NAGRA

HD DAC X

OWNER MANUAL

/// Dear music lover

Congratulations, you have just purchased one of the best DACs ever made! The HD DAC X was created by an engineering team with more than 60 years of experience designing world-class products for the professional audio, national security and military markets. Since its inception in 1951, Nagra has built products that continue to earn a reputation for delivering ultimate sonic performance. Numerous awards have been bestowed upon Nagra for its technical innovation, excellence in design and flawless construction including three Oscars® and one Emmy®. The professional and Hi-Fi ranges are both designed by our Research and Development department. Nagra has launched a Hi-Fi range to allow the wider public to benefit from technical advances that are often the sole privilege of professionals. This technology exists in the service of music, your music. We wish you some great moments of listening pleasure with your HD DAC X.

Thank you for your trust.

Pascal Mauroux
CEO


MODULOMETER
FORMAT
PCM

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SAFETY WARNINGS WARRANTY//

Safety warnings

- Read this manual carefully before operating the HD DAC X.
- Should you have any questions on how to setup or use your HD DAC X, please contact your Nagra dealer.
- Audio Technology Switzerland SA declines any responsibility in the event of an accident caused by the non-observance of these instructions or any other form of user negligence.
- The HD DAC X has a specific power supply to work correctly in your country. The power supply voltage can only be changed at the factory. Make sure you have the right operating voltage before switching your device ON.
- The HD DAC X is a CLASS I equipment. It is essential that it is connected to a MAINS socket outlet with a protective earthing connection.
- The HD DAC X must not be exposed to dripping or splashing liquids and no objects filled with liquids, such as vases, should be placed on the machine.
- Never try to open your HD DAC X when it is powered to prevent the risk of electric shock and burns. Switch it OFF, remove the MAINS cable from the appliance inlet and wait at least 15 minutes before any intervention into your HD DAC X such as for tube exchange or IR Remote Control Unit channel selection. If you are unsure, please contact your Nagra dealer.

Warranty

Audio Technology Switzerland SA certifies that this device has been inspected and tested before leaving the factory. Every Nagra unit goes through our test laboratory. The result of the measurements is recorded in the “Protocol” documentation that comes with your device. We guarantee our products against all manufacturing defects. For the HD DAC X, this is for a period of three years from the date of delivery to the customer (validated by the serial number on the device casing and the invoice from an official Nagra dealer). This warranty is only valid for the original purchaser of new equipment. This limited warranty covers the repair and replacement of defective parts, excluding any other remedy.

The absence of a serial number invalidates the warranty.

We decline any responsibility for damages resulting directly or indirectly from the use of our products and from the use of any components or spare parts other than those designated as original/approved parts by Audio Technology Switzerland SA. As we constantly strive to improve our products, we reserve the right to modify them or change their specifications without notice.

Package contents

The package of your HD DAC X includes the following parts:

One ① HD DAC X audio device chassis

One ① HD DAC X power supply chassis

Four ④ ceramic balls

One ① user manual

One ① pair of microfiber gloves « Haute Horlogerie »

One ① power cord*

Two ② umbilical cords with LEMO plugs

One ① set of fuses (for 100V~ – 127V~ or 230V~ – 240V~, depending on your country)

One ① remote control unit and its docking station with 3 x AA dry cells

Please contact your Nagra dealer should anything be missing.

*** Depending on your country, the power cord features either a US, European or Swiss plug.**


SPDIF 1
AES
USB
OFF
MUTE
PHASE

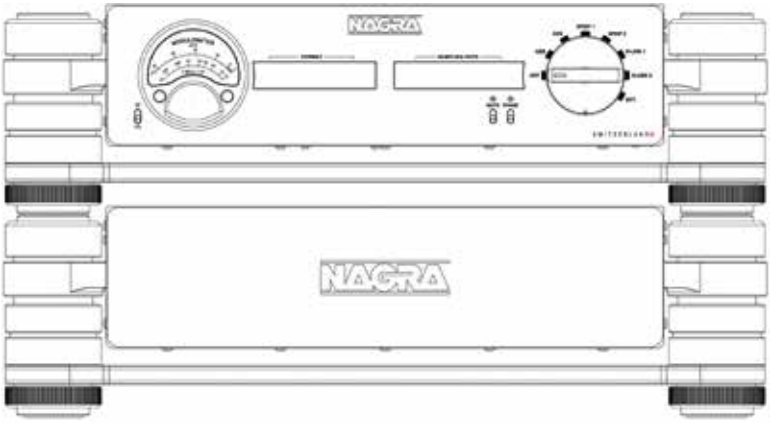

SPDIF 2
N-LINK 1
N-LINK 2
OPT.
WITZERLAND

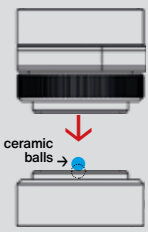
INSTALLATION OF YOUR HD DAC X

Choosing a location

The HD DAC X is designed exclusively for indoor use in a moderate climate.

The HD DAC X is contained in two chassis: one audio device and one power supply. These chassis feature an anti-vibration base that allows for putting either one chassis on top of the other or one chassis next to the other, while remaining completely insensitive to vibration. They must be installed horizontally on a flat, firm and stable stand. There must be enough space all around the chassis for adequate ventilation. Ventilation should not be impeded by covering the ventilation openings with items such as newspapers, table-cloths, curtains, etc.



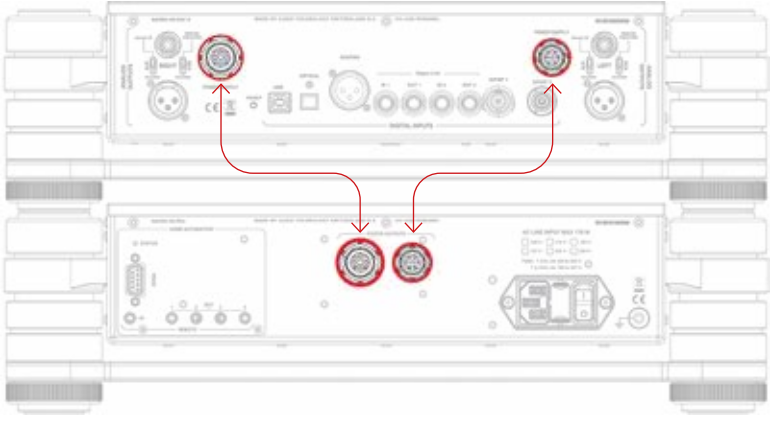


Adjusting the level of the HD DAC X / HD PSU

Each chassis has four decoupling feet whose height can be adjusted with a wheel (knurled part). Turning the wheel adjusts the height of the foot and thus the level of the chassis. When the chassis are installed one on top of the other, the four feet of the upper chassis are in contact with the four feet of the lower chassis through four ceramic balls supplied with the HD DAC X. The balls are seated in the small indentations at the top of each foot of the lower chassis (preferably the power supply chassis).

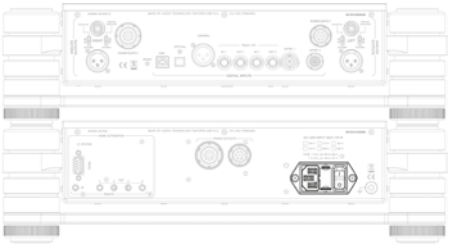
Powering the HD DAC X

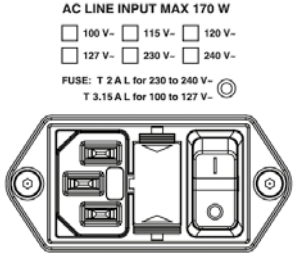
The power cord of the HD DAC X is connected on the rear panel of its power supply chassis. The power supply chassis converts the Mains supply into several different regulated voltages sent to the audio device chassis through two umbilical cords with LEMO plugs. These umbilical cords are supplied with the HD DAC X.



Connection to the Mains

Push the Mains appliance inlet switch at the back of the power supply chassis into the Ø (OFF) position. Insert the Mains cord into the IEC connector of the power supply chassis.

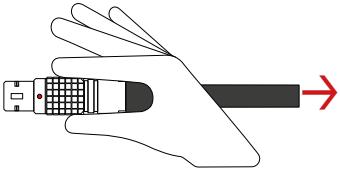




Connection/Disconnection of LEMO cables

Turn the front selector of the audio device chassis to the OFF position. Insert one LEMO plug of each umbilical cord into the matching LEMO socket at the back of the power supply chassis. Please note that the red dot on the LEMO plugs must be facing up before trying to insert them into the chassis sockets. You will hear a click indicating that the plug is securely locked in.

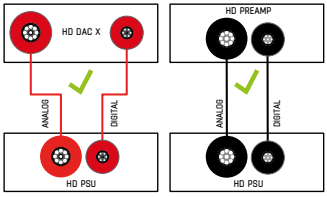
Repeat the procedure with the other ends of the umbilical cords, inserting them into the LEMO sockets at the back of the audio device chassis in the same way.



To disconnect the LEMO plug, hold the knurled section of the plug and pull it backwards.

Note

There is a coloured ring around each LEMO socket on both chassis and around each LEMO plug on both cables. So if you possess several Nagra HD devices such as an HD PREAMP and an HD DAC X, be sure to connect the right power supply chassis with the right audio device chassis by using the correct cables (same colour of ring). This is important because the power supply chassis have different output configurations.



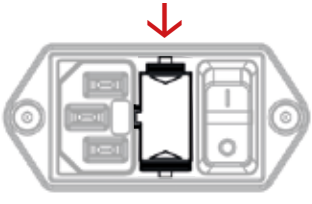
If you connect the wrong power supply chassis to one of your audio device chassis the STATUS LED located on the rear panel of the power supply chassis above the SUB-D9 HOME AUTOMATION connector comes ON when you move the front rotary selector to a position other than OFF. The audio device chassis does not switch ON for safety reasons.

The fuse holder located in Mains appliance inlet, between the IEC connector and the switch, includes a replacement fuse.

The fuse type is: **FST 5x20mm 250V.**

Should you need to replace it, use only the same fuse type and value.

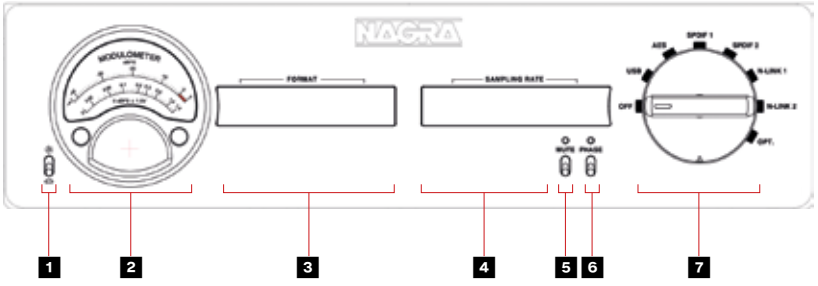
T 3.15A L for 100V~ to 127V~ versions.
T 2A L for 230V~ to 240V~ versions.




MODULOMETER
dBFS
-20
-30
-10
-40
0.05
0.1
0.2
0.3
0.5
0.02
0 dBFS ≙ 1.5V
1.0

HD DAC X description

Front panel // audio device chassis

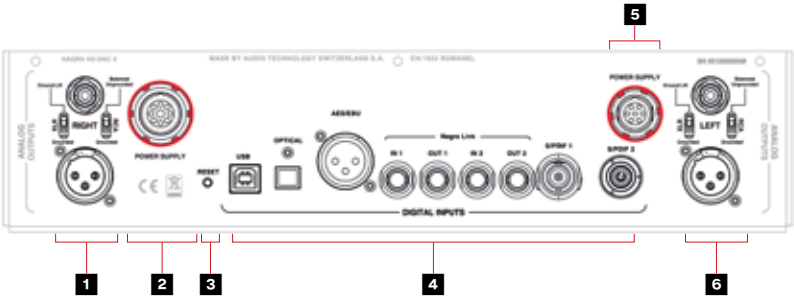


1. Modulometer & displays brightness switch.
   Push up for more intensity, push down for less. There are 7 intensity levels.
2. Nagra Modulometer. Indicates digital audio input level in dBFS (upper scale) and analog audio output level in VRMS (lower scale). Reference 0 dBFS = 1.5 VRMS.
3. FORMAT display.
4. SAMPLING RATE display.
5. MUTE switch with reminder LED.
6. PHASE switch with reminder LED.
7. Front rotary selector.

When turned ON, the HD DAC X will enter a 4 minute preheating phase in order to optimize tubes and warm up critical components. This will allow your HD DAC X to offer excellent performance for a longer period of time.

Note: Should the HD DAC X be switched OFF then ON again, the preheating phase will start again from zero.

Rear panel // audio device chassis



1 XLR and RCA outputs of right channel with connection type selectors.

2 LEMO power supply input (Analog).

3 RESET of digital inputs board (NADM).

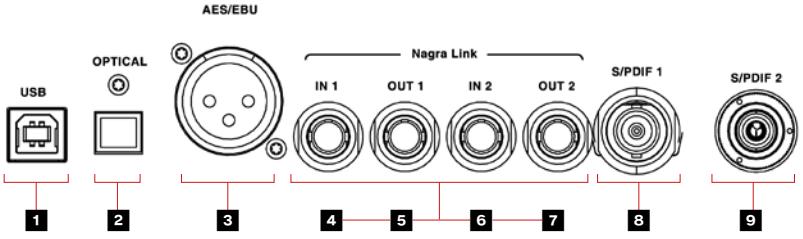
4 USB, OPTICAL, AES, Optical Nagra Links, S/PDIFs digital inputs.

5 LEMO power supply input (Digital).

6 XLR and RCA outputs of left channel with connection type selectors.

The input is selected with the front rotary selector (see page 22).

Audio inputs



	Input type	Input format
1	USB B-a	DSD: up to DSD256 (DSD4x) PCM: up to PCM 384kHz
2	TOSLINK EIAJ optical (MM fiber)	PCM: up to PCM 192kHz
3	AES/EBU	PCM: up to PCM 192kHz
4-7	ST (MM fiber)	DSD: up to DSD256 (DSD4x) PCM: up to PCM 384kHz
8	S/PDIF 1 BNC	PCM: up to PCM 192kHz
9	S/PDIF 2 RCA	PCM: up to PCM 192kHz

Audio outputs

There are RCA and XLR audio output connectors. **They cannot be used simultaneously (this is not a switch; they are connected in parallel).**
You can select the following connection features with switches:

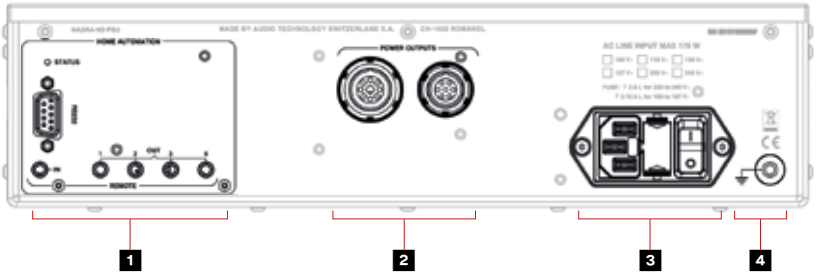
WITHOUT OUTPUT TRANSFORMER OPTION
RCA UNBALANCED (Whatever the RCA switch position)
XLR UNBALANCED UNGROUNDED (Ground lift, UP)
XLR UNBALANCED GROUNDED (Grounded, DOWN)

WITH OUTPUT TRANSFORMER OPTION
RCA BALANCED (Balanced ungrounded, UP)
RCA UNBALANCED (Grounded, DOWN)
XLR BALANCED UNGROUNDED (Ground lift, UP)
XLR BALANCED GROUNDED (Grounded, DOWN)

WARNING

Be careful when connecting your HD DAC X to a preamplifier, ensuring that you connect it properly with the appropriate cables so as not to decrease audio signal quality! Pay attention to the grounding to avoid any potential difference between equipment that could permanently damage your HD DAC X, especially when using Mains power filters!

Rear panel // power supply chassis



1 STATUS LED for software upgrade & detection of wrong audio device chassis
SUB-D9 for Home automation
REMOTE IN (1x) to be driven by “master” device
REMOTE OUT (4x) to drive “slave” devices

2 LEMO power supply outputs (Analog 9p, Digital 7p)

3 Mains appliance inlet with switch and fuse
+ voltage version & fuse value information

4 Ground post

About ground post

This feature is seldom used but can sometimes come in handy to solve specific setup issues. Your NAGRA dealer will assist you on when and how to use this connector.


PCM


NAGRA
384.0 kHz
NAGRA

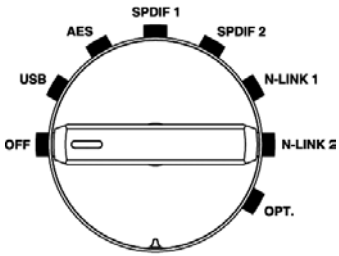
OPERATION OF YOUR HD DAC X //

Only proceed if you have completed the installation steps as described in the previous chapter INSTALLATION OF YOUR HD DAC X.

Power on & Audio input selection

To use your HD DAC X, firstly you must push the Mains power switch to position 1 (ON). The Mains power switch is located on the rear panel of power supply chassis.

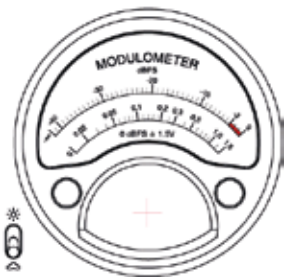
The front rotary selector offers 8 positions to select the desired input or to switch your HD DAC X OFF:



OFF	Similar to STANDBY, the unit is still powered but the consumption remains very low
USB	Selection of USB input
AES	Selection of AES input
SPDIF1	Selection of SPDIF1 input
SPDIF2	Selection of SPDIF2 input
N-LINK1	Selection of N-LINK1 input
N-LINK2	Selection of N-LINK2 input
OPT	Selection of Optical input

Audio output selection

Connect the HD DAC X output to your preamplifier by using either the XLR or the RCA connectors but not both simultaneously!



Nagra modulometer

The Nagra modulometer is inherited from the second recorder developed by Nagra back in 1952, the Nagra II. The Modulometer is a typical Nagra precision instrument that displays the necessary information to achieve the best possible audio level setting. In the case of the HD DAC X, the modulometer displays the selected digital audio input level (upper scale) and the corresponding analog audio output level (lower scale). Reference 0 dBFS = 1.5 VRMS.

Left channel – black needle

Right channel – red needle

Light intensity adjustment

This two-way toggle switch allows you to adjust the Modulometer & displays backlight intensities. Pushing the toggle up will increase the brightness, pushing it down will lower the brightness all the way to complete extinction. There are 7 different intensity levels.

Mute

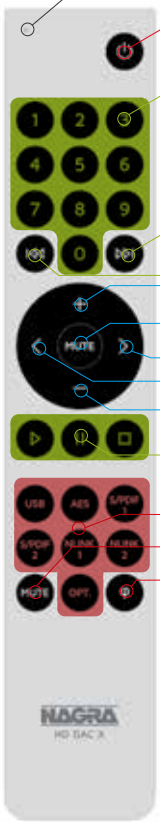
The outputs of the HD DAC X can be set to standby mode when you activate the MUTE switch. Pulling up the switch will activate the muting (no more sound) and the yellow LED. Pulling down the switch will deactivate the muting and the yellow LED. The HD DAC X outputs will be working again.

Phase

The outputs of the HD DAC X can be set to phase inversion mode when you activate the PHASE switch. Pulling up the switch will activate the phase inversion and the yellow LED. Pulling down the switch will deactivate the phase inversion and the yellow LED.

IR Remote Control Unit

The HD DAC X currently comes with the new IR Remote Control Unit with Philips RC-5 format encoding. You may also use a Nagra RCU or RCU-II IR Remote Control Unit.
As they require a different communication protocol (RECS-80), please contact your Nagra dealer to make the necessary adjustments inside your HD DAC X.



Red LED

Power OFF - ON // HD DAC X

Numeric keyboard //CD track

Short press: next track (CD) or Long press: fast forward (CD)

Short press: track restart (CD) or Long press: fast backward (CD)

Volume up // HD PREAMP

Mute // HD PREAMP

Right balance on right volume control // HD PREAMP

Left balance on right volume control // HD PREAMP

Volume down // HD PREAMP

Standard commands from left to right: PLAY, PAUSE, STOP (CD)

Direct input selection // HD DAC X

Mute // HD DAC X

Phase inversion // HD DAC X

- CD
- HD PREAMP
- HD DAC X

Note

To protect the Li battery in the device during transport, the Remote Control Unit keys have been locked. To unlock them, press on the central MUTE button (HD PREAMP) for 5 seconds until the red LED blinks twice.

WARNING

The Remote Control Unit, with battery installed, must not be exposed to excessive heat such as sunshine, fire or similar.

Red LED on Remote Control Unit

The red LED lights ON when pressing any key on the Remote Control Unit. If not, it means either the Remote Control Unit keyboard is locked or the Remote Control Unit Li battery is empty. Insert the unit into the docking station to charge the Li battery.

HD DAC X Power OFF / ON key

Toggle key to switch the HD DAC X ON and OFF. When switching ON, the HD DAC X automatically turns the front selector to the last input selection active before last power OFF.

Note: This key is not operative when a REMOTE AUTOMATION jack cable is connected to the REMOTE IN socket of the power supply chassis!

HD DAC X ⏻ keys

The outputs of the HD DAC X can be set to phase inversion mode when you press on the ⏻ key.

HD PREAMP ⊕ and ⊖ volume keys

To move both left and right volume controls simultaneously, either up or down, press on key briefly for a ±0.5dB change, or longer for bigger volume differences. The volume controls can be set to work either in synchronized mode or in desynchronised mode.

HD PREAMP ❮ and ❯ keys

With synchronized volume controls = No effect.

With desynchronized volume controls = step of ±0.5dB, only on right volume control.

Docking station usage

To charge the Remote Control Unit Li battery, insert the unit into the docking station (unit keyboard towards docking station front). Fully charged, the Remote Control Unit will work for around 2-3 months, depending on usage. The 3x AA-dry cells in the docking station will be able to charge the Li battery for about 3 years.

Docking station LED indicator

The LED on the front indicates the condition of the Remote Control Unit Li battery **when the unit is inserted into the docking station:**

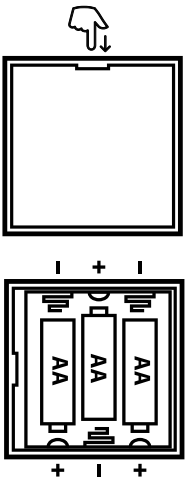
WHITE blinking = The Li Battery in Remote Control Unit is charging.

RED blinking = The Remote Control Unit is defective. Please contact your Nagra dealer.

Permanently OFF = The Li Battery in the Remote Control Unit is fully charged or the Remote Control Unit is not properly inserted into the docking station. Remove and reinsert the unit into the docking station. If the LED blinks white everything is OK, if not, the 3x AA-dry cells are exhausted and must be exchanged.

Note

When the Li Battery in the Remote Control Unit is fully charged, the docking station only uses a small amount of current to maintain the full charge. There is no risk of overload even if the Remote Control Unit is inserted in the docking station for a long time!



Battery installation/exchange in docking station

Open the battery box by removing the bottom panel of the docking station (magnet lock). Insert your thumb nail into the groove and lift the panel up. Replace empty batteries with 3x new AA-dry cell batteries.

WARNING

Do not use any mechanical tool to open the docking station battery box; you could damage the body or the panel of the unit!

By ensuring battery is disposed of correctly, you will help prevent potential negative consequences for the environment and human health. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of battery, please contact your local authority, your household waste disposal service or the shop where you purchased the battery.

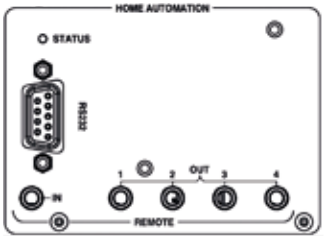
Use of a universal IR Remote Control Unit

The HD DAC X responds to IR (Infra Red) signals encoded in Philips RC-5 format.

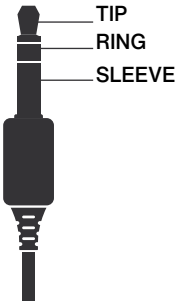
A default code 19 has been allocated to HD DAC X as a Digital-to-Analog converter. Should you wish to program your universal remote control, please use the following table:

Code	Device group number	Key
HD DAC X		
1	19	USB
2	19	AES
3	19	S/PDIF 1
4	19	S/PDIF 2
5	19	NLINK 1
6	19	NLINK 2
7	19	OPT
12	19	Power ON/OFF
13	19	Mute
37	19	⏻
HD PREAMP		
13	16	Mute
16	16	⊕ (Volume up)
17	16	⊖ (Volume down)
26	16	⊙ (Right balance)
27	16	⊙ (Left balance)
CD		
0	20	0
1	20	1
2	20	2
3	20	3
4	20	4
5	20	5
6	20	6
7	20	7
8	20	8
9	20	9
32	20	⏭ (Short press: next track)
33	20	⏮ (Short press: track restart)
48	20	⏸ (Pause)
50	20	⏪ (Long press: fast backward)
52	20	⏩ (Long press: fast forward)
53	20	⏵ (Play)
54	20	⏹ (Stop)

Remote automation



The power supply chassis has 1x 3.5mm (1/8") stereo jack socket **REMOTE IN** (to connect a master device) and 4x 3.5mm (1/8") stereo jack socket **REMOTE OUT** (to connect slave devices). It allows you to switch a complete configuration of Nagra devices ON/OFF by only driving the master device manually or with an IR Remote control unit. If a 3.5mm (1/8") stereo jack connector is inserted into the "Remote IN" input at the back of the power supply chassis, this control gains priority over the IR Remote Control Unit and RS232 commands (ON-OFF key switch on IR Remote Control Unit no longer works).



Short between TIP and RING: HD DAC X is switched ON. As soon as the HD DAC X is switched ON, the front rotary switch turns itself to the selected input before it was last switched off. If you manually turn the front rotary switch to the OFF position when TIP and RING are shorted, it will turn itself back to the last select-ed input. Use standard straight cable to connect the different devices (except for the **REM** (REMOTE IN) input of a slave Nagra MPS). For more information, please ask your Nagra dealer who will provide you with a specific Nagra document on the topic: Nagra Remote automation - User+service instruction - How does it work?

Home automation

All commands are sent/received on the SUB-D9 connector located on the rear panel of the power supply chassis. The serial settings are: 115200 bits per second, 8 data bits, no parity, 1 stop bit. All commands are executed after sending the command itself and terminating with a <CR> (carriage return).

Command	Description
BLUP	Increase backlight intensity
BLDOWN	Decrease backlight intensity
MUON	Mute ON
MUOFF	Mute OFF
PHON	Set phase inversion
PHOFF	Reset phase inversion
PWON	Power on the device
PWSTANDBY	Set device to standby (or power off)
SILEFT	Previous input

SIRIGHT	Next input
SI1	Select input 1
SI2	Select input 2
SI3	Select input 3
SI4	Select input 4
SI5	Select input 5
SI6	Select input 6
SI7	Select input 7

Tube ageing

Nagra selects the HD DAC X tubes according to exacting criteria. Their theoretical minimum useful life is 5'000 hours. In actual fact, some tubes operate consistently for more than 10'000 hours.

Thus, the useful life of the tubes is somewhat unpredictable. Rather than replacing the tubes arbitrarily after 5'000 hours, we suggest that you identify the signs of ageing:

→ Distortion gently increases to an audible level
→ Presence of clicks (dry, brief noises, like dead wood snapping)
→ Presence of pops, brief noises in the low frequencies
→ Presence of hiss, higher background noise
→ Reduction of spaciousness, loss of naturalness

As soon as one of these signs appears, please contact your Nagra dealer to order an HD DAC X replacement tube kit.

HD DAC X software update

The update is carried out with two MicroSD memory cards, one for the audio device and one for the power supply. You will be advised of the availability of any updates by your dealer who will install them.

Case cleaning

Clean the HD DAC X casing by using a soft, non-fluffy, slightly damp cloth. Do not use any cleaning products that could have a corrosive effect.

Disposal of old electrical & electronic equipment (Applicable in the European Union and other European countries with separate collection systems). This symbol on the product or on its packaging indicates that it should be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local authority, your household waste disposal service or the shop where you purchased the product.

Applicable to the following devices: HD DAC X and all the package contents

TECHNICAL SPECIFICATIONS //

Digital inputs	1x AES/EBU, 2x S/PDIF, 2x NAGRA-LINK, 1x Optical, 1x Audio USB (UCA2)	
Analog outputs	1 stereo RCA 1 stereo XLR	Symmetrical on optional transformers
Output level	1.5 V_{RMS}	@ 0 dBFS
Output impedance	< 215 ohms	
Analog output Noise level	-128 dBr	@ 1 kHz / 1.5 V No ponderation
Distortion	< 0.02 % < 0.005 % (H2 filtered)	@ -20 dBFS @ -3 dBFS
THD + N	< 0.03 %	@ 192 kHz
Frequency Response	5 Hz - 40 kHz	+0 / -1 dB
Crosstalk	> 110 dB > 100 dB	@ 1 kHz @ 20 kHz
Inter-channel phase	< 0.05 ° < 0.3 ° < 0.5 °	@ 1 kHz @ 20 kHz @ 50 kHz
Remote automation		
Input Output	1x 3.5mm (⅛") stereo jack socket 4x 3.5mm (⅛") stereo jack socket	Input command Output switching by relay
Home automation	1x SUB-D9 connector	RS232 115200 bits/s, 8 data bits, no parity, 1 stop bit
Mains power	100V~, 115V~, 120V~, 127V~, 230V~ or 240V~ NOT ADJUSTABLE	±10%, 50-60 Hz
Power consumption	170W max	
Mains fuse		
230V~ to 240V~ 100V~ to 127V~	T 2A L T 3.15A L	FST 5x20mm 250V FST 5x20mm 250V
Operating temperature	+15°C to +35°C +59°F to +95°F	Moderate climate
Operating environment	Indoor only	IP30
Dimensions LxWxH with VFP		
Power supply chassis (HD PSU) Audio device chassis	433x436x121 mm 433x436x121 mm	17.05x17.17x4.76 in 17.05x17.17x4.76 in
Weight with VFP		
Power supply chassis (HD PSU) Audio device chassis	16.5 kg 13.5 kg	36.38 lb 29.77 lb

Specifications may change without notice

MADE IN SWITZERLAND

MANUFACTURER AUDIO TECHNOLOGY SWITZERLAND

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