Genius.lab Starter Kit V1.0

About:

Genius.lab is a user programmable macro system that was introduced in RIVAGE PM V6.0 firmware. It's so flexible and powerful that a single function can be achieved in a number of different ways. Real-world examples are a useful starting point for understanding what is possible.

This document acts as a guide, explaining how the set of various macros, included in the accompanying RIVAGE PM console file "Genius.lab Starter Kit.RIVAGEPM", were programmed. It lays out the various features of the Genius.lab programming environment and how you can take advantage of these to create your own powerful custom macros to suit individual requirements. The following sections are written on the assumption that the accompanying console file is loaded into a RIVAGE PM console or editor that is available to the reader.

All macros are stored in the "MACRO LIBRARY" in the accompanying console file, hence can be easily imported into any environment running V6.0 or higher.

A "macro" and a "MACRO":

After the console file is loaded , pre-programmed macros can be found in the MACRO LIST. These are examples. Some examples consist of a single macro, while others consist of two or more macros. To distinguish from individual macros, each example is referred to "MACRO" using upper case in this document. So, a MACRO may be a single macro, or a set of macros.

The title of the first macro in a MACRO expresses the name of the example. When a MACRO consists of two or more macros, the title of the second and any subsequent macros begin with " --" for clarity. If the first macro of a MACRO ends with "*", it's a "prep" macro, which is intended to be executed before using the MACRO. The procedure to execute these "prep" macros is described below.

Each MACRO has been created with a focus on a practical use case, but please note that some MACROs may seem a bit unusual or even unrealistic for the real world, this is due to this document's goal of describing as many features of Genius.lab as possible and how they can be used. There are some utility macros at the bottom of the MACRO LIST.
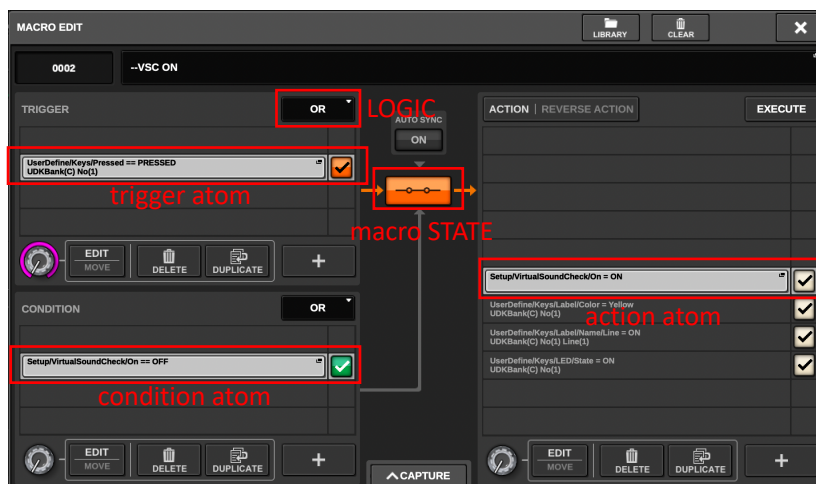
Terminology:

Following are the essential terms to know to read this document. More details are described in the relevant sections of the RIVAGE PM V6.0 operation manual.

MACRO LIST view

MACRO EDIT view

"TRIGGER /CONDITION / ACTION (REVERSE ACTION)" : Four sections constituting a macro.

"LOGIC" : AND/OR logic applied in the TRIGGER/CONDITION section.

"atom" : A unit which constitutes TRIGGER / CONDITION / ACTION. An atom in the TRIGGER section is called "trigger atom" for example.

macro "STATE" :

- "OFF" STATE : Macro is OFF, so ACTION cannot be executed.
- "OPEN" STATE : CONDITION is FALSE (not met), so ACTION is not executed.
- "FALSE" STATE : TRIGGER is FALSE, so REVERSE ACTION is executed if applicable.
- "TRUE" STATE : TRIGGER is TRUE, so ACTION is executed if applicable.

Trigger (condition) atom edit window
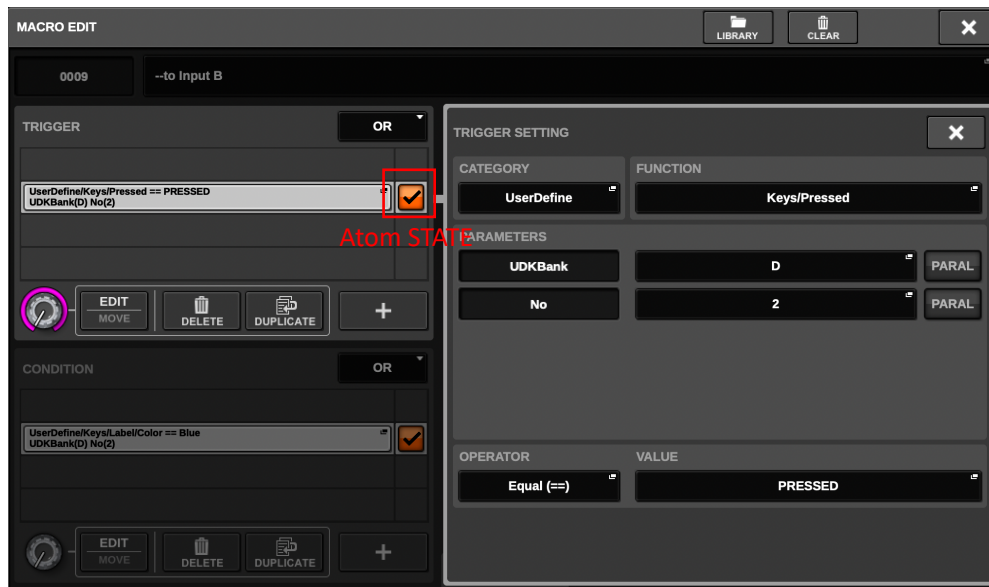
CATEGORY, FUNCTION and PARAMETERS determines parameter(s) or event, i.e., "UDK D2".

OPERATOR and VALUE determines the criterion, i.e., "is pressed".

atom STATE :

    ■ "OFF" STATE : The atom is disabled

    ☑ "FALSE" STATE : The trigger/condition atom is FALSE

    ☑ "TRUE" STATE : The trigger/condition atom is TRUE

Action atom editor window
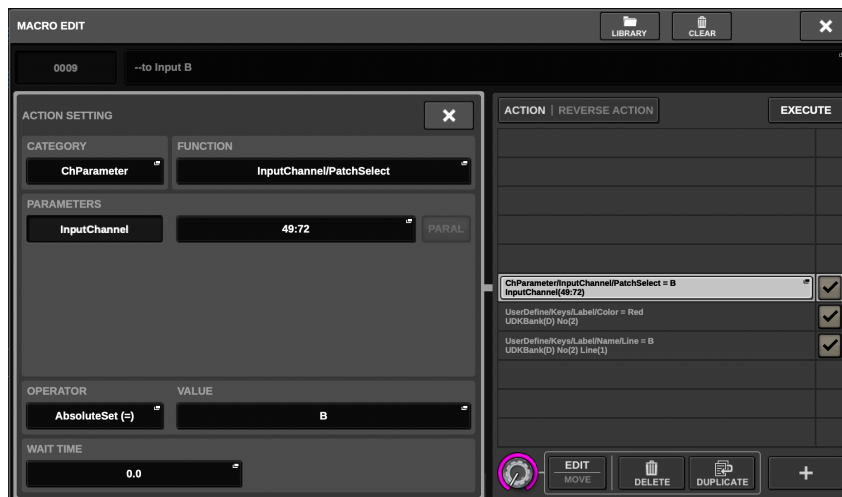
CATEGORY and PARAMETERS determine parameter(s) or event, i.e., "Input Patch Select [ch49-72]".

OPERATOR and VALUE determine the criterion, e.g., "set to B".

WAIT TIME is the time to when the action is processed, referencing the time of the ACTION being executed.

Procedures:

Here is the procedure for how to test each MACRO. It is recommended to read these in order from the beginning.

0. Open SETUP -> GENIUS.LAB. Make sure Ganius.lab is turned ON in the MACRO LIST view.

1. Turn on a MACRO. If it consists of two or more macros, turn all of them ON. It's recommended to turn OFF all other MACROs, as some MACROs may share the same User Defined Key (hereinafter called "UDK"), or a MACRO may trigger another which could lead to unexpected behavior.
    Please note, utility macros from "Clear pressed UDK (A)" to "Clear pressed UDK (D)" should be left turned ON.

2. Press the MacroKey D32 to execute the "prep" macro. As explained above, the "prep" macro has a symbol of "*" at the end of its title.
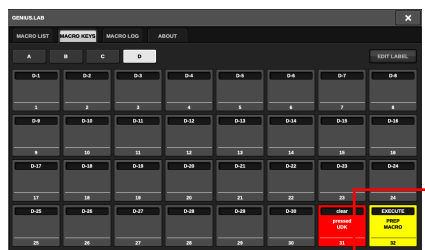
3. Each MACRO explanation consists of following 4 parts -

    [background]   : the situation and reason of the MACRO
    [behavior]   : what happens with the MACRO
    [mechanism]   : how those macros work. Open the macro edit view or atom edit popup to check.
    [notes]   : additional information

4. Turn OFF the MACRO. Before turning on the next MACRO, it's recommended to clear the indication of unused UDKs. Clear all UDKs by executing the macro "clear all UDKs", or clear an UDK individually by pressing and holding MacroKey D31 then pressing the UDK. These are also realized by utility macros which are described below.
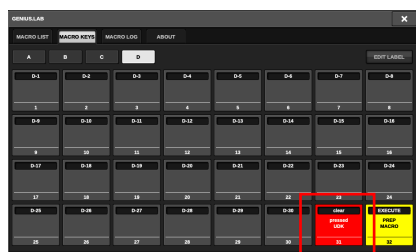
Description of each MACRO:

1. VSC On/Off

[background] There are cases when Virtual Sound Check (aka: VSC) needs to be turned ON and OFF quickly.

[behavior] This MACRO uses UDK C1 to turn VSC ON and OFF. Press the UDK a few times. You will see that VSC is toggled ON and OFF. LED, Color and Labels of the UDK also change.

[mechanism] The macro "VSC ON" turns VSC ON when the UDK is pressed. The LED, Color and Label of the UDK are also set. As the condition is set as "VSC is OFF", the trigger is ignored while VSC is ON. Similarly, the macro "VSC OFF" turns VSC OFF when the same UDK is pressed. The triggers of those two macros are the same, but the condition is opposite, therefore one of two macros is executed each time the UDK is pressed.

[notes] Should the VSC state be changed from somewhere else, for example from the RECORDING view, the state of the UDK and actual VSC state won't match anymore. This is because these macros are triggered only by pressing of the UDK. One solution for this mismatch is discussed later in the "Input A/B switch" MACRO.

2. Sax and Flute

[background] In this MACRO the same one musician plays multiple instruments, such as Alto Saxophone and Flute. Ch23 is A.Sax and Ch24 is Flute. Usually, the Flute channel (Ch24) should be OFF when they play A.Sax (Ch23), and vice versa.

[behavior] Press UDK C4 a few times. The Ch ON of those channels flip. Also the LED, Color and Label of the UDK changes.

[mechanism] The macro "Toggle LED" toggles the LED state ON and OFF triggered by pressing of the UDK. The "Toggle" operator in the action atom realizes this. Then the macro "Ch ONs" is triggered by the LED state, which toggles between two states (A.Sax ON, Flute OFF / A.Sax OFF, Flute ON) through the ACTION and REVERSE ACTION.

[notes] The "Toggle" operator can be used with all ON/OFF types of parameters. For example, the previous MACRO of "VSC On/Off" can be rewritten by using the "Toggle" operator to turn VSC ON/OFF instead of using two separate macros. It is worth becoming familiar with this useful function.

3. Input A/B switch

[background] Ch49-Ch72 are used for multi-track playback. The playback system is redundant, with the outputs of the main playback machine patched to inputs A and those of backup machine patched to inputs B. In the event of a problem with the main playback machine, all Ch49-Ch72 must be quickly switched to inputs B.

[behavior] This MACRO uses UDK D2. Press the UDK a few times and see that all 24 channels toggle between inputs B and A. The Color and Label of the UDK also change with each press.

[mechanism] The macro "UDK COLOR" is triggered by the input A/B state of the 24 channels. As "AND" logic is chosen in the TRIGGER section, the ACTION is executed when all channels are in input B. The REVERSE ACTION is executed when one or more channels are in input A. UDK Colors (BLUE and RED) are also set by ACTIONs.

  The macro "to Input B" sets all 24 channels to input B, is triggered by pressing the UDK. By the condition of "UDK is BLUE", it is executed only when one or more channels are in input A. The macro "to Input A" is the opposite way.

  When in the state of "All 24 channels are input B", and therefore the UDK is set to Red, it will become Blue by turning any one channel back to input A. This is because the macro "UDK COLOR" is triggered by the change of parameter state. Then macros "to Input B" and "to Input A" behave according to the UDK Color. The UDK indication can keep up with any change of parameter state set by others means than the UDK. But how about when the console is booted-up? Or when the macro is first turned on? For that, "AUTO SYNC" is activated in the macro. This option will forcibly execute ACTION or REVERSE ACTION according to the TRIGGER state when the macro starts working. As a result, the UDK state matches the reality at all times.

[notes] A range of channels can be set by using ":" in the parameters section of the ACTION atom, in this MACRO we use "49:72". Discontinuous channels can be set by using ",", e.g. "1,3,5". These two symbols can be combined to create two or more separate ranges, e.g. "1:12,15,21:32".

  The reason for using the Color of the UDK in this MACRO, instead of the LED Color, is only to create a sense of equal weighting between input A and B states. Should one state be required to suggest a different weighting to the other, use LED ON/OFF. It is completely up to user preference.

4. Fader Cue Release (Ch1)

[background] In broadcast environments, an input channel waiting to be put "on-air" is often monitored in PFL (CUE) when the fader is at -inf. Once the channel is "on air" (with the fader is opened), the PFL is released automatically to avoid double hearing of channels in monitoring.

[behavior] Set the fader level of fader of Ch1 to -Inf, set its CUE to ON, then push the fader up to greater

than -60dB. The CUE is turned OFF automatically.

[mechanism] In this macro, input fader level of "more than -60dB" is set for the trigger atom. The atom state is False when it is in the range of "not more than -60dB", and True when it is in the range of "more than -60dB". The ACTION is executed once when the atom changes from "False" to "True". The ACTION simply turns OFF both CUE A and B of Ch1. Similarly, the REVERSE ACTION (disabled by default in this example), is executed whenever the atom changes from "True" back to "False", this then turns those CUEs back ON.

[notes] Parameters that contain continuous values, such as fader level, are set as the trigger. "Equal(==)" or "NotEqual(!=)" should not be chosen as the OPERATOR, because it is not guaranteed that the ACTION will be executed by the fader level when it crosses a specific value during a fast fader movement. To be certain that the macro will always execute whenever a parameter crosses over a value, for example "0dB", it is recommended to use two separate atoms with operators set as "MoreThan(>) -2.0dB" and "LessThan(<) +2.0dB" combined with "AND" logic.

  In real world applications, this kind of macro would rarely be programmed for a single channel. Usually, it would be applied across a specific range of channels or even to all channels, but it would be undesirable to repeatedly duplicate the same macro for use on each different channel. The following MACRO describes how to solve this problem by making use of the PARAL function.

5. Fader Cue Release (All CH)

[background] Typically functions like "Fader Cue Release" would be applied to multiple inputs. It could be a range of channels, or sometimes through all channels.

[behavior] The behavior of this MACRO is the same as the previous MACRO, "Fader Cue Release (1Ch)", but it is applied through all channels. Hence when CUE is ON for any input channel, opening the faders of any channel will release its CUE.

[mechanism] In the trigger atom, "#ALL" channels are selected and in addition "PARAL" is turned ON. This option means "parallel" and it makes the relationship between trigger atoms and action atoms apply in the same way across all channels contained within the macro e.g. Ch1-for-Ch1, Ch2-for-Ch2 etc. PARAL must be set in both trigger, condition and action atoms which require a one-to-one relationship.

  In this MACRO, enabling PARAL means that when the fader of Ch1 is opened, only the PFL of Ch1 is released. Then opening the Ch2 fader releases the Ch2 PFL and so on, all within a single macro.

  The PARAL function makes it quick and efficient to create macros that require the same triggers and actions to be applied across many channels.

[notes] As explained in the previous MACRO of "3. Input A/B switch", it is not only possible to select all channels (#ALL) in an atom, but also to select any combination of channels (1:12,15,21:32 etc.) and then make them parallel.

  Please note, only one parameter type can be set to parallel within a single macro, in this case "input channel".

6. Talk Switch

[background] Monitor engineers frequently need to talk with musicians and stage crew using an easily accessible "Talk Switch" on the console surface. They may want to latch each talk switch in the ON position, to allow communication with multiple musicians simultaneously, or they may want to talk to a single musician whilst pressing a single switch.
*This MACRO uses Fn keys, which are available on PM10 and PM7.

[behavior] Press UDK C12 a few times and check that the display switches between "LATCH" and "UNLATCH". Next, press any Fn key for Mix1 to Mix12. In "LATCH" mode, each press of the Fn key toggles the assignment of the Mix bus in and out of TALK GROUP1. In "UNLATCH" mode, the Mix bus is only assigned to TALK GROUP1 when the Fn key is pressed.

[mechanism] The macros "to Latch Mode" and "to Unlatch Mode" changes the state (Color and Label) of UDK C12. This difference in Label text acts as conditions for the subsequent macros.
  The macro "TB Assign (LATCH)" is for latched behavior. Its trigger is the pressing of the Fn Keys of Mix 1-12. PARAL is ON, so the same macro applies across the range of mixes. Its action toggles the Mix bus to TALKBACK GROUP 1 by pressing the Mix Fn key. Its condition is that the Label of the UDK is "LATCH". Alternatively, the condition could be the LED Color state, but Label text is used here to be clearer.
  The macro "TB Assign (UNLATCH)" is for unlatched behavior, e.g. press and hold then release. It turns on the TB assignment in ACTION, and turns it OFF in REVERSE ACTION. Its condition is that the Label of the UDK is "UNLATCH". PARAL is ON.
  The macro "Fn Key LED" is used for indicating the assignment status using the LED of Fn Keys. In this case, AUTO SYNC is activated to ensure the Fn Keys LED states match the reality (actual TALKBACK assignments) when the macro starts running. PARAL is ON.

[note] A UDK is used as a MODE selector for the Fn keys behavior. – Latched or unlatched. Similarly, any "user defined mode" can be created and be used as a CONDITION to control the execution of macros.
  PARAL will be typically used with Fn Key macros which require one-to-one functions, as seen in this example. However, this does not necessarily have to be the case. With PARAL OFF, a Fn Key can be set to change parameters of different channels. Just like any parameters or surface buttons, the usage of Fn Keys is completely up to user imagination.

7. On Air Light

[background] In broadcast studio environments, sometimes complex logic of Ch ONs, faders, and so on, is required for setting the state of an "On Air" light. For this MACRO, GPI OUT1 is connected to a red light which would indicate "On Air / Off Air".

[behavior] When all of Ch1-Ch3 are ON and their faders are above -40dB, GPI OUT1 becomes active. The red light connected to the GPI is then ON. Otherwise, GPI OUT1 becomes inactive and the light is OFF. In addition, the state of "ON AIR" or "OFF AIR" can be confirmed by the Label and Color of UDK C6. These are only for indicating status. Nothing happens if the UDK is pressed. MIDI Note On/Off messages are also sent, should external MIDI equipment need to receive the On-Air/Off-Air state.

[mechanism] "AND" logic chosen in the TRIGGER section. This logic is applied not only across the trigger atoms but also across the channel range (Ch1-3) of each atom. Therefore, TRIGGER becomes "True" when all Ch1-Ch3 faders are ON and greater than -40dB. In the ACTION section, a GPI OUT atom and a MIDI NOTE ON atom are set. LED, Color, and Label of the UDK are also set to change.

[notes] When two or more atoms are set in the TRIGGER section, ACTION or REVERSE ACTION could be executed multiple times. In this MACRO, REVERSE ACTION is executed each time a channel is turned OFF or a fader is pulled down to below -40dB. There is no problem with this when actions are simple one-shot parameter state changes. But when event-based atoms such as MIDI messages are used, care should be taken because the message will be transmitted each time the ACTION is executed.

8. GPI Pulse

[background] To provide an example of the potential synergy between macros and traditional UDK functions by having both functions share one UDK.

[behavior] Press UDK D12 and confirm the output of GPI OUT 1.

[mechanism] The first action atom outputs an ACTIVE signal to GPI OUT 1. Then the second action atom outputs an INACTIVE GPI signal with a Wait Time of 1.0sec. These actions form a pulse on GPI OUT 1.

[notes] This macro is perhaps not so useful in itself, but it highlights the possibilities for combining macros with conventional UDK functions. For example, if "(Scene) Inc Recall" is assigned to the same UDK, a red light connected to GPI OUT1 can be used to express that "the scene for next song has been recalled". The cast/staff on stage are then aware that they can proceed.

9. Speaker Check

[background] Each Matrix bus 1-8 is connected to an output that feeds a speaker. These speakers must be checked on a daily basis as part of daily pre-show checks.

[behavior] Press UDK C6. The OSCILLATOR is assigned to matrix buses 1-8, one by one as a sequence over a period of time.

[mechanism] The macro "OSC to Matrix", is triggered by pressing UDK C6, this in turn triggers a number of action atoms in the ACTION section. First, the oscillator mode and level are set, all previous oscillator assignments are cleared, and the oscillator output is turned ON. The oscillator output is then assigned and unassigned in turn to Matrix buses 1-8, making use of the Wait Time function to create a sequence. When the sequence is completed, the oscillator output is turned OFF.

[notes] The "Wait Time" of each action atom references the time of the ACTION being executed, not the time of the previous atom. So, the order of action atoms in the ACTION section has no effect on the sequence order, although in this example the atoms are arranged in the actual order of Matrix outputs.

10. Stick/Brush

[background] When a drummer uses sticks and brushes for different songs or parts of songs, certain settings for drum channels are changed accordingly.

[behavior] This MACRO uses two UDKs (C1 and C2) to switch between "stick" and "brush". Press UDK C1 and C2 alternately and check that the following parameters for (Ch1-Ch10) are changed: Dyn1 ON/OFF, Dyn2 Threshold and send level to Mix1. Dyn2 threshold and Mix1 send levels are changed relative to the previous values, not to an absolute value. The LEDs of those UDK also change.

[mechanism] The macro "to Brush" is triggered by pressing UDK C1, which turns Dyn1 OFF for the range of channels (Ch1-Ch10). It also changes the Threshold of Dyn2 for the same range. As "RelativeSet(+=)" is chosen as the OPERATOR, "-5.0dB" is applied relatively to the Threshold. In the same way, it changes send level to Mix1 by "+3dB". It also turns on the LED of UDK C1 and turns OFF C2. "C1 LED = OFF" in the CONDITION which prevents the macro from being executed multiple times by any mistouch of the UDK. Without this condition, the relative value changes for Threshold and Mix Send could be executed multiple times in an additive or subtractive manner and the end values would be incorrect.
   The macro "to Stick" is the opposite of the macro "to Brush".   It is triggered by UDK C2 and will return the drum channels to their previous parameter values if no further parameter edits have been made from the point that "to Brush" was executed. If parameters have since been edited, the relative value changes will be applied to the new current values at the point that the next macro is executed.

[notes] There are two choices of "RelativeSet" in OPERATOR, "RelativeSet(+=)" and "RelativeSet(-=)". The former increases the value, whereas the latter decreases the value.

  The available relative value range is always defined by the absolute value range of the parameter type. As a result, if a relative value change is required that is greater than the available range, it is not possible to apply a single +dB relative value change that is greater than the absolute range. For example, the available range of fader level is -Inf to +10dB. But there are various easy solutions for this. For example, to achieve a relative fader level increase of +20dB, add a second atom also containing "RelativeSet(+=) +10dB", then each atom will apply +10dB resulting in a +20dB total change. Another way is to create an atom with the following operator and value "RelativeSet(-=) -20dB". The double negative results in a positive value being applied.

11. Monitor Mute

[background] In a location recording scenario where console and monitoring speakers must be placed in the same space as musicians, all speakers have to be easily muted before recording.

[behavior] When all faders of Ch1-Ch64 are below -75dB, both CUE OUTPUT are ON. When one or more faders of those faders are above -75dB, both CUE OUTPUTs are set to OFF.

  The macro "Monitor Mute" turns CUE outputs OFF and so monitoring speakers are muted when any input fader of Ch1-64 is open (more than -75dB). When all faders are pushed back down below -75dB, the monitoring speakers are unmuted by REVERSE ACTION.

[mechanism] The macro "Mute On/Off" realizes the behavior. Fader levels act as the trigger with the operator set to "More Than(>)".

[notes] none

12. Mix Send pre/post

[background] Mix1 is routed to a Side Fill speaker on stage. Input channels (Ch1-Ch32) are sent to the Mix1 sends (Post Fader). So there is a risk of audio feedback if input faders are pushed up to high. The macro "Mix send post to pre" changes the mix send point of input Ch 1-32 to Mix 1, from "post fader" to "pre fader" whenever the fader level of a channel exceeds 0dB, and vice versa, so the macro acts like a send level limiter which in turn helps to prevent on-stage feedback.

[behavior] When one of input channels Ch1-Ch32 is pushed up and exceeds 0dB, the send point from the channel to Mix1 is switched from "post fader" to "pre fader". When the fader is pulled down to under 0dB,

the send point is switched back to "post fader" again. The behavior only happens when the channel is ON.

[mechanism] The macro "Mix Send pre/post" is a parallel macro that is applied to a range of input channels (Ch1-Ch32). PARAL is enabled in all trigger, condition and action atoms. Both trigger and condition atoms are set to the same range of channels (Ch1-Ch32).

[notes] As previously noted, the PARAL option is used with one parameter type within a macro, in this case "InputChannel". But the range of the parameter can be set differently for each atom. In this MACRO, if the range of channels in the condition atom is set as [1:16], the condition only applies for those channels. From Ch17 upwards, Ch ON would not be considered by the Condition. So any channels which must remain Pre Fader at all times would then do so. Thus, care should be taken to not only turn PARAL ON, but also select correct channels.

Utility macros

1. Clear all UDKs

  This macro clears all UDKs by clearing all LED, Color and Labels settings through Bank A-D. It is useful to use this macro once between exploring each macro described in this guide to ensure that UDK's are in the correct state before enabling the next macro. This macro has no TRIGGER assignment, so it should be executed directly using the EXECUTE button in the macro list or in the macro edit view. Please note this macro also clears any LED, Color and labels from already existing assigned system level functions (like Tap Tempo, for example).

2. Clear pressed UDK (A) – (D)

  These macros are for clearing UDK individually. The pressing of MacroKey D31 is set as a condition, so the MacroKey has to be pressed and held to execute the ACTION. In each macro, all 12 keys of a UDK bank are selected and set as parallel. As previously mentioned, PARAL is usable for one parameter type in a macro, hence there are 4 macros in this case, for banks A,B,C,D.