

REFERENCE MANUAL AND OPERATING INSTRUCTIONS

(Software version V 2.10)

NAGRA *Seven*



Guarantee / Warranty

AUDIO TECHNOLOGY SWITZERLAND 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 *Seven* and 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 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.

About This Manual

This instruction manual is broken down into several chapters. Each chapter covers different aspects of the Nagra *Seven* recorder, the settings, actual use, eventual problem localisation and technical specifications.

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Introduction

The NAGRA *Seven* is a 2-track, 24-bit digital recorder offering sampling frequencies up to 192kHz, with analogue and digital inputs and outputs on XLR connectors, and AES 42-ready for digital microphone applications. Standard features include full iXML metadata, USB 2.0 and Ethernet ports, and a docking battery pack. The principal recording media is an internal 16GB memory backup with removable standard SD cards. Hardware options include SMPTE/EBU Time Code or I.S.D.N. codec, WiFi/3G/4G communication and a rechargeable lithium-ion battery pack. Several software options for audio compression, voice over IP and on-board audio editing are also available.

Our aim is quality, not quantity – adding tracks seems to be easy and inexpensive to others, our concept was to build a portable, high-quality two channel recorder that offers an intuitive interface with modern features never seen in any other battery operated over-the-shoulder recorder, and with a modular design allowing it to adapt to a multitude of field applications.

To make it more practical and more reliable – we added a sunlight-readable color touchscreen, combining the metering and information display with a practical touch control of the operating system. The main transport functions are still implemented with the familiar rotary Nagra main function selector, a unique design that is less susceptible to accidental switching than the common hardware devices.

To clean and simplify the audio path – audio limiters, automatic gain control and equalization are achieved through a dedicated Digital Signal Processor. The principal advantages are enhanced and cleaner AGC, to have limiter and filter processing with the possibility of adjusting more parameters, and due to less electronics in the analogue audio signal path – achieve better microphone preamplifiers !

Software updates will be available, from time to time, through our website www.nagraaudio.com offering system upgrades and additional new features as they become available. Please use the contact form from our website for any questions or comments you might have about the **NAGRA *Seven***

Versatile – like a Swiss Army Knife
and again – very user-friendly !

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S W I T Z E R L A N D 

CHAPTER I

THE POWER

YOU NEED POWER FIRST

The Nagra *Seven* is delivered with an empty battery box, into which 8 rechargeable NiMh “AA” cells can be installed. We do not recommend the use of dry cells except in emergencies. The running time of the recorder depends upon the capacity of the cells used, as well as the operating mode. Alternatively, an optional Lithium Polymer (LiPo) pack can be used. The supplied external DC supply can power the machine, and recharge the batteries at the same time.

Charging of the battery packs

The detachable battery boxes, and Lithium Polymer packs are fitted with a RED LED to indicate when external DC is present and the charge status.

When external DC is connected the LED will light and if rechargeable cells are installed in the battery box it will start to flash after a few seconds to indicate that the cells are being charged. When fully charged, the LED will remain ON. No harm will be caused to the lithium packs if the external charger is left connected as they cannot be “Overcharged”.

Charger ON / OFF switch



Removable battery box for “AA” size cells

Some approximate times are shown below using the Nagra charger and supplied power supply:

Battery type	Capacity	Approx. Running time (with 2 +48V condenser mics)
NiMh	2500 mAh	5h (4h)
Lithium Polymer	3200 mAh	8h (6h)
Dry Cells		2h45m (2hr)

The above trials were made with fully charged cells, with the recorder in continuous Record mode with using dynamic microphones and time code running and the display set to “dimmer” mode.

The optional 3200 mAh lithium-polymer rechargeable pack is available (Part Number # 70 19166 000) can also be used giving an autonomy of about 8 hours. External DC can also be used by connecting the supplied, wall-mount charger to the DC connector. The use of standard “AA” cells is not recommended as their discharge rate will exceed the specifications of the cells. However, they can be used in an emergency, but will be drained quite quickly, and will get quite hot while being used.

Charging times

N7-BB1 3.2 Ah Lithium Polymer battery pack is approximately 5 hours.
Eight 2'500 mAh NiMH cells will take about 3½ hours to charge.

Fuses

The power supply board is mounted on the rear panel board and is accessible in the bottom of the recorder by removing the lower panel. There are 2 fuses F1 and F2 in the external power line and battery power line respectively. These fuses are of the OMF 63 type and manufactured by Schuller and do not require soldering. Replacement fuses are available through your Nagra agent.

Replacement fuses part number:

F1 & F2 # 54 82001 500

Mains power unit

The N7-PSU (KSA# 20 19180 020) external mains power unit supplied with the Nagra *Seven* is a 100 - 240V 50/60Hz supply with a rated output of 15V 2A.

The Nagra *Seven* can be operated while the mains power is connected to the battery box on the rear of the machine without danger, and it will supply enough energy to power the recorder and recharge the attached pack at the same time.

Power indication

The top line of the main display shows a “fuel gauge” type charge indication of a battery at all times. Different indications show the various status positions of the batteries:

When the background of the fuel display turns RED this indicates that there is approximately 10 minutes of power remaining.

When the curved “flash” is present, this indicates that external DC power is present on the dc connector of the battery box



- Battery full



- Half-full battery



- Battery pack almost exhausted (Icon will flash)



- External Mains power connected to the battery box (charging)

Note: All times and durations indicated in this section assume that the phantom powering is OFF and that options such as WiFi are not in use. In addition it is assumed that the battery elements are in good condition and are fully charged.

Time Code and Real Time Clock (RTC) powering.

The power supply circuit of the Nagra *Seven* is equipped with a “super capacitor” which is designed to maintain the time of the internal RTC and the time code clock (If TC option is fitted) for about 10 minutes if the battery of the recorder is removed. This ensures that the time code will remain accurate while the battery pack is replaced. If the date and time is lost, then it will automatically be requested when the next power on is made.

Note: The external DC supply can be connected and disconnected at any time without any interference even during recording.

Lithium-Polymer battery life and care

Lithium-Polymer battery packs will last for between 500 and 1'000 charge cycles before being replaced, which if correctly cared for, in the case of a Nagra *Seven* would represent about 5 years or so of normal operation. However there are some important points to be made concerning the “housekeeping” of such packs, to guarantee their best performance.

Contrary to NiCd packs, the most damaging event that can happen to a Lithium pack is for it to discharge completely. If this happens it is very likely that the pack will be irreparably damaged. In the Nagra *Seven* the software will close the recorder down well before the battery pack gets to a critical charge point thus protecting the cells. In addition, a security circuit inside the pack itself will also cut in should the pack get too drained, however in any event running the battery flat is strongly inadvisable.

It should be remembered that even with the recorder turned OFF, the internal real time clock and Time Code circuit (if fitted) WILL CONTINUE TO DRAW POWER from the pack. The time code circuit alone will completely drain a fully charged pack in about 1 month.

A Lithium-Polymer pack will have a longer lifetime if it is regularly recharged (even when half full). It is not possible to “overcharge” the pack. Unlike a NiCd battery, the “memory” effect does not exist with Lithium-Polymer packs.

A charged battery pack, in good condition, can be stored, disconnected from the recorder, for a period of 1 year without risk. If one wishes to store a Lithium pack for an extended period at room temperature (a year or more) then ideally it should be charged to about 50-70% before storage (suggested by the manufacturer). In such a case, after 1 year the pack will have lost about 4% of its total capacity, whereas if the pack is charged to 100% before storage, after 1 year it will have lost nearly 20% of its total capacity. (At lower storage temperatures, this effect is minimized). One should always verify from time to time that the pack remains at around 50% and recharge a little as necessary.

So remember:

- **DO NOT** store the Nagra *Seven* for long periods with the battery box attached.
- **NEVER** allow the pack to be drained completely.
- **ALWAYS** keep the battery charged as no harm will occur.

CHAPTER II

THE EXTERIOR

The OPERATIONAL FRONT PANEL



The Nagra *Seven* uses a 3.5" color TFT touchscreen display. Its resolution is of 270 dpi giving precise definition and excellent resolution (a standard computer screen generally has a resolution of around 70 dpi).

It is a "resistive" touchscreen, meaning that it activates when gently "pressed" or "tapped" using a finger or pointer stick (a set of 2 pointers is included with the machine and replacements can be ordered under the number 2019180010) and can thus be manipulated using gloves which is more difficult with a "Capacitive" touchscreen (as used on mobile smartphones and tablet devices). The touch feature is adjusted so that the action is effective when the touch is released rather than at the moment the screen is touched which gives a more user-friendly feel to the functions. Operation is easier using a pointer stick if possible, and gets the best response from the sensors. As the display is the heart of the communication interface between the user and the recorder, the screens and different functions are explained in detail in chapter III of this manual.

Main function selector



The 5 position rotary main function selector is used for the principal "transport" functions of the recorder, in the traditional Nagra manner. It should be noted that the transport icons on the main display will change depending on the position of the main function selector. The various function positions of the selector are described below.

OFF:

This is the main power OFF position of the Nagra *Seven*. None of the circuits of the machine are powered in this position except the real time clock and the time code generator (if fitted).

When OFF is selected the main display will show "SHUTTING DOWN" while all the machine settings are being saved.

Power OFF is completed 2-3 seconds after selection but will NOT occur while the machine is copying files, only once the copy procedure is completed.

In the Settings menu under Miscellaneous it is possible to inhibit the OFF position, such that it becomes "Stand-by" where the machine will not power off but will "Sleep" for a pre-set time.

TEST: In this position all the circuits are powered allowing recording levels, audio monitoring adjustments, menu verification and alteration. This can be considered as a "stand-by before record" position. If the Pre-record function is active the REC led flashes and some menu alterations are prohibited. In this position the time code to be recorded will be fed to the time code lemo output if the TC option is installed.

REC: This is the standard position used for recording. When recording, the red led beside REC position of the main function selector will be alight. Record can be selected at any time and will take priority over any other function. Some menu settings are prohibited in the REC position. From full power off to RECORD mode takes about 10 seconds – depending on the number of files on the media. Recording will begin before the entire booting process is completed.

STOP: In this position the push-button transport keys on the touchscreen display are active for rewind, fast forward and skip functions. Access to all menus and machine settings is also enabled.
In this position the time code output will be frozen at the last value read.
In this position the audio inputs are not fed to the outputs.

PLAY: This is the principal PLAYBACK position. Playback will start either from its current position, or from the beginning of the last recorded take if the machine had previously been in record mode.
In this mode the transport icons for search (4x) and skip can be used as well as the pause function.
In this position the time code from the take being played will be fed to the time code lemo output.

Slate Microphone



Located towards the top center of the front panel is the internal built-in microphone, commonly called a "Slate" microphone. It is activated by pressing the SLATE icon on the main display. It can be programmed to toggle ON and OFF on each consecutive press or to be active only while the icon is pressed. It can be directed to one or both audio channels in the menu mode, and it can either be mixed (added) to the audio tracks or can replace the audio. If the Icon is not present on the screen then it must be added using the Icon selection menu as this is the only way to activate the slate mic. The slate mic can be used at all sampling frequencies.

Level potentiometers



Two potentiometers located on the front panel can be used for various features according to their programming in the pot. assign menu. Principally, they are used to adjust the input sensitivity of the microphone inputs or the line input levels. They can be ganged together when working in stereo or if a fixed offset between the channels is to be maintained. Pressing a pot will activate the push-button switch and this will instantly display the current level adjustment setting of the corresponding channel on the main display, and will also select the corresponding channel in "Solo" (Mono) on the headphone output. A "double" press of either pot will select the "Solo" for the respective channel and maintain it until the pot is pressed again. The pots programming to other functions is covered in the pot. assign menu. Both straight or round knobs are available – as shown.

Headphone connector and level control



The headphone output is a 6.35mm stereo jack connector and its level is adjusted using the pot. The headphone output level can be digitally boosted in the menu mode if required by 6 or 12 dB. Pressing the headphone volume button will temporarily set the headphone output to mono monitoring. This can be programmed to a toggle mode in the monitoring menu. A “double” press is a user programmable feature and can be used, for example to rapidly switch the internal speaker on and off.

LEFT INPUT SIDE PANEL



MIC / LINE Input connectors



These transformerless inputs can be used for both dynamic and condenser microphones or as analogue line inputs. The sensitivity for the different microphone input sources is selectable from 2.8 mV/pa to 40 mV/pa in the audio settings menu. When used for analogue line inputs, they will accept up to +24 dB.

The pinning of the connectors is the standard 1 = Ground, 2 = (High), 3 = Return (Lo)

AES connector



The AES input connector is used for digital AES input signals. This selection is made in the menus. The AES input is a standard AES 3 stereo audio input. This connector is also used for a digital microphone according to the AES 42 format. The digital inputs are fitted with an internal SRC (sample rate converter) to ensure accurate synchronization is possible at all times.

SD Flash card Slot



This slot permits the use of removable SD memory cards. The Nagra *Seven* will accept SD, SD-HC (4 – 32 GB) and SD-XC (32+ GB) type cards. To remove the SD card, press directly on the end of the card and it will eject. Micro SD cards may also be used with the appropriate adapter.

The LED to the left of the slot will light when the card is being addressed. It is recommended to format removable cards using the Nagra rather than a PC, to guarantee optimized performance. The machine does not need to be powered down to insert or remove an SD card they can be “hot swapped”.

Ethernet connector



The RJ45 Ethernet connector is used to connect the NAGRA *Seven* to the internet and will allow file transfer using FTP and Voice Over IP (VOIP) and is planned to permit streaming of live audio in the future. The yellow led in the connector will light when an active ethernet cable is connected and the green led will light when communication data is being transmitted.

USB port



The Micro USB connector is of the A/B style, and serves not only as a slave port, allowing the *Seven* to be connected to a computer and appear as an external device, but via the appropriate adapter (Part number 20 70119 000) it can be used as a host port and can accept an external device such as a keyboard, mouse or a USB thumb drive.

Start / Stop connection



This miniature 3.5mm jack is a remote start / stop connection or “fader start”. It is a simple contact closure and activation is achieved by making a short-circuit between the terminals. The “polarity” can be selected in the menus, and if the position “Inverted” is selected, then the function will be activated when the connection is shorted out as opposed to “open”. The function depends on the position of the main function switch. In the record position, it will switch between record and test modes. If the pre-record function is active then the start / stop will switch between record and Pre-record. In playback it will switch between playback and stop. Operation of this function can also be limited to either Playback or Record in the menus if desired.

RIGHT **OUTPUT** SIDE PANEL



The right side panel of the recorder is different depending on the version of the recorder. There is one panel for the standard version without any internal options, another for the time code version and a third one for the ISDN version, both of the latter two are also available with the 3G / WiFi option. (version pictured has both Time code and WiFi / 3G installed)

AES output connector



The 3-pole male XLR AES output connector is a digital output corresponding to the format of the AES bus used throughout the professional audio industry. The resolution is of 16 or 24 bits depending of the current machine settings, and if the machine is in 24-bit mode this output can be redithered to 16 bits to feed a lower resolution device. This liason allows direct connection to any other digital equipment fitted with an AES-3 interface.

Line output connectors



These two 3-pole XLR connectors are the standard analogue audio transformerless symmetrical floating outputs. The output level on these connectors is adjustable from 0 to +15 dBu for 0dBFS on the meters.

Time code LEMO connector



The time code input and output is located on a traditional 5-pole LEMO connector, the pinning of which corresponds to that of all previous Nagra TC models.

(QCTCU cable # 70 16909 000 – LEMO to “open-ended” TC cable)

WCK IN / OUT



The two BNC connectors form part of the TC option and are the standard external word clock reference connectors for locking the Nagra to an external reference and for supplying such a reference to other equipment. Other reference signals such as PAL / NTSC video, HDTV references are also fed to the recorder through the WCK IN connector, in video applications.

WiFi / GSM / 3G antennae



These are the antennae connections that form part of the WiFi / GSM option. A pair of antennae is delivered with the option. The gold antenna is for the WiFi and the steel (Silver) antenna is for the GSM communication.

Replacement GSM and WiFi antennae kit: 20 19180 008

I.S.D.N. connector



The RJ45 connector is part of the I.S.D.N. system and is only available on machines equipped with this option. This is where the ISDN line is connected to the NT.

The **BACK** and **POWER**



*Rear view of the Nagra **Seven** showing the battery connector and battery fixing threads.*

Serial number

The serial number, located on a sticker on the rear panel of the recorder is also burned into the internal memory of the recorder and cannot be altered or erased. The serial number can be seen in the “Tools / about” menu.

Battery packs

Please refer to Chapter 1 “Powering” for all information concerning the battery packs and powering options.



PART 1 – HOME SCREEN AND MENUS

The screen or display of the Nagra *Seven* is the main user interface and has the following tasks:

- Display operational information to the user
- Display and modify the parameters of the recorder (Menus)
- Allow control of the unit as well as communication (Short-cuts)

As the display is the heart of the communication interface between the user and the recorder, the screens and different functions are explained in detail in the following pages.

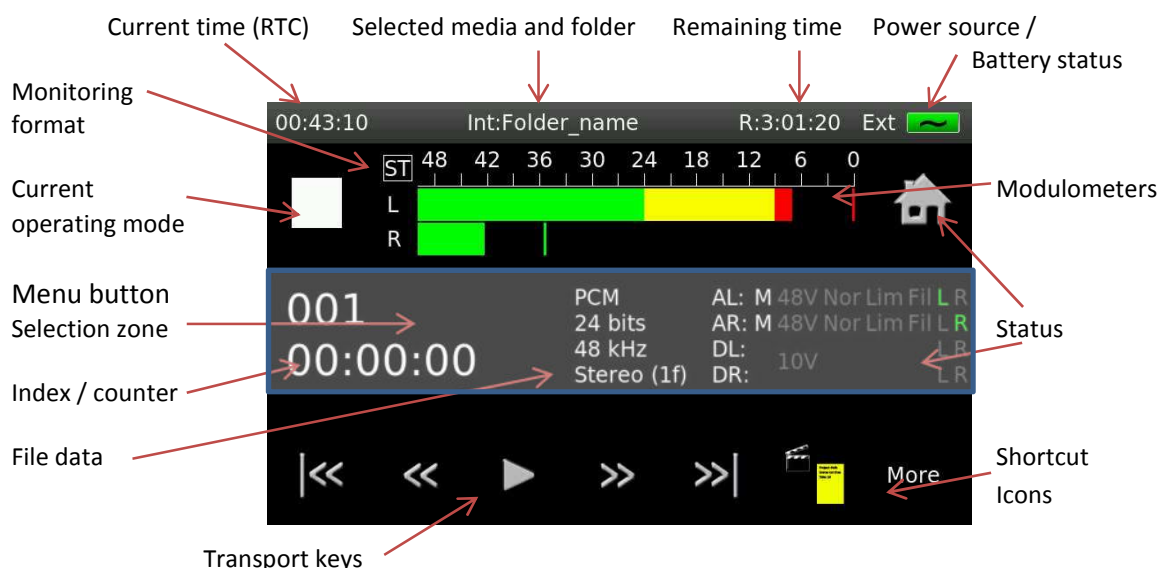
The “home” screen, is adaptable depending on the users desires. Certain elements are fixed but other items can be displayed depending on the position of the main function switch and the icon programming chosen by the user:

The main screen

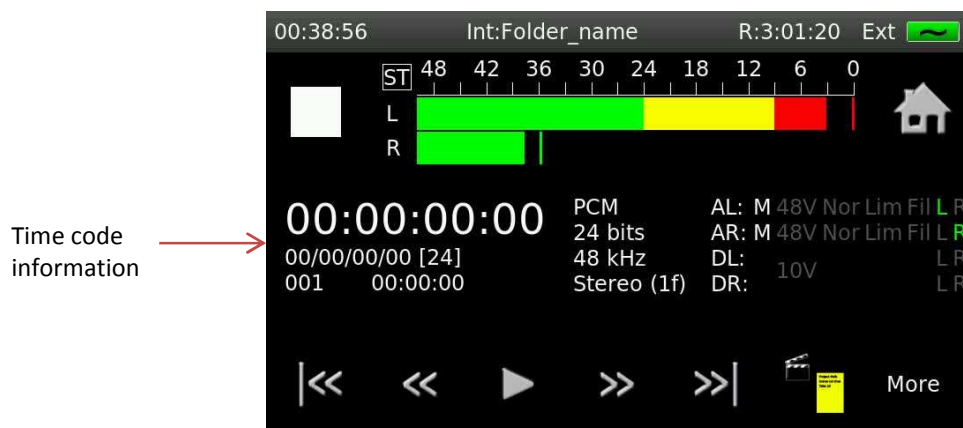
The central area (shown in grey) of the home screen can be programmed in the “Home screen menu” to display up to three different sets of information, which will be scrolled through each time the central section of the display is touched.

The available displays depend on the options installed in the machine.


The example below shows the home screen of a NON-TC Nagra *Seven*, where the “Counter and settings” display selection has been chosen.



Below is the home screen of a TC machine with the “Time code and settings” display selected.



Along the top, the status bar remains the same on all displays and shows the current time, the recording media and data folder in use, remaining recording time (according to current file format and media size) and the status of the battery / power source.

On the second line of the display, the current operating mode, monitoring format, the modulometers for audio levels with peak indicators are shown as well as the  icon to enter the MENU mode.

The central section is programmable in the display menu screen (described later). The displayed file information corresponds to the machine settings in TEST and REC and to the recorded file in STOP / PLAY. The bottom line shows the transport functions / action buttons (depending on main selector position) and user selectable shortcut keys.

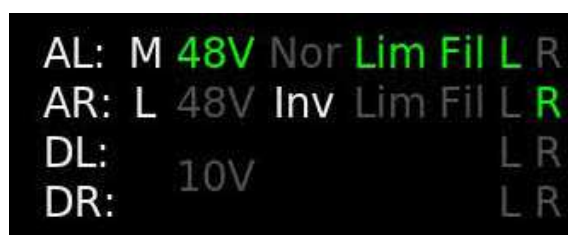
Display Screen Information

Current time:	Shown in HH:MM:SS format. The internal clock is set in the menu mode. This is independent of time code (if fitted). This data will be used for the time information of a recorded index.
Media / folder:	Shows where the recordings will be stored. The media can be either the internal micro-SD card (INT) or the extractable SD card (SD) or USB memory (USB). After the “:” the name of the selected folder on the current media is displayed, and is where the files will actually be stored.
Remaining time:	Indicates the remaining recording time on the selected media depending on the current recording file format and media free size.
Power source / status:	EXT : External power supply is connected LiPo: Lithium Polymer pack NiMH: Rechargeable cells DryC: Regular alkaline cells The battery status icon shows the remaining battery reserve.
Monitoring format:	Indicates the audio headphone monitoring format currently selected. Possible indications are: M (Mono), ST (Stereo), L / R (Left or Right) and MS (Mid/Side)
Modulometers:	Standard level metering over a 50 dB range. Touching on the modulometer display will show the “Highest Level” or “Hold Max.” peak level reached since the last reset, and touching / pressing for 5 seconds will reset the “Hold” display to -50dB. Activation of the audio limiters is shown by the L / R modulometer signs having a yellow background as shown below.



Menu mode:	Pressing the  will select the MENU mode.
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Status section:



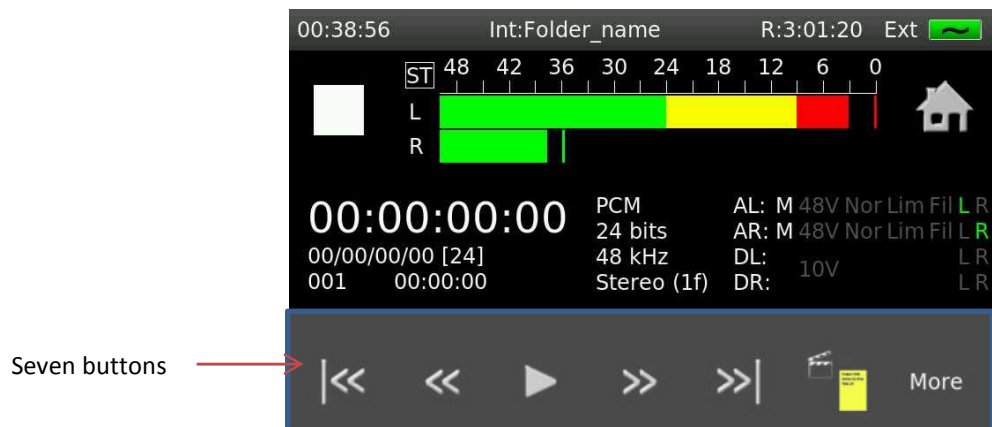
Inputs	Source	Phantom	Phase	Limiter	Filter	Track
Analog L (AL)	M: Mic	+48V	NORmal	LIM	FIL	L
Analog R (AR)	L: Line		INVerted			R
Digital L (DL)						
Digital R (DR)						

10V (AES 42 powering)

keys :	Either transport keys or “action buttons” according to main function switch position.
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Progression line:	A white horizontal bar across the bottom of the display (from left to right) shows the progression of the playback through a file and the width of the display is a % representation of the file.
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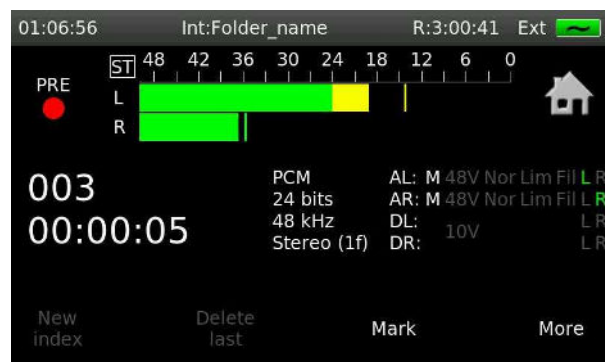
Transport and action buttons



The lower portion of the display is user configurable, and can have different sets of buttons for the PLAY/STOP and TEST/REC positions of the main selector. In the PLAY/STOP position, the 5 leftmost keys are fixed as transport functions, only the 2 rightmost buttons are configurable.

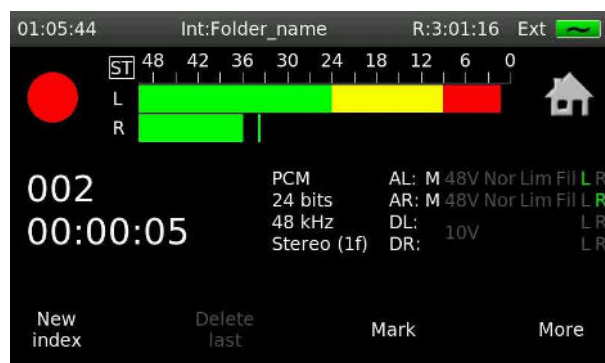
In the TEST/REC position all seven positions are programmable. This system has been adopted to allow the user to program the desired buttons that are to be used frequently during recording, for example Slate mic ON/OFF or MARK etc. They can also be programmed under the “MORE” button which will light a second row of shortcuts, thus avoiding that functions are activated unwillingly during recording.

With the main function selector in the TEST (pre-record) position:



In the picture above only the “MARK” key is active. The “New Index” and “Delete Last” are greyed out as they are not active in pre-record / TEST modes. They will become active when the main function selector is set to REC. or as soon as the function is possible.

With the main function selector in the RECORD position:



Other features such as False start can be programmed if desired.

The possible Transport / Action buttons are:



Normal playback in PLAY or STOP.



Pause at the current point during play



Search forward at 4x nominal speed while in playback or Fast Forward at 128x when in STOP mode.



Skip to next take




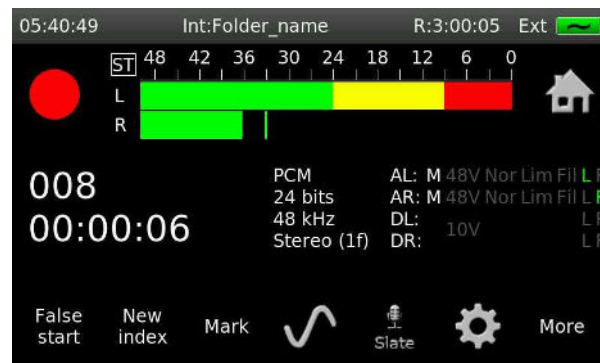
Search backwards at 4x nominal speed while in playback or Fast Rewind at 128x when in STOP mode.



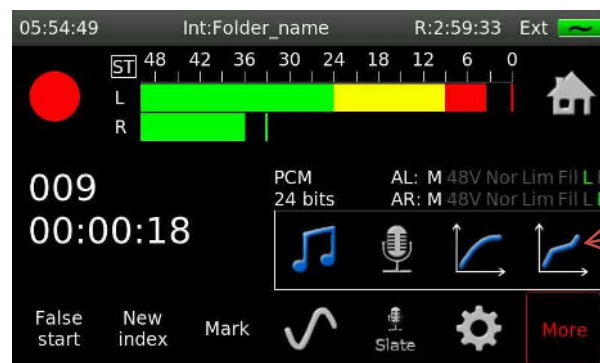
Skip to previous take

Shortcuts

Depending on the installed options a different number of shortcuts can be shown on the main screen. Pressing the MORE key will display the remaining choices. The displayed icons can be programmed depending on the position of the main function selector. Access to all the menus of the machine is gained by pressing the  key.



REC screen showing the "MORE" key



More icons



Loudspeaker: This icon will show blue when the speaker is active.



Audio: Access to the audio related features menus of the recorder (Inputs, Outputs, filters, ALC and reference generator).



Inputs: Access the input related parameters.















Media: Access the internal micro SD memory card and the extractible SD card, USB media, copy settings/status as well as the different folders of each media.



Tools: Access to features not involved with recording and that are considered as user tools, such as Date & time, formatting, keyboard layout etc.



Settings: Access to all other settings of the recorder, such as Sample frequency, File format, display appearance, beep functions etc.

	Slate:	Activates the slate microphone. It can be programmed to toggle mode also. This icon will turn blue whenever the internal slate microphone is active.
	Filters:	Access internal programmable digital filters.
	ALC/Lim:	Access to the Automatic level control and audio limiters programming.
	Outputs:	Access to the audio headphone and loudspeaker outputs programming.
	Reference generator:	Audio signal generator activation icon programmable in level and frequency in the menu mode. This will turn blue when the reference generator is active.
	Meters:	Programming of the modulometer color bars and Mic display indication
	Pot Assign:	Assignment of the main level and headphone pots as well as switch functions of the headphone pot.
	Metadata:	Access to iXML metadata programming.
	Templates:	Up to 6 user programmable templates (complete machine parameter settings) can be recalled rapidly using this short-cut.
	Time Code:	Access to the internal time code settings of the machine (if TC option # 71 19185 000 is installed).
	Transmission:	Access to the internal communication possibilities, including, Ethernet, FTP, I.S.D.N. if ISDN option #71 19186 000 is installed and WiFi/3G if option #7119187000 is installed and VOIP if option #7019180030 is installed.
	Editor:	On-board graphic audio editor (if Editor option # 70 19180 020 is installed)



Places a mark (pointer) in the audio file when pressed (Max 99 marks per take can be stored)



Restart a take with the same index number



Seamlessly create a new index while recording.



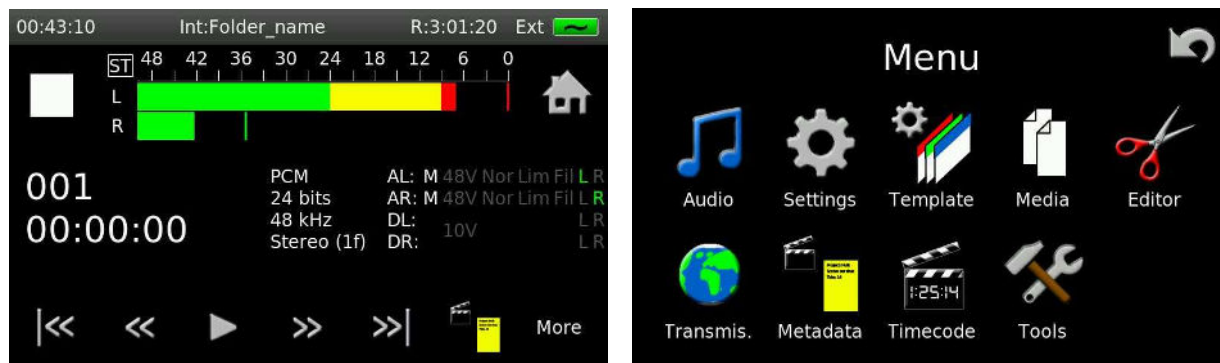
Delete the last index.


Each of the topics shown here is covered in detail in the MENU section of this manual, along with all the other menu-driven features.

Menu mode

Like other Nagra models the *Seven* is structured around a system of powerful user-friendly menus. However, unlike previous models where the structure was based on a “Tree” where each branch was dedicated to specific areas, the Nagra *Seven*’s menus take full advantage of the touch screen and specific features are grouped together in a similar way as in a modern mobile phone.



To enter the menu mode, press on the  icon on the main display screen. Each of the different menu items is covered in detail below:



Clicking on the individual icons will enter the respective menus, and the reverse arrow  will return to the previous screen. Holding the reverse arrow will jump all the way back to the main display screen.

Screen lock

The display of the Nagra *Seven* can be voluntarily locked by the user at any time to avoid accidental alteration of settings while in operation.

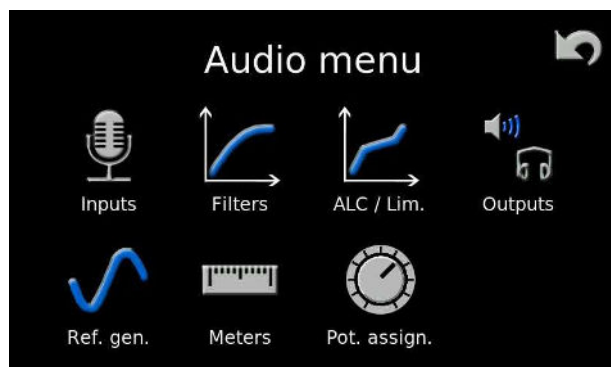
To lock the display, simply press and hold the  icon for 2 seconds and the message SCREEN LOCKED will appear on the top of the display. Pressing on the  icon again will open the window, press OK to unlock the display.

PART 2 - The AUDIO

Audio Menu



The Audio menu is used to set the parameters of all audio related aspects of the Nagra *Seven*.



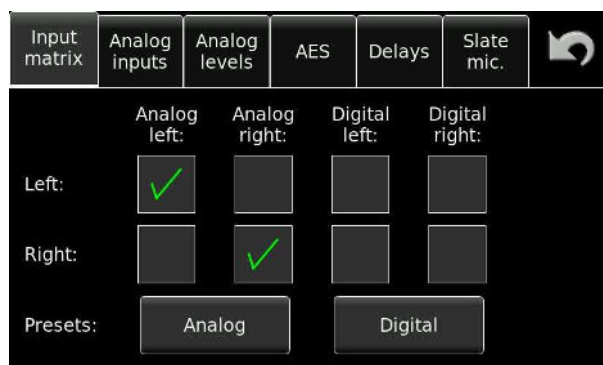
Inputs



Will enter the inputs of the audio menu, giving access to all the parameters related to the analogue and digital audio inputs of the recorder. This menu is split into 6 different sections:

Input matrix

The Input Matrix is used to route the audio to the left and/or right channels. By touching the different boxes, either input can be sent to either or both channels. The selections can be made for both analogue and digital input signals. The analogue and digital “Presets” will reset the inputs to their default mode of standard stereo.



Analogue inputs

This screen programs the analogue inputs. For each input, the type of source signal (Mic. or Line) can be selected, and +48V Phantom powering, phase inversion, filters and ALC/LIM can also be chosen. If the limiters are ganged (Linked) then if one limiter is activated due to a strong signal then the other channel will activate simultaneously as well.

The screenshot shows the 'Analogue inputs' screen. At the top, there are tabs: 'Input matrix', 'Analog inputs' (selected), 'Analog levels', 'AES', 'Delays', 'Slate mic.', and a refresh icon. Below the tabs, the settings for the Left (L) and Right (R) channels are displayed. For both channels, the input type is 'Mic 2.8 mV/Pa (Dyn)'. Below this, there are five columns of settings: '48V', 'Invert phase', 'Filter', 'ALC / Lim.', and 'ALC / Lim. gang'. For the Left channel, '48V' and 'ALC / Lim.' are checked with green checkmarks. For the Right channel, 'ALC / Lim.' is checked with a green checkmark. The 'ALC / Lim. gang' setting is currently disabled (greyed out).

Analogue input selection

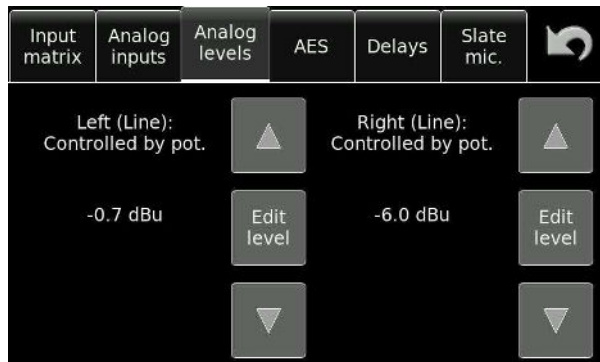
For both inputs, the LINE input can be selected as well as a choice of three different microphone sensitivity positions, as shown below. The sensitivity of a particular microphone can be found in the respective manufacturers' documentation, but as a guide, dynamic microphones do not require 48V phantom powering and have a very low sensitivity and therefore require the most amplification. Condenser microphones DO need +48V powering and provide a much stronger signal, and will use one of the other sensitivity settings.

The screenshot shows the 'Analogue input selection' screen. It has the same top tabs as the previous screen. The 'Left' (L) channel input type dropdown menu is open, showing four options: 'Line', 'Mic 2.8 mV/Pa (Dyn)', 'Mic 10 mV/Pa (Cond)', and 'Mic 40 mV/Pa (Cond)'. The 'Right' (R) channel input type is 'Mic 2.8 mV/Pa (Dyn)'. Below the input type selection, the same five columns of settings are visible. For the Left channel, 'ALC / Lim.' is checked with a green checkmark. For the Right channel, 'ALC / Lim.' is checked with a green checkmark. The 'ALC / Lim. gang' setting is currently disabled (greyed out).

Note: Phantom +48V powering and AES 42 10V powering will be shut off, to save power, if the machine is set to a stand-by mode on the main function selector.

Analogue levels screen

For each input, the current microphone input levels in dBSPL, or Line input level in dBu can be displayed. If they are assigned to the pots, then the up/down keys are inactive. If they are not assigned to a pot then the levels can be adjusted using the buttons. In the example below, the both inputs are selected as line inputs and assigned to the relevant pot. They can be modified with the UP/DN buttons, or by using the EDIT LEVEL button where the exact value can be entered directly, as shown in the picture below.



The acronym dBSPL means “Decibels of Sound Pressure Level” If the modulometer shows and average of -10dBfs (full scale), and the dBSPL level on the fuel gauge of display scale of the input potentiometer shows 94dB, then this means that the acoustic level on the input of the capsule of the microphone is actually $94-10=84\text{dBSPL}$

AES screen

The AES screen gives the possibility to choose between AES 3 or AES 42. The AES 42 is the AES format for digital microphones. The Nagra *Seven* will supply the 10V power for the digital microphones (known as mode 1), but does not run the entire protocol to control the microphones dynamically (mode 2). The 10V supply is only available when the inputs or clock reference are selected to digital, and will be cut if analogue inputs or other references are selected.

The SRC Sample Rate Converter can also be activated making sure there are no synchronization issues between the digital microphones / inputs and the recorder.

Input matrix	Analog inputs	Analog levels	AES	Delays	Slate mic.	
AES mode:		AES 3				
Sample rate converter:		On				

Delays






Audio delays can be programmed into the machine to accommodate a certain delay created by external devices, allowing the analogue or digital signals to be delayed so that all the inputs are coherent and naturally the time code (if installed) is compensated by the corresponding amount.

Input matrix	Analog inputs	Analog levels	AES	Delays	Slate mic.	
		External delay:		Internal delay:		
Analog left:	0 ms		3 ms			
Analog right:	0 ms		3 ms			
Digital:	1 ms		2 ms			

There is an inherent internal delay in the Nagra *Seven* which is shown on the right of the screen, and this will be compensated according to the analogue or digital delay programmed by the user. The Nagra *Seven* can manage delays up to 30 ms at 48 kHz, approximately 15 ms at 96 kHz and about 7 ms at 192 kHz

Slate microphone

The front panel of the recorder is fitted with a built-in microphone or “Slate mic”. The operational parameters of the slate mic can be set on this screen. The “Button mode” can be set to either “Normal” where the mic is active as long as the icon on the main display is pressed, or “Toggle” which will toggle ON/OFF upon each press.

Input matrix	Analog inputs	Analog levels	AES	Delays	Slate mic.	
Button mode:		Normal				
Destination:		Both				
Recording mode:		Replace audio				
Boost:		+18 dB				

The destination button allows the user to decide where the slate microphone will be recorded when it is active, the possible choices are Left channel, Right channel or Both.

The Recording mode allows the slate mic to replace any existing audio input on the destination channel(s) or for the audio to be mixed to the existing audio input of the destination channels.

The boost function allows the user to adjust the level of the slate mic.

Filters



The Nagra *Seven* is equipped with fully programmable internal digital filters. These filters can be programmed for each microphone input independently. The frequency of the filter, from 30 Hz to 300 Hz and the slope of either 12 or 24 dB/Octave and the headroom, from 0 to 42 dB can be programmed using the settings window.

Filters	Settings
Left (LC 80 Hz, 12 dB/oct):	<input checked="" type="checkbox"/>
Right (LC 80 Hz, 12 dB/oct):	<input type="checkbox"/>
Head room:	0 dB

Filters	Settings
Mic left frequency:	LC 80 Hz
Mic left slope:	12 dB/oct
Mic right frequency:	LC 80 Hz
Mic right slope:	12 dB/oct

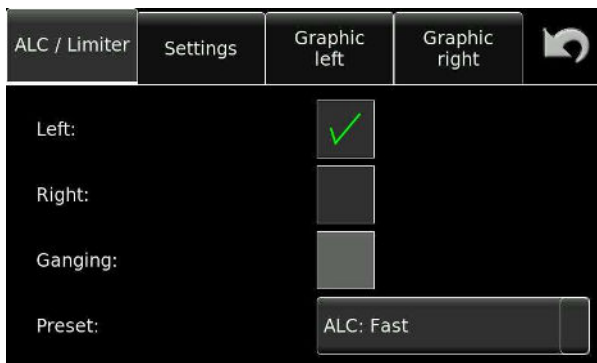
The settings window accesses all the specific parameters of the digital filters.

The headroom can also be used by the filters if necessary, this can be useful when low frequencies are too loud (wind noise for example) and may saturate the A/D converter; as the filtering is done next to A/D conversion rather than in the microphone preamplifier, it will not prevent the saturation.

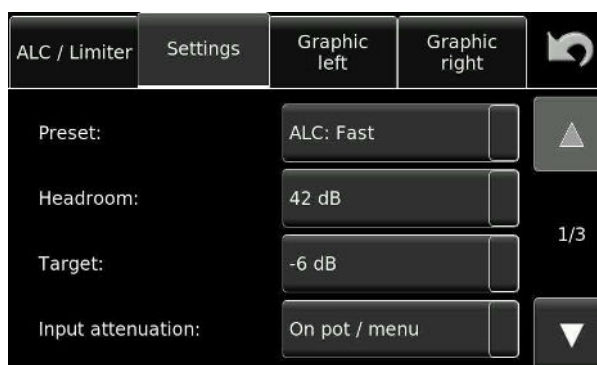
ALC / LIM.



The Nagra *Seven* is equipped with a very sophisticated, fully programmable internal audio control system that can be set as an audio limiter or ALC, or any combination between the two. It is an entirely new approach that allows the user to adjust the parameters exactly as desired. The different parameters of the system, such as the headroom, target, attack, release and ratio can all be set with dropdown menus from the settings window. If the GRAPHIC window is opened then the operating zone can be visualised to give a clearer understanding of the settings. When the graphic display is shown, turning the left or right potentiometer will adjust the parameters for the corresponding channel.

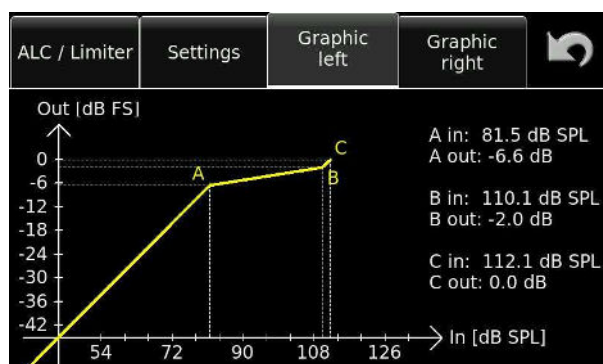


If the PRESET button is pressed a drop-down menu will appear allowing the user to choose between several pre-programmed operational modes for the ALC / LIMITER. This is the simplest selection for those not wishing to set all the parameters individually.

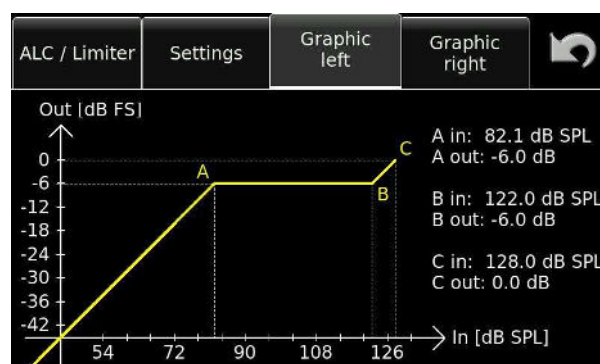


Preset:	User selectable preset values
Headroom:	The range into which the signal can go before distortion
Target:	The upper limit of the operational zone
Input attenuation:	Analogue input attenuation control
Attack:	The reaction time of the limiter defines the duration of a sound needed to close the limiter entirely
2nd limiter attack:	Attack time of the second limiter.
Delay:	Time before the release is active.
Release:	The decay time of the ALC/Lim effect.
Ratio:	How much audio compression will be used (i.e. 6:1 means that 6dB will be compressed to 1 dB)

Limiter activation is shown on the main modulometers by the “L&R” having a yellow background.



Left channel programmed as a limiter



Left channel programmed as an ALC

Using the Graphic left / right windows, all the parameters of the ALC/Limiter can be adjusted using the corresponding channel potentiometer. The operating position is indicated in the form of a graphic display and the values are displayed to the right of the graph.

A detailed explanation of the operational principals of the ALC/LIMITER system of the Nagra *Seven* is covered in Annex V found at the end of this manual.

Outputs Menu



The outputs screen gives access to three different areas concerning the audio outputs for the line outputs, monitoring – headphone output, and built-in loudspeaker.

For the line outputs, the analogue output level can be pre-set from -6 to +15 dBu, and the digital outputs can be set to either standard 24 bits or to 16 bits re-dithered.

Output	Monitoring	Loudspeaker	
Line out level:	<input type="text" value="15 dBu"/>		
AES out word length:	<input type="text" value="24 bits"/>		

Monitoring Menu

For the monitoring section, an additional headphone boost can be added to increase the headphone output level. The M/S decoder can be turned ON or OFF. The M/S decoder will only decode the headphone output into a L/R signal and will have no effect on the recording or the line outputs.

The level of the Beep signal can also be adjusted in this menu. The beep will be audible to indicate that a command has been correctly interpreted, or to signal a warning.

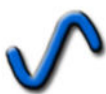
Outputs	Monitoring	Loudspeaker	↶
Monitoring boost:		Off	
M / S:		Off	
Beep level:		Medium	

Loudspeaker Menu

The loudspeaker menu allows the user to decide when the internal loudspeaker of the recorder is active. It can be ON, OFF or only in playback to avoid feedback when in TEST mode.

Outputs	Monitoring	Loudspeaker	↶
Loudspeaker mode:		In playback only	
Loudspeaker:		Off	

Ref.Gen.



The internal reference signal generator can be programmed in frequency, from 1 Hz to 20 kHz. The level can also be set from -6 dB to -20 dB in 2 dB steps and it can be selected to toggle ON / OFF or be a momentary signal.

Reference generator	↶	
Button mode:	Normal	
Frequency [Hz]:	1000	
Level:	-18 dB	

Meters Menu



The meters screen gives access to three different settings concerning the fuel gauge metering displays.

Modulometers

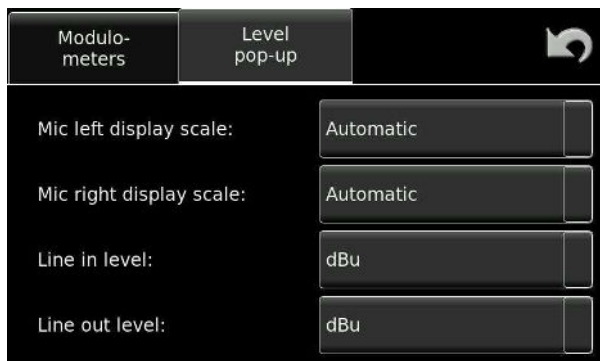
This menu allows two critical parameters of the bar-graph modulometers to be adjusted. The point at which the horizontal bar-graph display changes color from green to yellow, and from yellow to red as well as the overall range of the scales, can be set in this menu.

Modulo-meters	Level pop-up	
Range:	-50 dB	
Yellow level:	-24 dB	
Red level:	-9 dB	

Range:	The scale of the modulometers can be set to 30, 40 or 50 dB.
Yellow level:	Programmable from -9dB to -24dB in 3 dB steps.
Red level:	Programmable 0, -1, -2,-3 -6 or -9db.

Level pop-up

The Level pop-up menu allows the user to program the indications shown on the blue “fuel gauge” pop-up display which is indicated when the level pots are adjusted.



The screenshot shows the 'Level pop-up' menu with the following settings:

Modulo-meters	Level pop-up	
Mic left display scale:	Automatic	
Mic right display scale:	Automatic	
Line in level:	dBu	
Line out level:	dBu	

The microphone display scale menu allows adjustment of the scale of the level indication so that it will correspond to the actual dBSPL value according to the specific sensitivity of the microphone being used. If the sensitivity of the microphone is known (supplied by the manufacturer in the technical specifications of the microphone), select the corresponding sensitivity for the microphone. The correct dBSPL indication will now be shown as soon as a potentiometer is touched. If the microphone sensitivity is unknown, select “Attenuation” so as to see dB rather than dBSPL. “Not indicated”, can be selected so that the “fuel gauge” will no longer appear when the potentiometer is touched.

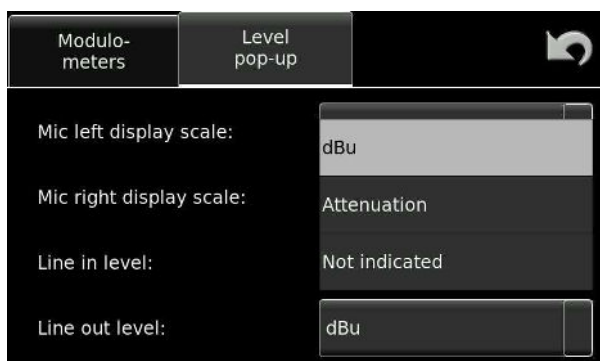
In the Automatic position, the sensitivity selected in the inputs menu will be used as the scale for the fuel gauge. This setting will have no effect on the input sensitivity only the scale of the level display.

If Attenuation is selected, then the indication will be in dB's from 0 when the pot is touched.

If a particular potentiometer is assigned to more than one input gain, then when the blue fuel gauge is indicated it will only show the corresponding level in “dB” rather than “dB SPL” if their sensitivity settings are different.

Note: This selection will NOT alter the actual sensitivity of the preamplifier which is adjusted using the potentiometer for the corresponding input.

For the line inputs and line outputs, the display can be selected to dBu or attenuation.



The screenshot shows the 'Level pop-up' menu with the following settings:

Modulo-meters	Level pop-up	
Mic left display scale:	dBu	
Mic right display scale:	Attenuation	
Line in level:	Not indicated	
Line out level:	dBu	

Pot. Assign Menu



Access to the assignment of the input pots and the headphone pot. It allows different functions to be attributed switch function of the main level pots and the headphone pot switch.

Input pot.	Headphone pot.	
Pot. assignment:	Mic and line	
Pot. ganging:		Grab
Right offset adjustment:	0.0 dB	+ -

- Pot. assignment:** The main level pots can be attributed to MIC or LINE, both or neither as required.
- Pot. ganging:** Allows the pots to be ganged together so that turning the left pot will control both channels together. If there is an offset to be placed between the channels this can be either set manually using the Right offset adjustment, or automatically by clicking on the GRAB button which will instantly grab the current pot offset.
- Right offset adjust:** Manual adjustment of the channel offset of the pots when ganged together

Input pot.	Headphone pot.	
Pot. assignment:	Headphone level	
Press:	Mono while pressed	
Double-click:	Loudspeaker	

- Pot. assignment:** The headphone level pot can be attributed to headphones or line output or neither as required.
- Press:** Allows the pot switch to be set to normal or toggle mode.
- Double click:** Attributes the double click to either loudspeaker ON / OFF or MONO selection.

Part 3 – THE SETTINGS

Settings Menu



The settings menu accesses various features of the recorder, which will all be stored in the templates (if used) and is broken into 5 categories: General, File format, Pot. assign, Display and Icon selection. Each is explained below:

General settings

The “General settings” section is spread over 2 screens, press the UP/DN arrows to alternate between them.

General	File format	Display	Home screen	Icon selection	
Sample frequency:	48 kHz				▲
Clock reference:	Master				1/3
Pre-record mode:	Off				
Pre-record time:	5 s				▼

Sample frequency: Sets the internal sampling frequency of the A/D converter for recording. It can be set to 44.1, 48, 88.2, 96, 176.4 and 192 kHz.

Clock reference: Sets the reference signal to which all the internal clocks of the machine are to be locked. Generally the machine will be synchronised to its internal high stability (MASTER position), which will guarantee the correct sampling frequency.

If an external reference is being used then this signal must be stable. The entire list of possible clock reference signals is shown in the list below:

Selection**Signal explanation**

MASTER	Machine is set to be “master”, all clocks are synchronised using the internal stratum III high stability crystal.
MASTER +0.1%*	As for master but accelerated by 0.1% for NTSC applications. (Sampling frequency will be increased by 0.1% i.e. 48'000Hz becomes 48'048 Hz)
MASTER -0.1%*	As for master but slowed down by 0.1% for NTSC applications. (Sampling frequency will be slowed by 0.1% i.e. 48'000Hz becomes 47'952 Hz)
Wclk 44.1*	External word clock on the word clock reference connector at 44.1 kHz
Wclk 48*	External word clock on the word clock connector at 48 kHz
Wclk 88.2*	External word clock on the word clock connector at 88.2 kHz
Wclk 96*	External word clock on the word clock connector at 96 kHz
Wclk 176.4*	External word clock on the word clock connector at 176.4 kHz
Wclk 192*	External word clock on the word clock connector at 192 kHz
AES 44.1	External ref on the AES input at 44.1 kHz
AES 48	External ref on the AES input at 48 kHz
AES 88.2	External ref on the AES input at 88.2 kHz
AES 96	External ref on the AES input at 96 kHz
AES 176.4	External ref on the AES input at 176.4 kHz
AES 192	External ref on the AES input at 192 kHz
Video PAL*	External video reference is on the word clock connector in PAL 25fps
Video NTSC*	External video reference is on the word clock connector in NTSC 29.97fps
Video NTSC 60 Hz*	External video reference is on the extension connector in NTSC 30fps
HDTV 720p23.98*	High definition digital video 720 progressive at 23.98 frames
HDTV 720p24*	High definition digital video 720 progressive at 24 frames
HDTV 720p25*	High definition digital video 720 progressive at 25 frames
HDTV 720p29.97*	High definition digital video 720 progressive at 29.97 frames
HDTV 720p30*	High definition digital video 720 progressive at 30 frames
HDTV 720p50*	High definition digital video 720 progressive at 50 frames
HDTV 720p59.94*	High definition digital video 720 progressive at 59.94 frames
HDTV 720p60*	High definition digital video 720 progressive at 60 frames
HDTV 1080p23.98*	High definition digital video 1080 progressive at 23.98 frames
HDTV 1080p24*	High definition digital video 1080 progressive at 24 frames
HDTV 1080p25 *	High definition digital video 1080 progressive at 25 frames
HDTV 1080p29.97*	High definition digital video 1080 progressive at 29.97 frames
HDTV 1080p30 *	High definition digital video 1080 progressive at 30 frames
HDTV 1080p50 *	High definition digital video 1080 progressive at 50 frames
HDTV 1080p59.94*	High definition digital video 1080 progressive at 59.94 frames
HDTV 1080p60 *	High definition digital video 1080 progressive at 60 frames

("*" indicates reference possibilities only available for machines equipped with internal time code option.)

For interlaced HDTV formats, use half the frame rate. For example, 1080i50 you should select 1080P25

Pre-record mode

The pre-record feature will record into a buffer memory while the recorder is in TEST position and this buffer will be added to the start of the recording once RECORD is selected.

Pre-record time

The length of the buffer is chosen in the PRE-RECORD TIME menu. The duration can be selected to 5, 10, 15 or 20 seconds at all sampling frequencies up to 48 kHz. At higher sampling frequencies the available pre-record time is limited to 5 seconds at 96 kHz and 1 second at 192 kHz. When active, the counter on the display will start to count until the pre-record time is reached.

VOX – Voice operated recording

General	File format	Display	Home screen	Icon selection	
Auto record (VOX):		On			▲
Auto rec. threshold:		-18 dB			2/3
Auto rec. trigger delay:		Immediate			
Auto rec. stop delay:		Non-stop			▼

The VOX mode allows the machine to start recording automatically when a pre-set sound level arrives on the inputs. The speed with which it reacts can be set by the threshold level, and the duration of sound needed to trigger the function can also be set. The trigger delay works using 5 ms “slices”. A 100 ms delay means that 5 consecutive slices of 20 ms must be above the threshold to activate the trigger.

Finally the length of time that the recording continues once the pre-set sound level has disappeared can also be programmed. This function is very useful when trying to record unpredictable sounds, and will avoid recording lots of silence.



Auto-skip in playback

If set to ON then during playback the recorder will only playback files of the identical format to that of the current machine settings, and will jump over all other files in a folder. The Index loop function will allow the same index to be played back repeatedly. The SKIP functions are used to jump back to the beginning / end and to another index while this mode is active.

Start / stop mode

The Start / Stop connector on the left side of the recorder is used for a remote “fader” start and will start or stop the recorder in its current mode (according to the position of the main function selector) when the two contacts are shorted together. This selection allows activation of the function in Playback, Recording or both modes of the recorder.

Start / stop polarity

The Start / Stop connector on the left side of the recorder is used for a remote “fader” start and will start or stop the recorder in its current mode (according to the position of the main function selector) when the two contacts are shorted together. This selection allows the polarity to be inversed so that the opposite function will be activated when the connections are shorted together.

Auto rec. on TC ext.TC

The Auto record on external time code function allows the machine to start a new index as soon as a valid time code is detected on the external time code input.

File format Menu

The file format menu determines all the parameters of the audio file that the recorder will make and record to the media.



Format

This can be either 16 or 24 bits and can be set to make a single mono or stereo file (Polyphonic) or two individual files (monophonic). The main difference between the monophonic or polyphonic formats is the addition of the track number in the file name as “_1 or _2” in the file naming.

File name

The file name is the alpha-numeric name given to each recorded file. The file name changes depending on whether a monophonic or a polyphonic file is being made. The file name format can be selected from a pre-defined list of “name formats” made up of different combinations of data and are selected in the “File Name” menu

When recording monophonic files the name formats will all end with “_#” (# = track number) for example Tape_XXX_1.wav (for the file corresponding to channel 1) and Tape_XXX_2.wav for the file of channel 2.

The “MachName” can be programmed by the user in the “Tools” menu. The date and time settings depend upon the settings of the real time clock and NOT the time code information.

A file can be named using a computer, but In all cases, the last 3 positions “XXX” must be a numerical value otherwise the file will not be recognized by the Nagra. The “X” symbols in the examples correspond to the index number in numeric digits from 0 to 9. As an example:” Beethoven_001.wav”

Possible automatic file naming selections are:

MachNameXXX.wav
MachNameHHMMSS_XXX.wav
MachNameYYYYMMDDHHMMSS.wav
Folder_XXX.wav
FolderHHMMSS_XXX.wav
FolderYYYYMMDDHHMMSS_XXX.wav
Folder_Scene_Take_XXX.wav
Scene_Take_XXX.wav
YYMMDD_HHMMSS_XXX.wav

Max file size



The Nagra *Seven* records audio using the standard FAT 32 (File Allocation Table) file format that allows the audio files to be read by either MAC or PC. The FAT system limits any file to a maximum size of 4 GB although many computer programs will not accept audio files larger than 2 GB. The recorder will automatically, and seamlessly create a new file (or index) up to a maximum of 999, when the file size reaches 2GB during any recording.

Recording at 2 channels of 24 bits per sample audio at sampling frequency of 192 kHz represents approximately 1 GB in 15.5 minutes. This means that a new file will be created about every 31 minutes. If a long duration recording is to be made, then it is strongly recommended to use the monophonic file mode, and this will allow each track to have its own file each of which can go up to 2 GB. This calculates approximately to 1h 02 minutes per track of mono for 2 GB of memory space.

Display

The display menu gives access to the operation parameters of the screen, rather than what is actually displayed.

General	File format	Display	Home screen	Icon selection	
Brightness:		100%			
Dimmer after:		3 min			
Dimmer level:		10%			

- Brightness:** Screen intensity 5, 10, 25, 50, 75 and 100%
- Dimmer after:** Delay before the display switches to low power mode. This can be set to 30s, 1min, 3 min, 5 min or never.
- Dimmer level:** The percentage of maximum intensity that will be used when the dimmer becomes active after the pre-set time.

The dimmer function is only active when no external power supply is connected.

Home screen

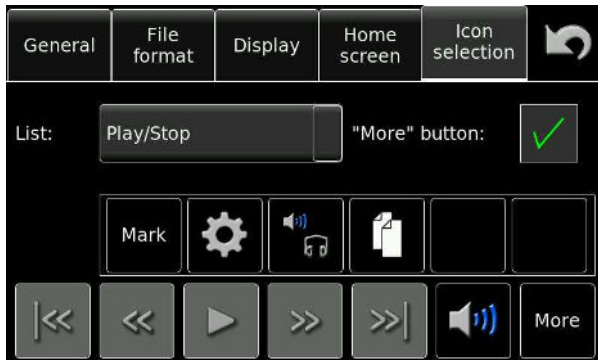
The central “Selection “ section of the home screen has three possible displays which will be scrolled through in turn each time the section is touched, These three displays can be programmed in this menu. The available choices depend on the installed options of the machine.

General	File format	Display	Home screen	Icon selection	
Central info 1:		Counter and settings			
Central info 2:		Counter only			
Central info 3:		<Unused>			

The “settings” information shown changes depending on the mode of the recorder. In the TEST or REC positions the file information is according to the current settings of the machine. In the STOP or PLAY positions, the information shown corresponds to the current playback file.

Icon selection

The Nagra *Seven* offers programmable shortcuts which will put different icons on the main display for rapid access to different user definable features of the recorder. Different displays can be adapted for the PLAY / STOP and TEST / REC positions of the main selector. Checking the "More" button will allow the 6 additional icons to be displayed on the main display.



PLAY / STOP screen:

Programming of any button is made by selecting the desired position and then choosing the function from the drop down menu.



TEST / REC screen

USB keyboard shortcuts can also be programmed in this window.



Part 4 – THE TEMPLATES

It is important to understand that a template is a set of predefined settings that can be rapidly stored or recalled by the user to set the recorder to a pre-defined operating mode. They are NOT “Profiles”. It is perfectly possible to recall a pre-stored template and then subsequently change any specific setting in the machine.

Templates Menu Screen



Six internal templates are available for the storage of different machine parameter settings for rapid access. All settings that affect the recording are stored. Each template can be given a name up to 16 characters for easy identification. The most recently selected template is indicated by (last) to show the last machine set-up selected. However, this does not guarantee that the setting have not been altered since the last recall.



Settings in the “Tools” menus are NOT saved in the templates.

- Recall:** Retrieve a previously saved template and set the recorder accordingly.
Store: Save the current settings of the recorder to a selected template.
Rename: Replace the existing template name with a new one.
Erase: Erase the highlighted template.

Settings stored in templates: (according to installed options)

AES Sample rate converter mode
AES 42 On/Off
AES output dither
Auto-copy mode / destination / tracks
Auto-skip mode setting
Auto-record on TC selection
Beep level
Clock reference
Channel 1+2 source selection
Channel 1+2 input matrix settings
Digital filter parameters
File format / maximum file size
File name format
FTP settings
Headphone potentiometer assignment
Home screen
ICON display selections
Input delays
ISDN TX / RX data compression settings
ISDN Sync protocol settings
Limiter 1+2 parameters
Limiters 1+2 On/Off
Line input 1+2 level settings
Line output gain selection
Loudspeaker mode
Microphone input +48V On/Off
Microphone input 1+2 level setting
Microphone input 1+2 phase
Microphone sensitivity 1+2
Modulometer settings
Monitoring boost setting
Monitoring level / format
M/S monitoring On/Off
Potentiometer assignment selection
Potentiometer ganging selection
Potentiometer offset setting
Pre-record mode / time
Reference generator mode / level / frequency
SIP communication parameters
Slate microphone mode / destination
Start / Stop polarity setting
Slate microphone boost setting
TC format / mode / Rec source / User bits mode
Template name
Voice start (VOX)

Part 5 – THE MEDIA

Media Menu



The MEDIA menu gives access to all the file and storage components of the machine. This section is broken into 5 sub-divisions covering the Directory, Folder, Drive, Copy Status and Auto copy. Each of which is covered in detail below.

Directory

The directory is the list of files located in the currently selected working folder on the selected drive. Each file has a certain quantity of data associated with it known as Metadata. This data is shown next to the highlighted file. (Folder, index, length.... Please refer to the METADATA section for more detailed explanations). The UP and DOWN keys on the right of the display will move through the list of files, and their corresponding metadata will be displayed automatically.



Pressing the “Opt.” (Options) button opens a selection of choices that can be applied to the current file (highlighted) as shown below.

- Play:** Playback the selected file irrespective of the current machine settings. i.e. a file of a different sampling frequency and bit depth can be played back without changing the settings of the machine. This can be used when the main function switch is in PLAY, STOP or TEST (without pre-record) but NOT in the REC. position.
- Copy Index:** Allows the file(s) to be copied from the current folder to another media.
- Delete Index:** Permanently erase the currently highlighted file.
- Edit:** Open the internal audio editor (If option installed) on this file
- Edit Metadata:** This function allows the user to alter previously recorded metadata, after the event.
- Remove Marks:** Delete all markers in the highlighted file.
- Transmit:** Prepare to transmit the highlighted file (according to transmission options).
- Renumber:** Renumber the files in the directory, either from zero or starting from a specific number.
- Create Report:** Generate a text file listing all the Metadata of all the recordings of the current folder and save it to the disk. If the “auto copy” function is active then the report will also be saved on the destination drive.
- Import a file:** Import an audio file and convert it to the current Nagra “file name” format.

File importation.

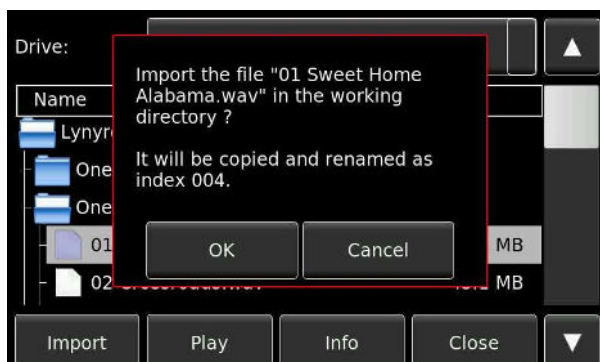
The Nagra *Seven* has a unique feature to allow it to play back files that do not correspond to the defined file naming principals and to subsequently import them into the working directory allowing them to be treated like any normal file recorded on the machine. This allows audio files, from a CD for example, with standard “track names” to be imported into the working directory.

When the Import a file button is selected from the directory options menu the following screen appears:



In this example the selected source drive is the USB drive, where the different folders and files can be seen.

From this position the file “01 Sweet Home Alabama.wav” can be played back or imported. If import is selected, the file will be brought into the current working drive but the name will be modified to contain the three digit index number that corresponds to the next available number in the destination folder.



The INFO display (above right) shows the file information.

Folders

The “Folders” is the location where the audio files recorded are to be stored. Folders, otherwise known as “Directories” can be located on either the internal Flash card of the recorder or on the extractible SD card or USB. Information about the size and number of files within the currently displayed folder is clearly shown. The drive, upon which the current working folder is located is also indicated.



Pressing the Opt. (Options) button opens a selection of choices that can be applied to the current file (highlighted) as shown below.



Set working: Select the currently highlighted folder as the working folder where recordings are to be stored.

Rename: Rename the folder.

Delete: Delete a folder.

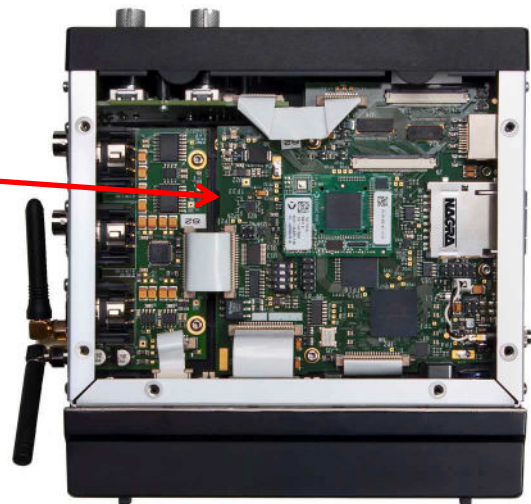
Copy to Internal: Copy the current folder and all the files within it from the SD card to the internal micro-SD memory.

Copy to USB: Copy the current folder and all the files within it from the SD card to the USB drive.

Note: The currently selected working folder cannot be renamed or deleted. To do so, first select another folder as the working folder, then change the name of the original or delete it as desired.

Drives

The covers are held in place with TORX T8 screws. Location of the internal 16 GB micro SD card when the top of the machine is removed. The Micro SD card is located just below the circuit board and is removed by simply pulling it gently away from the circuit. There is no limit to the acceptable size of the internal micro SD card.

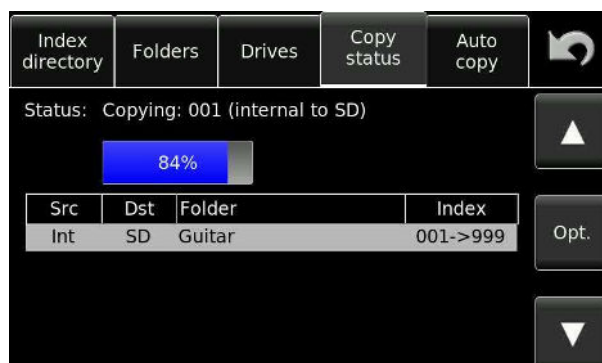


The drives window gives information about the connected media. “INT” refers to the internal 16 GB micro SD memory card. SD refers to the extractable SD media and USB refers to any external hard drive or USB memory stick connected to the USB port. The green “check” indicates the currently selected working drive (media). As shown below, the total size of the media as well as the remaining unused space is clearly shown for each media.

Index directory	Folders	Drives	Copy status	Auto copy	
	Total	Free	Format		
Int:	14.83 GB	14.83 GB	Ok	<input checked="" type="checkbox"/>	
SD:	0	0	Not present	<input type="checkbox"/>	
USB:	0	0	Not present	<input type="checkbox"/>	

Copy (Manager) Status

The copy manager display shows what the copy process is doing.



This example shows the copy status screen currently copying file 001 from the internal Micro SD to the SD. There is only one “item” in this copy list.

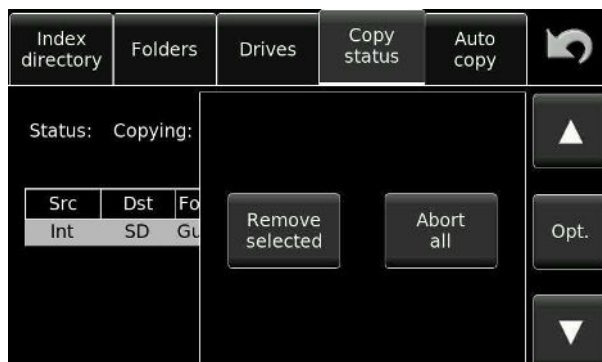
The blue fuel gauge shows the copy progression.

Operational modes of the copy manager

MODE	DESCRIPTION
IDLE:	The copy list is empty, no copies are running, no errors on previous copy.
COPYING:	The copy process is running.
SUSPENDED:	The Nagra <i>Seven</i> is in record mode and the current copy destination is the same drive as the working folder (copy will always go to the other drive). The copy is suspended to avoid file fragmentation on the disk and to guarantee a reliable remaining recording time.

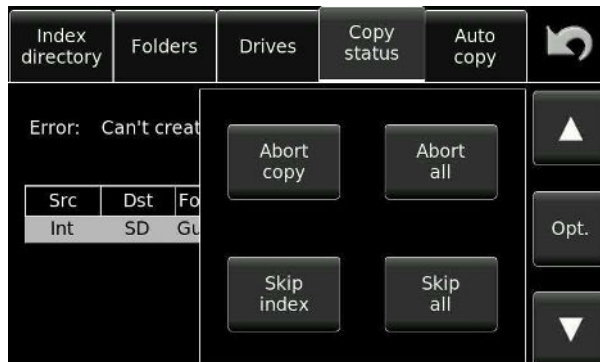
Copy manager commands

Pressing the OPT button while copying is underway will open the following screen:



Remove Selected:	Remove specific files from the copy list.
Abort all	Stop the copy action and remove all additional items from the copy list.

When a problem occurs with a copy, pressing the OPT key will provide a selection of related operations to be performed.



Abort copy	Remove the current copy list item and continue copying the next copy list item (if any).
Abort all	Stop the copy action and remove all additional items from the copy list.
Skip index	Skip this index and continue with the next index.
Skip all	Skip all indexes of the current item in the list that pose a problem (such as those that exist already in the destination folder).

The next two functions are only possible in event of the message "File already exists"

Overwrite	Overwrite this index. The existing index on the destination disk is deleted before the copy.
Overwrite all	Overwrite all indexes of the current item in the list. Any existing index on the destination disk is deleted before the copy. If another index of the current list item already exists on the destination drive, it will be automatically deleted and overwritten without warning.

The next function is available when the power to the Nagra *Seven* was lost prior to finishing a copy. This is the only function possible in this case.

Retrieve Yes/No?	This menu appears in the form of a pop-up when opening the copy status if an error occurred during the last copy session.
-------------------------	---

Copy error messages

While a copy is running in the background, you may be alerted by the error message “Copy Error” on the main display. This tells you that copy process has stopped and needs your intervention. The copy manager screen will give you an explanation of the reason for the error. Error messages are displayed as “Error: xxxxxxxx”: on the copy manager screen.

If an error is displayed, go into the copy manager menu screen and the reason behind the error will be indicated. Press the OPT button or retry.

MESSAGES

Can't create the directory
Can't find the source file
Can't open the destination file
Can't read the source file
Can't write the destination file
The index XXX already exists
Can't delete the file
The disk is full
Power lost during last session

Auto Copy

The Auto copy feature can also be considered as an automatic back-up of the current recordings, and once activated, requires no further user input. This will enable the automatic copying of all recordings, into a folder bearing the same name as the current working folder on the working drive. This folder will be automatically created on the destination media. This mode will also copy the report file if selected.

Directory	Folder	Drive	Copy manager	Auto copy	
Auto copy:			<input type="text" value="OFF"/>		
Auto copy destination:			<input type="text" value="SD"/>		

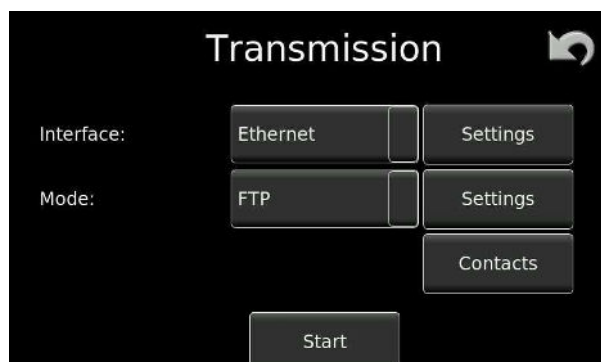
Note: In the event of a copy error, the auto copy will not be executed until the copy error has been resolved, as the copy process has been interrupted. A corresponding error message will be displayed. If alterations are made to the metadata, or a false start is made, then the metadata will automatically be corrected on the copy. This may even be done after the event on the condition that the destination file exists on the drive and that it is of identical size.

Part 6 – TRANSMISSION

Transmission MENU



The transmission menu screen is opened using the “world” icon from the shortcuts screen, and gives access to the different communication possibilities. The interface selection depends on the hardware options installed in the machine (ISDN, WIFI/3G /4G etc). The CONTACTS button gives access to the internally stored “Phone book” or contacts list, which is common to all communication methods.



INTERFACE

Allows the operator to select the internal interface to be used for the transmission. All machines are equipped with the ETHERNET port and can send files by FTP (File Transfer Protocol) over the internet or to the line output to feed an external communication device.

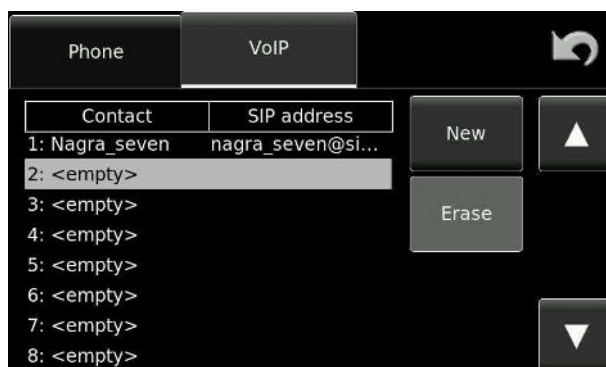
The use of I.S.D.N. and WiFi requires the relevant hardware options to be installed. The “Line output” possibility should be used if an external codec is being employed. All the features (Mixing microphone signals with played back files etc.) are all possible in stereo in this mode.

MODE:

Allows different transmission modes to be selected and the choices vary according to the interface chosen (FTP, VOIP, Speech, data.....)

CONTACTS

Opens the internal phone book where contact information can be stored for quick access. The contacts feature is common to all communication methods of the NAGRA.



Adding a new contact:

Up to a total of 8 Phone and 8 VOIP contacts can be stored in the memory.

Contact

Name:

Number:

Ok Cancel

7 8 9
4 5 6
1 2 3
<- 0 Del

Phone VoIP

Contact	Number
1: ATS	0216475071
2: <empty>	
3: <empty>	
4: <empty>	
5: <empty>	
6: <empty>	
7: <empty>	
8: <empty>	

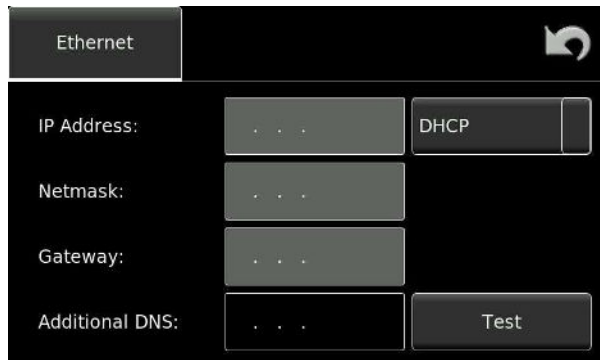
Edit Erase

▲ ▼

ETHERNET transmission:

All Nagra *Seven* machines have the possibility to send audio files over the internet using the File Transfer Protocol (F.T.P.) to do so proceed as follows:

In the Interface drop-down menu, select the Ethernet position, and click on the settings button and the following screen will open to allow the necessary parameters to be entered. In the DHCP mode, all the settings are automatically provided to the Nagra *Seven* from the router. If there is no DHCP server on the LAN then the settings can be programmed manually, then selecting the "Static" mode instead of DHCP will allow manual entry of the configuration.



Ethernet settings as an example:

IP address: 192.168.0.15 (IP address of the NAGRA)

Netmask: 255.255.255.0

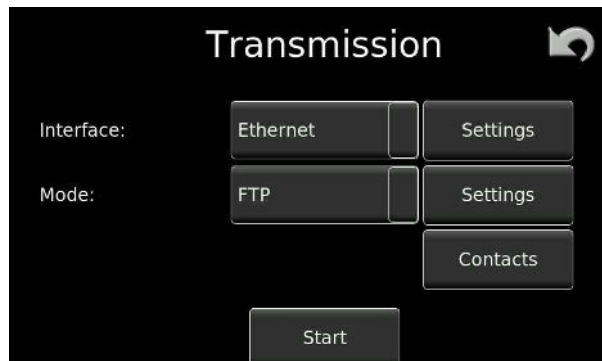
Gateway: 192.168.0.1

It is strongly recommended to contact the IT Administrator for this information.

Pressing the test button will make trial communication to see if the parameters are correct and connection to the internet can be made.

F.T.P. Transmission

To send audio files by F.T.P. the correct interface needs to be chosen (Ethernet, WiFi GSM /3G/4G). Once the desired interface has been chosen select FTP for the “mode” and then press the settings button.

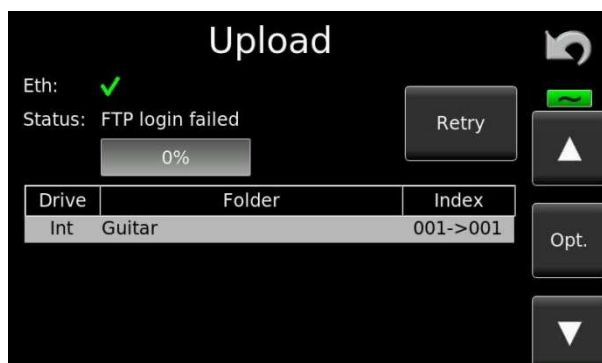


FTP settings:



Once the settings are correct a file can be sent by FTP. Click on the START button on the transmission screen and the FTP connection will be established with the destination server then the directory will be show allowing the desired file to be selected.

If error occurs, it may be due to a variety of reasons. Log-in with the FTP server was not possible, or a file with the same name as the one to be transmitted already exists on the destination server, or even data errors during the FTP transfer, in which case different screens / options appear depending on the error:

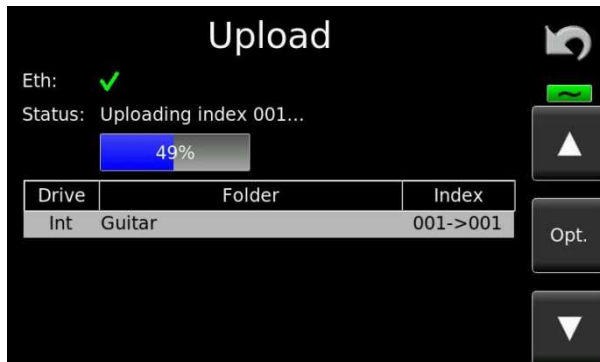


FTP Log-in error

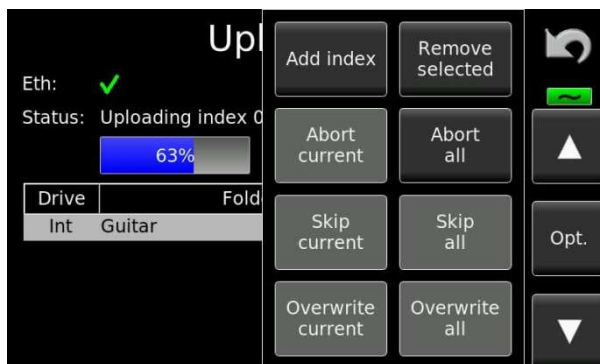


File already exists error

The FTP upload window will open and the file transfer will begin to the pre-defined FTP server.



Pressing the OPT button allows a selection of self-explanatory FTP operational options to be selected.



Part 7 – THE METADATA

Metadata Menu



Metadata is additional user information attached to a BWF file, it has been defined by the internationally accepted iXML metadata standard, and the NAGRA *Seven* conforms to this accepted norm.

Generic metadata screen

Current metadata screen

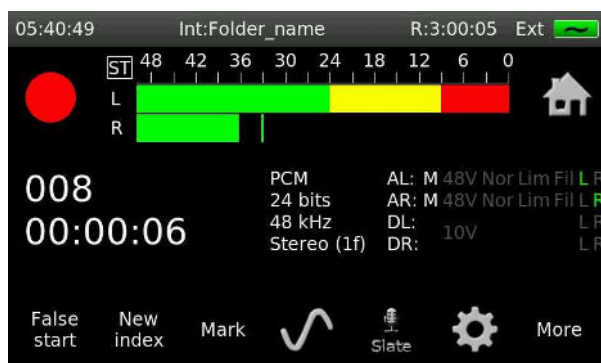
The “Generic” metadata, is the data that will be recorded on a new file. The “Current” metadata is the metadata of the currently selected index. Both can be altered using the keyboard as explained below.

The following information can be stored:

Project:	Alpha-numeric (max 32 characters)
Sequ./Scene:	Alpha-numeric (max 12 characters between the two boxes)
Take:	Numeric (1 – 999) (Will automatically reset to the highest take number +1 found in the working folder when the scene information is changed.)
Notes:	Alphanumeric (max 64 characters)
Wild track:	Check / uncheck
False start:	Check / uncheck (Current metadata screen only)
Pick-up:	Check / uncheck (Generic metadata screen only)
Track 1 / 2:	Alpha-numeric (max 8 characters each)

False start

A false start of a take in cinema production is unfortunately all too common. If this happens, the recording needs to start using the previous take number, and this is accomplished on the Nagra *Seven* by simply pressing the “False start” button on the display prior to moving the main selector to the record position. The FALSE START button can be programmed to appear on the bottom of the screen during test and record modes using the ICON selection function in the settings menu. The metadata of the previous take will then have the “-F” indication following the scene number to indicate that a false start was made. This indication takes priority over the “-W” wild track information although both bits of information are indeed written into the metadata. A false start can be used when the main selector is in either the REC or TEST position.



If Metadata is altered or a False Start is made while the autocopy is active, the modifications will be taken into consideration on the copy.

When changing the scene the machine will locate the highest take number already recorded, having the same scene number, and the new index will be the following take. This will also take into account any takes marked “-p” as well. However a Wild track is not counted as an official take.

Wild track

A wild track is the term used for a recording that is not linked to any pictures but is generally linked to the actual scene currently being shot. If “wild track” is checked, the suffix “-W” will be indicated after the scene number. When a wild track recording is made the take number will increase on each new recording if multiple wild tracks are being made.

If “Wild” is checked or unchecked in the metadata then the take number is reset as for a scene change.

Pick-up scene

A pick-up scene is the term used for the recording of a partial segment of a scene. If “pick-up” is checked then “-P” will be indicated after the scene number. When a pick-up recording is made the take number will increase as this can be considered as a take except it is only a partial scene.

Note: The Pick-up scene tag is not a formal iXML flag and is simply added by the Nagra *Seven* to the end of the scene name. If the scene name already consists of 12 characters then the last two characters will be replaced by “-P” if a pick-up is selected.

Data entry

An internal keyboard is provided and will be activated by clicking on any of the fields to be completed. The keyboard layout can be changed in the tools menu. An external USB keyboard may also be used for data entry if desired.



(Swiss-French keyboard layout shown)

Caps lock can be engaged by double pressing on the “Aa” key as on a smart phone. The <, > and <- keys will auto repeat if pressure is kept on the key, for ease of use.

Special characters can be assessed by clicking the “!?\$” key in the bottom left corner of the display, which will open the second keyboard display as shown below.



If a USB keyboard is connected to the Nagra *Seven* then this screen does not open, the external keyboard is automatically active, and can be used for all data entry. Functions available on the USB keyboard are covered in the ANNEX VI at the end of this manual.

For an external device such as an external keyboard or mouse to be connected, an adapter cable part number # 20 70119 000 is necessary and can be ordered from your local NAGRA dealer.



Part 8 - THE TOOLS

Tools Menu



Various features are available that do not directly affect the audio work in progress, but give access to less critical features of the Nagra *Seven*.

Reformat

The reformat menu allows the user to reformat either the internal Micro SD memory card or an external media. It is strongly recommended to format all media to be used with this feature to ensure that the format on the drive is perfectly compatible with the recorder and does not contain any unnecessary files from a computer formatting. This cannot be used while the recorder is in record mode.

The screenshot shows the 'Reformat' menu. At the top, there is a navigation bar with buttons: 'Reformat', 'Time and date', 'Misc.', 'Lock settings', and 'About', followed by a circular arrow icon. Below the navigation bar, the 'Drive:' label is next to a dropdown menu showing 'SD'. Below that, the 'Status:' label is next to the text 'Idle'. At the bottom, there is a large 'Reformat' button.

Time and Date

This screen allows setting of the internal real time clock (RTC). This is the information that will be used for the time and date stamps of files. This information has nothing to do with the internal time code generator (if the unit is equipped with the time code option). The time format is in the 24 hour format.

The screenshot shows the 'Time and date' menu. At the top, there is a navigation bar with buttons: 'Reformat', 'Time and date', 'Misc.', 'Lock settings', and 'About', followed by a circular arrow icon. Below the navigation bar, there are three input fields: 'Time (HH:MM:SS):' with the value '11:35:04', 'Date (DD.MM.YYYY):' with the value '08:12:2014', and 'US date format:' with an empty field.

The screenshot shows the 'Time' input screen. It has a numeric keypad with buttons for digits 0-9 and a 'Del' button. The 'Hour:' field shows '5' and the 'Minute:' field shows '5'. At the bottom, there are 'Ok' and 'Cancel' buttons.

The screenshot shows the 'Date' input screen. It has a numeric keypad with buttons for digits 0-9 and a 'Del' button. The 'Day:' field shows '5', the 'Month:' field shows '7', and the 'Year:' field shows '13'. At the bottom, there are 'Ok' and 'Cancel' buttons.

Miscellaneous

Several additional features, used to adapt the user environment or assist the easier use of the Nagra *Seven* can be programmed on this screen.

Reformat	Time and date	Misc.	Lock settings	About	
Machine name:		Nagra_Seven			
Keyboard layout:		Swiss french			
Automatic daily folder:		Off			
OFF position behaviour:		Shut down			

Machine name

The name chosen in this menu will be used in the file name if one of the “machine name” file naming options is selected. The factory default name is “Nagra_Seven” but this can be replaced with any alpha-numeric name of up to 15 characters.

Keyboard layout

Three choices of keyboard layouts are available. This setting corresponds to the layout of the internal keyboard display as well as any external USB device connected to the recorder. The machine will need to re-booted if the layout of an external keyboard is altered.

English (US)	-	QWERTY
French	-	AZERTY
Swiss-french	-	QWERTZ

Automatic Daily Folder

This feature, when activated, will automatically create a new working folder each new day. The moment of “New Day” is determined by the passage over midnight of the internal real time clock (RTC). The new working folder will be created when the recorder is powered for the first time on the new day. If however the recorder is switched on between midnight and 06:00 a.m. then the main display will ask the user whether a new folder is to be created or not, in the event that a “night shoot” is happening and a new folder is not required. If the recorder is turned on after 06:00 a.m. then the folder will be created without asking the user.

If the function is deactivated, then all recordings will continue to be made into the same working directory. An automatically created folder will be generated with the current DATE as the folder name in the format YYYYMMDD. This can of course be modified by the user later if desired.

Off position behaviour

In order to prevent the recorder from powering off it is possible to define how the machine will behave when the OFF position of the main function selector is selected.

Reformat	Time and date	Misc.	Shut down
			Stand-by
Machine name:			Stand-by during 1 min
Keyboard layout:			Stand-by during 5 min
Automatic daily folder:			Stand-by during 15 min
OFF position behaviour:			Stand-by during 30 min

Reformat	Time and date	Misc.	Stand-by during 5 min
			Stand-by during 15 min
Machine name:			Stand-by during 30 min
Keyboard layout:			Stand-by during 1 h
Automatic daily folder:			Stand-by during 2 h
OFF position behaviour:			Stand-by during 4 h

When one of the stand-by positions is selected the machine will go into a “Sleep” mode, which uses less power than when the unit is powered normally, and will allow instant start-up when the main selector is activated.



When the pre-determined stand-by time is reached the Nagra will shut-down in the normal way. If the rotary main function switch is moved during the stand-by time the counter will immediately restart from zero.

NOTE: In this mode the machine remains powered and will continue to consume the batteries. Phantom +48V and AES 42 powering are cut off in the stand-by position to save power. The REC led will flash periodically when in standby mode to indicate that the machine is still ON.

Lock Settings

The lock settings feature allows all the user settings of the machine to be programmed and then subsequently blocked to avoid accidental modification. Once the password is entered (Which is the same as the password for the ARES-C machine and is available only from your local Nagra dealer, or by sending an e-mail to audio_pro@nagraaudio.com), all the Icons and settings menus will disappear. There is the optional choice to allow the reformat command to remain active by checking the appropriate box.

Unlocking the settings is done in the reverse manner using the same password.

The screenshot shows the 'Lock settings' menu. At the top, there is a navigation bar with buttons for 'Reformat', 'Time and date', 'Misc.', 'Lock settings' (which is highlighted), and 'About', followed by a circular arrow icon. Below the navigation bar, the main area contains a 'Password:' label next to a text input field. Below that is a 'Lock "Reformat":' label next to a checkbox. At the bottom of the main area is a 'Lock' button.

About

Shows the serial number, which is burned into the memory of the recorder, hardware and software versions installed in the unit, as well as the different options that are installed. Pressing the DEFAULT settings button will reset all parameters of the Nagra *Seven* back to their original factory default setting and will also erase any templates stored in the recorder.

The screenshot shows the 'About' menu. At the top, there is a navigation bar with buttons for 'Reformat', 'Time and date', 'Misc.', 'Lock settings', and 'About' (which is highlighted), followed by a circular arrow icon. Below the navigation bar, the main area displays the title 'NAGRA Seven' in large text. Underneath, it lists the following information: 'Serial number: 191801234567890', 'Hardware version: 1.00', 'Software version: 2.00d', 'Hardware options: WiFi/GSM', and 'Software options: MPEG II (rec), Editor, VoIP, AAC (VoIP), Opus (VoIP)'. At the bottom of the main area, there are four buttons: 'Default settings', 'Software options', 'Load config.', and 'Save config.'.

Default settings The default settings are the standard settings that are factory defined and will be restored when this key is pressed. Activating this function will erase all templates and any other user programmable parameters of the Nagra *Seven*, and will return all parameters to their pre-determined selection.

The factory default settings are as follows:

Format: 48 kHz 24 bit Stereo (1 file polyphonic)

File name: Machinename xxx.wav

Drive: Internal Micro-SD

Max file size: 2 GB

Reference: Master

Pre-recording: OFF

Inputs: Analogue Left / Right
 Line Inputs, Controlled by pot

Filters None

ALC / LIM None

Slate Mic: Normal mode, Both channels, +18 dB

Line output: +15 dBu

AES out: 24 bits

Monitoring: Boost OFF, M/S OFF

Beep level: Medium

Loudspeaker: OFF

Ref. gen.: Normal mode, 1kHz, -18 dB

Mic scales: Automatic

Meters: Range -50 dB, Yellow -24 dB, Red -9 dB

Start/Stop: Normal

Icons: - Loudspeaker
 - Audio
 - Input
 - Media
 - Tools
 - Settings

Machine name: - Nagra_Seven

Keyboard: - Swiss-french

Auto. Folder: - OFF

Load / Save config: These keys allow the user to save the entire current settings (Configuration) of every parameter of the Nagra, as a file onto the SD card. This can then be put into another machine and the identical setting stored into the second machine, by clicking on the "load" settings button. This is specifically useful for setting several machines to identical operating modes.

Installing software options

Clicking on SOFTWARE OPTIONS allows the installation of additional options features such as the on-board audio editor. The following screen will be displayed:

The screenshot shows a dark-themed interface for installing software options. At the top left, the text 'Option:' is followed by a button labeled 'Editor'. Below this is a 4x4 grid of buttons for hexadecimal digits: 7, 8, 9 in the first row; 4, 5, 6 in the second row; A, B, C, D in the third row; and E, F in the fourth row. To the right of this grid is another column of buttons: 1, 2, 3 in the first row; 0, Del in the second row. At the bottom left are two buttons: 'Add' and 'Cancel'.

To install a software option, select the option to be installed then insert the 8 hexadecimal digits (provided by your local Nagra dealer, into the four boxes. They are in pairs for example: E1 F8 21 B7

Once complete press the ADD key and the internal option will be activated. The hexadecimal code is unique to each machine and cannot be installed on any other Nagra *Seven* .

CHAPTER IV

The EXTRAS

Overview

The Nagra *Seven* can be equipped with various optional extras, to adapt it to many different working environments (Broadcast, film/TV, music etc). Some of the options are physical boards that are installed inside the machine and others are software options that are activated through the introduction of access codes supplied from the factory.

There are two hardware “slots” inside the machine. The first can be either SMPTE/EBU Time Code OR and I.S.D.N. codec. It is not possible to have both of these options in the same unit.

The second slot can be fitted with the WiFi / 3G circuit.

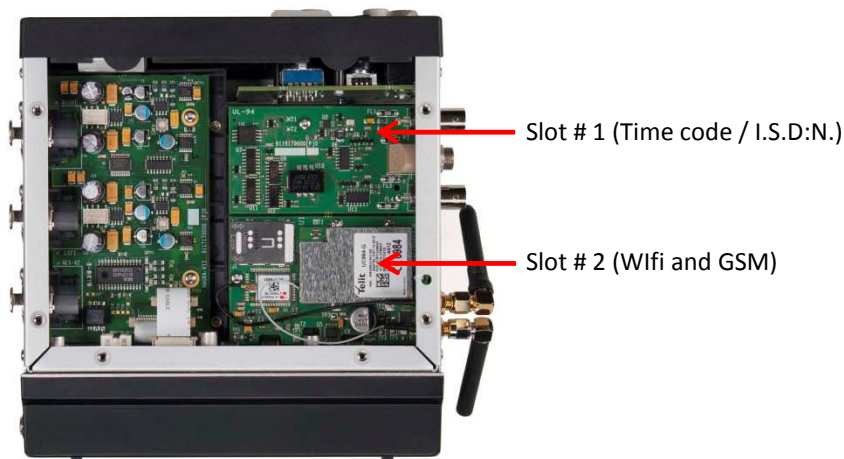
The internal audio editor, MPEG compression and Voice over IP are all software options activated with a password. These can be installed at any time and do not need to be installed when the machine is ordered.

Internal options (For machine upgrades only)

7119187000	WiFi / 3G option including new side panel and 2 antennas
7119187100	WiFi / 4G option including new side panel and 2 antennas
7119185000	TC Option (Non-ISDN machines only) including new side panel
7119186000	ISDN option with audio compression (Non-TC machines only) including new side panel (With Wifi or not)

Software options

7019180010	MPEG 1 layer II recording option
7019180020	On-board audio editor option
7019180030	Voice Over IP (VOIP) option including TX/RX compression



TIMECODE (Hardware option part number 70 19185 000)



The Nagra *Seven* can be equipped with an internal time code system. The time code system in the Nagra *Seven* corresponds to all the internationally recognized formats defined by the SMPTE and EBU. This manual does not cover the generalities of the time code format as this is covered in detail in many other publications.

This section covers more of the global aspects of the time code system covering the following subjects:

- Time code in digital recorders
- Time code frame rates
- The internal time code generator
- Time code playback / conversion
- Displaying time code
- Time code recording

Time code in digital recorders

When time code was first introduced to audio recorders in the Nagra IV-STC back in 1984, the time code signal was longitudinally recorded along the center of the analogue tape, and the official audio time code format stipulated that the time code value recorded on the tape at any given time was coincident with the corresponding audio so as to maintain inter-machine compatibility.

Time code in a file based digital recorder is managed in a totally different manner. At the start moment of a given recording, the time code value at that instant is “calculated” by the time code system and this value is known as the time code “stamp” and is recorded in the “header” of the broadcast wave file. This time code value is calculated based on several criteria, namely the presently selected frame rate, the sampling frequency in use, the duration of the pre-recording buffer and the time code mode (Time of day or not). During playback, or post production this time code stamp is read and calculated as if it were a normal longitudinal time code throughout the recording.

This explanation helps understand why certain common features used in longitudinal tape-based formats cannot be used in a file based system. For example, the recording of external time code in the past was relatively simple, the incoming time code was simply re-generated and put on the tape. Therefore, time code jumps or changes were all copied “blindly”. In a file based format, once the external time code has been “grabbed” at the instance that the recording starts, the external incoming time code becomes “irrelevant” until the end of the current recording, because no further time code is recorded until the next record start on a new file. The time code during playback of the file is calculated from the time code stamp in the file header. It is thus technically possible to playback a file and re-create time code at any frame rate irrespective of the original recorded format. It is important to understand these basic concepts to avoid making mistakes while using the time code system, and selecting the correct parameters for your recordings.

Frame rates

Time code frame rates that can be internally generated directly by the Nagra *Seven* are as follows:

- | | |
|-------------|---|
| 23.976 fps: | High definition rate, and is most commonly used with high definition video cameras. At this frame rate, the count is 0.1% slower than real time. |
| 24 fps: | Standard frame rate for film. Also occasionally used for high definition video production. |
| 25 fps: | PAL Video Frame rate, generally the norm in countries with 50Hz mains frequency. (Typically European countries) |
| 29.97 fps: | NTSC color video frame rate. At this frame rate, the count is 0.1% slower than real time. Used for production in NTSC countries (typically North America and Japan). |
| 29.97 df: | NTSC frame rate with drop frame. Drop frame is the compensation system used in NTSC to match the standard 29.97 frame rate to real time. Used in television production in NTSC countries. (typically North America and Japan) |

- | | |
|---------|---|
| 30 fps: | NTSC black and white frame rate (typically countries with 60 Hz mains supply). It should be used if the audio (and pictures) are to be transferred to NTSC video for editing purposes. |
| 30 df: | This frame rate uses the drop frame compensation system at 30 frames per second. It allows audio to be slowed down by 0.1% and remain compatible with the NTSC color television system. It is not often used and the count is 0.1% faster than real time. |

In Cinema applications always verify with the post production facilities which frame rate should be used prior to starting the recording.

It is important to know, that inside the Nagra *Seven* the time code system is locked to the sampling frequency selected for the digital recording. The sampling frequency depends on the reference frequency selection (usually "Master" in a stand-alone situation). This means, for example, that if the sampling frequency is set to 48 kHz and the reference frequency is set to "Master + 0.1%", and the time code is set to the 23.976 frame rate then the result will be a file with a sampling frequency of 48'048 kHz and a time code of 24 fps, which is suitable for slow-down from 30 fps to 29.97 to render a sampling frequency of 48 kHz for NTSC applications.

If the machine is clocked by an external digital clock frequency, then the internal time code generator will follow this external clock and this guarantees a perfect coherence between the audio sampling frequency and the time code. The time code system of the Nagra *Seven* is able to follow variations in the external clock of up to $\pm 4\%$

When using an external clock this coherence will remain perfect as long as the machine is still powered. If the machine is switched off, then when restarted, it will take the time code from the internal RTC based on its internal reference.

Time code can be recorded in either the "Time of day" mode or can be set to any arbitrary value by the user. All the time code settings are made in the menu mode.

The internal time code generator

The internal time code generator is clocked by the main master clock of the recorder which runs from a crystal which is a "Stratum III" TCXO that has been artificially aged in an oven to maintain stability. This crystal gives a guaranteed overall stability better than $\pm 4.6\text{ppm}$ over a period of 15 years throughout a temperature range from -20°C to $+70^{\circ}\text{C}$. The drift due to temperature changes is less than 0.28ppm . This means that the time code generator of the Nagra *Seven* would only be re-jammed about once per day, but this may be more frequent if other equipment is used as a gen lock.

The Time and User portions of the time code can be set either manually, using the main display, or alternatively from an external time code source, by executing the "Set from External" function (Jam sync). This operation will instantaneously "grab" the time code on the 5 pin LEMO connector assuming it is a valid format, and that it is moving (not a stationary time code).

Note: The Stratum III TCXO is precise even if the Nagra *Seven* is powered down. If upon power up, the Nagra *Seven* does NOT ask for the date and time to be set by the user (Not TC date and time) then this guarantees that the TC is still accurate as both the TC and RTC use the same crystal.

Time code playback and time code conversion

When a file is played back the time code on the output will be regenerated according to the current time code settings of the Nagra *Seven*. Thus a recording originally made with 25 frame TC can be played back at any time code frame rate by simply changing the settings of the internal generator.

Time code Pull-up / down

The time code system of the Nagra *Seven* is very powerful and allows a lot of possibilities but should be used with a lot of care and consideration to avoid unexpected surprises! The notion of "pull-up" is referred to when talking about the time code in film and television in countries where the NTSC color television system is used (typically North America and Japan). In these countries, the television frame rate is 29.97 fps and the film rate is 30 fps. Slowing down a 30 frame film by 0.1% will give a speed of 29.97 fps compatible with the TV system. This mode of speed alteration implemented in the Nagra *Seven* allows many possibilities, some of which if incorrectly used will render the audio unusable.

In the Nagra *Seven*, the time code rate is slave to the main audio clock. This means that if audio clock runs slower, then the time code runs slower too.

As an example, if the clock reference of the Nagra VI is set to master -0.1% and the time code rate of the internal time code generator set to 30 ND, the resulting time code recorded is 29.97 ND ($= 30 - 0.1\%$)

Never use master -0.1% and 29.97 frame rate because this will create an unusable frame rate of 29.94 (29.97 - 0.1%)!!!

Some examples: For a playback shoot:

If the audio track to be played back was initially recorded at 95.904 kHz (96 - 0.1%), you should set the Nagra to master -0.1% and the time code to 30 ND

If the audio track to be played back was initially recorded at 95.904 kHz and the Nagra *Seven* is slaved from a 95.904 external clock, you should set the Nagra to "ext. 96" kHz and the time code to 30 ND (the time code will run at the external frequency speed)

If the audio track to be played back was initially recorded at 96 KHz (trans-sampled from 95.904 kHz to 96.000 kHz) you should set the Nagra to master and the time code to 29.97 ND

Displaying time code

Time code is always in the HH.MM.SS.FF format and the user bits correspond to either the “date” format of DD.MM.YY.xx or the “Free” format of xx.xx.xx.xx

The time code is displayed on the main screen of the Nagra. If the main function selector is in the TEST (pre-record) position then the time code and user bits which are displayed on the screen are the values that are to be recorded. This may be the internal generator or an external source depending on the menu selection.

In the STOP position of the main function selector, the display will show the time code and user bits of the file current take. If the machine was previously in RECORD then this will correspond to the last time code value of the last take recorded.

In the PLAYBACK mode, the displayed time code and user bits correspond to the selected take being played back.

Time code recording


Recording of time code is completely automatic and will record time code according to the settings of the time code menus. Time code on the Nagra *Seven* is recorded in the header of the audio file (as opposed to longitudinally in parallel with the audio as in analogue recorders). This does mean that for the time code to be read by another device (for example a PC) the program reading the file must be capable of interpreting the header information, otherwise only the audio will be played back.

At the moment a recording is started the time code to be recorded is corrected according to the pre-record buffer duration setting, thus keeping the time code coincident with the audio start point.

Time code “Assemble” recording can be selected in the menu. If so, the new take recorded will have a time code stamp corresponding to the consecutive frame number of the last frame from the last recorded take in the currently selected working directory.

If a new “take” is created during recording by pressing the “New Index” button then the time code system will always make an assemble edit.

TIME CODE MENU



This menu allows the access and setting of all the time code options of the machine. It permits the setting of the internal time code generator, for both TIME and USER data, as well as frame rate selection and the time code mode. It also allows the choice of the time code to be recorded and external references to be used.

THE INTERNAL TIME CODE GENERATOR

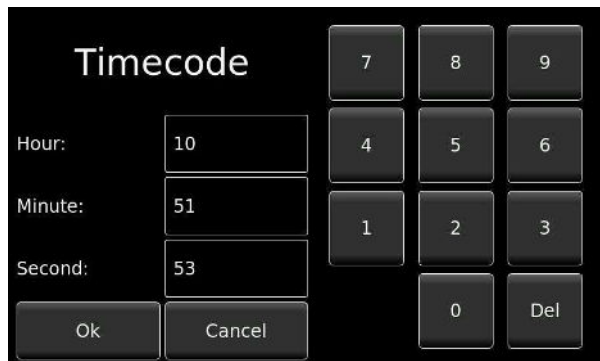
Source

This is used to choose which time code is to be used. If an external time code is present on the LEMO connector, external time code can be selected by using the up or down arrow key.

- | | |
|---------------|---|
| Internal Gen: | The Nagra <i>Seven</i> will record TC from the internal generator. |
| External: | The Nagra <i>Seven</i> will record TC from an external source. |
| Assemble: | If Assemble is selected each time the machine is put into REC mode a full time code assemble will be performed. This is done by calculating the time code value of the sample following the last sample of the previous index. There will be no time code discontinuity between indexes. |
| Jam Sync: | In the Jam Sync position, the internal time code generator will automatically be set as soon as a valid time code is connected to the time code input connector. If the cable providing the external time code signal is left connected to the machine, a new jam sync will be performed automatically as soon as the machine detects a difference between the internal time code generator and the external signal of more than 2 ms. In order for the jam sync function to operate when the cable is connected, certain conditions are verified before the set is made. The incoming TC must be at the correct speed ($\pm 1\%$) for 10 consecutive frames. Frozen or reverse time code will prevent a jam of the generator from occurring. |

Time entry

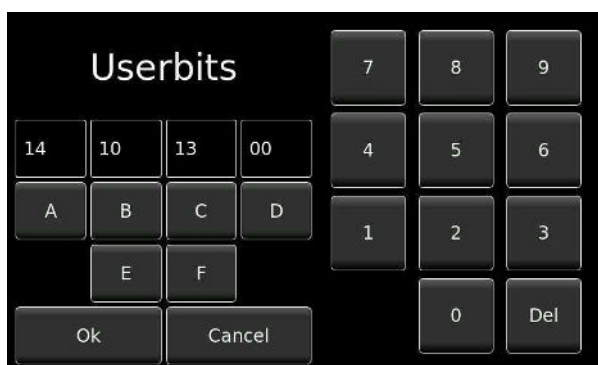
To enter a new time, press on the time portion on the screen and a keypad will appear. Enter the correct time data in the Hour, Minute and Second windows then press the "OK" key and the time code starts running.



The screenshot shows a keypad titled "Timecode". On the left, there are three input fields labeled "Hour:", "Minute:", and "Second:". The "Hour:" field contains "10", "Minute:" contains "51", and "Second:" contains "53". Below these fields are "Ok" and "Cancel" buttons. To the right of the input fields is a numeric keypad with buttons for digits 0-9 and a "Del" button.

User bits entry

Entering the user bits and or date is made in the same way as for the time. According to the screen shot below. Remember that if the machine is in the DATE mode for the user bits then the first 6 digits must conform to a valid date in the DD:MM:YY format. The two right-most digits are always free to be used as desired.



The screenshot shows a keypad titled "Userbits". On the left, there are four input fields labeled "14", "10", "13", and "00". Below these fields are buttons labeled "A", "B", "C", "D", "E", and "F". At the bottom left are "Ok" and "Cancel" buttons. To the right of the input fields is a numeric keypad with buttons for digits 0-9 and a "Del" button.

Format

Selects the frame rate of the internal time code generator. The internal time code generator can generate all presently used formats i.e. 23.976, 24, 25, 29.97 and 30 (the latter two either with or without drop frame). The first value indicated is the presently selected choice.

User mode

This menu selects the operating mode of the user bits portion of the time code generator. In the FREE mode, each digit of the user bits can be any value in hexadecimal (0 to F).

In the Free AutoInc. Mode (Inc = Increment), the last two digits will be increased by "1" each time a new index is made in record, starting from 00 up to a maximum value of 99.

In the DATE position, the date in the DD.MM.YY.xx format must be used. The date will be automatically updated at midnight (except when running 29.97 non-drop or 30 drop frame).

In the Date AutoInc. Mode Inc = Increment), the last two digits will be increased by "1" each time a new index is made in record, starting from 00 up to a maximum value of 99.

Set from Ext. / RTC

Selecting set from Ext. and pressing the Ext button sets the internal time code generator of the Nagra *Seven* to the external time code signal connected to the LEMO connector. Selecting RTC and pressing the Ext button will set the time code hours, minutes and seconds from the internal real time clock of the recorder, allowing a very rapid TC setting. Naturally, it is assumed that the internal real time clock of the machine is also correctly set.

Reset TC

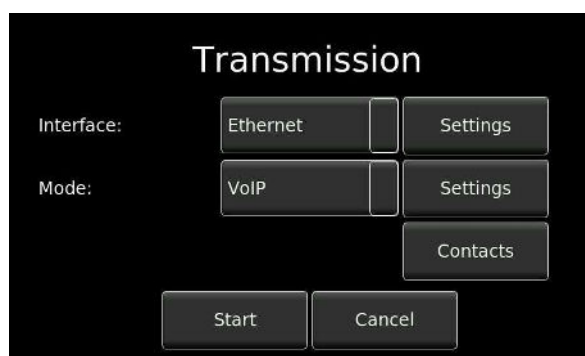
Pressing the Reset button the time code to 00:00:00:00. This will not reset the user bits of the time code generator.

In assemble mode this will not set the internal generator, but will set the start time of the next recording, It is not viewable on this screen but is shown on the main display in text mode.

VoIP – Voice over IP (Software option # 70 19180 030)

Voice over Internet Protocol (VoIP) is a methodology and group of technologies for the delivery of voice communications over Internet Protocol (IP) networks, such as the Internet. VoIP systems employ session control and signalling protocols to control the signalling, set-up, and tear-down of calls. They transport audio streams over IP networks using special media delivery protocols that encode audio with audio codecs as Digital audio by streaming media. Various codecs exist that optimize the media stream based on application requirements and network bandwidth; some implementations rely on narrowband and compressed speech, while others support high fidelity codecs.

In order that the Nagra *Seven* can make a VoIP communication to another device, the VoIP option must be installed on the machine. Then several different communication methods, using various procedures and protocols are possible, all the different parameters allowing VoIP communication to be established can be set in the TRANSMISSION section of the menus. Select VoIP mode and then click on settings (explained on the following pages).



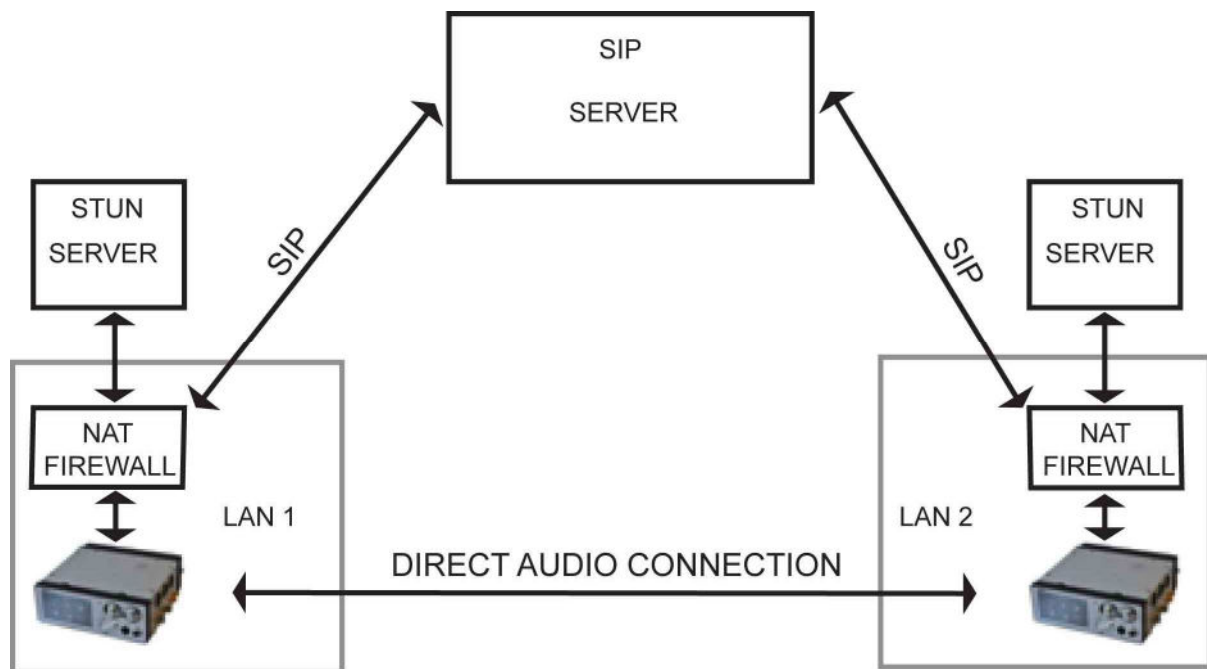
To set-up a connection, in most cases a SIP server is used. The devices register themselves on this server with a unique address known as the SIP address which is similar to an e-mail address (e.g. myname@sipserver.com). Each device that is online (registered) is thus known under this address by the server. Thanks to the SIP server the device can always be reached under that same address even if it changes its location or IP address. Subsequently the SIP protocol allows the set-up of an audio connection between the two parties.

A special case is the Direct SIP Connection, where no SIP server is used. This type of connection is described towards the end of this chapter.

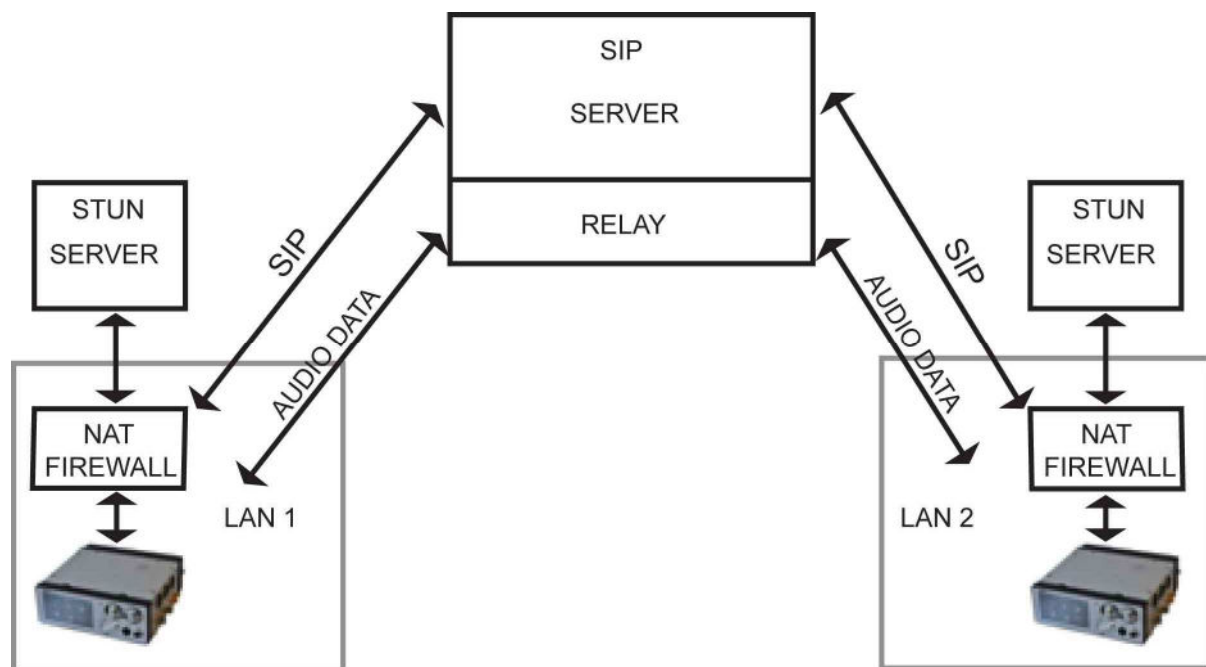
There are two principal methods for the Nagra *Seven* to make a connection using a SIP server. To give an overall understanding of the procedures the two methods are outlined step-by-step as following.

Method 1: (Preferable choice) is a direct audio communication between devices without going through a dedicated SIP server. A SIP server is required to initially establish the connection but is subsequently bypassed once the connection is made. The direct audio connection using the RTP protocol induces lower delays since the data does not pass through a relay point.

In case an (asymmetric) NAT / Firewall is present a STUN server is used to configure the communication across the NAT (Firewall).



Method 2: (2ND choice) is audio communication through the relay part of a SIP server. The inconvenience of this method is that delays will be incurred in the communication as the audio communication passes through the relay server. This method is used when a direct communication cannot be established due to NAT/ Firewall restrictions.



To set the different parameters for the VoIP communication click on the settings button of the transmission screen next to the mode selection: there are various screens in the transmission menu described below.

ISDN	FTP	VoIP	
Alias:	Nagra_Seven		▲
Username:	nagra_seven		1/4
Password:	*****		
Server:	sipserver.com		▼

Alias: Machine name / identifier as seen by third parties
 Username: This name is given by the SIP provider
 Password: Provided by the SIP provider
 Server: Name of the chosen SIP server. If this is left blank, the Nagra *Seven* does not connect to a SIP server and only direct connections are possible.

ISDN	FTP	VoIP	
Compression 1:	G722		2/4  
Compression 2:	MPEG 64/24		
Compression 3:	MPEG 128/48		
Compression 4:	MPEG 192/48		

This is a prioritized list of available communication compressions. During connection setup the common compression with the highest priority of both parties is selected. To force a compression all fields except one can be left empty. The compression should be selected according to the available link quality which is displayed on the VoIP transmission screen / details.

Some of the compression modes offered by the NAGRA Seven require a licence and can be ordered from NAGRA who will issue a password.

Available compressions are:

TYPE	Sample rate	Bit rate(s)	Bandwidth	Remarks
G-711 a		64 kb/s	3 kHz	Speech compression used outside the USA
G-711 μ		64 kb/s	3 kHz	Speech compression used in the USA
G-722		64 kb/s	7 kHz	Wider band speech and data compression
MPEG-II	24 /48 kHz	64, 128 & 192 kb/s	Up to 20 kHz	Optimised for Speech and music
AAC-LC	48 kHz	64, 96, 128, 160, 192 & 256 kb/s	Up to 20 kHz	Advanced audio coding – low complexity – better for higher bit rate communications
AAC-HE	24 / 48 kHz	16, 32, 48 & 64 kb/s	Up to 20 kHz	Advanced audio coding – High efficiency – better for very low bit rate communications
OPUS-CBR		16, 24, 32, 48, 64, 96 & 128 kb/s	Up to 20 kHz	OPUS Constant Bit Rate for Speech and music low bit rate low latency
OPUS-VBR		16, 24, 32, 48, 64, 96 & 128 kb/s	Up to 20 kHz	OPUS Variable Bit Rate for optimum quality, very low latency

FTP	VoIP	
Compr. 1:	Opus VBR	64 kBit
Compr. 2:	Opus CBR	48 kBit
Compr. 3:	AAC-HE 48 kHz	32 kBit
Compr. 4:	AAC-LC 48 kHz	192 kBit

Notes:

- Drift compensation not supported for AAC/OPUS
- VBR mode, effective bitrate not considered for quality indication
- Recording only possible at 48 kHz

Compressions:

The G 711 (a-law and μ -law) are standard monophonic compressions used for voice transmission over the public telephone network, and has a bandwidth of 300 Hz to 3'400 Hz. This algorithm is typically used for IP connections via IP telephones or VoIP. For I.S.D.N., G 711 is used for connections to a standard phone.

G 722 The monophonic compression has a bit rate of 64 kb/s and has a bandwidth of 50Hz – 7 kHz. It is principally used in I.S.D.N. communication or mobile IP networks. With I.S.D.N. different synchronization modes of SRT, H221 and H242 are available.

MPEG II is a more efficient compression than G-711/722 and allows a wide range of settings in terms of bit rate and sampling frequency. Sampling frequencies from 16 to 24 kHz give a narrower bandwidth of 7 kHz and 10 kHz then 48 kHz which offers up to 20 kHz bandwidth.

AAC (Advance Audio Compression) has two principal modes of AAC-LC and AAC-HE. AAC-LC is better suited for higher bit rates of 64 kbits/s and above and should be used when the communication channel allows higher bit rates to be used. AAC-HE is better when the communication channel is limited. These compressions allow the bit rate to be lower without degradation of the audio quality, and are often used for music applications.

OPUS is a highly versatile audio codec. Opus is unmatched for interactive speech and music transmission over the Internet, but is also intended for storage and streaming applications. It is standardized by the Internet Engineering Task Force (IETF). OPUS also supports variable bit rate communication which gives improved efficiency for the communication.

ISDN	FTP	VoIP	
Auth. name:	<input type="text" value="auth_nagra_seven"/>		 3/4 (Adv.) 
Proxy:	<input type="text" value="proxyserver.com"/>		
SIP port:	<input type="text" value="5060"/>		
Transport:	<input type="text" value="UDP"/>		

Auth. Name:	Might be required and provided by the SIP provider in rare cases, otherwise leave this blank.
Proxy:	Usually provided by the SIP provider. If not used then leave this blank.
SIP port:	Standard is 5060 but can be different for certain SIP providers.
Transport:	UDP or TCP selection. Normally, UDP is used.

ISDN	FTP	VoIP	
Stun server:		stun.server.com	▲
Jitter buffer max (ms):		250	4/4 (Adv.)
Drift compensation:		On	
RTP port range:		16384 to 32767	▼

STUN Server: STUN server name. A port number may be added by the server separated by a colon.

Jitter buffer min / max:

Allows the user to set the minimum and maximum buffer length for the received audio packets to be shuffled to be in the correct order. The minimum value needs to be reached at connection establishment and when the buffer suddenly gets empty before audio data is played. This value is typically between 0 and 100 ms. The maximum value will be between 200 and 300 ms.

The actual duration of the buffering corresponds to the jitter of the received packets and lies on average between the configured minimum and maximum values.

Both values depend on the quality of the link, the better the link the lower the values can be set and vice versa. The link quality is displayed on the VoIP transmission screen / details.

Drift comp: Selection of ON/OFF for automatic drift compensation which synchronises the clock of the Nagra *Seven* to the clock of the remote party and compensates for the drift between the two. This helps jitter buffers on both sides to be stable. Drift compensation is effective only in master mode.

RTP port range: Default 5004 to 5005 (RTP and RTCP port). If the range contains more than two ports the Nagra *Seven* selects two consecutive ports randomly. Make sure that the ports in the port range are not blocked by a potential firewall.

SIP Direct Connection:

A direct SIP connection uses no SIP server and is possible if both devices are directly accessible and their (public) IP addresses are known.

If your correspondent's IP address is e.g. 178.143.56.92 you can call this IP address directly by putting hisname@178.143.56.92 (which can also be stored in the contacts). "hisname" is the identifier in the "USERNAME" field of the settings.

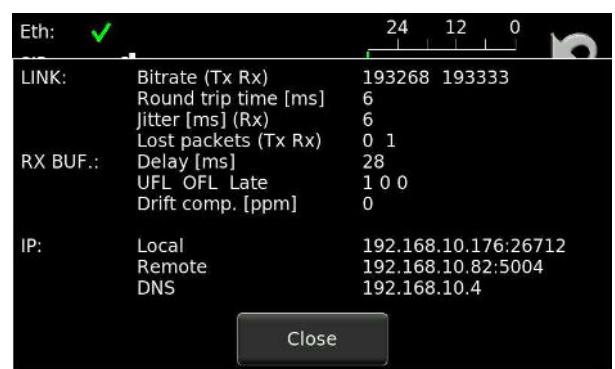
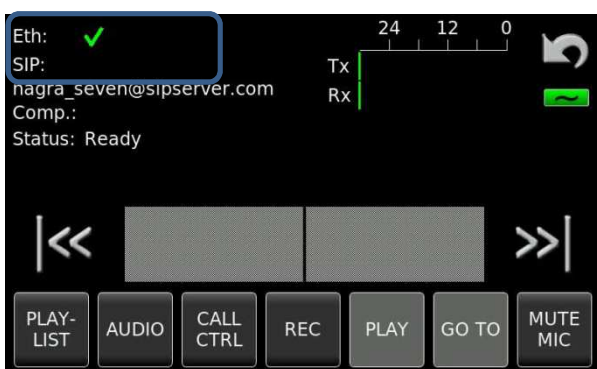
If your correspondent knows that you will call direct, he doesn't need to log-on to his SIP server, (although it won't hurt) and can leave the "SERVER" field empty (he can only be contacted directly). The identifier "hisname" in this case is supplied by the user in the "USERNAME" field which in this case can be chosen as desired as it is not linked to the SIP server.

VoIP transmission screen / details:

The transmission screen shows basic information regarding the network connection (local network connection type and its quality) in the top left corner. In case of an established communication the SIP symbol shows an overall audio link quality from 0 to 5 bars. The quality corresponds to the entire network link from A to B. It takes into account actual jitter, round trip delay, and packet loss. In case all bars are empty (0), quality is not available. If the quality indication is low, the jitter buffer settings might need to be increased and a compression with lower bandwidth requirements might give better results.

On the third line, the own SIP identity is shown.

For more details, click on the SIP/network portion of the screen (encircled below) and more details will be displayed. Among the information is the actual jitter buffer delay (Delay [ms]) and the jitter buffer reception statistics: "UFL" (number of buffer underflows), "OFL" (number of overflows), and "Late" (late packet arrivals).



The modulometers, when touched, will show the highest Tx/Rx achieved (Peak hold function). This value is reset if the pointer is left for 4 seconds on the displays in the same manner as the main machine modulometers.

I.S.D.N. (R.N.I.S) (Hardware option part number 71 19186 000)

The Nagra *Seven* can be equipped with an internal I.S.D.N (R.N.I.S.) transmission codec system for communication via a digital telephone system. The features offered are very complete and allow many different communication possibilities which are all explained in the following pages.

I.S.D.N. BASICS.

A standard analogue telephone line consists of two copper wires running from the users' telephone unit to the external telephone exchange and is more commonly known as a Public Switched Telephone Network or P.S.T.N. When the receiver of the telephone is lifted a relay closes and makes a circuit causing a current to flow through the telephone line, and this current alerts the exchange to attribute a free line and waits for a series of numbers (either pulses or dial tones) to follow. This two wire system is more commonly known as a "U" connection. The acronym I.S.D.N. stands for Integrated Services Digital Network which is a digital telephone network using the same two copper wires but has to be connected to a digital exchange.

The standard analogue line is a two wire system and I.S.D.N. is a four wire system which is more commonly known as an "S" connection. In order to transform the users "U" connection (2 wire) into an "S" connection (4-wire) an interface known as an NT needs to be installed. This unit not only converts from 2 wire to 4 wire but also serves for line equalization.

The four wire system of I.S.D.N. consists of two symmetrical pairs known as TX-, RX-, TX+ and RX+. A single I.S.D.N. line is used to pass digital data and will permit 2 x 64 kbits signals and 1 x 16 kbit signal to be transmitted along it. These data streams are known as channels, so one I.S.D.N. line consists of 2 x "B" (bearer) channels and 1 x "D" (delta) channel.

If an I.S.D.N. line has been installed with the NT it can still be used in the same way as a standard telephone line providing that the telephone unit is a special digital telephone. If this is the case then the user can dial normally to a standard analogue number. All information passing on an I.S.D.N. line is compressed therefore the A/D and D/A conversion as well as the compression and decompression is done within the special digital telephone unit. Such a digital telephone can be represented as follows:

If the handset is lifted on the digital phone, then immediately one of the "B" channels is used and part of the "D" channel. The "B" channel will carry the audio data and the "D" channel is used to carry communication control data such as the number being called, the return signal coming from the receiver with its number as well as the tariffs for the connection etc. As this system uses only one "B" channel, it is possible to connect a second digital telephone to the same I.S.D.N. line if required, and this will use the second "B" channel.

I.S.D.N. SYSTEMS

The format of the Euro I.S.D.N. standard is as described above. That is to say 2 x 64 kbits/sec "B" channels and 1 x 16 kbits/sec "D" channel. A second system also exists, and is known as the "Switched 56" system, which consists of transmission of the signal at 56 kbits/second and generally found in the U.S.A.

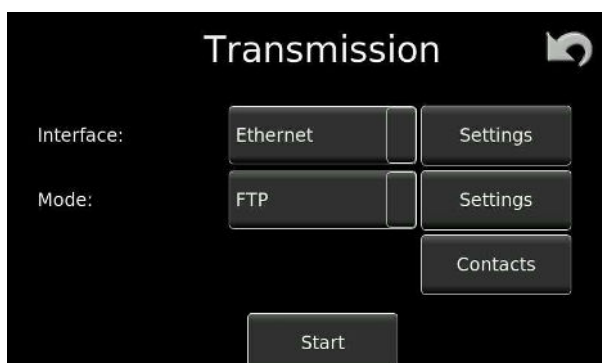
AUDIO COMPRESSION USED IN THE I.S.D.N. DOMAIN.

Signals sent down an I.S.D.N. line are compressed and vary from country to country. There are three principal transmission modes, G-711 or "Speech" and G 722 or "Data" and MPEG-1 Layer II. In Europe, an I.S.D.N. telephone in "speech" mode will normally use the A-Law compression standard which allows a bandwidth of 3.5 kHz. In the United States a similar telephone will generally use the μ -Law compression standard. The G722 and MPEG compression standards for data transmission are used on both sides of the Atlantic.

I.S.D.N. OPERATION

Communication using I.S.D.N. can involve various different operations such as making a call, receiving an incoming call, mixing live audio with a previously recorded file, recording a communication etc. so to simplify matters, the various different screens and their operations are explained on the following pages which should cover all areas.

On the transmission screen the communication interface to be used can be selected. This can be I.S.D.N., Local area network (LAN) via the on-board Ethernet connection, WIFI or GSM phone (if the option is installed). The transmission mode options vary according to the interface selected.



When settings is pressed for the I.S.D.N. selection, the following screen gives access to the different transmission modes, of G711-A (A-law), G711- μ (μ -Law) speech modes, G-722 data mode depending on the selection made on the previous screen. If a data transmission is selected then the synchronization protocol of S.R.T. (Synchronization Relation Tree) can be selected, which is the most common protocol.

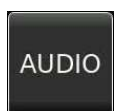


I.S.D.N. screen

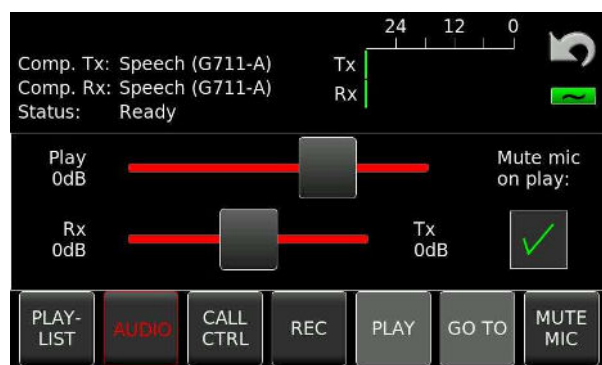
When I.S.D.N. is selected and OK is pressed in the transmission screen the principal I.S.D.N. screen will be shown. It offers several options described below:



Opens the directory of the current working folder allowing a play list to be selected for transmission over the I.S.D.N. connection.



Gives access to the Play gain. If one speaks into the microphone while adjusting the slider, then the level of the played back file will be changed. Selection of the signal to be monitored which can be chosen TX, RX or TX+RX together. The following screen will be shown.



Mute on playback can also be checked in this screen to mute the microphones during file playback.



Mute the microphone input while transmitting on ISDN.



Opens the dial mode window allowing the user to set the recorder to accept incoming I.S.D.N. call, wait for an incoming call and answer automatically or to allow a number to be dialed.



The REC key is inactive (grey) until the I.S.D.N. connection has been made and the unit is in the "On-Line" status when it turns black. When pressed it offers the choice to record between TX, RX and TX+RX together.



The PLAY key is inactive (grey) until the I.S.D.N. connection has been made and the unit is in the "On-Line" status when it turns black. Once active, it will play back the previously selected file, indicated visually in the white window.



Allows the user to locate a particular sequence within an audio file for playback.

From the DIAL MODE screen a number can be entered in the "Dial a number" window,



Note that the Dial Mode button changes to Hang-up allowing the user to break the connection.



Incoming calls

When an incoming call is detected, the ring-tone can be heard in the headphones, and the following screen will be displayed. It indicates the number of the caller and permits the user to accept or refuse the call.



Play list

Files can be selected individually to be transmitted from the directory listing or they can be added to the play list. The menu at the bottom of the screen allows the desired tracks to be added to a play list in any order.

Index	Length	Folder:	Int:Folder_name	
001	0:39	Index:	1	▲
002	0:38	Length:	0:39	
003	0:09	Date:	01.01.2014	
004	0:06	Time:	0:04	
005	0:03	Project:	Project	Play
006	0:03	Scene:	Scene	
007	0:07	Take:	1	
008	0:20	Note:	Note	▼
		TC:	00:00:00 [24]	
		UB:	00/00/00/00	
		Format:	PCM 24/48k St (1f)	
Playlist: <empty>				
<div> Add to playlist Clear playlist Close </div>				

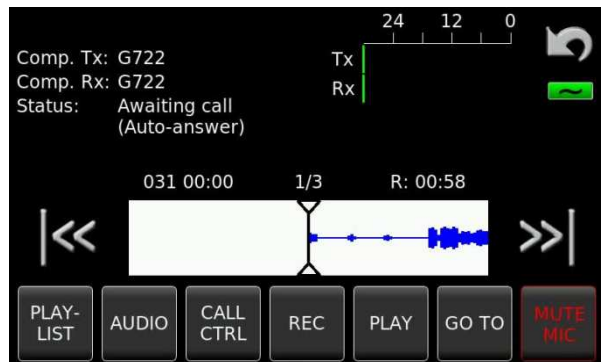
Empty play list

Index	Length	Folder:	Int:Folder_name	
002	0:38	Index:	8	▲
003	0:09	Length:	0:20	
004	0:06	Date:	01.01.2014	
005	0:03	Time:	5:40	
006	0:03	Project:	Project	Play
007	0:07	Scene:	Scene	
008	0:20	Take:	5	
009	1:01	Note:	Note	▼
		TC:	00:00:00 [24]	
		UB:	00/00/00/00	
		Format:	PCM 24/48k St (1f)	
Playlist: 001, 005, 008				
<div> Add to playlist Clear playlist Close </div>				

Three tracks selected

Automatic answer

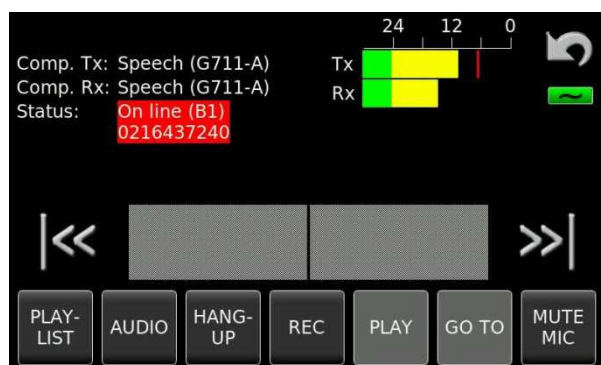
When this function is selected, the Nagra will wait for an incoming I.S.D.N. call. In this mode the machine will answer, as soon as an incoming call arrives, and after 4 seconds, it will immediately playback the previously selected audio file. If multiple files have been selected in a play list, then the first file playback will start automatically and the other files will follow in the order they were selected with a short break between each. Once the transmission of the file(s) is complete it will hang-up, and remain in the Auto Answer mode ready to reply to the next incoming call. If no file has been selected, the Nagra will answer and remain on line until the communication is ended.



On-Line screen

When a call connection is made, either by dialing a number or by answering an incoming call the Nagra will be in the On-Line status. The RX level indicates the signal level of the caller and the TX level indicates the level of the transmit signal which can be either the microphone input or the playback signal of a previously recorded file. The dialed (or connected) number is also clearly displayed.

In the example below, the file to be played back or transmitted is index number 15 and has a duration of 22 seconds. Playback has not yet been activated and the TX level shows that of the microphone.



WiFi / GSM

(Hardware option part number 71 19187 000 for 3G and 7119187100 for 4G)

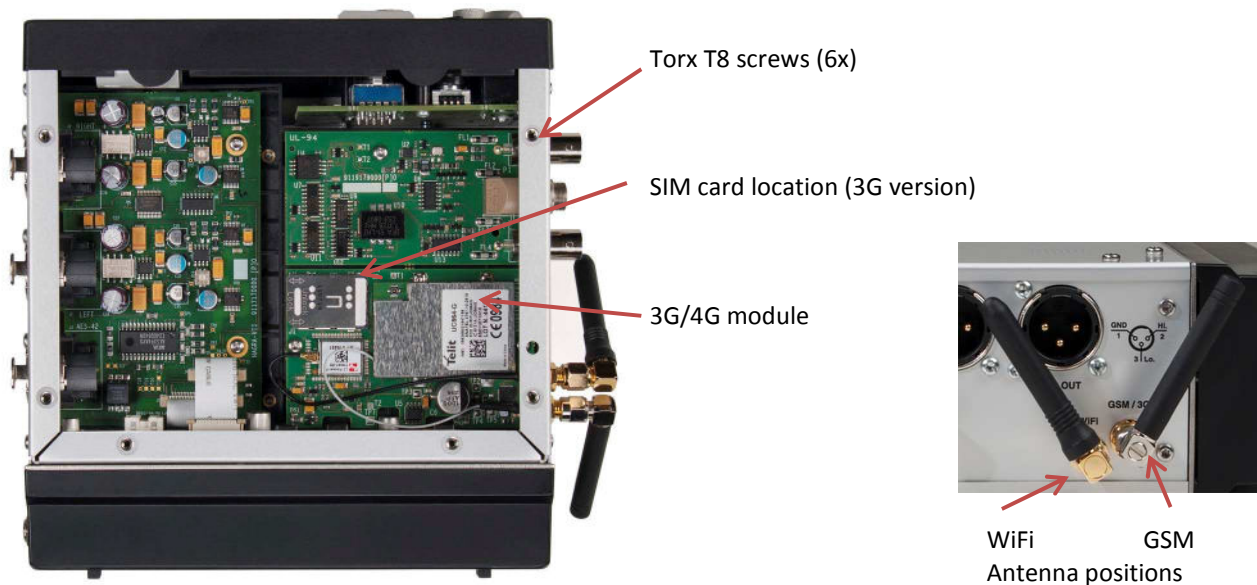
The Nagra Seven can be equipped with an internal WiFi / GSM communication option which is inserted into the second slot under the lower panel of the recorder. The features offers the possibility to either FTP files or use VoIP via the on-board WiFi if a network is available or alternatively to use the standard GSM network in 3G or 4G mode.

Note: A SIM card needs to be obtained from a local provider and installed into the slot provided on the board for the GSM option to operate.

Inserting the SIM card.

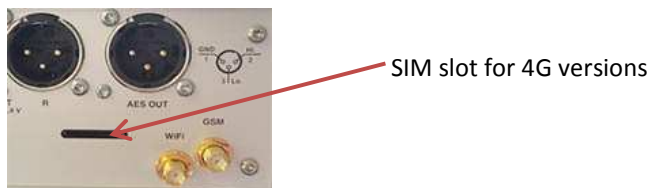
On the 3G version the SIM card is located inside the recorder. Remove the detachable battery pack from the recorder. Place the recorder upside down on a clean, non-abrasive surface. Remove the Six "Torx T8" screws holding the bottom cover of the machine in place. The SIM card is located on the WiFi / GSM option board as shown below, and is inserted in the same way as for a mobile phone.

The SIM card is a standard size, but micro SIM cards can be used if the appropriate adapter is available.




Once correctly inserted, re-fit the lower cover of the recorder and re-attach the battery pack.

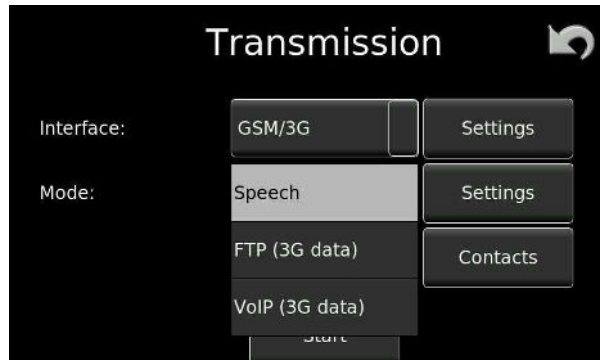
The SIM card on the 4G version is inserted without opening the recorder. The slot is located on the right side next to the antennas as shown in the picture below.



Making a GSM or DATA connection

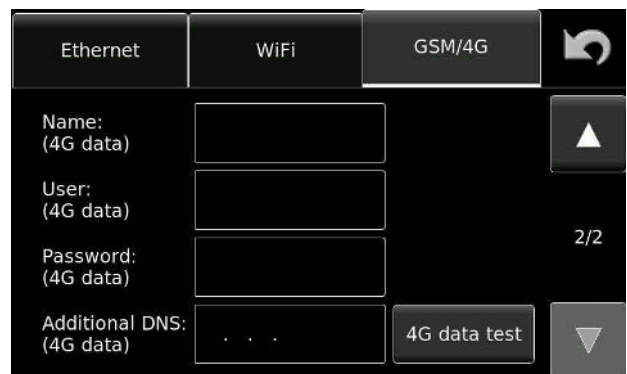
A "GSM" communication infers a VOICE communication over the standard GSM network, and the 3G or 4G connection refers to a DATA communication such as FTP file transfer, or VoIP communication.

When the WiFi / GSM option is installed in the recorder, the available options will appear automatically in the transmission  menu .



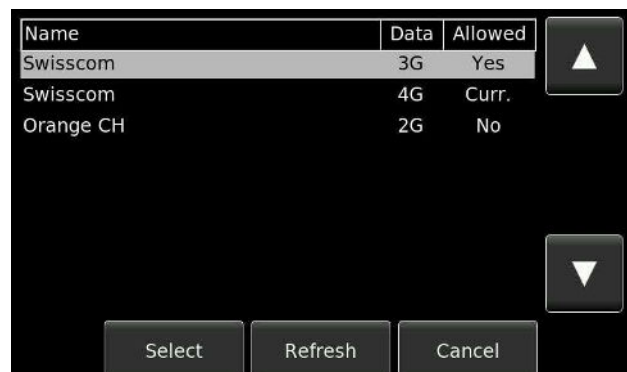
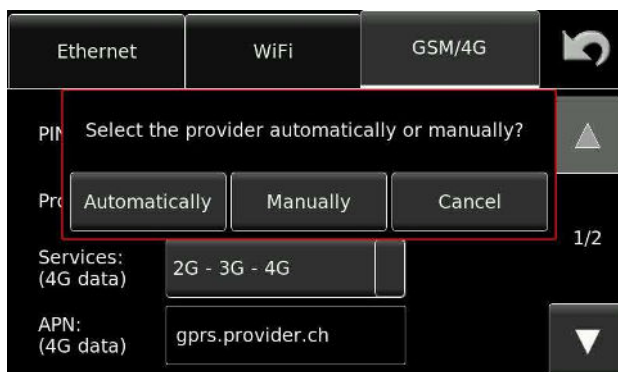
On this screen the transmission interface is set to GSM / 3G (or 4G) and the choice of available transmission modes is displayed in the drop-down menu according to the options installed. Once the desired mode is chosen proceed in the same manner as any other communication method already explained in this manual. Machines equipped with the 4G interface will naturally show 4G in place of 3G

GSM settings:



PIN / Provider:

This is the PIN number of the SIM card inserted into the slot on the circuit board of the Nagra. For the Provider portion, this should be left blank for automatic provider detection. If a specific provider is desired it can be selected using the EDIT key.



Services:

This allows specific data modes to be selected. The available choices depend on the installed circuit.

APN/ name (3G/4G): This is the Access Point Name for 3G / 4G operation and is supplied by the provider.

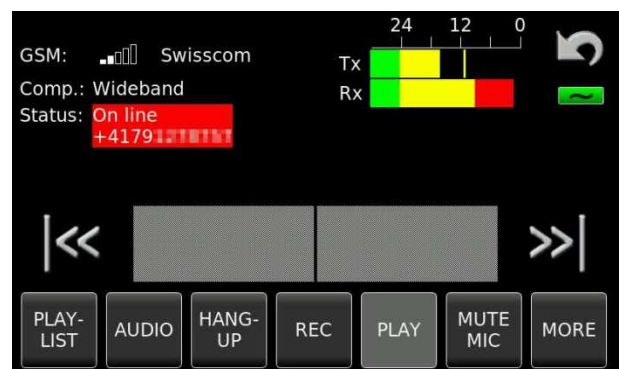
User / password (3G/4G): Supplied by the provider

Additional DNS (3G/4G): Additional Domain Name Server address (for advanced users only)

Generally these optional fields should be left blank unless problems occur with the data communication , in which case contact your nearest Nagra dealer for assistance.


Pressing the Data test button will check the communication with the service provider.

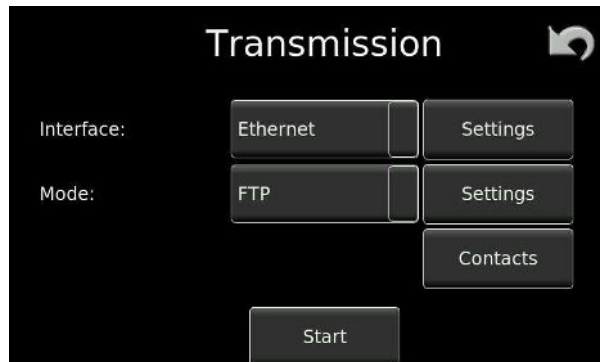
When all the GSM settings are correct, then a communication may be made. In 3G mode the on-line connection will be marked “narrow band” (3.5 kHz bandwidth) and in 4G “Wide band” (7 kHz bandwidth) and the following screens will be displayed.



Once the “on-Line” is shown all the buttons at the bottom of the screen can be used.

WiFi operation

If a WiFi connection is to be created using the WiFi / 3G option then the network settings for the WiFi operation need to be configured as for the other transmission modes. The available options will appear automatically in the transmission menu. 



In the WiFi mode, both FTP and VoIP (if option is installed) are possible.

Press the settings button next to the WiFi Interface to access the parameters for the WiFi configuration as shown below:

Available WiFi networks can be searched for automatically, and all the necessary parameters can be stored automatically or entered manually in the settings screen. Any saved WiFi networks will immediately be displayed when the WiFi tab is selected.



WiFi Settings

WiFi Settings screen with the following fields and buttons:

- SSID: NETGEAR
- Security: WPA/WPA2
- Password: (empty field)
- Additional DNS: (empty field)
- Buttons: Save, Test, Cancel

SSID: Service Set Identification is the WiFi network name
Security: This is the encryption code for a secure WiFi network often referred to as the WPA
Password: This is for the network password if necessary
Additional DNS: Additional Domain Name Server address (for advanced users only)

Once the parameters have been installed, pressing the TEST button will allow the recorder to ask the WiFi network router for a dedicated IP address, and thus appear on the WiFi network. If everything is OK, click on the Start button on the transmission screen.

Scanning for WiFi networks

WiFi settings screen showing a list of saved WiFi networks and control buttons:

- Buttons: Ethernet, WiFi, GSM/3G
- Section: Saved WiFi
- List:
 - 1: <empty>
 - 2: <empty>
 - 3: <empty>
 - 4: <empty>
 - 5: <empty>
- Buttons: New, Remove, Move up, Move down

Pressing the “NEW” button on the WiFi display will open a sub-window allowing the user to scan for available WiFi networks. Naturally, if known in advance the name can be entered after pressing the “Manually enter” key. When the Scan networks key is pressed the WIFI system will search and display available networks.

WiFi settings screen with a dialog box overlay:

- Buttons: Ethernet, WiFi, GSM/3G
- Section: Saved WiFi
- List:
 - 1: <empty>
 - 2: <empty>
 - 3: <empty>
 - 4: <empty>
 - 5: <empty>
- Buttons: Move up, Move down
- Dialog box: Scan available WiFi networks or manually enter the settings?
 - Buttons: Scan networks, Manually enter, Cancel

WiFi scan results screen showing a list of available networks:

SSID	Security	Signal
NETGEAR	WPA/WPA2	5/5
ATSR-D	WPA/WPA2	3/5
ECA-SUP	WPA/WPA2	2/5
ZyXEL	WPA/WPA2	2/5
nesa admin	WPA/WPA2	2/5
nesa guest	WPA/WPA2	1/5

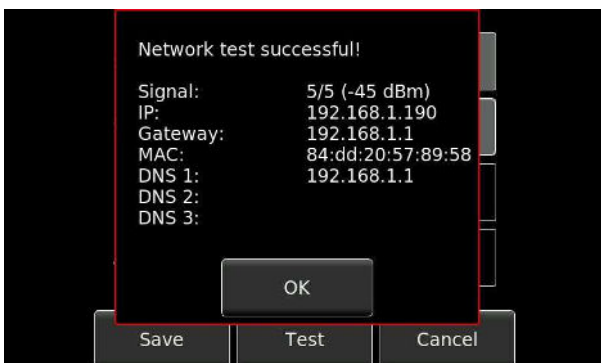
Buttons: Select, Refresh, Cancel

Selecting an available network will immediately access the settings allowing the password for the network to be entered.



A screenshot of a network settings interface. It features four input fields: 'SSID' with the value 'NETGEAR', 'Security' with 'WPA/WPA2', 'Password' (empty), and 'Additional DNS' (empty). Below these fields are three buttons: 'Save', 'Test', and 'Cancel'.

Pressing the TEST button will then verify the network connection and settings and if successful will display the parameters as shown below:



A screenshot of a 'Network test successful!' dialog box. The dialog lists the following parameters: Signal: 5/5 (-45 dBm), IP: 192.168.1.190, Gateway: 192.168.1.1, MAC: 84:dd:20:57:89:58, DNS 1: 192.168.1.1, DNS 2: (empty), and DNS 3: (empty). An 'OK' button is at the bottom of the dialog. Below the dialog are the 'Save', 'Test', and 'Cancel' buttons from the previous screen.

Up to a total of 5 different networks can be stored in the machine and they are saved in order of importance, and this order can be changed using the move UP / DOWN functions.

Audio Editor

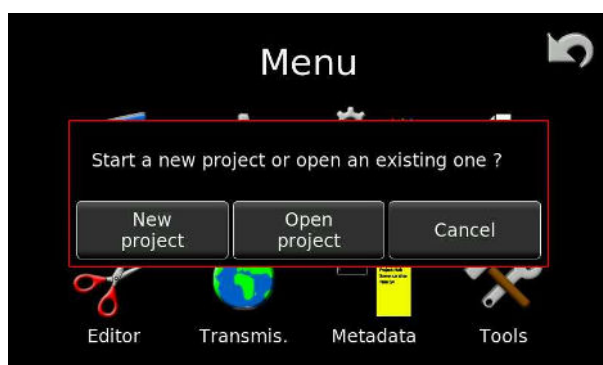
EDITOR (Software option part number 70 19180 020)

The audio editing option allows simple “cut ‘n paste” type editing of audio files. It is a “non-destructive” system meaning that making edits does not affect the original audio recording in any way. When editing is completed, the newly edited material is saved as a new “take” in the same format as the original. Audio from different files can be edited together into the final edit assuming the files are of the same format initially.



The scissors icon is used to open the audio editor. If the icon is not present in the icons menu then the option is not installed on the recorder. Please contact your nearest Nagra dealer to install the option.

When the Icon is touched a pop-up will appear asking what action is to be taken:



Pressing on New Project will open the following screen:

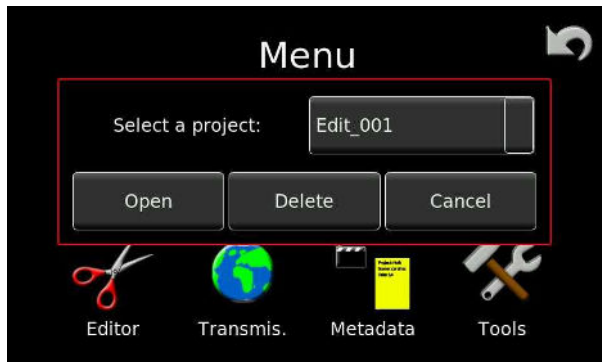


This edit selection screen allows the user to scroll through all the recordings on the currently selected media to choose the track to be edited.

The play button can be used to preview any track prior to its selection for editing.

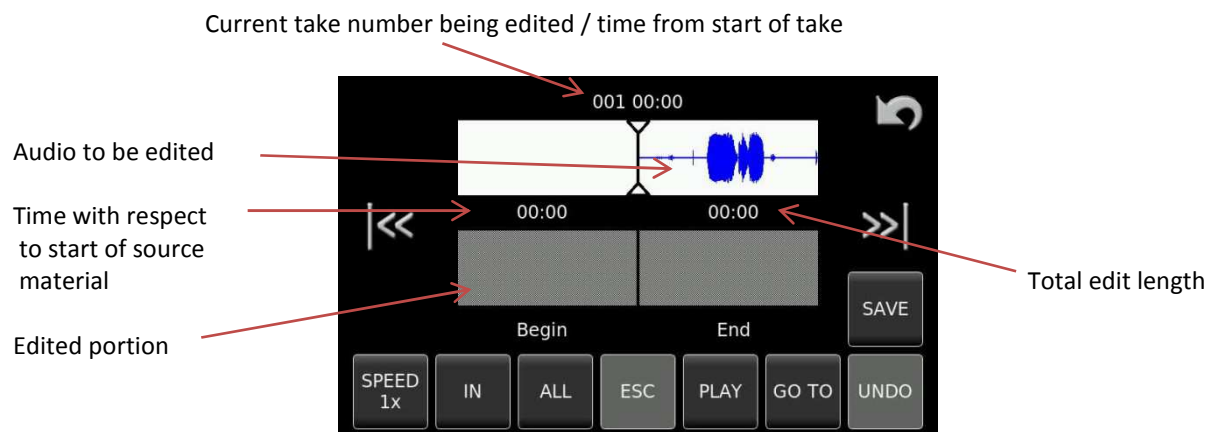
In the index list, edited audio files are indicated by an “*” next to the index number. Unedited source audio files just have the number without the asterisk. Any file can be selected for editing even if it is not in the same format as the current settings of the recorder.

Pressing on Open Project will open the following screen:



When OK is selected the main editing screen (below) will be opened.

Overall description of the editing screen:



All the different areas and operations, as well as the software screen buttons and all editor functions available are described in detail in the following pages.

Edit controls

All features of the editor are controlled either with the touchscreen or by means of the two level potentiometers. In the edit mode, the left pot is used to advance or reverse the audio up to 1x nominal speed depending on the angular rotation of the pot. The right pot is a “jog” function and allows the graphic audio to be moved back and forth in direct relation to the pot position.

Using the touchscreen, the audio can be advanced by “stroking” the graphic displays in either direction or constant speed advance and rewind can be achieved by “swiping” the graphic display in the relevant direction. Touching the screen or one of the pots will immediately cancel this feature.

It is recommended to use a stili (part number 2019180010) to manipulate the editor with precision.

The touchscreen also has 5 soft keys permanently located along the bottom of the screen, whose functions change depending on the mode of the editor, each is explained below.

	When active the displacement speed of the audio graphics is increased to the range of $\pm 4x$ or $16x$ nominal speed in each direction. Effective for the swipe function as well as under potentiometer control. The button will be red while it is active.
	Select / Mark an edit “IN” point
	Used to copy the entire source of audio on the upper graphic display track to the lower “edit” graphic display track.
	Escape from current mode, or to remove an “IN” point if placed by in error.
	Play audio from the current cursor position at nominal speed. Functional for both the upper (source) and lower (edit) tracks on the display. The button will be red while it is active.
	Allows the editor to locate a specified time in an audio file, to avoid scrolling through a large piece of audio.
	This is a single undo function available while editing. Allowing a single “step backwards” during editing. The button will automatically change to “REDO” when used.
	Select / Mark and edit “OUT” point
	When active the audio can be moved to accurately locate the desired edit point. The button will be red while active.
	Used to delete the current edit point or section of edited audio.
	Will mark an edit point in the edited section of audio.
	Save the current editing job.

There are also two transport keys which allow different segments to be located easily and their functions are as follows:



This will advance to the end of the current take, then to the start of the subsequent take. While the EDIT graphic is active this will advance to the next edit point or will jump to the next mark.



This will return to the beginning of the current take, then to the end of the previous take. While the EDIT graphic is active this will jump to the previous edit point or will jump to the previous mark.

General information about editing

Audio editing on the Nagra *Seven* can be made in two different manners.

The first method involves a complete piece of audio source recording, and portions of sound are to be removed, such as silent periods, to obtain a shortened yet concise adaptation of the original.


The second method is to build up a new piece of audio by assembling pieces of audio coming from the initial source or from a variety of different recordings. Naturally, both methods can be used together, meaning that additional portions of audio can be added to an entire source track, and portions of audio can be removed from any audio segment.

Although the editing features are similar in both cases, the two methods will be explained below giving a clear perspective of the different editing features available.

The upper graphic design on the display represents the source material and the lower display represents the edited portion. Jumping from one to the other is done by touching the relevant graphic on the screen. The currently selected portion of audio is lit when active to clearly indicate to the user the operational segment of the editor.

Edit method 1: Removing audio from a source:

This editing method is used, for example, for removing unwanted silent periods in a piece of audio to create a fluent piece of audio.

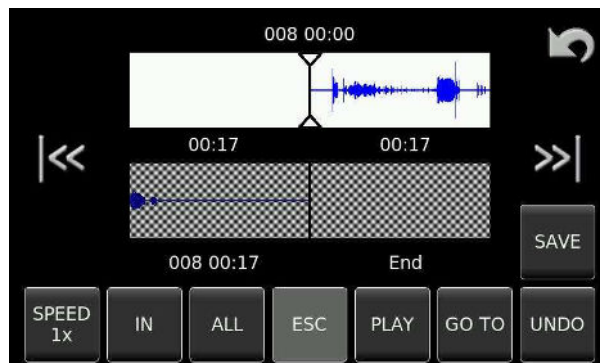
Press on the  icon, to open the editor. Select the desired audio file in the directory of the recorder, and the following screen will be displayed.



The upper graphic display represents the source audio file containing the parts to be removed by editing.

The lower "Edit" track is currently empty as no instructions have been given.

Press the “ALL” button to select the entire audio take to the lower editing track and the following display will be shown.



On the lower graphic, the end of the copied source file can be seen on the left side of the display. It is now possible to join the next piece of audio to this if desired, but in this example, only unwanted parts of audio are to be removed from the file using the editor.

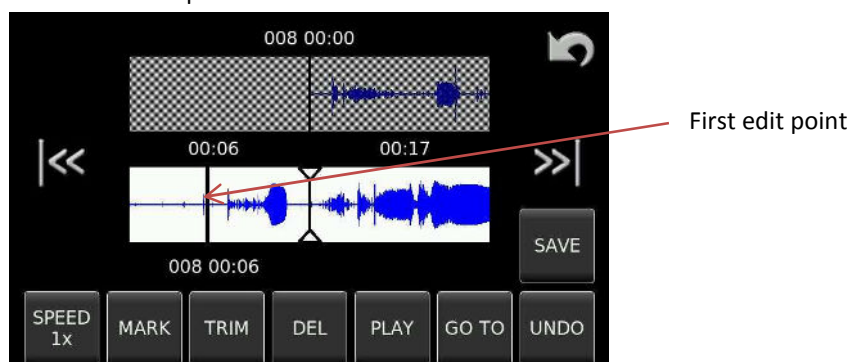
Currently the upper display is active (White).

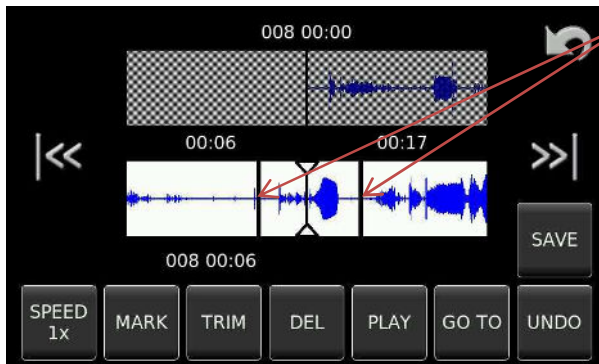
Click on the lower display to select the edit track to be active.

Using either the touchscreen, with a stili pointer, or alternatively the two channel potentiometers move the edit track graphic display to the start of the audio portion to be removed.

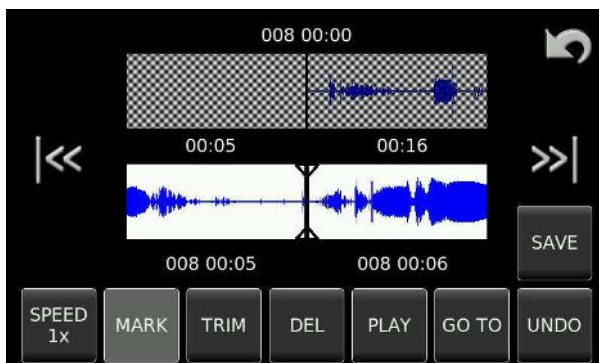


Press the “MARK” button (which will light red) to place the mark or CUT point. Move the audio along to the second desired mark or “CUT” point and press the MARK button again. The two cut points are now apparent, as shown in the pictures below.






Both edit points are shown and the portion between them can be deleted. Trimming of the edit points is possible to accurately locate the exact cut point. To move to either point press the appropriate skip key.



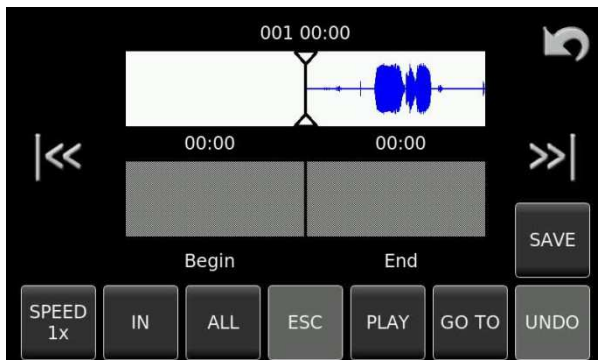
Pressing the DEL button will now remove the portion of audio located between the left and right edit points.

Repeat this operation until all the audio portions that are to be removed have been eliminated. Once complete press  and the machine will ask whether to save the edit or not. If saved, it will automatically have the next available index number on the currently selected media.

Edit method 2: Creating a new edit by assembling audio portions:

In this method, a new edited audio track is being created by taking either entire source tracks and adding the together (end-to-end) or inserting different portions of audio at a specific point in the edit track.

Start the editor function by pressing the scissors on the main display. Press the SKIP forward / backwards keys to locate the initial source track where the editing should begin.



Use the display or potentiometers to locate the first "IN" point, where the new Edit track should commence and press the "IN" button. Scroll forwards and press the "OUT" button.

The portion of audio between the two points will immediately be copied from the source track to the edit track as shown below.

The upper source track is the active track and the next piece of desired audio can now be located. It will in turn be added to the edit track thus building up the newly created track.

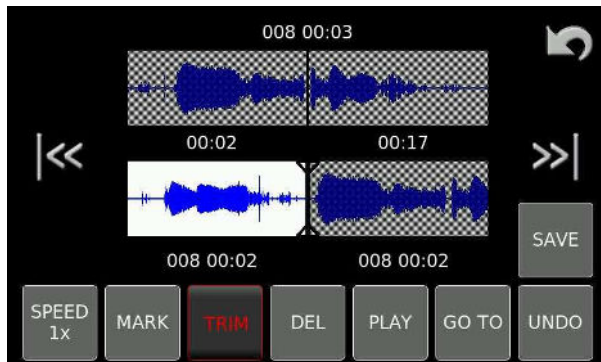
The next piece of audio may also come from a different index if necessary.



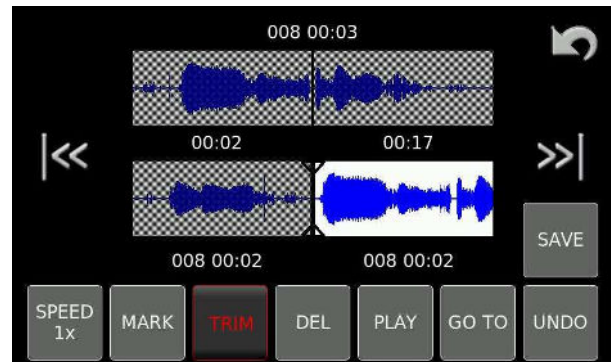
Each audio portion added will be inserted into the edit track at the point where the cursor on the edit track is currently located.

Once all the audio segments have been assembled activate the edit track by clicking on it.

All the edit points can now be adjusted or “Trimmed” by selecting the desired point and then using the trim function.



Trimming of the left edit point



Trimming of the right edit point

The PLAY key can be used to listen to either of the tracks at any time.

The GOTO function can be used to quickly locate a specific section of audio in a long recording.



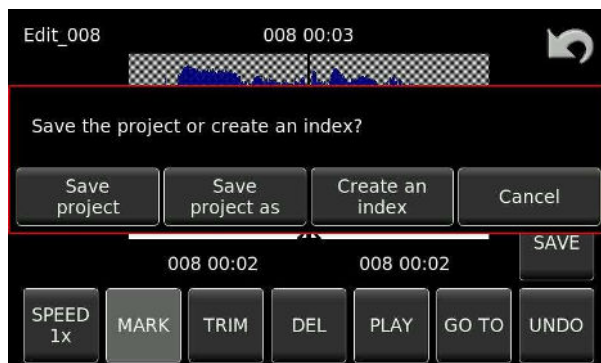
Simply enter the time of the audio portion and press OK and the editor will immediately locate the respective portion of the audio within the file.

Playback mode



When the PLAY key is pressed, the Icons either side of it change to allow the FWD and REV commands to become easily accessible. Pressing the STOP button will return to the previous display.

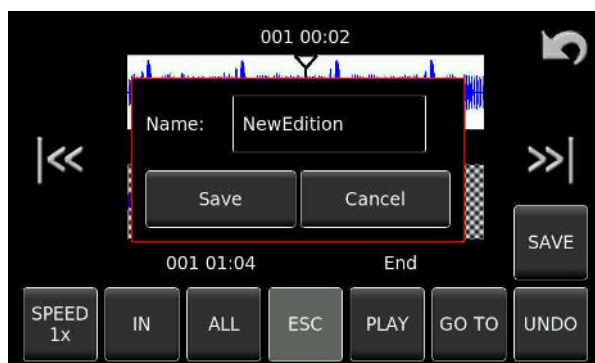
Edit saving



Once editing is completed use the SAVE button to leave the editor to display the following screen:

This gives the user the option of saving the edit as a new index, or to save the edit as a "Project" or an edit decision list (EDL). Saving as an EDL allows the use to return to the editing at a later time and continue or alter the initial edits.

When saving an edit it is possible to rename the new file at the time of saving. This allows transmitted files to be easily identified. The name of the new edit file will be followed by the index number ie "NewEdition_Index#.wav" in the normal way.



ERROR MESSAGES AND PROBLEM SOLVING

Error messages on the Nagra *Seven* appear on the main display irrespective of the current operating mode of the recorder. Generally speaking they are self-explanatory and do not need any additional information. However some additional information on certain messages is listed here:

Message	Reason and solution
"Aborted"	The copy process was requested to stop by the user, cleaning of the partially copied index.
"AES: no signal"	The AES input has been selected and no signal is present.
"AES: slipping"	The AES signal is slipping with respect to the selected reference.
"AES: SRC unlock"	The internal sample rate converter is not synchronized.
"Buffer overflow"	The audio buffer is full due to media problems.
"Copying"	Attempt to DELETE or RENUMBER indexes or SELECT, RENAME or ERASE a folder while the selected indexes or folder is still in the copy list. You have put the Nagra <i>Seven</i> in power off and it has not yet finished to copy, this is not really an error message in this case. (see copy section).
"Copy Error"	A copy was stopped because a copy error occurred.
"Copy Error: List full"	A copy was stopped because too many copy operations have been chosen. (See Copy section).
"Copying"	The copy process is running.
"Autocopy: Destination error"	The destination media for the copy manager is not present.
"Copy Destination Full"	The destination media for the copy manager is full.
"Creating error"	The destination disk is certainly either not present or not formatted. Insert a formatted compact flash card.
"Deleting Error"	Initially use the RETRY function. If the error re-appears your disk may be damaged. Index with file attributes set to read-only can cause this error; this problem must be resolved with a PC as file attributes cannot be altered using the Nagra <i>Seven</i> .
"Disk Busy"	Media not ready.
"Disk full"	Selected working drive is at maximum capacity.
"Directory full"	Will be displayed when the Nagra <i>Seven</i> is set to pre-record / record for the 999 th file in the current working folder. Delete unnecessary folders / indexes on your destination media. (Maximum allowed number of entries is 999)

“Directory nearly full”	Will be displayed when the Nagra <i>Seven</i> is set to pre-record / record for the 995 th file in the current working folder. Delete unnecessary folders / indexes on your destination media. (Maximum allowed number of entries is 999)
“Disk nearly full”	Destination media (containing the current working folder) is almost full. Delete unnecessary folders/indexes on your destination media. Then execute the RETRY function. Change the media. Execute the RETRY function. The incomplete copy items will continue on this new media.
“Disk error”	Media not responding.
“Disk Jam”	Media not responding.
“Error: Used for copy”	The copy destination has been selected as the working folder
“Error: Used for Working folder”	An attempt to delete the working folder has been made
“File already exists”	An index with the same number exists on the destination disk. There are two solutions. Use the skip function to ignore this index, or Abort to stop the copy process. Use Overwrite or overwrite all in the copy status menu.
“File open error”	An error occurred when opening the chosen file
“Idle”	The copy list is empty, no copies are running, no errors on previous copy.
“In Use”	The destination folder is in use. Attempt to copy to the working folder has been requested which is not allowed.
“List Full”	The copy list can contain up to 20 items. This list is full and you can't add another copy at this time.
“Low battery”	Attached battery pack is almost exhausted.
“Power lost During last session”	Execute the RETRY function to continue the copy process.
“Reading Error”	Initially use the RETRY function. If the error re-appears your index or your disk may be damaged.
“Suspended”	The Nagra <i>Seven</i> is in record mode and the current copy destination is the same drive as the working folder (Copy will always go to the other drive). The copy is suspended to avoid file fragmentation on the disk and to guarantee you a reliable remaining recording time.
“Unlock”	Internal clocks are no longer locked to the selected reference.
“Writing Error”	Initially use the RETRY function. If the error re-appears your disk may be damaged.
“Waiting for trigger”	Unit is waiting for a remote start signal.
“Writing for ext. TC”	Unit is waiting for a valid external time code signal.

CHAPTER VI

SPECIFICATIONS

Recording

Data storage medium	16 GB Internal micro SD card (user expandable)
Removable media	SD card (Hot Swappable)
Disk format	FAT 16 / 32
Recording Method	Linear digital PCM (optional MPEG 1 layer II)
File type	16 / 24 bit Broadcast Wave File BWF (WAV) with iXML, AES 31 compatible
A/D & D/A conversion	24-Bit Sigma Delta
Tracks	2 individual
Sampling Rate	44.1, 48, 88.2, 96, 176.4 and 192 kHz (with 0.1% pull up/down)
Recording capacity	1 hr. stereo @ 24 bit 48 kHz per GB of disk / memory
Mono / polyphonic	Selectable
Pre-recording buffer	Up to 20 seconds @ 48 kHz.
Display	4-inch color LCD touchscreen TFT anti-reflection / sun light readable
Level meters	On color display

Inputs

Digital inputs	XLR AES-3 / AES 42, SRC (Sample Rate Converter)
Analogue inputs	2 x symmetrical XLR Microphone (Dynamic, +48V Phantom) / line
Microphone input sensitivity	2.8, 10 and 40 mV/Pa selectable
Limiters	User programmable on microphone inputs, individual as a pair.
Line input sensitivity	Adjustable from -6 dBm up to +24 dBm for 0 dBFS recording
THD at 1 kHz	<0.2% Mic, <0.01% line (measured on AES out)
Frequency response	Mic, 10Hz – 21.8 kHz @ 48 kHz, 10 Hz – 43.5 kHz @ 96 kHz and 10 Hz – 70 kHz @ 192 kHz ± 0.5 dB, Line ±0.2 dB (measured on AES out)
Input noise (condenser mic)	0.73 µV (10 mV/Pa)
Input noise (dynamic mic)	0.55 µV dB (measured ASA "A" loaded 220Ω) 2.8 mV/Pa
Signal-to-noise ratio	>114 dB Line
Input level adj. range	45 dB Mic and from -6 to +24 dB Line
Input filters	Fully programmable frequency and slope
Slate microphone	Electret behind the front panel

Outputs

Analogue line output	XLR 4.4V max (+15 dBm)
Digital output	XLR AES-3 (24 bit or 16 bit dithered)
Headphones	Stereo 6.3mm (¼") Jack 50 Ω
Internal speaker	0.5W

Other

USB Port	USB 2.0 OTG connector type "A/B"
Time code IN/OUT	5 pin LEMO (SMPTE / EBU)
M/S Decoder	Switchable
External reference	Word Clock, TC option, video and HDTV on BNC with TC Option.
Dither	Menu selectable 24/16bits on Inputs and/or Outputs

General Dimensions	165 x 65 x 175mm (6½ x 2½ x 7") (W x H x D) (Incl. battery box)
Weight	800g (1.76 lbs) (without battery box)
Power supply	8 X NiMH "AA", Lithium-Polymer, or external dc
Power Consumption	Approximately 5W
Charge time	5 hours (Lithium-Ion pack)
Relative humidity	From 10% to 99% (non-condensing)
Operating temperature	From -30°C to + 60°C (-22°F to 140°F)

The analogue inputs of the Nagra *Seven* are managed using a completely new concept. The new principle of the ALC/Limiter of the Nagra *Seven* is that it is done entirely in the digital domain using a dedicated DSP (Digital Signal Processor). The principal advantages are to create a better and cleaner ALC, give limiter and filter processing with the possibility of adjusting more parameters and thus achieving better microphone preamplifiers due to less electronics in the analogue audio signal path.

A classic ALC/Lim. handles the gain of microphone preamplifier, in the analogue domain; the main goal being to have an acceptable level but limited in such a way so as not to clip the audio signal on the A/D converter that follows.

The exceptional quality of the Seven's mic preamplifier allows a technique, called scaling, which consists in decreasing the gain of mic preamplifier, before the AD converter, and increasing the gain by the same amount (the headroom), after the A/D converter, entirely in the digital domain. The first advantage of this scaling is that we can handle the ALC/Lim. in the digital domain with more powerful and more appropriate algorithms than with "analogue" algorithms. The second advantage is that the mic preamplifier, without any electronics for the limiter, is simpler, cleaner and more straightforward. With this scaling, the A/D converter can accept up to the nominal level plus the selected headroom without clipping; the process to prevent clipping is moved to the digital domain. The only disadvantage is that the noise floor level increases by the same amount as the selected headroom, so, it is recommended not to select unnecessarily big headroom; however headroom up to about 18-24 dB is not noticeable in terms of noise floor increase.

In the digital domain we can use more complicated and better adapted algorithms than we can in the analogue domain. We have developed, in the Nagra laboratories, a very fine and subtle algorithm which can work as a limiter or as an ALC just by changing its parameters. We have resolved some of the problems of classic limiters such as distortion of low frequency signals or the ALC pumping problems. Another subtlety is to add a very short delay to the signal: this delay is too short to be detectable by a human (about 2 ms), but is enough for an algorithm to be greatly improved. By knowing the present level but acting on the delayed signal, this is as if the algorithm can see into the future! When a sudden high level sound should be attenuated, it can do it a fraction of time in advance, reducing considerably distortion on the incoming high level signal. The gain is changed just in front (or before) the high level signal, at a moment which the human ear is less sensible to distortion, this even, and particularly, with short attack parameters ("immediate" parameter); this keeps attack absolutely clean without any artefacts. Moreover, we use our anti-zipper noise system to minimize distortion when changing the gain.

Yet another subtlety is the gain control. As all gains are digitally controlled (including the mic preamplifier gain), we can use same algorithm to make a limiter or an ALC (Automatic gain control) just by changing speed parameters (attack, delay and release) with larger values. The manual gain control (typically controlled with the potentiometer) is embedded in the ALC/Lim. algorithm, this allows fade in / fade out and gain control, but, if the gain is too high, the ALC/Lim take the priority control over your manual control. So the manual gain control, naturally and seamlessly, changes from a simple gain control to a threshold control. In ALC mode this gives you the gain control but without any worry of clipping, the ALC takes control as soon the gain is too high. The gain control acts as a threshold control, which allows you to limit the gain on low level signals (silences) and avoids the ambient noise from rising up too much.

A limiter is typically used for those who want control the input gain themselves, but only want a security in the event of an unexpected louder sound.

An ALC is typically used for voice recording (broadcast) to avoid worrying about the gains. The medium preset (typical release time 4-6 s) is the standard. The fast preset (2-3 s) is a variant for those who want rapid gain adaptation in the event of frequent speaker changes (and sound level) or for those who speak very quickly; a

fast ALC can easily “pump”, and the threshold control is used to limit this effect. The slow preset (8-10 s) is pleasant for its naturalness; it also gives good results with most music content for those who cannot monitor the recording levels.

If you do not understand all these parameters, we suggest that you simply use the preset that you need. Here is a simple wizard setting:

- Limiter preset: this preset is good in all conditions; you can decrease headroom to preserve quality if you are sure that unexpected levels will not be too high. A ratio set to “flat” will prevent the limiter from working below the target level, but all peaks will be at the same level.
- ALC preset: change the target level if needed, a target higher than -6 dB may require a shorter 2nd limiter attack time to avoid clipping (max “250 μ s” for targets up to -3 dB and “immediate” for higher). Select Input attenuation to “0 dB” if you do not want to use the potentiometer; use a lower value if the gain is too high during silences. Use a low pass filter in the event of loud low frequencies (wind, inside a car, ...).

Below, we explain various different parameters of the ALC/LIMITER to give a clearer understanding of the various adjustments.

Ganging:

This setting is used to lock the ALC/lim of both channels together for a stereo pair. When an ALC/LIM process is active on a particular channel due to a loud sound, the other channel gain will be limited by the same amount, keeping the gain of the stereo pair correlated.

Preset:

This is a quick way to select predetermined parameters for a standard limiter or a standard ALC, avoiding the necessity to understand all the parameters of the ALC/LIM programming process. The preset drop-down will be cleared if any of the Attack, Delay, Release and Ratio parameters have been altered, indicating that non-standard parameter has been chosen.

Headroom:

The ALC/LIM processing uses a principle called “scaling”: where the analogue gain of the input is decreased by a specified factor while the input gain is increase digitally by the same amount, resulting in a signal of the same level; this scaling factor is called headroom. The DSP uses this headroom to handle the ALC/LIM processing, by reducing the gain up to headroom factor.

The headroom of the ALC/LIM and the headroom of the filters are same; the Nagra *Seven* simply uses the larger of the two. In other words, if the headroom for the limiter is set to 18 dB, and a filter is subsequently selected with a headroom of 24 dB, then the limiter will be active at 24 dB rather than 18 dB.

The ALC system and limiters use the same process, they differ only in the parameters used to set them (attack, release and delay): a limiter uses very fast attack factor and an ALC uses a slower factor.

Beware: not to specify an unnecessarily large headroom, the disadvantage of the scaling is to increase to noise floor level by a factor equal to the headroom; larger headroom can noticeably increase the noise floor.

Target:

The target setting specifies the level (dBFS) not to be overshoot. With a flat ratio the ALC/LIM process will not limit the gain while the level is below this value. With a non-flat ratio the ALC/LIM process will already start limiting the gain before this value is reached.

With the Attack parameter set to “immediate”, this limit will never be overshoot except if the gain limitation is greater than the headroom.

Input attenuation:

As the ALC/LIM processing is done digitally, the analogue input gain is still controlled by the user, but physically the gain is decrease by the amount of the headroom; with an input attenuation of -12 dB and a headroom of 24 dB the microphone preamplifier gain is physically -36 dB (-12dB – 24dB). This is true as long as the microphone preamplifier gain does not reach its maximum attenuation of -42 dB; when reached the microphone preamplifier gain will stay at -42 dB and the “rest” of the attenuation will limit the digital gain that the DSP can use, as a result reducing the headroom; with an input attenuation of -30 dB and a headroom of 24 dB the microphone preamplifier gain is physically -42 dB (max reached) and not -54 dB (-30 dB – 24 dB), the headroom is only -12 dB (-42 dB - -30 dB).

You have the choice whether to control this gain with the potentiometer or by specifying a fixed value. When using as a limiter, it is probably preferable to use the potentiometer for control. The control will act on the microphone preamplifier gain as if the limiter were not switched on, except there will be the headroom offset subtracted. Just be aware that with large attenuations the headroom can be smaller than specified. When using as an ALC it is better to use larger headroom, letting the DSP control the gain. With a headroom of 42 dB, the input attenuation will only limit the digital gain and act as a “threshold” avoiding the gain being too loud when the ALC is not limiting the gain (during a silence). When the input attenuation is controlled with the potentiometer, the potentiometer will mainly act as threshold and allow fade IN/OUT, if a fixed input attenuation is set, the potentiometer is disconnected from input gain control and no longer does anything.

Attack:

This parameter manages the speed with which the gain is limited. You can specify a time (from 250 microseconds to 2 seconds) which represents approximately the sound duration needed to entirely close the ALC/LIM. With the “immediate” parameter, also known as a “brick wall”, the gain limitation will be done immediately avoiding the target parameter to be overshoot. With small value (up to 1 ms), the attack parameter suits for limiter type parameter and will act as a filter on high-pitched / frequency sounds (such as keys being shaken or paper being crumpled for example). This avoids closing the gain too much on unwanted sounds; by the way the target level can be overshoot on such sounds. Typically the overshoot can be of 1-2 dB for 250 µs setting; 3-4 dB for 500 µs setting; 4-5 dB for 1 ms setting; Larger values (up to 2 seconds) can be used for ALC type parameter; with a larger value, the ALC/LIM needs a longer duration sound to reduce the gain and so avoiding closing the gain too much on plosive (p, b... pronunciations) or a cry for example. To avoid too larger overshoots, with slow attack parameters, a second limiter is switch on in parallel with the main ALC/LIM; its function is to limit high level sounds while the main ALC/LIM is closing.

2nd limiter attack:

This parameter is the attack of the second limiter. The second limiter is only active when the attack parameter of the main ALC/LIM is 1 ms or more. The second limiter is a complete limiter, its parameters are same as those of the main ALC/LIM except the attack, delay and release; delay is fixed to minimum, release is fixed to 125 ms. The attack parameter is the only parameter you can change on the second limiter, it works in the same manner as for the main ALC/LIM.

Delay:

This is the time period during which the ALC/LIM process will not increase the gain after having limited, keeping the gain constant even if the sound is too low. This parameter avoids the gain “pumping”, that is the gain increase during short silences. This setting should be of the same order as the release parameter to be consistent and give a pleasant operation of the ALC/lim.

Release:

This is the speed of gain increase when limiting gain is not necessary. The speed is set by specifying the time that the ALC/LIM process takes to reach the maximum gain starting from minimum gain. This parameter, along with the delay mainly determines whether the ALC/LIM process works as limiter (set to minimum) or as an ALC.

Ratio:

This parameter determines the target level function of the input level. With a flat ratio, the ALC/LIM will only limit the gain when the signal would overshoot the target parameter, giving a signal level that is independent of the input level. Specifying a ratio other than flat, allows having a more natural relationship between microphone signal and signal level. A ratio of 6:1, for example, will “compress” 6 dB into 1 dB; That is the ALC/LIM will start limiting when the signal is lower than the target level. With headroom of 24 dB and a ratio of 6:1, the limiter start limiting when the signal is 4 dB ($24 \text{ dB} / 6$) before the target level, if the target level is -2 dB the ALC/lim will start limiting at -6 dB ($-2 \text{ dB} - 4 \text{ dB}$); for ALC or limiter, usually a ratio of at least 6:1 is used, lower ratios (3:1, 4:1, ...) are for those who want the limiter to work more like a compressor than a limiter.

Graphic tabs:

On the graphic tabs you can see the effect of headroom, target, input attenuation and slope parameters for clarity. These graphics show the relationship between the microphone level and recorded level for a constant input microphone level. Dynamic parameters (Attack, Delay and Release) cannot be represented on these graphics and are not shown.

ANNEX II

RECORDING TIMES

Recording durations of audio files on the Nagra *Seven* depend on different criteria such as bit depth and sampling frequency selected for the recording. Below is a small table indicating the recording times available on the internal Micro SD card, as well as on a 4GB removable SD card, from which you can calculate the respective times for any other card sizes.

The internal 16 GB Micro SD card will allow the following recording times in PCM linear:

S.Freq Bits	44.1 kHz		48 kHz		96 kHz		192 kHz	
	16	24	16	24	16	24	16	24
2 tracks	25h03m	16h42m	23h01m	15h20m	11h30m	7h40m	5h45m	3h50m

An External 4 GB SD flash card will give:

S.Freq Bits	44.1 kHz		48 KHz		96 KHz		192 kHz	
	16	24	16	24	16	24	16	24
2 tracks	6h12m	4h08m	5h42m	3h48m	2h51m	1h54m	1h25m	57m

DATA TRANSFER RATES

File transfers in the digital domain are of critical importance, and the time taken to make such transfers can be a fairly costly matter. Many factors influence the transfer speed of digital material from one media to another so it is very difficult to accurately predict exact times.

It is not sufficient to say “USB-2” and assume that the transfer will be made at 480 Mbits/second because this will not be the case. The speed is governed by three principal factors, the speed which the source device can supply the data, and the speed that the receptor can accept the data and the USB link speed between the two devices.

In recent tests the Nagra *Seven* transfers data either through USB-2 or from the internal micro SD to the computer at a rate of approximately 7.5 Mbytes per second. This means that the transfer of 1GB of data will take approximately 2 minutes 15 seconds. This means that 1 hour of stereo 2 channels 48 kHz will transfer at approximately 25 times faster than real time. The type of file will not make any difference to the transfer speed.

ANNEX III

iXML Metadata implementation

The Nagra *Seven* records Broadcast Wave Files which include the iXML metadata in the header chunk. This information will be ignored by equipment not able to interpret the data. The table below shows the implementation of the data within the Nagra *Seven*.



iXML Metadata Implementation

VENDOR MODEL	Nagra Nagra VI		DATE VERSION	19/12/2008 v1.52	
IXML MASTER TAG	IXML SUB TAGS	WRITTEN	READ	REMARKS	
<PROJECT> <SCENE> <TAKE> <TAPE> <CIRCLED> <FALSE_START> <WILD_TRACK> <FILE_UID> <UBITS> <NOTE> <BEXT> <USER>		✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	Max 32 chars (EDIT) Max 12 chars (EDIT) (EDIT) = Work. Folder (max 32) (EDIT) = Orig. Reference (BEXT) = UBITS (BEXT) Max 64 chars (EDIT) = BEXT Chunk (BEXT)	
<SPEED>	<SPEED> <SPEED> <SPEED> <SPEED> <SPEED> <SPEED> <SPEED> <SPEED> <SPEED> <SPEED> <SPEED>	<NOTE> <MASTER_SPEED> <CURRENT_SPEED> <TIMECODE_RATE> <TIMECODE_FLAG> <FILE_SAMPLE_RATE> <AUDIO_BIT_DEPTH> <DIGITIZER_SAMPLE_RATE> <TIMESTAMP_SAMPLES_SINCE_MIDNIGHT_HI> <TIMESTAMP_SAMPLES_SINCE_MIDNIGHT_LO> <TIMESTAMP_SAMPLE_RATE>	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	= Frame Rate = DF or NDF = Sample Rate = 16 or 24 = Sample Rate = SMPTE Hi (BEXT) = SMPTE Lo (BEXT) = SMPTE Rate
<SYNC_POINT_LIST> <SYNC_POINT> <SYNC_POINT> <SYNC_POINT> <SYNC_POINT> <SYNC_POINT> <SYNC_POINT>	<SYNC_POINT_TYPE> <SYNC_POINT_FUNCTION> <SYNC_POINT_COMMENT> <SYNC_POINT_LO> <SYNC_POINT_HI> <SYNC_POINT_EVENT_DURATION>	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓		
<HISTORY> <HISTORY> <HISTORY> <HISTORY>	<ORIGINAL_FILENAME> <PARENT_FILENAME> <PARENT_UID>	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	= Original Filename	
<FILE_SET> <FILE_SET> <FILE_SET> <FILE_SET> <FILE_SET>	<TOTAL_FILES> <FAMILY_UID> <FAMILY_NAME> <FILE_SET_INDEX>	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	= OriginatorReference = Scene/Take	
<TRACK_LIST> <TRACK_LIST> <TRACK> <TRACK> <TRACK> <TRACK> <TRACK>	<TRACK_COUNT> <CHANNEL_INDEX> <INTERLEAVE_INDEX> <NAME> <FUNCTION>	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓		
NOTES:		(BEXT) = same as in BEXT chunk (EDIT) = user editable		✓ = YES ✗ = NO	

New firmware versions for the NAGRA *Seven* will be posted on our web site www.nagraaudio.com from time to time when new features or important updates are available. Installing these updates is a very simple and automated procedure.

Updating the firmware of the recorder will NOT affect any recordings on either the internal or external memories. Internal settings of the machine will not be lost either unless specifically stated on the software bulletin.

Firstly, copy the file named **Nseven_0100_xxx.nbu** from our web site to the root directory of an SD card. This can be done while the Nagra *Seven* is connected to the PC with a USB cable, simply save the file directly to the EXTERNAL SD card of the machine (Do not save it to the internal micro SD card).

Once this is completed, put the SD card into the slot and switch on the machine and follow the on-screen instructions, or in the latter case simply disconnect the USB cable from the machine. The upgrade is fully automatic.

If the upgrade file is left on the SD card the machine will perform the operation each time the machine is switched on, so once completed it is recommended to remove the “.nbu” file from the SD card

ANNEX V

Explanations of some important “Cyber terms”

Dynamic Host Configuration Protocol (DHCP) is a network application protocol used by devices (*DHCP clients*) to obtain configuration information for operation in an Internet Protocol network. This protocol reduces system administration workload, allowing devices to be added to the network with little or no manual intervention.

Domain Name System (DNS) is a hierarchical naming system for computers, services, or any resource participating in the Internet. It associates various information with domain names assigned to such participants. Most importantly, it translates domain names meaningful to humans into the numerical (binary) identifiers associated with networking equipment for the purpose of locating and addressing these devices world-wide. An often used analogy to explain the Domain Name System is that it serves as the "phone book" for the Internet by translating human-friendly computer hostnames into IP addresses. For example, *www.example.com* translates to *208.77.188.166*.

Ethernet is a family of frame-based computer networking technologies for local area networks (LANs). The name comes from the physical concept of the ether. It defines a number of wiring and signaling standards for the Physical Layer of the OSI networking model, through means of network access at the Media Access Control (MAC) /Data Link Layer, and a common addressing format.

File Transfer Protocol (FTP) is a network protocol used to transfer data from one computer to another through a network such as the Internet. An FTP client may connect to an FTP server to manipulate files on that server.

Internet Connectivity Establishment (ICE) is a technique used in computer networking involving network address translators (NATs) in Internet applications of Voice over Internet Protocol (VoIP), peer-to-peer communications, video, instant messaging and other interactive media. In such applications, NAT traversal is an important component to facilitate communications involving hosts on private network installations, often located behind firewalls.

Internet Protocol (IP) is a protocol used for communicating data across a packet-switched internetwork using the Internet Protocol Suite, also referred to as TCP/IP. IP is the primary protocol in the Internet Layer of the Internet Protocol Suite and has the task of delivering distinguished protocol datagrams (packets) from the source host to the destination host solely based on their addresses. For this purpose the Internet Protocol defines addressing methods and structures for datagram encapsulation. The first major version of addressing structure, now referred to as Internet Protocol Version 4 (IPv4) is still the dominant protocol of the Internet, although the successor, Internet Protocol Version 6 (IPv6) is being deployed actively worldwide.

Local area network (LAN) is a computer network covering a small physical area, like a home, office, or small group of buildings, such as a school, or an airport. The defining characteristics of LANs, in contrast to wide-area networks (WANs), include their usually higher data-transfer rates, smaller geographic range, and lack of a need for leased telecommunication lines.

Network Address Translation (NAT) is a general term for techniques that establish and maintain Internet protocol connections traversing network address translation (NAT) gateways, which break end-to-end connectivity. Intercepting and modifying traffic can only be performed transparently in the absence of secure encryption and authentication.

Real Time Protocol (RTP) is a protocol designed for end-to-end, real-time, transfer of stream data. The protocol provides facilities for jitter compensation and detection of out of sequence arrival in data, which are common during transmissions on an IP network. RTP allows data transfer to multiple destinations through IP multicast. RTP is

regarded as the primary standard for audio/video transport in IP networks and is used with an associated profile and payload format.

Real Time Control Protocol (RTCP) is a sister protocol to the Real Time Transport Protocol, The primary function of RTCP is to gather statistics on quality aspects of the media distribution during a session and transmit this data to the session media source and other session participants

Session Initiation Protocol (SIP) is a signaling communications protocol, widely used for controlling multimedia communication sessions such as voice over Internet Protocol (VOIP) networks. The protocol defines the messages that are sent between endpoints which govern establishment, termination and other essential elements of a call. SIP can be used for creating, modifying and terminating sessions consisting of one or several media streams.

Session Traversal Utilities for NAT (STUN) is a standardized set of methods and a network protocol to allow an end host to discover its public IP address if it is located behind a NAT. It is used to permit NAT traversal for applications of real-time voice messaging, and other interactive IP communications.

Transmission Control Protocol (TCP) is one of the core protocols of the Internet protocol (IP), and is so common that the entire suite is often called TCP/IP. TCP provides reliable, ordered and error-checked delivery of a stream of octets (data packets) between programs running on devices connected to a local area network (LAN), intranet or the public Internet.

Voice over Internet Protocol (VoIP) is a methodology and group of technologies for the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet.

User Datagram Protocol (UDP) is one of the core members of the Internet protocol suite (the set of network protocols used for the Internet). With UDP, device applications can send messages, in this case referred to as datagrams, to other hosts on an Internet Protocol (IP) network without prior communications to set up special transmission channels or data paths.

Wireless gateway is a computer networking device that routes packets from a wireless LAN to another network, typically a wired WAN. Wireless gateways combine the functions of a wireless access point, a router, and often provide firewall functions as well; thus they are converged devices.

ANNEX VI

USB keyboard functions

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When an external keyboard is connected to the USB port, in addition to being able to type text, many of the machines functions can be directly accessed from the function keys. This template can be printed and cut-out along the dotted lines and placed above the function keys of a standard IBM style keyboard. It saves memorizing all the different key functions. It may also be useful to keep the list below handy for the other short-cuts.

Other USB Keyboard functions:

RETURN	-	Enter menu mode / press selected button
↑↓↔ keys	-	UP / Down / Left and Right
ESC key	-	Close window
TAB	-	Jump to next zone
Ctrl + TAB	-	Jump to next sheet in current window
Ctrl + SHIFT + TAB	-	Jump to previous sheet in current window
Ctrl + A	-	Select entire line while text editing
Ctrl + C	-	Copy entire line while text editing
Ctrl + D	-	Delete entire line / character string
Ctrl + R	-	Reset Modulometer max position
Ctrl + V	-	Paste entire line while text editing
Ctrl + X	-	Cut selected text
Home	-	Goto start of line / character string
End	-	Goto end of line / character string
Delete	-	Delete character
Backspace	-	Delete previous character
Ctrl + Delete	-	Delete to end of current line
Ctrl + Backspace	-	Delete to beginning of current line
F1 – F8	-	8 programmable shortcut functions (Icon selection)

DECLARATION DE CONFORMITE CE

DECLARATION OF CONFORMITY CE

FABRICANT: AUDIO TECHNOLOGY SWITZERLAND S.A., 1032 Romanel SUISSE
MANUFACTURER: NAGRAVISION S.A. KUDELSKI GROUP, 1033 Cheseaux, SWITZERLAND

APPAREIL : Nagra Seven
MODEL: Nagra Seven

NORMES APPLICABLES : **APPLICABLE NORMS:**

Champ électromagnétique rayonné EN 55022 Cl. B
Radiated electromagnetic field EN 55022 Cl. B

Perturbations conduites sur secteur EN 55022 Cl. B
Disturbance voltage on mains terminal 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 transitoires électriques rapides en salves sur
câble d'alimentation EN 61000-4-4 level 2 (1000V)
Immunity to burst on mains line EN 61000-4-4 level 2 (1000V)

Immunité 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)

Immunité aux ondes de choc EN 61000-4-5 level 2 (1000V)
Immunity to surge EN 61000-4-5 level 2 (1000V)

Cheseaux 2ème trimestre 2014
Cheseaux 2nd quarter 2014

Thierry FRANK

Head of R+D

Gestion des déchets d'équipements électriques et électroniques
Regulation on waste electrical and electronic equipment
En fin de vie de l'appareil, amener à un centre de récupération des déchets.
Please dispose of through an appropriate recycling Centre.

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