

# OPERATING INSTRUCTIONS

## AND

### REFERENCE MANUAL

# NAGRA EMP



Version Nagra EMP PC: V1.024  
Version Recorder: V6.00

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## **Guarantee / Warranty**

NAGRA/KUDELSKI certifies that this instrument was thoroughly inspected and tested prior to leaving our factory and is in accordance with the data given in the accompanying test sheet.

We guarantee the Nagra EMP 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 NAGRAVISION / KUDELSKI S.A. are covered by the guarantee clauses of their respective manufacturers. We decline any responsibility for damages resulting from the use of these products.

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

## Introduction to the Nagra EMP

The Nagra-EMP is a stereo / 2 channel portable preamplifier designed for classical music and film / TV location recording. In addition a simple 2 channel 16 bit recorder is included. All controls as audio limiters, filters, Phantom power, record are controlled from the front.

The front panel, chassis and features were all designed using the experience of previous NAGRA recorders which render the Nagra-EMP to very user-friendly and comfortable to operate even in harsh environmental conditions. It is powered by a 4 AA cells. The autonomy without recording is approximately 4 hours (No Phantom, no record). It is equipped with a Hirose connector allowing external power.

The Nagra EMP has two analogue inputs on XLR connectors, equipped with extremely high quality microphone preamplifiers. They include, as one expects, +48 V phantom powering and in-house wound NAGRA transformers offering an improvement of +6 dB in the noise floor when set to the 2 mV/Pa (for dynamic microphones) position.

Connected to a Nagra VI, you obtain 6 high quality microphone inputs instead of 4.

Any questions you may have concerning the Nagra EMP can be sent to us through the "Contact us" form on the professional side of our web site [www.nagraaudio.com](http://www.nagraaudio.com)

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## Power introduction

The Nagra-EMP can be powered by internal or external power.

Internal power is on 4 “AA” cells. To install the batteries, remove the bottom cover by sliding the pad. Install the batteries in such away that the 2 plastic ribbons are below the cells. This makes it easier to extract them later. Rechargeable cells may be used but they will not be recharged by the external power supply.

External power enters the preamplifier via the Hirose connector. The voltage must be between 9 to 13 V. The minimum power needed is 3.5 W.

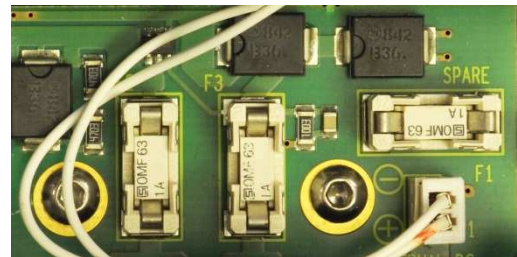
Optional Hirose cables

- 2032 265 000 Hirose power cable Male-Male 50 cm
- 2032 266 000 Hirose power cable Male-Male 1 m

## Fuses

The power supply board is accessible in the bottom of the preamplifier by removing the lower panel and is equipped with 3 fuses to protect various elements. These fuses are of the OMF 63 type and manufactured by Schuller and do not require soldering. Replacement fuses are available through your Nagra distributor.

F1:	1A	Spare fuse
F2:	1A	Internal batteries
F3:	1A	Hirose connector



## Power indication

The power indication only operates on the internal batteries. If the batteries are in place and the power button is pulled to “TEST” 1 or 2 of the led's above the channel 1 sensitivity adjustment will light up:

Green:	Full power (6 V to 4.5 V)
Green & yellow:	Power (4.5 V to 4.4 V)
Yellow & red:	Power (4.4 V to 4.2 V)
Yellow:	Power (4.2 V to 4.0 V)
Red:	Low power (below 4 V)

Consumption on batteries:

- 6 V, 240 mA or 1.44 W without Phantom use and not recording
- 6 V, 360 mA or 2.16 W with Phantom use (charged, 2 x 4 mA) and not recording
- 6 V, 310 mA or 1.86 W without Phantom use and recording
- 6 V, 430 mA or 2.58 W with Phantom use (charged, 2 x 4 mA) and recording

Maximum consumption on external power:

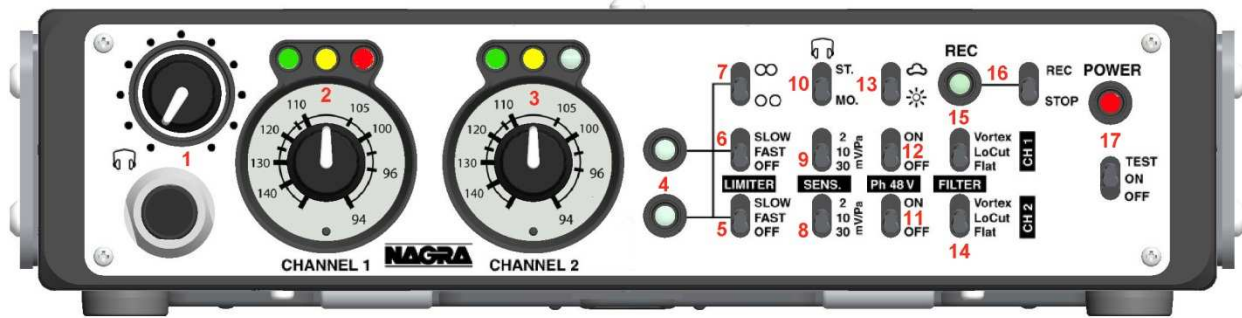
- 9V, 310 mA or 2.79 W with Phantom use (charged, 2 x 4 mA) and recording
- 13V, 205 mA or 2.67 W with Phantom use (charged, 2 x 4 mA) and recording

Autonomy on batteries:

- Panasonic Alkaline Xtreme power, approximately 2 hours with Phantom use (charged, 2 x 4 mA) and recording
- Panasonic Alkaline Xtreme power, approximately 4 hours without Phantom use and not recording
- Rechargeable Sanyo 2500 mA, approximately 2 hours with Phantom use (charged, 2 x 4 mA) and recording

If the batteries are not present and an external supply is connected, the “TEST” position will turn on the red led.

## Front panel description



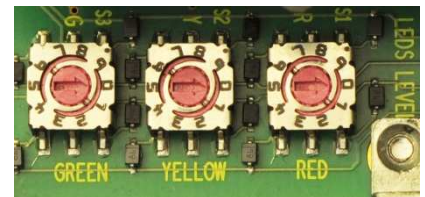
### Headphone jack output & level adjustment (1)

The potentiometer adjusts the level of the headphone output only (not line output). The jack is a standard 6.3 mm (1/4") type.

### Input sensitivity pots and modulometers (2 & 3)

The potentiometer adjusts the input level in a range of 66 dB. The modulometer above indicates the level:

The led's above indicates the input level and can be preset inside the preamp. To do this, turn off the preamplifier, remove the bottom cover and adjust the selectors as required. Beware that new settings will be activated only after a power off /on.



<p>RED: 0 = turns on at -1 dBFS            1 = turns on at -2 dBFS            2 = turns on at -3 dBFS            3 = turns on at -4 dBFS            4 = turns on at -6 dBFS            5 = turns on at -9 dBFS</p>	<p>YEL: 0 = turns on at -9 dBFS            1 = turns on at -12 dBFS            2 = turns on at -15 dBFS            3 = turns on at -18 dBFS            4 = turns on at -24 dBFS</p>	<p>GRE: 0 = turns on at -30 dBFS            1 = turns on at -39 dBFS            2 = turns on at -47 dBFS</p>
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Factory default settings are: RED at -1 dBFS, YELLOW at -9 dBFS, GREEN at -30 dBFS.

### Limiter activity led's (4)

If the limiter(s) is turned on, the led's are lighting up when the limiter activates.

### Limiter selection (5 & 6)

Permits to set the limiter to "FAST" or "SLOW" reaction time or turns it "OFF". The limiters start to activate at a signal level of -9.5 dBFS and from the range of -8 dB to -2 dB they compress the audio by 36 dB (max + 36 dB for -2 dBFS).

### Limiter ganging (7)

The upper position means ganged, the down position means independent. When ganged, if one channel limiter is activated, then the other will activate automatically irrespective of its input level.

### Input sensitivity selection (8 & 9)

The 2 microphone inputs can be selected to one of three different sensitivity settings, of 2.8 mV/Pa, 10 mV/Pa or 30 mV/Pa. The 2.8 mV/Pa sensitivity position goes trough a high quality Nagra input transformer and is designed for use with dynamic microphones.

### Headphone output selection (10)

Can be set to "MONO" or "STEREO".

### Phantom power selection (11 & 12)

Turns on or off, independently for each channel, the 48 V Phantom power.

### Led dimmer (13)

Permits to reduce the led brightness (reduces power consumption)

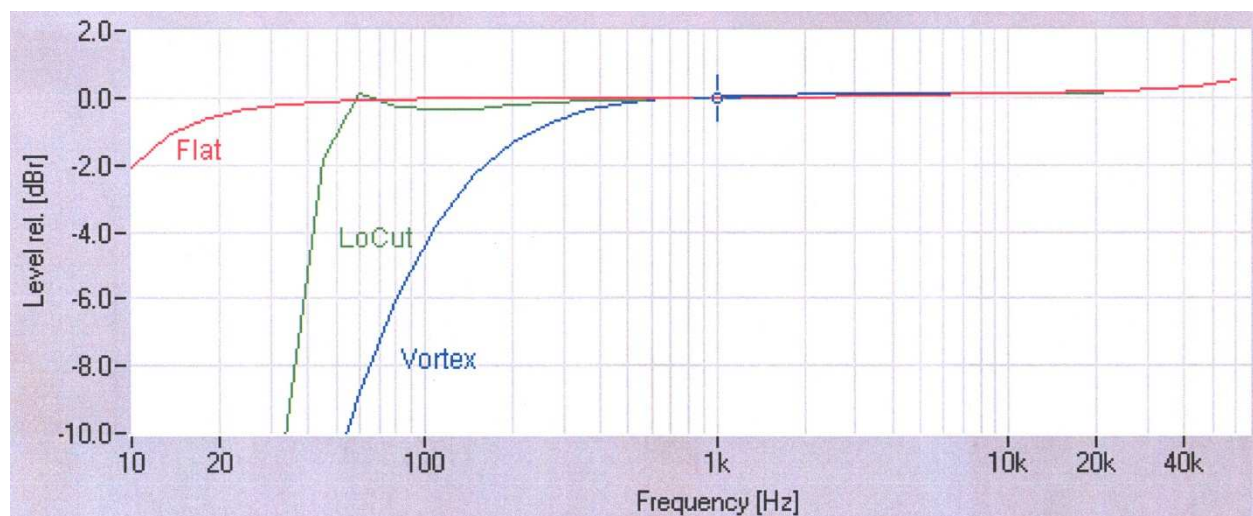
### Filter selection (14 & 15)

Unlike most other pieces of equipment, the Vortex filter as well as the low cut filter is embedded in the very front-end of the microphone preamplifier. The Vortex filter specifically designed to give ultimate protection against wind / boom microphone noise. This filter is designed to allow the Nagra EMP to be used in the most difficult conditions on location.

The input filter on the Nagra EMP is a hardware filter and is therefore not software programmable. The reason for this choice is simple. A software programmable filter is a digital filter in the heart of the digital part of the audio chain. Wind noise coming into the preamplifier will already have done its distortion and overloading directly in the preamplifier long before it gets to the digital filtering stage. The filters in the Nagra EMP roll off -3 dB at 150 Hz and then at 12 dB per octave. If an alternative curve is required, then provision is made on the input circuit board to add capacitors accordingly and the necessary values can be supplied if necessary.

The low cut filter roll off -3 dB at approximately 60 Hz.

3 possibilities: "Flat", "Low cut" or Vortex".



### Recorder control and indicator (16)

Turns on or off the built-in 16 bit recorder. This recorder has a built-in recording capacity of 2 GB of Flash memory. The recordings can be made in a PCM BWF or WAV format as well as in MP2. The setup of the recorder as well as the download of the files is made via a Nagra EMP software on PC through the mini USB port.

### Power on switch (17)

When set to "ON" the led above the switch will light up. When pulling the switch to "TEST", in the case of the use of internal batteries, the left modulometer gives an indication of the battery status. At the moment that the power switch is set to off, the power led starts blinking for 5 seconds before the power off takes place. So during a little less than 5 seconds, the switch can be set to ON without switching OFF the unit.



## Rear panel description



### USB connector.

This is used for setting up the recorder via PC or for downloading the recorded files. No power from the Nagra-EMP is required to setup or download the recorder files.

### Hirose DC connector.

Beware that the maximum power draining reaches 3.5 W (recorder included) and that the voltage range goes from minimum 9 V up to maximum 13 V. When using the external power, the internal batteries are automatically disconnected.

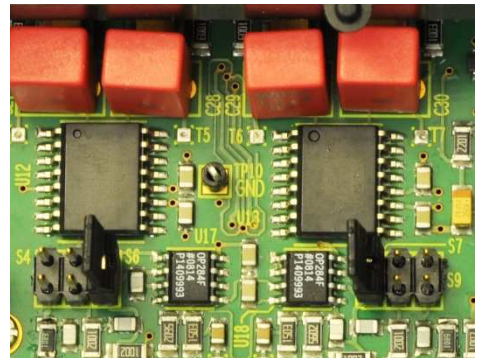
### Line output XLR's.

The line output level can be preset inside the Nagra-EMP (jumpers S4, S5, S6 for CH1 and S7, S8, S9 for CH2). 3 levels are available. To set the jumpers, switch the unit off and remove the bottom panel.

S4, S9 = 4.40 V, 15 dBu for FS

S5, S8 = 1.55 V, 6 dBu for FS

S6, S7 = 0.775 V, 0 dBu for FS





## “NagraEMP” software installation.

In order to operate the built-in recorder it needs to have the NAGRA EMP software installed on a PC to enable to be “set-up”. The latest version of the NAGRA EMP software can be found on our web site [www.nagraaudio.com](http://www.nagraaudio.com).

Connecting the Nagra EMP preamplifier to a PC on which the NAGRA EMP is NOT installed or not running will have no effect and the recorder will be “invisible” for the user. Likewise, attempting to “run” the NAGRAEMP software on a PC WITHOUT the Nagra preamp connected will immediately close the window (a NagraEMP icon will be shown in the bottom right corner), until the Nagra EMP is connected via USB.

Before connecting the Nagra EMP to the PC or laptop. Insert the Nagra memory stick in the PC or laptop or use the downloaded version. With Windows Explorer select in the memory stick EMP\_Installer\_Vx.xxx or the downloaded version and double click to start the installation.

### Important note

If a previous NAGRA EMP software was already installed on your PC or laptop, uninstall first, then power down the PC or laptop and start again.

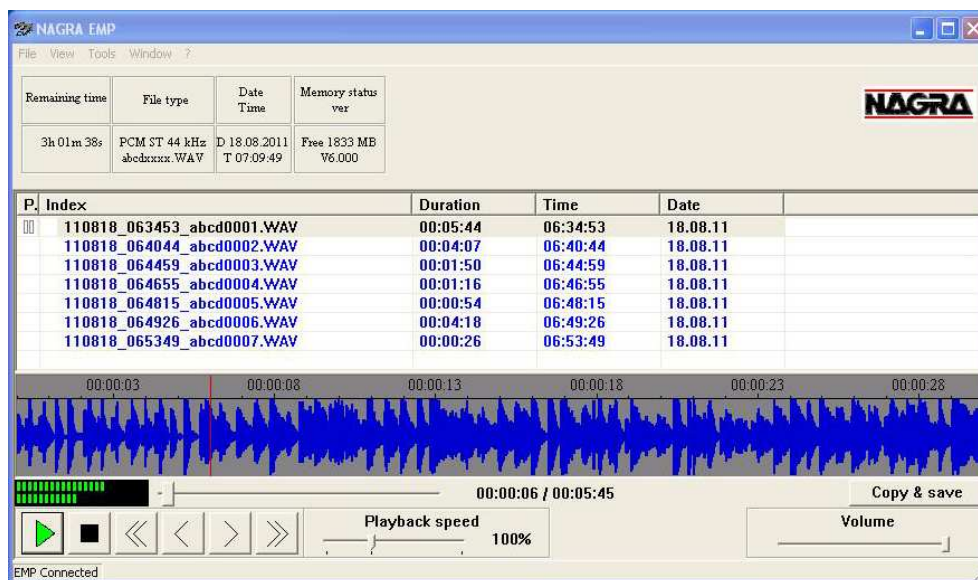
Once installed, via the “Start” button, “All Programs”, select “Nagra EMP” and run.

The program starts and immediately disappears (it runs in the background of the PC until a Nagra EMP is connected to the USB port).

Connect the EMP (in power off mode) via the USB cable to the PC or laptop. The EMP will be powered via the USB cable from the PC or laptop (No need to turn on the Nagra EMP). The first time it is connected, the Nagra EMP will be recognised by the PC or laptop. Once this is done, the program starts.

## Recorder setup

The top of the screen shows the current settings of the machine (status bar).



In this example:

- The remaining recording time is 3h01m38s.
- The file type is PCM stereo at 44.1 kHz and the recorded filenames will start with abcdxxxx.
- The date & time are August 18, 2011 & 07h09m49s.
- The memory status shows a free memory of 1833 MB and the software version is V6.xxx.

By selecting “View”, the following sub-windows become available:

- File type
- Date & Time
- Player

## File type

From the “View”, select “File type”.

The file type window allows to select PCM (linear) or MPEG compression recording, Mono / Stereo, sampling frequency, bit rate, file name (4 characters) and the file extension name to be selected.



- **Type**  
This is the audio recording method selection. Two possibilities are available: PCM (linear non-compressed) or MPEG 1 Layer II.
- **Channels**  
Selection of Stereo or Mono recording. When selecting mono recording, both input channels will be mixed to a single channel.
- **Sampling frequency**  
Three selections are available: 32, 44.1 or 48 kHz.
- **Bit rate**  
The bit rate can only be selected when recording in MPEG. Bit rates can be selected from 32 kb/s up to 384 kb/s. Note that the full “Subjective” bandwidth is obtained if a single channel is recorded with a minimum of 128 kb/s (stereo recording minimum 256 kb/s).
- **File name**  
The first four characters can be personalised. To do this, use the mouse and the left mouse button, to highlight the characters and replace them. Once changed, click the “OK” button to enter this new information into Nagra EMP.
- **File extension**  
As standard, all file extensions have the name xxx.WAV. In the case that some players, analysers or editors are requesting a dedicated extension, apply the same rules as for the file name.

Once all the information is entered, press the “Apply” button to save those settings in the EMP recorder (check the status bar).

## Date & Time

From the “View”, select “Date & Time”.

- Using the left or right arrows, row by row, increment or decrement the settings. Once the correct time and date is set, press “Apply” and verify in the status bar that time & date is updated.

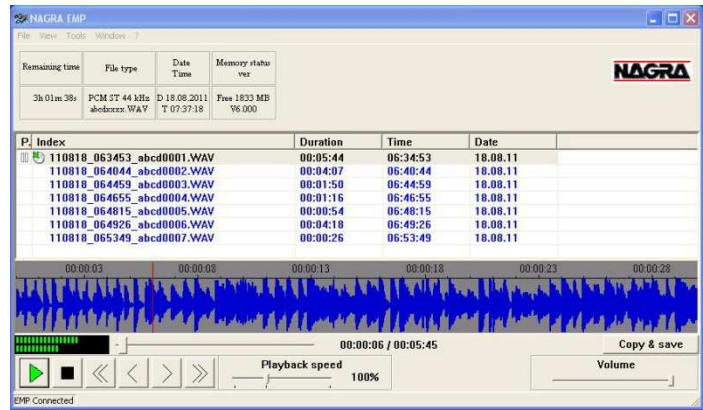


The recorder contains a built-in super capacitor keeping the real time clock running, even without batteries or external power. It will maintain the clock for up to 90 hours. If the super capacitor is totally empty (due to long storage without battery pack), it will need minimum one minute of charge once the Nagra EMP receives batteries or external power.

## Player

The main functions are playback, delete, copy to a local hard drive USB key or even create a CD/DVD.

The player shows the list (Index column) of recordings in the memory of the Nagra EMP. As an example, the first index 110818\_063453\_abcd0001.WAV was recorded in 2011, 8<sup>th</sup> month, 18<sup>th</sup> day or August 18, 2011 started at 6 h 34 m 53 seconds.



The other columns clearly show the DURATION, TIME and DATE.

To select an index, move the pointer to the index, press the left mouse key.

To playback an index, move the pointer on the index and double click the left mouse key.

The playback can also be started by first highlighting an index followed by pressing the green play button or simply by a double click on an index.

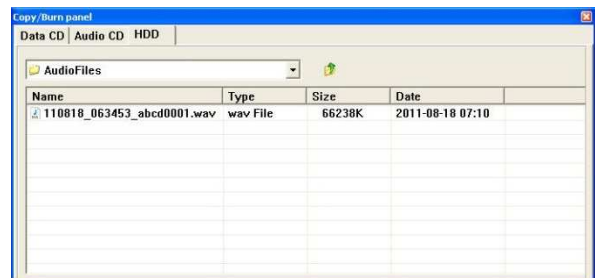
During play, the fast forward or rewind keys (single arrow) moves the playback position inside the selected index. To jump to a previous or next index, use the double arrow keys. The playback speed potentiometer adjusts the playback from 50 % to 200 % of the nominal speed. The volume button controls the output level of the audio card inside the PC.

To select additional functions such as delete, press the right mouse key. A sub-menu appears, permitting to play, delete all or delete a highlighted index.

## Copy / Burn panel

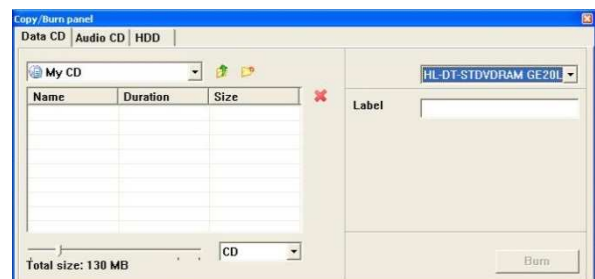
To access to the Burner, press the "Copy / Save" button in the player window.

Before selecting any files, first select in the Copy / Burn panel if the files need to be burned on a CD / DVD or Audio CD or copied to HDD.



Return to the main window, select the files and press "Copy & save"

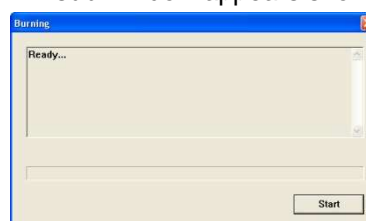
In case of CD / DVD burning, select the target burner in the upper right corner and add eventually a label name. The lower area of the window will later on show the used size versus the total available memory. Observe in the bottom left corner that the total file size stays below the maximum capacity of the CD / DVD memory size.



Return to the main window and select the files to be burned and press "Copy & Save".

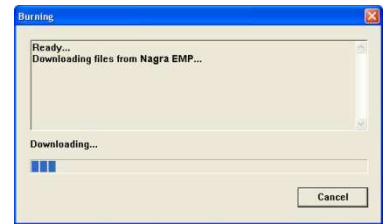
Return to the Copy / Burn panel and press the "Burn" button". A sub-window appears showing the burning status:

Follow the instructions to complete the burning process:



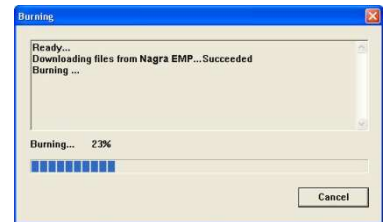
The following sub-window appears. This informs already that the correct burner was selected and that the support inside the burner is correct. Press the “Start” button.

The next sub-window appears. The files start to be downloaded from the Nagra EMP into a temporary folder before burning.



In the case that an audio CD burning process was requested, the files will first be converted to PCM stereo 44.1 kHz.

After the downloading process, the burning starts and shows the following sub-window.





Wait until the burning process is ended and the next sub-window appears. Press the “OK” button to terminate the burning process.



Press the “Finish” button to quite the burning process.



Once the burning process is completed, the player will show a disk icon in front of each burned or copied file.

In case of HDD copying: If the indexes need to be copied in a folder, press the  icon and a new directory is created. To change the name, move the pointer to “New Directory” and right click the mouse. A sub-menu appears giving the possibility to delete or to rename. If the new directory or an index needs to be immediately deleted, highlight the folder name and click .

## Specifications

### Inputs

Analogue inputs	2 x symmetrical XLR Microphone (Dynamic, +48V Phantom)
Microphone input sensitivity	2.8, 10 and 30 mV/Pa selectable
Limiters	Selectable on microphone inputs, individual or in pairs. Active at -9.5dBFS, max +40dB for -2 dBFS
THD at 1 kHz	<0.15 % Mic, <0.01% line
Frequency response	10Hz - 48 kHz $\pm$ 0.5 dB
Input noise with condenser mic	0.88 $\mu$ V (-119 dBm)
Input noise with dynamic mic	4 dB (measured ASA "A" loaded 200 $\Omega$ )
Signal-to-noise ratio	>114 dB
Input level adjustment range	50 dB Mic
Input filters	LFA (with vortex filtering), Low cut
External power	Hirose 4 pin connector (9 to 13 V, 3.5W)

### Outputs

Analogue line output	2 x XLR 4.4V max. , selectable 0 dBm, +6 dBm or +15 dBm
Headphones	Stereo 6.3mm (1/4") Jack 50 $\Omega$

### Recorder

File type	PCM BWF or MPEG 1 L II, 16 bit, 32 to 48 kHz, Stereo / Mono
Memory size	2 GB (corresponds to 2 h 53 min in PCM BWF 48 kHz stereo)

### Other

USB Host	USB 2.0 connector type "mini USB"
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### General

Dimensions	190 x 50 x 175 mm (W x H x D) 7.5 x 2 x 6.9 " (W x H x D)
Weight	1 Kg (2.2 lbs), including batteries
Power supply	4 Dry cells / NimH cells "AA" type or external 9 - 13V
External power consumption	Approximately 2.8 W (2 Phantom mic. & record)
Battery consumption	Approximately 2.6 W (2 Phantom mic. & record) Approximately 1.5 W at 6 V (no Phantom, no record)
Battery autonomy	Approximately 2 hours (2 Phantom mic. & record) Approximately 4 hours (no Phantom, no record)
Relative humidity	From 10% to 99% (non condensing)

CE norm



# DECLARATION DE CONFORMITE DECLARATION OF CONFORMITY



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

**APPAREIL :** Nagra EMP  
**MODEL:** Nagra EMP

**NORMES APPLICABLES :**  
**APPLICABLE NORMS:**

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

Cheseaux 3<sup>ème</sup> trimestre 2011  
Cheseaux 3<sup>rd</sup> quarter 2011

Paul REBMANN

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