

CHAPTER 4

OPERATING THE NAGRA V

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PREPARATION OF THE MACHINE

FORMAT OF A HDD


The HDD is already formatted when purchased. The format is actually FAT 32 and is compatible with all PC's. HDD's should generally be formatted FAT 32 as formatting to FAT 16 will limit their size to 2GB of usable space.

Once used on a Nagra-V, a "NAGRAV" folder will be automatically created.



Name	Size	Type	Modified
NAGRAV		File Folder	18.11.2002 13:50
Recycled		Recycle Bin	14.03.2003 09:46

The other information in the root are not necessarily needed but will not affect the Nagra-V. Inside the "NAGRAV" folder, the following information is stored:



Name	Size	Type	Modified
112001.WAV	2'821 KB	Wave Sound	28.10.2002 10:18
112002.WAV	12'320 KB	Wave Sound	28.10.2002 10:18
112003.WAV	12'250 KB	Wave Sound	28.10.2002 10:19
112004.WAV	6'027 KB	Wave Sound	28.10.2002 10:20

Each file is recorded as a "nnnxxx.wav" Broadcast Wave Format file. "nnn" stands for the or HDD number, "xxx" stands for the index number. All information such as record date and time, Time Code stamp, 24 or 16 bit, sampling rate etc. are stored in the chunk of the file.

SETTING THE INTERNAL CLOCK

When the NAGRA V is first powered on, certain settings need to be made, namely those of the date and time. This information will be used to stamp the files recorded to the HDD in the same way a PC does for a diskette. These settings have no bearing on the internal time code system (if fitted).

TIME AND DATE

The NAGRA V is equipped with a lithium battery (Type CR2032), which keeps the date and time of the machine in memory. Naturally this needs to be changed if you change time zones. It is also important to set this from time to time as such clocks tend to drift a bit. In order to set the time and date, in the menu mode move to the Other settings menu and into the **DateTime** menu. From here moving to the right makes it possible to set the Date and Time using the arrow keys to select the correct values and Execute to store them.

POWERING OF THE MACHINE

(-Ve is ground)

GENERAL

The NAGRA V is designed as a portable recorder for in the field “On-Location” sound acquisition. Therefore it is designed to operate using autonomous battery powering. Today there are many different types of batteries or accumulators available and the NAGRA V can be powered in various different configurations.

Lithium Ion Pack	(NV-LIB # 70 31110 000)
External power	
Dry cells	(NA-BB8B # 70 19111 000)
Other rechargeable cells	

This section is designed to cover all aspects of the different powering possibilities, indications and precautions that should be observed.

NV-LIB (Lithium Ion battery box/charger)

This accessory can only be used with a Nagra Lithium Ion pack (NV-LISET # 2098260000). Which gives 65Wh of power. This powering solution is the lightest possible solution will give an autonomy of approximately 7 hours. The NV-LIB is equipped with a charger circuit for the NV-LISET cells and can be connected to an AC power supply (NV-PSU) via a standard DC connector. The charge time is approximately 7 hours because Lithium Ion cells do not like to be charged rapidly in the way Nickel Cadmium cells can. The charger can be connected while the machine is being used which will prevent the power in the battery pack from being consumed. It will power the machine AND charge the battery pack at the same time, but the charging will be at a reduced rate.

Releasing the two plastic clamps towards the rear of the recorder allows the battery pack to be changed very quickly. The memory of the internal time code generator will be kept for a few minutes while the battery pack is being replaced. However the machine will need to be “Re-Booted” once the new battery pack is installed.

NOTE: Only a NAGRA certified Lithium Ion pack should be used.

DRY CELLS

The NAGRA V can also be operated using standard “D” cells which can be found all over the world. However if “D” cells are to be used the machine needs to be equipped with the 8 cells box (NA-BB8B # 70 19111 000). This option naturally adds quite a lot of weight to the machine. In this event the user should select “DRY CELLS” in the battery menu.

To install the batteries remove the battery box on the rear of the machine by lifting the plastic battery box clamps on each side of the rear of the machine and remove the battery box. Open the upper lid of the battery box by squeezing the closing mechanism. When installing batteries into the battery case, be sure that they are installed with the correct polarity according to the sticker inside the battery case (+ve terminals towards the right-hand side of the machine).

NA-DC2(NiCd or NiMH battery box / charger)

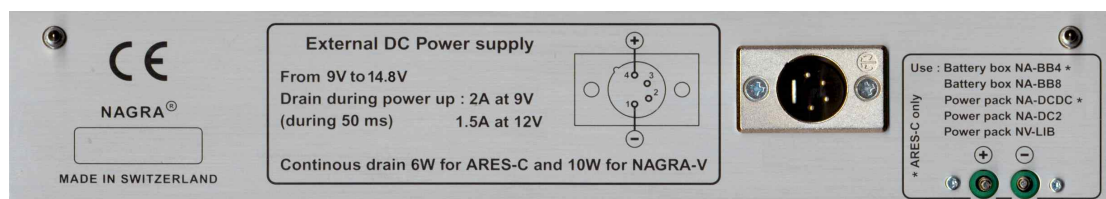
This accessory can be used with either 8 individual “D” size NiCd / NiMH cells or alternatively the NA-ACC (#98253) accumulator sticks. If the NA-DC2 is connected to the external transformer, but the NAGRA-V is either OFF or totally disconnected then the cells inside the NA-DC2 will be recharged if the voltage is below minimum or if the white button is pressed. The charging time for eight cells (or 2 sticks) is approximately 6 Hours (Charge current 0.8A). Charging is automatically stopped when the internal temperature of the cells increases by 6°C with respect to the ambient temperature.

If the NAGRA-V is switched on while the batteries are connected to the external supply, then the power will be supplied by the cells and not by the external supply. When the cells become flat the charger will switch on but in this case will only charge the cells slowly as most of the power being supplied to them will be used by the machine. If the machine is then turned OFF, normal charging will resume.

The green LED on the end of the case indicates that the external DC supply is present. When both the green led and the red led are alight the internal cells are being recharged.

EXTERNAL POWER

The NAGRA V is equipped with a 4 pole male XLR connector, which can be accessed by removing the battery box. The pinning of this connector is between pins 1 (-ve) and 4 (+ve) corresponding to the standard XLR powering configuration. This input will accept from 9 to 14.8 volts. The NV-PSU power supply will power the NAGRA V but an adapter needs to be used.



Standard “Camera” battery belts can be connected directly to this point assuming their voltage is within the accepted range.

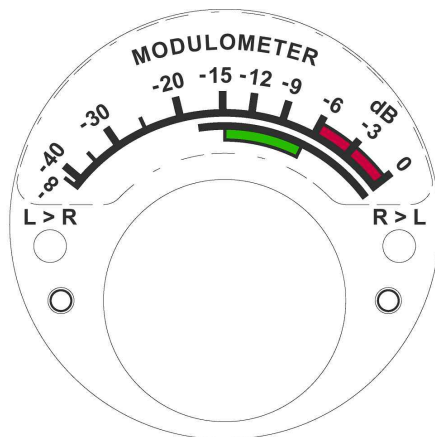
INDICATIONS

BATTERY MENU

In the menu mode of the machine there is a menu called “BAT”. This indication is purely a counter, which counts in Hours and minutes since the last time it was reset. It will only count while the machine is powered. It is designed to give the user a method of monitoring how long the current battery pack has been used. The user can reset this each time the external battery pack is replaced. It will also be reset whenever the selection of the type of battery is changed.

MODULOMETER

Indication of the state of the batteries / cells installed in the removable battery compartment can be seen at any time by selecting BATT on the meter on the front panel of the machine. It is important to select the correct battery type in the Battery menu so that the modulometer indication and the low battery warnings are correctly adapted to the type of batteries installed.



The Green portion of the modulometer scale indicates a “fuel gauge” and will approximately indicate the current state of the supply. When the supply becomes exhausted, a LOW BAT indication will appear on the display and a beep will be heard on the headphones.

This will be repeated every minute until the machine cuts off. The cut off point varies depending on the type of batteries selected in the Battery menu.

BEEP WARNING

When the batteries of the NAGRA V get flat, a double beep will be heard in the headphones (or on speaker if selected) once per minute. This will start when the supply voltage drops to the lower limit according to the battery type selected. The beep warning is also accompanied by a “Low Bat” indication on the LCD display on the front panel of the machine as well as the POWER flag on the top of the display.

NOTE: Before power is cut off completely the machine will stop the current recording and close the file correctly before switching off.

THE POWER DELAY MODE

Because the NAGRA V has a PC aboard, it needs to “boot” each time the power is turned on. This process takes a little less than 30 seconds and can be a nuisance if the machine is accidentally switched to the STOP position. To avoid this potential inconvenience, the POWER DELAY menu in the OTHER settings menu allows the user to pre-programme how long the machine will remain in the stop position before a complete power down is performed.

If the MANUAL position is selected then the machine will remain powered up indefinitely until there is insufficient power supplied to the unit. In this position the only way to manually stop the machine is to press the SHIFT key while moving the main function selector to the STOP position and then keeping the SHIFT key pressed for an additional 2 seconds. The machine will then shut down completely.

USING THE NAGRA V

New HDD's need to be formatted before use. Hard disks supplied from the factory are already formatted FAT 32.

INSTALLING THE HDD DRAWER



Keep the machine switched off and insert the drawer into the machine as shown in the photograph above. Before inserting completely, verify that the little switch on the drawer is in the off position, insert fully and put the little switch to on. The switch also mechanically locks the drawer in the bay.

ATTENTION: NEVER REMOVE A HDD WHEN THE MACHINE IS SWITCHED ON. HOT SWAP IS NOT POSSIBLE.

Removing the HDD drawer

Always turn off the machine before removing the drawer. Put the little switch on the drawer to the off position and remove the drawer.

RECORDING

SETTINGS PRIOR TO RECORDING

Various settings of the machine should be made before the recording starts. Naturally these settings are stored in memory but they may need to be checked before a recording is started.

The most important settings to be made are:

- Time code
- Sampling Frequency
- Reference Frequency
- Recording Format
- Input selection
- Pre-recording time

All of the above settings are made in the MENU mode of the machine.

TIME CODE

The time code should be set according to the required frame rate, recording source and user bits mode. See Time Code chapter for full explanations of all these different settings.

SAMPLING FREQUENCY / REFERENCE FREQUENCY

Sampling frequency NV-96K can be set to either 44.1kHz or 48kHz (or 88.2kHz or 96kHz if the High Sampling option is installed). The sampling frequency can be increased/decreased by 0.1% (e.g. to record 48.048 kHz) by setting the reference frequency to the MASTER +0.1% position. Otherwise, during the recording process the reference frequency must be set to the MASTER position. (The reference frequency selections are only available for machines fitted with the time code option NV-TC).

RECORDING FORMAT

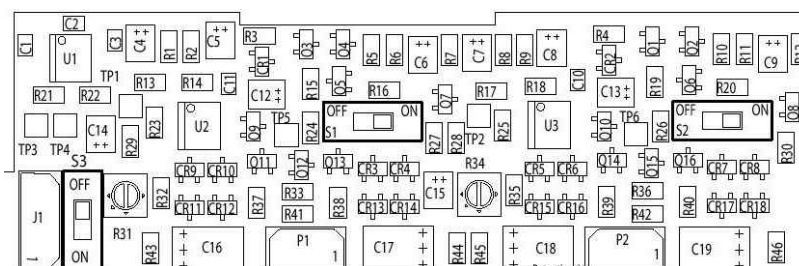
The NAGRA V normally records a 24 bit digital word length. However in certain circumstances, it may be necessary to record only 16 bits so as to remain compatible with digital post production equipment which cannot handle the full 24 bit signal. In this case, the signal on the HDD will be a true 16 bit signal. (It is also possible to re-dither a 24 bit signal during playback to transform it to 16 bits – see Output menu). Recording at 16 bits will increase the recording time respectively.

INPUT SETTINGS

Before making a recording it may be necessary to select the audio input menu to change the desired configuration. The most important selection here is the choice between ANALOGUE or DIGITAL. If the input is a digital input then the special cable NV-CDI # 7031140000 must be used.

In the analogue mode, there are 4 possible signal inputs. The first two are the standard microphone inputs and there are two auxiliary inputs located on the 15 pole miniature “D” connector. In the input menu it is also possible to select to which channel of the HDD each of these four inputs is directed. Each can be set to Left, Right or Both channels as required.

Also the optional limiters can be disabled or enabled via the menus. The ganging of the two limiters is only possible by setting the switch S3 to the corresponding position.



The switches S1 and S2 must stay in the ON position. Only in this way can they be disabled or enabled via the menus. If both switches are in the OFF position, the limiters will not be enabled, even if in the menus, they were selected ON.

PRE-RECORDING MEMORY

The pre-recording memory can be set to record into RAM memory a pre-set length of time while the machine is in the TEST position. This means that when the machine is put into RECORD the previous "X" seconds prior to the recording function being operated, will automatically be recorded to the HDD, with the corresponding time code. This eliminates the need to worry about pre-rolls as they will be recorded automatically. This time can be set to 1, 3, 5, 10, 15 or 20 seconds.

MICROPHONE SELECTION

The NAGRA V allows Dynamic, Phantom +48V or "T" power microphones to be selected by means of the toggle switch above each input connector. The sensitivity of the microphone can also be selected using the two sensitivity switches located on the front panel of the machine. The level is then adjusted for each microphone independently with the potentiometers on the front of the machine.

MAKING THE RECORDING

The procedure described below covers the important steps necessary in order to record using the NAGRA V. It does not give indications as to the type of microphones or their placement but purely the steps that should be followed.

Initially ensure that the machine is either connected to an external power source or that the battery box is fitted. Verify that the HDD drawer is inserted and turned on.

Select the desired powering using the selectors above the connectors according to the microphones being used. Connect the microphone(s) to the input connectors on the left-hand side of the machine. Once this is done set the microphone sensitivity selectors, located under the microphone potentiometers on the front panel according to the type of microphone being used. The sensitivity selections for a specific microphone are indicated in the documentation of the microphone. (0.2 μ V for dynamic and 1 and 4mV for condenser microphones).

At this point the selection of one of the three filters can be selected if required. The three filters are LFA (Low Frequency Attenuation), SPEECH and FLAT, the curves for these are all indicated in chapter I of this manual.

Verify the settings listed above concerning the sampling frequency, time code etc.

Verify also if there is a need to use the limiters (optional).

Set the EE / AUTO / TAPE selector to the AUTO position to allow monitoring of the audio on the headphones.

Set the main function selector of the NAGRA V to the TEST position. The RED led will flash to indicate that the machine is in the record mode (Pre-record) assuming this has been programmed. If the pre-record is not programmed then the led will remain off.

Adjust the microphone input potentiometer (Left and / or Right) on the front panel until an indication is shown on the modulometer. If no indication is shown when speaking into the microphone refer to chapter V "Problem Solving" of this manual. Check that the AUX. IN / LINE OUT potentiometer is not in the fully counter clockwise position or in the OFF mode (menus). Adjust the headphone level using the headphone output level potentiometer located to the right of the headphone connector.

Once audio is heard in the headphones and is correctly indicated on the modulometer simply move the main function selector to the RECORD position. The contents of the pre-record memory will then immediately be recorded to the HDD along with the corresponding time code according to the selected time code settings.

Pressing the STOP "■" key at any time during the recording will cause a new "INDEX" to be created on the HDD, although there will be no audible break in the audio signal. This is very useful for locating special events after the recording has taken place. When the recording is completed return the main function selector to the TEST or STOP position.

RECORDING AN ANALOGUE LINE INPUT SIGNAL

Recording a line input signal is performed in exactly the same manner, except the signal is fed to the miniature 15-pole "D" connector and the level is adjusted using the AUX pot on the front of the machine. A NAGRA made line input cable is available with either female or male XLR connectors.

RECORDING A DIGITAL INPUT SIGNAL

Set the input menu to the AES position. Connect the special digital input cable to the 15 pole miniature "D" connector. Set the reference frequency menu according to the digital input supplied. If this is not set then the internal clocks will not be synchronised to the incoming AES signal and there will be "clicks" in the audio due to missed samples. (The Red LED will flash as a warning if this is the case).

MONITORING THE AUDIO SIGNALS

AUDIO MONITORING ON HEADPHONES

Headphones having an impedance from 4Ω to 100Ω are ideal for operation with the NAGRA V. They should be connected to the headphone socket on the right side of the machine and the audio level is adjusted using the potentiometer next to the connector.

NOTE: The line input potentiometer on the front of the machine is electronically in series with the headphone level pot. Therefore if it is set to the ZERO position then there will be no signal on the headphone output.

During recording the headphones will monitor the incoming audio signal on the selected inputs.

Pressing the BAT switch at any time will feed the audio signals to the headphones in the mono mode while the switch is activated as long as the monitoring menu is set to the STEREO position. If the monitor menu is set to the TOGGLE position then the headphone monitoring will switch from MONO to STEREO each time the switch is pressed. In the MONO position then the monitoring will be in MONO all the time. When in STEREO position, the inputs can also be monitored as SOLO. Pushing the switch L max. R to L or to R will reproduce on the headphones only the left channel or the right channel in mono. This is only possible on machines equipped with a box motherboard 9131 300 000 B or higher. If needed, the older board 91 31 300 000 A can be modified by your local agent.

AUDIO MONITORING ON THE INTERNAL SPEAKER

The NAGRA V is fitted with an internal speaker that enables the user to listen to the recordings on the drive. The internal speaker can be turned ON or OFF in the Monitor menu as required. It is also possible to select the AUTO position. In this mode the speaker will be in the ON position during playback and will be muted in the TEST and RECORD positions.

A shortcut has been implemented to allow the user to rapidly change the speaker operation mode. Pressing the SHIFT key and simultaneously pressing the BAT switch will toggle between the three possible operating modes of the loudspeaker consecutively.

VISUAL MONITORING ON THE MODULOMETER

The modulometer of the NAGRA V has several different operating modes and can indicate different readings. These are chosen partially in the menus of the machine and partially using the selector switches next to the modulometer. Equally the modulometer is fitted with two LEDs which also can be selected to have different operating modes.

Machines equipped with a box motherboard 9131 300 000 B have the possibility to set the modulometer before or behind the line output potentiometer (electronically speaking). Machines with the previous board 9131 300 000 A if needed can be modified by your local agent. In the case that the modulometer is set before the line output potentiometer, the menu selection LEV.IN & LEV.OUT no longer exist. The changing of the jumpers can only be made

by your local agent as some hardware options need to be enabled or disabled, otherwise the modulometer reading will be wrong.

First of all, in the menus, the source of the modulometer can be selected to indicate the Input or output signal level. In the AUTO position it is set to show the input level during TEST and RECORD and the output level during PLAYBACK.

The operating mode of the two leds can also be selected to either STEREO or TWO CHANNEL operation. In the stereo mode the leds indicate which channel has the highest signal level. In the two channel operation the leds indicate the actual level on the left and right channel respectively allowing verification that the signal arrives on the respective input.

The three position switch "L / MAX / R" below the modulometer will force the pointer to indicate the selected channel. In the MAX position it will always indicate the greatest signal level of the two channels (which is identified by the corresponding led, when set to the stereo mode.)

This is not anymore the case if you have purchased a NAGRA-V with double modulometer. The same switch will only select the headphone outputs between Stereo, Solo left or Solo right.

The pointer can also indicate the highest level achieved since the last reset by setting the MEM / NORM / RESET switch to the MEM position. In the NORM position the modulometer indicates as above and in the RESET position the highest level in memory will be reset to zero.

CAMERA RETURN MONITOR FEATURE

When sound engineers are recording in video applications, the audio is frequently recorded directly onto the audio tracks of the video camera. In this case the engineer has no feedback from the camera to verify that the recording is being made correctly. The Camera return input on the right side of the NAGRA V allows the headphone output (or line output) of the camera to be connected back into the NAGRA V so that the sound engineer can verify the recording quality on the video camera.

In this case the NAGRA V is being used principally in the role of a small mixer, but of course can still record the audio in full 24 bits if required to the HDD.

If the camera return monitoring input is to be used, it must be selected in the MONITOR menu, by executing the CAM RET position. Moving to the right gives the operator the possibility to adjust the headphone level for this input by +6dB to -12dB.

The camera return signal will be fed to the headphones whenever the user selects the TAPE position of the EE / AUTO / TAPE switch.

REPLAYING RECORDINGS

If the replay function is chosen immediately after a recording, then the machine will immediately play back the last recorded take. If PLAY is selected once the data has been read the machine will automatically start playing back the first take on the HDD which was recorded in the same format as the machine is currently set.

That is to say if the machine is set to 24 bit 48kHz sampling, and the first track to be replayed will be the first track on the HDD which was recorded at 24 / 48 kHz. If there are no takes recorded at the same bit rate as the machine is currently set then the machine will just sit in the same place.

When the main function selector is set to the play position, the fast forwards, fast rewind and skip keys are all activated. (See full description of each function in chapter 1)

ERASING RECORDINGS

It is possible to erase either individual takes, or from any point to the end of the HDD using the directory menu.

In the directory menu, all the current recordings are displayed one after the other in a list, in the same way as files are listed on the directory of a diskette. If the EXE key is pressed while in this menu a sub-menu will appear and gives the user the possibility to delete the current take, or to the end of the HDD. It also allows the takes to be renumbered if desired (See Renumbering Takes). Pressing execute on any of these choices will prompt the "SURE?" question to avoid accidents. Executing the ABORT position returns to the directory menu.

RENUMBERING TAKES

If takes have been erased from the HDD it may be useful to renumber the takes so that all the numbers run consecutively. If necessary go to the directory menu and display the take number from which the renumbering is to start. Press the EXECUTE key and then choose the option RENUMBER to start renumbering from the current position to the end. The REN. ALL. Function will automatically renumber all the recorded takes. Naturally this operation will have no effect on the time code of the recordings.