date — 2010 / 04 / 15 / 06 : 57 : 20 / OK / Cancel
- Record LED ► On
  - Off
- Beep settings ► On
  - Off
- Speaker settings ► On
  - Off
- Auto skip ► On
  - Index loop
- Display extinction ► Off
  - 10 s
  - 30 s
  - 1 m
- Auto power off ► Off
  - 30 s
  - 1 m
  - 3 m
  - 5 m
- Battery type ► Dry cells
  - Ni-mH
- USB write protect ► On
  - Off
- Language setting ► English
  - French
  - German
- SD information —
  - SD information
  - Capacity: 3878 M
  - Free: 3870 M
  - Used: 8 M
  - OK
- SD speed test —
  - SD speed test / Are you sure to test SD speed? / OK / Cancel
  - SD test: Write 14% / Avg: 1.3M Ins: 1.3M / Min: 1.2M Max: 1.4M / DEL: Exit
  - Test finished! P1/2 / SD card is OK. / DEL: Exit
  - Speed: P2/2 / W Avg: 1.3M R Avg: 1.3M / W Min: 1.2M R Min: 1.3M / DEL: Exit
- SD format —
  - Format SD / Are you sure to format the card? / OK / Cancel
  - Formatting
- Version —
  - Version / Hw Ver: 1.0.0.0 / Soft Ver: 1.0.0.4 / OK
  - Version / Soft Ver: 1.2.0.0 / Loader Ver: 1.2.0.0 / OK
  - Version / Machine ID: 210B01994993E6C9 / OK
- System reset —
  - System reset / Are you sure to reset? / OK / Cancel
- System update —
  - System update / Loader Ver: 1.2.0.0 / Are you sure to update? / OK / Cancel
  - System update / Checksum OK / Starting update
  - System update / Updating....
  - System update / Update complete
  - System update / Power off
- Export configuration — Export finished!
- Import configuration —
  - Import configuration / Are you sure to import configuration from SD card? / OK / Cancel

Note: While surfing through the different menu windows in some cases the "**CENTRE**" key or "**RIGHT**" key can be used to advance one step but also the "**UP**" and "**DOWN**" keys. To go one step back or to escape from a particular screen press the "**LEFT**" key.
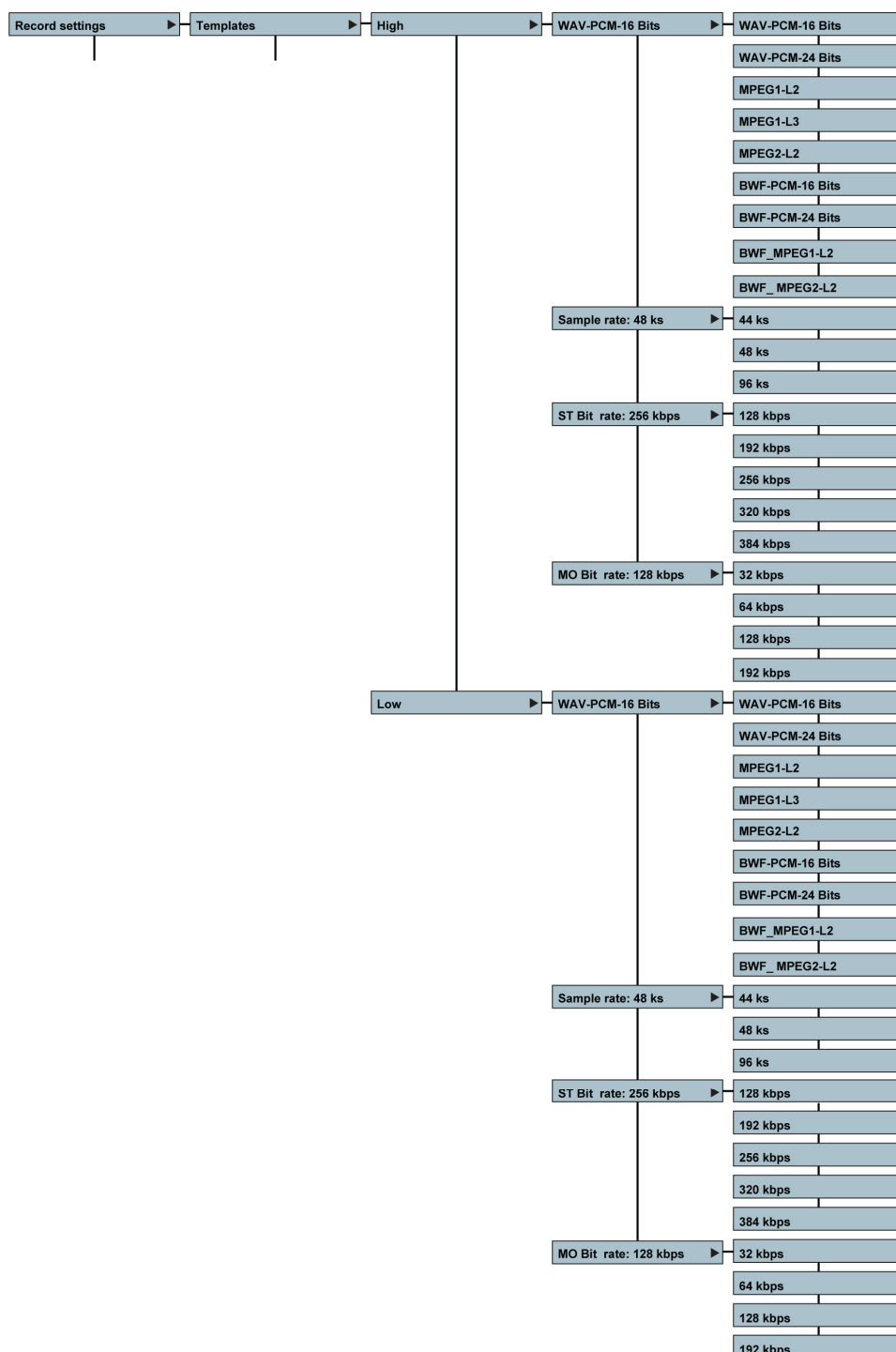
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9.1 Record settings

9.1.1 Templates

Before the templates can be selected with the QUALITY switch (6) on the rear side, they first need to be stored. 2 templates, "**High**" and "**Low**", for the file type, sampling rate, bit rate can be entered.

Several possibilities exist: WAV-PCM 16 or 24 bits, MPEG1L2, MPEG1L3, MPEG2L2. Select one of the possibilities using the "**UP**" or "**DOWN**" keys and press the "**CENTRE**" key to confirm and to go to the next step.

Once the compression type is selected, the corresponding sampling rate as well as the bit rate need to be entered.

Record settings ▶	Templates ▶	High ▶	WAV-PCM-16 Bits ▶	WAV-PCM-16 Bits
				WAV-PCM-24 Bits
				MPEG1-L2
				MPEG1-L3
				MPEG2-L2
				BWF-PCM-16 Bits
				BWF-PCM-24 Bits
				BWF_MPEG1-L2
				BWF_ MPEG2-L2
			Sample rate: 48 ks ▶	44 ks
				48 ks
				96 ks
			ST Bit rate: 256 kbps ▶	128 kbps
				192 kbps
				256 kbps
				320 kbps
				384 kbps
			MO Bit rate: 128 kbps ▶	32 kbps
				64 kbps
				128 kbps
				192 kbps
		Low ▶	WAV-PCM-16 Bits ▶	WAV-PCM-16 Bits
				WAV-PCM-24 Bits
				MPEG1-L2
				MPEG1-L3
				MPEG2-L2
				BWF-PCM-16 Bits
				BWF-PCM-24 Bits
				BWF_MPEG1-L2
				BWF_ MPEG2-L2
			Sample rate: 48 ks ▶	44 ks
				48 ks
				96 ks
			ST Bit rate: 256 kbps ▶	128 kbps
				192 kbps
				256 kbps
				320 kbps
				384 kbps
			MO Bit rate: 128 kbps ▶	32 kbps
				64 kbps
				128 kbps
				192 kbps

9.1.2 Matrix

The input matrix permits the routing the analogue input signal to the left and or right recording channel. As an example: After having selected Stereo both from left, making a stereo recording with only one microphone connected to the left input will record the same signal on the left and right channels.
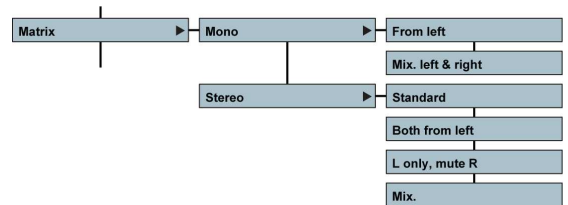
Matrix mode	Record file set	Output L	Output R
Mono from left	Mono	Input L	Input L
Mono Mix. Left & Right	Mono	Input L & R	Input L & R
Stereo standard	Stereo	Input L	Input R
Stereo both from left	Stereo	Input L	Input L
Left only, Mute Right	Stereo	Input L	No signal
Stereo mix.	Stereo	Input L & R	Input L & R

9.1.3 Pre-record

The pre-record buffer can be turned off or set to 1 or 3 seconds. The pre-record function can also be used in conjunction with the VOR function if desired.
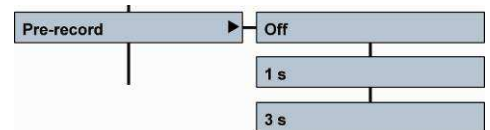
9.1.4 VOR

Access to the parameters of the Voice Operated Recording mode.

VOR Level: This sub-menu permits to set the minimum input trigger level before the recording starts, or to turn off the VOR mode.

VOR Mode:

Pause: The recording will be paused (with default settings: depending on the stop delay) if the level drops 25 dB below the trigger level. If the input level rises again above the trigger level, the recording on the same file will continue.

Split: The recording will be stopped (with default settings: depending upon the stop delay) if the level drops 25 dB below the trigger level. If the input level rises again above the trigger level, recording will re-start and a new file will be created.

VOR Delay: Selects the length of time that the recording will continue once the input level drops 25 dB or more below the trigger level.
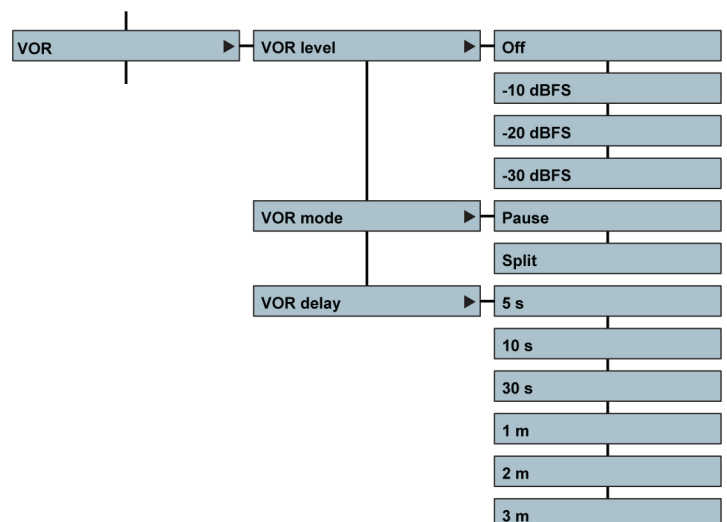
9.1.5 Input device

Permits to select the input device (external microphone or line input)
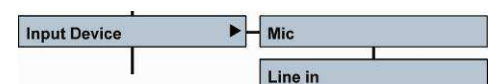
9.1.6 Prefix name

This sub-menu allows the first 4 characters of the file name to be customized. Once "**USER**" is highlighted, use the "**UP**" and "**DOWN**" keys to select a character.
Press the "**RIGHT**" key to move to next character etc. Once all characters have been entered, press "**OK**" and press the "EXE" key (11).
Example of a file name: USER0001.
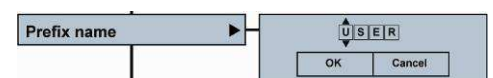
9.2 System settings

9.2.1 Time & Date

The "**TIME & DATE**" sub-menu sets the current time and date for the internal Real Time Clock (RTC) which will be used for each recording. Use the "**RIGHT**" key to highlight the item to be set. Use the "**UP**" or "**DOWN**" keys to select the corresponding digits and press the "**RIGHT**" key to move to the next digit. Once the settings made, highlight "**OK**" and press the "**CENTRE**" key.

Remark: The super capacitor will keep time and date running without batteries or USB power for approximately 24 hours.

9.2.2 Record LED

A RED recording indicator led is integrated in the centre key (11). Select the desired function and press the "**CENTRE**" key. In the "**ON**" mode, the recording led will blink slowly while the recorder is in pre-record mode and will light continuously once the record function is activated.

9.2.3 Beep settings

This menu turns on or off the beep warning signals in the headphones. The beep signal confirms that any function has been correctly interpreted.

9.2.4 Speaker settings

The built-in monitoring speaker can be turned off or set to auto. In the auto mode, the speaker only active in the playback mode and will be muted in all other situations. The playback level of the loudspeaker is controlled with the output volume buttons.

9.2.5 Auto skip

If "**On**" is selected, then all files of the same file format will be played back consecutively without stopping at the end of each file. Selecting "**Index loop**" restarts the playback of the same index continuously in a loop function.

9.2.6 Display extinction

To save battery power, the screen can be set to turn off automatically after a pre-selected time. This time starts to count after the last key press. After extinction, the display will re-light as soon as a key is pressed.

9.2.7 Auto power off

This menu allows a time delay to be selected, after which the recorder will power down when no keys have been pressed for the specified period (except when in record or play modes). Selecting "**Off**" disables this mode.

9.2.8 Battery type

Selects the type of battery used in the recorder. This ensures that the remaining power indicator is correct. Dry cells will deliver 3V, rechargeable Ni-mH deliver 2.4V which alters the indication of the battery fuel gauge.
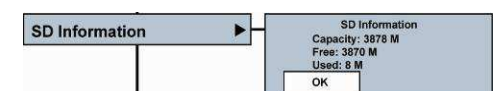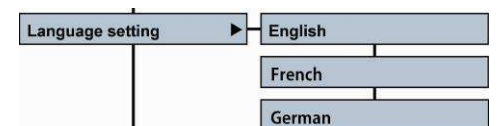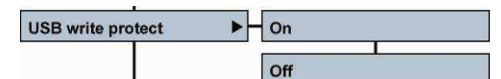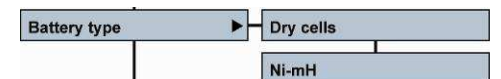
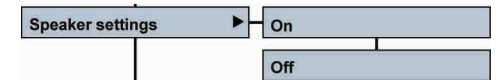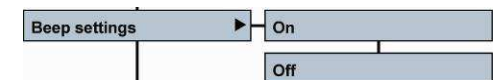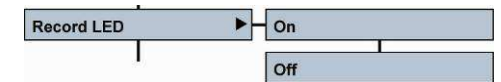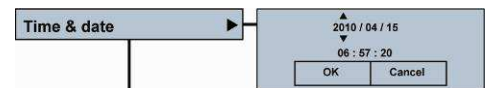### 9.2.9 USB write protection

When turned "**On**", no files can be copied to the recorder from a PC or Mac via USB.

9.2.10 Language settings

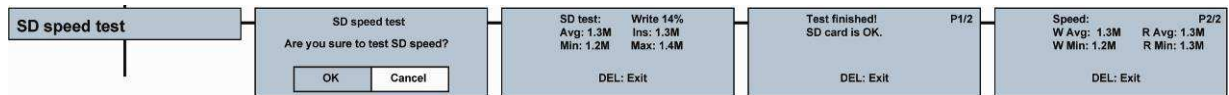English, French or German are available for all menu tree positions.

9.2.11 SD information

Gives information about the size, the free memory space as well as the used memory on the installed SD card.
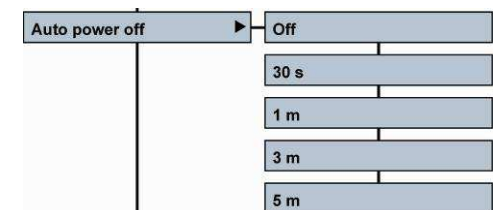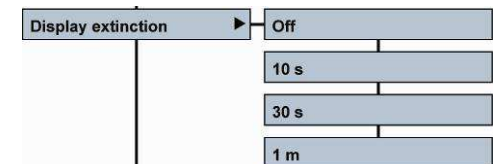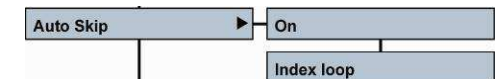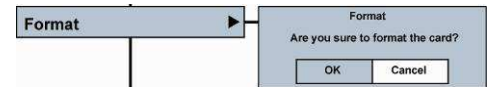
9.2.12 SD speed test

This menu allows the record and playback speed of an SD card to be tested. Some low cost SD cards are not particularly fast and may cause problems during recording particularly at higher sampling frequencies.
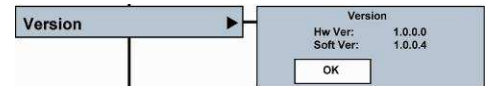
| SD speed test | SD speed test
Are you sure to test SD speed?
OK   Cancel | SD test: Write 14%
Avg: 1.3M   Ins: 1.3M
Min: 1.2M   Max: 1.4M
DEL: Exit | Test finished!   P1/2
SD card is OK.

DEL: Exit | Speed: P2/2
W Avg: 1.3M   R Avg: 1.3M
W Min: 1.2M   R Min: 1.3M
DEL: Exit |

9.2.13 Format

Formats the SD card. Attention: All files will be lost.

| Format   ► | Format
Are you sure to format the card?
OK   Cancel |

9.2.14 Version

Shows the hardware and software versions of the Nagra SD.

| Version   ► | Version
Hw Ver: 1.0.0.0
Soft Ver: 1.0.0.4
OK |

9.2.15 System reset

Reset all internal parameters to the factory default values.

| System reset   ► | System reset
Are you sure to reset?
OK   Cancel |

9.2.16 System update

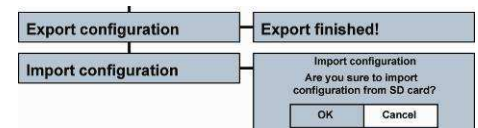| System update | System update
Loader Ver: 1.2.0.0
Are you sure to update?
OK   Cancel | System update

Checksum OK
Starting update | System update

Updating.... | System update

Update complete | System update

Power off |
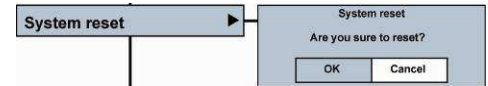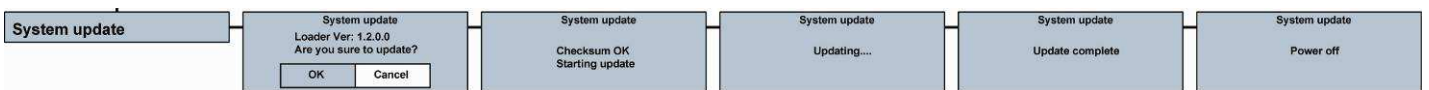
To update the internal operating software of the Nagra-SD, copy the update file (NagraSD.coe) from our web site (www.nagraaudio.com) to the root directory of the SD card. This can be done, either by inserting the card into an SD slot on the PC, or via an USB connection with the Nagra-SD.
In the system update menu, select OK and press the "EXE" key (11). At the end of the update cycle, the Nagra-SD will automatically switch off. When the Nagra-SD is restarted the new updated version will be used. This can be verified in the menu.

9.2.17 Export / Import the configuration

This function allows the settings of the "high" and "low" templates to be saved in a file on the SD card, which can in turn be uploaded into other NAGRA SD recorders.
Select "Export configuration" and the templates are automatically saved to the SD card. To load the templates on to another machine, insert the SD card containing the configuration, select "Load" and confirm. Beware that the previous stored templates in the machine are overwritten by the new configuration.

| Export configuration | Export finished! |
| Import configuration | Import configuration
Are you sure to import
configuration from SD card?
OK   Cancel |

10 MICROPHONES AND SETTINGS.

The Nagra-SD can use the following microphones:

External mono cardioid clip-on mic	(White band)
External standard stereo cardioid clip-on mic	(Red band)
External mono clip-on mic	(Blue band)
External high quality stereo cardioid clip-on mic	(Green band)

The standard Stereo microphone (Red band) contains two cardioid capsules.

The high quality stereo microphone (Green band) has two cardioid capsules, mounted on special shock resistant neoprene mountings. The capsules are individually selected and matched in both noise and gain characteristics, according to a strict selection and measurement protocol. This microphone offers a good stereo image, and is very versatile.

The mono capsule (Blue band) is an omni-directional capsule, which offers two principal differences to the stereo capsule. Firstly, being an omni-directional capsule it captures much more of the ambience and is ideal for on-the-move journalism, especially because most interviews are mono. Secondly, in an interview situation it is not necessary to "point" the microphone at the person speaking. The omni-directional characteristics allow all those being recorded to be captured equally, hence making the journalist job less intimidating. In addition it offers longer recording times to the Nagra-SD as the recorded files can be mono.

The mono cardioid microphone (White band) contains one of the same capsules present in the cardioid high quality stereo mic. It gives monophonic directional characteristics, and will capture less of the ambient surrounding noise than the blue band mono mic.

The use of the foam windshield is strongly recommended with the clip-on NAGRA microphones, particularly outside where wind conditions can affect the recordings.

11 LOW CUT FILTER

The Nagra-SD is equipped with an analogue low cut filter integrated within the microphone preamplifier. This filter can be turned ON or OFF as desired.

The frequency of the cut is at 100Hz with a gradient of 40 dB / octave.
This filter can be activated for each microphone type, using the switch on the rear of the Nagra SD.
It is especially useful for recordings made using directional microphones outside in windy conditions, such as the green band stereo microphone. In fact, cardioid (speed capsules) such as the NAGRA microphones are susceptible to vortexes induced by wind moving round the microphone capsule, contrary to omni-directional (pressure) capsules, which are not.

Note however that the NAGRA microphone is equipped with a fine silk screen directly behind the grill / basket carefully positioned to compensate for these vortexes and "pop" effects. It is also recommended to use the external foam windshield whenever one works outside when unexpected wind noise may be encountered.

     July 25, 2012
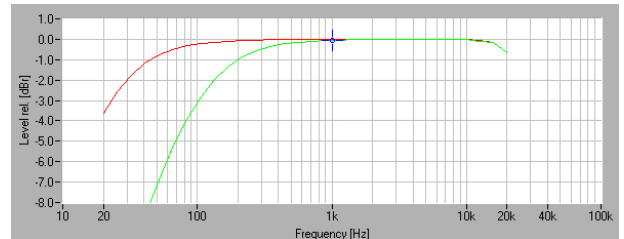
## 12 AUDIO COMPRESSION (WHY AND WHEN TO USE IT).

The Nagra-SD is able to record using different Audio qualities PCM Linear, MPEG Layer II (MP2) and MPEG layer III (MP3) that have their own particular advantages, which are explained below.

What to use?

Firstly, the less compression used, the better the quality of the recording will be. However at higher bit rates (384 kbits/s) you can easily record music and probably not notice any difference.

A few guidelines should be considered:

For journalism / interview work it is unnecessary to use PCM linear. Generally MPEG 1 Layer II is used and the compression / bit rate is generally defined by the broadcaster.
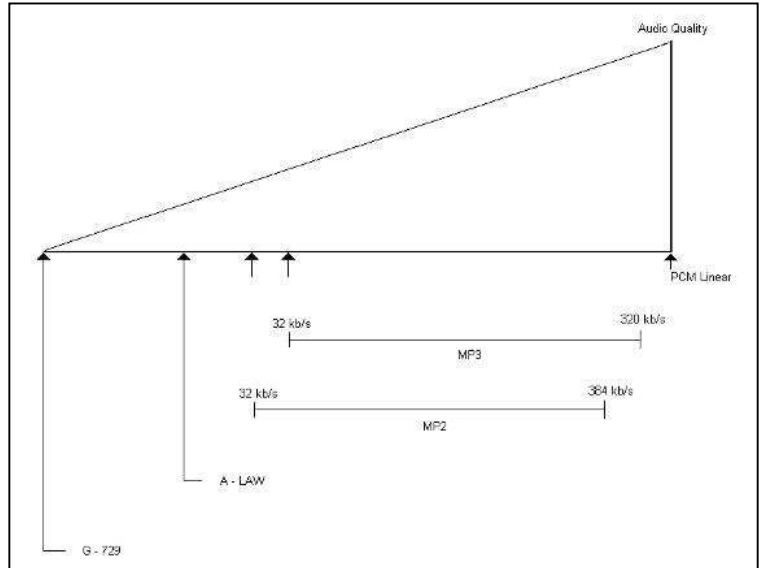
For music / effects PCM linear is the best quality although MPEG at a high bit rate is probably good enough and gives faster download time.

For ultra-long recordings use a very low bit rate, where quality will be "Dictaphone" quality.

Some important things to remember:

- Some computers will not play MPEG 1 Layer II compressed files without appropriate audio editing software. Typically some versions of the Windows Media player fall into this category.

- Audio CD's will only accept 44.1 kHz linear PCM 16 bit if they are to be played on a standard CD player.

13 USB

The miniature USB port serves two purposes: File download / upload or external DC powering.
Audio can be extracted either through the line output in normal playback mode or alternatively via the USB port to the PC / MAC.

Connect the USB cable to the computer and to the recorder and power up. When the USB is connected, a sub-window appears giving the possibility to select "**Power**" or "**USB communication**". Make a selection and press the "**CENTRE**" key.

The USB power position is for simply powering the Nagra-SD through the USB port for normal operation without internal batteries.

If the USB transfer is selected, the machine will immediately appear as a removable disk in the explorer of the PC/MAC. The Nagra-SD display shows "USB Connecting".

On a PC or Mac, the Explorer will display a folder called "RECORD" in which all recorded indexes are stored.

- Download speed from the machine to the computer is at a fixed bit rate and will take about 1 minute per GB to copy.

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NAGRA

DECLARATION DE CONFORMITE
DECLARATION OF CONFORMITY   C E

FABRICANT: NAGRAVISION S.A. KUDELSKI GROUP, 1033 Cheseaux SUISSE
MANUFACTURER: *NAGRAVISION S.A. KUDELSKI GROUP, 1033 Cheseaux, SWITZERLAND*

APPAREIL : Nagra SD
MODEL: *Nagra SD*

NORMES APPLICABLES :
APPLICABLE NORMS:

Champ électromagnétique rayonné	EN 55022 Cl. B
Radiated electromagnetic field	*EN 55022 Cl. B*
Immunité aux champs électromagnétiques	EN 61000-4-3
Immunity to electromagnetic fields	*EN 61000-4-3*
Immunité aux décharges électrostatiques	EN 61000-4-2
Immunity to electrostatic discharges	*EN 61000-4-2*
Immunité aux aux transitoires électriques rapides en salves sur câbles d'entrées/sorties signaux	EN 61000-4-4 level 1 (500V)
Immunity to burst on input/output signal line	*EN 61000-4-4 level 1 (500V)*

Cheseaux   2ème trimestre 2011
Cheseaux   2nd   quarter 2011

Paul Rebmann

Paul Rebmann (signature)

Gestion des déchets d'équipements électriques et électroniques
Regulation on waste electrical and electronical equipment

En fin de vie de l'appareil, amener à un centre de récupération des déchets.
 Please dispose off through an appropriate recycling centre.

        July 25, 2012

14 SPECIFICATIONS

GENERAL

Data Storage medium	SD HC / card FAT 32
Recording Method	Digital (PCM) or Digital compression
Compression type	ISO MPEG Layer II / III
File Format	16 / 24 Bit Wave Format (xxx.WAV) or MPEG Raw (xxx.MP2, xxx.MP3)
Sampling Rate	From 24 to 96 kHz selectable
Compress Bit-Rates	32 to 384 kb/s
Mono/Stereo	Switchable
Dynamic Range Adjustment	45 dB for 0 dB record
Filters	"Flat", "LFA"
Automatic Gain Control	"ON", "OFF"

INPUTS

Mike Inputs	3.5 mm stereo jack connector
Mike Powering	3V Electret
Mike Input Sensitivity	Minimum 1.5 mV (Electret) for full scale
	Minimum 650 µV (Dynamic)
Line Inputs	3.5 mm stereo jack connector
Line Input Sensitivity	33 mV to 6.2 V for 0 dB recording

OUTPUTS

Headphone / Line output	3.5 mm stereo jack connector
Line Output Level	Maximum 0.9 V

RECORDED FILE

THD + N at 1 kHz	0.025 %
Frequency Response	25 Hz – 20 kHz (-3 dB in EE mode)
Total Dynamic Range Line Output	Up to 80 dB
Total Dynamic Range On Recorded File	Up to 90 dB
Built-in Speaker	0.1 W
USB	2.0

POWER SUPPLY

Internal Batteries	2 x "AA" cells
Consumption	3 V, maximum 150 mA (> 10 hours)

PHYSICAL

Dimensions	107 x 63 x 24 mm (4.2 x 2.6 x 1 inch) w/o plug-on mike
Weight	250g, (0.5 lb) incl. batteries, w/o plug-on mike

Specifications are subject to modification without notice.

AUDIO TECHNOLOGY SWITZERLAND SA
Chemin de l'Orio 30A
CH-1032 Romanel-sur-Lausanne
Switzerland

Phone +41 (0)21 643-7240
Fax +41 (0)21 641-7532
E-mail: info@nagraaudio.com

 July 25, 2012