nABC+
USER MANUAL

suonobuono

Foreword

Suonobuono is my personal attempt to share innovative products with other music enthusiasts like me. Supervising all aspects of this Company, from early design to products manufacturing, from marketing to logistics, has taken me great deals of time, passion and energy. However, musicians like you, who care about creativity and support independent realities make it all worth it.
THANK YOU!

I hope that you will enjoy your new nABC+ and really recommend reading this short manual to get the most out of it. I did all my best to deliver a good product and I look forward to your comments and suggestions.

Stefano Sorrentino
Founder, Suonobuono AB

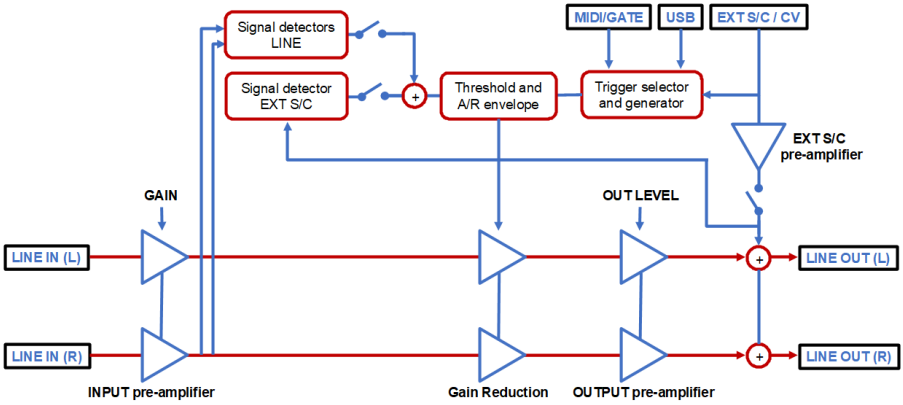
1. Contents and functional overview

The nABC+ original package includes the following items:

- 1 x nABC+
- 1 x TRS to DIN MIDI cable
- 1 x USB 2.0 cable
- 2 x mini stands
- 1 x User manual

The nABC+ is a stereo sidechain compressor, where sidechain can be triggered in multiple ways. Depending on the selected **S/C SELECT Mode**, one or more sidechain triggers can be simultaneously used.

Even though the response of the compressor has been optimized for sidechain use, the nABC+ may even be used as a “traditional” compressor without sidechain. The analogue signal path has been calibrated for low distortion and to give a smooth dynamic response that resembles that of an analog synthesizer VCA, however the nABC+ can even be used as a warming unit by saturating its amplifier stages.



The touch-based control panel and rotary encoder allow adjusting all audio parameters with a single hand. Audio parameters may even be controlled by MIDI or stored in user-defined presets, also recalled by MIDI.

Power is provided via a USB 2.0 port, which may be connected to a USB power adapter, a power bank or any other suitable USB host.

Two mini stands are provided to tilt the unit for desktop use. To mount them, screw them to the nABC+ using the provided washers, as shown in the figure.

⚠ Always use the provided washers when mounting the mini stands and don't tighten them too hard. Not doing so will likely crack the mini stands.

2. Connections

Line In – Connect one (for mono) or two (for stereo) ¼" line jacks. In case of balanced connections, a TRS jack should be used, with hot signal on tip.

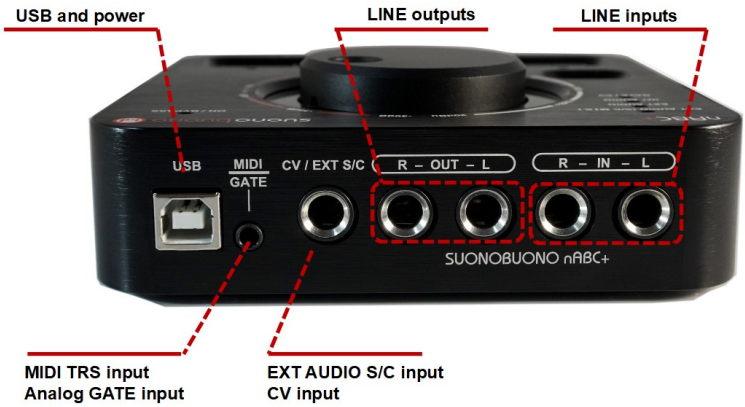
Line Out – Connect one (for mono) or two (for stereo) ¼" line jacks. In case of balanced connections, a TRS jack should be used, with hot signal on tip.

USB – this connection is needed to power the nABC+ from any suitable USB 2.0 compatible power supply, host or power bank, using the provided USB cable. Additionally, you may use the USB port to exchange MIDI-over-USB messages with a DAW.

MIDI/GATE – this port serves two purposes: receiving analog Gate signals using a mono 1/8" patch cable (not included) when in GATE/CV **S/C SELECT Mode** or receiving MIDI using the provided TRS to DIN cable in all remaining **S/C SELECT Modes**.

The DIN side of the TRS to DIN MIDI cable should be connected to a MIDI OUT interface, via a MIDI extension cable (not included). It is also possible to directly connect the 1/8" TRS MIDI to another TRS MIDI OUT using a stereo cable. However, note that not all manufacturers use the same TRS MIDI standard and compatibility is not guaranteed. Good luck!

CV / EXT S/C – this port serves two purposes: receiving Control Voltage signals when in GATE/CV **S/C SELECT Mode** and receiving Sidechain audio mono signals when one of the "EXT AUDIO" **S/C SELECT Mode** is used.



A 1/8" to 1/4" adapter (not included) is needed for connecting with 1/8" Eurorack patch cables.

3. Panel, menus and settings

The panel is managed by 6 touch pads and one encoder with pushbutton.

Normally, all *Menu pads and indicator LEDs* are turned off. The LED ring visualizes the preamplified **LINE IN** signal level (left semi-circle, green) and the amount of gain reduction (right semi-circle, red).

Power On/Off

When power is received over USB, the nABC+ automatically turns on. The Power/bypass indicator LED will be lit.

To turn the nABC+ off, press the knob pushbutton for 3 seconds. The Power/bypass indicator LED will turn off. The nABC+ automatically turns off even when receiving a “power off” command over USB, typically when a host is turned off.

To turn it on again, press the knob pushbutton once more. The nABC+ will reuse the same audio settings from the last time it was regularly turned off.

⚠ Even when turned off, the nABC still consumes a small amount of power in order to monitor a potential turn on command. To maximize the nABC lifetime and reduce energy waste, it is recommended to detach the power supply or the USB cable when the nABC is not going to be used for longer time.

Bypass

To toggle bypass, press momentarily the knob pushbutton. In bypass mode, gain reduction is not applied but preamplifiers are still engaged.

Overload

The On/Bypass LED also shows when the internal analogue circuits are overloaded. Since the nABC+ can be used as a warming unit, overload is not necessarily a bad thing, but it is useful to know when it kicks in.
Overload is measured at two points: the first one at the output of the LINE input preamplifier and triggers a yellow On/Bypass LED. The second one is at the output of the LINE output preamplifier and triggers a red On/Bypass LED.

Saturating the signal by using the LINE input preamplifier (yellow LED indication) gives an effect that is similar to any saturation pedal, which uniformly distorts the signal. On the other hand, saturating the signal after gain reduction, with the output preamplifier, gives a more dynamic distortion that depends on the actual gain reduction. This is indicated by the red LED. Which type of saturation/distortion fits your sound, if any at all, is something that I recommend that you experiment with.

⚠ When signal saturation happens at the output of the LINE input preamplifier, the On/Bypass LED turns yellow. When signal saturation happens at the output of the LINE output preamplifier, the On/Bypass LED turns red.

Menu Mode

The main parameters on the menu are accessed by shortly touching the corresponding pad, adjusting the parameter by turning the knob, and then touching again the same pad to exit the menu.

Panel parameter	Functionality	Notes
ATTACK	Compressor attack time	
RELEASE	Compressor release time	
THRESH	Compressor threshold	Only effective when sidechain is triggered by audio signals
RATIO	Compressor ratio	Only effective when sidechain is triggered by audio signals
GAIN	LINE Input gain	

⚠ The RATIO parameter ranges from 1:1 to -1:1. To achieve limiter-like operation (inf:1) the RATIO should be set to half range.

To access a parameter in the submenu, press the corresponding pad for one second. Once the corresponding pad led blinks, adjust the parameter turning the knob, and press the pad again to exit the menu.

Panel parameter (submenu)	Functionality	Notes
COMP SLOPE	Selection between hard/soft/linear/delayed compression slope	With hard and soft knee, the release follows a typical exponential decay. When linear is selected, release decays linearly (in dB). When delayed is selected, exponential release starts approximately 50ms later than with the other settings.
MIDI CH	MIDI channel	For USB and MIDI inputs

S/C DEPTH	Compressor maximum gain reduction	Applicable only when sidechain is triggered by GATE/ USB/ MIDI
LOAD	Select a preset to be loaded	Once the preset is selected, press the knob pushbutton to actually load it. The led ring will blink.
STORE	Select a preset to be overridden	Once the preset is selected, press the knob pushbutton to actually store it and override the previous preset. The led ring will blink.

Additional functions are reached by pad combinations:

Panel parameter	Functionality	Notes
OUT LEVEL:	Adjust the Output gain	Accessed by touching RATIO and GAIN and later turning the knob
EXT S/C preamplifier On/Off:	Engage the sidechain preamplifier	Accessed by touching GAIN and S/C SELECT and later turning the knob

All the audio parameters except the MIDI channel are also controlled via USB/MIDI and they send MIDI CC when adjusted. See Chapter 9 for details.

4. Sidechain selection and operation

The nABC+ operates in four different **S/C SELECT Modes** that are sequentially selected with the S/C SELECT pad.

	S/C SELECT Mode			
	EXT AUDIO (S/C MIX)	**EXT AUDIO**	**INT AUDIO**	**GATE/CV**
USB sidechain trigger, control change and program change	✓	✓	✓	✓
MIDI sidechain trigger, control change and program change	✓	✓	✓	✓
Analog GATE and CV				✓
External audio sidechain trigger	✓	✓		
Internal audio sidechain trigger			✓	
EXT audio signal mixed on line output	✓			

Depending on the selected **S/C SELECT Mode**, compression is triggered whenever a note is received via MIDI, USB, or when a positive voltage is detected on the analog GATE input. Compression may even be engaged when the audio signal level exceeds a set threshold on either the External sidechain audio input or the Line signal input, depending on the **S/C SELECT Mode**.

Multiple sidechain triggers can be combined, which is a pretty unique feature. The maximum combined gain reduction is circa 30dB.

1. **EXT AUDIO (S/C MIX)**
   Active sidechain inputs:

   - USB (via USB port)
   - MIDI (via MIDI/GATE port)
   - External audio (via EXT S/C port)

   Compression is triggered whenever a note is received via MIDI or USB. The compression depth is determined by the latest incoming note velocity, with incremental steps (in dB scale) from 0 to 127, where 127 corresponds to the value of the S/C DEPTH parameter.

   Additionally, sidechain is triggered whenever an audio signal is provided on the EXT S/C port and its level exceeds the THRESH parameter. The amount of compression is determined by the RATIO parameter. Note that the depth of compression triggered by the External Audio is determined by the combination of the THRESH and RATIO parameters and by the audio signal level applied to the External Audio input, while the depth of compression triggered by USB/MIDI is determined by the S/C DEPTH parameter and by the note velocity.

   Attack and release times are respectively determined by the parameters ATTACK and RELEASE.

When THRESH is selected, the ring shows the sidechain signal level in blue instead of the LINE input level in green.

The mono signal from EXT S/C port is mixed with the stereo output signal. This is very useful for saving mixer channels. If you prefer to not mix the EXT S/C signal on the output, you should use any other **S/C SELECT Mode.**

2. **EXT AUDIO**
   This mode is identical to **EXT AUDIO (S/C MIX)**, however the EXT S/C signal is not mixed on the output.

3. **INT AUDIO**
   Active sidechain inputs:

   - USB (via USB port)
   - MIDI (via MIDI/GATE port)
   - Line audio (via LINE IN L/R port)

   This mode is identical to **EXT AUDIO**, with the difference that the sidechain audio is read from the LINE signal itself, rather than the EXT S/C port. This is the configuration of a traditional compressor.

4. GATE/CV

Active sidechain inputs:

- USB (via USB port)
- MIDI (via MIDI/GATE port)
- GATE (via MIDI/GATE port)
- CV (via CV port)

In this mode, no audio sidechain is used. Instead, digital MIDI/USB or analog GATE/CV signals are used to trigger compression.

Note that the MIDI/GATE port is shared, therefore MIDI and Gate triggers cannot be used simultaneously. The nABC+ detects automatically whether the input signal is a MIDI signal or an analog Gate whenever **GATE/CV Mode** is re-selected. If you change your MIDI/GATE connection from MIDI to analog Gate, switch the **S/C SELECT Modes** until **GATE/CV** is selected again.

The compression depth is determined by the S/C DEPTH parameter. It can also be linearly controlled (in dB) by applying a control voltage to the CV port, where 0 Volt (or no connection) give compression equal to the S/C DEPTH parameter and 5 Volt give no compression.

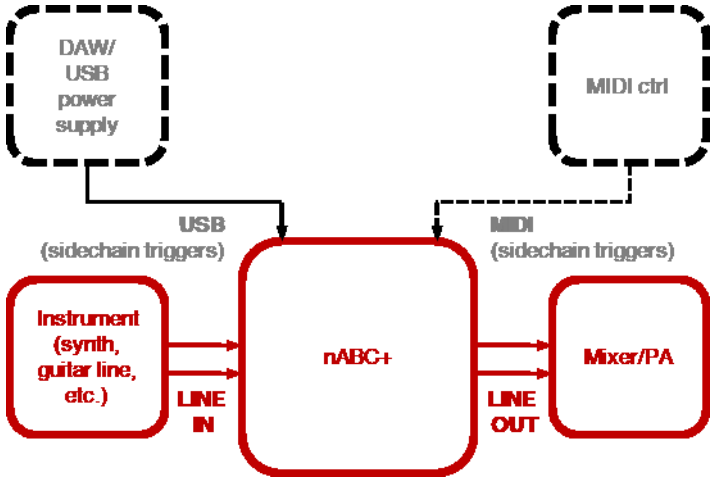
Compression is also triggered whenever a note is received via MIDI or USB, as in all **GATE/CV Modes**.

⚠ The nABC receives and transmits over USB in any of the above configurations. Additionally, it receives MIDI in any of the above configurations except for GATE/CV. Thus, audio parameters and programs can be remotely adjusted in real-time for all **S/C SELECT Modes**.

5. Typical use scenarios

Triggering the nABC+ using a DAW or digital sequencer/controller

The nABC+ reacts to sidechain triggers over USB in all **S/C SELECT Modes**, and also to MIDI triggers in all **S/C SELECT Modes** except for GATE/CV.



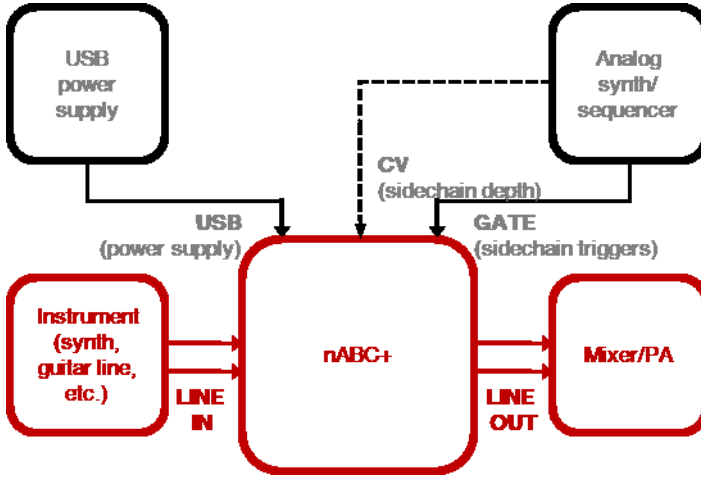
When connected to a computer or other USB host, the nABC+ will appear as a MIDI device. For recent OS such as Microsoft Windows 10 and Apple OS X, the nABC+ should appear without the need to install any driver. For other OS, it may be necessary to install a generic USB MIDI driver, please refer to the documentation of your OS.

In order to exchange MIDI messages, the nABC+ must be selected as a MIDI device in the DAW. Please make sure that the MIDI channel matches the one configured on the nABC+.

⚠ Unless you intend to send USB signals to the nABC+, it is recommended to power it with a good quality USB 2.0-compatible power adapter such as a phone charger. USB hosts such as computers sometimes have noisy power supplies and may introduce ground loop noise. If you experience ground loop noise, please read Section 8.

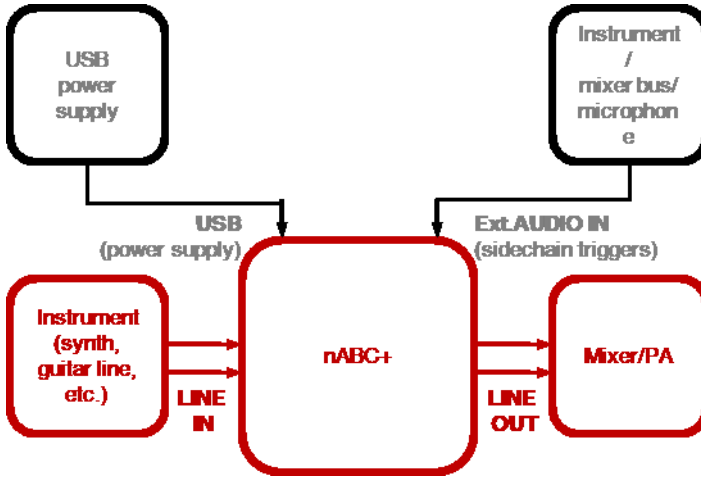
Triggering the nABC+ using an analog sequencer/controller/synth

When triggering the nABC+ with analog signals, the GATE/CV **S/C SELECT Mode** should be selected using S/C SELECT.



Triggering the nABC+ using an audio signal

When triggering the nABC+ with an external audio signal, one of the EXT AUDIO **S/C SELECT Modes** should be selected using S/C SELECT.



The nABC+ sidechain can even be triggered with the input line audio signal itself, as a traditional compressor would do. The INT AUDIO **S/C SELECT Mode** should be selected using S/C SELECT.

6. Onboard preamplifiers configuration

Compared to the original nABC and to most compressors, the nABC+ offers additional flexibility in terms of preamplification combined with gain reduction (see Chapter 0). This is handy for coloring/saturating or even overdriving your sound in dynamic ways.

- The **INPUT preamplifier** operates directly on the LINE input signal, offering up to 30dB gain controlled by the GAIN parameter. The green LEDs show the level of the preamplified signal. When input signals are weak, say below 0dBu, it is recommended to boost them above 10dBu for maximizing the dynamic range. Boosting signals above the supported range introduces analog signal saturation. Since this amplifier operates before the dynamic gain reduction, the saturation is applied uniformly to the signal.

- The **OUTPUT preamplifier** operates after the gain reduction stage, offering up to 20dB gain controlled by the OUT LEVEL parameter. Depending on the mutual settings of gain reduction and preamplifier gain, it is possible to create interesting dynamic saturation effects. For example, the signal can be made to saturate only when gain reduction is mild, while the signal is clean for larger gain reduction values. Since gain reduction is triggered by the sidechain, the saturation level of the signal can be made pumping together with the compression level.
  The **OUTPUT preamplifier** can also be handy for slightly saturating signal peaks, a feature that is useful for increasing loudness when using the nABC+ as a limiter or on the master bus. However, use it with care!

- The **EXT S/C preamplifier** provides 25dB gain for weak EXT S/C audio sources, such as a dynamic microphone. The gain cannot be adjusted, the preamplifier can only be engaged or disengaged (see Chapter 0). This preamplifier is good enough to raise the signal of a drum microphone, but it offers less audio quality than the ones on the LINE. Therefore, we recommend to disengage this preamplifier when not needed.

7. Quick tips

Because the nABC+ can also operate in different ways compared to traditional compressors, it offers new opportunities. We list some of them here and encourage you to find your own!

Ducking effect on beats

This is the classic ducking effect where a bass, synth, vocal, drums or even a bus is dynamically compressed during each beat. The most convenient way to do this is to trigger the sidechain using a sequencer or DAW (**S/C SELECT Mode** 1 or 2).

It is essential to adjust the trigger note length (in the DAW/sequencer) according to the desired compression duration, and to adjust the release time so that gain reduction vanishes between the beats. Short attack time are usually preferable. Adjust S/C DEPTH until the desired effect intensity is achieved.

⚠ A “trick” to obtain punchier ducking consists of triggering sidechain ahead of the beat, e.g., from just a few milliseconds up to a 1/16th step ahead. By playing with the attack time, one can progressively “empty” the sound ahead of the incoming beat, to create a subtle tension and maximize impact.

Arpeggios

Movement can be added to arpeggios and sequences by triggering sidechain on all or some of the steps. This is conveniently achieved by triggering the nABC+ with a DAW or sequencer (**S/C SELECT Mode** 1 or 2).

The time duration of the nABC+ sidechain trigger should be adjusted to be shorter or at most equal to the duration of the stepped note, which is easily achieved with a DAW and most sequencers. By playing with attack, release and trigger step duration times in the DAW/sequencer, a variety of effects are possible, from pseudo slap-delay to transient adjustments and syncopated effects.

To make the effect more interesting, sidechain can be triggered on a subset of the arpeggio steps, or sidechain parameters may be automated across steps using MIDI control change or CV to adjust gain reduction.

Reverb compression

An interesting effect is achieved by modulating the amplitude of a long tail reverb using the nABC+. This can conveniently be achieved by modulating a wet reverb insert with the nABC+, before mixing it back into the main mix. The actual modulation pattern can be programmed using a sequencer or DAW, to induce rhythmic movement in the reverb.

⚠ When applied to a stab or pad, the nABC+ can easily generate gated effects, typical of 90s electronic music.

CV modulation

Differently from most audio processors, the nABC+ is DC-coupled, which means that it can process continuous signals such as control voltage from analog synthesizers. This configuration

could be used to modulate the envelope of a VCF and create a filter ducking effect. Similarly, an LFO modulation can be rhythmically “choked” with the nABC+.

Sequenced audio compression

For specific sounds, such as drum hits, it is possible to program compression using the USB/MIDI/gate sidechain trigger rather than the traditional audio sidechain. Such unorthodox setup allows surprisingly effective results for example on kick drum, thanks to the very low distortion even with large gain reduction. Furthermore, the transient shape can be freely designed and even triggered slightly earlier than the actual hit, to achieve sharper attack profiles and unusual dynamics.

Using the nABC+ on a (master) bus

When a dedicated masterig unit is not available, the nABC+ offers a good alternative for tightening the mix. It is important to adjust the preamplifier and gain reduction stages to achieve the desired loudness and saturation.

While different approaches are possible, we propose the following:

1. Select the INT AUDIO S/C SELECT Mode and reduce ratio to 0, so that no gain reduction is applied. Remove gain from both LINE input and LINE output preamplifiers.

2. **Input preamplifier**: increase the input preamplifier GAIN until close to saturation, however maintaining a clean, undistorted sound.

3. **Compression**: increase the compression RATIO to infinite (half of the ring lit). Zero the ATTACK time and use short RELEASE, with just a couple of lit LEDs. Adjust the threshold so that peaks of the signal are compressed by 3-6dB, so that sound sounds tighter but not pumping. The amount of compression is however highly dependent on the type of material and target sound.

4. **Output preamplifier**: increase the OUT LEVEL until close to saturation (the ON/BYPASS LED will turn right during saturation) until the target level of loudness is achieved.

5. Re-adjust the other parameters until the desired sound is achieved.

8. About ground loops

Ground loops are sometimes experienced when audio equipment is powered over USB, especially when a USB host powers multiple devices or with certain ground configurations. Ground loops are not due to poorly designed devices. The noise is rather the unavoidable result of the dynamic variations of the current that flows over USB cables, which induce faint shifts in the ground level which are sufficient to be picked up by a high gain audio amplifier. Ground loop noise sounds “digital”, not like white noise, which resembles wind, or mains hum, which sounds like a constant low tone.

The good news is that ground loops can often be avoided with simple steps. Once the devices that introduce noise are identified, one may power them with individual USB power adapters or USB power banks instead of connecting them to a computer USB host. Using balanced cables between the nABC+ and other devices may also improve the noise level, if such devices support balanced connections. Changing the way power supplies and other equipment are plugged to different mains outlets may also impact the result. Often, these measures are sufficient to solve the noise problem.

If it is necessary to send USB messages to the nABC+ and the connection between the computer host and nABC+ is subject to a ground loop, it is possible to use USB isolators with external power supply, which may be bought online.

9. MIDI implementation

Presets are loaded by sending a corresponding MIDI Program Change message within range [1, 8]. Audio parameters are controlled by MIDI using the following Control Change messages.

Parameter	*CC*	*Range*
ATTACK	12	0-127
RELEASE	13	0-127
THRESH	14	0-127
RATIO	15	0-127 (64 for inf:1)
COMP KNEE	16	0-31 – hard knee 32-63 – soft knee 64-95 – linear release decay 96-127 – delayed release
S/C DEPTH	17	0-127
INPUT GAIN	18	0-127
BYPASS	19	0-63 – no bypass 64-127 - bypass
OUTPUT GAIN	20	0-127
SIDECHAIN GAIN	21	0-63 – off 64-127 - on

When a parameter is changed on the panel, the corresponding CC is transmitted over USB.

10. Troubleshooting

Compression cannot be triggered via MIDI/USB	• Verify that the MIDI channel on the sequencer and the nABC match. • Verify that S/C DEPTH is not 0
There is a “digital” noise on the output (ground loop)	• Disconnect all inputs and verify if the noise is still present. • Turn the nABC+ off and verify if noise is still there. • Power the nABC+ with a USB power bank and verify is the noise is still there. • Use balanced audio cables (TRS) and connect the nABC+ to other devices that support balanced signals.
There is a “white” noise on the output	• Disconnect all inputs and verify if noise is still present. • Reduce all gains and disengage the EXT S/C preamplifier • Switch the S/C SELECT Mode to verify whether noise comes from the LINE or from the EXT S/C

11. Technical specifications

Audio Input	2 x 1/4″, impedance balanced, 30 kOhm
Max Audio Input	+19.5dBu
Audio Output	2 x ¼”, impedance balanced, 400 Ohm
Max Audio Output	+19.5dBu
External Sidechain Audio Input:	1 x 1/8”, max 20dBu, 50kOhm, unbalanced
External Control Voltage Input:	1 x 1/8”, 0-5V, unipolar (10V is tolerated)
Gate input:	1 x 1/8”, 0-5V, unipolar (10V is tolerated)
MIDI input	1 x 1/8” TRS (DIN to TRS cable is included)
USB	Type B, 2.0
Frequency Response	20Hz-20kHz, +0.5, -0.5dB
LINE THD+N	Typical <0.035% (A), <0.04% (unweighted); @1kHz, 0dBu, no gain reduction nor boost
Compressor Threshold Range	-20dBu to +20dBu
Compressor Ratio	1:1 to -1:1
Preamplifiers gain	Adjustable 0dB to +30dB (LINE input), Adjustable 0dB to +18dB (LINE output), Switchable 0/+25dB (Sidechain input)
Maximum gain reduction	>30dB
Presets	8, user defined
Attack time	Adjustable
Release time	Adjustable
MIDI control	Sidechain trigger, all audio parameters, preset selection
MIDI out	All audio parameters
Compression knee	Adjustable, hard or soft
Power	5V via USB, typically 450mA (2A capable supply recommended)
Dimensions	125mm x 125mm x 40mm
Weight	450gr

12. Warnings and legal disclaimers

The nABC+ must be connected to a USB 2.0-compliant power supply generating stable, clean 5V and at least 1A current.

When the nABC+ is unused for several hours, disconnect the USB power connector.

The nABC+, in combination with an external amplification system or headphones, may generate a high sound level, which could potentially damage your ears. Do not operate the nABC+ for a long period of time at high-volume level. It's safer to keep reasonable levels and start with low volume.

Before connecting and disconnecting the nABC+ to a power supply source, turn your amp's volume control all the way down to avoid damage due to on/off switching noise. The nABC+ produces a high level output signal. Please take care that the connected playback device is suitable for the high level of an electronic instrument. Never use the microphone or phono input of the connected amp.

Do not expose the nABC+ to rain, moisture, dust, sand or dirt. Do not pour liquids into the nABC+. Never use or store the nABC+ near water, for example sea, swimming pool, bathtub, kitchen or bathroom sink. The nABC+ should be located away from high temperatures (> 35 degrees C), for example direct sunlight in a closed vehicle, radiators, heat registers, stoves or other heat sources. Only clean the nABC+ with a soft, dry cloth. Do not apply any liquids or alcohol. Do not apply excessive vibration forces to the nABC+, do not drop it and always transport it in shock absorbing material. Never climb on top of, nor place heavy objects on the nABC+. Some parts of the nABC+ are fragile (such as the housing and some electronic components), so dropping it might damage your nABC+. Repair work resulting from dropped the nABC+ is not covered by the normal warranty of the product.

Do not leave small children alone with the nABC+, and do not let them use the nABC+ unless they are capable of following all the rules for the safe operation of the nABC+. Do not open (or modify in any way) the nABC+. There are no userserviceable parts inside. Refer all servicing to qualifed personnel only. If you think your nABC+ needs repair, you can send us an e-mail at: info @ suonobuono . net.

A very small percentage of individuals may experience epileptic seizures or blackouts when exposed to certain light patterns or flashing lights. If you have an epileptic condition or have had seizures of any kind, consult your physician before using the nABC+.

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