



KSP Reference Manual

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2. CALLBACKS

2.1. General Information

- A callback is a section within a script that is being "called" (i.e. executed) at certain times.
- All callbacks start with `on <callback-name>` and end with `end on`.
- Callbacks can be stopped by using the command `exit`.
- Each callback has a unique ID number which can be retrieved with `$NI_CALLBACK_ID`
- You can query which callback triggered a function with `$NI_CALLBACK_TYPE` and the corresponding built-in constants.

Examples

```
function show_callback_type
  if ($NI_CALLBACK_TYPE = $NI_CB_TYPE_NOTE)
    message("Function was called from note callback!")
  end if
  if ($NI_CALLBACK_TYPE = $NI_CB_TYPE_CONTROLLER)
    message("Function was called from controller callback!")
  end if
end function

on note
  call show_callback_type
end on

on controller
  call show_callback_type
end on
```

Query the callback type in a function

See Also

`exit`

`$NI_CALLBACK_ID`

`$NI_CALLBACK_TYPE`

2.2. on async_complete

on async_complete

async complete callback, triggered after the execution of any load/save command or other commands which are async-enabled.

Remarks

To resolve synchronization issues, the commands listed in the "See Also" section return unique IDs when being used. Upon completion of the command's action, the `on async_complete` callback gets triggered and the built-in variable `$NI_ASYNC_ID` is updated with the ID of the command that triggered the callback. If the command was completed successfully (for example if the file was found and successfully loaded), the internal value `$NI_ASYNC_EXIT_STATUS` is set to 1, otherwise it is 0.

Examples

```
on init
  declare $load_midi_file_id
  declare ui_button $load_midi_file
end on

on ui_control ($load_midi_file)
  $load_midi_file_id := load_midi_file(<midifile-path>)
  while ($load_midi_file_id # -1)
    wait (1)
  end while
  message ("MIDI file loaded")
end on

on async_complete
  if ($NI_ASYNC_ID = $load_midi_file_id)
    $load_midi_file_id := -1
  end if
end on
```

Example that pauses the `ui_control` callback until the file is loaded

See Also

`$NI_ASYNC_EXIT_STATUS`

`$NI_ASYNC_ID`

Load/Save Commands

`set_voice_limit()`

`save_midi_file()`

`mf_insert_file()`

`mf_set_buffer_size()`

`mf_reset()`

`$ENGINE_PAR_EFFECT_TYPE`

`$ENGINE_PAR_EFFECT_SUBTYPE`

`set_engine_par()`

`set_zone_par()`

`set_loop_par()`

`set_sample()`

`purge_group()`

`load_ir_sample()`

MIR Commands

2.3. on controller

on controller

MIDI controller callback, executed whenever a CC, pitch bend or channel pressure message is received

Examples

```
on controller
  if (in_range($CC_NUM,0,127))
    message("CC Number: "& $CC_NUM&" - Value: " & %CC[$CC_NUM])
  else
    if ($CC_NUM = $VCC_PITCH_BEND)
      message("Pitchbend" & " - Value: " & %CC[$CC_NUM])
    end if
    if ($CC_NUM = $VCC_MONO_AT)
      message("Channel Pressure" & " - Value: "&%CC[$CC_NUM])
    end if
  end if
end on
```

Query CC, pitch bend and channel pressure data

See Also

set_controller()

ignore_controller

%CC[]

\$CC_NUM

\$VCC_PITCH_BEND

\$VCC_MONO_AT

2.4. on init

on init
Initialization callback, executed when the script was successfully analyzed

Remarks

The init callback will be executed when:

- clicking the "Apply" button in the script editor
- loading a script preset or an instrument
- restarting KONTAKT's audio engine by clicking the restart button in the Monitor/Engine tab or the restart button in KONTAKT's header
- loading a snapshot with `set_snapshot_type()` set to 0

Examples

```
on init
  declare ui_button $Sync
  declare ui_menu $time
  add_menu_item ($time,"16th",0)
  add_menu_item ($time,"8th",1)
  $Sync := 0 {sync is off by default, so hide menu}
  move_control ($time,0,0)
  move_control ($Sync,1,1)
  make_persistent ($Sync)
  make_persistent ($time)

  read_persistent_var ($Sync)
  if ($Sync = 1)
    move_control ($time,2,1)
  else
    move_control ($time,0,0)
  end if
end on
on ui_control ($Sync)
  if ($Sync = 1)
    move_control ($time,2,1)
  else
    move_control ($time,0,0)
  end if
end on
```

init callback with `read_persistent_var()`

```
on init
  declare ui_button $Sync
  move_control ($Sync,1,1)
  make_persistent ($Sync)

  declare ui_menu $time
  add_menu_item ($time,"16th",0)
  add_menu_item ($time,"8th",1)
  move_control ($time,0,0)
  make_persistent ($time)
end on

function show_menu
  if ($Sync = 1)
    move_control ($time,2,1)
  else
    move_control ($time,0,0)
  end if
end function

on persistence_changed
  call show_menu
end on

on ui_control ($Sync)
  call show_menu
end on
```

The same script functionality, now with persistence_changed callback

See Also

make_persistent()
read_persistent_var()
on persistence_changed

2.5. on listener

on listener

Listener callback, executed at definable time intervals or whenever a transport command is received

Remarks

The listener callback is executed at time intervals defined with the `set_listener()` command. It can also react to the host's transport start and stop command. This makes it the ideal callback for anything tempo-synced like sequencers, arpeggiators, MIDI file player etc.

- In some situations (like tempo changes within the host) ticks can be left out.

Examples

```
on init
  declare ui_knob $Test (0,99,1)
  declare $direction
  declare $tick_counter
  set_listener($NI_SIGNAL_TIMER_MS,10000)
end on

on listener
  if ($NI_SIGNAL_TYPE = $NI_SIGNAL_TIMER_MS)
    if ($direction = 0)
      inc($tick_counter)
    else
      dec($tick_counter)
    end if

    $Test := $tick_counter

    if ($tick_counter = 99)
      $direction := 1
    end if
    if ($tick_counter = 0)
      $direction := 0
    end if
  end if
end on
```

Not useful as such, but nice to look at

See Also

`set_listener()`

`change_listener_par()`

`$NI_SIGNAL_TYPE`

\$NI_SONG_POSITION

2.6. on note

on note

Note callback, executed whenever a note on message is received

Examples

```
on note
    message("Note Nr: " & $EVENT_NOTE & " - Velocity: " &
$EVENT_VELOCITY)
end on
```

Query note data

See Also

on release

ignore_event()

set_event_par()

get_event_par()

\$EVENT_NOTE

\$EVENT_VELOCITY

\$EVENT_ID

2.7. on persistence_changed

on persistence_changed

Executed after the init callback or whenever a snapshot has been loaded

Remarks

The `on persistence_changed` callback is called whenever the persistent variables change in an instrument, i.e. it is always executed after the init callback has been called and/or upon loading a snapshot.

Examples

```
on init
    set_snapshot_type(1) {init callback not executed upon snapshot
loading}
    reset_ksp_timer

    declare $init_flag {1 if init callback has been executed, 0
otherwise}
    $init_flag := 1

    declare ui_label $label (2,2)
    set_text($label,"init callback " & $KSP_TIMER)
end on

function add_text
    add_text_line($label,"persistence_changed callback " & $KSP_TIMER)
end function

on persistence_changed
    if ($init_flag = 1) {instrument has been loaded}
        call add_text
    else {snapshot has been loaded}
        set_text($label,"Snapshot loaded")
    end if

    $init_flag := 0
end on
```

Query if a snapshot or if an instrument has been loaded. This also demonstrates the ability to call functions upon initialization, i.e. the persistence callback acts as an extension to the init callback.

See Also

```
on init
read_persistent_var()
```

`set_snapshot_type()`

2.8. on pgs_changed

on pgs_changed
Executed whenever any pgs_set_key_val() command is executed in any script

Remarks

PGS stands for Program Global Storage and is a means of communication between script slots. See the chapter on PGS for more details.

Examples

```
on init
    pgs_create_key(FIRST_KEY, 1) {defines a key with 1 element}
    pgs_create_key(NEXT_KEY, 128){defines a key with 128 elements}
    declare ui_button $Push
end on

on ui_control($Push)
    pgs_set_key_val(FIRST_KEY, 0, 70 * $Push)
    pgs_set_key_val(NEXT_KEY, 0, 50 * $Push)
    pgs_set_key_val(NEXT_KEY, 127, 60 * $Push)
end on
```

Pressing the button...

```
on init
    declare ui_knob $First (0,100,1)
    declare ui_table %Next[128] (5,2,100)
end on

on pgs_changed

{checks if FIRST_KEY and NEXT_KEY have been declared}
    if(pgs_key_exists(FIRST_KEY) and pgs_key_exists(NEXT_KEY))
        $First := pgs_get_key_val(FIRST_KEY,0)
        %Next[0] := pgs_get_key_val(NEXT_KEY,0)
        %Next[127] := pgs_get_key_val(NEXT_KEY,127)
    end if
end on
```

... will change the controls in this example, regardless of the script slot order

See Also

pgs_create_key()
pgs_set_key_val()
pgs_get_key_val()

2.9. on poly_at

on poly_at

Polyphonic aftertouch callback, executed whenever a polyphonic aftertouch message is received

Examples

```
on init
  declare %note_id[128]
end on

on note
  %note_id[$EVENT_NOTE] := $EVENT_ID
end on

on poly_at
  change_tune(%note_id[$POLY_AT_NUM],%POLY_AT[$POLY_AT_NUM]*1000,0)
end on
```

A simple poly aftertouch to pitch implementation

See Also

%POLY_AT[]

\$POLY_AT_NUM

\$VCC_MONO_AT

2.10. on release

on release
Release callback, executed whenever a note off message is received

Examples

```
on init
  declare polyphonic $new_id
end on

on release
  wait(1000)
  $new_id := play_note($EVENT_NOTE,$EVENT_VELOCITY,0,100000)
  change_vol ($new_id, -24000,1)
end on
```

Creating an artificial release noise

See Also

```
on note
ignore_event()
```

2.11. on RPN/NRPN

on rpn/nrpn

RPN and NRPN callbacks, executed whenever a RPN or NRPN (registered/nonregistered parameter number) message is received

Examples

```
on rpn
  select ($RPN_ADDRESS)
    case 0
      message ("Pitch Bend Sensitivity"&" - Value: "& $RPN_VALUE)
    case 1
      message ("Fine Tuning" & " - Value: " & $RPN_VALUE)
    case 2
      message ("Coarse Tuning" & " - Value: " & $RPN_VALUE)
  end select
end on
```

Query standard RPN messages

See Also

on controller

set_rpn/set_nrpn

msb()/lsb()

\$RPN_ADDRESS

\$RPN_VALUE

2.12. on ui_control()

on ui_control(<variable>)

UI callback, executed whenever the user changes the respective UI element

Examples

```
on init
  declare ui_knob $Knob (0,100,1)
  declare ui_button $Button
  declare ui_switch $Switch
  declare ui_table %Table[10] (2,2,100)
  declare ui_menu $Menu
  add_menu_item ($Menu,"Entry 1",0)
  add_menu_item ($Menu,"Entry 2",1)
  declare ui_value_edit $VEdit (0,127,1)
  declare ui_slider $Slider (0,100)
end on
on ui_control ($Knob)
  message("Knob" & " (" & $ENGINE_UPTIME & ")")
end on
on ui_control ($Button)
  message("Button" & " (" & $ENGINE_UPTIME & ")")
end on
on ui_control ($Switch)
  message("Switch" & " (" & $ENGINE_UPTIME & ")")
end on
on ui_control (%Table)
  message("Table" & " (" & $ENGINE_UPTIME & ")")
end on
on ui_control ($Menu)
  message("Menu" & " (" & $ENGINE_UPTIME & ")")
end on
on ui_control ($VEdit)
  message("Value Edit" & " (" & $ENGINE_UPTIME & ")")
end on
on ui_control ($Slider)
  message("Slider" & " (" & $ENGINE_UPTIME & ")")
end on
```

Various UI controls and their corresponding callbacks

See Also

on ui_update

2.13. on ui_update

on ui_update
UI update callback, executed with every GUI change in KONTAKT

Remarks

This command is triggered with every GUI change in KONTAKT, so use it with caution.

Examples

```
on init
  declare ui_knob $Volume (0,1000000,1)
  set_knob_unit ($Volume,$KNOB_UNIT_DB)
  set_knob_defval ($Volume,630859)
  $Volume := _get_engine_par ($ENGINE_PAR_VOLUME, -1, -1, -1)
  set_knob_label ($Volume,_get_engine_par_disp...
    ($ENGINE_PAR_VOLUME, -1, -1, -1))
end on

on ui_update
  $Volume := _get_engine_par ($ENGINE_PAR_VOLUME, -1, -1, -1)
  set_knob_label($Volume,_get_engine_par_disp...
    ($ENGINE_PAR_VOLUME, -1, -1, -1))
end on

on ui_control ($Volume)
  _set_engine_par($ENGINE_PAR_VOLUME,$Volume, -1, -1, -1)
  set_knob_label ($Volume,_get_engine_par_disp...
    ($ENGINE_PAR_VOLUME, -1, -1, -1))
end on
```

Mirroring instrument volume with a KSP control

See Also

on ui_control()

3. VARIABLES

3.1. General Information

- All user defined variables must be declared in the `on init` callback.
- Variable names may contain only numbers, characters and the underscore (`_`).
- Please do not create variables with the prefixes below, as these prefixes are used for internal variables and constants.

`$NI_`

`$CONTROL_PAR_`

`$EVENT_PAR_`

`$ENGINE_PAR_`

3.2. \$ (int variable)

declare \$<int variable>
Declare a user-defined variable to store a single integer value

Examples

```
on init
  declare $test
  $test := -1
end on
```

Creating a variable

```
on init
  declare $test := -1
end on
```

Creating a variable, the same as above but shorter

See Also

```
on init
make_persistent()
read_persistent_var()
int_to_real()
real_to_int()
```

3.3. % (int array)

declare %<array-name>[<num-of-elements>]

Declare a user-defined array to store single integer values at specific indices

Remarks

- The maximum size of arrays is 1000000.
- The number of elements must be defined with a constant value, a standard variable cannot be used.
- It is possible to initialize an array with one value, see the second example below.

Examples

```
on init
  declare %presets[10*8] := (...
    {1}      8,8,8,0,  0,0,0,0,...
    {2}      8,8,8,8,  0,0,0,0,...
    {3}      8,8,8,8,  8,8,8,8,...
    {4}      0,0,5,3,  2,0,0,0,...
    {5}      0,0,4,4,  3,2,0,0,...
    {6}      0,0,8,7,  4,0,0,0,...
    {7}      0,0,4,5,  4,4,2,2,...
    {8}      0,0,5,4,  0,3,0,0,...
    {9}      0,0,4,6,  7,5,3,0,...
    {10}     0,0,5,6,  4,4,3,2)
end on
```

Creating an array for storing preset data

```
on init
  declare %presets[10*8] := (4)
end on
```

Quick way of initializing the same array with the value 4

See Also

Array and Group Commands

make_persistent()

3.4. ~ (real variable)

declare ~<real variable>
Declare a user-defined variable to store a single real value

Remarks

- Real numbers must always be defined using a decimal, even if the number is a whole number. For example 2.0 should be used instead of only 2.

Examples

```
on init
  declare ~test
  ~test := 0.5
end on
```

Creating a variable

```
on init
  declare ~test := 0.5
end on
```

Creating a variable, the same as above but shorter

See Also

```
on init
make_persistent()
read_persistent_var()
int_to_real()
real_to_int()
```

3.5. ? (real array)

```
declare ?<array-name>[<num-of-elements>]
```

Declare a user-defined array to store single real values at specific indices

Remarks

- The maximum size of arrays is 1000000.
- The number of elements must be defined with a constant integer value, a standard variable cannot be used.
- It is possible to initialize an array with one value, see the second example below.
- The commands `array_equal()` and `search()` do not work with arrays of real numbers.

Examples

```
on init
  declare ?presets[5*4] := (...
    {1}    1.0, 1.0, 1.0, 1.0, ...
    {2}    0.5, 0.7, 0.1, 0.5, ...
    {3}    1.0, 0.6, 0.6, 0.2, ...
    {4}    0.0, 0.0, 0.5, 0.3, ...
    {5}    0.0, 1.0, 0.4, 0.1)
end on
```

Creating an array for storing preset data

```
on init
  declare ?presets[10*8] := (1.0)
end on
```

Quick way of initializing the same array with the value 1.0

See Also

Array and Group Commands

`make_persistent()`

3.6. @ (string variable)

declare @<variable-name>

Declare a user-defined string variable to store text

Remarks

- You cannot declare and define a string variable in the same line of code as you can with an integer variable.
- It is possible to make string variables persistent.

Examples

```
on init
    declare @text
    @text := "Last received note number played or released: "
end on

on note
    message(@text & $EVENT_NOTE)
end on

on release
    message(@text & $EVENT_NOTE)
end on
```

Use string variables to display long text

See Also

!(string array)
 ui_text_edit
 make_persistent()

3.7. ! (string array)

```
declare !<array-name>[<num-of-elements>]
```

Declare a user-defined string array to store text strings at specified indices

Remarks

- The maximum size of arrays is 1000000.
- Just like with string variables, the contents of a string array cannot be defined on the same line as the declaration.

Examples

```
on init
  declare $count

  declare !note[12]
  !note[0] := "C"
  !note[1] := "Db"
  !note[2] := "D"
  !note[3] := "Eb"
  !note[4] := "E"
  !note[5] := "F"
  !note[6] := "Gb"
  !note[7] := "G"
  !note[8] := "Ab"
  !note[9] := "A"
  !note[10] := "Bb"
  !note[11] := "B"

  declare !name [128]
  while ($count < 128)
    !name[$count] := !note[$count mod 12] & (($count/12)-2)
    inc ($count)
  end while
end on

on note
  message("Note played: " & !name[$EVENT_NOTE])
end on
```

Creating a string array with all MIDI note names

See Also

@ (string variable)

3.8. const \$ (constant integer)

```
declare const $<variable-name>
```

Declare a user-defined constant to store a single integer value

Remarks

- As the name implies, the value of constant variables can only be read, not changed.
- It is quite common to capitalize the names of constants.

Examples

```
on init
  declare const $NUM_OF_PRESETS := 10
  declare const $NUM_OF_PARAMETERS := 5

  declare %preset_data[$NUM_OF_PRESETS * $NUM_OF_PARAMETERS]
end on
```

Creating constants – useful when creating preset arrays

See Also

```
on init
```

3.9. const ~ (real constant)

```
declare const ~<variable-name>
```

Declare a user-defined constant to store a single real value

Remarks

- As the name implies, the value of constant variables can only be read, not changed.
- It is quite common to capitalize the names of constants.

Examples

```
on init
  declare const ~BIG_NUMBER := 100000.0
  declare const ~SMALL_NUMBER := 0.00001
end on
```

See Also

```
on init
```

3.10. polyphonic \$ (polyphonic integer)

declare polyphonic \$<variable-name>

Declare a user-defined polyphonic variable to store a single integer value per note event

Remarks

- A polyphonic variable acts as a unique variable for each executed note event, avoiding conflicts in callbacks that are executed in parallel, for example when using `wait()`.
- A polyphonic variable retains its value in the release callback of the corresponding note.
- Polyphonic variables need much more memory than normal variables.
- Polyphonic variables can only be used in note and release callbacks.

Examples

```
on init
  declare polyphonic $a
  {declare $a}
end on

on note
  ignore_event($EVENT_ID)
  $a:= 0
  while ($a < 13 and $NOTE_HELD = 1)      play_note($EVENT_NOTE+
$a,$EVENT_VELOCITY,0,$DURATION_QUARTER/2)
    inc($a)
    wait($DURATION_QUARTER)
  end while
end on
```

To hear the effect of the polyphonic variable, play and hold an octave: both notes will ascend chromatically. Then make \$a a normal variable and play the octave again: \$a will be shared by both executed callbacks, thus both notes will ascend in larger intervals.

```
on init
  declare $counter
  declare polyphonic $polyphonic_counter
end on

on note
  message($polyphonic_counter & " " & $counter)
  inc($counter)
  inc($polyphonic_counter)
end on
```

Since a polyphonic variable is always unique per callback, \$polyphonic_counter will always be 0 in the displayed message

3.11. make_instr_persistent()

make_instr_persistent(<variable>)

Retain the value of a variable within the instrument only

Remarks

`make_instr_persistent()` is similar to `make_persistent()`, however the value of a variable is only saved with the instrument, not with snapshots. It can be used to prevent UI elements from being changed when loading snapshots.

Examples

```
on init

    set_snapshot_type(1) {init callback not executed upon snapshot
loading}

    declare ui_knob $knob_1 (0,2,1)
    set_text($knob_1, "Pers.")
    make_persistent($knob_1)

    declare ui_knob $knob_2 (0,2,1)
    set_text($knob_2, "Inst Pers.")
    make_instr_persistent ($knob_2)

    declare ui_knob $knob_3 (0,2,1)
    set_text($knob_3, "Not Pers.")

end on
```

The second knob will not be changed when loading snapshots

See Also

`read_persistent_var()`

`make_persistent()`

`set_snapshot_type()`

3.12. make_persistent()

make_persistent(<variable>)

Retain the value of a variable with the instrument and snapshot

Remarks

- The state of the variable is saved not only with the patch (or multi or host chunk), but also when a script is saved as a KONTAKT preset (.nkp file).
- The state of the variables is read at the end of the init callback. To load a stored value manually within the init callback, use `read_persistent_var()`.
- You can also use the `on_persistence` callback for retrieving the values of persistent variables
- When replacing script code by copy and replacing the text, the values of persistent variables are also retained.
- Sometimes, when working on more complex scripts, you'll want to "flush" the variables by resetting the script. You can do this by applying an empty script in the respective slot.

Examples

```
on init
  declare ui_knob $Preset (1,10,1)
  make_persistent ($Preset)
end on
```

User interface elements, such as knobs, should usually retain their value when reloading the instrument

See Also

`read_persistent_var()`

`on_persistence_changed`

`make_instr_persistence()`

3.13. read_persistent_var()

read_persistent_var(<variable>)

Instantly reloads the value of a variable that was saved via the `make_persistent()` command

Remarks

- This command can only be used within the `init` callback.
- The state of the variable is saved not only with the patch (or multi or host chunk), but also when a script is saved as a KONTAKT preset (.nkp file).
- When replacing script code by copy and replacing the text, the values of persistent variables is also retained.
- When working on more complex scripts, you might want to "flush" the variables by resetting the script. You can do this by applying an empty script in the respective slot.
- You can also use the `on_persistence` callback for retrieving the values of persistent variables.

Examples

```
on init
  declare ui_label $label (1,1)
  declare ui_button $button
  set_text($button,"$a := 10000")

  declare $a
  make_persistent($a)
  {read_persistent_var($a)}
  set_text ($label,$a)
end on

on ui_control ($button)
  $a := 10000
  set_text($label,$a)
end on
```

After applying this script, click on the button and then save and close the NKI. After reloading it, the label will display 0 because the value of \$a is initialized at the very end of the init callback. Now remove the {} around `read_persistent_var` and apply the script again.

See Also

`make_persistent()`

`on_persistence_changed`

3.14. watch_var()

watch_var(<variable>)

sends an event to the Creator Tools KSP Log for every change of the watched array cell's value

Remarks

- This command can only be used within the init callback.
- This command has no effect on Kontakt's status bar – the events only appear in Creator Tools.
- This command does not work with built-in variables

Examples

```
on init
  declare $intVar
  watch_var($intVar)
  make_persistent($intVar)

end on

on note
  $intVar := $EVENT_VELOCITY
end on
```

Try playing some notes while having Creator Tools running. Make sure you have the Variable Watching panel of the Debugger tool open.

3.15. watch_array_idx()

watch_array_idx(<array>, <array_idx>)

sends an event to the Creator Tools KSP Log for every change of the watched array cell's value

Remarks

- This command can only be used within the init callback.
- This command has no effect on Kontakt's status bar – the events only appear in Creator Tools.
- This command does not work with built-in arrays

Examples

```
on init
  declare %mykeys[128]
  watch_array_idx(%mykeys,60)
  watch_array_idx(%mykeys,61)
  watch_array_idx(%mykeys,62)
  watch_array_idx(%mykeys,63)
  watch_array_idx(%mykeys,64)

  declare ui_button
$save
  declare ui_button
$load
end on

on note
  %mykeys[$EVENT_NOTE]
:= $EVENT_VELOCITY
end on

on ui_control($save)
  save_array(%mykeys,0)
end on

on ui_control($load)
  load_array(%mykeys,0)
end on
```

Try playing some notes or clicking on the save and load buttons while having Creator Tools running. Make sure you have the Variable Watching panel of the Debugger tool open.

4. USER INTERFACE CONTROLS

4.1. ui_button

```
declare ui_button $<variable-name>
```

Create a user interface button

Remarks

- A button, i.e. its callback, is triggered when releasing the mouse (mouse-up).
- A button cannot be automated.

Examples

```
on init
  declare ui_button $free_sync_button
  $free_sync_button := 1
  set_text ($free_sync_button, "Sync")
  make_persistent ($free_sync_button)

  read_persistent_var($free_sync_button)
  if ($free_sync_button = 0)
    set_text ($free_sync_button, "Free")
  else
    set_text ($free_sync_button, "Sync")
  end if
end on

on ui_control ($free_sync_button)
  if ($free_sync_button = 0)
    set_text ($free_sync_button, "Free")
  else
    set_text ($free_sync_button, "Sync")
  end if
end on
```

A simple free/sync button implementation

See Also

ui_switch

4.2. ui_knob

declare ui_knob \$<variable-name>(<min>, <max>, <display-ratio>)	
Create a user interface knob	
<min>	The minimum value of the knob
<max>	The maximum value of the knob
<display-ratio>	The knob value is divided by <display-ratio> for display purposes

Examples

```
on init
  declare ui_knob $Knob_1 (0,1000,1)
  declare ui_knob $Knob_2 (0,1000,10)
  declare ui_knob $Knob_3 (0,1000,100)
  declare ui_knob $Knob_4 (0,1000,20)
  declare ui_knob $Knob_5 (0,1000,-10)
end on
```

Various display ratios

```

on init
  declare $count
  declare !note_class[12]
  !note_class[0] := "C"
  !note_class[1] := "Db"
  !note_class[2] := "D"
  !note_class[3] := "Eb"
  !note_class[4] := "E"
  !note_class[5] := "F"
  !note_class[6] := "Gb"
  !note_class[7] := "G"
  !note_class[8] := "Ab"
  !note_class[9] := "A"
  !note_class[10] := "Bb"
  !note_class[11] := "B"
  declare !note_names [128]
  while ($count < 128)
    !note_names[$count] := !note_class[$count mod 12] & (($count/
12)-2)
    inc ($count)
  end while

  declare ui_knob $Note (0,127,1)
  set_knob_label ($Note,!note_names[$Note])
  make_persistent ($Note)

  read_persistent_var($Note)
  set_knob_label ($Note,!note_names[$Note])
end on
on ui_control ($Note)
  set_knob_label ($Note,!note_names[$Note])
end on

```

Knob displaying MIDI note names

4.3. ui_file_selector

```
declare ui_file_selector $<variable-name>
```

Create a file selector

Remarks

Only three file selectors can be applied per script slot.

Examples

(See next page)

```

on init
    set_ui_height(5)

    declare @basepath
    {set browser path here, for example
    @basepath := "/Users/username/Desktop/MIDI Files/"}

    declare @file_name
    declare @file_path

    declare ui_file_selector $file_browser
    declare $browser_id
    $browser_id := get_ui_id($file_browser)

    set_control_par_str($browser_id,$CONTROL_PAR_BASEPATH,@basepath)

set_control_par($browser_id,$CONTROL_PAR_FILE_TYPE,$NI_FILE_TYPE_MIDI)
set_control_par($browser_id,$CONTROL_PAR_COLUMN_WIDTH,180)
set_control_par($browser_id,$CONTROL_PAR_HEIGHT,170)
set_control_par($browser_id,$CONTROL_PAR_WIDTH,550)
move_control_px($file_browser,66,2)

    declare ui_button $prev
    declare ui_button $next
    move_control($prev,5,1)
    move_control($next,6,1)

    declare $load_mf_id
    $load_mf_id := -1

end on
on async_complete
    if ($NI_ASYNC_ID = $load_mf_id)
        $load_mf_id := -1
        if ($NI_ASYNC_EXIT_STATUS = 0)
            message("MIDI file not found!")
        else
            message("Loaded MIDI File: " & @file_name)
        end if
    end if
end on
on ui_control ($file_browser)
    @file_name := fs_get_filename($browser_id,0)
    @file_path := fs_get_filename($browser_id,2)
    $load_mf_id := load_midi_file(@file_path)
end on
on ui_control ($prev)
    fs_navigate($browser_id,0)

```

```
    @file_name := fs_get_filename($browser_id,0)
    @file_path := fs_get_filename($browser_id,2)
    $load_mf_id := load_midi_file(@file_path)
    $prev := 0
end on
on ui_control ($next)
    fs_navigate($browser_id,1)
    @file_name := fs_get_filename($browser_id,0)
    @file_path := fs_get_filename($browser_id,2)
    $load_mf_id := load_midi_file(@file_path)
    $next := 0
end on
```

Loading MIDI files via UI file selector

4.4. ui_label

declare ui_label \$<variable-name> (<width>,<height>)	
Create a user interface text label	
<width>	The width of the label in grid units
<height>	The height of the label in grid units

Examples

```
on init
  declare ui_label $label_1 (1,1)
  set_text ($label_1,"Small Label")

  declare ui_label $label_2 (3,6)
  set_text ($label_2,"Big Label")
  add_text_line ($label_2,"...with a second text line")
end on
```

Two labels with different sizes

```
on init
  declare ui_label $label_1 (1,1)
  set_text ($label_1,"Small Label")
  hide_part ($label_1,$HIDE_PART_BG)
end on
```

Hide the background of a label (also possible with other UI elements)

See Also

```
set_text()
add_text_line()
hide_part()
```

4.5. ui_level_meter

```
declare ui_level_meter $<variable-name>
```

Create a level meter

Remarks

- The level meter can only be attached to the output levels of buses or the instrument master.

Examples

```
on init
  declare ui_level_meter $Level1
  declare ui_level_meter $Level2
  attach_level_meter (get_ui_id($Level1), -1, -1, 0, -1)
  attach_level_meter (get_ui_id($Level2), -1, -1, 1, -1)
end on
```

Creating two volume meters, with each displaying one channel of KONTAKT's instrument output

See Also

\$CONTROL_PAR_BG_COLOR

\$CONTROL_PAR_OFF_COLOR

\$CONTROL_PAR_ON_COLOR

\$CONTROL_PAR_OVERLOAD_COLOR

\$CONTROL_PAR_PEAK_COLOR

\$CONTROL_PAR_VERTICAL

attach_level_meter()

4.6. ui_menu

```
declare ui_menu $<variable-name>
```

Create a user interface drop-down menu

Examples

```
on init
  declare ui_menu $menu
  add_menu_item ($menu, "First Entry",0)
  add_menu_item ($menu, "Second Entry",1)
  add_menu_item ($menu, "Third Entry",2)
end on
```

A simple menu

```
on init
  declare $count
  declare ui_menu $menu

  $count := 1
  while ($count < 17)
    add_menu_item ($menu, "Entry Nr: " & $count,$count)
    inc ($count)
  end while
end on
```

Quickly create a menu with many entries

See Also

```
add_menu_item()
get_menu_item_str()
get_menu_item_value()
get_menu_item_visibility()
set_menu_item_str()
set_menu_item_value()
set_menu_item_visibility()
```

4.7. ui_mouse_area

declare ui_mouse_area

Create a user interface mouse area

Remarks

- A mouse area supports drag and drop of the following file types: audio (WAV, AIF, AIFF, NCW), MIDI and array (NKA).
- It is possible to define which types of files are accepted as drop targets, and whether to accept just one or multiple files.
- The mouse area widget is invisible, but the drop target can be shown or hidden like any other UI widget.

Examples

```
on init
  declare ui_mouse_area $waveDnD
  set_control_par(get_ui_id($waveDnD),
    $CONTROL_PAR_DND_ACCEPT_AUDIO, $NI_DND_ACCEPT_ONE)
  set_control_par(get_ui_id($waveDnD),
    $CONTROL_PAR_DND_ACCEPT_ARRAY,
    $NI_DND_ACCEPT_ONE)set_control_par(get_ui_id($waveDnD),
    $CONTROL_PAR_WIDTH,90)set_control_par(get_ui_id($waveDnD),
    $CONTROL_PAR_HEIGHT,32)set_control_par(get_ui_id($waveDnD),
    $CONTROL_PAR_RECEIVE_DRAG_EVENTS, 1)
end on
```

The on ui_control callback is triggered by a drop action. It has 3 built-in arrays:

```
!NI_DND_ITEMS_AUDIO
!NI_DND_ITEMS_MIDI
!NI_DND_ITEMS_ARRAY
```

Example UI callback

```
on ui_control ($waveDnD)
  if ($NI_MOUSE_EVENT_TYPE = $NI_MOUSE_EVENT_TYPE_DRAG)
    message("DRAG")
    message("MOUSE OVER CONTROL: " & $NI_MOUSE_OVER_CONTROL)
  end if

  if ($NI_MOUSE_EVENT_TYPE = $NI_MOUSE_EVENT_TYPE_DROP)
    if (num_elements(!NI_DND_ITEMS_AUDIO) = 1)
      wait_async(set_sample(%NI_USER_ZONE_IDS[0],
        !NI_DND_ITEMS_AUDIO[0]))
    end if
  end if
end on
```

See Also

`$NI_MOUSE_EVENT_TYPE`

`$NI_MOUSE_EVENT_TYPE_DND_DROP`

`$NI_MOUSE_EVENT_TYPE_DND_DRAG`

`$NI_MOUSE_OVER_CONTROL`

4.8. ui_panel

```
declare ui_panel $<variable-name>
```

Create a user interface panel

Remarks

A panel is a control that can contain one or multiple controls. Unlike the rest of the UI control types, panels don't have size. They are very useful for grouping controls that are meant to be handled together, then one can simultaneously modify the `$CONTROL_PAR_HIDE`, `$CONTROL_PAR_POS_X`, `$CONTROL_PAR_POS_Y` or `$CONTROL_PAR_Z_LAYER` properties of all the controls contained in that panel. The position of a contained control is relative to the panel's position. This means that the control's (0,0) position is the current (x,y) position of the panel.

Panels can be nested, so they can contain other panels. If panelA is contained in panelB, then panelA will appear in front of panelB. This is because children panels have a higher Z-Layer value than their parent panels. One could use this logic to easily create hierarchies in a performance view.

Examples

```
on init
    declare ui_panel $mixer
    declare ui_knob $volume(0,300,1)

    set_control_par(get_ui_id($volume), $CONTROL_PAR_PARENT_PANEL, get_ui_id($mixer))
end on
```

Adds the volume knob in the mixer panel

See Also

`$CONTROL_PAR_PARENT_PANEL`

4.9. ui_slider

declare ui_slider \$<variable-name> (<min>,<max>)	
Create a user interface slider	
<min>	The minimum value of the slider
<max>	The maximum value of the slider

Examples

```
on init
  declare ui_slider $test (0,100)
  set_control_par(get_ui_id($test),$CONTROL_PAR_DEFAULT_VALUE,50)
end on
```

Slider with default value

```
on init
  declare ui_slider $test (-100,100)
  $test := 0
  declare $id
  $id := get_ui_id($test)

  set_control_par($id,$CONTROL_PAR_MOUSE_BEHAVIOUR,2000)
  set_control_par($id,$CONTROL_PAR_DEFAULT_VALUE,0)
  set_control_par_str($id,$CONTROL_PAR_PICTURE,"K4_SLIDER_BIP_1")
end on
```

Creating a bipolar slider by loading a different picture background

See Also

ui_knob

set_control_par()

\$CONTROL_PAR_MOUSE_BEHAVIOUR

4.10. ui_switch

```
declare ui_switch $<variable-name>
```

Create a user interface switch

Remarks

- A switch, i.e. its callback, is triggered when clicking the mouse (mouse-down).
- A switch can be automated.

Examples

```
on init
  declare ui_switch $rec_button
  set_text ($rec_button, "Record")
  declare $rec_button_id
  $rec_button_id:= get_ui_id ($rec_button)

  set_control_par ($rec_button_id, $CONTROL_PAR_WIDTH, 60)
  set_control_par ($rec_button_id, $CONTROL_PAR_HEIGHT, 20)

  set_control_par ($rec_button_id, $CONTROL_PAR_TEXT_ALIGNMENT, 1)

  set_control_par ($rec_button_id, $CONTROL_PAR_POS_X, 250)
  set_control_par ($rec_button_id, $CONTROL_PAR_POS_Y, 5)
end on
```

Switch with various settings utilizing set_control_par()

See Also

ui_button

4.11. ui_table

declare ui_table %<array>[columns](<width>,<height>,<range>)	
Create a user interface table	
<width>	The width of the table in grid units
<height>	The height of the table in grid units
<range>	The range of the table. If negative values are used, a bipolar table is created.

Examples

```
on init
  declare ui_table %table_uni[10] (2,2,100)
  declare ui_table %table_bi[10] (2,2,-100)
end on
```

Unipolar and bipolar tables

```
on init
  declare ui_table %table[128] (5,2,100)
  declare ui_value_edit $Steps (1,127,1)
  $Steps := 16
  set_table_steps_shown (%table,$Steps)
end on
on ui_control ($Steps)
  set_table_steps_shown (%table,$Steps)
end on
```

Changes the amount of shown steps (columns) in a table

See Also

set_table_steps_shown()

\$NI_CONTROL_PAR_IDX

4.12. ui_text_edit

declare ui_text_edit @<variable-name>

Create a text edit field

Examples

```
on init

    declare ui_text_edit @label_name
    make_persistent(@label_name)

set_control_par_str(get_ui_id(@label_name), $CONTROL_PAR_TEXT, "empty")
set_control_par(get_ui_id(@label_name), $CONTROL_PAR_FONT_TYPE, 25)
set_control_par(get_ui_id(@label_name), $CONTROL_PAR_POS_X, 73)
set_control_par(get_ui_id(@label_name), $CONTROL_PAR_POS_Y, 2)

    declare ui_label $pattern_lbl(1,1)
    set_text($pattern_lbl, "")
    move_control_px($pattern_lbl, 66, 2)

end on

on ui_control (@label_name)
    message(@label_name & " it is!")
end on
```

A text edit field on top of a label

See Also

@ (string variable)

4.13. ui_value_edit

declare ui_value_edit \$<variable>(<min>, <max>, <\$display-ratio>)	
Create a user interface number box	
<min>	The minimum value of the value edit
<max>	The maximum value of the value edit
<display-ratio>	The value is divided by <display-ratio> for display purposes
You can also use \$VALUE_EDIT_MODE_NOTE_NAMES to display note names instead of numbers.	

Examples

```
on init
  declare ui_value_edit $test (0,100,$VALUE_EDIT_MODE_NOTE_NAMES)
  set_text ($test,"")
  set_control_par (get_ui_id($test),$CONTROL_PAR_WIDTH,45)
  move_control_px($test,66,2)
end on

on note
  $test := $EVENT_NOTE
end on
```

Value edit displaying note names

```
on init
  declare ui_value_edit $test (0,10000,1000)
  set_text ($test,"Value")
end on
```

Value edit with three decimal spaces

See Also

\$VALUE_EDIT_MODE_NOTE_NAMES

\$CONTROL_PAR_SHOW_ARROWS

4.14. ui_waveform

declare ui_waveform \$<variable>(<width>,<height>)	
Create a waveform control to display zones and slices. This can also be used to control specific parameters per slice and for drag and drop functionality.	
<width>	The width of the waveform in grid units
<height>	The height of the waveform in grid units

Examples

```
on init
  declare ui_waveform $Waveform(6,6)
  attach_zone ($Waveform, find_zone("Test"), 0)
end on
```

Displays the zone "Test" within the waveform control

See Also

set_ui_wf_property()

get_ui_wf_property()

attach_zone()

find_zone()

Waveform Flag Constants

Waveform Property Constants

\$CONTROL_PAR_WAVE_COLOR

\$CONTROL_PAR_BG_COLOR

\$CONTROL_PAR_WAVE_CURSOR_COLOR

\$CONTROL_PAR_SLICEMARKERS_COLOR

\$CONTROL_PAR_BG_ALPHA

4.15. ui_wavetable

```
declare ui_wavetable $ <variable>
```

create a wavetable widget, visualizing the state of a zone that is running in wavetable mode

Examples

```
on init
    declare ui_wavetable $wavetable
    set_control_par(get_ui_id($wavetable), $CONTROL_PAR_WT_ZONE,...
                    find_zone("Wavetable01"))
end on
```

displays the zone "Wavetable01" within the wavetable widget

See Also

set_control_par()

find_zone()

\$CONTROL_PAR_WT_VIS_MODE

 \$NI_WT_VIS_2D

 \$NI_WT_VIS_3D

\$CONTROL_PAR_WAVE_COLOR

\$CONTROL_PAR_BG_COLOR

\$CONTROL_PAR_BG_ALPHA

\$CONTROL_PAR_WAVE_COLOR

\$CONTROL_PAR_WAVE_ALPHA

\$CONTROL_PAR_WAVE_END_COLOR

\$CONTROL_PAR_WAVE_END_ALPHA

\$CONTROL_PAR_WAVETABLE_COLOR

\$CONTROL_PAR_WAVETABLE_ALPHA

\$CONTROL_PAR_WAVETABLE_END_COLOR

\$CONTROL_PAR_WAVETABLE_END_ALPHA

\$CONTROL_PAR_PARALLAX_X

\$CONTROL_PAR_PARALLAX_Y

\$CONTROL_PAR_WT_ZONE

4.16. ui_xy

```
declare ui_xy ?<array>[num-of-elements]
```

Create an XY pad

Remarks

- The range of each axis on the XY pad is always between 0.0 and 1.0.
- The number of cursors in the XY pad, i.e. the interactive elements, is defined by the size of the array. Each index in the array represents one axis of one cursor, so two indices are needed for each cursor. Applying this, if you wanted to create an XY pad with 3 cursors, then the size of the XY array would be 6 elements.
- The maximum size of the XY array is 32 elements, so the maximum number of cursors in the XY pad is 16.
- The even indices of the array hold the X axis value of the cursors, and the odd indices hold the Y axis values. So index 0 is the X value of the first cursor, and index 1 is the Y value of the first cursor.
- It is possible to define how the XY pad reacts to mouse interaction using the \$CONTROL_PAR_MOUSE_MODE parameter.
- Querying \$NI_MOUSE_EVENT_TYPE within the on ui_control() callback allows identification of the mouse event type that triggered it.

Examples

on init

```
{basic initialization}
message("")
make_perfview

set_ui_color(9dddddhh)
set_ui_height_px(350)

{create an XY pad with 2 cursors}
declare ui_xy ?myXY[4]

{store the UI ID of the XY pad}
declare $xyID
$xyID := get_ui_id(?myXY)

{skinning the cursors}
set_control_par_str_arr($xyID, $CONTROL_PAR_CURSOR_PICTURE, ...
    "Picture1", 0)
set_control_par_str_arr($xyID, $CONTROL_PAR_CURSOR_PICTURE, ...
    "Picture2", 2)

{set automation IDs and names}
set_control_par_arr($xyID, $CONTROL_PAR_AUTOMATION_ID, 0, 0)
set_control_par_arr($xyID, $CONTROL_PAR_AUTOMATION_ID, 1, 1)
set_control_par_arr($xyID, $CONTROL_PAR_AUTOMATION_ID, 2, 2)
set_control_par_arr($xyID, $CONTROL_PAR_AUTOMATION_ID, 3, 3)

set_control_par_str_arr($xyID, $CONTROL_PAR_AUTOMATION_NAME, ...
    "Cutoff", 0)
set_control_par_str_arr($xyID, $CONTROL_PAR_AUTOMATION_NAME, ...
    "Resonance", 1)
set_control_par_str_arr($xyID, $CONTROL_PAR_AUTOMATION_NAME, ...
    "Delay Pan", 2)
set_control_par_str_arr($xyID, $CONTROL_PAR_AUTOMATION_NAME, ...
    "Delay Feedback", 3)

{define the mouse behaviour}
set_control_par($xyID, $CONTROL_PAR_MOUSE_MODE, 0)
set_control_par($xyID, $CONTROL_PAR_MOUSE_BEHAVIOUR_X, 1000)
set_control_par($xyID, $CONTROL_PAR_MOUSE_BEHAVIOUR_Y, 1000)

{position and size}
set_control_par($xyID, $CONTROL_PAR_POS_X, 50)
set_control_par($xyID, $CONTROL_PAR_POS_Y, 50)
set_control_par($xyID, $CONTROL_PAR_WIDTH, 200)
```

```
set_control_par($xyID, $CONTROL_PAR_HEIGHT, 200)

{move the cursors to the center of the XY pad}
?myXY[0] := 0.5 {1st cursor, X axis}
?myXY[1] := 0.5 {1st cursor, Y axis}
?myXY[2] := 0.5 {2nd cursor, X axis}
?myXY[3] := 0.5 {2nd cursor, Y axis}

end on
```

Creating an XY pad control with two cursors, custom cursor images, and automation information

See Also

\$CONTROL_PAR_MOUSE_MODE

\$CONTROL_PAR_ACTIVE_INDEX

\$CONTROL_PAR_CURSOR_PICTURE

\$CONTROL_PAR_MOUSE_BEHAVIOUR_X

\$CONTROL_PAR_MOUSE_BEHAVIOUR_Y

set_control_par_arr()

set_control_par_str_arr()

\$HIDE_PART_CURSOR

\$NI_CONTROL_PAR_IDX

5. CONTROL STATEMENTS

5.1. if...else...end if

if...else...end if
A conditional if statement

Examples

```
on controller
  if (in_range($CC_NUM,0,127))
    message("CC Number: "& $CC_NUM&" - Value: " & %CC[$CC_NUM])
  else
    if ($CC_NUM = $VCC_PITCH_BEND)
      message("Pitchbend" & " - Value: " & %CC[$CC_NUM])
    end if
    if ($CC_NUM = $VCC_MONO_AT)
      message("Channel Pressure" & " - Value: "&%CC[$CC_NUM])
    end if
  end if
end on
```

Display different messages depending on the controller number

See Also

`select()`

5.2. select()

<code>select(<variable>)...end select</code>
Select statement

Remarks

- The `select` statement is similar to the `if` statement, except that it has an arbitrary number of branches. The expression after the `select` keyword is evaluated and matched against the single case branches, the first case branch that matches is executed.
- The case branches may consist of either a single constant number or a number range, expressed by the term "x to y").

Examples

```
on controller
  if ($CC_NUM = $VCC_PITCH_BEND)
    select (%CC[$VCC_PITCH_BEND])
      case -8192 to -1
        message("Pitch Bend down")
      case 0
        message("Pitch Bend center")
      case 1 to 8191
        message("Pitch Bend up")
    end select
  end if
end on
```

Query the state of the pitch bend wheel

See Also

`if...else...end if`

5.3. while()

while(<condition>)...end while
While loop

Examples

```
on note
```

```
    ignore_event($EVENT_ID)
```

```
    while($NOTE_HELD = 1)
```

```
        play_note($EVENT_NOTE, $EVENT_VELOCITY, 0, $DURATION_QUARTER/2)
```

```
        wait($DURATION_QUARTER)
```

```
    end while
```

```
end on
```

Repeating held notes at the rate of one quarter note

See Also

`$NOTE_HELD`

`wait()`

5.4. Boolean Operators

Boolean Operators	
<code>x > y</code>	Greater than
<code>x < y</code>	Less than
<code>x >= y</code>	Greater than or equal
<code>x <= y</code>	Less than or equal
<code>x = y</code>	Equal
<code>x # y</code>	Not equal
<code>in_range(x, y, z)</code>	True if x is between y and z
<code>not a</code>	True if a is false and vice versa
<code>a and b</code>	True if a is true and b is true
<code>a or b</code>	True if a is true or b is true

Remarks

- Boolean operators are used in `if` and `while` statements, since they return if the condition is either true or false. In the list above, `x`, `y` and `z` denote numerals, `a` and `b` stand for Boolean values.

6. ARITHMETIC COMMANDS & OPERATORS

6.1. Basic Operators

Basic operators	
The following operators work on both integers and real numbers.	
$x := y$	Assignment (the value of y is assigned to x)
$x + y$	Addition
$x - y$	Subtraction
$x * y$	Multiplication
x / y	Division
$-x$	Negative value
$\text{abs}(x)$	Absolute value

6.2. Integer Operators & Commands

The following commands and operators can only be performed on integer variables and values.

inc(x)
Increment an expression by 1 ($x + 1$)

dec(x)
Decrement an expression by 1 ($x - 1$)

x mod y
Modulo; returns the remainder of a division e.g. 13 mod 8 returns the value 5

6.3. Real Number Commands

The following commands can only be performed on real numbers.

exp(x)
Exponential function (returns the value of e^x)

log(x)
Logarithmic function

pow(x, y)
Power (returns the value of x^y)

sqrt(x)
Square root

6.4. Rounding Commands

Rounding commands can only be performed on real numbers.

ceil(x)
Ceiling (round up)
<code>ceil(2.3) = 3.0</code>

floor(x)
Floor (round down)
<code>floor(2.8) = 2.0</code>

round(x)
Round (round to nearest)
<code>round(2.3) = 2.0</code>
<code>round(2.8) = 3.0</code>

6.5. Trigonometric Commands

Trigonometric commands can only be performed on real numbers.

cos(x)
cosine function

sin(x)
sine function

tan(x)
tangent function

acos(x)
arccosine (inverse cosine function)

asin(x)
arcsine (inverse sine function)

atan(x)
arctangent (inverse tangent function)

6.6. Bit Operators

The following bit operators can be used:

Bit Operators	
x .and. y	Bitwise and
x .or. y	Bitwise or
.not. x	Bitwise negation
sh_left(<expression>,<shift-bits>)	Shifts the bits in <expression> by the amount of <shift-bits> to the left
sh_right(<expression>,<shift-bits>)	Shifts the bits in <expression> by the amount of <shift-bits> to the right

6.7. random()

random(<min>, <max>)

Generate a random integer in the range <min> to <max>

Examples

```
on init
  declare $rnd_amt
  declare $new_vel
end on

on note
  $rnd_amt := $EVENT_VELOCITY * 10/100
  $new_vel := random($EVENT_VELOCITY-$rnd_amt,$EVENT_VELOCITY+$rnd_amt)
  change_velo($EVENT_ID,$new_vel)
end on
```

Randomly changing velocities in by ± 10 percent

6.8. int_to_real()

int_to_real(<integer value>)
Converts an integer value into a real number

Examples

```
on init
  declare ~velocity_disp
end on

on note
  ~velocity_disp := int_to_real($EVENT_VELOCITY)/127.0
  message(~velocity_disp)
end on
```

Displays the event velocity in the range 0.0 to 1.0

See Also

real_to_int()

6.9. real_to_int()

real_to_int(<real value>)
Converts a real number into an integer

Remarks

- Using this process without any rounding function will cause the real value to be truncated, so performing this function both 2.2 and 2.8 will return an integer value of 2

Examples

```
on init
  declare $test_int
  declare ~test_real := 2.8

  $test_int := real_to_int(~test_real)
  message($test_int)
end on
```

Converting a variable from real to integer and then displaying it

See Also

int_to_real()

round()

ceil()

floor()

6.10. msb()

msb(<value>)

Return the MSB portion (most significant byte) of a 14 bit value

Examples

```
on rpn
  message(msb($RPN_VALUE))
end on
```

Commonly used when working with RPN and NRPN messages

```
on init
  declare ui_value_edit $Value (0,16383,1)
end on

on ui_control ($Value)
  message("MSB: " & msb($Value) & " - LSB: " & lsb($Value))
end on
```

Understanding MSB and LSB

See Also

lsb()

\$RPN_ADDRESS

\$RPN_VALUE

6.11. lsb()

lsb(<value>)
Return the LSB portion (least significant byte) of a 14 bit value

Examples

```
on rpn
  message(lsb($RPN_VALUE))
end on
```

Commonly used when working with RPN and NRPN messages

```
declare ui_value_edit $Value (0,16383,1)
end on

on ui_control ($Value)
  message("MSB: " & msb($Value) & " - LSB: " & lsb($Value))
end on
```

Understanding MSB and LSB

See Also

msb()

\$RPN_ADDRESS

\$RPN_VALUE

7. GENERAL COMMANDS

7.1. disable_logging()

disable_logging(<type>)	
Disables emission of messages, warnings or watched variable events to both the Kontakt status bar and Creator Tools	
<type>	The type of event the emission of which is disabled. Use one of the following: \$NI_LOG_MESSAGE, \$NI_LOG_WARNING or \$NI_LOG_WATCHING.

Remarks

- Only supported in the init callback

Examples

```
on init
  disable_logging($NI_LOG_MESSAGE)
  disable_logging($NI_LOG_WARNING)
  disable_logging($NI_LOG_WATCHING)
end on
```

Keep the lines above commented out while development and bring them back in right before shipping your product to disable any debugging-related content

See Also

watch_var()

watch_array_idx()

7.2. exit

exit
Immediately stops a callback or exits a function

Remarks

- `exit` is a very strong command. Be careful when using it, especially when dealing with larger scripts.
- If used within a function, `exit` only quits the function but not the entire callback.

Examples

```
on note
  if (not(in_range($EVENT_NOTE, 60, 71)))
    exit
  end if
  {from here on, only notes between C3 to B3 will be processed}
end on
```

Useful for quickly setting up key ranges to be affected by the script

See Also

`wait()`

`stop_wait()`

7.3. ignore_controller

ignore_controller

Ignore a controller event in a controller callback

Examples

```
on controller
  if ($CC_NUM = 1)
    ignore_controller
    set_controller($VCC_MONO_AT,%CC[1]
  end if
end on
```

Transform the mod wheel into aftertouch

See Also

ignore_event()

set_controller()

on controller

7.4. message()

message(<variable/text>)

Display text in the status line of KONTAKT

Remarks

- The message command is intended to be used for debugging and testing while programming a script. Since there is only one status line in KONTAKT, it should not be used as a generic means of communication with the user. Use a label instead.
- Make it a habit to write `message( "")` at the start of the init callback. You can then be sure that all previous messages (by the script or by the system) are deleted and you see only new messages.
- Messages defined in the init callback will only be displayed if the user manually applies the script by clicking on the APPLY button. These messages will not be displayed when an instrument loads and initializes the script automatically.

Examples

```
on init
    message("Hello, world!")
end on
```

The inevitable implementation of "Hello, world!" in KSP

```
on note
    message("Note " & $EVENT_NOTE & " received at " & ...
           $ENGINE_UPTIME & " milliseconds")
end on
```

Concatenating elements in a message() command

See Also

```
$ENGINE_UPTIME
$KSP_TIMER
reset_ksp_timer
declare ui_label
set_text()
```

7.5. note_off()

note_off(<ID-number>)	
Send a note off message to a specific note	
<ID-number>	The ID number of the note event

Remarks

- `note_off()` is equivalent to releasing a key, thus it will always trigger a release callback as well as the release portion of a volume envelope. Notice the difference between `note_off()` and `fade_out()`, since `fade_out()` works on voice level.

Examples

```
on controller
  if ($CC_NUM = 1)
    note_off($ALL_EVENTS)
  end if
end on
```

A custom "All Notes Off" implementation triggered by the mod wheel

```
on init
  declare polyphonic $new_id
end on

on note
  ignore_event($EVENT_ID)
  $new_id := play_note($EVENT_NOTE,$EVENT_VELOCITY,0,0)
end on

on release
  ignore_event($EVENT_ID)
  wait(200000)
  note_off($new_id)
end on
```

Delaying the release of each note by 200ms

See Also

`fade_out()`

`play_note()`

7.6. play_note()

play_note(<note-number>,<velocity>,<sample-offset>,<duration>)	
Generate a note, i.e. generate a note-on message followed by a note-off message	
<note-number>	The note number to be generated (0 - 127)
<velocity>	Velocity of the generated note (1 - 127)
<sample-offset>	Sample offset in microseconds
<duration>	Length of the generated note in microseconds
	This parameter also accepts two special values:
	-1: releasing the note which started the callback stops the sample
	0: the entire sample is played

Remarks

- In DFD mode, the sample offset is dependent on the Sample Mod (S.Mod) value of the respective zones. Sample offset value greater than the zone's S.Mod setting will be ignored and no sample offset will be applied.
- You can retrieve the event ID of the played note in a variable by writing:

```
variable> := play_note(<note>, <velocity>, <sample-offset>, <duration>)
```

Examples

```
on note
  play_note($EVENT_NOTE+12,$EVENT_VELOCITY,0,-1)
end on
```

Harmonizes the played note with the upper octave

```
on init
  declare $new_id
end on
on controller
  if ($CC_NUM = 64)
    if (%CC[64] = 127)
      $new_id := play_note(60,100,0,0)
    else
      note_off($new_id)
    end if
  end if
end on
```

Trigger a MIDI note by pressing the sustain pedal

See Also

`note_off()`

7.7. set_controller()

set_controller(<controller>,<value>)	
Send a MIDI CC, pitch bend or channel pressure value	
<controller>	This parameter sets the type, and in the case of MIDI CCs, sets the CC number: • A number from 0 to 127 designates a MIDI CC number • \$VCC_PITCH_BEND indicates pitch bend • \$VCC_MONO_AT indicates channel pressure (monophonic aftertouch)
<value>	The value of the specified controller: • MIDI CC and channel pressure values go from 0 to 127 • Pitch bend values go from -8192 to 8191

Remarks

- set_controller() should not be used within an init callback.

```
on note
  if ($EVENT_NOTE = 36)
    ignore_event($EVENT_ID)
    set_controller($VCC_MONO_AT,$EVENT_VELOCITY)
  end if
end on
on release
  if ($EVENT_NOTE = 36)
    ignore_event($EVENT_ID)
    set_controller($VCC_MONO_AT,0)
  end if
end on
```

If you have a keyboard with no aftertouch, press C1 instead

See Also

ignore_controller

\$VCC_PITCH_BEND

\$VCC_MONO_AT

7.8. set_rpn()/set_nrpn()

set_rpn(<address>, <value>)	
Send a RPN or NRPN message	
<address>	The RPN or NRPN address (0 - 16383)
<value>	The value of the RPN or NRPN message (0 - 16383)

Remarks

- KONTAKT cannot handle RPN or NRPN messages as external modulation sources. You can however use these message for simple inter-script communication.

See Also

on rpn/nrpn

set_controller

\$RPN_ADDRESS

\$RPN_VALUE

msb()

lsb()

7.9. set_snapshot_type()

set_snapshot_type(<type>)	
Configures the KSP processor behavior of all five slots when a snapshot is recalled	
<type>	The available types are: 0: The init callback will always be executed upon snapshot change, afterwards the on_persistence_changed callback will be executed (default behavior) 1: the init callback will not be executed upon loading a snapshot, only the on_persistence_callback will be executed

Remarks

- This command acts globally, i.e. it can be applied in any script slot.
- In snapshot type 1, the value of a non-persistent and instrument-persistence variable is preserved.
- Loading a snapshot always resets KONTAKT's audio engine, i.e. audio is stopped and all active events are deleted.

Examples

```

on init
    set_snapshot_type(1)

    declare ui_knob $knob_1 (0,127,1)
    set_text($knob_1,"Knob")
    make_persistent($knob_1)

    declare ui_button $gui_btn
    set_text($gui_btn,"Page 1")
end on
function show_gui
    if ($gui_btn = 1)

set_control_par(get_ui_id($knob_1),$CONTROL_PAR_HIDE,...
    $HIDE_PART_NOTHING)
    else

set_control_par(get_ui_id($knob_1),$CONTROL_PAR_HIDE,$HIDE_WHOLE_CONTROL
)
    end if
end function
on persistence_changed
    call show_gui
end on
on ui_control ($gui_btn)
    call show_gui
end on

```

Retaining the GUI upon loading snapshots

See Also

```

on init
on persistence_changed

```

8. EVENT COMMANDS

8.1. by_marks()

by_marks(<bit-mark>)
A user defined group of events (or event IDs)

Remarks

`by_marks()` is a user defined group of events which can be set with `set_event_mark()`. It can be used with all commands which utilize event IDs like `note_off()`, `change_tune()` etc.

Examples

```
on note
  if ($EVENT_NOTE mod 12 = 0) {if played note is a c}
    set_event_mark($EVENT_ID,$MARK_1)
    change_tune(by_marks($MARK_1),%CC[1]*1000,0)
  end if
end on

on controller
  if($CC_NUM = 1)
    change_tune(by_marks($MARK_1),%CC[1]*1000,0)
  end if
end on
```

Moving the mod wheel changes the tuning of all C notes (C-2, C-1...C8)

See Also

`set_event_mark()`

`$EVENT_ID`

`$ALL_EVENTS`

`$MARK_1 ... $MARK_28`

8.2. change_note()

change_note(<ID-number>,<note-number>)

Change the note number of a specific note event

Remarks

- change_note() is only allowed in the note callback and only works before the first wait() statement. If the voice is already running, only the value of the variable changes.
- Once the note number of a particular note event is changed, it becomes the new \$EVENT_NOTE
- It is not possible to address events via event groups like \$ALL_EVENTS

Examples

```
on init
  declare %black_keys[5] := (1,3,6,8,10)
end on

on note
  if (search(%black_keys,$EVENT_NOTE mod 12) # -1)
    change_note($EVENT_ID,$EVENT_NOTE-1)
  end if
end on
```

Constrain all notes to white keys, i.e. C major

See Also

\$EVENT_NOTE

change_velo()

8.3. change_pan()

change_pan(<ID-number>,<panorama>,<relative-bit>)	
Change the pan position of a specific note event	
<ID-number>	The ID number of the note event to be changed
<panorama>	The pan position of the note event, from -1000 (left) to 1000 (right)
<relative-bit>	If the relative bit is set to 0, the amount is absolute, i.e. the amount overwrites any previous set values of that event. If set to 1, the amount is relative to the actual value of the event. The different implications are only relevant with more than one change_pan() statement applied to the same event.

Remarks

- change_pan() works on the note event level and does not change any panorama settings in the instrument itself. It is also not related to any modulations regarding panorama.

Examples

```
on init
  declare $pan_position
end on
on note
  $pan_position := ($EVENT_NOTE * 2000 / 127) - 1000
  change_pan ($EVENT_ID,$pan_position,0)
end on
```

Panning the entire key range from left to right, i.e. C-2 all the way left, G8 all the way right

```
on note
  if ($EVENT_NOTE < 60)
    change_pan ($EVENT_ID,1000,0)
    wait(5000000)
    change_pan ($EVENT_ID,-1000,0) {absolute, pan is at -1000}
  else
    change_pan ($EVENT_ID,1000,1)
    wait(5000000)
    change_pan ($EVENT_ID,-1000,1) {relative, pan is at 0}
  end if
end on
```

Notes below C3 utilize a relative bit of 0. C3 and above utilize a relative bit of 1

See Also

change_vol()

`change_tune()`

8.4. change_tune()

change_tune(<ID-number>,<tune-amount>,<relative-bit>)	
Change the tuning of a specific note event in millicent.	
<ID-number>	The ID number of the note event to be changed.
<tune-amount>	The tune amount in millicents. 100000 equals 100 cent, i.e. a half tone.
<relative-bit>	If the relative bit is set to 0, the amount is absolute, i.e. the amount overwrites any previous set values of that event. If it is set to 1, the amount is relative to the actual value of the event. The different implications are only relevant with more than one change_tune() statement applied to the same event.

Remarks

- change_tune() works on the note event level and does not change any tune settings in the instrument itself. It is also not related to any modulations regarding tuning.

Examples

```
on init
  declare $tune_amount
end on

on note
  $tune_amount := random(-50000,50000)
  change_tune ($EVENT_ID,$tune_amount,1)
end on
```

Randomly detune every played note by ± 50 cent

See Also

change_vol()

change_pan()

8.5. change_velo()

change_velo(<ID-number>, <velocity>)

Change the velocity of a specific note event

Remarks

- change_velo() is only allowed in the note callback and only works before the first wait() statement. If the voice is already running, only the value of the variable changes.
- Once the velocity of a particular note event is changed, it becomes the new \$EVENT_VELOCITY
- It is not possible to address events via event groups like \$ALL_EVENTS

Examples

```
on note
  change_velo ($EVENT_ID, 100)
  message($EVENT_VELOCITY)
end on
```

All velocities are set to 100. Note that \$EVENT_VELOCITY will also change to 100.

See Also

\$EVENT_VELOCITY

change_note()

8.6. change_vol()

change_vol(<ID-number>,<volume>,<relative-bit>)	
Change the volume of a specific note event in millidecibel	
<ID-number>	The ID number of the note event to be changed
<volume>	The volume change in millidecibel
<relative-bit>	If the relative bit is set to 0, the amount is absolute, i.e. the amount overwrites any previous set values of that event. If it is set to 1, the amount is relative to the actual value of the event. The different implications are only relevant with more than one change_vol() statement applied to the same event.

Remarks

- change_vol() works on the note event level and does not change any tune settings in the instrument itself. It is also not related to any MIDI modulations regarding volume (e.g. MIDI CC7).

Example

```
on init
  declare $vol_amount
end on

on note
  $vol_amount := (($EVENT_VELOCITY - 1) * 12000/126) - 6000
  change_vol ($EVENT_ID,$vol_amount,1)
end on
```

A simple dynamic expander: lightly played notes will be softer, harder played notes will be louder

See ALSO

change_tune()
 change_pan()
 fade_in()
 fade_out()

8.7. delete_event_mark()

delete_event_mark(<ID-number>,<bit-mark>)	
Delete an event mark, i.e. ungroup the specified event from an event group	
<ID-number>	The ID number of the event to be ungrouped
<bit-mark>	Here you can enter one of 28 marks from \$MARK_1 to \$MARK_28, which is assigned to the event.

See Also

set_event_mark()

by_marks()

\$EVENT_ID

\$ALL_EVENTS

\$MARK_1 ... \$MARK_28

8.8. event_status()

event_status(<ID-number>)

Retrieve the status of a particular note event, or MIDI event in the multi script.

The note can either be active, then this function returns.

\$EVENT_STATUS_NOTE_QUEUE (or \$EVENT_STATUS_MIDI_QUEUE in the multi script)

or inactive, then the function returns

\$EVENT_STATUS_INACTIVE

Remarks

event_status() can be used to find out if a note event is still "alive" or not.

Examples

```
on init
  declare %key_id[128]
end on

on note
  if (event_status(%key_id[$EVENT_NOTE])= $EVENT_STATUS_NOTE_QUEUE)
    fade_out(%key_id[$EVENT_NOTE],10000,1)
  end if
  %key_id[$EVENT_NOTE] := $EVENT_ID
end on
```

Limit the number of active note events to one per MIDI key

See Also

\$EVENT_STATUS_INACTIVE

\$EVENT_STATUS_NOTE_QUEUE

\$EVENT_STATUS_MIDI_QUEUE

get_event_ids()

8.9. fade_in()

fade_in(<ID-number>,<fade-time>)	
Perform a fade-in for a specific note event	
<ID-number>	The ID number of the note event to be faded in
<fade-time>	The fade-in time in microseconds

Examples

```
on init
  declare $note_1_id
  declare $note_2_id
end on

on note
  $note_1_id := play_note($EVENT_NOTE+12,$EVENT_VELOCITY,0,-1)
  $note_2_id := play_note($EVENT_NOTE+19,$EVENT_VELOCITY,0,-1)
  fade_in ($note_1_id,10000000)
  fade_in ($note_2_id,50000000)
end on
```

Fading in the first two harmonics

See Also

change_vol()

fade_out()

8.10. fade_out()

fade_out(<ID-number>,<fade-time>,<stop-voice>)	
Perform a fade-out for a specific note event	
<ID-number>	The ID number of the note event to be faded in
<fade-time>	The fade-in time in microseconds
<stop-voice>	If set to 1 , the voice is stopped after the fade out
	If set to 0 , the voice will still be running after the fade out

Examples

```
on controller
  if ($CC_NUM = 1)
    if (%CC[1] mod 2 # 0)
      fade_out($ALL_EVENTS, 5000, 0)
    else
      fade_in($ALL_EVENTS, 5000)
    end if
  end if
end on
```

Use the mod wheel on held notes to create a stutter effect

```
on controller
  if ($CC_NUM = 1)
    fade_out($ALL_EVENTS, 5000, 1)
  end if
end on
```

A custom "All Sound Off" implementation triggered by the mod wheel

See Also

[change_vol\(\)](#)

[fade_in\(\)](#)

8.11. get_event_ids()

get_event_ids(<array-name>)	
Fills the specified array with all active event IDs. The command overwrites all existing values as long as there are events, and writes 0 if no events are active anymore.	
<array-name>	Array to be filled with active event IDs

Examples

```
on init
  declare const $ARRAY_SIZE := 500
  declare %test_array[$ARRAY_SIZE]
  declare $a
  declare $note_count
end on

on note
  get_event_ids(%test_array)
  $a := 0
  $note_count := 0
  while($a < $ARRAY_SIZE and %test_array[$a] # 0)
    inc($note_count)
    inc($a)
  end while
  message("Active Events: " & $note_count)
end on
```

Monitoring the number of active events

See Also

event_status()

ignore_event()

8.12. get_event_par()

get_event_par (<ID-number>, <parameter>)	
Return the value of a specific event parameter of the specified event	
<ID-number>	The ID number of the event
<parameter>	The event parameter, either one of four freely assignable event parameters: \$EVENT_PAR_0 \$EVENT_PAR_1 \$EVENT_PAR_2 \$EVENT_PAR_3 or the "built-in" parameters of a note event: \$EVENT_PAR_VOLUME \$EVENT_PAR_PAN \$EVENT_PAR_TUNE \$EVENT_PAR_NOTE \$EVENT_PAR_VELOCITY \$EVENT_PAR_SOURCE \$EVENT_PAR_PLAY_POS \$EVENT_PAR_ZONE_ID (use with caution, see below)

Remarks

A note event always carries certain information like the note number, the played velocity, but also volume, pan and tune. With `set_event_par ( )`, you can set either these parameters or use the freely assignable parameters like `$EVENT_PAR_0`. This is especially useful when chaining scripts, i.e. set an event parameter for an event in slot 1, then retrieve this information in slot 2 by using `get_event_par ( )`.

Examples

(see next page)

```
on note
  message(get_event_par($EVENT_ID, $EVENT_PAR_NOTE))
end on
```

The same functionality as `message($EVENT_NOTE)`

```
on note
  message(get_event_par($EVENT_ID,$EVENT_PAR_SOURCE))
end on
```

Check if the event comes from outside (-1) or if it was created in one of the five script slots (0-4)

```
on note
  wait(1)
  message(get_event_par($EVENT_ID,$EVENT_PAR_ZONE_ID))
end on
```

Note that in the above example, an event itself does not carry a zone ID (only a voice has zone IDs), therefore you need to insert `wait(1)` in order to retrieve the zone ID.

See Also

`set_event_par()`

`ignore_event()`

`set_event_par_arr()`

`get_event_par_arr()`

8.13. get_event_par_arr()

get_event_par_arr(<ID-number>,<parameter>,<group-index>)	
Special form of get_event_par (), used to retrieve the group allow state of the specified event	
<ID-number>	The ID number of the note event
<parameter>	In this case, only \$EVENT_PAR_ALLOW_GROUP
<group-index>	The index of the group for retrieving the specified note's group allow state

Remarks

- get_event_par_arr() is a special form (or to be more precise, it's the array variant) of get_event_par(). It is used to retrieve the allow state of a specific event. It will return 1 if the specified group is allowed and 0 if it's disallowed.

Examples

```
on init
  declare $count
  declare ui_label $label (2,4)
  set_text ($label,"")
end on

on note
  set_text($label,"")
  $count := 0
  while($count < $NUM_GROUPS)

    if (get_event_par_arr($EVENT_ID,$EVENT_PAR_ALLOW_GROUP,$count)
= 1)
      add_text_line($label,"Group ID " & $count & " allowed")
    else
      add_text_line($label,"Group ID " & $count & " disallowed")
    end if

    inc($count)
  end while
end on
```

A simple group monitor

See Also

set_event_par_arr()

get_event_par()

\$EVENT_PAR_ALLOW_GROUP

%GROUPS_AFFECTED

8.14. ignore_event()

ignore_event(<ID-number>)

Ignore a note event in a note on or note off callback

Remarks

- If you ignore an event, any volume, tune or pan information is lost. You can however retrieve this information with `get_event_par()`, see the two examples below.
- `ignore_event()` is a very "strong" command. Always check if you can get the same results with the various `change_xxx()` commands without having to ignore the event.

Examples

```
on note
  ignore_event($EVENT_ID)
  wait (500000)
  play_note($EVENT_NOTE,$EVENT_VELOCITY,0,-1)
end on
```

Delaying all notes by 0.5s. Not bad, but if you, for example insert a microtuner before this script, the tuning information will be lost.

```
on init
  declare $new_id
end on

on note
  ignore_event($EVENT_ID)
  wait (500000)
  $new_id := play_note($EVENT_NOTE,$EVENT_VELOCITY,0,-1)

  change_vol($new_id,get_event_par($EVENT_ID,$EVENT_PAR_VOLUME),1)
  change_tune($new_id,get_event_par($EVENT_ID,$EVENT_PAR_TUNE),1)
  change_pan($new_id,get_event_par($EVENT_ID,$EVENT_PAR_PAN),1)
end on
```

Better: the tuning (plus volume and pan to be precise) information is retrieved and applied to the played note

See Also

`ignore_controller`
`get_event_par()`

8.15. set_event_mark()

set_event_mark(<ID-number>, <bit-mark>)	
Assign the specified event to a specific event group	
<ID-number>	The ID number of the event to be grouped
<bit-mark>	Here you can enter one of 28 marks from \$MARK_1 to \$MARK_28 which is assigned to the event. You can also assign more than one mark to a single event, either by typing the command or by using the + operator.

Remarks

When dealing with commands that deal with event IDs, you can group events by using `by_marks(<bit-mark>)` instead of the individual ID, as the program needs to know that you want to address marks and not IDs.

Examples

```
on init
  declare $new_id
end on

on note

  set_event_mark($EVENT_ID, $MARK_1)

  $new_id := play_note($EVENT_NOTE + 12, 120, 0, -1)
  set_event_mark($new_id, $MARK_1 + $MARK_2)

  change_pan(by_marks($MARK_1), -1000, 1) {both notes panned to left}
  change_pan(by_marks($MARK_2), 2000, 1) {new note panned to right}

end on
```

The played note belongs to group 1, the harmonized belongs to group 1 and group 2

See Also

`by_marks()`
`delete_event_mark()`
`$EVENT_ID`
`$ALL_EVENTS`
`$MARK_1 ... $MARK_28`

8.16. set_event_par()

set_event_par(<ID-number>,<parameter>,<value>)	
Assign a parameter to a specific event	
<ID-number>	The ID number of the event
<parameter>	The event parameter, either one of four freely assignable event parameters: \$EVENT_PAR_0 \$EVENT_PAR_1 \$EVENT_PAR_2 \$EVENT_PAR_3 or the "built-in" parameters of a note event: \$EVENT_PAR_VOLUME \$EVENT_PAR_PAN \$EVENT_PAR_TUNE \$EVENT_PAR_NOTE \$EVENT_PAR_VELOCITY
<value>	The value of the event parameter

Remarks

- A note event always "carries" certain information like the note number, the played velocity, but also volume, pan and tune. With `set_event_par()`, you can set either these parameters or use the freely assignable parameters like `$EVENT_PAR_0`. This is especially useful when chaining scripts, i.e. set an event parameter for an event in slot 1, then retrieve this information in slot 2 by using `get_event_par()`.
- The event parameters are not influenced by the system scripts anymore.

Examples

```
on note
  set_event_par($EVENT_ID,$EVENT_PAR_NOTE,60)
end on
```

Setting all notes to middle C3, same as `change_note($EVENT_ID,60)`

See Also

`get_event_par()`
`ignore_event()`

`set_event_par_arr()`

`get_event_par_arr()`

8.17. set_event_par_arr()

set_event_par_arr(<ID-number>,<parameter>,<value>,<groupindex>)	
Special form of set_event_par (), used to set the group allow state of the specified event.	
<ID-number>	The ID number of the note event.
<parameter>	In this case, only \$EVENT_PAR_ALLOW_GROUP can be used.
<value>	If set to 1 , the group set with <groupindex> will be allowed for the event.
	If set to 0 , the group set with <groupindex> will be disallowed for the event.
<group-index>	The index of the group for changing the specified note's group allow state.

Remarks

- set_event_par_arr() is a special form (or to be more precise, it's the array variant) of set_event_par(). It is used to set the allow state of a specific event.

Examples

```
on note
  if (get_event_par_arr($EVENT_ID,$EVENT_PAR_ALLOW_GROUP,0) = 0)
    set_event_par_arr($EVENT_ID,$EVENT_PAR_ALLOW_GROUP,1,0)
  end if
end on
```

Making sure the first group is always played

See Also

allow_group()

disallow_group()

get_event_par_arr()

set_event_par()

\$EVENT_PAR_ALLOW_GROUP

9. ARRAY COMMANDS

9.1. array_equal()

array_equal(<array-variable>, <array-variable>)
Checks the values of two arrays. True if all values are equal, false if not

Remarks

This command does not work with arrays of real numbers.

Examples

```
on init
  declare %array_1[10]
  declare %array_2[11]

  if (array_equal(%array_1,%array_2))
    message($ENGINE_UPTIME)
  end if
end on
```

This script will produce an error message as the two arrays don't have the same size

See Also

sort()

num_elements()

search()

9.2. num_elements()

num_elements(<array-variable>)
Returns the number of elements in an array

Remarks

With this function you can, e.g., check how many groups are affected by the current event by using `num_elements(%GROUPS_AFFECTED)`.

Examples

```
on note
  message(num_elements(%GROUPS_AFFECTED))
end on
```

Outputs the number of groups playing

See Also

`array_equal()`

`sort()`

`search()`

`%GROUPS_AFFECTED`

9.3. search()

search(<array-variable>, <value>)

Searches the specified array for the specified value and returns the index of its first position. If the value is not found, the function returns -1.

Remarks

This command does not work with arrays of real numbers.

Examples

```
on init
  declare ui_table %array[10] (2,2,5)
  declare ui_button $check
  set_text ($check, "Zero present?")
end on

on ui_control ($check)
  if (search(%array, 0) = -1)
    message ("No")
  else
    message ("Yes")
  end if
  $check := 0
end on
```

Checking if a specific value is present

See Also

array_equal()

num_elements()

sort()

9.4. sort()

sort(<array-variable>, <direction>)

Sorts an array in ascending or descending order.

With direction = 0, the array is sorted in ascending order.

With direction # 0, the array is sorted in descending order.

Examples

```
on init
  declare $count
  declare ui_table %array[128] (3,3,127)

  while ($count < 128)
    %array[$count] := $count
    inc($count)
  end while
  declare ui_button $Invert
end on

on ui_control ($Invert)
  sort(%array, $Invert)
end on
```

Quickly inverting a linear curve display

See Also

array_equal()

num_elements()

sort()

10. GROUP COMMANDS

10.1. allow_group()

allow_group(<group-index>)

Allows the specified group, i.e. makes it available for playback

Remarks

- The numbering of the group index is zero-based, i.e. the first group has the group index 0.
- The groups can only be changed if the voice is not running.

Examples

```
on note
    disallow_group($ALL_GROUPS)
    allow_group(0)
end on
```

Only the first group will play back

See Also

\$ALL_GROUPS

\$EVENT_PAR_ALLOW_GROUP

disallow_group()

set_event_par_arr()

10.2. disallow_group()

disallow_group(<group-index>)

Disallows the specified group, i.e. makes it unavailable for playback

Remarks

- The numbering of the group index is zero-based, i.e. the first group has the group index 0.
- The groups can only be changed if the voice is not running.

Examples

```
on init
  declare $count
  declare ui_menu $groups_menu

  add_menu_item ($groups_menu, "Play All", -1)
  while ($count < $NUM_GROUPS)
    add_menu_item ($groups_menu, "Mute: " &
group_name($count), $count)
    inc($count)
  end while
end on

on note
  if ($groups_menu # -1)
    disallow_group($groups_menu)
  end if
end on
```

Muting one specific group of an instrument

See Also

\$ALL_GROUPS

\$EVENT_PAR_ALLOW_GROUP

allow_group()

set_event_par_arr()

10.3. find_group()

<code>find_group(<group-name>)</code>
Returns the group index for the specified group name

Remarks

If no group with the specified name is found, this command will return a value of zero. This can cause problems as this is the group index of the first group, so be careful when using this command.

Examples

```
on note
  disallow_group(find_group("Accordion"))
end on
```

A simple, yet useful script

See Also

`allow_group()`

`disallow_group`

`group_name()`

10.4. get_purge_state()

get_purge_state(<group-index>)	
Returns the purge state of the specified group:	
0: The group is purged.	
1: The group is not purged, i.e. the samples are loaded.	
<group-index>	The index number of the group that should be checked.

Examples

```
on init
  declare ui_button $purge
  declare ui_button $checkpurge
  set_text ($purge,"Purge 1st Group")
  set_text ($checkpurge,"Check purge status")
end on

on ui_control ($purge)
  purge_group(0,abs($purge-1))
end on

on ui_control ($checkpurge)
  if (get_purge_state(0) = 0)
    message("Group is purged.")
  else
    message("Group is not purged.")
  end if
end on
```

A simple purge check

See Also

`purge_group()`

10.5. group_name()

group_name(<group-index>)

Returns the group name for the specified group

Remarks

The numbering of the group index is zero-based, i.e. the first group has the group index 0.

Examples

```
on init
  declare $count
  declare ui_menu $groups_menu

  $count := 0
  while ($count < $NUM_GROUPS)
    add_menu_item ($groups_menu, group_name($count), $count)
    inc($count)
  end while
end on
```

Quickly creating a menu with all available groups

```
on init
  declare $count
  declare ui_label $label (2,6)
  set_text($label, "")
end on
on note
  $count := 0
  while ($count < num_elements(%GROUPS_AFFECTED))
    add_text_line($label, group_name(%GROUPS_AFFECTED[$count]))
    inc($count)
  end while
end on
on release
  set_text($label, "")
end on
```

Display the names of the sounding groups

See Also

\$ALL_GROUPS

\$NUM_GROUPS

allow_group()

disallow_group()

`find_group()`

`output_channel_name()`

10.6. purge_group()

purge_group(<group-index>, <mode>)	
Purges (i.e. unloads from RAM) the samples of the specified group	
<group-index>	The index number of the group which contains the samples to be purged.
<mode>	If set to 0, the samples of the specified group are unloaded. If set to 1, the samples are reloaded.

Remarks

- When using `purge_group()` in a while loop, don't use any wait commands within the loop.
- `purge_group()` can only be used a UI and `persistence_changed` callback.
- It is recommended to not use the `purge_group()` command in the callback of an automatable control.
- It is now possible to supply an `async ID` to the `purge_group()` function and get a return in the `async_complete` callback.

Examples

```
on init
  declare ui_button $purge
  set_text ($purge, "Purge 1st Group")
end on

on ui_control ($purge)
  purge_group(0, abs($purge-1))
end on

on async_complete
  if (get_purge_state(0) = 0)
    message("Group is purged")
  else
    message("Group is not purged")
  end if
end on
```

Unloading all samples of the first group

See Also

`get_purge_state`

11. TIME-RELATED COMMANDS

11.1. change_listener_par()

change_listener_par(<signal-type>,<parameter>)	
Changes the parameters of the on listener callback. It can be used in every callback.	
<signal-type>	The signal to be changed, can be either: \$NI_SIGNAL_TIMER_MS \$NI_SIGNAL_TIMER_BEAT
<parameter>	Dependent on the specified signal type: \$NI_SIGNAL_TIMER_MS Time interval in microseconds \$NI_SIGNAL_TIMER_BEAT Time interval in fractions of a beat/quarter note

Examples

```

on init

  declare ui_value_edit $Tempo (20,300,1)
  $Tempo := 120

  declare ui_switch $Play

  set_listener($NI_SIGNAL_TIMER_MS,60000000 / $Tempo)

end on

on listener
  if ($NI_SIGNAL_TYPE = $NI_SIGNAL_TIMER_MS and $Play = 1)
    play_note(60,127,0,$DURATION_EIGHTH)
  end if
end on

on ui_control($Tempo)
  change_listener_par($NI_SIGNAL_TIMER_MS,60000000 / $Tempo)
end on

```

A very basic metronome

See Also

on listener

set_listener()

\$NI_SIGNAL_TYPE

11.2. ms_to_ticks()

ms_to_ticks(<microseconds>)

Converts a microseconds value into a tempo dependent ticks value

Examples

```
on init
  declare ui_label $bpm(1,1)
  set_text($bpm,ms_to_ticks(600000000)/960)
end on
```

Displaying the current host tempo

See Also

`ticks_to_ms()`

`$NI_SONG_POSITION`

11.3. set_listener()

set_listener(<signal-type>, <parameter>)	
Sets the signals on which the listener callback should react to. Can only be used in the init callback.	
<signal-type>	The event on which the listener callback should react. The following types are available: <code>\$NI_SIGNAL_TRANSP_STOP</code> <code>\$NI_SIGNAL_TRANSP_START</code> <code>\$NI_SIGNAL_TIMER_MS</code> <code>\$NI_SIGNAL_TIMER_BEAT</code>
<parameter>	User defined parameter, dependant on the specified signal type: <code>\$NI_SIGNAL_TIMER_MS</code> Time interval in microseconds <code>\$NI_SIGNAL_TIMER_BEAT</code> Time interval in fractions of a beat/quarter note <code>\$NI_SIGNAL_TRANSP_START</code> Set to 1 if the listener callback should react to the host's transport start command <code>\$NI_SIGNAL_TRANSP_STOP</code> Set to 1 if the listener callback should react to the host's transport stop command

Remarks

When using `$NI_SIGNAL_TIMER_BEAT`, the maximum resolution is 24 ticks per beat/quarter note.

Examples

```
on init
  set_listener($NI_SIGNAL_TIMER_BEAT,1)
end on
on listener
  if ($NI_SIGNAL_TYPE = $NI_SIGNAL_TIMER_BEAT)
    message($ENGINE_UPTIME)
  end if
end on
```

Triggering the listener callback every beat. Triggering will occur even when transport is stopped.

See Also

`change_listener_par()`

`$NI_SIGNAL_TYPE`

11.4. stop_wait()

stop_wait(<callback-ID>, <parameter>)	
Stops wait commands in the specified callback	
<callback-ID>	The callback's ID number in which the wait commands will be stopped
<parameter>	0 : stops only the current wait 1 : stops the current wait and ignores all following wait commands in this callback.

Remarks

- Be careful with while loops when stopping all wait commands in a callback.

Examples

```
on init
  declare ui_button $Play
  declare $id
end on
on ui_control ($Play)
  if ($Play = 1)
    $id := $NI_CALLBACK_ID
    play_note(60,127,0,$DURATION_QUARTER)

    wait($DURATION_QUARTER)
    if ($Play = 1)
      play_note(64,127,0,$DURATION_QUARTER)
    end if

    wait($DURATION_QUARTER)
    if ($Play = 1)
      play_note(67,127,0,$DURATION_QUARTER)
    end if
  else
    stop_wait($id,1)
    fade_out($ALL_EVENTS,10000,1)
  end if
end on
```

The Play button triggers a simple triad arpeggio. Without the stop_wait() command, parallel callbacks could occur when pressing the Play button quickly in succession resulting in multiple arpeggios.

See Also

wait()
wait_ticks()

Callback Type Variables and Constants (Built-in variables/Specific)

11.5. reset_ksp_timer

reset_ksp_timer
Resets the KSP timer (\$KSP_TIMER) to zero

Remarks

- Since the built-in variable \$KSP_TIMER returns the engine uptime in microseconds (instead of milliseconds as with \$ENGINE_UPTIME), the variable \$KSP_TIMER will reach its limit after about 30 minutes due to its 32 bit nature. By using reset_ksp_timer, the variable is reset to 0.
- Since the KSP timer is based on the CPU clock, the main reason to use it is for debugging and optimization. It is a great tool to measure the efficiency of certain script passages. However, it should not be used for ‘musical’ timing, as it remains at a real-time constant rate, even if KON-TAKT is being used in an offline bounc

Examples

```
on init
  declare $a
  declare $b
  declare $c
end on

on note
  reset_ksp_timer
  $c := 0
  while($c < 128)
    $a := 0
    while($a < 128)
      set_event_par($EVENT_ID, $EVENT_PAR_TUNE, random(-1000, 1000))
      inc($a)
    end while
    inc($c)
  end while
  message($KSP_TIMER)
end on
```

A nested while loop – takes about 5400 to 5800 microseconds

See Also

\$ENGINE_UPTIME

\$KSP_TIMER

11.6. ticks_to_ms()

ticks_to_ms(<ticks>)

Converts a tempo dependent ticks value into a microseconds value

Remarks

- Since the returned value is in microseconds, the command will reach its limit after about 30 minutes due to its 32 bit nature.

Examples

```
on init
  declare ui_label $label (2,1)
  declare $msec
  declare $sec
  declare $min
  set_listener($NI_SIGNAL_TIMER_MS,1000)
end on

on listener
  if ($NI_SIGNAL_TYPE = $NI_SIGNAL_TIMER_MS)
    $msec := ticks_to_ms($NI_SONG_POSITION)/1000
    $sec := $msec/1000
    $min := $sec/60
    set_text($label,$min & ":" & $sec mod 60 & "." & $msec mod 1000)
  end if
end on
```

Displaying the song position in real time

See Also

ms_to_ticks()

\$NI_SONG_POSITION

11.7. wait()

wait(<wait-time>)

Pauses the callback for the specified time in microseconds

Remarks

`wait()` stops the callback at the position in the script for the specified time. In other words, it freezes the callback, although other callbacks can be accessed or processed. After the specified time period the callback continues.

Examples

```
on note
  ignore_event($EVENT_ID)
  wait($DURATION_BAR - $DISTANCE_BAR_START)
  play_note($EVENT_NOTE, $EVENT_VELOCITY, 0, -1)
end on
```

Quantize all notes to the downbeat of the next measure

See Also

`stop_wait()`

`wait_ticks()`

`while()`

`$DURATION_QUARTER`

11.8. wait_async()

wait_async(<asyncID>)

Waits until the async command identified by the <asyncID> is finished.

Remarks

When performing multiple operations it is also possible to collect them together and then calling the `wait_async()` function on the collection. When the operations are collected in this manner they will be calculated in one block resulting in a performance gain. If the async operation is not in the pipeline anymore or invalid, there is no wait and the script continues.

Example performing a single operation

```
wait_async(set_engine_par($ENGINE_PAR_EFFECT_TYPE, ...
$EFFECT_TYPE_CHORUS, -1, 2, 1))
```

Example performing multiple operations

```
%asyncid[0] := async_operation
%asyncid[1] := another_async_operation
...
%asyncid[x] := last_async_operation

$i := 0
while($i < num_elements(%asyncid))
    wait_async(%asyncid[$i])
    inc($i)
end while
```

See also

`$NI_ASYNC_EXIT_STATUS`

`$NI_ASYNC_ID`

11.9. wait_ticks()

wait_ticks(<wait-time>)
Pauses the callback for the specified time in ticks

Remarks

Same as `wait()`, but with ticks as the wait time parameter.

See Also

`stop_wait()`

`wait()`

12. USER INTERFACE COMMANDS

12.1. add_menu_item()

add_menu_item(<variable>,<text>,<value>)	
Create a menu entry	
<variable>	The variable of the UI menu
<text>	The text of the menu entry
<value>	The value of the menu entry

Remarks

- You can create menu entries only in the init callback but you can change their text and value afterwards by using `set_menu_item_str()` and `set_menu_item_value()`. You can add as many menu entries as you want and then show or hide them dynamically by using `set_menu_item_visibility()`.
- Using the `$CONTROL_PAR_VALUE` constant in the `get_control_par()` command will return the menu index and not the value. If you want to get the menu value, use the `get_menu_item_value()` command.

Examples

```
on init
  declare ui_menu $menu
  add_menu_item ($menu, "First Entry",0)
  add_menu_item ($menu, "Second Entry",1)
  add_menu_item ($menu, "Third Entry",2)
end on
```

A simple menu

See Also

`$CONTROL_PAR_SELECTED_ITEM_IDX`

`$CONTROL_PAR_NUM_ITEMS`

`get_menu_item_str()`

`get_menu_item_value()`

`get_menu_item_visibility()`

`set_menu_item_str()`

`set_menu_item_visibility()`

`ui_menu`

12.2. add_text_line()

add_text_line(<variable>,<text>)	
Add a new text line in the specified label without erasing existing text	
<variable>	The variable of the UI label
<text>	The text to be displayed

Examples

```

on init
  declare ui_label $label (1,4)
  set_text($label,"")
  declare $count
end on

on note
  inc($count)
  select ($count)
    case 1
      set_text($label, $count & ": " & $EVENT_NOTE)
    case 2 to 4
      add_text_line($label, $count & ": " & $EVENT_NOTE)
    end select
  if ($count = 4)
    $count := 0
  end if
end on

```

Monitoring the last four played notes

See Also

set_text()

ui_label

12.3. attach_level_meter()

attach_level_meter(<ui-ID>, <group>, <slot>, <channel>, <bus>)	
Attach a level meter to a certain position within the instrument to read volume data	
<ui-ID>	The ID number of the level meter
<group>	The index of the group you want to access. Should be set to -1 if not using the group level
<slot>	The index of the fx slot you wish to access. Should be set to -1 if you do not wish to access an fx slot.
<channel>	Select either the left (0) or right (1) channel
<bus>	The index of the instrument bus you wish to access. Should be set to -1 if you are not accessing the bus level.

Remarks

- Currently, the level meters can only be attached to the output level of the instrument buses and the instrument master. Consequently, the group index and slot index should always be set to -1.
- The instrument volume has the following syntax: `attach_level_meter (<uiID>, -1, -1, <channelIdx>, -1)`

Examples

```
on init
  declare ui_level_meter $Level1
  declare ui_level_meter $Level2
  attach_level_meter (get_ui_id($Level1), -1, -1, 0, -1)
  attach_level_meter (get_ui_id($Level2), -1, -1, 1, -1)
end on
```

Creating two volume meters, each one displaying one side of KONTAKT's instrument output

See Also

\$CONTROL_PAR_BG_COLOR

\$CONTROL_PAR_OFF_COLOR

\$CONTROL_PAR_ON_COLOR

\$CONTROL_PAR_OVERLOAD_COLOR

\$CONTROL_PAR_PEAK_COLOR

\$CONTROL_PAR_VERTICAL

ui_level_meter

12.4. attach_zone()

attach_zone(<variable>, <zone_id>, <flags>)	
Connects the corresponding zone to the waveform so that it shows up within the display	
<variable>	The variable of the UI waveform
<zone_id>	The ID number of the zone that you want to attach to the waveform display
<flags>	You can control different settings of the UI waveform via its flags. The following flags are available: \$UI_WAVEFORM_USE_SLICES \$UI_WAVEFORM_USE_TABLE \$UI_WAVEFORM_TABLE_IS_BIPOLAR \$UI_WAVEFORM_USE_MIDI_DRAG

Remarks

- Use the bitwise `.or.` to combine flags.
- The `$UI_WAVEFORM_USE_TABLE` and `$UI_WAVEFORM_USE_MIDI_DRAG` flags will only work if `$UI_WAVEFORM_USE_SLICES` is already set.

Examples

```
on init
  declare ui_waveform $Waveform(6,6)
  attach_zone ($Waveform, find_zone("Test"), ...
    $UI_WAVEFORM_USE_SLICES .or. $UI_WAVEFORM_USE_TABLE)
end on
```

Attaches the zone "Test" to the waveform and displays the zone's slices and a table

See Also

`set_ui_wf_property()`

`get_ui_wf_property()`

`ui_waveform()`

`find_zone()`

Waveform Flag Constants

Waveform Property Constants

12.5. fs_get_filename()

fs_get_filename(<ui-ID>,<return-parameter>)	
Return the filename of the last selected file in the UI file browser.	
<ui-ID>	The ID number of the UI control
<return-parameter>	0: Returns the filename without extension 1: Returns the filename with extension 2: Returns the whole path

See Also

fs_navigate()

ui_file_selector

12.6. fs_navigate()

fs_navigate(<ui-ID>, <direction>)	
Jump to the next/previous file in a UI file selector and trigger its callback.	
<ui-ID>	The ID number of the UI control
<direction>	0: The previous file (in relation to the currently selected one) is selected 1: The next file (in relation to the currently selected one) is selected

See Also

fs_get_filename()

ui_file_selector

12.7. get_control_par()

get_control_par(<ui-ID>,<control-parameter>)	
Retrieve various parameters of the specified GUI control	
<ui-ID>	The ID number of the UI control. You can retrieve the ID number with get_ui_id()
<control-parameter>	The control parameter variable, \$CONTROL_PAR_WIDTH

Remarks

get_control_par() comes in one additional flavor, get_control_par_arr() for working with arrays.

Examples

```
on init
  declare ui_value_edit $Test (0,100,1)
  message(get_control_par(get_ui_id($Test),...
    $CONTROL_PAR_WIDTH))
end on
```

Retrieving the width of a value edit in pixels

See Also

set_control_par()

\$CONTROL_PAR_KEY_SHIFT

\$CONTROL_PAR_KEY_ALT

\$CONTROL_PAR_KEY_CONTROL

12.8. get_font_id()

get_font_id(<file_name>)	
returns a font ID from an image file; the font ID can be used on any control that has dynamic text elements	
<file_name>	The filename of the image file, without the file extension. The image has to be in PNG format and residing in the pictures subfolder of the resource container.

Remarks

The images need to be formatted in a special way to be interpreted correctly as sprite fonts. All characters need to be placed side-by-side, following the Windows-1252 character set, with a red pixel on the top left of every character frame.

Examples

```
on init
    declare ui_text_edit @textEdit
    set_control_par(get_ui_id(@textEdit), $CONTROL_PAR_FONT_TYPE, ...
                    get_font_id("Font1"))
end on
```

using a custom font on a ui_text_edit control

See Also

set_control_par()

\$CONTROL_PAR_FONT_TYPE

12.9. get_menu_item_str()

get_menu_item_str(<menu-id>,<index>)	
Returns the string value of the menu's entry	
<menu-id>	The ID of the menu that you want to modify
<index>	The index (not value) of the menu item

Remarks

The <index> is defined by the order in which the menu items are added within the init callback; it can't be changed afterwards.

Examples

```
on init
  declare ui_menu $menu
  add_menu_item ($menu, "First Entry",0)
  add_menu_item ($menu, "Second Entry",5)
  add_menu_item ($menu, "Third Entry",10)
  declare ui_button $button
end on

on ui_control ($button)
  message(get_menu_item_str (get_ui_id($menu),1))
end on
```

Displays the message "Second Entry" when clicking on the button

See Also

\$CONTROL_PAR_SELECTED_ITEM_IDX

\$CONTROL_PAR_NUM_ITEMS

add_menu_item()

get_menu_item_value()

get_menu_item_visibility()

set_menu_item_str()

set_menu_item_value()

set_menu_item_visibility()

12.10. get_menu_item_value()

get_menu_item_value(<menu-id>,<index>)	
Returns the value of the menu's entry	
<menu-id>	The ID of the menu that you want to modify
<index>	The index of the menu item

Remarks

The <index> is defined by the order in which the menu items are added within the init callback; it can't be changed afterwards.

Examples

```
on init
  declare ui_menu $menu
  add_menu_item ($menu, "First Entry",0)
  add_menu_item ($menu, "Second Entry",5)
  add_menu_item ($menu, "Third Entry",10)
  declare ui_button $button
end on

on ui_control ($button)
  message (get_menu_item_value (get_ui_id($menu),1))
end on
```

Displays the number 5

See Also

\$CONTROL_PAR_SELECTED_ITEM_IDX

\$CONTROL_PAR_NUM_ITEMS

add_menu_item()

get_menu_item_str()

get_menu_item_visibility()

set_menu_item_str()

set_menu_item_value()

set_menu_item_visibility()

12.11. get_menu_item_visibility()

<code>get_menu_item_visibility(<menu-id>,<index>)</code>	
Returns 1 if the menu entry is visible, otherwise 0	
<code><menu-id></code>	The ID of the menu that you want to modify
<code><index></code>	The index of the menu entry

Remarks

The `<index>` is defined by the order in which the menu items are added within the init callback; it can't be changed afterwards.

Examples

```
on init
  declare ui_menu $menu
  add_menu_item ($menu, "First Entry",0)
  add_menu_item ($menu, "Second Entry",5)
  add_menu_item ($menu, "Third Entry",10)

  declare ui_button $visibility
  declare ui_button $value
end on

on ui_control ($visibility)
  set_menu_item_visibility (get_ui_id($menu),$visibility))
end on

on ui_control ($value)
  message (get_menu_item_visibility (get_ui_id($menu),1))
end on
```

Clicking on Visibility button shows or hides the second menu entry, while clicking on Value button shows the visibility state of that same menu entry.

See Also

```
$CONTROL_PAR_SELECTED_ITEM_IDX
$CONTROL_PAR_NUM_ITEMS
add_menu_item()
get_menu_item_str()
get_menu_item_value()
set_menu_item_str()
set_menu_item_value()
set_menu_item_visibility()
```

12.12. get_ui_id()

get_ui_id(<variable>)

Retrieve the ID number of a UI control

Examples

```
on init
  declare ui_knob $Knob_1 (0,100,1)
  declare ui_knob $Knob_2 (0,100,1)
  declare ui_knob $Knob_3 (0,100,1)
  declare ui_knob $Knob_4 (0,100,1)

  declare ui_value_edit $Set(0,100,1)
  declare $a
  declare %knob_id[4]
  %knob_id[0] := get_ui_id ($Knob_1)
  %knob_id[1] := get_ui_id ($Knob_2)
  %knob_id[2] := get_ui_id ($Knob_3)
  %knob_id[3] := get_ui_id ($Knob_4)

end on

on ui_control ($Set)
  $a := 0
  while ($a < 4)
    set_control_par(%knob_id[$a],$CONTROL_PAR_VALUE,$Set)
    inc($a)
  end while
end on
```

Store IDs in an array

See Also

set_control_par()

get_control_par()

12.13. get_ui_wf_property()

get_ui_wf_property(<variable>, <property>, <index>)	
Returns the value of the waveform's different properties	
<variable>	The variable of the UI waveform
<property>	The following properties are available: \$UI_WF_PROP_PLAY_CURSOR \$UI_WF_PROP_FLAGS \$UI_WF_PROP_TABLE_VAL \$UI_WF_PROP_TABLE_IDX_HIGHLIGHT \$UI_WF_PROP_MIDI_DRAG_START_NOTE
<index>	The index of the slice

Examples

```
on init
  declare $play_pos
  declare ui_waveform $Waveform(6,6)
  attach_zone ($Waveform, find_zone ("Test"), 0)
end on

on note
  while ($NOTE_HELD = 1)
    $play_pos := get_event_par($EVENT_ID, $EVENT_PAR_PLAY_POS)
    set_ui_wf_property($Waveform, $UI_WF_PROP_PLAY_CURSOR, ...
    0, $play_pos)
    message(get_ui_wf_property($Waveform, ...
    $UI_WF_PROP_PLAY_CURSOR, 0))
    wait (10000)
  end while
end on
```

Displays the current play position value

See Also

set_ui_wf_property()

ui_waveform()

attach_zone()

find_zone()

Waveform Flag Constants

Waveform Property Constants

12.14. hide_part()

hide_part(<variable>,<hide-mask>)	
Hide specific parts of user interface controls	
<variable>	The name of the UI control
<hide-mask>	Bit by bit combination of the following constants: \$HIDE_PART_BG {Background of knobs, labels, value edits and tables} \$HIDE_PART_VALUE {value of knobs} \$HIDE_PART_TITLE {title of knobs} \$HIDE_PART_MOD_LIGHT {mod ring light of knobs}

Examples

```
on init
  declare ui_knob $Knob (0,100,1)

  hide_part($Knob,$HIDE_PART_BG...
    .or. $HIDE_PART_MOD_LIGHT...
    .or. $HIDE_PART_TITLE...
    .or. $HIDE_PART_VALUE)
end on
```

A naked knob

```
on init
  declare ui_label $label_1 (1,1)
  set_text ($label_1,"Small Label")
  hide_part ($label_1,$HIDE_PART_BG)
end on
```

Hide the background of a label. This is also possible with other UI elements.

See Also

\$CONTROL_PAR_HIDE

\$HIDE_PART_NOTHING

\$HIDE_WHOLE_CONTROL

12.15. load_performance_view()

load_performance_view(<filename>)	
Loads a performance view file (NCKP) that was created in the Creator Tools GUI Designer	
<filename>	The filename of the NCKP file, without extension, as a string (in quotation marks)

Remarks

- Only one performance view file can be loaded per script slot
- The performance view file should be in the performance_view subfolder of the resource container
- All contained controls are then accessible as if they were declared and set up in KSP; variable names can be identified in Creator Tools
- More information in the Creator Tools documentation

Examples

```
on init
    load_performance_view("performanceView")
end on

on ui_control ($testButton)
    if ($testButton = 0)
        set_control_par(get_ui_id($testSlider), $CONTROL_PAR_HIDE,
$HIDE_PART_WHOLE_CONTROL)
    else
        set_control_par(get_ui_id($testSlider), $CONTROL_PAR_HIDE,
$HIDE_PART_NOTHING)
    end if
end on
```

Loads a performance view file and then defines some basic behavior involving two of the contained controls

12.16. make_perfview

make_perfview

Activates the performance view for the respective script

Remarks

- make_perfview is only available in the init callback.
- Cannot be used alongside the load_performance_view() command.

Examples

```
on init
    make_perfview
    set_script_title("Performance View")
    set_ui_height(6)
    message("")
end on
```

Many performance view scripts start like this

See Also

set_skin_offset()

set_ui_height()

set_ui_height_px()

12.17. move_control()

move_control(<variable>,<x-position>,<y-position>)	
Position UI elements in the standard KONTAKT grid	
<variable>	The name of the UI control
<x-position>	The horizontal position of the control (0 to 6) in grid units
<y-position>	The vertical position of the control (0 to 16) in grid units

Remarks

- move_control() can be used in the init and other callbacks.
- Note that the usage of move_control() in other callbacks than the init callback is more CPU intensive, so handle with care.
- move_control(<variable>, 0, 0) will hide the UI element.

Examples

```
on init
  set_ui_height(3)
  declare ui_label $label (1,1)
  set_text ($label,"Move the wheel!")
  move_control ($label,3,6)
end on
on controller
  if ($CC_NUM = 1)
    move_control ($label,3, (%CC[1] * (-5) / (127)) + 6 )
  end if
end on
```

Move a UI element with the modwheel

See Also

move_control_px()

\$CONTROL_PAR_HIDE

12.18. move_control_px()

<code>move_control_px(<variable>,<x-position>,<y-position>)</code>	
Position UI elements in pixels	
<code><variable></code>	The name of the UI control
<code><x-position></code>	The horizontal position of the control in pixels
<code><y-position></code>	The vertical position of the control in pixels

Remarks

- Once you position a control in pixel, you have to make all other adjustments in pixels too, i.e. you cannot change between "pixel" and "grid" mode for a specific control.
- `move_control_px()` can be used in the init and other callbacks.
- Note that the usage of `move_control_px()` in other callbacks than the init callback is more CPU intensive, so handle with care.
- `move_control_px(<variable>,66,2)` equals `move_control(<variable>,1,1)`

Examples

```
on init
  declare ui_label $label (1,1)
  set_text ($label,"Move the wheel!")
  move_control_px ($label,66,2)
end on
on controller
  if ($CC_NUM = 1)
    move_control_px ($label,%CC[1]+66,2)
  end if
end on
```

Transform CC values into pixel. This might be useful for reference.

See Also

`move_control()`

`$CONTROL_PAR_POS_X`

`$CONTROL_PAR_POS_Y`

12.19. set_control_help()

set_control_help(<variable>,<text>)	
Assigns a text string to be displayed when hovering the UI control. The text will appear in KONTAKT's info pane.	
<variable>	The name of the UI control
<text>	The info text to be displayed

Examples

```
on init
  declare ui_knob $Knob(0,100,1)
  set_control_help($Knob,"I'm the only knob, folks")
end on
```

set_control_help() in action

See Also

set_script_title()

\$CONTROL_PAR_HELP

12.20. set_control_par()

set_control_par(<ui-ID>,<control-parameter>,<value>)	
Change various parameters of the specified GUI control	
<ui-ID>	The ID number of the UI control. You can retrieve the ID number with get_ui_id()
<control-parameter>	The control parameter variable, for example \$CONTROL_PAR_WIDTH
<value>	The (integer) value

Remarks

set_control_par_str() is a variation of the command for usage with text strings.

Examples

```
on init
  declare ui_value_edit $test (0,100,$VALUE_EDIT_MODE_NOTE_NAMES)
  set_text ($test,"")
  set_control_par (get_ui_id($test),$CONTROL_PAR_WIDTH,45)
  move_control_px($test,100,10)
end on
```

Changing the width of a value edit to 45 pixels. Note that you also have to specify its position in pixels once you enter "pixel-mode".

```
on init
  declare ui_label $test (1,1)
  set_control_par_str(get_ui_id($test),$CONTROL_PAR_TEXT,"This is
Text")
  set_control_par(get_ui_id($test),$CONTROL_PAR_TEXT_ALIGNMENT,1)
end on
```

Set and center text in labels

See Also

get_control_par()

get_ui_id()

12.21. set_control_par_arr()

set_control_par_arr(<ui-ID>,<control-parameter>,<value>,<index>)	
Change various parameters of an element within an array-based GUI control, e.g. cursors in the XY pad	
<ui-ID>	The ID number of the UI control. You can retrieve the ID number with get_ui_id()
<control-parameter>	The control parameter variable, e.g. \$CONTROL_PAR_AUTOMATION_ID
<value>	The (integer) value
<index>	The element index

Remarks

set_control_par_str_arr() is a variation of the command for usage with text strings.

Examples

```
on init
  make_perfview
  set_ui_height_px(350)

  declare ui_xy ?myXY[4]
  declare $xyID
  $xyID := get_ui_id(?myXY)

  set_control_par_arr($xyID, $CONTROL_PAR_AUTOMATION_ID, 0, 0)
  set_control_par_arr($xyID, $CONTROL_PAR_AUTOMATION_ID, 1, 1)
  set_control_par_arr($xyID, $CONTROL_PAR_AUTOMATION_ID, 2, 2)
  set_control_par_arr($xyID, $CONTROL_PAR_AUTOMATION_ID, 3, 3)

  set_control_par_str_arr($xyID, $CONTROL_PAR_AUTOMATION_NAME, ...
    "Cutoff", 0)
  set_control_par_str_arr($xyID, $CONTROL_PAR_AUTOMATION_NAME, ...
    "Resonance", 1)
  set_control_par_str_arr($xyID, $CONTROL_PAR_AUTOMATION_NAME, ...
    "Delay Pan", 2)
  set_control_par_str_arr($xyID, $CONTROL_PAR_AUTOMATION_NAME, ...
    "Delay Feedback", 3)
end on
```

Setting automation IDs and names of an XY pad with two cursors

See Also

\$CONTROL_PAR_CURSOR_PICTURE

\$CONTROL_PAR_AUTOMATION_ID

\$CONTROL_PAR_AUTOMATION_NAME

\$HIDE_PART_CURSOR

12.22. set_knob_defval()

set_knob_defval(<variable>, <value>)

Assign a default value to a knob to which the knob is reset when Cmd-clicking (Mac) or Ctrl-clicking (PC) the knob.

Remarks

In order to assign a default value to a slider, use

`set_control_par(<ui-ID>, $CONTROL_PAR_DEFAULT_VALUE, <value>)`

Examples

```
on init
  declare ui_knob $Knob(-100,100,0)
  set_knob_defval ($Knob,0)
  $Knob := 0

  declare ui_slider $Slider (-100,100)
  set_control_par(get_ui_id($Slider), $CONTROL_PAR_DEFAULT_VALUE, 0)
  $Slider := 0
end on
```

Assigning default values to a knob and slider

See Also

`$CONTROL_PAR_DEFAULT_VALUE`

12.23. set_knob_label()

set_knob_label(<variable>,<text>)

Assign a text string to a knob

Examples

```
on init
  declare !rate_names[18]
  !rate_names[0] := "1/128"
  !rate_names[1] := "1/64"
  !rate_names[2] := "1/32"
  !rate_names[3] := "1/16 T"
  !rate_names[4] := "3/64"
  !rate_names[5] := "1/16"
  !rate_names[6] := "1/8 T"
  !rate_names[7] := "3/32"
  !rate_names[8] := "1/8"
  !rate_names[9] := "1/4 T"
  !rate_names[10] := "3/16"
  !rate_names[11] := "1/4"
  !rate_names[12] := "1/2 T"
  !rate_names[13] := "3/8"
  !rate_names[14] := "1/2"
  !rate_names[15] := "3/4"
  !rate_names[16] := "4/4"
  !rate_names[17] := "Bar"

  declare ui_knob $Rate (0,17,1)
  set_knob_label($Rate,!rate_names[$Rate])

  read_persistent_var($Rate)
  set_knob_label($Rate,!rate_names[$Rate])
end on

on ui_control ($Rate)
  set_knob_label($Rate,!rate_names[$Rate])
end on
```

Useful for displaying rhythmical values

See Also

\$CONTROL_PAR_LABEL

12.24. set_knob_unit()

set_knob_unit(<variable>,<knob-unit-constant>)

Assign a unit mark to a knob.

The following constants are available:

\$KNOB_UNIT_NONE

\$KNOB_UNIT_DB

\$KNOB_UNIT_HZ

\$KNOB_UNIT_PERCENT

\$KNOB_UNIT_MS

\$KNOB_UNIT_OCT

\$KNOB_UNIT_ST

Examples

```
on init
  declare ui_knob $Time (0,1000,10)
  set_knob_unit ($Time,$KNOB_UNIT_MS)

  declare ui_knob $Octave (1,6,1)
  set_knob_unit ($Octave,$KNOB_UNIT_OCT)

  declare ui_knob $Volume (-600,600,100)
  set_knob_unit ($Volume,$KNOB_UNIT_DB)

  declare ui_knob $Scale (0,100,1)
  set_knob_unit ($Scale,$KNOB_UNIT_PERCENT)

  declare ui_knob $Tune (4300,4500,10)
  set_knob_unit ($Tune,$KNOB_UNIT_HZ)
end on
```

Various knob unit marks

See Also

\$CONTROL_PAR_UNIT

12.25. set_menu_item_str()

<code>set_menu_item_str(<menu-id>,<index>,<string>)</code>	
Sets the value of a menu entry	
<code><menu-id></code>	The ID of the menu that you want to modify
<code><index></code>	The index of the menu item
<code><string></code>	The text you wish to set for the selected menu item

Remarks

The `<index>` is defined by the order in which the menu items are added within the init callback; it can't be changed afterwards.

Examples

```
on init
  declare ui_menu $menu
  declare ui_button $button
  add_menu_item ($menu, "First Entry",0)
  add_menu_item ($menu, "Second Entry",5)
  add_menu_item ($menu, "Third Entry",10)
end on

on ui_control ($button)
  set_menu_item_str (get_ui_id($menu),1,"Renamed")
end on
```

Renaming the second menu entry

See Also

`$CONTROL_PAR_SELECTED_ITEM_IDX`

`$CONTROL_PAR_NUM_ITEMS`

`add_menu_item()`

`get_menu_item_str()`

`get_menu_item_value()`

`get_menu_item_visibility()`

`set_menu_item_value()`

`set_menu_item_visibility()`

12.26. set_menu_item_value()

<code>set_menu_item_value(<menu-id>,<index>,<value>)</code>	
Sets the value of a menu entry	
<code><menu-id></code>	The ID of the menu that you want to modify
<code><index></code>	The index of the menu item
<code><value></code>	The value you want to give the menu item

Remarks

The `<index>` is defined by the order in which the menu items are added within the init callback; it can't be changed afterwards. The `<value>` is set by the third parameter of the `add_menu_item()` command.

Examples

```
on init
  declare ui_menu $menu
  add_menu_item ($menu, "First Entry",0)
  add_menu_item ($menu, "Second Entry",5)
  add_menu_item ($menu, "Third Entry",10)
  set_menu_item_value (get_ui_id($menu),1,20)
end on
```

Changing the value of the second menu entry to 20

See Also

`$CONTROL_PAR_SELECTED_ITEM_IDX`

`$CONTROL_PAR_NUM_ITEMS`

`add_menu_item()`

`get_menu_item_str()`

`get_menu_item_value()`

`get_menu_item_visibility()`

`set_menu_item_str()`

`set_menu_item_visibility()`

12.27. set_menu_item_visibility()

set_menu_item_visibility(<menu-id>,<index>,<visibility>)	
Sets the visibility of a menu entry	
<menu-id>	The ID of the menu that you want to modify
<index>	The index of the menu item
<visibility>	Set to either 0 (invisible) or 1 (visible)

Remarks

The <index> is defined by the order in which the menu items are added within the init callback; it can't be changed afterwards. The <value> is set by the third parameter of the add_menu_item() command.

Add as many menu entries as you would possibly need within the init callback, then show or hide them dynamically by using set_menu_item_visibility().

If you set the currently selected menu item to invisible, the item will remain visible until it is no longer selected.

Examples

```
on init
    declare ui_menu $menu
    declare ui_button $button
    add_menu_item ($menu, "First Entry",0)
    add_menu_item ($menu, "Second Entry",5)
    add_menu_item ($menu, "Third Entry",10)
end on

on ui_control ($button)
    set_menu_item_visibility (get_ui_id($menu),1,0)
end on
```

Hiding the second menu entry

See Also

\$CONTROL_PAR_SELECTED_ITEM_IDX

\$CONTROL_PAR_NUM_ITEMS

add_menu_item()

get_menu_item_str()

get_menu_item_value()

get_menu_item_visibility()

set_menu_item_str()

set_menu_item_visibility()

12.28. set_table_steps_shown()

set_table_steps_shown(<variable>, <num-of-steps>)	
Changes the number of displayed columns in a UI table	
<variable>	The name of the UI table
<num-of-steps>	The number of displayed steps

Examples

```
on init
  declare ui_table %table[32] (2,2,127)

  declare ui_value_edit $Steps (8,32,1)
  $Steps := 16
  set_table_steps_shown(%table,$Steps)
end on

on ui_control($Steps)
  set_table_steps_shown(%table,$Steps)
end on
```

Changing the number of shown steps

See Also

ui_table

12.29. set_script_title()

<code>set_script_title(<text>)</code>
Set the script title

Remarks

- This command overrides any manually set script titles.

Examples

```
on init
  make_perfview
  set_script_title("Performance View")
  set_ui_height(6)
  message("")
end on
```

Many performance view scripts start like this

See Also

`make_perfview`

12.30. set_skin_offset()

set_skin_offset(<offset-in-pixel>)

Offsets the chosen background picture file by the specified number of pixels

Remarks

If a background TGA/PNG graphic file has been selected in the instrument options and it is larger than the maximum height of the performance view, you can use this command to offset the background graphic, thus creating separate backgrounds for each of the script slots while only using one picture file.

Examples

```
on init
  make_perfview
  set_ui_height(1)
end on

on controller
  if ($CC_NUM = 1)
    set_skin_offset(%CC[1])
  end if
end on
```

See Also

make_perfview

set_ui_height_px()

12.31. set_text()

set_text(<variable>,<text>)

When applied to a label: delete the text currently visible in the specified label and add new text.

When applied to knobs, buttons, switches and value edits: set the display name of the UI element.

Examples

```
on init
  declare ui_label $label_1 (1,1)
  set_text ($label_1,"Small Label")

  declare ui_label $label_2 (3,6)
  set_text ($label_2,"Big Label")
  add_text_line ($label_2,"...with a second text line")
end on
```

Two labels with different sizes

```
on init
  declare ui_label $label_1 (1,1)
  set_text ($label_1,"Small Label")
  hide_part ($label_1,$HIDE_PART_BG)
end on
```

Hide the background of a label. This is also possible with other UI elements.

See Also

add_text_line()

\$CONTROL_PAR_TEXT

set_control_par_str()

12.32. set_ui_color()

set_ui_color(<hex value>)

Set the main background color of the performance view

<hex value> The hexadecimal color value in the following format:

9ff0000h {red}

The **9** at the start lets KONTAKT know the value is a number.

The **h** at the end indicates that it is a hexadecimal value.

Remarks

Can be used in all callbacks.

Examples

```
on init
  make_perfview
  set_ui_color(90000000h)
end on
```

Creates a black interface

See Also

set_ui_height()

set_ui_height_px()

12.33. set_ui_height()

set_ui_height(<height>)	
Set the height of a script performance view in grid units	
<height>	The height of script in grid units (1 to 8)

Remarks

Only possible in the init callback.

Examples

```
on init
  make_perfview
  set_script_title("Performance View")
  set_ui_height(6)
  message("")
end on
```

Many performance view scripts start like this

See Also

set_ui_height_px()

12.34. set_ui_height_px()

set_ui_height_px(<height>)	
Set the height of a script performance view in pixels	
<height>	The height of script in pixels (50 to 750)

Remarks

Only possible in the init callback.

Examples

```
on init
  make_perfview
  declare const $SIZE := 1644 {size of tga file}
  declare const $NUM_SLIDES := 4 {amount of slides in tga file}

  declare ui_value_edit $Slide (1,$NUM_SLIDES,1)

  declare const $HEADER_SIZE := 93

  set_ui_height_px(($SIZE/$NUM_SLIDES)-$HEADER_SIZE)
  set_skin_offset (($Slide-1)*($SIZE/$NUM_SLIDES))
end on

on ui_control ($Slide)
  set_skin_offset (($Slide-1)*($SIZE/$NUM_SLIDES))
end on
```

See Also

set_ui_height()

set_ui_width_px()

12.35. set_ui_width_px()

set_ui_width_px(<width>)	
Set the width of a script performance view in pixels	
<width>	The width of the script in pixels (633 to 1000)

Remarks

Only possible in the init callback.

Examples

```
on init
  make_perfview
  set_ui_height_px(750)
  set_ui_width_px(1000)
end on
```

Making a performance view with the largest possible dimensions

See Also

set_ui_height_px()

12.36. set_ui_wf_property()

set_ui_wf_property(<variable>, <property>, <index>, <value>)	
Sets different properties for the waveform control	
<variable>	The variable of the ui waveform
<property>	The following properties are available: \$UI_WF_PROP_PLAY_CURSOR \$UI_WF_PROP_FLAGS \$UI_WF_PROP_TABLE_VAL \$UI_WF_PROP_TABLE_IDX_HIGHLIGHT \$UI_WF_PROP_MIDI_DRAG_START_NOTE
<index>	The index of the slice
<value>	The (integer) value

Examples

```
on init
  declare $play_pos
  declare ui_waveform $Waveform(6,6)
  attach_zone ($Waveform, find_zone("Test"), 0)
end on

on note
  while ($NOTE_HELD = 1)
    $play_pos := get_event_par($EVENT_ID, $EVENT_PAR_PLAY_POS)
    set_ui_wf_property($Waveform, $UI_WF_PROP_PLAY_CURSOR, ...
      0, $play_pos)
    wait (10000)
  end while
end on
```

Attaches the zone "Test" to the waveform and displays a play cursor within the waveform as long as you play a note

See Also

get_ui_wf_property()

ui_waveform()

attach_zone()

find_zone()

Waveform Flag Constants

Waveform Property Constants

13. KEYBOARD COMMANDS

13.1. get_key_color()

get_key_color(<note-nr>)

Returns the color constant of the specified note number

Examples

```
on init
  message("")
  declare $count
  while ($count < 128)
    set_key_color($count,$KEY_COLOR_INACTIVE)
    inc($count)
  end while

  declare $random_key
  $random_key := random(60,71)

  set_key_color($random_key,$KEY_COLOR_RED)

end on

on note
  if (get_key_color($EVENT_NOTE) = $KEY_COLOR_RED)
    message("Bravo!")

    set_key_color($random_key,$KEY_COLOR_INACTIVE)
    $random_key := random(60,71)
    set_key_color($random_key,$KEY_COLOR_RED)
  else
    message("Try again!")
  end if
end on

on release
  message("")
end on
```

Catch me if you can

See Also

set_key_color()

13.2. get_key_name()

get_key_name(<note-nr>)
Returns the name of the specified key

Examples

```
on init

    declare $count
    while ($count < 128)
        set_key_name($count, "")
        inc($count)
    end while

    set_key_name(60, "Middle C")

end on

on note
    message(get_key_name($EVENT_NOTE))
end on
```

See Also

set_key_name()

13.3. get_key_triggerstate()

get_key_triggerstate(<note-nr>)

Returns the pressed state of the specified note number, i.e. key, on the KONTAKT keyboard. It can be either 1 (key pressed) or 0 (key released).

Remarks

get_key_triggerstate() only works with set_key_pressed_support() set to 1.

Examples

```
on init
    set_key_pressed_support(1)
end on
on note
    set_key_pressed($EVENT_NOTE, 1)
    message(get_key_triggerstate($EVENT_NOTE))
end on
on release
    set_key_pressed($EVENT_NOTE, 0)
    message(get_key_triggerstate($EVENT_NOTE))
end on
```

See Also

set_key_pressed()

set_key_pressed_support()

13.4. `get_key_type()`

<code>get_key_type(<note-nr>)</code>
Returns the key type constant of the specified key

See Also

`set_key_type()`

13.5. get_keyrange_min_note()

get_key_type(<note-nr>)
Returns the lowest note of the specified key range

Remarks

Since a key range cannot have overlapping notes, it is sufficient with all `get_keyrange_xxx()` commands to specify the key range with one note number only.

Examples

```
on init

  declare $count
  while ($count < 128)

    remove_keyrange($count)
    inc($count)
  end while

  set_keyrange(36,72,"Middle Range")

end on

on note
  message(get_keyrange_min_note($EVENT_NOTE))
end on
```

See Also

`set_keyrange()`

13.6. get_keyrange_max_note()

get_keyrange_max_note(<note-nr>)

Returns the highest note of the specified key range

Remarks

Since a key range cannot have overlapping notes, it is sufficient with all `get_keyrange_XXX()` commands to specify the key range with one note number only.

Examples

```
on init

  declare $count
  while ($count < 128)

    remove_keyrange($count)
    inc($count)
  end while

  set_keyrange(36,72,"Middle Range")

end on

on note
  message(get_keyrange_min_note($EVENT_NOTE))
end on
```

See Also

`set_keyrange()`

13.7. get_keyrange_name()

get_keyrange_name(<note-nr>)
Returns the name of the specified key range

Remarks

Since a key range cannot have overlapping notes, it is sufficient with all `get_keyrange_xxx()` commands to specify the key range with one note number only.

Examples

```
on init

  declare $count
  while ($count < 128)

    remove_keyrange($count)
    inc($count)
  end while

  set_keyrange(36,72,"Middle Range")

end on

on note
  message(get_keyrange_name($EVENT_NOTE))
end on
```

See Also

`set_keyrange()`

13.8. set_key_color()

set_key_color(<note-nr>, <key-color-constant>)

Sets the color of the specified key, i.e. MIDI note, on the KONTAKT keyboard.

The following colors are available:

\$KEY_COLOR_RED

\$KEY_COLOR_ORANGE

\$KEY_COLOR_LIGHT_ORANGE

\$KEY_COLOR_WARM_YELLOW

\$KEY_COLOR_YELLOW

\$KEY_COLOR_LIME

\$KEY_COLOR_GREEN

\$KEY_COLOR_MINT

\$KEY_COLOR_CYAN

\$KEY_COLOR_TURQUOISE

\$KEY_COLOR_BLUE

\$KEY_COLOR_PLUM

\$KEY_COLOR_VIOLET

\$KEY_COLOR_PURPLE

\$KEY_COLOR_MAGENTA

\$KEY_COLOR_FUCHSIA

\$KEY_COLOR_DEFAULT sets the key to KONTAKT's standard color for mapped notes

\$KEY_COLOR_INACTIVE resets the key to standard black and white

\$KEY_COLOR_NONE resets the key to its normal KONTAKT color, e.g. red for internal key-switches

Remarks

The keyboard colors reside outside of KSP, i.e. changing the color of a key is similar to changing a KONTAKT knob with `set_engine_par()`. It is therefore a good practice to set all keys to either `$KEY_COLOR_INACTIVE` or `$KEY_COLOR_NONE` in the init callback or whenever changed later.

Example

(see next page)

```

on init
  message("")
  declare ui_button $Color

  declare $count
  declare $note_count
  declare $color_count
  declare %white_keys[7] := (0,2,4,5,7,9,11)
  declare %colors[16] := (...
    $KEY_COLOR_RED,$KEY_COLOR_ORANGE,$KEY_COLOR_LIGHT_ORANGE,...
    $KEY_COLOR_WARM_YELLOW,$KEY_COLOR_YELLOW,$KEY_COLOR_LIME,...
    $KEY_COLOR_GREEN,$KEY_COLOR_MINT,$KEY_COLOR_CYAN,...
    $KEY_COLOR_TURQUOISE,$KEY_COLOR_BLUE,$KEY_COLOR_PLUM,...
    $KEY_COLOR_VIOLET,$KEY_COLOR_PURPLE,$KEY_COLOR_MAGENTA,$KEY_COLOR_FUCHSIA)

  $count := 0
  while ($count < 128)
    set_key_color($count,$KEY_COLOR_NONE)
    inc($count)
  end while
end on

on ui_control ($Color)
  if ($Color = 1)

    $count := 0
    while ($count < 128)
      set_key_color($count,$KEY_COLOR_INACTIVE)
      inc($count)
    end while

    $note_count := 0
    $color_count := 0
    while ($color_count < 16)

      if (search(%white_keys,(60 + $note_count) mod 12) # -1)
        set_key_color(60 + $note_count,%colors[$color_count])
        inc ($color_count)
      end if

      inc($note_count)

    end while

  else

```

```
    $count := 0
    while ($count < 128)
        set_key_color($count,$KEY_COLOR_NONE)
        inc($count)
    end while

end if

end on
```

KONTAKT rainbow

See Also

`set_control_help()`

`get_key_color()`

`set_key_name()`

`set_keyrange()`

13.9. set_key_name()

set_key_name(<note-nr>, <name>)
Assigns a text string to the specified key

Remarks

Key names are instrument parameters and reside outside KSP, i.e. changing the key name is similar to changing a KONTAKT knob with `set_engine_par()`. Make sure to always reset all key names in the init callback or whenever changed later.

Key names and ranges are displayed in KONTAKT's info pane when hovering the mouse over the key on the KONTAKT keyboard.

Examples

```
on init

  declare $count
  while ($count < 128)
    set_key_name($count, "")
    inc($count)
  end while

  set_key_name(60, "Middle C")

end on
```

See Also

`set_keyrange()`

`get_key_name()`

13.10. set_key_pressed()

set_key_pressed(<note-nr>, <value>)

Sets the trigger state of the specified key on KONTAKT's keyboard either to pressed/on (1) or released/off (0).

Remarks

By using `set_key_pressed()` in combination with `set_key_pressed_support()` it is possible to show script generated notes on KONTAKT's keyboard. The typical use case would be if an instrument features a built-in sequencer/harmonizer and the triggered notes should be shown on the keyboard.

Examples

```
on init
    set_key_pressed_support(1)
end on
on note
    set_key_pressed($EVENT_NOTE, 1)
end on
on release
    set_key_pressed($EVENT_NOTE, 0)
end on
```

Insert this after an arpeggiator or harmonizer script

See Also

`set_key_pressed_support()`

`get_key_triggerstate()`

13.11. set_key_pressed_support()

set_key_pressed_support (<mode>)

Sets the pressed state support mode for KONTAKT'S keyboard. The available modes are:

0: KONTAKT handles all pressed states. set_key_pressed () commands are ignored (default mode).

1: KONTAKT's keyboard is only affected by set_key_pressed () commands.

Remarks

The pressed state mode resides outside KSP, i.e. changing the mode is similar to changing a KONTAKT knob with set_engine_par (). Make sure to always set the desired mode in the init callback.

Examples

```
on init
    declare ui_button $Enable
    set_key_pressed_support(0)
end on

on ui_control ($Enable)
    set_key_pressed_support($Enable)
end on

on note
    play_note($EVENT_NOTE+4,$EVENT_VELOCITY,0,-1)
    play_note($EVENT_NOTE+7,$EVENT_VELOCITY,0,-1)
    set_key_pressed($EVENT_NOTE,1)
    set_key_pressed($EVENT_NOTE+4,1)
    set_key_pressed($EVENT_NOTE+7,1)
end on

on release
    set_key_pressed($EVENT_NOTE,0)
    set_key_pressed($EVENT_NOTE+4,0)
    set_key_pressed($EVENT_NOTE+7,0)
end on
```

Press the button and you will see what you hear

See Also

set_key_pressed ()

get_key_triggerstate ()

13.12. set_key_type()

set_key_type(<note-nr>, <key-type-constant>)

Assigns a key type to the specified key.

The following key types are available:

\$NI_KEY_TYPE_DEFAULT i.e. normal mapped notes that produce sound.

\$NI_KEY_TYPE_CONTROL i.e. key switches or other notes that do not produce sound.

\$NI_KEY_TYPE_NONE resets the key to its normal KONTAKT behaviour.

Remarks

Setting the key type is useful for supported hosts like KOMPLETE KONTROL, where keys with control functionality, e.g. key switches, should not be affected by any note processing.

Examples

```
on init

  declare $count

  $count := 0
  while ($count < 128)
    set_key_type($count, $NI_KEY_TYPE_NONE)
    inc($count)
  end while

  $count := 36
  while ($count <= 96)

    select ($count)

      case 36 to 47 {e.g. key switch}
        set_key_type($count, $NI_KEY_TYPE_CONTROL)

      case 48 to 96 {e.g. main notes}
        set_key_type($count, $NI_KEY_TYPE_DEFAULT)

    end select

    inc($count)
  end while
end on
```

See Also

get_key_type()

13.13. set_keyrange()

```
set_keyrange(<min-note>, <max-note>, <name>)
```

Assigns a text string to the specified range of keys

Remarks

Key ranges are instrument parameters and reside outside KSP, i.e. changing the key range is similar to changing a KONTAKT knob with `set_engine_par()`. Make sure to always remove all key ranges in the init callback or whenever changed later.

There can be up to 16 key ranges per instrument.

Key names and ranges are displayed in KONTAKT's info pane when hovering the mouse over the key on the KONTAKT keyboard. The range name is followed by the key name, separated by a dash.

Examples

```
on init

  declare $count
  while ($count < 128)

    remove_keyrange($count)
    inc($count)
  end while

  set_keyrange(36, 72, "Middle Range")

end on
```

See Also

`remove_keyrange()`

`set_key_name()`

13.14. remove_keyrange()

remove_keyrange(<note-nr>)
Assigns a text string to the specified range of keys

Remarks

Key ranges are instrument parameters and reside outside KSP, i.e. changing the key range is similar to changing a KONTAKT knob with `set_engine_par()`. Make sure to always remove all key ranges in the init callback or whenever changed later.

Examples

```
on init

  declare $count
  while ($count < 128)

    remove_keyrange($count)
    inc($count)
  end while

  set_keyrange(36,72,"Middle Range")

end on
```

See Also

`set_keyrange()`

14. ENGINE PARAMETER COMMANDS

14.1. find_mod()

find_mod(<group-index>, <mod-name>)	
Returns the slot index of an internal modulator or external modulation slot	
<group-index>	The index of the group
<mod-name>	The name of the modulator or modulation slot. Each modulator or modulation slot has a predefined name, based on the modulation source and target. The name can be changed with the script editor's edit area open and right-clicking on the modulator or modulation slot.

Examples

```
on init
  declare $grp_idx
  $grp_idx := 0

  declare $env_idx
  $env_idx := find_mod(0, "VOL_ENV")

  declare ui_knob $Attack (0,1000000,1)
  set_knob_unit($Attack,$KNOB_UNIT_MS)

  $Attack := get_engine_par($ENGINE_PAR_ATTACK,$grp_idx,$env_idx,-1)

  set_knob_label($Attack,get_engine_par_disp...
    ($ENGINE_PAR_ATTACK,$grp_idx,$env_idx,-1))

end on
on ui_control ($Attack)

  set_engine_par($ENGINE_PAR_ATTACK,$Attack,$grp_idx,$env_idx,-1)

  set_knob_label($Attack,get_engine_par_disp...
    ($ENGINE_PAR_ATTACK,$grp_idx,$env_idx,-1))

end on
```

Controlling the attack time of the volume envelope of the first group. Note: the envelope has been manually renamed to "VOL_ENV"

```
on init

    declare $count
    declare ui_slider $test (0,1000000)
    $test := get_engine_par($ENGINE_PAR_MOD_TARGET_INTENSITY,0,...
    find_mod(0,"VEL_VOLUME"),-1)

end on

on ui_control ($test)

    $count := 0
    while($count < $NUM_GROUPS)
        set_engine_par($ENGINE_PAR_MOD_TARGET_INTENSITY,$test,$count,...
        find_mod($count,"VEL_VOLUME"),-1)
        inc($count)
    end while

end on
```

Creating a slider which controls the velocity to volume modulation intensity of all groups

See Also

find_target()

set_engine_par()

14.2. find_target()

find_target(<group-index>, <mod-index>, <target-name>)	
Returns the slot index of a modulation slot of an internal modulator	
<group-index>	The index of the group
<mod-index>	The slot index of the internal modulator. Can be retrieved with <code>find_mod(<group-idx>, <mod-name>)</code>
<target-name>	The name of the modulation slot
	Each modulation slot has a predefined name, based on the modulation source and target.
	The name can be changed with the script editor's edit area open and right-clicking on the modulation slot.

Examples

```
on init
  declare ui_knob $Knob (-100,100,1)
  declare $mod_idx
  $mod_idx := find_mod(0, "FILTER_ENV")

  declare $target_idx
  $target_idx := find_target(0, $mod_idx, "ENV_AHDSR_CUTOFF")
end on

on ui_control ($Knob)
  if ($Knob < 0)
    set_engine_par ($MOD_TARGET_INVERT_SOURCE, ...
      1, 0, $mod_idx, $target_idx)
  else
    set_engine_par ($MOD_TARGET_INVERT_SOURCE, ...
      0, 0, $mod_idx, $target_idx)
  end if
  set_engine_par ($ENGINE_PAR_MOD_TARGET_INTENSITY, ...
    abs($Knob*10000), 0, $mod_idx, $target_idx)
end on
```

*Controlling the filter envelope amount of an envelope to filter cutoff modulation in the first group.
Note: the filter envelope has been manually renamed to "FILTER_ENV".*

See Also

`find_mod()`

`set_engine_par()`

14.3. get_engine_par()

get_engine_par(<parameter>,<group>,<slot>,<generic>)	
Returns the value of a specific engine parameter	
<parameter>	Specifies the engine parameter by using one of the built in engine parameter variables.
<group>	The index (zero-based) of the group in which the specified parameter resides. If the specified parameter resides on an Instrument level, enter -1.
<slot>	The slot index (zero-based) of the specified parameter. It applies only to group/instrument effects, modulators and modulation intensities. For group/instrument effects, this parameter specifies the slot in which the effect resides (zero-based). For modulators and modulation intensities, this parameters specifies the index which you can retrieve by using: <code>find_mod(<group-idx>,<mod-name>)</code> For all other applications, set this parameter to -1.
<generic>	This parameter applies to instrument effects and to internal modulators. For instrument effects, this parameter distinguishes between: 1: Insert Effect 0: Send Effect For buses, this parameter specifies the actual bus: <code>\$NI_BUS_OFFSET + [0-15]</code> one of the 16 busses For internal modulators, this parameter specifies the modulation slider which you can retrieve by using: <code>find_target(<group-idx>,<mod-idx>,<target-name>)</code> For all other applications, set this parameter to -1.

Examples

```
on init
  declare $a

  declare ui_label $label (2,6)
  set_text ($label,"Release Trigger Groups:")

  while ($a < $NUM_GROUPS)
    if(get_engine_par($ENGINE_PAR_RELEASE_TRIGGER , $a, -1, -1)=1)
      add_text_line($label,group_name($a)&" (Index: "&$a&"")
    end if
    inc($a)
  end while
end on
```

Output the name and index of release trigger group

```

on init
  declare ui_label $label (2,6)

  declare ui_button $Refresh

  declare !effect_name[128]
  !effect_name[$EFFECT_TYPE_NONE] := "None"
  !effect_name[$EFFECT_TYPE_PHASER] := "Phaser"
  !effect_name[$EFFECT_TYPE_CHORUS] := "Chorus"
  !effect_name[$EFFECT_TYPE_FLANGER] := "Flanger"
  !effect_name[$EFFECT_TYPE_REVERB] := "Reverb"
  !effect_name[$EFFECT_TYPE_DELAY] := "Delay"
  !effect_name[$EFFECT_TYPE_IRC] := "Convolution"
  !effect_name[$EFFECT_TYPE_GAINER] := "Gainer"

  declare $count
  while ($count < 8)
    add_text_line($label,"Slot: " & $count+1 & ": " & ...
    !
effect_name[get_engine_par($ENGINE_PAR_SEND_EFFECT_TYPE, -1,$count, -1)])
    inc($count)
  end while

end on

on ui_control ($Refresh)
  set_text($label,"")
  $count := 0
  while ($count < 8)
    add_text_line($label,"Slot: " & $count+1 & ": " & ...
    !
effect_name[get_engine_par($ENGINE_PAR_SEND_EFFECT_TYPE, -1,$count, -1)])
    inc($count)
  end while

  $Refresh := 0
end on

```

Output the effect types of all eight send effect slots

See Also

Module Status Retrieval

14.4. get_engine_par_disp()

get_engine_par_disp(<parameter>, <group>, <slot>, <generic>)	
Returns the displayed string of a specific engine parameter	
<parameter>	Specifies the engine parameter.
<group>	The index (zero-based) of the group in which the specified parameter resides. If the specified parameter resides on an Instrument level, enter -1.
<slot>	The slot index (zero-based) of the specified parameter. It applies only to group/instrument effects, modulators and modulation intensities. For group/instrument effects, this parameter specifies the slot in which the effect resides (zero-based). For modulators and modulation intensities, this parameters specifies the index which you can retrieve by using: <pre>find_mod(<group-idx>, <mod-name>)</pre> For all other applications, set this parameter to -1.
<generic>	this parameter applies to instrument effects and to internal modulators. For instrument effects, this parameter distinguishes between 1: Insert Effect 0: Send Effect For buses, this parameter specifies the actual bus: <pre>\$NI_BUS_OFFSET + [0-15] one of the 16 busses</pre> For internal modulators, this parameter specifies the modulation slider which you can retrieve by using: <pre>find_target(<group-idx>, <mod-idx>, <target-name>)</pre> For all other applications, set this parameter to -1

Examples

```
on init
  declare $a

  declare ui_label $label (2,6)
  set_text ($label,"Group Volume Settings:")

  while ($a < $NUM_GROUPS)
    add_text_line($label,group_name($a) & ": " & ...
    get_engine_par_disp($ENGINE_PAR_VOLUME,$a,-1,-1) & " dB")
    inc($a)
  end while
end on
```

Query the group volume settings in an instrument

14.5. get_voice_limit()

get_voice_limit(<voice-type>)	
Returns the voice limit for the Time Machine Pro mode of the source module	
<voice-type>	The voice type, can be one of the following:
	\$NI_VL_TMPRO_STANDARD {Standard Mode}
	\$NI_VL_TMRPO_HQ {High Quality Mode}

Examples

```
on init
  declare ui_label $label (3,2)

  add_text_line($label,"Standard Voice Limit: " & ...
  get_voice_limit($NI_VL_TMPRO_STANDARD))

  add_text_line($label,"HQ Voice Limit: " & ...
  get_voice_limit($NI_VL_TMRPO_HQ))

end on
```

Displaying TM Pro voice limits

See Also

set_voice_limit()

14.6. output_channel_name()

output_channel_name(<output-number>)	
Returns the channel name for the specified output	
<output-number>	The number of the output channel (zero-based, i.e. the first output is 0)

Examples

```
on init
  declare $count
  declare ui_menu $menu
  add_menu_item($menu, "Default", -1)

  $count := 0
  while($count < $NUM_OUTPUT_CHANNELS)
    add_menu_item($menu, output_channel_name($count), $count)
    inc($count)
  end while

  $menu := get_engine_par($ENGINE_PAR_OUTPUT_CHANNEL, 0, -1, -1)
end on

on ui_control ($menu)
  set_engine_par($ENGINE_PAR_OUTPUT_CHANNEL, $menu, 0, -1, -1)
end on
```

Mirroring the output channel assignment menu of the first group

See Also

\$NUM_OUTPUT_CHANNELS

\$ENGINE_PAR_OUTPUT_CHANNEL

14.7. set_engine_par()

set_engine_par(<parameter>,<value>,<group>,<slot>,<generic>)	
Control automatable KONTAKT parameters and bypass buttons	
<parameter>	The engine parameter to be modified, e.g. \$ENGINE_PAR_CUTOFF
<value>	The value to which the specified parameter is set. The range of values is always 0 to 1000000, except for switches in which case it is 0 or 1.
<group>	The index (zero-based) of the group in which the specified parameter resides. If the specified parameter resides on an Instrument level, enter -1. Busses also reside on Instrument level, so you need to set <group> to -1 if you want to address a bus.
<slot>	The slot index (zero-based) of the specified parameter. This applies only to group/instrument effects, modulators and modulation intensities. For group/instrument effects, this parameter specifies the slot in which the effect resides (zero-based). For modulators and modulation intensities, this parameters specifies the index which you can retrieve by using: <pre>find_mod(<group-idx>,<mod-name>)</pre> For all other applications, set this parameter to -1.
<generic>	This parameter applies to instrument effects and to internal modulators. For instrument effects, this parameter distinguishes between: 1: Insert Effect 0: Send Effect For buses, this parameter specifies the actual bus: $\\$NI_BUS_OFFSET + [0-15]$ one of the 16 busses For internal modulators, this parameter specifies the modulation slider which you can retrieve by using: <pre>find_target(<group-idx>,<mod-idx>,<target-name>)</pre> For all other applications, set this parameter to -1

Examples

```
on init
  declare ui_knob $Volume (0,1000000,1000000)
end on
on ui_control ($Volume)
  set_engine_par($ENGINE_PAR_VOLUME,$Volume,-1,-1,-1)
end on
```

Controlling instrument volume

```
on init
  declare ui_knob $Freq (0,1000000,1000000)
  declare ui_button $Bypass
end on

on ui_control ($Freq)
  set_engine_par($ENGINE_PAR_CUTOFF,$Freq,0,0,-1)
end on

on ui_control ($Bypass)
  set_engine_par($ENGINE_PAR_EFFECT_BYPASS,$Bypass,0,0,-1)
end on
```

Controlling the cutoff and bypass button of any filter module in the first slot of the first group

```
on init
  declare ui_knob $Knob (-100,100,1)
  declare $mod_idx
  $mod_idx := find_mod(0,"FILTER_ENV")

  declare $target_idx
  $target_idx := find_target(0,$mod_idx,"ENV_AHDSR_CUTOFF")
end on

on ui_control ($Knob)
  if ($Knob < 0)
    set_engine_par ($MOD_TARGET_INVERT_SOURCE,...
      1,0,$mod_idx,$target_idx)
  else
    set_engine_par ($MOD_TARGET_INVERT_SOURCE,...
      0,0,$mod_idx,$target_idx)
  end if
  set_engine_par($ENGINE_PAR_MOD_TARGET_INTENSITY,...
    abs($Knob*10000),0,$mod_idx,$target_idx)
end on
```

*Controlling the filter envelope amount of an envelope to filter cutoff modulation in the first group.
Note: the the filter envelope has been manually renamed to "FILTER_ENV".*

```
on init
    declare ui_knob $Vol (-0,1000000,1)
end on

on ui_control ($Vol)
    set_engine_par($ENGINE_PAR_VOLUME,$Vol,-1,-1,$NI_BUS_OFFSET + 15)
end on
```

Controlling the amplifier volume of the 16th bus

14.8. set_voice_limit()

set_voice_limit(<voice-type>,<value>)	
Sets the voice limit for the Time Machine Pro mode of the source module	
<voice-type>	The voice type, can be one of the following: \$NI_VL_TMPRO_STANDARD {Standard Mode} \$NI_VL_TMRPO_HQ {High Quality Mode}
<value>	The voice limit of the Time Machine Pro mode

Remarks

- Changing voice limits is an asynchronous operation. This means, that one cannot reliably access the newly allocated voices immediately after instantiation. To resolve this, the set_voice_limit() command returns an \$NI_ASYNC_ID and triggers the on_async_complete callback.

Examples

```
on init
  declare ui_value_edit $Voices (1,8,1)
  make_persistent($Voices)

  declare $change_voices_id

end on

on ui_control ($Voices)
  $change_voices_id := set_voice_limit($NI_VL_TMPRO_STANDARD,$Voices)
end on

on async_complete
  if ($NI_ASYNC_ID = $change_voices_id)
    message("New TM Pro Standard Voice Limit: " & ...
get_voice_limit($NI_VL_TMPRO_STANDARD))
  end if
end on
```

Changing TM Pro voice limits

See Also

get_voice_limit()

15. ZONE COMMANDS

15.1. General Information

User zones are a special kind of zone that allow for zone creation and manipulation “on the fly” and can be used to allow user interaction with the sampled content within an instrument (for example in conjunction with sample drag-and-drop). These zones must be declared via script in the `on init` callback.

When a user zone is created the mapping is set to 0 on all zone parameters by default (root key, high velocity, high note, low note etc...). Therefore, the zone will not show in the mapping editor’s normal view (it will be listed and present in the list view).

Note that some of the functions listed below only work on user zones, while some also work on every zone.

15.2. get_loop_par()

<code>get_loop_par(<zone_id>,<loop-index>,<parameter>)</code>	
Returns the loop parameters of a zone	
<code><zone_id></code>	The ID of the zone
<code><loop-index></code>	The index number of the loop
<code><parameter></code>	The following parameters are available:
	<code>\$LOOP_PAR_MODE</code>
	<code>\$LOOP_PAR_START</code>
	<code>\$LOOP_PAR_LENGTH</code>
	<code>\$LOOP_PAR_XFADE</code>
	<code>\$LOOP_PAR_COUNT</code>
	<code>\$LOOP_PAR_TUNING</code>

Remarks

- `get_loop_par()` works on every loop from every zone
- This function runs synchronously

Examples

```
message(get_loop_par($myZoneId, 0, $LOOP_PAR_MODE))
```

15.3. get_sample()

get_sample(<zone-id>,<return-parameter>)	
Returns paths, file names and extensions of samples.	
<zone-id>	The ID of the zone
<return-parameter>	The following parameters are available:
	\$NI_FILE_NAME
	\$NI_FILE_FULL_PATH
	\$NI_FILE_FULL_PATH_OS
	\$NI_FILE_EXTENSION

Remarks

- get_sample() works on every zone
- This function runs synchronously

Examples

```
message(get_sample(%NI_USER_ZONE_IDS[0], $NI_FILE_NAME))
```

See Also

\$NI_FILE_NAME

\$NI_FILE_FULL_PATH

\$NI_FILE_FULL_PATH_OS

\$NI_FILE_EXTENSION

15.4. get_zone_par()

get_zone_par (<zone-id>, <parameter>)	
Returns the zone parameters	
<zone-id>	The ID of the zone
<parameter>	The following parameters are available: \$ZONE_PAR_HIGH_KEY \$ZONE_PAR_LOW_KEY \$ZONE_PAR_HIGH_VELO \$ZONE_PAR_LOW_VELO \$ZONE_PAR_ROOT_KEY \$ZONE_PAR_FADE_LOW_KEY \$ZONE_PAR_FADE_HIGH_KEY \$ZONE_PAR_FADE_LOW_VELO \$ZONE_PAR_FADE_HIGH_VELO \$ZONE_PAR_VOLUME \$ZONE_PAR_PAN \$ZONE_PAR_TUNE \$ZONE_PAR_GROUP \$ZONE_PAR_SAMPLE_START \$ZONE_PAR_SAMPLE_END \$ZONE_PAR_SAMPLE_MOD_RANGE

Remarks

- get_zone_par () works on every zone
- This function runs synchronously

Examples

```
get_zone_par(%NI_USER_ZONE_IDS[0], $ZONE_PAR_PAN)
```

15.5. is_zone_empty()

is_zone_empty(<zone-ID>)	
Returns 1 if a zone is empty (has no sample), otherwise returns 0	
<zone-ID>	The ID of the zone

Examples

```
message("Zone empty status: " & is_zone_empty(%NI_USER_ZONE_IDS[0]))
```

15.6. set_loop_par()

set_loop_par (<zone-id>, <loop-index>, <parameter>, <value>	
Sets the loop parameters of a user zone	
<zone-id>	The ID of the zone
<loop-index>	The index number of the loop
<parameter>	The following parameters are available: \$LOOP_PAR_MODE \$LOOP_PAR_START \$LOOP_PAR_LENGTH \$LOOP_PAR_XFADE \$LOOP_PAR_COUNT \$LOOP_PAR_TUNING
<value>	The value of the loop parameter

Remarks

- set_loop_par () only works in user zone loops
- When executed in the `init` callback, this function runs synchronously and returns -1
- When executed outside the `init` callback, this function runs asynchronously and returns an async ID

Examples

```
wait_async(set_loop_par(%NI_USER_ZONE_IDS[0], 0, $LOOP_PAR_MODE,
$SampleLoopOnA))
```

15.7. set_num_user_zones()

set_num_user_zones(<number_of_user_zones>)	
Creates empty user zones	
<number_of_user_zones>	Defines the number of user zones to be created. %NI_USER_ZONE_IDS is the array of size <number_of_user_zones> with all the user zone IDs.

Remarks

- A maximum of 512 user zones per instrument can be created
- User zones are shown with a different color in the mapping editor
- User zones cannot be modified from the mapping editor
- In order to manipulate the user zones, the IDs stored in the %NI_USER_ZONE_IDS array should be used, instead of the hardcoded zone IDs

Examples

```
on init
...
    set_num_user_zones(2)
    set_zone_par(%NI_USER_ZONE_IDS[0], $ZONE_PAR_GROUP, 30)
    set_zone_par(%NI_USER_ZONE_IDS[1], $ZONE_PAR_GROUP, 31)
...
end on
```

15.8. set_sample

set_sample(<zone-id>, <sample-path>)	
Sets the user sample in a zone	
<zone-id>	The ID of the zone
<sample-path>	The sample path of the sample

Remarks

- set_sample() only works in user zones
- When executed in the `init` callback, this function runs synchronously and returns -1
- When executed outside the `init` callback, this function runs asynchronously and returns an async ID

Examples

```
on ui_control ($myMouseArea)
  if ($NI_MOUSE_EVENT_TYPE = $NI_MOUSE_EVENT_TYPE_DROP)
    if (num_elements(!NI_DND_ITEMS_AUDIO) = 1)
      $async_lock := 1
      wait_async(set_sample(%NI_USER_ZONE_IDS[0],
        !NI_DND_ITEMS_AUDIO[0]))
    end
  end
on
```

15.9. set_zone_par()

set_zone_par(<zone-id>, <parameter>, <value>)	
Sets the user zone parameters	
<zone-id>	The ID of the zone
<parameter>	The following flags are available: \$ZONE_PAR_HIGH_KEY \$ZONE_PAR_LOW_KEY \$ZONE_PAR_HIGH_VELO \$ZONE_PAR_LOW_VELO \$ZONE_PAR_ROOT_KEY \$ZONE_PAR_FADE_LOW_KEY \$ZONE_PAR_FADE_HIGH_KEY \$ZONE_PAR_FADE_LOW_VELO \$ZONE_PAR_FADE_HIGH_VELO \$ZONE_PAR_VOLUME \$ZONE_PAR_PAN \$ZONE_PAR_TUNE \$ZONE_PAR_GROUP \$ZONE_PAR_SAMPLE_START \$ZONE_PAR_SAMPLE_END \$ZONE_PAR_SAMPLE_MOD_RANGE
<value>	The value of the zone parameter

Remarks

- set_zone_par() only works in user zones
- When executed in the `init` callback, this function runs synchronously and returns -1
- When executed outside the `init` callback, this function runs asynchronously and returns an async ID

Examples

```
set_zone_par(%NI_USER_ZONE_IDS[0], $ZONE_PAR_GROUP, 0)
```

16. LOAD/SAVE COMMANDS

16.1. General Information

File Formats

It is possible to load and save the following file formats:

- KONTAKT arrays (.nka files)
- MIDI files (.mid) to be used with the file commands in KSP
- IR samples (.wav, .aif, .aiff, .ncw) to be used with KONTAKT's convolution effect (loading only)

Async Handling

Loading and saving files cannot be executed in real time. This is why all load/save commands return a unique value upon completion of their action. You can use this value in combination with `$NI_ASYNC_ID` and `$NI_ASYNC_EXIT_STATUS` within the `on_async_complete` callback to check whether the command has completed its action, and whether or not the loading or saving was successful.

Path Handling

All file paths in KSP use a slash character (/) as a folder separator. Backslash characters are not supported. The full path has to start with a slash character "/".

Examples

Factory folder on OS X:

```
/Library/Application Support/Native Instruments/Kontakt 6/
```

Factory folder on Windows:

```
/C:/Program Files/Common Files/Native Instruments/Kontakt 6/
```

When loading or saving files with an absolute path as opposed to loading from the Resource Container, always use path variables in combination with `get_folder()`.

See Also

`$NI_ASYNC_ID`

`$NI_ASYNC_EXIT_STATUS`

`on_async_complete`

16.2. get_folder()

get_folder(<path-variable>)	
Returns the path specified with the built-in path variable	
<path-variable>	The following path variables are available: \$GET_FOLDER_LIBRARY_DIR If used with an NKI belonging to an encoded library: library folder. If used with an unencoded NKI: the user content directory. \$GET_FOLDER_FACTORY_DIR The factory folder of KONTAKT, mainly used for loading factory IR samples. Note: this is not the factory library folder! \$GET_FOLDER_PATCH_DIR The directory in which the patch was saved. If the patch was not saved before, an empty string is returned.

Remarks

- The behaviour `$GET_FOLDER_LIBRARY_DIR` changed from KONTAKT 5 onwards. If the NKI belongs to an encoded library, it will point to its library folder. Otherwise, the user content directory is returned.

Example

```
on init
  message(get_folder($GET_FOLDER_FACTORY_DIR))
end on
```

Displaying the path of the factory folder of KONTAKT

See Also

```
load_ir_sample()
$GET_FOLDER_LIBRARY_DIR
$GET_FOLDER_FACTORY_DIR
$GET_FOLDER_PATCH_DIR
```

16.3. load_array()

load_array(<array-variable>,<mode>)	
Loads an array from an external file (.nka file)	
<array-variable>	The array variable, this name must be present in the .nka file
<mode>	0: A dialog window pops up, allowing you to select an .nka file. Can only be used in UI, PGS and persistence_changed callbacks. 1: The array is directly loaded from the "Data" folder. For user instruments, the "Data" folder is located beside the resource container. For library instruments, the "Data" folder is located here: OS X: <UserName>/Library/Application Support/<Library Name>/ Win: C:\User\<UserName>\AppData\Local\<Library Name>\ Can be used in UI, PGS, init (synchronous) and persistence_changed callbacks. 2: The array is directly loaded from the "data" folder inside the resource container. Can be used in UI, PGS, init (synchronous) and persistence_changed callbacks.

Remarks

- It is also possible to load string arrays from .nka files.
- It is not possible to load an array with %xyz in its .nka file into array %abc.
- The array data is not directly available after the load_array() command has been executed since the command works asynchronously. The only situation in which the values are instantly available is when using mode 1 or mode 2 within an init callback.
- When using mode 0 the callback continues even if the loading dialog is still open.
- Mode 2 is only available for loading arrays, i.e. save_array() does not have this option.
- When loading an array within the init callback, please remember that the loaded data will be overwritten at the end of the callback if the array is persistent. Use read_persistent_var() before loading the array to avoid this problem.
- .nka files loaded from the resource container should always have a newline character at the end of the file. If this last newline is missing, then KONTAKT will not know the file has ended and will continue to try and load other data from the resources container. Files generated by the save_array() command have this automatically, but if you are creating files manually, then this is something to take care of.

Example

(see next page)

```

on init
  declare $count
  declare ui_button $Load
  declare ui_button $Save
  declare ui_table %table[8] (2,2,100)
  make_persistent(%table)
  declare %preset[8]
  declare $load_arr_id
  $load_arr_id := -1
  declare $save_arr_id
  $save_arr_id := -1
end on

on ui_control (%table)
  $count := 0
  while($count < 8)
    %preset[$count] := %table[$count]
    inc($count)
  end while
end on

on ui_control ($Load)
  $load_arr_id := load_array(%preset,0)
end on

on ui_control ($Save)
  $save_arr_id := save_array(%preset,0)
end on

on async_complete
  if ($NI_ASYNC_ID = $load_arr_id)
    $load_arr_id := -1
    $Load := 0
    if ($NI_ASYNC_EXIT_STATUS = 1)
      $count := 0
      while($count < 8)
        %table[$count] := %preset[$count]
        inc($count)
      end while
    end if
  end if
  if ($NI_ASYNC_ID = $save_arr_id)
    $save_arr_id := -1
    $Save := 0
  end if
end on

```

Exporting and loading the contents of a UI table

See Also`$NI_ASYNC_ID``$NI_ASYNC_EXIT_STATUS``on async_complete``save_array()`

16.4. load_array_str()

load_array_str(<array-variable>,<path>)	
Loads an array from an external file (.nka file) using the file's absolute path	
<array-variable>	The array variable. This name must be present in the .nka file
<path>	The absolute path of the .nka file

Remarks

- The behaviour is similar to load_array() with mode set to 0, but instead of manually choosing an .nka file you can specify it with an absolute path.
- Can be used in init (synchronous), persistence_changed, UI and PGS callbacks.

Example

(see next page)

```

on init
    set_ui_height(2)

    declare @basepath_browser
    {set browser path here, for example
    @basepath_browser := "/Users/<username>/Desktop/Arrays"}

    declare @file_path
    make_persistent(@file_path)

    declare @file_name
    make_persistent(@file_name)

    declare ui_file_selector $file_browser
    declare $browser_id
    $browser_id := get_ui_id($file_browser)

set_control_par_str($browser_id,$CONTROL_PAR_BASEPATH,@basepath_browser)
    set_control_par($browser_id,$CONTROL_PAR_WIDTH,112)
    set_control_par($browser_id,$CONTROL_PAR_HEIGHT,68)
    set_control_par($browser_id,$CONTROL_PAR_COLUMN_WIDTH,110)

set_control_par($browser_id,$CONTROL_PAR_FILE_TYPE,$NI_FILE_TYPE_ARRAY)
    move_control_px($file_browser,66,2)

    declare ui_table %table[8] (2,2,100)
    make_persistent(%table)
    move_control(%table,3,1)

    declare %preset[8]

    declare $load_arr_id
    $load_arr_id := -1
    declare $count
end on

on async_complete

    if ($NI_ASYNC_ID = $load_arr_id)

        $load_arr_id := -1

        if ($NI_ASYNC_EXIT_STATUS = 0)
            message("Array not found!")
        else
            message("")
            $count := 0
            while($count < 8)

```

```
                %table[$count] := %preset[$count]
                inc($count)
            end while
        end if
    end if
end on

on ui_control ($file_browser)
    @file_name := fs_get_filename($browser_id,0)
    @file_path := fs_get_filename($browser_id,2)
    $load_arr_id := load_array_str(%preset,@file_path)
end on
```

Loading different table presets with a browser. Make sure to first set the browser path of the file selector to point to a folder with compatible .nka files

16.5. load_ir_sample()

load_ir_sample(<file-path>,<slot>,<generic>)	
Loads an impulse response sample into KONTAKT's convolution effect	
<file-path>	The absolute file path of the IR sample. If no path is specified, the command will look for the specified sample within the "ir_samples" folder of the Resource Container. If no Resource Container is available, the folder "ir_samples" within the KONTAKT user folder will be checked. The KONTAKT user folder is located here: OS X: /Users/<username>/Documents/Native Instruments/Kontakt/ Windows: C:/Users/<username>/Documents/Native Instruments/Kontakt/
<slot>	The slot index of the convolution effect (zero-based)
<generic>	Specifies whether the convolution effect is used as an: 1: Insert Effect 0: Send Effect For buses, this parameter specifies the actual bus: \$NI_BUS_OFFSET + [0-15] one of the 16 busses

Remarks

- Please note that subfolders inside the "ir_samples" folder will not be scanned and it is not recommended to add them manually via text strings. Doing so could lead to problems because subfolders are being ignored during the creation of a Resource Container monolith.

Example

(see next page)

```

on init
  declare ui_button $Load
  declare $load_ir_id
  $load_ir_id := -1
end on

on ui_control ($Load)
  $load_ir_id := load_ir_sample("Small Ambience.wav",0,0)
  $Load := 0
end on

on async_complete

  if ($NI_ASYNC_ID = $load_ir_id)

    $load_ir_id := -1

    if ($NI_ASYNC_EXIT_STATUS = 0)
      message("IR sample not found!")
    else
      message("IR sample loaded!")
    end if

  end if

end on

```

Load an IR sample into a convolution send effect in the first slot

See Also

\$NI_ASYNC_ID

get_folder()

on async_complete

16.6. save_array()

save_array(<array-variable>, <mode>)	
Saves an array to an external file, i.e. an .nka file	
<array-variable>	The array to be saved
<mode>	0: A dialog window pops up, allowing you to save the .nka file. Can only be used in UI and PGS callbacks. 1: The array is directly loaded from the "Data" folder. For user instruments, the "Data" folder is located beside the resource container. For library instruments, the "Data" folder is located here: OS X: <UserName>/Library/Application Support/<Library Name>/ Win: C:\User\<UserName>\AppData\Local\<Library Name>\ Can be used in UI, PGS, and persistence_changed callbacks.

Remarks

- It is also possible to save string arrays into .nka files.
- The exported .nka file consists of the name of the array followed its values.
- When using mode 0 the callback continues even if the loading dialog is still open.

See Also

\$NI_ASYNC_ID

\$NI_ASYNC_EXIT_STATUS

on_async_complete

load_array()

16.7. save_array_str()

save_array_str(<array-variable>, <path>)	
Saves an array to an external file, i.e. an .nka file, using the specified absolute path	
<array-variable>	The array to be saved
<path>	The absolute path of the .nka file to be saved

Remarks

- The behaviour is similar to save_array(), but instead of manually choosing a save location, you can directly save the file to the specified location.
- If the file does not exist but the folder does, a new .nka file will be created.
- Can be used in persistence_changed, UI and PGS callbacks.

Example

(see next page)

```

on init
    declare $count

    declare @path
    {set save path here, for example
    @path := "/Users/<username>/Desktop/Arrays/"}

    declare ui_button $Save

    declare ui_table %table[8] (2,2,100)
    make_persistent(%table)

    declare %preset[8]

    declare $save_arr_id
    $save_arr_id := -1

    declare ui_text_edit @preset_name
    make_persistent(@preset_name)

set_control_par_str(get_ui_id(@preset_name), $CONTROL_PAR_TEXT, "empty")
    set_control_par(get_ui_id(@preset_name), $CONTROL_PAR_FONT_TYPE, 25)
    set_control_par(get_ui_id(@preset_name), $CONTROL_PAR_POS_X, 73 +
3*92)
    set_control_par(get_ui_id(@preset_name), $CONTROL_PAR_POS_Y, 2)

    declare ui_label $pattern_lbl(1,1)
    set_text($pattern_lbl, "")
    move_control_px($pattern_lbl, 66 + 3*92, 2)

end on

on ui_control (%table)
    $count := 0
    while($count < 8)
        %preset[$count] := %table[$count]
        inc($count)
    end while
end on

on ui_control ($Save)
    $save_arr_id := save_array_str(%preset, @path & @preset_name &
".nka")
end on

on async_complete
    if ($NI_ASYNC_ID = $save_arr_id)

```

```
        $save_arr_id := -1
        $Save := 0
    end if
end on
```

Save table presets with custom names. Make sure to set the path where the .nka files will be saved.

See Also

`save_array()`

`load_array_str()`

16.8. save_midi_file()

save_midi_file(<path>)	
Saves a file with a range specified by the mf_set_export_area() command.	
<path>	The absolute path of the file

Example

```

on init
  declare @path
  {set save path here, for example
  @path := "/Users/<username>/Desktop/MIDI Files/"}

  declare ui_text_edit @file_name

set_control_par_str(get_ui_id(@file_name), $CONTROL_PAR_TEXT, "<empty>")
set_control_par(get_ui_id(@file_name), $CONTROL_PAR_FONT_TYPE, 25)
make_persistent(@file_name)
move_control_px(@file_name, 73, 2)

  declare ui_label $file_name_lbl(1,1)
  set_text($file_name_lbl, "")
  move_control_px($file_name_lbl, 66, 2)

  declare ui_button $Save
  move_control($Save, 2, 1)

  declare $save_mf_id
  $save_mf_id := -1

end on

on ui_control ($Save)
  $save_mf_id := save_midi_file(@path & @file_name & ".mid")
end on

on async_complete
  if ($NI_ASYNC_ID = $save_mf_id)
    $save_mf_id := -1
    $Save := 0
  end if
end on

```

Saving a MIDI file

See Also

mf_insert_file()

`mf_set_export_area()`

17. MUSIC INFORMATION RETRIEVAL

17.1. General Information

Music Information Retrieval (MIR) allows the extraction of meaningful features from audio files, such as pitch or the volume level of a sample. New KSP commands allow extraction of such parameters from samples via script. MIR functions are not asynchronous in the `init` callback (-1 as `async ID`), but asynchronous otherwise.

Note: the type detection functions listed below (Sample Type, Drum Type, and Instrument Type) are designed to process one-shot audio samples.

17.2. detect_pitch()

detect_pitch(<zone-id>, <pitch-result>)	
Returns a real value representing the fundamental frequency of an audio sample, in semi-tones and cents. If detection fails, the function will set <pitch-result> to ~NI_DETECT_PITCH_INVALID	
<zone-id>	The ID of the zone
<pitch-result>	The MIDI note value of the detected pitch

17.3. detect_loudness()

detect_loudness(<zone-id>, <loudness-result>)

Returns a real value representing the loudness of an audio sample in dB. Loudness is measured according to the standard established by the International Telecommunication Union: *Algorithms to measure audio program loudness and true-peak audio level* - ITU-R BS.1770-4 (2015). If detection fails, the function will set <loudness-result> to:

~NI_DETECT_LOUDNESS_INVALID

<zone-id>	The ID of the zone
<loudness-result>	The detected loudness in dB

17.4. detect_peak()

detect_peak(<zone-id>, <peak-result>)	
Returns a real value representing peak level of an audio sample in dB. Peak is measured according to the standard established by the International Telecommunication Union: <i>Algorithms to measure audio program loudness and true-peak audio level - ITU-R BS.1770-4 (2015)</i> . If detection fails, the function will set <peak-result> to: ~NI_DETECT_PEAK_INVALID	
<zone-id>	The ID of the zone
<peak-result>	The detected peak level in dB

17.5. detect_rms()

detect_rms(<zone-id>,<rms-result>)	
Returns a real value representing the RMS level of an audio sample in dB. If detection fails, the function will set <rms-result> to: ~NI_DETECT_RMS_INVALID	
<zone-id>	The ID of the zone
<rms-result>	The real value of the RMS level of the audio sample in dB

17.6. detect_sample_type()

detect_sample_type(<zone-id>,<sample-type-result>)	
Assigns <sample-type-result> a \$NI_DETECT_SAMPLE_TYPE tag describing the whether an audio sample is a drum or an instrument. If detection fails, the function will set <sample-type-result> to: \$NI_DETECT_SAMPLE_TYPE_INVALID.	
<zone-id>	The ID of the zone
<sample-type-result>	The detected sample type, can be one of the following: \$NI_DETECT_SAMPLE_TYPE_INVALID \$NI_DETECT_SAMPLE_TYPE_INSTRUMENT \$NI_DETECT_SAMPLE_TYPE_DRUM

17.7. detect_drum_type()

detect_drum_type(<zone-id>,<drum-type-result>)	
Assigns <drum-type-result> a \$NI_DETECT_DRUM_TYPE tag describing the drum type of an audio sample. Hint: use this function if detect_sample_type() determines that a given audio sample is of type \$NI_DETECT_SAMPLE_TYPE_DRUM. If detection fails, the function will set <drum-type-result> to: ~NI_DETECT_DRUM_TYPE_INVALID.	
<zone-id>	The ID of the zone
<drum-type-result>	The detected drum type, can be one of the following: \$NI_DETECT_DRUM_TYPE_INVALID \$NI_DETECT_DRUM_TYPE_KICK \$NI_DETECT_DRUM_TYPE_SNARE \$NI_DETECT_DRUM_TYPE_CLOSED_HH \$NI_DETECT_DRUM_TYPE_OPEN_HH \$NI_DETECT_DRUM_TYPE_TOM \$NI_DETECT_DRUM_TYPE_CYMBAL \$NI_DETECT_DRUM_TYPE_CLAP \$NI_DETECT_DRUM_TYPE_SHAKER \$NI_DETECT_DRUM_TYPE_PERC_DRUM \$NI_DETECT_DRUM_TYPE_PERC_OTHER

17.8. detect_instrument_type()

detect_instrument_type(<zone-id>,<instrument-type-result>)	
Assigns <drum-type-result> a \$NI_DETECT_INSTRUMENT_TYPE tag describing the instrument type of an audio sample. Hint: use this function if detect_sample_type() determines that a given audio sample is of type \$NI_DETECT_SAMPLE_TYPE_INSTRUMENT. If detection fails, the function will set <instrument-type-result> to: \$NI_DETECT_INSTRUMENT_TYPE_INVALID.	
<zone-id>	The ID of the zone
<instrument-type-result>	The detected instrument type, can be one of the following: \$NI_DETECT_INSTRUMENT_TYPE_INVALID \$NI_DETECT_INSTRUMENT_TYPE_BASS \$NI_DETECT_INSTRUMENT_TYPE_BOWED_STRING \$NI_DETECT_INSTRUMENT_TYPE_BRASS \$NI_DETECT_INSTRUMENT_TYPE_FLUTE \$NI_DETECT_INSTRUMENT_TYPE_GUITAR \$NI_DETECT_INSTRUMENT_TYPE_KEYBOARD \$NI_DETECT_INSTRUMENT_TYPE_MALLET \$NI_DETECT_INSTRUMENT_TYPE_ORGAN \$NI_DETECT_INSTRUMENT_TYPE_PLUCKED_STRING \$NI_DETECT_INSTRUMENT_TYPE_REED \$NI_DETECT_INSTRUMENT_TYPE_SYNTH \$NI_DETECT_INSTRUMENT_TYPE_VOCAL

17.9. Examples

```
wait_async(detect_pitch(%NI_USER_ZONE_IDS[0], ~pitch_result))
wait_async(set_zone_par(%NI_USER_ZONE_IDS[0], $ZONE_PAR_ROOT_KEY,
real_to_int(round(~pitch_result))))
wait_async(set_zone_par(%NI_USER_ZONE_IDS[0], $ZONE_PAR_TUNE,
real_to_int(100.0 * (round(~pitch_result) - ~pitch_result)))
```

Set the zone root key by rounding the pitch result to an integer value. Then set the zone tune to correct for the pitch offset.

```
wait_async(detect_sample_type(%NI_USER_ZONE_IDS[0], $sample_type))
if ($sample_type = $NI_DETECT_SAMPLE_TYPE_INSTRUMENT)
    wait_async(detect_instrument_type(%NI_USER_ZONE_IDS[0],
$instrument_type))
else
    wait_async(detect_drum_type(%NI_USER_ZONE_IDS[0], $drum_type))
end if

if ($sample_type = $NI_DETECT_SAMPLE_TYPE_INSTRUMENT)
    if ($instrument_type = $NI_DETECT_INSTRUMENT_TYPE_BASS)
        set_text ($label_5, "Bass")
    end if
else
    if ($drum_type = $NI_DETECT_DRUM_TYPE_KICK)
        set_text ($label_5, "Kick")
    end if
end if
```

Detect whether a sample is of type instrument or drum, and detect the corresponding drum or instrument type.

18. MIDI OBJECT COMMANDS

18.1. General Information

Please note that in KONTAKT version 5.2, the MIDI file handling has been significantly updated. Commands and working methods from before the 5.2 release will remain in order to keep backwards compatibility; however this reference will document the post 5.2 working method.

You can only use one MIDI object at a time within an NKI. The MIDI object is held in memory and can be accessed by any of the script slots. It is possible to add, remove and edit MIDI events within the object, as well as import and export MIDI files.

The Multi Script can also hold one MIDI object, and handles it in the same way as an NKI.

Creating, Importing and Exporting MIDI files

When you initialize an instrument, an empty MIDI object is initialized with it. You can either start editing the object by defining a buffer size and inserting events, or by inserting a whole MIDI file.

If you want to create a MIDI sequence from scratch, you first need to assign a buffer size, which effectively creates a number of inactive MIDI events. From this point you can activate, i.e. insert, and edit MIDI events using the MIDI event commands.

You can also load a MIDI file to use or edit the data in a script. Depending on the command and variables you use, this will either be combined with any existing MIDI data, or will replace the existing data. It should be noted that loading a MIDI file is an asynchronous command, and thus the common asynchronous loading commands and working methods apply.

MIDI objects can be exported from KONTAKT either by using the `save_midi_file()` command, or via a drag and drop enabled label element. In either case, it is possible to define the export area, both in terms of start and end times, as well as the start and end tracks, by using the `mf_set_export_area()` command.

Navigating and Editing

MIDI events in KONTAKT's MIDI object are given event parameters, which are accessed using either the `mf_get_event_par()` or `mf_set_event_par()` commands. A unique event ID can be used to access a specific event, or you can navigate through events by position. The event ID is assigned whenever a MIDI event is created or loaded.

In order to access the event data of a loaded MIDI file, you can navigate around the MIDI events with a position marker, something analogous to a play-head. The position marker will focus on one single event at a time, allowing you to use a variety of commands to access or edit the event's parameters. You have the option to either navigate from one event to the next, or to specify exact positions in MIDI ticks.

It should be noted that MIDI note off messages are not used. When you load a MIDI file using the `mf_insert_file()` command, the note off events are used to give a length parameter to the respective note on event, and are then discarded.

18.2. mf_insert_file()

mf_insert_file(<path>,<track-offset>,<position-offset>,<mode>)	
Inserts a MIDI file into the object	
<path>	The absolute path of the MIDI file, including the file name
<track-offset>	Applies a track offset to the MIDI data
<position-offset>	Applies a position offset, in ticks, to the MIDI data
<mode>	Defines the mode of insertion: 0: Replace all existing events 1: Replace only overlapping events 2: Merge all events

Remarks

- The loading of MIDI files with this command is asynchronous, so it is advised to use the `async_complete` callback to check the status of the load. However, the `async_complete` callback will not be called if this command is used in the `init` callback.
- This command will pair Note On and Note Off events to a single Note On with a Note Length parameter. The Note Off events will be discarded.

Example

(see next page)

```

on init
  declare @file_name
  declare @filepath

  @file_name := "test.mid"
  @filepath := get_folder($GET_FOLDER_FACTORY_DIR) & @file_name

  declare $load_mf_id
  declare ui_button $load_file
end on

on ui_control($load_file)
$load_mf_id := mf_insert_file(@filepath,0,0,0)
end on

on async_complete
  if ($NI_ASYNC_ID = $load_mf_id)

    $load_mf_id := -1

    if ($NI_ASYNC_EXIT_STATUS = 0)
      message("FATAL ERROR: MIDI file not found!")
    else
      message("Loaded MIDI File: " & @file_name)
    end if
  end if
end on

```

Loading a MIDI file with a button. In order for this to work you will need to put a MIDI file called "test.mid" into your KONTAKT Factory folder. Otherwise the defined error message will be displayed.

See Also

\$NI_ASYNC_ID

\$NI_ASYNC_EXIT_STATUS

on async_complete

save_midi_file()

mf_set_event_par()

mf_get_event_par()

18.3. mf_set_export_area()

mf_set_export_area(<name>, <start-pos>, <end-pos>, <start-track>, <end-track>)	
Defines the part of the object that will be exported when using a drag and drop area, or the <code>save_midi_file()</code> command.	
<name>	Sets the name of the exported file.
<start-pos>	Defines the start position (in ticks) of the export area. Use -1 to set this to the start of the object.
<end-pos>	Defines the end position (in ticks) of the export area. Use -1 to set this to the end of the object.
<start-track>	Defines the first track to be included in the export area. Use -1 to set this to the first track of the object.
<end-track>	Defines the last track to be included in the export area. Use -1 to set this to the last track of the object.

Remarks

- If a start point is given a value greater than the end point, the values will be swapped.
- When this command is executed, the events in the range are checked if they are valid MIDI commands. The command will return a value of 0 if all events are valid, otherwise it will return the event ID of the first invalid event.

Example

```
on init
  @filepath := get_folder($GET_FOLDER_FACTORY_DIR) & "test.mid"
  mf_insert_file(@filepath, 0, 0, 0)

  declare ui_button $check_area
  declare $area_status
end on

on ui_control($check_area)
  $area_status := mf_set_export_area("name", -1, -1, -1, -1)
  if($area_status = 0)
    message("All Good")
  else
    message("Error: check event with ID " & $area_status)
  end if
end on
```

A simple script, using this command to check if all events in a MIDI file are valid. If there is an error it will display the event ID of the first invalid event. In order for this to work you will have to put a MIDI file called "test.mid" into your KONTAKT Factory folder.

See Also

`mf_insert_file()`

`$CONTROL_PAR_DND_BEHAVIOUR`

`save_midi_file()`

18.4. mf_set_buffer_size()

mf_set_buffer_size(<size>)	
Defines a number of inactive MIDI events, that can be activated and edited	
<size>	The size of the MIDI object edit buffer

Remarks

- Using the `mf_insert_event()` and `mf_remove_event()` technically activate or deactivate events in the buffer.
- It is not possible to insert MIDI events without first setting a buffer size.
- The maximum buffer size is 1,000,000 events, including both active and inactive events.
- If this command is called outside of the init callback, it is asynchronous, and thus calls the `async_complete` callback.
- Inserting a MIDI event will decrease the buffer size by one. Removing an event will increase it by one.
- Inserting a MIDI file will not affect the buffer.

See Also

`mf_insert_file()`
`mf_get_buffer_size()`
`mf_reset()`
`mf_insert_event()`
`mf_remove_event()`
`save_midi_file()`

18.5. mf_get_buffer_size()

<code>mf_get_buffer_size()</code>
Returns the size of the MIDI event buffer

Remarks

- The maximum buffer size is 1,000,000 events, including both active and inactive events.
- Inserting a MIDI event will decrease the buffer size by one. Removing an event will increase it by one.

See Also

`mf_insert_file()`

`mf_set_buffer_size()`

`mf_reset()`

`mf_insert_event()`

`mf_remove_event()`

`save_midi_file()`

18.6. mf_reset()

<code>mf_reset()</code>
Resets the MIDI object, sets the event buffer to zero, and removes all events

Remarks

- This command purges all MIDI data. Use with caution.
- This command is also asynchronous, and thus calls the `async_complete` callback.

See Also

`mf_insert_file()`

`mf_set_buffer_size()`

`mf_reset()`

`mf_insert_event()`

`mf_remove_event()`

`save_midi_file()`

18.7. mf_insert_event()

mf_insert_event(<track>, <pos>, <command>, <byte1>, <byte2>)	
Activates an inactive MIDI event in the MIDI object. However, because the command and position are defined in this command, it can be considered as an insertion.	
<track>	The track into which the event will be inserted
<pos>	The position at which the event will be inserted, in ticks
<command>	Defines the command type of the event, can be one of the following: \$MIDI_COMMAND_NOTE_ON \$MIDI_COMMAND_POLY_AT \$MIDI_COMMAND_CC \$MIDI_COMMAND_PROGRAM_CHANGE \$MIDI_COMMAND_MONO_AT \$MIDI_COMMAND_PITCH_BEND
<byte1>	The first byte of the command
<byte2>	The second byte of the command

Remarks

- It is not possible to insert MIDI events without first setting an event buffer size with the `mf_set_buffer_size()` command.
- Using this command when the buffer is full, i.e. has a size of zero, will do nothing.
- You can retrieve the event ID of the inserted event in a variable by writing:
`<variable> := mf_insert_event(<track>, <pos>, <command>, <byte1>, <byte2>)`

See Also

`mf_insert_file()`
`mf_set_buffer_size()`
`mf_get_buffer_size()`
`mf_reset()`
`mf_remove_event()`
`save_midi_file()`

18.8. mf_remove_event()

mf_remove_event(<event-id>)	
Deactivates an event in the MIDI object, effectively removing it	
<event-id>	The ID of the event to be deactivated

Remarks

- Using this command will increase the MIDI event buffer size by one.

See Also

mf_insert_file()
mf_set_buffer_size()
mf_get_buffer_size()
mf_reset()
mf_insert_event()
save_midi_file()

18.9. mf_set_event_par()

mf_set_event_par(<event-id>,<parameter>,<value>)	
Sets an event parameter	
<event-id>	The ID of the event to be edited
<parameter>	The event parameter, either one of four freely assignable event parameters: \$EVENT_PAR_0 \$EVENT_PAR_1 \$EVENT_PAR_2 \$EVENT_PAR_3 Or the "built-in" parameters of a event: \$EVENT_PAR_MIDI_CHANNEL \$EVENT_PAR_MIDI_COMMAND \$EVENT_PAR_MIDI_BYTE_1 \$EVENT_PAR_MIDI_BYTE_2 \$EVENT_PAR_POS \$EVENT_PAR_NOTE_LENGTH \$EVENT_PAR_TRACK_NR
<value>	The value of the event parameter

Remarks

- You can control all events in the MIDI object by using the \$ALL_EVENTS constant as the event ID.
- You can access the currently selected event by using the \$CURRENT_EVENT constant.
- You can also control events by track, or group them with markers by using the by_track() and by_mark() commands.

See Also

mf_insert_file()
mf_insert_event()
mf_remove_event()
\$ALL_EVENTS
\$CURRENT_EVENT
by_marks()

by_track()
mf_set_mark()
mf_get_id()
save_midi_file()

18.10. mf_get_event_par()

mf_get_event_par(<event-id>,<parameter>)	
Returns the value of an event parameter	
<event-id>	The ID of the event to be edited
<parameter>	The event parameter, either one of four freely assignable event parameter: \$EVENT_PAR_0 \$EVENT_PAR_1 \$EVENT_PAR_2 \$EVENT_PAR_3 Or the "built-in" parameters of a event: \$EVENT_PAR_MIDI_CHANNEL \$EVENT_PAR_MIDI_COMMAND \$EVENT_PAR_MIDI_BYTE_1 \$EVENT_PAR_MIDI_BYTE_2 \$EVENT_PAR_POS \$EVENT_PAR_NOTE_LENGTH \$EVENT_PAR_ID \$EVENT_PAR_TRACK_NR

Remarks

- You can access all events in the MIDI object by using the \$ALL_EVENTS constant as the event ID.
- You can access the currently selected event by using the \$CURRENT_EVENT constant.
- You can also access events by track, or group them with markers by using the by_track() and by_mark() commands.

See Also

mf_insert_file()
mf_insert_event()
mf_remove_event()
\$CURRENT_EVENT
mf_get_id()
save_midi_file()

18.11. mf_get_id()

mf_get_id()

Returns the ID of the currently selected event, when using the navigation commands like `mf_get_first()` and `mf_get_next()`, etc

See Also

`mf_get_first()`

`mf_get_next()`

`mf_get_next_at()`

`mf_get_prev()`

`mf_get_prev_at()`

`mf_get_last()`

18.12. mf_set_mark()

mf_set_mark(<event-id>, <mark>, <status>)	
Marks an event, so that you may group events together and process that group quickly	
<event-id>	The ID of the event to be marked
<mark>	The mark number. Use the constants \$MARK_1 to \$MARK_10
<status>	Set this to 1 to mark an event or to 0 to unmark an event

See Also

mf_insert_file()
 mf_insert_event()
 mf_remove_event()
 \$ALL_EVENTS
 \$CURRENT_EVENT
 mf_get_mark()
 by_marks()
 by_track()
 mf_get_mark()
 mf_get_id()
 save_midi_file()

18.13. mf_get_mark()

mf_get_mark(<event-id>,<mark>)	
Checks if an event is marked or not. Returns 1 if it is marked or 0 if it is not.	
<event-id>	The ID of the event to be edited
<mark>	The mark number. Use the constants \$MARK_1 to \$MARK_10

See Also

mf_insert_file()
 mf_insert_event()
 mf_remove_event()
 \$ALL_EVENTS
 \$CURRENT_EVENT
 mf_set_mark()
 by_marks()
 by_track()
 mf_get_mark()
 mf_get_id()
 save_midi_file()

18.14. by_marks()

by_marks(<mark>)	
Can be used to access a user defined group of events	
<mark>	The mark number. Use the constants \$MARK_1 to \$MARK_10

See Also

mf_insert_file()
mf_insert_event()
mf_remove_event()
\$ALL_EVENTS
\$CURRENT_EVENT
mf_set_mark()
mf_get_mark()
by_marks()
by_track()
mf_get_mark()
mf_get_id()
save_midi_file()

18.15. by_track()

by_track(<track>)	
Can be used to group events by their track number	
<track>	The track number of the events you wish to access

Remarks

- Similar in functionality to the `by_marks()` command.

See Also

`mf_insert_file()`
`mf_insert_event()`
`mf_remove_event()`
`$ALL_EVENTS`
`$CURRENT_EVENT`
`mf_set_mark()`
`mf_get_mark()`
`by_marks()`
`mf_get_mark()`
`mf_get_id()`
`save_midi_file()`

18.16. mf_get_first()

mf_get_first(<track-index>)	
Moves the position marker to the first event in the MIDI track	
<track-index>	The number of the track you want to edit. -1 refers to the whole file.

Remarks

- Using this command will also select the event at the position marker for editing.

See Also

mf_insert_file()

mf_get_next()

mf_get_next_at()

mf_get_num_tracks()

mf_get_last()

mf_get_prev()

mf_get_prev_at()

save_midi_file()

18.17. mf_get_last()

mf_get_last(<track-index>)	
Moves the position marker to the last event in the MIDI track	
<track-index>	The number of the track you want to edit. -1 refers to the whole file.

Remarks

- Using this command will also select the event at the position marker for editing.

See Also

load_midi_file()

mf_get_first()

mf_get_next()

mf_get_next_at()

mf_get_num_tracks()

mf_get_prev()

mf_get_prev_at()

save_midi_file()

18.18. mf_get_next()

mf_get_next(<track-index>)	
Moves the position marker to the next event in the MIDI track	
<track-index>	The number of the track you want to edit. -1 refers to the whole file.

Remarks

- Using this command will also select the event at the position marker for editing.

See Also

load_midi_file()

mf_get_first()

mf_get_next_at()

mf_get_num_tracks()

mf_get_last()

mf_get_prev()

mf_get_prev_at()

save_midi_file()

18.19. mf_get_next_at()

mf_get_next_at(<track-index>, <pos>)	
Moves the position marker to the next event in the MIDI track right after the defined position.	
<track-index>	The number of the track you want to edit. -1 refers to the whole file
<pos>	Position in ticks

Remarks

- Using this command will also select the event at the position marker for editing.

See Also

load_midi_file()

mf_get_first()

mf_get_next()

mf_get_num_tracks()

mf_get_last()

mf_get_prev()

mf_get_prev_at()

save_midi_file()

18.20. mf_get_prev()

mf_get_prev(<track-index>)	
Moves the position marker to the previous event in the MIDI track	
<track-index>	The number of the track you want to edit. -1 refers to the whole file

Remarks

- Using this command will also select the event at the position marker for editing.

See Also

load_midi_file()

mf_get_first()

mf_get_next()

mf_get_next_at()

mf_get_num_tracks()

mf_get_last()

mf_get_prev_at()

save_midi_file()

18.21. mf_get_prev_at()

mf_get_prev_at(<track-index>, <pos>)	
Moves the position marker to the first event before the defined position	
<track-index>	The number of the track you want to edit. -1 refers to the whole file
<pos>	Position in ticks

Remarks

- Using this command will also select the event at the position marker for editing.

See Also

load_midi_file()

mf_get_first()

mf_get_next()

mf_get_next_at()

mf_get_num_tracks()

mf_get_last()

mf_get_prev()

save_midi_file()

18.22. mf_get_num_tracks()

<code>mf_get_num_tracks()</code>
Returns the number of tracks in the MIDI object

See Also

`mf_insert_file()`

`mf_get_first()`

`mf_get_next()`

`mf_get_next_at()`

`mf_get_last()`

`mf_get_prev()`

`mf_get_prev_at()`

`save_midi_file()`

19. BUILT-IN VARIABLES AND CONSTANTS

19.1. General

\$CURRENT_SCRIPT_SLOT

The script slot of the current script (zero-based, i.e. the first script slot is 0).

%GROUPS_SELECTED[<group-idx>]

An array with each array index pointing to the group with the same index.

If a group is selected for editing, the corresponding array cell contains a **1**, otherwise **0**.

\$NI_ASYNC_EXIT_STATUS

Returns a value of 1 if the command that triggered the on async_complete callback has successfully completed its action. 0 if the command could not complete its action, e.g. file not found.

\$NI_ASYNC_ID

Returns the ID of the command that triggered the on async_complete callback.

\$NI_BUS_OFFSET

To be used in the <generic> part of the engine parameter commands to point to the instrument bus level. Add the index of the bus you wish to address, e.g. \$NI_BUS_OFFSET + 2 will point to instrument bus 3.

\$NUM_GROUPS

Total amount of groups in an instrument. This is not a constant and thus cannot be used to define the size of an array.

\$NUM_OUTPUT_CHANNELS

Total amount of output channels of the respective KONTAKT Multi, not counting Aux channels.

\$NUM_ZONES

Total amount of zones in an instrument.

\$PLAYED_VOICES_INST

The amount of played voices for the current instrument.

\$PLAYED_VOICES_TOTAL

The amount of played voices for all instruments.

Path Variables

\$GET_FOLDER_LIBRARY_DIR

If used with an NKI belonging to an encoded library: library folder.

If used with an unencoded NKI: the user content directory.

\$GET_FOLDER_FACTORY_DIR

The factory folder of KONTAKT, mainly used for loading factory IR samples.

Note: this is not the factory library folder!

\$GET_FOLDER_PATCH_DIR

The directory in which the patch was saved.

If the patch was not saved before, an empty string is returned.

Time Machine Pro Variables

User access the two voice limits (Standard and High Quality) of the Time Machine Pro, to be used with `set_voice_limit()` and `get_voice_limit()`.

\$NI_VL_TMPRO_STANDARD

\$NI_VL_TMRPO_HQ

\$REF_GROUP_IDX

Group index number of the currently viewed group

19.2. Events and MIDI

\$ALL_GROUPS

Addresses all groups in the instrument when used in a `disallow_group()` and `allow_group()` function.

\$ALL_EVENTS

Addresses all events in functions which deal with an event ID number.

This constant also works with MIDI event commands that require a MIDI event ID.

Bit Mark Constants

Bit mark of an event group, to be used with `by_marks()`

`$MARK_1`

`$MARK_2`

...

`$MARK_28`

%CC[<controller-number>]

Current controller value for the specified controller

\$CC_NUM

Controller number of the controller which triggered the callback

%CC_TOUCHED[<controller-number>]

1 if the specified controller value has changed, 0 otherwise

\$EVENT_ID

Unique ID number of the event which triggered the callback

\$CURRENT_EVENT

The currently selected MIDI event, i.e. the MIDI event at the position marker

\$EVENT_NOTE

Note number of the event which triggered the callback

\$EVENT_VELOCITY

Velocity of the note which triggered the callback

Event Parameter Constants

Event parameters to be used with `set_event_par()` and `get_event_par()`

`$EVENT_PAR_0`

`$EVENT_PAR_1`

`$EVENT_PAR_2`

`$EVENT_PAR_3`

`$EVENT_PAR_VOLUME`

`$EVENT_PAR_PAN`

`$EVENT_PAR_TUNE`

`$EVENT_PAR_NOTE`

`$EVENT_PAR_VELOCITY`

To be used with `set_event_par_arr()` and `get_event_par_arr()`:

`$EVENT_PAR_ALLOW_GROUP`

To be used with `get_event_par()`:

`$EVENT_PAR_SOURCE` (-1 if event originates from outside, otherwise slot number 0 - 4)

`$EVENT_PAR_PLAY_POS` (returns the value of the play cursor within a zone)

`$EVENT_PAR_ZONE_ID` (returns the zone ID of the event and can only be used with active events returns -1 if no zone is triggered; returns the highest zone id if more than one zone is triggered by the event, make sure the voice is running by writing e.g. `wait(1)` before retrieving the zone ID.)

`$EVENT_PAR_MIDI_CHANNEL`

`$EVENT_PAR_MIDI_COMMAND`

`$EVENT_PAR_MIDI_BYTE_1`

`$EVENT_PAR_MIDI_BYTE_2`

`$EVENT_PAR_POS`

`$EVENT_PAR_NOTE_LENGTH`

`$EVENT_PAR_ID`

`$EVENT_PAR_TRACK_NR`

%EVENT_PAR

Array which contains values of \$EVENT_PAR_0 . . . \$EVENT_PAR_3 valid for \$EVENT_ID.
Can be considered a shorthand for writing `get_event_par ($EVENT_ID, $EVENT_PAR_0 . . 3)`.

Event Status Constants

\$EVENT_STATUS_INACTIVE

\$EVENT_STATUS_NOTE_QUEUE

\$EVENT_STATUS_MIDI_QUEUE

%GROUPS_AFFECTED

An array with the group indices of those groups that are affected by the current Note On or Note Off events.

The size of the array changes depending on the number of groups the event affects, so use the `num_elements()` command to get the correct array size.

The returned indices come before any allow or disallow group commands, and so it can be used to analyze the mapping of the instrument.

\$NOTE_HELD

1 if the key which triggered the callback is still held, 0 otherwise

%POLY_AT[<note-number>]

The polyphonic aftertouch value of the specified note number

\$POLY_AT_NUM

The note number of the polyphonic aftertouch note which triggered the callback

\$RPN_ADDRESS

The parameter number of a received RPN/NRPN message (0 – 16383)

\$RPN_VALUE

The value of a received RPN or NRPN message (0 – 16383)

\$VCC_MONO_AT

The value of the virtual CC controller for mono aftertouch (channel pressure)

\$VCC_PITCH_BEND

The value of the virtual CC controller for pitch bend

%KEY_DOWN[<note-number>]

Array which contains the current state of all keys. 1 if the key is held, 0 otherwise

%KEY_DOWN_OCT[<note-number>]

1 if a note, independent of the octave, is held. **0** otherwise. Due to this, the note number should be a value between 0 (C) and 11 (B).

19.3. Transport and Timing

\$DISTANCE_BAR_START

Returns the time of a note on message in microseconds from the beginning of the current bar with respect to the current tempo.

\$DURATION_BAR

Returns the duration in microseconds of one bar with respect to the current tempo.

This variable only works if the clock is running, otherwise it will return a value of zero.

You can also retrieve the duration of one bar by using \$SIGNATURE_NUM and \$SIGNATURE_DENOM in combination with \$DURATION_QUARTER.

\$DURATION_QUARTER

Duration of a quarter note in microseconds, with respect to the current tempo.

Also available:

\$DURATION_EIGHTH

\$DURATION_SIXTEENTH

\$DURATION_QUARTER_TRIPLET

\$DURATION_EIGHTH_TRIPLET

\$DURATION_SIXTEENTH_TRIPLET

\$ENGINE_UPTIME

Returns the time period in milliseconds (not microseconds) that has passed since the start of KONTAKT. The engine uptime is calculated from the sample rate and can thus be used in 'musical' contexts, (eg. building arpeggiators or sequencers) as it remains in sync, even in an offline bounce.

\$KSP_TIMER

Returns the time period in microseconds that has passed since the start of KONTAKT.

Can be reset with `reset_ksp_timer`.

The KSP timer is based on the CPU clock and thus runs at a constant rate, regardless of whether or not KONTAKT is being used in real-time. As such, it should be used to test the efficiency of script and not to make musical calculations, as musical calculations use the \$ENGINE_UPTIME timer.

\$NI_SONG_POSITION

Returns the host's current song position in 960 ticks per quarter note.

\$NI_TRANSPORT_RUNNING

1 if the host's transport is running, **0** otherwise

\$SIGNATURE_NUM

Numerator of the current time signature, i.e. **4/4**

\$SIGNATURE_DENOM

Denominator of the current time signature, i.e. **4/4**

Tempo Unit Variables

Used to control the unit parameter of time-related controls (e.g. Delay Time, Attack etc.) with engine parameter variables like \$ENGINE_PAR_DL_TIME_UNIT.

\$NI_SYNC_UNIT_ABS

\$NI_SYNC_UNIT_WHOLE

\$NI_SYNC_UNIT_WHOLE_TRIPLET

\$NI_SYNC_UNIT_HALF

\$NI_SYNC_UNIT_HALF_TRIPLET

\$NI_SYNC_UNIT_QUARTER

\$NI_SYNC_UNIT_QUARTER_TRIPLET

\$NI_SYNC_UNIT_8TH

\$NI_SYNC_UNIT_8TH_TRIPLET

\$NI_SYNC_UNIT_16TH

\$NI_SYNC_UNIT_16TH_TRIPLET

\$NI_SYNC_UNIT_32ND

\$NI_SYNC_UNIT_32ND_TRIPLET

\$NI_SYNC_UNIT_64TH

\$NI_SYNC_UNIT_64TH_TRIPLET

\$NI_SYNC_UNIT_256TH

\$NI_SYNC_UNIT_ZONE (Only applies to the Source Module Speed parameter)

%NOTE_DURATION[<note-number>]

Note length since note start in microseconds for each key.

\$NI_BAR_START_POSITION

Returns the start of current bar in ticks (at 960 PPQ) from the start of the host's song.

19.4. Callbacks and UI

Callback Type Variables and Constants

`$NI_CALLBACK_ID`

Returns the ID number of the callback. Every callback has a unique ID number which remains the same within a function.

`$NI_CALLBACK_TYPE`

Returns the callback type. Useful for retrieving the callback that triggered a specific function.

The following constants are available:

`$NI_CB_TYPE_ASYNC_OUT`

`$NI_CB_TYPE_CONTROLLER`

`$NI_CB_TYPE_INIT`

`$NI_CB_TYPE_LISTENER`

`$NI_CB_TYPE_NOTE`

`$NI_CB_TYPE_PERSISTENCE_CHANGED`

`$NI_CB_TYPE_PGS`

`$NI_CB_TYPE_POLY_AT`

`$NI_CB_TYPE_RELEASE`

`$NI_CB_TYPE_RPN/$NI_CB_TYPE_NRPN`

`$NI_CB_TYPE_UI_CONTROL`

`$NI_CB_TYPE_UI_UPDATE`

`$NI_CB_TYPE_MIDI_IN`

Listener Constants

Can be used with `set_listener()` or `change_listener_par()` to set which signals will trigger the on listener callback. Can also be used with `$NI_SIGNAL_TYPE` to determine which signal type triggered the callback.

`$NI_SIGNAL_TRANSP_STOP`

`$NI_SIGNAL_TRANSP_START`

`$NI_SIGNAL_TIMER_MS`

`$NI_SIGNAL_TIMER_BEAT`

Knob Unit Mark Constants

To be used with `set_knob_unit()`.

`$KNOB_UNIT_NONE`

`$KNOB_UNIT_DB`

`$KNOB_UNIT_HZ`

`$KNOB_UNIT_PERCENT`

`$KNOB_UNIT_MS`

`$KNOB_UNIT_ST`

`$KNOB_UNIT_OCT`

`$NI_SIGNAL_TYPE`

Can be used in the `on listener` callback to determine which signal type triggered the callback.

19.5. Mathematical Constants

~NI_MATH_PI

Returns the mathematical constant pi (approx. 3.14159...)

~NI_MATH_E

Returns the mathematical constant e (approx. 2.71828...)

20. CONTROL PARAMETERS

20.1. General

\$CONTROL_PAR_NONE
Nothing will be applied to the control

\$CONTROL_PAR_HELP
Sets the help text which is displayed in the info pane when hovering the control

\$CONTROL_PAR_PARENT_PANEL
Places a control to a panel. The value should be the UI ID of the panel

Size, Position, and Look

\$CONTROL_PAR_POS_X
Sets the horizontal position in pixels

\$CONTROL_PAR_POS_Y
Sets the vertical position in pixels

\$CONTROL_PAR_GRID_X
Sets the horizontal position in grid units

\$CONTROL_PAR_GRID_Y
Sets the vertical position in grid units

\$CONTROL_PAR_WIDTH
Sets the width of the control in pixels

\$CONTROL_PAR_HEIGHT
Sets the height of the control in pixels

\$CONTROL_PAR_GRID_WIDTH
Sets the width of the control in grid units

\$CONTROL_PAR_GRID_HEIGHT
Sets the height of the control in grid units

\$CONTROL_PAR_HIDE

Sets the hide status. Can be used with the following built in constants:

\$HIDE_PART_BG (background of knobs, labels, value edits and tables)

\$HIDE_PART_VALUE (value of knobs and tables)

\$HIDE_PART_TITLE (title of knobs)

\$HIDE_PART_MOD_LIGHT (mod ring light of knobs)

\$HIDE_PART_NOTHING (show all)

\$HIDE_WHOLE_CONTROL

\$CONTROL_PAR_PICTURE

Sets the picture name. An extension is not required for the picture name, neither is the full path. If the NKI references a resource container, KONTAKT will look for the file in the pictures subfolder. If the NKI does not reference a resource container, it will first look in the user pictures folder (located in user/documents/Native Instruments/Kontakt/pictures), then in the KONTAKT pictures folder.

\$CONTROL_PAR_PICTURE_STATE

The picture state of the control for tables, value edits and labels

\$CONTROL_PAR_Z_LAYER

Sets the Z layer position of the control. Controls can be placed in one of three layers. Within these layers they are then positioned by type, and then by declaration order.

0: Default layer. All controls are assigned to this layer by default

-1: Back layer. Controls in this layer are placed below the default layer

1: Front layer. Controls in this layer are placed on top of the default and back layers.

Z layer order by control type (from lowest level to highest):

File Selector

Waveform

Wavetable

Level Meter

Label

Knob

Slider

Switch

Button

Value Edit

Menu

Table

XY Pad

Text Edit

Mouse Area

Values**\$CONTROL_PAR_VALUE**

Sets/returns the value

\$CONTROL_PAR_DEFAULT_VALUE

Sets the default value

Text

\$CONTROL_PAR_TEXT

Sets the control text, similar to `set_text()`

\$CONTROL_PAR_TEXTLINE

Adds a text line, similar to `add_text_line()`

\$CONTROL_PAR_LABEL

Sets the knob label, similar to `set_knob_label()`.

This is also the value/string published to the host when using automation.

This also works for switches.

\$CONTROL_PAR_UNIT

Sets the knob unit, similar to `set_knob_unit()`

\$CONTROL_PAR_FONT_TYPE

Sets the font type. Numbers 0 to 24 are used to select any of the 25 factory fonts. Combine with `get_font_id()` to use custom fonts.

For responsive controls (buttons, switches and menus) the font can also be set separately for each of the control's states via the following control parameters:

`$CONTROL_PAR_FONT_TYPE_ON`

`$CONTROL_PAR_FONT_TYPE_OFF_PRESSED`

`$CONTROL_PAR_FONT_TYPE_ON_PRESSED`

`$CONTROL_PAR_FONT_TYPE_OFF_HOVER`

`$CONTROL_PAR_FONT_TYPE_ON_HOVER`

Not using any of the five additional state fonts will result in the default (`$CONTROL_PAR_FONT_TYPE`) being used for those states.

\$CONTROL_PAR_DISABLE_TEXT_SHIFTING

Deactivates text position shifting when clicking on buttons and switches

\$CONTROL_PAR_TEXTPOS_Y

Shifts the vertical position in pixels of text in buttons, menus, switches and labels

\$CONTROL_PAR_TEXT_ALIGNMENT

The text alignment in buttons, menus, switches and labels:

0: left

1: centered

2: right

Automation**\$CONTROL_PAR_AUTOMATION_NAME**

Assigns an automation name to a UI control when used with `set_control_par_str()`

`$CONTROL_PAR_LABEL` can be used to set the automation value string

When assigning automation names to XY pad cursors, use the `set_control_par_str_arr()` command with this parameter.

\$CONTROL_PAR_ALLOW_AUTOMATION

Defines if a `ui_control` can be automated (1) or not (0). By default automation is enabled for all automatable controls. Can only be used in the init callback. Automation IDs can also be assigned to XY pad cursors using the `set_control_par_arr()` command.

\$CONTROL_PAR_AUTOMATION_ID

Assigns an automation ID to a UI control (range 0 to 511). Can only be used in the init callback.

Automation IDs can only be assigned to automatable controls (sliders, switches, and knobs)

When assigning automation IDs to XY pad cursors, use the `set_control_par_arr()` command with this parameter.

Key Modifiers**\$CONTROL_PAR_KEY_SHIFT**

Returns **1** when the shift key was pressed (**0** otherwise) while clicking the UI control.

Menus and value edits are not supported.

The basic shift modifier functionality on sliders and knobs is preserved.

\$CONTROL_PAR_KEY_ALT

Returns **1** if the ALT key (PC) or OPT key (Mac) was pressed (**0** otherwise) while clicking the UI control. Menus and value edits are not supported.

\$CONTROL_PAR_KEY_CONTROL

Returns **1** if the CTRL key (PC) or Cmd key (Mac) was pressed (**0** otherwise) while clicking the UI control.

Menus and value edits are not supported.

20.2. Specific

Tables

\$NI_CONTROL_PAR_IDX
Returns the index of the table column that triggered the <code>on_ui_control()</code> callback

Tables and Waveform

\$CONTROL_PAR_BAR_COLOR
Sets the color of the step bar in UI tables and UI waveforms. Colors are set using a hex value in the following format: 9ff0000h {red} The 9 at the start is just to let KONTAKT know the value is a number. The h at the end is to indicate that it is a hexadecimal value.

\$CONTROL_PAR_ZERO_LINE_COLOR
Sets the color of the middle line in UI tables.

Menus

\$CONTROL_PAR_NUM_ITEMS
Returns the number of menu entries of a specific dropdown menu. Only works with <code>get_control_par()</code>.

\$CONTROL_PAR_SELECTED_ITEM_IDX
Returns the index of the currently selected menu entry. Only works with <code>get_control_par()</code>.

Mouse Area

\$CONTROL_PAR_DND_ACCEPT_AUDIO
Enables the mouse area to accept audio files.

\$CONTROL_PAR_DND_MIDI
Enables the mouse area to accept MIDI files.

\$CONTROL_PAR_DND_ACCEPT_ARRAY
Enables the mouse area to accept arrays.

All three flags can have one of the following values:

`$NI_DND_ACCEPT_NONE`

`$NI_DND_ACCEPT_ONE`

`$NI_DND_ACCEPT_MULTIPLE`

\$CONTROL_PAR_RECEIVE_DRAG_EVENTS

Configures whether the mouse area's ui_control callback gets triggered just for the drop event (variable = 0) or also for drag events (variable = 1).

The ui_control callback has 2 built-in variables:

<code>\$NI_MOUSE_EVENT_TYPE</code>	Specifies the event type that triggered the callback and can have one of the following values:
	<code>\$NI_MOUSE_EVENT_TYPE_DND_DROP</code>
	<code>\$NI_MOUSE_EVENT_TYPE_DND_DRAG</code>
<code>\$NI_MOUSE_OVER_CONTROL</code>	Equals 1 if the mouse entered the mouse_area on a drag event
	Equals 0 if the mouse left the mouse_area on a drag event

Example

```
on ui_control ($aMouseArea)
  if ($NI_MOUSE_EVENT_TYPE = $NI_MOUSE_EVENT_TYPE_DROP)
    message(num_elements(!NI_DND_ITEMS_AUDIO))
  end if

  if ($NI_MOUSE_EVENT_TYPE = $NI_MOUSE_EVENT_TYPE_DRAG)
    message(num_elements(!NI_DND_ITEMS_AUDIO))
    message($MOUSE_OVER_CONTROL)
  end if
end on
```

Labels

\$CONTROL_PAR_DND_BEHAVIOUR

Using a value of 1 with this variable sets the label as a “Drag and Drop” area, allowing the user to export the MIDI object currently held in the script memory by a simple drag and drop action. See the section on MIDI Object Commands for more information on MIDI handling in KSP.

Value Edit

\$CONTROL_PAR_SHOW_ARROWS

Hides the arrows of value edits:

0: arrows are hidden

1: arrows are shown

Level Meters

\$CONTROL_PAR_BG_COLOR

Sets the background color of the UI level meter.

Colors are set using a hex value in the following format:

9ff0000h {red}

The **9** at the start is just to let KONTAKT know the value is a number. The **h** at the end is to indicate that it is a hexadecimal value.

\$CONTROL_PAR_OFF_COLOR

Sets the second background color of the UI level meter

\$CONTROL_PAR_ON_COLOR

Sets the main level meter color of the UI level meter

\$CONTROL_PAR_OVERLOAD_COLOR

Sets the color of the level meter's overload section

\$CONTROL_PAR_PEAK_COLOR

Sets the color of the little bar showing the current peak level

\$CONTROL_PAR_VERTICAL

Aligns a UI level meter vertically (**1**) or horizontally (**0**, default)

File Browser

\$CONTROL_PAR_BASEPATH

Sets the basepath of the UI file browser. This control par can only be used in the init callback. Be careful with the number of subfolders of the basepath as it might take too long to scan the sub file system. The scan process takes place every time the NKI is loaded.

\$CONTROL_PAR_COLUMN_WIDTH

Sets the width of the browser columns. This control par can only be used in the init callback.

\$CONTROL_PAR_FILEPATH

Sets the actual path (full path of the file) of the UI file browser. The file path must be a subpath of the instrument's basepath. This control par is useful for recalling the last status of the browser upon loading the instrument. Can only be used in the init callback.

\$CONTROL_PAR_FILE_TYPE

Sets the file type for file selector. Can only be used in the init callback.

The following file types are available:

`$NI_FILE_TYPE_MIDI`

`$NI_FILE_TYPE_AUDIO`

`$NI_FILE_TYPE_ARRAY`

Instrument Icon and Wallpaper

\$INST_ICON_ID

The (fixed) ID of the instrument icon.

It's possible to hide the instrument icon:

```
set_control_par($INST_ICON_ID,$CONTROL_PAR_HIDE,$HIDE_WHOLE_CONTROL)
```

It's also possible to load a different picture file for the instrument icon:

```
set_control_par_str($INST_ICON_ID,$CONTROL_PAR_PICTURE,<file-name>)
```

\$INST_WALLPAPER_ID

The (fixed) ID of the instrument wallpaper. It is used in a similar way as `$INST_ICON_ID`:

```
set_control_par_str ($INST_WALLPAPER_ID,$CONTROL_PAR_PICTURE,<file_name>)
```

This command can only be used in the init callback. Note that a wallpaper set via script replaces the one set in the instrument options and it will not be checked in the samples missing dialog when loading the wallpaper from a resource container.

This command only supports wallpapers that are located within the resource container.

If you use it in different script slots then the last wallpaper set will be the one that is loaded.

Waveform

Waveform Flag Constants	
To be used with <code>attach_zone()</code>	
You can combine flag constants using the bit-wise <code>.or</code> .	
<code>\$UI_WAVEFORM_USE_SLICES</code>	Display the zone's slice markers
<code>\$UI_WAVEFORM_USE_TABLE</code>	Display a per slice table
	Note: this only works if the slice markers are also active
<code>\$UI_WAVEFORM_TABLE_IS_BIPOLAR</code>	Make the table bipolar
<code>\$UI_WAVEFORM_USE_MIDI_DRAG</code>	Display a MIDI drag and drop icon
	Note: this only works if the slice markers are also active

Waveform Property Constants	
To be used with <code>get/set_ui_wf_property()</code>	
<code>\$UI_WF_PROP_PLAY_CURSOR</code>	Sets or returns the play head position
<code>\$UI_WF_PROP_FLAGS</code>	Used to set new flag constants after the <code>attach_zone()</code> command is used
<code>\$UI_WF_PROP_TABLE_VAL</code>	Sets or returns the value of the indexed slice's table
<code>\$UI_WF_PROP_TABLE_IDX_HIGHLIGHT</code>	Highlights the indexed slice within the UI waveform
<code>\$UI_WF_PROP_MIDI_DRAG_START_NOTE</code>	Defines the start note for the MIDI drag & drop function

\$CONTROL_PAR_WF_VIS_MODE	
Changes the way the waveform is drawn. Valid values:	
<code>\$NI_WF_VIS_MODE_1</code> (default)	
<code>\$NI_WF_VIS_MODE_2</code>	
<code>\$NI_WF_VIS_MODE_3</code>	

\$CONTROL_PAR_BG_COLOR

Sets the background color of the waveform display

Colors are set using a hex value in the following format:

9ff0000h {red}

The **9** at the start is just to let KONTAKT know the value is a number. The **h** at the end is to indicate that it is a hexadecimal value.

\$CONTROL_PAR_WAVE_COLOR

Sets the color of the waveform

\$CONTROL_PAR_WAVE_CURSOR_COLOR

Sets the color of the playback cursor

\$CONTROL_PAR_SLICEMARKERS_COLOR

Sets the color of the slice markers

\$CONTROL_PAR_BG_ALPHA

Sets the alpha channel (opacity) of the background of the widget.

Range: **0** (fully transparent) to **255** (fully opaque)

Wavetable

\$CONTROL_PAR_WT_VIS_MODE

Sets the mode of the wavetable widget. Can be set to the following values:

\$NI_WT_VIS_2D (2D, oscilloscope-style visualization, only showing the current wavetable position)

\$NI_WT_VIS_3D (3D visualization displaying the whole wavetable as well as the the current position)

\$CONTROL_PAR_PARALLAX_X

Sets the x-axis parallax of the wavetable control (only applicable to 3D mode)

Range: **-1000000** to **1000000**

\$CONTROL_PAR_PARALLAX_Y

Sets the y-axis parallax of the wavetable control (only applicable to 3D mode)

Range: **-1000000** to **1000000**

\$CONTROL_PAR_WAVE_COLOR

Sets the color of the waveform

\$CONTROL_PAR_WAVE_ALPHA

Sets the alpha channel (opacity) of the waveform.

Range: **0** (fully transparent) to **255** (fully opaque)

\$CONTROL_PAR_WAVETABLE_COLOR

Sets the color of the whole wavetable

\$CONTROL_PAR_WAVETABLE_ALPHA

Sets the alpha channel (opacity) of the whole wavetable

Range: **0** (fully transparent) to **255** (fully opaque)

\$CONTROL_PAR_BG_COLOR

Sets the background color of the wavetable widget.

Colors are set using a hex value in the following format:

9ff0000h {red}

The **9** at the start is just to let KONTAKT know the value is a number. The **h** at the end is to indicate that it is a hexadecimal value.

\$CONTROL_PAR_BG_ALPHA

Sets the alpha channel (opacity) of the background of the widget.

Range: **0** (fully transparent) to **255** (fully opaque)

Additional Color and Alpha Parameters

To be paired with the ones above to create gradient effects; if not explicitly set, they inherit the value of their match from above, resulting in no gradient.

\$CONTROL_PAR_WAVE_END_COLOR	Sets or returns the play head position
\$CONTROL_PAR_WAVE_END_ALPHA	Used to set new flag constants after the <code>attach_zone()</code> command is used
\$CONTROL_PAR_WAVETABLE_END_COLOR	Sets or returns the value of the indexed slice's table
\$CONTROL_PAR_WAVETABLE_END_ALPHA	Highlights the indexed slice within the UI waveform

Slider

\$CONTROL_PAR_MOUSE_BEHAVIOUR

A value from -5000 to 5000, setting the move direction of a slider and its drag-scale.

Settings are relative to the size of the slider picture.

Negative values give a vertical slider behavior, positive values give a horizontal behavior.

XY Pad

\$CONTROL_PAR_MOUSE_BEHAVIOUR_X

Mouse behavior, i.e the drag scale, of the x axis of all cursors

\$CONTROL_PAR_MOUSE_BEHAVIOUR_Y

Mouse behavior, i.e the drag scale, of the y axis of all cursors

\$CONTROL_PAR_MOUSE_MODE

Sets the way the XY pad responds to mouse clicks and drags.

0: Clicks anywhere other than on a cursor are ignored. Clicking on a cursor and dragging, sets new values respecting the usual `$CONTROL_PAR_MOUSE_BEHAVIOR` settings.

1: Clicks anywhere on the XY pad are registered but don't change the values. Clicking anywhere and dragging, sets new values; the cursor moves parallel to the mouse cursor with distances scaled based on the `$CONTROL_PAR_MOUSE_BEHAVIOR` settings.

2: Clicks anywhere on the XY pad are registered and immediately change the values, with the cursor immediately matching the mouse cursor. Clicking anywhere and dragging has a similar effect; the `$CONTROL_PAR_MOUSE_BEHAVIOR` settings are ignored; cursor always follows mouse cursor one-to-one.

\$CONTROL_PAR_ACTIVE_INDEX

Sets and gets the index of the active cursor. Only relevant in multi-cursor set-ups. The `$CONTROL_PAR_MOUSE_MODE` setting will influence how this parameter behaves:

Mouse Mode = **0** and **1**: the active cursor can only be changed manually, by setting this control parameter. Inactive cursors don't receive any clicks.

Mouse Mode = **2**: it is set automatically based on the last clicked cursor. Setting it manually from within the `ui_control` callback of the XY pad can result in unexpected results, but using it in other callbacks is fully encouraged and makes sense in many scenarios. The value is -1 when not clicking on any cursor.

The index can only be an even number (with the exception of the -1 value) that matches the index of the X axis of the cursor in the main array representing the XY control, e.g. the first cursor has an index of 0, the second one has an index of 2, etc

\$CONTROL_PAR_CURSOR_PICTURE

Sets the cursor image. Each cursor can have its own image set using the `set_control_par_str_arr()` command.

Using `$CONTROL_PAR_PICTURE` with the XY pad will set the background image of the control.

The cursor images can have up to 6 frames, corresponding to the following states. Frame selection is automatic as with buttons/switches.

1: Inactive

2: Active

3: Inactive pressed

4: Active pressed

5: Inactive mouse over

6: Active mouse over

\$HIDE_PART_CURSOR

When used with `set_control_par_arr()`, this can be used to hide specific cursors in the XY pad. Below is a simple syntax example:

```
if($hide = 1)
    set_control_par_arr($id, $CONTROL_PAR_HIDE, $HIDE_PART_CURSOR,
    $index)
else
    set_control_par_arr($id, $CONTROL_PAR_HIDE, $HIDE_PART_NOTHING,
    $index)
end if
```

The index should be an even number that matches the index of the X axis of the cursor in the main array representing the XY control, so the first cursor has an index of 0, the second has an index of 2, and so on.

\$NI_CONTROL_PAR_IDX

Returns the index of the cursor that triggered the `on_ui_control()` callback for the XY pad. Note that indices are always even numbers starting from 0, so the first cursor has an index of 0, the second has an index of 2, and so on.

\$NI_MOUSE_EVENT_TYPE

Returns the type of mouse event that triggered the `on ui_control()` callback for the XY pad. Can only be used within a `on ui_control()` callback.

The following file types are available:

`$NI_MOUSE_EVENT_TYPE_LEFT_BUTTON_DOWN` (click)

`$NI_MOUSE_EVENT_TYPE_LEFT_BUTTON_UP` (release)

`$NI_MOUSE_EVENT_TYPE_DRAG` (drag)

21. ENGINE PARAMETERS

21.1. Instrument, Source and Amp Module

\$ENGINE_PAR_VOLUME
Instrument/group/bus volume

\$ENGINE_PAR_PAN
Instrument/group/bus panorama

\$ENGINE_PAR_TUNE
Instrument/group tuning

Source Module	
\$ENGINE_PAR_SMOOTH	
\$ENGINE_PAR_FORMANT	
\$ENGINE_PAR_SPEED	
\$ENGINE_PAR_GRAIN_LENGTH	
\$ENGINE_PAR_SLICE_ATTACK	
\$ENGINE_PAR_SLICE_RELEASE	
\$ENGINE_PAR_TRANSIENT_SIZE	
\$ENGINE_PAR_ENVELOPE_ORDER	
\$ENGINE_PAR_FORMANT_SHIFT	
\$ENGINE_PAR_SPEED_UNIT	
\$ENGINE_PAR_WT_POSITION	
\$ENGINE_PAR_WT_FORM	
\$ENGINE_PAR_WT_PHASE	
\$ENGINE_PAR_WT_PHASE_RAND	
\$ENGINE_PAR_WT_QUALITY	
\$NI_WT_QUALITY_LOFI	
\$NI_WT_QUALITY_MEDIUM	
\$NI_WT_QUALITY_HIGH	
\$NI_WT_QUALITY_BEST	
\$ENGINE_PAR_WT_FORM_MODE	
\$NI_WT_FORM_LINEAR	
\$NI_WT_FORM_SYNC1	
\$NI_WT_FORM_SYNC2	
\$NI_WT_FORM_SYNC3	
\$NI_WT_FORM_BENDP	
\$NI_WT_FORM_BENDM	
\$NI_WT_FORM_BENDMP	
\$NI_WT_FORM_PWM	
\$NI_WT_FORM_ASYMP	
\$NI_WT_FORM_ASYMM	

\$ENGINE_PAR_OUTPUT_CHANNEL

Designates the output for the group or bus.

0 routes to one of KONTAKT's outputs. This bypasses the instrument insert effects.

-1 routes to the instrument output (default).

-2 routes to the instrument output with the instrument insert effects bypassed.

$\$NI_BUS_OFFSET + [0 - 15]$ routes to one of the busses. Busses cannot be routed to other busses.

21.2. Insert Effects

\$ENGINE_PAR_EFFECT_BYPASS
Bypass button of all insert effects

\$ENGINE_PAR_INSERT_EFFECT_OUTPUT_GAIN
Output gain of all insert effects

Compressor
\$ENGINE_PAR_THRESHOLD
\$ENGINE_PAR_RATIO
\$ENGINE_PAR_COMP_ATTACK
\$ENGINE_PAR_COMP_DECAY

Limiter
\$ENGINE_PAR_LIM_IN_GAIN
\$ENGINE_PAR_LIM_RELEASE

Surround Panner
\$ENGINE_PAR_SP_OFFSET_DISTANCE
\$ENGINE_PAR_SP_OFFSET_AZIMUTH
\$ENGINE_PAR_SP_OFFSET_X
\$ENGINE_PAR_SP_OFFSET_Y
\$ENGINE_PAR_SP_LFE_VOLUME
\$ENGINE_PAR_SP_SIZE
\$ENGINE_PAR_SP_DIVERGENCE

Saturation
\$ENGINE_PAR_SHAPE

Lo-Fi

\$ENGINE_PAR_BITS

\$ENGINE_PAR_FREQUENCY

\$ENGINE_PAR_NOISELEVEL

\$ENGINE_PAR_NOISECOLOR

Stereo Modeller

\$ENGINE_PAR_STEREO

\$ENGINE_PAR_STEREO_PAN

Distortion

\$ENGINE_PAR_DRIVE

\$ENGINE_PAR_DAMPING

Send Levels

\$ENGINE_PAR_SENLEVEL_0

\$ENGINE_PAR_SENLEVEL_1

\$ENGINE_PAR_SENLEVEL_2

<...>

\$ENGINE_PAR_SENLEVEL_7

Skreamer

\$ENGINE_PAR_SK_TONE

\$ENGINE_PAR_SK_DRIVE

\$ENGINE_PAR_SK_BASS

\$ENGINE_PAR_SK_BRIGHT

\$ENGINE_PAR_SK_MIX

Rotator

\$ENGINE_PAR_RT_SPEED
\$ENGINE_PAR_RT_BALANCE
\$ENGINE_PAR_RT_ACCEL_HI
\$ENGINE_PAR_RT_ACCEL_LO
\$ENGINE_PAR_RT_DISTANCE
\$ENGINE_PAR_RT_MIX

Twang

\$ENGINE_PAR_TW_VOLUME
\$ENGINE_PAR_TW_TREBLE
\$ENGINE_PAR_TW_MID
\$ENGINE_PAR_TW_BASS
\$ENGINE_PAR_TW_BRIGHT
\$ENGINE_PAR_TW_MONO

Cabinet

\$ENGINE_PAR_CB_SIZE
\$ENGINE_PAR_CB_AIR
\$ENGINE_PAR_CB_TREBLE
\$ENGINE_PAR_CB_BASS
\$ENGINE_PAR_CABINET_TYPE

AET Filter Module

\$ENGINE_PAR_EXP_FILTER_MORPH
\$ENGINE_PAR_EXP_FILTER_AMOUNT

Tape Saturator

\$ENGINE_PAR_TP_GAIN
\$ENGINE_PAR_TP_WARMTH
\$ENGINE_PAR_TP_HF_ROLLOFF
\$ENGINE_PAR_TP_QUALITY

Transient Master

\$ENGINE_PAR_TR_INPUT
\$ENGINE_PAR_TR_ATTACK
\$ENGINE_PAR_TR_SUSTAIN
\$ENGINE_PAR_TR_SMOOTH

Solid Bus Comp

\$ENGINE_PAR_SCOMP_THRESHOLD
\$ENGINE_PAR_SCOMP_RATIO
\$ENGINE_PAR_SCOMP_ATTACK
\$ENGINE_PAR_SCOMP_RELEASE
\$ENGINE_PAR_SCOMP_MAKEUP
\$ENGINE_PAR_SCOMP_MIX

Jump Amp

\$ENGINE_PAR_JMP_PREAMP
\$ENGINE_PAR_JMP_BASS
\$ENGINE_PAR_JMP_MID
\$ENGINE_PAR_JMP_TREBLE
\$ENGINE_PAR_JMP_MASTER
\$ENGINE_PAR_JMP_PRESENCE
\$ENGINE_PAR_JMP_HIGAIN
\$ENGINE_PAR_JMP_MONO

Feedback Compressor

\$ENGINE_PAR_FCOMP_INPUT
\$ENGINE_PAR_FCOMP_RATIO
\$ENGINE_PAR_FCOMP_ATTACK
\$ENGINE_PAR_FCOMP_RELEASE
\$ENGINE_PAR_FCOMP_MAKEUP
\$ENGINE_PAR_FCOMP_MIX
\$ENGINE_PAR_FCOMP_HQ_MODE
\$ENGINE_PAR_FCOMP_LINK

ACBox

\$ENGINE_PAR_AC_NORMALVOLUME
\$ENGINE_PAR_AC_BRILLIANTVOLUME
\$ENGINE_PAR_AC_BASS
\$ENGINE_PAR_AC_TREBLE
\$ENGINE_PAR_AC_TONECUT
\$ENGINE_PAR_AC_TREMOLOSPEED
\$ENGINE_PAR_AC_TREMOLODEPTH
\$ENGINE_PAR_AC_MONO

Cat

\$ENGINE_PAR_CT_VOLUME
\$ENGINE_PAR_CT_DISTORTION
\$ENGINE_PAR_CT_FILTER
\$ENGINE_PAR_CT_BASS
\$ENGINE_PAR_CT_BALLS
\$ENGINE_PAR_CT_TREBLE
\$ENGINE_PAR_CT_TONE
\$ENGINE_PAR_CT_MONO

DStortion
\$ENGINE_PAR_DS_VOLUME
\$ENGINE_PAR_DS_TONE
\$ENGINE_PAR_DS_DRIVE
\$ENGINE_PAR_DS_BASS
\$ENGINE_PAR_DS_MID
\$ENGINE_PAR_DS_TREBLE
\$ENGINE_PAR_DS_MONO

HotSolo
\$ENGINE_PAR_HS_PRENORMAL
\$ENGINE_PAR_HS_PREOVERDRIVE
\$ENGINE_PAR_HS_BASS
\$ENGINE_PAR_HS_MID
\$ENGINE_PAR_HS_TREBLE
\$ENGINE_PAR_HS_MASTER
\$ENGINE_PAR_HS_PRESENCE
\$ENGINE_PAR_HS_DEPTH
\$ENGINE_PAR_HS_OVERDRIVE
\$ENGINE_PAR_HS_MONO

Van51

\$ENGINE_PAR_V5_PREGAINRHYTHM

\$ENGINE_PAR_V5_PREGAINLEAD

\$ENGINE_PAR_V5_BASS

\$ENGINE_PAR_V5_MID

\$ENGINE_PAR_V5_TREBLE

\$ENGINE_PAR_V5_POSTGAIN

\$ENGINE_PAR_V5_RESONANCE

\$ENGINE_PAR_V5_PRESENCE

\$ENGINE_PAR_V5_LEADCHANNEL

\$ENGINE_PAR_V5_HIGAIN

\$ENGINE_PAR_V5_BRIGHT

\$ENGINE_PAR_V5_CRUNCH

\$ENGINE_PAR_V5_MONO

Cry Wah

\$ENGINE_PAR_CW_MONO

\$ENGINE_PAR_CW_PEDAL

Phasis
\$ENGINE_PAR_PHASIS_RATE
\$ENGINE_PAR_PHASIS_RATE_UNIT
\$ENGINE_PAR_PHASIS_ULTRA
\$ENGINE_PAR_PHASIS_AMOUNT
\$ENGINE_PAR_PHASIS_CENTER
\$ENGINE_PAR_PHASIS_STEREO
\$ENGINE_PAR_PHASIS_SPREAD
\$ENGINE_PAR_PHASIS_FEEDBACK
\$ENGINE_PAR_PHASIS_MOD_MIX
\$ENGINE_PAR_PHASIS_NOTCHES
\$ENGINE_PAR_PHASIS_INVERT_PHASE
\$ENGINE_PAR_PHASIS_INVERT_MOD_MIX
\$ENGINE_PAR_PHASIS_MIX

Choral
\$ENGINE_PAR_CHORAL_RATE
\$ENGINE_PAR_CHORAL_MODE
\$NI_CHORAL_MODE_SYNTH
\$NI_CHORAL_MODE_ENSEMBLE
\$NI_CHORAL_MODE_DIMENSION
\$NI_CHORAL_MODE_UNIVERSAL
\$ENGINE_PAR_CHORAL_AMOUNT
\$ENGINE_PAR_CHORAL_VOICES
\$ENGINE_PAR_CHORAL_DELAY
\$ENGINE_PAR_CHORAL_WIDTH
\$ENGINE_PAR_CHORAL_FEEDBACK
\$ENGINE_PAR_CHORAL_SCATTER
\$ENGINE_PAR_CHORAL_INVERT_PHASE
\$ENGINE_PAR_CHORAL_MIX

Flair
\$ENGINE_PAR_FLAIR_MODE
\$NI_FLAIR_MODE_STANDARD
\$NI_FLAIR_MODE_THRU_ZERO
\$NI_FLAIR_MODE_SCAN
\$ENGINE_PAR_FLAIR_CHORD
\$ENGINE_PAR_FLAIR_INVERT_PHASE
\$ENGINE_PAR_FLAIR_RATE
\$ENGINE_PAR_FLAIR_RATE_UNIT
\$ENGINE_PAR_FLAIR_FEEDBACK
\$ENGINE_PAR_FLAIR_AMOUNT
\$ENGINE_PAR_FLAIR_WIDTH
\$ENGINE_PAR_FLAIR_PITCH
\$ENGINE_PAR_FLAIR_DAMPING
\$ENGINE_PAR_FLAIR_VOICES
\$ENGINE_PAR_FLAIR_DETUNE
\$ENGINE_PAR_FLAIR_MIX
\$ENGINE_PAR_FLAIR_OFFSET
\$ENGINE_PAR_FLAIR_SCANMODE
\$NI_FLAIR_SCANMODE_TRIANGLE
\$NI_FLAIR_SCANMODE_SAW_UP
\$NI_FLAIR_SCANMODE_SAW_DOWN

21.3. Filter and EQ

\$ENGINE_PAR_CUTOFF
Cutoff frequency of all filters
\$ENGINE_PAR_RESONANCE
Resonance of all filters
\$ENGINE_PAR_EFFECT_BYPASS
Bypass button of all filters/EQ
\$ENGINE_PAR_GAIN
Gain control for the Ladder and Daft filter types
\$ENGINE_PAR_FILTER_LADDER_HQ
High Quality mode for the Ladder filter types
\$ENGINE_PAR_BANDWIDTH
Bandwidth control, found on the following filter types: SV Par. LP/HP SV Par. BP/BP SV Ser. LP/HP

3x2 Versatile

\$ENGINE_PAR_FILTER_SHIFTB
\$ENGINE_PAR_FILTER_SHIFTC
\$ENGINE_PAR_FILTER_RESB
\$ENGINE_PAR_FILTER_RESC
\$ENGINE_PAR_FILTER_TYPEA
\$ENGINE_PAR_FILTER_TYPEB
\$ENGINE_PAR_FILTER_TYPEC
\$ENGINE_PAR_FILTER_BYPA
\$ENGINE_PAR_FILTER_BYPB
\$ENGINE_PAR_FILTER_BYPC
\$ENGINE_PAR_FILTER_GAIN

Formant Filters

\$ENGINE_PAR_FORMANT_TALK
\$ENGINE_PAR_FORMANT_SHARP
\$ENGINE_PAR_FORMANT_SIZE

Simple Filter

\$ENGINE_PAR_LP_CUTOFF
\$ENGINE_PAR_HP_CUTOFF

EQ

\$ENGINE_PAR_FREQ1

\$ENGINE_PAR_BW1

\$ENGINE_PAR_GAIN1

\$ENGINE_PAR_FREQ2

\$ENGINE_PAR_BW2

\$ENGINE_PAR_GAIN2

\$ENGINE_PAR_FREQ3

\$ENGINE_PAR_BW3

\$ENGINE_PAR_GAIN3

Solid G-EQ

\$ENGINE_PAR_SEQ_LF_GAIN

\$ENGINE_PAR_SEQ_LF_FREQ

\$ENGINE_PAR_SEQ_LF_BELL

\$ENGINE_PAR_SEQ_LMF_GAIN

\$ENGINE_PAR_SEQ_LMF_FREQ

\$ENGINE_PAR_SEQ_LMF_Q

\$ENGINE_PAR_SEQ_HMF_GAIN

\$ENGINE_PAR_SEQ_HMF_FREQ

\$ENGINE_PAR_SEQ_HMF_Q

\$ENGINE_PAR_SEQ_HF_GAIN

\$ENGINE_PAR_SEQ_HF_FREQ

\$ENGINE_PAR_SEQ_HF_BELL

21.4. Send Effects

\$ENGINE_PAR_SEND_EFFECT_BYPASS
Bypass button of all send effects

\$ENGINE_PAR_SEND_EFFECT_DRY_LEVEL
Dry amount of send effects when used in an insert chain

\$ENGINE_PAR_SEND_EFFECT_OUTPUT_GAIN
When used with send effects, this controls either:
Wet amount of send effects when used in an insert chain
Return amount of send effects when used in a send chain

Phaser
\$ENGINE_PAR_PH_DEPTH
\$ENGINE_PAR_PH_SPEED
\$ENGINE_PAR_PH_SPEED_UNIT
\$ENGINE_PAR_PH_PHASE
\$ENGINE_PAR_PH_FEEDBACK

Flanger
\$ENGINE_PAR_FL_DEPTH
\$ENGINE_PAR_FL_SPEED
\$ENGINE_PAR_FL_SPEED_UNIT
\$ENGINE_PAR_FL_PHASE
\$ENGINE_PAR_FL_FEEDBACK
\$ENGINE_PAR_FL_COLOR

Chorus
\$ENGINE_PAR_CH_DEPTH
\$ENGINE_PAR_CH_SPEED
\$ENGINE_PAR_CH_SPEED_UNIT
\$ENGINE_PAR_CH_PHASE

Reverb

\$ENGINE_PAR_RV2_TYPE
 \$NI_REVERB2_TYPE_ROOM
 \$NI_REVERB2_TYPE_HALL
\$ENGINE_PAR_RV2_TIME
\$ENGINE_PAR_RV2_SIZE
\$ENGINE_PAR_RV2_DAMPING
\$ENGINE_PAR_RV2_MOD
\$ENGINE_PAR_RV2_DIFF
\$ENGINE_PAR_RV2_PREDELAY
\$ENGINE_PAR_RV2_HIGHCUT
\$ENGINE_PAR_RV2_LOWSHELF
\$ENGINE_PAR_RV2_STEREO
\$ENGINE_PAR_RV2_TYPE

Plate Reverb

\$ENGINE_PAR_PR_DECAY
\$ENGINE_PAR_PR_LOWSHELF
\$ENGINE_PAR_PR_HIDAMP
\$ENGINE_PAR_PR_PREDELAY
\$ENGINE_PAR_PR_STEREO

Legacy Reverb

\$ENGINE_PAR_RV_PREDELAY
\$ENGINE_PAR_RV_SIZE
\$ENGINE_PAR_RV_COLOUR
\$ENGINE_PAR_RV_STEREO
\$ENGINE_PAR_RV_DAMPING

Replika Delay

\$ENGINE_PAR_RDL_TYPE

\$NI_REPLIKA_TYPE_MODERN

\$NI_REPLIKA_TYPE_TAPE

\$NI_REPLIKA_TYPE_VINTAGE

\$NI_REPLIKA_TYPE_DIFFUSION

\$NI_REPLIKA_TYPE_ANALOGUE

\$ENGINE_PAR_RDL_TIME

\$ENGINE_PAR_RDL_TIME_UNIT

\$ENGINE_PAR_RDL_FEEDBACK

\$ENGINE_PAR_RDL_LOWCUT

\$ENGINE_PAR_RDL_HIGHCUT

\$ENGINE_PAR_RDL_SATURATION

\$ENGINE_PAR_RDL_TAPEAGE

\$ENGINE_PAR_RDL_FLUTTER

\$ENGINE_PAR_RDL_QUALITY

\$ENGINE_PAR_RDL_DEPTH

\$ENGINE_PAR_RDL_RATE

\$ENGINE_PAR_RDL_TYPE

\$ENGINE_PAR_RDL_STEREO

\$ENGINE_PAR_RDL_NOISE

\$ENGINE_PAR_RDL_PINGPONG

\$ENGINE_PAR_RDL_AMOUNT

\$ENGINE_PAR_RDL_SIZE

\$ENGINE_PAR_RDL_DENSE

\$ENGINE_PAR_RDL_MODULATION

\$ENGINE_PAR_RDL_BBDTYPE

Legacy Delay

\$ENGINE_PAR_DL_TIME
\$ENGINE_PAR_DL_TIME_UNIT
\$ENGINE_PAR_DL_DAMPING
\$ENGINE_PAR_DL_PAN
\$ENGINE_PAR_DL_FEEDBACK

Convolution

\$ENGINE_PAR_IRC_PREDELAY
\$ENGINE_PAR_IRC_LENGTH_RATIO_ER
\$ENGINE_PAR_IRC_FREQ_LOWPASS_ER
\$ENGINE_PAR_IRC_FREQ_HIGHPASS_ER
\$ENGINE_PAR_IRC_LENGTH_RATIO_LR
\$ENGINE_PAR_IRC_FREQ_LOWPASS_LR
\$ENGINE_PAR_IRC_FREQ_HIGHPASS_LR

Gainer

\$ENGINE_PAR_GN_GAIN

21.5. Modulation

\$ENGINE_PAR_MOD_TARGET_INTENSITY

The intensity slider of a modulation assignment. This controls the modulation amount.

\$MOD_TARGET_INVERT_SOURCE

The Invert button of a modulation assignment. This inverts the modulation amount.

\$ENGINE_PAR_INTMOD_BYPASS

The bypass button of an internal modulator, e.g. AHDSR envelope, LFO

\$ENGINE_PAR_INTMOD_RETRIGGER

The Retrigger button of a modulation assignment. This restarts the envelope every time a note is received.

AHDSR

\$ENGINE_PAR_ATK_CURVE

\$ENGINE_PAR_ATTACK

\$ENGINE_PAR_ATTACK_UNIT

\$ENGINE_PAR_HOLD

\$ENGINE_PAR_HOLD_UNIT

\$ENGINE_PAR_DECAY

\$ENGINE_PAR_DECAY_UNIT

\$ENGINE_PAR_SUSTAIN

\$ENGINE_PAR_RELEASE

\$ENGINE_PAR_RELEASE_UNIT

DBD

\$ENGINE_PAR_DECAY1

\$ENGINE_PAR_DECAY1_UNIT

\$ENGINE_PAR_BREAK

\$ENGINE_PAR_DECAY2

\$ENGINE_PAR_DECAY2_UNIT

LFO

For all LFOs:

\$ENGINE_PAR_INTMOD_FREQUENCY

\$ENGINE_PAR_INTMOD_FREQUENCY_UNIT

\$ENGINE_PAR_LFO_DELAY

\$ENGINE_PAR_LFO_DELAY_UNIT

For Rectangle:

\$ENGINE_PAR_INTMOD_PULSEWIDTH

For Multi:

\$ENGINE_PAR_LFO_SINE

\$ENGINE_PAR_LFO_RECT

\$ENGINE_PAR_LFO_TRI

\$ENGINE_PAR_LFO_SAW

\$ENGINE_PAR_LFO_RANDOM

Glide

\$ENGINE_PAR_GLIDE_COEF

\$ENGINE_PAR_GLIDE_COEF_UNIT

21.6. Module Types and Subtypes

\$ENGINE_PAR_EFFECT_TYPE

Used to query the type of a group insert or instrument insert effect. Can be any of the following:

\$EFFECT_TYPE_FILTER

\$EFFECT_TYPE_COMPRESSOR

\$EFFECT_TYPE_LIMITER

\$EFFECT_TYPE_INVERTER

\$EFFECT_TYPE_SURROUND_PANNER

\$EFFECT_TYPE_SHAPER (Saturation)

\$EFFECT_TYPE_LOFI

\$EFFECT_TYPE_STEREO (Stereo Modeller)

\$EFFECT_TYPE_DISTORTION

\$EFFECT_TYPE_SEND_LEVELS

\$EFFECT_TYPE_PHASER

\$EFFECT_TYPE_CHORUS

\$EFFECT_TYPE_FLANGER

\$EFFECT_TYPE_REVERB

\$EFFECT_TYPE_REVERB2

\$EFFECT_TYPE_PLATEREVERB

\$EFFECT_TYPE_REPLIKA

\$EFFECT_TYPE_DELAY

\$EFFECT_TYPE_IRC (Convolution)

\$EFFECT_TYPE_GAINER

\$EFFECT_TYPE_SKREAMER

\$EFFECT_TYPE_ROTATOR

\$EFFECT_TYPE_TWANG

\$EFFECT_TYPE_CABINET

\$EFFECT_TYPE_AET_FILTER

\$EFFECT_TYPE_TRANS_MASTER

\$EFFECT_TYPE_BUS_COMP

\$EFFECT_TYPE_TAPE_SAT

\$ENGINE_PAR_SEND_EFFECT_TYPE

Used to query the type of a send effect, can be any of the following:

\$EFFECT_TYPE_REVERB

\$EFFECT_TYPE_DELAY

\$EFFECT_TYPE_IRC (Convolution)

\$EFFECT_TYPE_GAINER

\$EFFECT_TYPE_REPLIKA

\$EFFECT_TYPE_REVERB2

\$EFFECT_TYPE_PLATEREVERB

\$EFFECT_TYPE_NONE {empty slot}

\$ENGINE_PAR_EFFECT_SUBTYPE

Used to query the type of filter/EQ. Can be any of the following:

\$FILTER_TYPE_LP1POLE

\$FILTER_TYPE_HP1POLE

\$FILTER_TYPE_BP2POLE

\$FILTER_TYPE_LP2POLE

\$FILTER_TYPE_HP2POLE

\$FILTER_TYPE_LP4POLE

\$FILTER_TYPE_HP4POLE

\$FILTER_TYPE_BP4POLE

\$FILTER_TYPE_BR4POLE

\$FILTER_TYPE_LP6POLE

\$FILTER_TYPE_PHASER

\$FILTER_TYPE_VOWELA

\$FILTER_TYPE_VOWELB

\$FILTER_TYPE_PR052

\$FILTER_TYPE_LADDER

\$FILTER_TYPE_VERSATILE

\$FILTER_TYPE_EQ1BAND

\$FILTER_TYPE_EQ2BAND

\$FILTER_TYPE_EQ3BAND

\$FILTER_TYPE_DAFT_LP

\$FILTER_TYPE_SV_LP1

\$FILTER_TYPE_SV_LP2

\$FILTER_TYPE_SV_LP4

\$FILTER_TYPE_LDR_LP1

\$FILTER_TYPE_LDR_LP2

\$FILTER_TYPE_LDR_LP3

\$FILTER_TYPE_LDR_LP4

\$FILTER_TYPE_AR_LP2

\$FILTER_TYPE_AR_LP4

\$FILTER_TYPE_AR_LP24

\$ENGINE_PAR_INTMOD_TYPE

Used to query the type of internal modulators, can be any of the following:

\$INTMOD_TYPE_NONE

\$INTMOD_TYPE_LFO

\$INTMOD_TYPE_ENVELOPE

\$INTMOD_TYPE_STEPMOD

\$INTMOD_TYPE_ENV_FOLLOW

\$INTMOD_TYPE_GLIDE

\$ENGINE_PAR_INTMOD_SUBTYPE

Used to query the sub type of envelopes and LFOs. Can be any of the following:

\$ENV_TYPE_AHDSR

\$ENV_TYPE_FLEX

\$ENV_TYPE_DBD

\$LFO_TYPE_SINE

\$LFO_TYPE_RECTANGLE

\$LFO_TYPE_TRIANGLE

\$LFO_TYPE_SAWTOOTH

\$LFO_TYPE_RANDOM

\$LFO_TYPE_MULTI

\$ENGINE_PAR_DISTORTION_TYPE

Used to query the sub type of the distortion effect. Can be any of the following:

\$NI_DISTORTION_TYPE_TUBE

\$NI_DISTORTION_TYPE_TRANS

Can also be used in the `set_engine_par ( )` command to change the distortion type

\$ENGINE_PAR_SHAPE_TYPE

Used to query the sub type of saturator (shape) effec. Can be any of the following:

`$NI_SHAPE_TYPE_CLASSIC`

`$NI_SHAPE_TYPE_ENHANCED`

`$NI_SHAPE_TYPE_DRUMS`

Can also be used in the `set_engine_par ( )` command to change the saturator type

21.7. Group Start Options Query

Group Start Options Constants
\$ENGINE_PAR_START_CRITERIA_MODE
\$ENGINE_PAR_START_CRITERIA_KEY_MIN
\$ENGINE_PAR_START_CRITERIA_KEY_MAX
\$ENGINE_PAR_START_CRITERIA_CONTROLLER
\$ENGINE_PAR_START_CRITERIA_CC_MIN
\$ENGINE_PAR_START_CRITERIA_CC_MAX
\$ENGINE_PAR_START_CRITERIA_CYCLE_CLASS
\$ENGINE_PAR_START_CRITERIA_ZONE_IDX
\$ENGINE_PAR_START_CRITERIA_SLICE_IDX
\$ENGINE_PAR_START_CRITERIA_SEQ_ONLY
\$ENGINE_PAR_START_CRITERIA_NEXT_CRIT
\$ENGINE_PAR_START_CRITERIA_MODE can return one of the following values:
\$START_CRITERIA_NONE
\$START_CRITERIA_ON_KEY
\$START_CRITERIA_ON_CONTROLLER
\$START_CRITERIA_CYCLE_ROUND_ROBIN
\$START_CRITERIA_CYCLE_RANDOM
\$START_CRITERIA_SLICE_TRIGGER
\$ENGINE_PAR_START_CRITERIA_NEXT_CRIT can return one of the following values:
\$START_CRITERIA_AND_NEXT
\$START_CRITERIA_AND_NOT_NEXT
\$START_CRITERIA_OR_NEXT

22. ZONE PARAMETERS

22.1. Zone Parameters

These set the parameters for the user zones via KSP in the same manner and ranges as available on the mapping editor. They can be set with the `set_zone_par(<zone-id>,<parameter>,<value>)` function and retrieved with the `get_zone_par(<zone-id>,<parameter>)` function. When the zones are declared, all these parameters are set to 0 by default.

\$ZONE_PAR_HIGH_KEY

Sets the high key for the zone. Range: 0-127

\$ZONE_PAR_LOW_KEY

Sets the low key of the zone. Range: 0-127

\$ZONE_PAR_HIGH_VELO

Sets the maximum velocity response of the zone. Range: 1-127

\$ZONE_PAR_LOW_VELO

Sets the minimum velocity response of the zone. Range: 1-127

\$ZONE_PAR_ROOT_KEY

Sets the root key of the zone. Range: 0-127

\$ZONE_PAR_FADE_LOW_KEY

Optionally use this parameter to create zone crossfades. The value is set in the form of a distance to the `$ZONE_PAR_LOW_KEY`.

Range: `$ZONE_PAR_HIGH_KEY - $ZONE_PAR_LOW_KEY + 1`

\$ZONE_PAR_FADE_HIGH_KEY

Optionally use this parameter to create zone crossfades. The value is set in the form of a distance to the `$ZONE_PAR_HIGH_KEY`.

Range: `$ZONE_PAR_HIGH_KEY - $ZONE_PAR_LOW_KEY + 1`

\$ZONE_PAR_FADE_LOW_VELO

Optionally use this parameter to create zone crossfades. The value is set in the form of a distance to the `$ZONE_PAR_LOW_VELO`.

Range: `$ZONE_PAR_HIGH_VELO - $ZONE_PAR_LOW_VELO + 1`

\$ZONE_PAR_FADE_HIGH_VELO

Optionally use this parameter to create zone crossfades. The value is set in the form of a distance to the \$ZONE_PAR_HIGH_VELO.

Range: \$ZONE_PAR_HIGH_VELO - \$ZONE_PAR_LOW_VELO + 1

\$ZONE_PAR_VOLUME

Sets the volume of the zone. Range: -3600 - 3600

\$ZONE_PAR_PAN

Sets the panning of the zone. Range: -1000 - 1000

\$ZONE_PAR_TUNE

Sets the tuning of the zone. Range: -3600 - 3600

\$ZONE_PAR_GROUP

Sets the group of the user zone. By default a user zone is placed in group 0.

Examples

```
set_num_user_zones(4)
set_zone_par(%NI_USER_ZONE_IDS[0], $ZONE_PAR_GROUP, 30)
set_zone_par(%NI_USER_ZONE_IDS[1], $ZONE_PAR_GROUP, 31)
set_zone_par(%NI_USER_ZONE_IDS[2], $ZONE_PAR_GROUP, 72)
set_zone_par(%NI_USER_ZONE_IDS[3], $ZONE_PAR_GROUP, 73)
```

\$ZONE_PAR_SAMPLE_START

Sets the sample start value of the sample attached to the zone.

\$ZONE_PAR_SAMPLE_END

Sets the sample end value of the sample attached to the zone.

\$ZONE_PAR_SAMPLE_MOD_RANGE

User zone loop parameters work in the same manner as manually setting loops via the wave editor.

22.2. Loop Parameters

\$LOOP_PAR_MODE

The Loop Mode of the selected loop within the zone. Range: 0-4

0: Loop off

1: Loop until end, alternate off

2: Loop until end, alternate on

3: Loop until release, alternate off

4: Loop until release, alternate on

Examples

```
on ui_control($SampleLoopOn)
    wait_async(set_loop_par(%NI_USER_ZONE_IDS[2], 0, ...
        $LOOP_PAR_MODE, $SampleLoopOn))
end on
```

\$LOOP_PAR_START

The starting point in samples of the selected loop within the zone. If this parameter is not the loop will start at the beginning of the sample.

\$LOOP_PAR_LENGTH

The loop length in samples of the selected loop within the zone. If this parameter is not set the loop length will correspond to the entire sample.

\$LOOP_PAR_XFADE

The crossfade value in microseconds for the selected loop within the zone.

\$LOOP_PAR_COUNT

The number of times the selected loop within the zone will repeat. If this parameter is not set (or is set to 0), the loop will continue indefinitely.

\$LOOP_PAR_TUNING

Sets the tuning offset inside the loop area for the selected loop within the zone, applied on the first repeat of the loop, and for all successive repeats (as defined by \$LOOP_PAR_COUNT).

22.3. Sample Parameters

\$NI_FILE_NAME
The file name of a zone's sample (corresponds to the zone name)
\$NI_FILE_FULL_PATH
The full path of a zone's sample (same result as without the parameter)
\$NI_FILE_FULL_PATH_OS
The full OS path of a zone's sample (uses backslashes on Windows)
\$NI_FILE_EXTENSION
The file extension of a zone's sample (without the dot)

23. ADVANCED CONCEPTS

23.1. Preprocessor & System Scripts

SET_CONDITION(<condition-symbol>)

Define a symbol to be used as a condition

RESET_CONDITION(<condition-symbol>)

Delete a definition

USE_CODE_IF(<condition-symbol>)

...

END_USE_CODE

Interpret code when <condition> is defined

USE_CODE_IF_NOT(<condition-symbol>)

...

END_USE_CODE

Interpret code when <condition> is not defined

NO_SYS_SCRIPT_GROUP_START

Condition; if defined with SET_CONDITION(), the system script which handles all group start options

NO_SYS_SCRIPT_PEDAL

Condition; if defined with SET_CONDITION(), the system script which sustains notes when CC# 64 is received will be bypassed

NO_SYS_SCRIPT_RLS_TRIG

Condition; if defined with SET_CONDITION(), the system script which triggers samples upon the release of a key is bypassed

reset_rls_trig_counter(<note>)

Resets the release trigger counter (used by the release trigger system script)

will_never_terminate(<event-id>)

Tells the script engine that this event will never be finished (used by the release trigger system script)

Examples

A preprocessor is used to exclude code elements from interpretation. Here's how it works:

```
USE_CODE_IF(<condition>)
```

```
...
```

```
END_USE_CODE
```

or

```
USE_CODE_IF_NOT(<condition>)
```

```
...
```

```
END_USE_CODE
```

<condition> refers to a symbolic name which consists of alphanumeric symbols, preceded by a letter. You could write for example:

```
on note
    {do something general}
$var := 5

{do some conditional code}
USE_CODE_IF_NOT(dont_do_sequencer)
    while ($count > 0)
        play_note()
    end while
END_USE_CODE
end on
```

What's happening here?

Only if the symbol `dont_do_sequencer` is not defined, the code between `USE_` and `END_USE` will be processed. If the symbol were to be found, the code would not be passed on to the parser; it is as if the code was never written. Therefore it does not utilize any CPU power.

You can define symbols with

```
SET_CONDITION(<condition symbol>)
```

and delete the definition with

```
RESET_CONDITION(<condition symbol>)
```

All commands will be interpreted **before** the script is running, i.e., by using `USE_CODE_`, the code might get stalled before it is passed to the script engine. This means, `SET_CONDITION` and `RESET_CONDITION` are not actually true commands: they cannot be utilized in `if()...end if` statements; also a `wait()` statement before those commands is useless. Each `SET_CONDITION` and `RESET_CONDITION` will be executed before something else happens.

All defined symbols are passed on to following scripts, i.e. if script 3 contains conditional code, you can turn it on or off in script 1 or 2.

You can use conditional code to bypass system scripts. There are three built-in symbols:

NO_SYS_SCRIPT_PEDAL

NO_SYS_SCRIPT_RLS_TRIG

NO_SYS_SCRIPT_GROUP_START

If you define one of those symbols with `SET_CONDITION( )`, the corresponding part of the system scripts will be bypassed. For clarity reasons, those definitions should always take place in the `in-init` callback.

```
on init
    {we want to do our own release triggering}
    SET_CONDITION(NO_SYS_SCRIPT_RLS_TRIG)
end on

on release
    {do something custom here}
end on
```

23.2. PGS

It is possible to send and receive values from one script to another, discarding the usual left-to-right order by using the Program Global Storage (PGS) commands. PGS is a dynamic memory that can be read/written by any script.

PGS commands
<code>pgs_create_key(<key-id>, <size>)</code>
<code>pgs_key_exists(<key-id>)</code>
<code>pgs_set_key_val(<key-id>, <index>, <value>)</code>
<code>pgs_get_key_val(<key-id>, <index>)</code>

<key-id> is similar to a variable name; it can only contain letters and numbers and must not start with a number. It is a good idea to always write them in capitals to emphasize their unique status.

Here's an example, insert this script into any slot:

```
on init
  pgs_create_key(FIRST_KEY, 1) {defines a key with 1 element}
  pgs_create_key(NEXT_KEY, 128) {defines a key with 128 elements}
  declare ui_button $Just_Do_It
end on

on ui_control($Just_Do_It)

  {writes 70 into the first and only memory location of FIRST_KEY}
  pgs_set_key_val(FIRST_KEY, 0, 70)

  {writes 50 into the first and 60 into the last memory location of
NEXT_KEY}
  pgs_set_key_val(NEXT_KEY, 0, 50)
  pgs_set_key_val(NEXT_KEY, 127, 60)
end on
```

and insert the following script into any other slot:

```

on init
  declare ui_knob $First (0,100,1)
  declare ui_table %Next[128] (5,2,100)
end on
on pgs_changed

  {checks if FIRST_KEY and NEXT_KEY have been declared}
  if(pgs_key_exists(FIRST_KEY) and _pgs_key_exists(NEXT_KEY))
    $First := pgs_get_key_val(FIRST_KEY,0) {in this case 70}
    %Next[0] := pgs_get_key_val(NEXT_KEY,0) {in this case 50}
    %Next[127] := pgs_get_key_val(NEXT_KEY,127) {in this case 60}
  end if
end on

```

As illustrated above, there is also a callback that is executed whenever a `set_key` command has been executed.

on pgs_changed
Callback type, executed whenever any <code>pgs_set_key_val()</code> is executed in any script

It is possible to have as many keys as you want, however each key can only have up to 256 elements.

The basic handling for PGS strings is the same as for normal PGS keys; there's only one difference: PGS strings keys aren't arrays like the standard PGS keys you already know – they resemble normal string variables.

PGS strings commands
<code>pgs_create_str_key(<key-id>)</code>
<code>pgs_str_key_exists(<key-id>)</code>
<code>pgs_set_str_key_val(<key-id>,<stringvalue>)</code>
<code><stringvalue> := pgs_get_str_key_val(<key-id>)</code>

`<key-id>` is something similar to a variable name. It can only contain letters and numbers and must not start with a number. It is a good idea to always write them in capitals to emphasize their unique status.

23.3. Zone and Slice Functions

find_zone(<zone-name>)

Returns the zone ID for the specified zone name. Only available in the init callback.

get_sample_length(<zone-ID>)

Returns the length of the specified zone's sample in microseconds

num_slices_zone(<zone-ID>)

Returns the number of slices in the specified zone

zone_slice_length(<zone-ID>, <slice-index>)

Returns the length in microseconds of the specified slice with respect to the current tempo

zone_slice_start(<zone-ID>, <slice-index>)

Returns the absolute start point of the specified slice in microseconds, independent of the current tempo

zone_slice_idx_loop_start(<zone-ID>, <loop-index>)

Returns the index number of the slice at the loop start

zone_slice_idx_loop_end(<zone-ID>, <loop-index>)

Returns the index number of the slice at the loop end

zone_slice_loop_count(<zone-ID>, <loop-index>)

Returns the loop count of the specified loop

dont_use_machine_mode(<ID-number>)

Play the specified event in sampler mode

23.4. User-defined Functions

```
function <function-name>
```

```
...
```

```
end function
```

Declares a function

```
call <function-name>
```

Calls a previously declared function

Remarks

The function has to be declared before it is called.

Examples

```

on init
  declare $root_note := 60

  declare ui_button $button_1
  set_text ($button_1,"Play C Major")

  declare ui_button $button_2
  set_text ($button_2,"Play Gb Major")

  declare ui_button $button_3
  set_text ($button_3,"Play C7 (b9,#11)")
end on
function func_play_triad
  play_note($root_note,100,0,300000)
  play_note($root_note + 4,100,0,300000)
  play_note($root_note + 7,100,0,300000)
end function
on ui_control ($button_1)
  $root_note := 60
  call func_play_triad
  $button_1 := 0
end on
on ui_control ($button_2)
  $root_note := 66
  call func_play_triad
  $button_2 := 0
end on
on ui_control ($button_3)
  $root_note := 60
  call func_play_triad
  $root_note := 66
  call func_play_triad
  $button_3 := 0
end on

```

Jazz Harmony 101

23.5. Resource Container

Introduction

The Resource Container is a useful tool for library developers. It is a dedicated location to store scripts, graphics, .nka files and impulse response files that can be referenced by any NKI or group of NKIs that are linked to the container. Another benefit is that you can create a resource container monolith file containing all the scripts, graphics etc, so that you can easily move them around or send them to other team members. When loading an NKI, the resource container is treated like a sample, so if it is not found it will appear in the Samples Missing dialogue.

Setup

To create a Resource Container for your NKI, open up its instrument options and click the <Create> button beside the area labeled as Resource Container. After creating a new resource container file, KONTAKT checks if there is already a resource folder structure available. If there isn't, you can let KONTAKT create it for you. If you do this, you will find Resources and Data folders next to the NKR file you just created.

The Resources folder is the place where you can store the files that an NKI can use, which are not samples. As you can see KONTAKT has already created several subfolders for you: ir_samples, pictures (for GUI graphics and wallpapers), data (for .nka files) and scripts. The only thing to do now is to move your files into the right folders and you are ready to go.

Working with the Resource Container

Let's say you're creating a new library: after setting up the Resource Container as described above, you can tell all of the NKIs that are part of your library to use this special Resource Container. Just open up the NKI's instrument options and use the Browse function.

As long as the Resources folder exist besides the NKR file (this is the Resource Container monolith), KONTAKT will read all files directly from this folder structure.

For loading scripts from the scripts subfolder, use the "Apply from... -> Resources folder" function within the script editor.

Now let's say you want to send your current working status to another team member. Open up the instrument options, click the Create button and then overwrite your NKR file. Be aware that this will completely overwrite your monolith, it won't be matched in any way. Now KONTAKT will do all of the following:

- Check the ir_samples subfolder for any .wav, .aif or .aiff files and put them into the monolith.
- Check the pictures folder for any .tga or .png files that also have a .txt file of the same filename next to them. All of these will be packed into the monolith. Note that wallpapers also need a .txt file or they will be ignored.
- Check the scripts subfolder for any .txt files which will then be put into the monolith.
- Check the data subfolder for any .nka files which will then be put into the monolith.

After that rename your Resources folder and reopen your NKI. Now that there is no Resources folder present anymore, KONTAKT will automatically read from the NKR monolith file. If everything is still working as expected you can send your NKIs and the NKR monolith to your team member.

To continue your work just rename the Resources folder back to "Resources".

Remarks

- The Resource Container will be checked in the samples missing dialog.
- When you save your NKI as a monolith file, the Resource Container will not be integrated into the monolith. The path to the Resource Container will be saved in absolute path mode.

23.6. Changing FX from KSP

Introduction

Prior to Kontakt 5.5, there was already the infrastructure in place to get info about the content of effect slots via engine parameter variables like `$ENGINE_PAR_EFFECT_TYPE` and built-in constants like `$EFFECT_TYPE_FILTER` (see Module Status Retrieval).

Starting with Kontakt 5.5, it is also possible to change FX with the same set of built-in variables.

Example

```
on init
    set_engine_par($ENGINE_PAR_EFFECT_TYPE,$EFFECT_TYPE_FILTER,0,0,-1)
    set_engine_par($ENGINE_PAR_EFFECT_SUBTYPE,
$FILTER_TYPE_LDR_LP4,0,0,-1)
end on
```

Inserts a 4 pole lowpass ladder filter into the first group slot

on async_complete callback

Changing FX slot contents is an asynchronous operation. This means, one cannot reliably access the newly instantiated effect immediately after instantiation. To resolve this, the command returns an `$NI_ASYNC_ID` and triggers the `on async_complete` callback.

Default Filter Type

Filters are somewhat special as they are effect types that feature subtypes. Since one can now instantiate a new filter from KSP without explicitly selecting its subtype, there is the need for a pre-defined default filter subtype. This is the SV LP4.

Implications on Modulation and Automation assignments

When changing the contents of FX slots through KSP, it is expected that the handling of assigned automation and modulation is identical to performing the same action using Kontakt's GUI.

- When changing a slot's effect type or removing it entirely, all modulation and automation assignments are also removed. Specifically to modulators, if the removed assignments are the only ones of a certain one (i.e., if the modulator is not assigned to other targets as well), the modulator itself is also removed.
- When changing a slot's effect subtype (only applies to filters), everything is left unchanged. It is accepted that in certain cases, one may end up with "orphaned" modulation assignments as it is the case right now; e.g., when having modulation assigned to a parameter that is no longer available, like Resonance or Gain.

Changing Modulator Subtypes

Using the same commands described above, one can also change the subtype of internal modulators. Specifically, one could switch between envelope types (AHDSR, Flex and DBD), or LFO types (Rectangle, Triangle, Sawtooth, Random and Multi). A modulator cannot be inserted or removed. Its Type (LFO, Envelope, Step Modulator, Envelope Follower and Glide) cannot be changed either.

Special Cases

There are two effect types that cannot be set from KSP:

- Surround Panner
- AET filter

23.7. The Advanced Engine Tab

The Advanced Engine tab can be a useful tool for debugging and measuring the performance of your scripts.

While the Engine tab (a sub-tab of the Expert tab in the Browser Pane) can provide a useful display of performance statistics, the advanced version gives higher accuracy to things like CPU usage, and also displays information on multiple instances of KONTAKT when it is used as a plug-in.

Displaying the Advanced Engine Tab

As mentioned earlier, the Engine tab is a sub section of the Expert tab, which can be found in the Browser Pane.

- To access the Advanced Engine tab, hold the [Alt] key while clicking on the Engine tab.
- To return to the main Engine tab, just click on the Engine tab again with no keys held.

Instance Overview

If you are running multiple instances of KONTAKT as a plug-in in a DAW or host, each instance will be given an entry in this section. If you are using KONTAKT in standalone, only the current instance will be displayed.

There are five performance statistics you can view here:

- **CPU**: displays the current CPU load in percent (at a higher resolution than the other CPU read-outs in KONTAKT) as well as the highest recorded peak CPU level (displayed in parenthesis). You can reset the high peak by re-initializing the KONTAKT instance by clicking on the Engine Restart (!) button.
- **Voices**: displays the total number of voices currently in use by the KONTAKT instance.
- **Voices killed**: displays the total number of voices that have been killed due to CPU overload (displayed on the left) and DFD overload (displayed on the right).
- **Process Buffer**: displays the current audio buffer size in samples.
- **Events**: displays the total number of events currently in the event queue. While a voice is the equivalent to a sample being played back, an event is more closely related to MIDI note messages being processed by the engine. For example, a single event could produce 3 voices, if there are 3 samples mapped to a single note. Additionally, if you are holding a MIDI key event though the triggered sample has finished playback, the voice will terminate, but the event will remain in the queue. As such, this display can be useful for tracking down events that are hanging, as these are not always audible in the way that hanging voices would be.

Total

The lower section displays the total performance statistics for all KONTAKT instances currently loaded. It has the following parameters:

- **Voices** and **Voices killed**: like the displays in the Instance Overview, but a total for all instances.
- **DFD load**: if you are playing Instruments that use DFD mode, this measures their hard disk access. It is essentially a more accurate version of the Disk meter in KONTAKT's Main Header.
- **DFD memory**: a measurement of how much RAM is being used to process the DFD stream.

- **DFD requests:** the total number of requests made by KONTAKT to read data from the hard disk.

24. MULTI SCRIPT

24.1. General Information

The multi script utilizes the same KSP syntax as the instrument scripts. Here are the main differences:

- The multi script works on a pure MIDI event basis, i.e., you're working with raw MIDI data.
- There are no `on note`, `on release` and `on controller` callbacks.
- Every MIDI event triggers the `on midi_in` callback.
- There are various built-in variables for the respective MIDI bytes.

The new multi script tab is accessed by clicking on the "KSP" button in the multi header.

Just as instrument scripts are saved with the instrument, multi scripts are saved with the multi. In relation to GUIs, everything is identical with the instrument script. The scripts are stored in a folder called "multiscripts", which resides next to the already existing "scripts" folder inside the "presets" folder:

/Native Instruments/Kontakt/presets/multiscripts

The multi script has only two callback types, the `on midi_in` callback and the various `on ui_control` callbacks. Each MIDI event like Note, Controller, Program Change etc. is triggering the `on midi_in` callback.

It is very important to understand the different internal structure of the event processing in the multi script as opposed to the instrument script.

On the instrument level, you can retrieve the event IDs of notes only, i.e., `$EVENT_ID` only works in the `on note` and `on release` callback. On the multi level, any incoming MIDI event has a unique ID which can be retrieved with `$EVENT_ID`. This means, `$EVENT_ID` can be a note event, a controller message, a program change command etc.

This brings us to the usage of `change_note()`, `change_velo()` etc. commands. Since `$EVENT_ID` does not necessarily refer to a note event, these commands will not work in the multi script.

And most important of all, remember that the multi script is nothing more than a MIDI processor, whereas the instrument script is an event processor. A note event in the instrument script is bound to a voice, whereas MIDI events from the multi script are "translated" into note events on the instrument level. This simply means that `play_note()`, `change_tune()` etc. don't work in the multi script.

You should be familiar with the basic structure of MIDI messages when working with the multi script.

24.2. ignore_midi

ignore_midi
Ignores events

Remarks

- Like `ignore_event()`, `ignore_midi` is a very "strong" command. Keep in mind that `ignore_midi` will ignore all incoming events.
- If you just want to change the MIDI channel and/or any of the bytes, you can also use `set_event_par()`.

Example

```
on midi_in
  if ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_ON and $MIDI_BYTE_2 > 0)
    ignore_midi
  end if

  if ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_OFF or ...
    ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_ON and $MIDI_BYTE_2 = 0))
    ignore_midi
  end if
end on
```

Ignoring note on and note off messages. Note that some keyboards use a note on command with a velocity of 0 to designate a note off command.

See Also

`ignore_event()`

24.3. on midi_in

on midi_in

MIDI callback, triggered by every incoming MIDI event

Example

```
on midi_in
  if ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_ON and $MIDI_BYTE_2 > 0)
    message ("Note On")
  end if
  if ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_ON and $MIDI_BYTE_2 = 0)
    message ("Note Off")
  end if
  if ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_OFF)
    message ("Note Off")
  end if
  if ($MIDI_COMMAND = $MIDI_COMMAND_CC)
    message ("Controller")
  end if
  if ($MIDI_COMMAND = $MIDI_COMMAND_PITCH_BEND)
    message ("Pitch Bend")
  end if
  if ($MIDI_COMMAND = $MIDI_COMMAND_MONO_AT)
    message ("Channel Pressure")
  end if
  if ($MIDI_COMMAND = $MIDI_COMMAND_POLY_AT)
    message ("Poly Pressure")
  end if
  if ($MIDI_COMMAND = $MIDI_COMMAND_PROGRAM_CHANGE)
    message ("Program Change")
  end if
end on
```

Monitoring various MIDI data

See Also

ignore_midi

24.4. set_midi()

```
set_midi(<channel>,<command>,<byte-1>, <byte-2>)
```

Create any type of MIDI event

Remarks

- If you simply want to change the MIDI channel and/or any of the MIDI bytes, you can also use `set_event_par()`.

Example

```
on midi_in
  if ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_ON and $MIDI_BYTE_2 > 0)
    set_midi
($MIDI_CHANNEL,$MIDI_COMMAND_NOTE_ON,$MIDI_BYTE_1+4,$MIDI_BYTE_2)
    set_midi
($MIDI_CHANNEL,$MIDI_COMMAND_NOTE_ON,$MIDI_BYTE_1+7,$MIDI_BYTE_2)
  end if

  if ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_OFF or ...
    ($MIDI_COMMAND = $MIDI_COMMAND_NOTE_ON and $MIDI_BYTE_2 = 0))
    set_midi
($MIDI_CHANNEL,$MIDI_COMMAND_NOTE_ON,$MIDI_BYTE_1+4,0)
    set_midi ($MIDI_CHANNEL,$MIDI_COMMAND_NOTE_ON,$MIDI_BYTE_1+7,0)
  end if
end on
```

A simple harmonizer – note that you also have to supply the correct note off commands

See Also

`set_event_par()`

`$EVENT_PAR_MIDI_CHANNEL`

`$EVENT_PAR_MIDI_COMMAND`

`$EVENT_PAR_MIDI_BYTE_1`

`$EVENT_PAR_MIDI_BYTE_2`

24.5. Multi Script Command Arguments

\$MIDI_CHANNEL

The MIDI channel of the received MIDI event. Since KONTAKT can handle four different MIDI ports, this number can go from 0 - 63 (four ports x 16 MIDI channels).

\$MIDI_COMMAND

The command type like Note, CC, Program Change etc. of the received MIDI event. There are various constants for this variable (see below).

\$MIDI_BYTE_1

\$MIDI_BYTE_2

The two MIDI bytes of the message, always in the range 0-127

\$MIDI_COMMAND_NOTE_ON

\$MIDI_BYTE_1 = note number

\$MIDI_BYTE_2 = velocity

Note: a velocity value of 0 equals a note off command

\$MIDI_COMMAND_NOTE_OFF

\$MIDI_BYTE_1 = note number

\$MIDI_BYTE_2 = release velocity

\$MIDI_COMMAND_POLY_AT

\$MIDI_BYTE_1 = note number

\$MIDI_BYTE_2 = polyphonic key pressure value

\$MIDI_COMMAND_CC

\$MIDI_BYTE_1 = controller number

\$MIDI_BYTE_2 = controller value

\$MIDI_COMMAND_PROGRAM_CHANGE

\$MIDI_BYTE_1 = program number

\$MIDI_BYTE_2 = not used

\$MIDI_COMMAND_MONO_AT

\$MIDI_BYTE_1 = channel pressure value

\$MIDI_BYTE_2 = not used

\$MIDI_COMMAND_PITCH_BEND

\$MIDI_BYTE_1 = LSB value

\$MIDI_BYTE_2 = MSB value

\$MIDI_COMMAND_RPN/\$MIDI_COMMAND_NRPN

\$MIDI_BYTE_1 = RPN/NRPN address

\$MIDI_BYTE_2 = RPN/NRPN value

Event Parameter Constants

Event parameters to be used with `set_event_par()` and `get_event_par()`:

\$EVENT_PAR_MIDI_CHANNEL

\$EVENT_PAR_MIDI_COMMAND

\$EVENT_PAR_MIDI_BYTE_1

\$EVENT_PAR_MIDI_BYTE_2

25. VERSION HISTORY

25.1. KONTAKT 6.2.0

New Features

- New Choral, Flair and Phasis modulation effects
- New UI element: `ui_mouse_area`
- New type of zones accessible from KSP: `set_num_user_zones()`, `set_sample()`, `set_zone_par()`, `set_loop_par()`
- All zone parameters can now be read from KSP: `get_sample()`, `get_zone_par()`, `get_loop_par()`
- New function to check whether a sample is loaded for a zone: `is_zone_empty()`
- New MIR functions to detect zones' pitch, RMS, peak level and loudness
- New MIR functions to classify samples based on their audio characteristics
- New command to make handling asynchronous operations more convenient: `wait_async()`

Improved Features

- `purge_group()` now returns an `asyncID`, allowing for reliable tracking of the operations completion

25.2. KONTAKT 6.1.0

New Features

- New engine parameter for the retrigger button on internal modulators (\$ENGINE_PAR_INTMOD_RETRIGGER)
- New waveform visualization modes (\$CONTROL_PAR_WF_VIS_MODE with \$NI_WF_VIS_MODE_1, \$NI_WF_VIS_MODE_2 and \$NI_WF_VIS_MODE_3 as values)
- New Wavetable Mode (\$ENGINE_PAR_WT_INHARMONIC_MODE)
- New UI Control (ui_panel) and related control parameter (\$CONTROL_PAR_PARENT_PANEL)
- New user interface command (load_performance_view()) to load performance views created on Creator Tools

25.3. KONTAKT 6.0.2

New Features

- New engine_par constants for new KONTAKT 6 effects.
- New engine_par constants for new Wavetable mode.
- New UI control: ui_wavetable including new commands and built-in variables.
- New commands for variable watching through Creator Tools: watch_var() and watch_array_idx()
- New control parameter allows deactivating text position shifts when clicking on buttons and switches: \$CONTROL_PAR_DISABLE_TEXT_SHIFTING
- New command enables use of custom dynamic fonts: get_font_id()
- New control parameters allow granular control over font types for a button's or menu's different states: \$CONTROL_PAR_FONT_TYPE_ON, \$CONTROL_PAR_FONT_TYPE_OFF_PRESSED, \$CONTROL_PAR_FONT_TYPE_ON_PRESSED, \$CONTROL_PAR_FONT_TYPE_OFF_HOVER and \$CONTROL_PAR_FONT_TYPE_ON_HOVER
- New command allows for quickly disabling emission of messages, warnings or watched variable events to both the Kontakt Status Bar and Creator Tools: disable_logging() with one of the following as the: \$NI_LOG_MESSAGE, \$NI_LOG_WARNING, \$NI_LOG_WATCHING

Improved Features

- New built-in variable and related built-in constants for the XY Pad allow identification of the mouse events that trigger its callback: \$NI_MOUSE_EVENT_TYPE, \$NI_MOUSE_EVENT_TYPE_LEFT_BUTTON_DOWN, \$NI_MOUSE_EVENT_TYPE_LEFT_BUTTON_UP and \$NI_MOUSE_EVENT_TYPE_DRAG
- \$CONTROL_PAR_TEXTPOS_Y is now allowed on value edit controls.

25.4. KONTAKT 5.8.0

Improved Features

- It is now possible to have up to three file selectors per script slot.
- The maximum number of controls per type has now been raised to 512.
- The maximum size for an array has now been raised to 1000000.

25.5. KONTAKT 5.7

New Features

- New built-in variable for all UI elements: `$CONTROL_PAR_Z_LAYER`
- Waveform styling options: `$CONTROL_PAR_WAVE_COLOR`, `$CONTROL_PAR_BG_COLOR`, `$CONTROL_PAR_WAVE_CURSOR_COLOR`, `$CONTROL_PAR_SLICEMARKERS_COLOR`, `$CONTROL_PAR_BG_ALPHA`
- Engine parameter variables for new effects: ACBox, Cat, DStortion, HotSolo, Van51.
- Added engine parameter variables for effect parameters that are buttons.
- Added engine parameter variables for setting the subtype for the Distortion and Saturator effects: `$ENGINE_PAR_DISTORTION_TYPE`, `$ENGINE_PAR_SHAPE_TYPE`

Improved Features

- `ui_waveform` now accepts `$HIDE_PART_BG` as a `hide_part()` and `$CONTROL_PAR_HIDE` constant.

25.6. KONTAKT 5.6.8

New Features

- New built-in UI variables: \$NI_CONTROL_PAR_IDX, \$HIDE_PART_CURSOR

25.7. KONTAKT 5.6.5

New Features

- New UI control: `ui_xy`
Including new built-in variables: `$CONTROL_PAR_CURSOR_PICTURE`, `$CONTROL_PAR_MOUSE_MODE`, `$CONTROL_PAR_ACTIVE_INDEX`, `$CONTROL_PAR_MOUSE_BEHAVIOUR_X`, `$CONTROL_PAR_MOUSE_BEHAVIOUR_Y`
- New UI commands: `set_control_par_arr()` and `set_control_par_str_arr()`

25.8. KONTAKT 5.6

New Features

- Support for real numbers, including new `~realVariable` and `?realArray[]` types.
- Additional mathematical commands for real numbers.
- New constants: `~NI_MATH_PI` and `~NI_MATH_E`
- New UI commands: `set_ui_color()` and `set_ui_width_px()`
- New control parameter for setting automation IDs via KSP: `$CONTROL_PAR_AUTOMATION_ID`

25.9. KONTAKT 5.5

New Features

- New engine parameter variables and built-in constants for controlling the unit parameter of time-related parameters, e.g., `$ENGINE_PAR_DL_TIME_UNIT`, `$NI_SYNC_UNIT_8TH`
- Possible to change FX from KSP by using engine parameter variables for effect type, e.g. `set_engine_par($ENGINE_PAR_EFFECT_TYPE, $EFFECT_TYPE_FILTER, 0, 0, -1)`
See also 'Changing FX from KSP' in 'Advanced Concepts'.
- Possible to set Time Machine Pro voice settings: `set_voice_limit()`, `get_voice_limit()`, `$NI_VL_TMPRO_STANDARD`, `$NI_VL_TMRPO_HQ`

25.10. KONTAKT 5.4.2

Improved Features

- Various manual corrections.

25.11. KONTAKT 5.4.1

New Features

- New callback type: `on_persistence_changed`
- New command: `set_snapshot_type()`
- New command: `make_instr_persistence()`
- New key color constants and command: `get_key_color()`
- Ability to set the pressed state of KONTAKT's keyboard: `set_key_pressed()`, `set_key_pressed_support()`, `get_key_triggerstate()`
- Ability to specify key names and ranges: `set_key_name()`, `get_key_name()`, `set_keyrange()`, `remove_keyrange()`
- Ability to specify key types: `set_key_type()`, `get_key_type()`

Improved Features

- Data folder in resource container, additional mode for `load_array()`
- Usage of `load_array_str()` in other callbacks.

25.12. KONTAKT 5.3

New Features

- Added Engine Parameter Variables for the new Simple Filter effect.

25.13. KONTAKT 5.2

Improved Features

- Updated file handling.

New Features

- Commands to insert and remove MIDI events.

25.14. KONTAKT 5.1.1

New Features

- Added Engine Parameter Variables for the new Feedback Compressor effect.

25.15. KONTAKT 5.1

New Features

- New commands: `load_array_str()`, `save_array_str()`
- Added Engine Parameter Variables for the new Jump Amp effect.

Manual Corrections

- Miscellaneous corrections and improvements.

25.16. KONTAKT 5.0.2

New Features

- New Engine Parameter Variables for Time Machine Pro (HQ Mode): \$ENGINE_PAR_ENVELOPE_ORDER, \$ENGINE_PAR_FORMANT_SHIFT

25.17. KONTAKT 5.0.1

New Features

- Added effect type and effect sub-type constants for the new KONTAKT 5 effects.

25.18. KONTAKT 5

New Features

- MIDI file support including many new commands: `load_midi_file()`, `save_midi_file()`, `mf_get_num_tracks()`, `mf_get_first()`, `mf_get_next()`, `mf_get_next_at()`, `mf_get_last()`, `mf_get_prev()`, `mf_get_prev_at()`, `mf_get_channel()`, `mf_get_command()`, `mf_get_byte_one()`, `mf_get_byte_two()`, `mf_get_pos()`, `mf_get_track_idx()`, `mf_set_channel()`, `mf_set_command()`, `mf_set_byte_one()`, `mf_set_byte_two()`, `mf_set_pos()`
- New UI control: `ui_text_edit`
- New UI control: `ui_level_meter`
Including new commands and built-in variables: `attach_level_meter()`, `$CONTROL_PAR_BG_COLOR`, `$CONTROL_PAR_OFF_COLOR`, `$CONTROL_PAR_ON_COLOR`, `$CONTROL_PAR_OVERLOAD_COLOR`, `$CONTROL_PAR_PEAK_COLOR`, `$CONTROL_PAR_VERTICAL`
- New UI control: `ui_file_selector`
Including new commands and built-in variables: `fs_get_filename()`, `fs_navigate()`, `$CONTROL_PAR_BASEPATH`, `$CONTROL_PAR_COLUMN_WIDTH`, `$CONTROL_PAR_FILEPATH`, `$CONTROL_PAR_FILE_TYPE`
- New commands for dynamic dropdown menus: `get_menu_item_value()`, `get_menu_item_str()`, `get_menu_item_visibility()`, `set_menu_item_value()`, `set_menu_item_str()`, `set_menu_item_visibility()`, `$CONTROL_PAR_SELECTED_ITEM_IDX`, `$CONTROL_PAR_NUM_ITEMS`
- New callback type: `on_async_complete`
Including new built-in variables: `$NI_ASYNC_ID`, `$NI_ASYNC_EXIT_STATUS`, `$NI_CB_TYPE_ASYNC_OUT`
- New internal constant for KONTAKT's new bus system: `$NI_BUS_OFFSET`
- New `engine_par` constants for new KONTAKT 5 effects.
- New commands: `wait_ticks()`, `stop_wait()`

Improved Features

- Support for string arrays added for `load_array()` and `save_array()`
- PGS support for strings: `pgs_create_str_key()`, `pgs_str_key_exists()`, `pgs_set_str_key_val()`, `pgs_get_str_key_val()`
- The maximum height of `set_ui_height_px()` is now 540 pixels.

25.19. KONTAKT 4.2

New Features

- The Resource Container, a helpful tool for creating instrument libraries.
- New ID to set wallpapers via script: `$INST_WALLPAPER_ID`
- New key color: `$KEY_COLOR_BLACK`
- New callback type: `on listener`
- New commands for this callback: `set_listener()`, `change_listener_par()`
- New commands for storing arrays: `save_array()`, `load_array()`
- New command to check the purge status of a group: `get_purge_state()`
- New built-in variable: `$NI_SONG_POSITION`
- New control parameter: `$CONTROL_PAR_ALLOW_AUTOMATION`

Improved Features

- The script editor is now much more efficient, especially with large scripts.
- New UI control limit: 256 (per control and script).
- Event parameters can now be used without affecting the system scripts.

25.20. KONTAKT 4.1.2

New Features

- New UI control: UI waveform
- New commands for this UI control: `set_ui_wf_property()`, `get_ui_wf_property()`, `attach_zone()`
- New variables & constants to be used with these commands: `$UI_WAVEFORM_USE_SLICES`, `$UI_WAVEFORM_USE_TABLE`, `$UI_WAVEFORM_TABLE_IS_BIPOLAR`, `$UI_WAVEFORM_USE_MIDI_DRAG`, `$UI_WF_PROP_PLAY_CURSOR`, `$UI_WF_PROP_FLAGS`, `$UI_WF_PROP_TABLE_VAL`, `$UI_WF_PROP_TABLE_IDX_HIGHLIGHT`, `$UI_WF_PROP_MIDI_DRAG_START_NOTE`
- New event parameter: `$EVENT_PAR_PLAY_POS`

25.21. KONTAKT 4.1.1

Improved Features

- The built-in variables `$SIGNATURE_NUM` and `$SIGNATURE_DENOM` don't reset to 4/4 if the host's transport is stopped

25.22. KONTAKT 4.1

New Features

- Implementation of user defined functions: `function`
- New control parameter variable: `$CONTROL_PAR_AUTOMATION_NAME`
- New command: `delete_event_mark()`
- Support for polyphonic aftertouch: `on poly_at...end on, %POLY_AT[], $POLY_AT_NUM`
- New command: `get_event_ids()`
- New control parameter variables: `$CONTROL_PAR_KEY_SHIFT`, `$CONTROL_PAR_KEY_ALT`, `$CONTROL_PAR_KEY_CONTROL`

Improved Features

- The built-in variable `$MIDI_CHANNEL` is now also supported in the instrument script.
- The sample offset parameter in `play_note()` now also works in DFD mode, according to the S.Mod value set for the respective zone in the wave editor

Manual Corrections

- Correct Modulation Engine Parameter Variables

25.23. KONTAKT 4.0.2

New Features

- New engine parameter to set the group output channel: `$ENGINE_PAR_OUTPUT_CHANNEL`
- New built-in variable: `$NUM_OUTPUT_CHANNELS`
- New function: `output_channel_name()`
- New built-in variable: `$CURRENT_SCRIPT_SLOT`
- New built-in variable: `$EVENT_PAR_SOURCE`

Improved Features

- The `load_ir_sample()` command now also accepts single file names for loading IR samples into KONTAKT's convolution effect, i.e. without a path designation. In this case the sample is expected to reside in the folder called "ir_samples" inside the user folder.

25.24. KONTAKT 4

New Features

- Multiscript
- New ID-based User Interface Controls system: `set_control_par()`, `get_control_par()` and `get_ui_id()`
- Pixel exact positioning and resizing of UI controls.
- Skinning of UI controls.
- New UI controls: switch and slider.
- Assign colors to KONTAKT's keyboard by using `set_key_color()`
- New timing variable: `$KSP_TIMER` (in microseconds).
- New path variable: `$GET_FOLDER_FACTORY_DIR`
- New hide constants: `$HIDE_PART_NOHING` and `$HIDE_WHOLE_CONTROL`
- Link scripts to text files.

Improved Features

- New array size limit: 32768
- Retrieve and set event parameters for tuning, volume and pan of an event: `$EVENT_PAR_TUNE`, `$EVENT_PAR_VOL` and `$EVENT_PAR_PAN`
- Larger performance view size: `set_ui_height()`, `set_script_title()`
- Beginning underscores from KONTAKT 2/3 commands like `_set_engine_par()` can be omitted, i.e. you can write `set_engine_par()` instead.

25.25. KONTAKT 3.5

New Features

- Retrieve the status of a particular event: `event_status()`
- Hide specific parts of UI controls: `hide_part()`

Improved Features

- Support for channel aftertouch: `$VCC_MONO_AT`
- New array size limit: 2048

25.26. KONTAKT 3

New Features

- Offset for wallpaper graphic: `_set_skin_offset()`
- Program Global Storage (PGS) for inter-script communication:
 - `_pgs_create_key()`
 - `_pgs_key_exists()`
 - `_pgs_set_key_val()`
 - `_pgs_get_key_val()`
- New callback type: `on_pgs_changed`
- Addressing modulators by name: `find_mod()` and `find_target()`
- Change the number of displayed steps in a column: `set_table_steps_shown()`
- Info tags for UI controls: `set_control_help()`

Improved Features

- All five performance views can now be displayed together.

25.27. KONTAKT 2.2

New Features

- New callback type: `on ui_update`
- New built-in variables for group-based scripting: `$REF_GROUP_IDX` and `%GROUPS_SELECTED`
- Ability to create custom group start options: `NO_SYS_SCRIPT_GROUP_START` (+ various Group Start Options Variables).
- Retrieving the release trigger state of a group: `$ENGINE_PAR_RELEASE_TRIGGER`
- Default values for knobs: `set_knob_defval()`

25.28. KONTAKT 2.1.1

New Features

- Assign unit marks to knobs: `set_knob_unit()`
- Assign text strings to knobs: `set_knob_label()`
- Retrieve the knob display: `_get_engine_par_disp()`

25.29. KONTAKT 2.1

New Features

- string arrays (! prefix) and string variables (@ prefix)
- Engine parameter: `_set_engine_par()`
- Loading IR samples: `_load_ir_sample()`
- Performance View: `make_perfview`
- RPN/NRPN implementation:
 - on `rpn` & on `nrpn`
 - `$RPN_ADDRESS` `$RPN_VALUE`
 - `msb()` and `lsb()`
 - `set_rpn()` and `set_nrpn()`
- Event parameters: `set_event_par()`
- New built-in variables:
 - `$NUM_GROUPS`
 - `$NUM_ZONES`
 - `$VCC_PITCH_BEND`
 - `$PLAYED_VOICES_TOTAL`
 - `$PLAYED_VOICES_INST`

Improved Features

- Possible to name UI controls with `set_text()`
- Moving and hiding UI controls.
- MIDI CCs generated by `set_controller()` can now also be used for automation, as well as modulation.

25.30. KONTAKT 2

Initial release.