The dNα-EffectRack

Multi Effect Module Rack

*High Quality DSP Plugin for
the Sonic Core Scope Platform*

dNa – Digital&Analog

DSP Plugins for Sonic Core Scope platform

Preface:

Thank you for purchasing the dNa-EffectRack. I can only hope it will bring lots of joy and creativity to your musical endeavor.

dNa has come a long way in developing plugins for the Scope Platform; main goal was always trying to create essential and intuitive plugins, which combine the best of my analog and digital experiences into the dNa products. This hopefully sets a new benchmark in what one can do with the platform; expanding the possibilities for it in being a true high-end multi effects unit which just gives you inspiration in making music.

One thing is for sure, I am very proud of this latest addition to the growing catalog of dNa plugins.
And...I am very grateful for the users supporting dNa and Sonic Core in keeping Scope alive.

A special thanks goes out to the PlanetZ, Hitfoundry, OSS and FB friends and supporters with whom I've always had very nice personal contact with. Sorry i won't name you all, since I couldn't forgive myself if I forgot one of you, you know who you are! But one person in particular I have to name: Holger for making and keeping it all possible after all these years, and for being a good friend.

Sincerely,

Ray

DISCLAIMER / IMPORTANT: If you only have a Luna, Pulsar1 or maybe even Pulsar2 PCI boards, we cannot guarantee you will be able to use the plugin to the full extent. It is highly optimized, but uses a lot of DSP processing. These boards alone just don't have enough DSP's to run it fully loaded (like for example with the more advanced SC reverbs). If you have boards combined, it's probably not a problem. Check Faxi's video made on a test system with 2 LUNA's and 1 Pulsar1 (that is 10 DSP's)

The Master Section:

dNa Logo: Opens the About window.

Info Field: Shows the last recalled preset, and you can fill in a custom name here, in the project view the name of the module will also adjust. *(v2.0 function)*

Numbers just above Peak Meters(1-6): Shows the bypass state of the separate slots.
Peak Meters: Show output peak levels of separate slots.

Big VU Meter: Shows the VU Output metering…RMS levels are shown, not Peak values.

Main Mix: Controls the dry/wet ratio of the unit. Watch out with this function; the dry signal is not in phase with the wet signal because of the effects complex nature. This might induce noticeable combfiltering when used. Use your ears for this function. If you have complex combined effect it is more likely that this not noticeable.

LED right to Mainmix: Blinks if Mix is used, off when unit is 100% Wet.
LED left to "dry": Indicates the Dry level is attenuated *(V2.0 function)*

On: Functions as a master bypass switch, the red light is also used as an indicator.

dNa-AMC: Open the dNa Advanced Midi Controller *(v2.0 function)*

Midi: Enable/Disable midi input and control receiving midichannel of unit. Midi off uses no DSP. Enable for remote controlling the unit.

Toggle switch: Choose between attenuating the overall input level(default), or the dry level used in the Main Mix function(Toggle up). *(v2.0 function)*

Rotary Level Control: This attenuates the input level, or the dry level fed to the Main Mix function. *(v2.0 function)*

DSP: ALL: Loads all modules on DSP but not all internal functions of the modules. Certain functions are not loaded if not used to keep it as efficient and dynamic as possible.

DSP: FULL: Loads all modules *and* functions on DSP, except for the functions of the Reverb*(but can be set on the reverb remote to "Follow Rack"; v2.0).* On the last Reverb page the is a slider "How to use DSP" for loading all functions of the reverb on DSP. Use these to make switching functions faster, or free DSP after it is set for other functions or plugins.

Preset buttons: Open separate preset windows, or the Full Rack preset window. The separate files can recall setting from the Rack preset file. Thus you can use a setting of a module from any Rack Preset! *(v2.0 function)*

CLOSE: Close all open presetwindows with just 1 knob *(v2.0 function)*

Extra windows and features from the Scope project view:

Double clicking of course opens the main window of the dNa-EffectRack, but from here you can also access multiple windows and features of the rack.
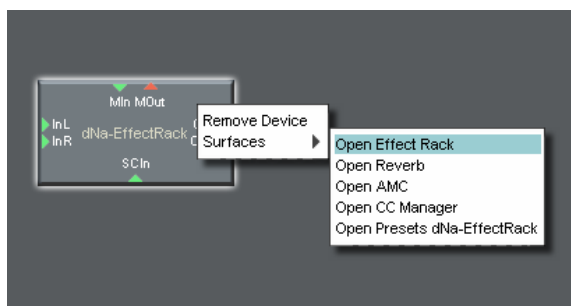
-Open Reverb; this opens the Reverb Remote
-Open AMC; this opens the Advanced Midi Controller
-Open CC Manager; this opens the Midi CC assignments
-Open Presets; this opens the main preset window

Inserting Modules in Slots / Moving modules:

To insert a module into a slot, just click on one of the knobs above the slot you want it in. If you want to move the module to another slot, just click on the knob above the slot you want it in. Settings of the module will stay in the module! This makes shifting and trying out alternate routings a piece of cake. This is such an easy approach it makes further explanation unnecessary.

The modules are: Chorus/Flanger (C/F) – Filter (FLT) – Modulation (MOD) – Delay (DEL) – Reverb (REV) – Insert (INS)

The Modules:

On the Chorus/Flange Module you can either select the Tri Modus or the 1210 Modus.

TRI Selected: a TRI Stereo Chorus inspired by a true Rhodes and Guitar Classic.

Module is divided in left, right and middle channel modulation.

Flip switches L/M/R: Controls which modulation to use; sine, sine and triangular combined, triangular.

Delay: Controls the modulation base delay time.

Depth: Control the modulation Range.

FRQ: Control the speed of the modulation.

LPF: Inserts a LPF on the modulated signal and controls the LP frequency. (steepness middle)

Mix: Control the amount of effect added to the original signal.

Chorus: The name below is also used as the **BYPASS** function switch!

1210 Selected: a chorus/flanger inspired by a true Studio and Guitar Classic.

Module is divided in left and right channel and options on how those interact.
Everything is displayed on the screen for easy overviewing

Mode 1 to 4: 1-2 is for Widening and Chorusing, 3-4 is for feedback Flanging

SYN: Synchronizes Modulation LFO's in different ways

SUM: Sum the Modulation LFO's, works best with one LFO slowly modulating the other faster one.

Intensity:
  -Intensity in Mode 1: Controls the amount of unprocessed or clean signal
  -Intensity in Mode 2: Controls the amount of processed signal
  -Intensity in Mode 3: Controls the amount of feedback signal
  -Intensity in Mode 4: Controls the amount of inverted feedback signal

Speed: Control the speed of the modulation.

Width: Control the modulation Range.

Delay: Controls the modulation base delay time.

LNK: Link the Speed, Width and Delay parameters.

Filter: Inserts a LPF on the modulated signal and controls the LP frequency. (steepness easy)

Chorus: The name below is also used as the **BYPASS** function switch!

This is a **Filter/AutoFilter module** consisting of Highpass and Lowpass resonating filters, which can be modulated through a LFO or Envelope.

HPF: Controls the Highpass(low cut) filter frequency.
LPF: Controls the Lowpass(high cut) filter frequency.
Reso: Controls the filter's Resonance.
LFO: Controls the LFO modultion speed.
Speed: In LFO mode doubles the LFO speed, in ENV mode results in a slower envelope attack.
LFO/ENV: Select how the modulation works, by LFO or following the source's envelope.
Inv Mod: In LFO mode the left and right are modulated inverted. In envelope mode this controls the direction of the modulation (up or down)
Mod On: Enables the modulation on the filters. When disabled you can use the filters on their own, thus by assigning it to a midiCC (rightclick in scope) you could also achieve Wahwah effects.
Depth: Controls the depth or amount of the modulation.
Filter: The name below is also used as the **BYPASS** function switch!

This is a **Pitch or Volume modulation module**.

Function: Controls what to modulate; Pitch or volume
Invert: Modulate Left and Right opposite from each other
Shape: Select the modulation waveforms or Envelope sidechain options.
Preset: You can store different settings here and switch while playing, thus giving a larger palette in creativity.
Speed: Controls the modulation speed/frequency.
x100: Multiplies the modulation speed times 100.
Depth: Controls the depth or amount of the frequency modulation.
Modulate: The name below is also used as the **BYPASS** function switch!

This is a **Stereo Delay module** with advanced filters. A slimmed down version of **dNa's Optimus Prime**.

Flip switch on top: Controls where the filters work, directly on the delay input, or on the feedback path.

Filter menu: Select 9 different filters here for great variation in sound!
The filters Modern, Vintage1 and Vintage2 are pre-set.

Time/Note: Select how you want to control the delay times, match tempo of song in Note mode.

Tempo: Double-click and fill to match your song's tempo

L-R: Controls Left and Right delay times or notes

XFB: Cross feed the feedback signal: left to right and right to left for bouncing.

Link: This links the Feedback and Mix parameters of L and R. *(v2.0 changed function)*

FB: Controls the amount of signal being fed back into the delay chain.

Mix: Controls the amount of delay/dry signal (Left is all dry, right is all wet)

Delay: The name below is also used as the **BYPASS** function switch!

There are 9 different filters that can be inserted on either the Delay or the Feedback circuit of the delay.

Modern: Giving a full spectrum delay, thus sounding modern.

Vintage1: Giving a vintage sounding filtered delay. (preset)

Vintage2: Giving a different vintage sounding filtered delay. (preset)

HPF: Highpass filtered delays; cuts off the lows in the delay sound.

LPF: Lowpass filtered delays; cuts off the highs in the delay sound.

BPF: Bandpass filtered delays; Cuts of the lows and highs in the delay sound.

Modulate: You can FM modulate the delays, giving strange complex sounds.

Resample: The delay can be distorted using lower bitrates and samplerates creating lofi delay sounds.

Pitch: Left and right can be pitch shifted, creating over- and subtones and those can cascade using them on the FB setting.

This is an advanced **Reverb Module** and it comes with its own DARC (dNa's Remote Control ;-)

My homage to the studio classic you just have to know and have to hear…**ahum** you have heard…in real life. This is NOT a copy or in any way affiliated to that classic, the Lexicon 480L, because that is just a league of it's own. It truly is a homage, it was and still is for me a blueprint on how to make a complex unit user friendly.

Mix: Controls the amount of effect added to the incoming signal

Bypass: Bypasses the unit, this is also displayed on the Remote.

Remote: Opens the remote for the Reverb for changing parameters.

Reverb: The name below is also used as the **BYPASS** function switch!

For more information on the functions in the remote see the "Reverb Remote Pages summary" later in this document.

This is an **Insert module** for inserting any plugin of your choice into the effectchain. It has added Low and High Cut filters to further shape the sound.

Insertfield: Select your stereo inserteffect of choice from here.

Lowcut: Enables and controls the Low cut/Highpass filter frequency. (post insert)
Hicut: Enables and controls the High cut(Lowpass) filter frequency. (post insert)

Input: Controls the insert's input level. (pre insert)
Output: Controls the insert's output level. (post filter)
Flipswitch: Switches the inserted effect off and unloads it from DSP. The filters can still be used.

Insert: The name below is also used as the **BYPASS** function switch!

A note on the insert functions in Scope:

There are some precautions to take care of when using the insert functions in Scope. Not only on this plugin, but in every Scope plugin!

-Case 1: Using this effect's insertfield or any effect using insert fields (P2) in an insert rack or insertfield of another plugin (P1); Saving the P1 to a preset, the parameters of the plugin in the P2 insertfield aren't recalled.

Case 2: Using a loaded multiFX or another plugin with an additional insertfields (P2) in the dNa-EffectRack's Insert Module (P1); Saving the P1(dNa_EffectRack) to a preset, the parameters of a plugin in the P2's insertfield aren't recalled.

In other words: It is not possible(or at least its settings) to save an insert in an insert of an insert. Rather confusing right?
Attempt #2: It is not possible to save settings of an effect (#1) that is in an insertslot of another effect (#2), while effect #2 is loaded as an insert.

This is not an error in any of the plugins, this is a "problem" in Scope. The workaround if you are using this scenario is to save the project. Then it should recall as saved.

Reverb Remote Pages Summary (dNa Advanced Remote Control):
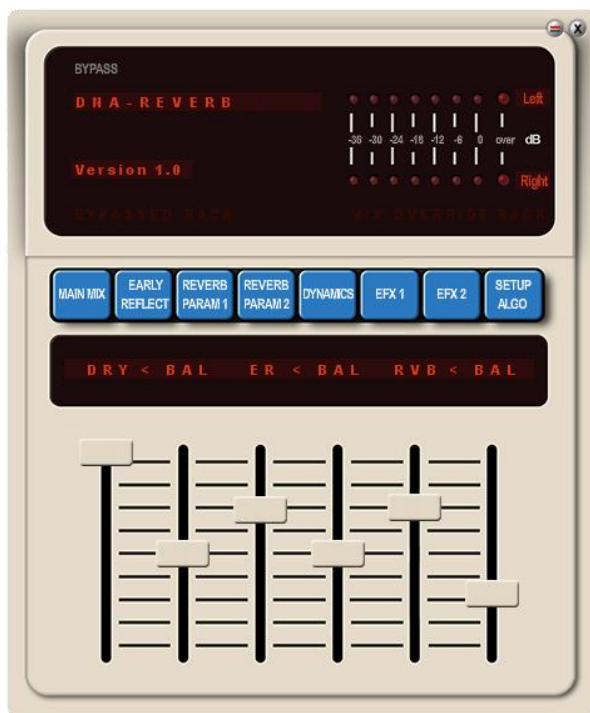
DARC Page 1:
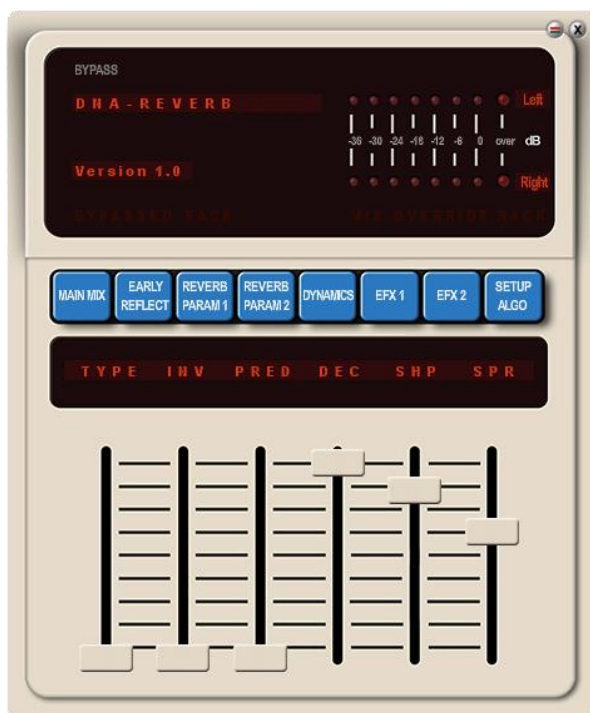
DRY: Controls the dry output level

<BAL: Controls the panning of the dry signal

ER: Controls the Early Reflections output level

<BAL: Controls the panning of the Early Reflections

RVB: Controls the Reverb output level

<BAL: Controls the panning of the Reverb

DARC Page 2:

TYPE: Lets you select the type of early reflections

INV: Inverses the early reflections

PRED: Adds a predelay to the early reflections; If ER are positioned AFTER diffusion (See Setup Algo) this has no effect, predelay is then controlled only by the predelay on Reverb Parameter Page 1.

DEC: Controls the Decay of the early reflections

SHP: Controls the Envelope Shape of the early reflections

SPR: Controls the Spread of the early reflections
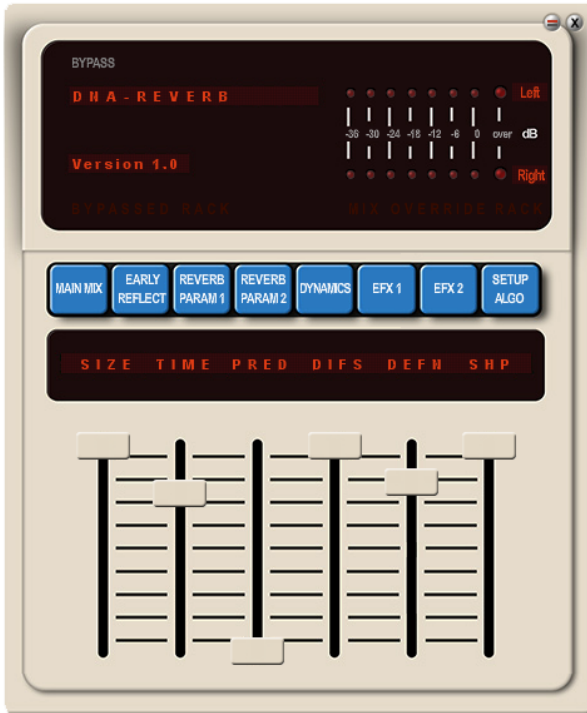
DARC Page 3:
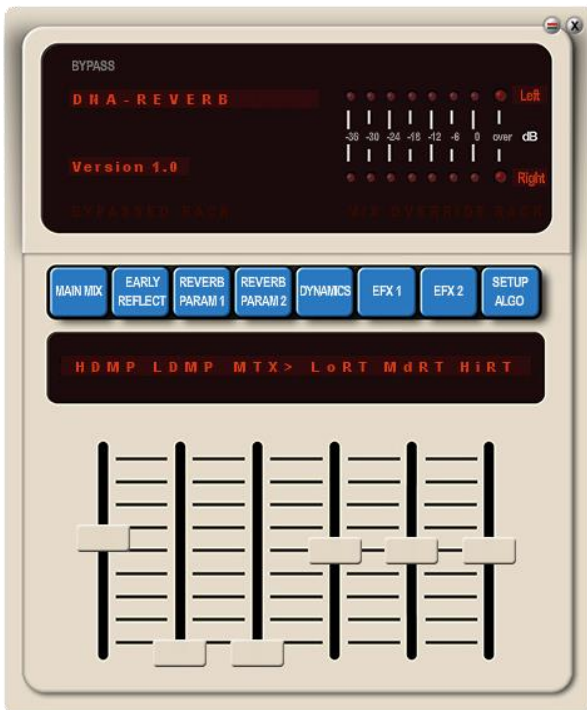
SIZE: Controls the Size of the Reverb algorythm

TIME: Controls the Reverb Time of decay

PRED: Adds a predelay to the Reverb

DIFS: Controls the amount of diffusion in the Reverb

DEFN: Controls the definition of the Reverb

SHP: Controls the Envelope Shape of the Reverb

DARC Page 4:

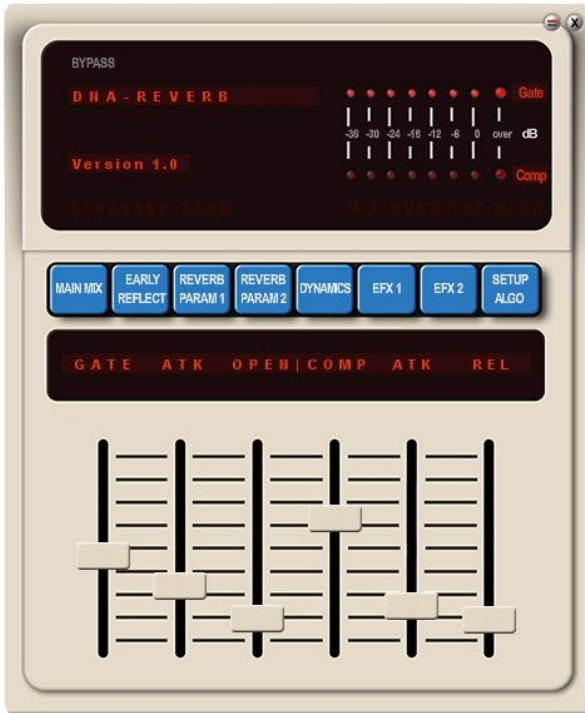HDMP: Controls the High frequency damping of the Reverb

LDMP: Controls the Low frequency damping of the Reverb

MTX: Enables the Multiband RT control

LoRT: Controls Low frequency reverb time multiplier

MdRT: Controls Mid frequency reverb time multiplier

HiRT: Controls High frequency reverb time multiplier

DARC Page 5:

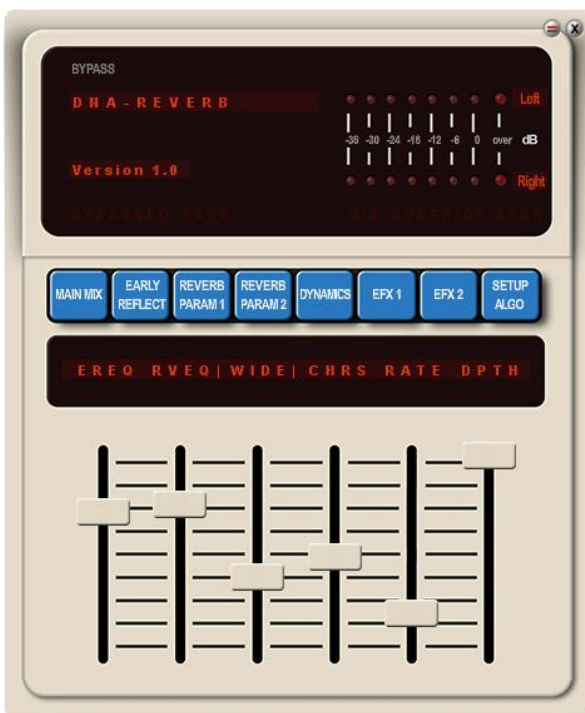GATE: Enables and controls threshold of internal Gate

ATK: Controls the Gate attack time

OPEN: Controls the time the Gate opens

COMP: Enables and controls threshold of internal Compressor

ATK: Controls the Compressor attack time

REL: Controls the Compressor's release time

DARC Page 6:

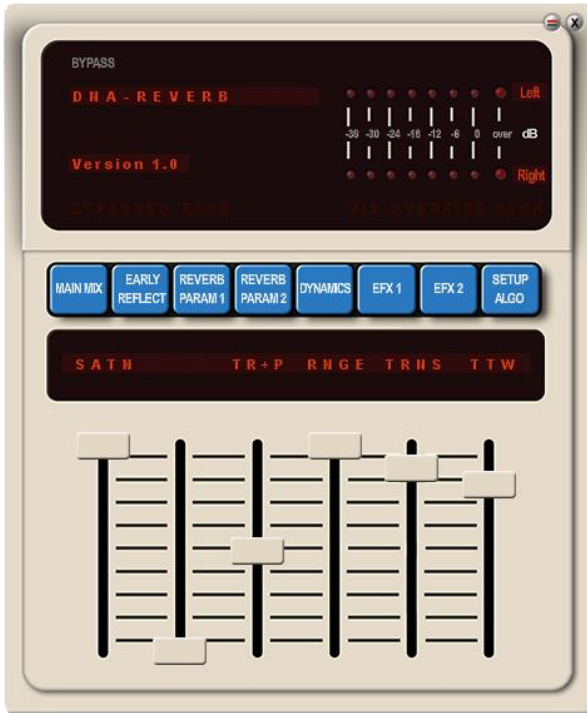EREQ: Controls the equalizer of the Early Reflections

RVEQ: Controls the equalizer of the Reverb

WIDE: Widens and spreads the Reverb

CHRS: Adds a chorusing effect on different places in the internal signal flow

RATE: Controls the rate of the Chorusing effect

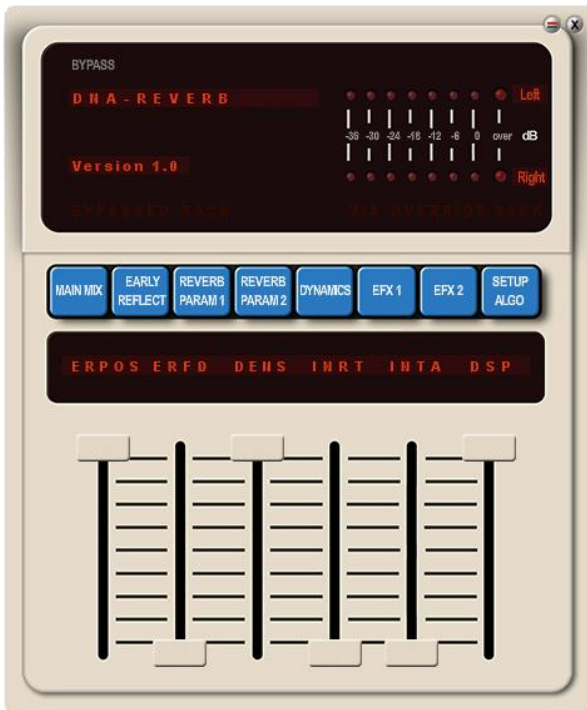DPTH: Controls the amount or depth of the Chorusing effect

DARC Page 7:

SATN: Enables saturation on the effect signal

TR+P: Transforms different portions of the effect signal

RNGE: Let's you select the range you can transform

TRNS: Transforms the signal up or down. Depending on settings

TTW: Transform Time Window, transform algorithm option

DARC Page 8:

ERPOS: Defines the position of the Early Reflections

ERFD: Defines whether to feed the Early reflections into the Reverb

DENS: Lets you select a somewhat denser diffusion

INRT: Let's you select a different internal reverb filtertype. Subtle!

INTA: Internal Reverb Timing Adjust; subtle enhancement in internal reverb path.

DSP: Defines how to load the DSP chips. Dynamically or all functions loaded for faster experimenting.
V2.0: Added option "Follow Rack"; the Reverb follows the Rack setting, and "Full Load 96k"; the Reverb loads all function except the Internal Reverb Types which will be kept dynamic for compatibility issues on PCI boards

dNa-AMC (Advance Midi Controller) Summary:

General description:

Advanced Midi Controller:

With the AMC it is possible to control up to 6 parameters of the dNa-EffectRack with just 1 master controller. This way advanced morphing between soundscapes are just 1 knob away!

Make sure Midi is **ENABLED** on the Rack, and AMC is **ON** to make use of the AMC's functions.
Click on the dNa logo for a brief guide on how to use!

State Manager:

As an extra feature it is also possible to switch between multiple "States" of the rack. The field on the right of the AMC controls the states.

Midi CC Assignment Manager:

In conjunction with the AMC there is an Midi CC Manager which can be accessed to assign CC to multiple functions of the Rack's Modules. **(Click on CC manager in the AMC window).**

If you set the CC assignments using the manager the assignments will be stored correctly in a preset. There is a bug in scope which is resolved this way. This ensures that if you recall your preset, you also recall your assigned functions and assignments!

Functions of the AMC:
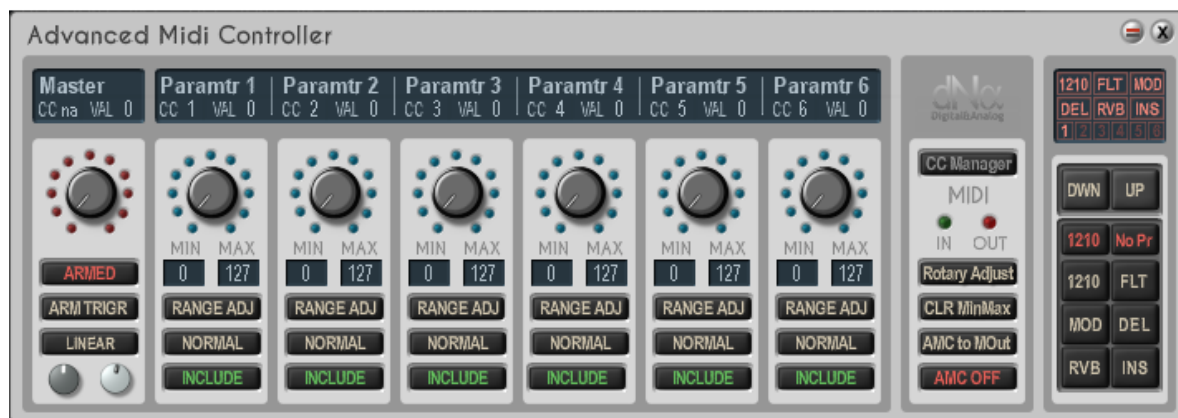
Master field:
-You can fill in a custom name in the namefield
-You can select the CC on which the master rotary will react (fed to the dNa-EffectRack through Midi In)
-The value of the Master Controller is displayed in the small display above.

If you select and rotate the master controller you will immediately see what it does: it controls the other 6 rotaries.

If you click on **<ARMED>,** the Master Controller will engage **an auto rotate function**. With **<ARM TRIGR>** you can define if it will "ARM" or "RETRIGGER". ARM will wait until you press again, then it will engage, retrigger will retrigger every time immediately.

The small **potmeters** and the **<LINEAR>** button define how the auto rotate function behaves: the speed and the curve, and its curve steepness it will use.

Parameter fields:
You can always use the parameter rotaries apart from the Master controller!!
-You can fill in a custom name in the namefield
-You can select the CC the parameter rotary will sent out. (use the CC manager to set the CC's of the Rack)
-The value of the controller is displayed in the small display above.

Min-Max: The parameter rotary will rotate between the minimal and maximum value in different ways. (click and drag)
RANGE ADJUST: The parameter rotary will adjust its range output in relation to the master between the Min and Max value .
BANDPASS: The parameter rotary will only rotate when the master is between Min and Max value.
ADD TO MAX: The parameter rotary will start rotating when the master goes up from zero, and stop when it reaches its Max value.

Normal/Reverse: Control if the parameter rotary runs up or down (reverse).

Include/Exclude: You can also exclude a parameter from reacting to the Master Rotary

Central or Main field:

Click on the **dNa logo** for a brief description on how to use.

Rotary Full; the parameter rotary will still output midi values between 0-127 no matter what Min/Max values are used.

Rotary Adjust: if the Min and Max values are set the parameter rotaries the rotary cannot be used outside these values.

CLR MinMax: this clears the Min/Max values of all the parameter rotaries.

AMC to MOut: This will send out the AMC midi information also to the dNa-EffectRack's midi output! This way you can use the AMC to control midi capable devices outside the dNa-EffectRack!

AMC ON/OFF: Enable the AMC, Off will save a little bit of DSP if the feature is not used.

State Manager Field:

Here you can control up to 6 states of the dNa-EffectRack.

In a "State" the following parameters are stored:
- Bypasses of the individual modules (which are displayed on the display)
- You can switch the two choruses per state! So State 1 can use the TRI chorus, State 2 can use the 1210!
- Which selected MOD-preset is active (which are displayed if a state is selected above the bypass switches)
- The MainMix value of the dNa-EffectRack
- The **values** of the separate parameters (parameter 1 to 6) of the AMC

When you select a state (**DWN / UP**) you can easily bypass the dNa-EffectRack's modules using the buttons in the State Manager. The bypass buttons also follow the bypass buttons in the Rack. You can also select whether to use the **TRI or the 1210 Chorus**, and you can select which **MOD preset (No preset, Preset1 or Preset2)** will be used in the State!

A brief walkthrough:
-Enable midi on the dNa-EffectRack
-Enable the AMC (AMC ON)
-Open CC Manager and assign midi CC to a parameter of any used module of the dNa-EffectRack, this should be pretty self-explanatory. (for example Depth of modulation to CC 1, and Mix of Delay to CC 2)
-Assign a parameter rotary of the AMC to the CC you want it to control
(in this example Parameter 1 to CC 1, Parameter 2 to CC 2)

Parameter rotary 1 will now control the Depth of Modulation and Parameter rotary 2 will now control the Mix of Delay. The Master Controller will control both!

Please take some time to explore this wonderful feature of the dNa-EffectRack, since it will take the already great effects to incredible new and previously unreachable heights!

Testconfigurations for 48k and 96k, PCI boards and Xite:

The plugin, as all dNa plugins, was extensively tested on both PCI boards and Xite. At 48k samplerate there was never any unusual behavior.

On 96k though, it can occur depending on hardware configuration, together with low ULLI, in DSP overflow, PCI overflow or SAT connection errors. MOST OF THE TIMES WHILE SWITCHING BETWEEN PRESETS (XITE + PCI) or switching DSP intensive functions (PCI). On PCI boards this can occur more often because of your hardware configuration and how much that can take. On Xite this only occurred with lower/lowest ULLI settings. Click through the windows and error codes, and reload the preset, or when asked use the DSP reload. This will probably solve this issue. See "Tips and Tricks" at the end of this document for some hands-on tips if these errors (keep) occurring.

Background on DSP overflows/SAT connection errors at 96k:

In my opinion the plugin is a real beast. Not only because of its possibilities, but also in DSP hunger. And although I did my best to program the plugin as efficient and dynamic as possible, especially to be able to run on both the PCI cards and the Xite(compatibility), running it full at 96k may push or reach the limits of your system. That is NOT an error, bug or fault of the plugin; It can run at 96k, with all the functions enabled. I test all the plugins to the limits on a combined Pulsar 1 and Scope SRB card, making a total of 19 older DSP chips, and on Xite. It does not use up all my DSP, although it uses A LOT of connections between the chips, in order to keep it dynamic, since I need it to be dynamic. The newer Xite chips have up to 5 times the power of 1 older, so you can assign a lot of functions to be processed on 1 chip. But that cannot be executed on the older PCI cards, thus a designer has to find a rather delicate balance between DSP distribution, power, compatibility and of course, phase coherency.

dNa-EffectRack running at 96kHz with moderate ULLI on a Pulsar1 + Scope SRB PCI Card.

Some statistics:

That said, dNa-EffectRack runs fully functional (all modules with all they can deliver plus all functions enabled in reverb) on 48kHz samplerate at around 3600 DSP cycles (older 66mHz chips); that is around 3,5 chip in use. Theoretically it should run a Pulsar 1. (This is one of the first generation cards, over 15 years old!!)

But…it distributes over 10 DSP chips on my system, making it implausible it would run on a Pulsar 1. It then uses about 25000 DSP memory. Also…certain functions you could assign to be processed on 1 DSP chip, it would still distribute over 2 DSP chips; those are things encoded in certain DSP code; things a designer can't change. It costs weeks if not months to find the balance in optimizations a designer is looking for.

Tips and tricks for 96k samplerate operation:

My experiences for running at 96kHz on my PCI system:

- Preferably find the sound you're looking for at 48kHz, switching functions(especially change in Reverb Type and Denser Diffusion) can temporarily overload the DSP's, then switch back to 96kHz.
- Try NOT using the "All modules on DSP's" and "Full load DSP's" buttons and "How to load DSP's" Slider on the Reverb Remote when working on 96k with PCI-cards if that overloads the system (also depends on PC configuration). You can test it yourself, especially the Xite owner who might not have any problems at all.
- The switch and reverb slider DSP options are actually only for finding or tweaking sound so the system doesn't have to load when trying out the functions; thus they need not be enabled all the time. If the dNa-EffectRack is set for use you can disable the options, thus reducing the DSP load from functions which are NOT used.
- In certain cases regarding the hardware configuration of your PC it could be that working at 96k, especially switching presets, it can occur that it is just unworkable. The only thing I can say as a solution is work at 48k samplerate or in the end upgrade your PC, or buy an Xite.

General Tips and Tricks for running DSP hardware on PC:

There is already a lot of information on PlanetZ about configuring your HW and BIOS for optimal DSP performance, but I thought I'd sum some of them here (thanks to GaryB for his knowledge on this subject):

Quoted from PlanetZ.com:
"as in the letter that came with v5.1, in the bios(you may have already done this) disable any of these things, or anything that is obviously the same, but slightly differently named:

Intel EIST
Intel C State
C1E Support
Overspeed Protection
Hyperthreading
Execute Bit Support
Set Limit CPUID MaxVal to 3 (maybe not so important)
Intel Virtual Tech
Intel VT-d Tech
"
For me personally also setting the PCI latency timer from 32 to 96 or even 128 enhanced stability.