

# PangoScript Commands

New for 2026, a tool has been created with all new fresh documentation of every Pango script Command. The tool linked below allows you to read every command as well as see examples the script commands in use. The tools is searchable with the search bar on the top.

Click the link below to review this tool which will open in a new window.

[Click here to view the PangoScript command list.](#)

Information below this line is being rewritten

==== Intro ====

Currently, the main purpose of "scripting" is ability to add custom relation on various events, like a MIDI, DMX, ArtNet, Channels. The script typically has a few lines, and a line has one Command. Command may have a parameters. Typically parameter is a number (constant).

==== Numbers ====

Supported float point , integer and hexadecimal numbers. As example:

100

-20

1.01

0xBF

All hexadecimal numbers much have 0x prefix, similar to C language, but without ending H

There is not strict separation on integer and float point numbers.

Separator between command parameter could be space (" ") or a comma (",")

==== Special characters (separators) ====

```
'.', '!', ';', ',', ' ', ':', '!', '\0', '\'', '^', '+', '-', '*', '\\', ' ',
'\`', '[', ']', '(', ')', '{', '}', '?', '%', '|', '&', '=':
```

#### ==== Predefined constants ====

There are a few constants mostly for readability of the code. Each constant will be transformed to a number

TRUE - numeric analog 1

FALSE - numeric analog 0

ANY equal to numeric -1. Used in a few WaitFor command

OFF equal to numeric 0

ON equal to numeric 1

TOGGLE equal to numeric 2

AsIs equal to -2.

This is required for commands like "MasterPause". I hope it should be handy to see ON or OFF instead of 0 or 1.

A few examples of using commands:

VirtualLJ off

MasterPause Toggle

WaitForMidi 0x90, 10, Any

#### ==== Math operations (expressions) ====

Standard: + - / \* %

Inversion: !

bit OR: |

bit AND: &

bit XOR: ^

bit right shift: >>

bit left shift: <<

#### ==== Operators ====

IF operator.

Syntax: if ( expression ) operator

expression - covered with brackets. Must be an expression with numerical result that gives "0" or not a "0". So, for numerical variable it's possible to write "if (variable) ...".

Compare operators are: ">" ">=" "<" "<=" "=" "<>". They produces numerical result "0" or "1".

You can combine comparing operations with "&" and "|" bit-wise operators (but be sure that left and right side are "0" or "1"). It's recommended to cover complex operations into brackets - like "if ((1>2) & ((3+2)>1))"

operator will be executed if condition gets non-zero result. If you want to place other operator after "if (condition) operator" - it must be divided with ";" - but it's better to place next operator on the next line ;-)

=== GOTO operator ===

Syntax: goto label

"label" is a name of position for a jump. The label can be placed before any operator and separated by ":" character. As example:

```
mylabel: WaitForBeat 4
... do something...
goto mylabel
```

Operator GOTO can work with the labels inside the string variables. It means that you declare string variable, assign a label name to variable, and then you a variable in GOTO.

Example:

```
var s
s="mylabel"
goto s
```

```
DisplayPopup "It does not work"
exit
```

```
mylabel:
DisplayPopup "It works"
```

=== VAR operator ===

PangoScript allow define local variables. The lifetime for the local variable defined by lifetime of the Scripeter that execute PangoScript. As soon as the Scripeter freed, all its local variables are removed as well.

All variables must be declared before the using. No need to specify the type of variable. The variable automatically adjust the type depending on value.

Internally supported integer, float and string variables.

The declaration start from VAR operation and the follow one or more variable names. As example:

```
var MyVariable  
var a,b,c
```

Before using the variable must be initialized by some value. Otherwise BEYOND will generate error and stop script execution. Example:

```
var MyInteger, MyString  
MyInteger = 10  
MyString = "Hello!"
```

All variables declared as VAR are local.

GLOBALVAR operator

The variable can be declared as global. In this case, it visible in ALL scripts of BEYOND.

==== General functions ====

intstr(value:number):string - transform number to string  
value - number or float number  
result - string

floatstr(value:number):string - transform number to string  
value - number  
result - string

abs(value:number):number - value by modulus  
value - integer or float number  
result - same type as argument. result is absolute value

int(value:number):integer - return integer part of float value  
value - a float point number

frac(value:number):float - return fractional part of float point value  
value - float

round(value:float):integer - return rounded float point value (to integer)  
value - a float point number

`sqr(value:number):number` - return a square of argument  
value - a float point number or integer

`sqrt(value:number):float` - return a square root of argument  
value - a float point number or integer

`cos(value:float):float` - co-sinus  
value - a float point number or integer. angle in radians

`sin(value: float):float` - sinus  
value - a float point number or integer. angle in radians

`tan(value:float):float` - tangents  
value - a float point number or integer. angle in radians

`arcsin(value:float)float` - arc sinus  
value - a float point number or integer. angle in radians

`arccos(value: float):float` - arc cosinus  
value - a float point number or integer. angle in radians

`arctan(value: float):float` - arc tangents  
value - a float point number or integer. angle in radians

`arctan2(dx, dy:float):float` - arc tangents  
dx, dy - ....

`min(a,b:number):number` - return a minimum of two numeric values  
a,b float or integer

`max(a,b:number):number` - return a maximum of two numeric values  
a,b float or integer

`pi:float` - return PI value - 3.1415926...

`invert(value:number):integer` - invert value. Boolean operation, but can be used with float point numbers. If value more than 0.5 then function return 0, otherwise return 1.

==== Date and Time ====

`now:float` - date&time, calls `now()` function of Delphi

`tickcount: integer` - return number of millisecond from start of PC.

`hms(hour, minute, second):integer` - transform hour, minute and second into seconds.

GetYear:integer - function return current year by PC clock. Result

GetMonth:integer - function return current month by PC clock

GetDay:integer - function return current day by PC clock.

timestr(now:float) :string

now - is variable representing time. Function return string with time in short format such as "11:53", without seconds

timestrlong(now:float):string -

now - is variable representing time. Function return string with hours, minutes, seconds, such as "11:53:10"

datestr(now:float):string - **00000000 000000 0000, 0 000 000** -

now - is variable representing date. Function return string short date format such as "21.11.2012"

datestrlong(now:float):string - **00000000 000000 0000, 0000** -

now - is variable representing date. Function return string long date format such as "21 000000 2012 0."

dayofweek(now:float):string - short version day of the week

dayofweeklong(now:float):string - long version day of the week

==== String functions ====

uppercase(string):string - transform input string to upper case. Result is a string.

lowercase(string:string):string - transform input string to lower case. Result is a string.

crlf:string - return a string, line separator (13,10)

==== Clock And Metronome ====

b2s(beats) - transform beats to seconds

b2ms(beats) - transform beats to milliseconds

s2b(seconds) - transform seconds to beats

**b2s(seconds) - transform beats to seconds**

==== Functions ====

There are a few functions for access of incoming data

**Dmx ( Channel, OutputMin, OutputMax )**

Parameters:

Channel - index of DMX channel, acceptable value from 1 to 2048

OutputMin, OutputMax - defines the range resulting value of the function.

Output value will start from OutputMin and increase up to OutputMax

result = OutputMin + (DmxChannelValue / 255) \* (OutputMax-OutputMin)

Example:

Position Dmx(10, -100, 100), Dmx(11, -100, 100), Dmx(12, -100, 100)

in this example we use Position command that has 3 arguments - X,Y,Z and we use DMX IN values (three channels, 10,11,12), and map the values range -100 to +100.

**Dmx ( Channel )**

or

**Dmx( Channel, OutputMin, OutputMax)**

Parameters:

Channel - index of DMX channel, acceptable value from 1 to 2048

Result of the function is value of DMX channel as it is, without any range adjustments

OutputMin, OutputMax - defines the range resulting value of the function.

Output value will start from OutputMin and increase up to OutputMax.

Internally channels are normalized to 0...1 range

result = OutputMin + (ChannelValue) \* (OutputMax-OutputMin)

Example:

DisplayPopup Dmx(10) // display the value of 10th DMX channel.

Note: version with min/max used for simplification of use of function in operators where you may need to transform DMX value range (0..255) to some other range. As example Size operator, you may want to use size range like 0...100, or 10...100, or -100..100.

**Channel ( Channel, OutputMin, OutputMax )**

or

**Channel( Channel )**

Parameters:

Channel - index of Channel, acceptable value from 1 to 255

OutputMin, OutputMax - defines the range resulting value of the function.  
Output value will start from OutputMin and increase up to OutputMax.  
Internally channels are normalized to 0...1 range  
$$\text{result} = \text{OutputMin} + (\text{ChannelValue}) * (\text{OutputMax} - \text{OutputMin})$$

If function has one argument then result is normalized channel value (range from 0 to 1)

Example:

Size Channel(10, 5, 100), ChannelIn(10, 5, 100), ChannelIn(10, 5, 100),

in this example we use Size command that has 3 arguments - X, Y,Z and we use Channel 10 value for all 3 axis.

Channel ( Channel )

Parameters:

Channel - index of Channel, acceptable value from 1 to 255

Result of the function is channel value. Channel value is normalized, the range from 0 to 1.

CC (Channel, Controller, OutputMin, OutputMax)

Get a value of of MIDI controller. BEYOND memorize all values of incoming MIDI controllers (Control Change Message) and you can get an access to it.

Channel - value 0..15

Controller - value 0..127. This is Data1 in MIDI messages

OutputMin, OutputMax - defines the range resulting value. 
$$\text{Result} = \text{OutputMin} + (\text{ChannelValue}/127) * (\text{OutputMax} - \text{OutputMin})$$

ExtValue( OutputMin, OutputMax )

There are a few pretty big tables of code-sources. A tables such as DMX, ArtNet, ControlChange, PitchBand, NoteOn initiated by channel/message that has a value. This function allow get access to the channel that initiate the code. Better explain on example. Lets say I want to connect DMX channel to Master Live Control, Position X. In this case, code that will do this is this:

PositionIndex 1, ExtValue(-100,100)

In this example PositionIndex is a live control command, see below. 1 is index of axis. And finally ExtValue() is a function that take DMX channel value in map to range -100 to 100.

ExtDelta( Delta )

Function equal to ExtValue but made specially for MIDI encoders. There are many controlled with wheels and knobs that generate Control Change message and the data2 value is 00 or 7F. That is all, no values in between. For such cases has a sense to use "delta" version of commands and ExtDelta() for getting exact value of delta. Function return -Delta or +Delta. Only two values, no



exceptions. Example of use

```
PositionDelta 0, ExtDelta(1), 0 // move vertically.
```

another example:

```
AngleDelta 0,0, ExtDelta(45) // rotate by Z on 45 degrees.
```

Random( MaxValue )

Function return random value in range 0..MaxValue. Note, MaxValue included into the range

RandomIn( MinValue, MaxValue )

Function return random value in range MinValue..MaxValue

Param( ParamIndex ) - newer name of OscParam() function. It get the value of parameter supplied into the script. See comment about OscParam()

OscParam( ParamIndex )

Specialy designed for use in "OSC to CODE" table.. When BEYOND receive OSC message and supply it into interpreter to execution, then we can supply up to 10 parameters with OSC message. BEYOND put them into local array, and you may use it inside the Code. Note, data is there only during execution of current script. As soon we exit from execution of this script, data will be lost. OK, parameter index is from 1 up to 10. BEYOND check how many parameters the OSC message has, and if you will try to access non existing parameter then script will stop with error. So, if OSC message has 3 parameters, then you can use index from 1 to 3. Accepts f, i, and s type of OSC parameters. You can freely mix float and integer.

ParamRange( MinValue, MaxValue) function return TRUE (1) if the first parameter inside the specified range.

ParamRange(ParamIndex, MinValue, MaxValue) function return TRUE (1) if the specified parameter (param index) inside the specified range (from MinValue to MaxValue)

GetTransitionName( index )

function return string, the name of transition. Index is number of transition. Range 0..23

BeatTime

Function has no arguments. The result of function is float point number. Integer part of function is number of beat from the start of BEYOND. The fractional part is progress inside the beat.

GetMidiDeviceIndex

function return currently selected MIDI Device pair, Value range 1..4.

`ObjectExists( AObjectName )` - function get object name as string and return 1 if object exists, or zero if object is not found.

==== Timecode input ====

`GetTimeCode` - return latest timecode value as a float point value, value in seconds

`GetTimeCodeTick` - return the tick when the last timecode value arrived. Use function `GetTick` for getting the current tick value.

==== Cue related functions ====

`CuePlaying( PageIndex, CueIndex)` - function return 1 if cue is currently playing in the Grid, otherwise return 0. Indexing of page and cue starts from 1.

Example: `CuePlaying(1,1)` //return state of first cue on a first page. Note, function is not applicable for ProTracks and DMX server.

`CueEmpty(PageIndex, CueIndex)` - function return 1 if cue is empty, otherwise return 0. Indexing of page and cue starts from 1.

`GetCueCaptionColor(PageIndex, CueIndex)` - return cue caption color in GDI format. Format is 24bit RGB, red is LSB. Overall formula  $\text{Blue} * 256 * 256 + \text{Green} * 256 + \text{Red}$ . Indexing of page and cue starts from 1.

==== Misc ====

`GetBeyondBuild` - return integer value, build of BEYOND application.

`GetMidiDeviveIndex` - return current MIDI device index associated with this script. BEYOND can use 4 MIDI devices. By default script associated with 1st device. There is a command for change device index. This function allows to check current association. Indexing from 1.

`GetMidiDeviceLayer` - return current layer of MIDI device mapping. Indexing from 1. Layering introduced because BEYOND has big number of functions, and at the same time, MIDI device has limited number of sliders and buttons. MIDI settings allow to organize several layers, and as a result, MIDI controller will do several functions (depending on current layer). `GetMidiDeviceLayer` return currently active layer of MIDI device associated with this script.

#### ==== User Interface ====

`GetLcTabMode:integer` - function return mode (destination of control) of Live Control tab. Basically, it tell what button selected - Master, Cue, Zone or ProTrack

Values are:

- 1 - Master
- 2 - Cue
- 3 - Zone
- 4 - ProTrack

`GetTcTabMode:integer` - function return mode of Time Control tab.Constant is same as in `GetLcTabMode`

`GetFxTabMode:integer` - function return mode of FX tab.Constant is same as in `GetLcTabMode`

`GetGrid1Mode:integer` - function return currently selected click mode of main Grid. Result is one of following values

- 0 - Select mode
- 1 - Flash mode
- 2 - FlashSolo mode
- 3 - Toggle mode
- 4 - Restart mode
- 5 - ProTrack mode

`GetGrid2Mode:integer` - function return currently selected click mode of secondary Grid. Constants same as for function `GetGrid1Mode`

#### ==== Timeline mode functions ====

`GetTimelinePos:float` - function return time position of current timeline. Value in seconds. Fractional part contain millisecond part.

`GetTimelineDuration:float` - function return duration of current timeline. Value in seconds. Fractional part contain millisecond part.

`GetTimelineOnline:integer` function return 1 when "Enable laser output" is enabled in Timeline mode, otherwise return value is 0.

`GetTimelinePlaying:integer` function return 1 when timeline is currently playing, otherwise return value is 0.

`GetTimelineTabIndex:integer`. Timeline editor can work with multiple timelines. Function return index of currently selected timeline.

GetTimelineTabName:string - function return tab name of currently selected timeline.

==== General commands ====

StartCue Page, Cell or StartCue "cue name"

Parameters: Page - page index, 1..100,. Cell - cell index, 1..100;

Parameters: "cue name" is a string that define cue name as we see it in the grid. At first BEYOND search for cue name in the current page. If not found than the search starting from the first page of the grid.

Purpose: Start the cue. If cue already started the no action

StopCue Page, Cell or StopCue "cue name"

Parameters: Page - page index, 1..100,. Cell - cell index, 1..100;

Parameters: "cue name" is a string that define cue name as we see it in the grid. At first BEYOND search for cue name in the current page. If not found than the search starting from the first page of the grid.

Purpose: Stop the cue. If cue is not started then no action.

ToggleCue Page, Cell or Toggle "cue name"

Parameters: Page - page index, 1..100,. Cell - cell index, 1..100;

Parameters: "cue name" is a string that define cue name as we see it in the grid. At first BEYOND search for cue name in the current page. If not found than the search starting from the first page of the grid.

Purpose: Start cue if it is not currently playing, or stop a cue if it is currently playing.

StopCueType mask, time

mask:

1-Image

2-Timeline

4-DMX

8-Fixture Sequence

16-Beams

32-Capture

time 0 optional value, this is for soft stop. Zero means "right now".

PauseCue Page, Cell, State

Parameters: Page - page index, 1..100,. Cell - cell index, 1..60; State - recommended to use predefined constants OFF, ON or TOGGLE. Values - 0,1,2

Purpose: allow to pause or unpause the cue

RestartCue

Parameters: Page - page index, 1..100,. Cell - cell index, 1..60;

Purpose: restart the cue if it already playing. Otherwise, no action.

CueDown Page, Cell

Parameters: Page - page index, 1..100,. Cell - cell index, 1..60;

Purpose: does a "mouse down" on the cue

CueUp Page, Cell

Parameters: Page - page index, 1..100,. Cell - cell index, 1..60;

Purpose: does a "mouse up" on the cue

StopCueNow Page, Cell

Parameters: - page index, 1..100,. Cell - cell index, 1..60;

Purpose: Stop cue immediatelly without soft ending what is default option

StopCueSync Page, Cell

Parameters: page index, 1..100,. Cell - cell index, 1..60;

Purpose: Stop cue softly and wait for completion

HoldClick state

Parameters: state - 0,1,2 or the constants ON, OFF, TOGGLE

Purpose: This is additional modifier for coming "click" command. It allow to start the Cue in "HOLD" mode. HoldClick command designed for with MIDI. You can use a special button on MIDI Controller and inside the button down you will enable hold mode, and on button release you will disable hold mode.

StopAllNow

Parameters: none

Purpose: Stop all running cues. Equal to click on menu "Run" -> "Stop All Cues". This version stop all cues immediatelly

Example: StopAllNow

StopAllSync Time

Parameters: time in seconds.

Purpose: Stop all running cues with specified soft-stop time. Also, wait for completion

Example: StopAllSync 0.2

StopAllAsync Time

Parameters: time in seconds.

Purpose: Stop all running cues with specified soft-stop time. Do not wait for command completion

Example: StopAllAsync 0.5

### BlackOut

Parameters: none

Purpose: The same action as click on "Blackout" button on a mail toolbar of BEYOND

Example: Blackout

### EnableLaserOutput

Parameters: none

Purpose: Access to "Enable Laser Output" button on mail toolbar. This command enable output :-)

Example: EnableLaserOutput

### DisableLaserOutput

Parameters: none

Purpose: Access to "Enable Laser Output" button on main toolbar. This command enable output :-). There is no "toggle" version.

Example: DisableLaserOutput

### MasterPause

Parameters: On or Off or Toggle

Purpose: Control of "Pause" button on main toolbar. Of course it does an action same as a button.

Example:

MasterPause On

MasterPause Toggle

### MasterSpeed Speed

Parameter: Speed, normalized value in range from 0 to 1. 0 represent full stop, 1 means normal speed

Purpose: It is global speed multiplier for players from Grid

### VirtualLJ

Parameters: On or Off or Toggle

Purpose: Control of "Virtual LJ" button on main toolbar. Of course it does an action same as a button.

Example: VirtualLJ OFF

==== VLJFX ====

### OneCue

Parameters: none

Purpose: Control of "One Cue" button on main toolbar. This command enable "One cue" mode

Example: OneCue

#### OnePer

Parameters: none

Purpose: Control of "One Per Zone" button on main toolbar. This command enable "One Per Zone" mode. Note, this mode share the button with OneCue mode

Example: OnePer

#### MultiCue

Parameters: none

Purpose: Control of "Multi Cue" button on main toolbar. This command enable "Multi cue" mode

Example: MultiCue

#### Transition

Parameters: On or Off or Toggle

Purpose: Control of "Transition" button on main toolbar. This command enable or disable the transition.

Example: Transition On

#### ClickSelect

Parameters: none

Purpose: Control of "Select" button on main toolbar. This command enable "Select" mode.

Example: ClickSelect

#### ClickToggle

Parameters: none

Purpose: Control of "Toggle" button on main toolbar. This command enable "Toggle" mode.

Example: ClickToggle

#### ClickRestart

Parameters: none

Purpose: Control of "Restart" button on main toolbar. This command enable "Restart" mode.

Example: ClickRestart

#### ClickFlash

Parameters: none

Purpose: Control of "Flash" button on main toolbar. This command enable "Flash" mode.

Example: ClickFlash

#### ClickSoloFlash

Parameters: none

Purpose: Control of "SoloFlash" button on main toolbar. This command enable "SoloFlash" mode.

Example: ClickSoloFlash

ClickLive

Parameters: none

Purpose: This button is currently invisible, but t active mode of LivePRO - like tracks.

Example: ClickLive

ClickTrack - enable ProTrack click mode.

StartPrevious - start previously started cue. Command is for button Back of the main toolbar (Grid mode).

TogglePrevious - stop current cue and start previously stated cue. Command is for button Swap of the main toolbar (Grid mode).

TimerBeat

Parameters: none

Purpose: Simulate Timer beat (BPM timer on the main toolbar)

Example: TimerBeat

AudioBeat

Parameters: none

Purpose: Simulate Audio beat what usualy comes from AudioIn and FFT.

Example: AudioBeat

ManualBeat

Parameters: none

Purpose: Manual beam comes from keyboard. Now it is possibl to initiate it from code.

Example: ManualBeat

SetBPM value- set master Beat timer value in BPM (beat per minute). The talk about BPM (Metronome) panel on the main toolbar in the Grid mode.

SetBpmDelta value - increase or decrease the BPM. This is relative version of SetBPM command. It designed for use with MIDI controllers, where MIDI button can be used for change of tempo.

BeatTap

Parameters: none

Purpose: This is tap-tempo. It work in BPM panel in a main toolbar and allow



enter beat-per-minute by means of tapping. Command work same as click on BMP panel. Or "space" key.

Example: BeatTap

BeatResync

Parameters: none

Purpose: Synchronize Beat timer to the moment of this command execution. Same as "backspace" key

Example: BeatResync

==== FX and Live Control commands ====

## The Destination

A few words about commands of BEYOND. Each command of BEYOND has information about:

Sender - who initiated the command

Server - who is recipient / server of the command. As example - zone, cue, master, and so on

Server index - index of server, of there are many such servers. As example - Projection Zone

Command - the command itself

Arguments - depends on exact commands.

Lets consider example. We want to set the size of second projection zone to 50%. In this case, command will have such values

Sender - BEYOND set it automatically, no worry about

Server - Zone

Server index - 2

Command - Size

Arguments - 50,50,50

For the script, to make a complex command that include all fields is not practical. Because the process has two parts. The first part - you define the destination. By default it is Master. The second part is a Command itself. BEYOND memorize the setting of destination and all consequent commands will use it.

ControlMaster

Parameters: none

Purpose: Select Master LiveControl as a destination for Live Control commands

ControlCue PageIndex, CellIndex

Parameters: PageIndex (1..PageNumber) and Cell Index 1..100. By default the

grid has 60 cells (10x6 mode). But the grid may have another dimension with 100 cells as max.

Purpose: Select Cue LiveControl as a destination for Live Control commands

ControlZone ZoneIndex

Parameters: Zone index, 1..ZoneNumber;

Purpose: Select Zone LiveControl as a destination for Live Control commands

ControlProTrack ProTrackIndex

Parameters: Iindex, 1 to number of ProTracks created in the BEYOND/

Purpose: Select ProTrack LiveControl as a destination for Live Control commands. Possible to select only one ProTrack

ControlSelZones

Parameters: none

Purpose: In opposite to ControlSelZones, this command address all selected zones of BEYOND. BEYOND keep the zones in list and each zone has Selected property. The command normally goes to only one destination - one zone, one cue, one track. But specially for external control, added ability to send the Live Control command to multiple destinations. Technically, BEYOND will send many command, by one for each selected zones.

Also, this command address selected ProTracks.

ControlSelCues

Parameters: none

Purpose: Control currently selected Cues. This command allow to address Live Control to multiple (currently selected) cues. The action of command limited to one page only. If BEYOND in Grid mode, then will be used the page of Main grid. If BEYOND in Timeline/PlayList mode, then will be used page from bottom side grid.

ControlFromUI

Note: commands above are local commands, and modify internal register of interpreter that execute this code. It means, that the setting work only for this code, and till

==== FX Control ====

FX Index1, (Index2,...)

Parameters: At least one argument that define state of FX layer. Number of arguments should be equal, but can be less than number of layers in FX grid. Command designed to setting all FX layers at once, by means of one command.

For setting each Layer separately use SetFX

Purpose: Control of FX register of cues, zones, and master

0 - stop.

1..100: Effect indexing start from zero and in current version up to 100

Example:

```
FX 0,0,0,0 // stop four FX layers
```

```
FX 10 // set 1st later to effect number 10.
```

Example:

```
FX 2,3,4,5 // lineary select 2th, 3rd, 4th, 5th FXs
```

```
FX 0,0,0,0 // stop all
```

FXAction Action1, (Action2,...)

Parameters: At least one argument that define state of FX layer action.

"Action" define a morph between original frame and frame after effects. Number of arguments should be equal, but can be less than number of layers in FX grid. Command designed to setting all FX layers at once, by means of one command. For setting each Layer separately use SetFXAction

0 - OFF, no action at all

100 - norma;. full action.

Example:

```
FXAction 0,0,0,0 // set action for four FX layers
```

Note: Action parameter is not same as "stop" effect. It relatively slow operation because of calculation of morph, extra buffers, and relating calculations.

SetFX LayerIndex, EffectIndex,[EffectIndex,EffectIndex...]

A bit more compact version. First parameter index of layer 1 to 4, and Effect index of 1..100.

Set state of one layer.

If EffectIndex is not defined, then command will stop the layer

If there are multiple Effectindex then command will activate multiple effects in this layer

SetFXAction LayerIndex, Action

Purpose: set Action parameter of one layer

Layer index - index of FX layer, 1..N

Action - 0..100, in percents

SetFXAction1 ActionValue

SetFXAction2 ActionValue

SetFXAction3 ActionValue

SetFXAction4 ActionValue

Purpose: set Action parameter of one layer

Action - 0..100, in percents

SetFXActionDelta ActionDelta1, [ActionDelta2,..]

Shift the action value by delta. For each layer value of delta is personal.

At least one argument required, Starts from 1st layer and up.

FXTimeScale Layer, ClockScale, BeatScale

FXTimeScaleDelta Layer, ClockScale, BeatScale

FXTimeShift Layer, ClockValue, BeatValue

FXTimeShiftDelta Layer, ClockValue, BeatValue

ShiftFX LayerIndex, Direction

Delta version of control. Allow to shift effect index on N

ToggleFX LayerIndex

Toggle between internal LC register and current state. Layer index is optional. If Layer not defined that will be swapped all layers

ShiftFX LayerIndex, IndexDelta

LayerIndex - 1..N

IndexDelta - how to shift current index

DropFX Layer, Effect, DurationMS

Layer - index of effect later in grid

Effect - index of effect in grid

DurationMS - define how long effect will be executed

FXClick Layer, Index - click on effect of FX grid, with absolute effect index, 1..N

FXCellClick Layer, CellIndex - click on effect of FX grid, but effect index based on left corner, so, click on visible area

FXScroll BaseIndex

Base index - control scrollbar of FX grid, define left corner. 0 - default state.

#### ==== Live Control ====

##### Size X, Y, Z

Parameters: X, Y and Z are size in %. 100% means a full size. Max value 400%.

Purpose: Access to Size of LiveControl object.

Example: Size 100,100,100

##### SizeDelta X, Y, Z

Parameters: X, Y and Z are deltas that will be added to Size values. Value in %.

Purpose: Access to Size of LiveControl object. Good to incrementive control

Example: SizeDelta 0,1,0

##### Zoom 100

Parameter - zoom value, 0..100

ZoomDelta 0

Parameter - zoom delta,

##### Position X,Y,Z

Parameters: X, Y and Z are value of Position. Value in %. 0,0,0 is a center :-), 100% is boundary. Max value 400%.

Purpose: Access to Position of LiveControl object.

Example: Position 100,0,0 // move to teh right corner

##### PositionDelta X,Y,Z

Parameters: X, Y and Z are deltas for Position. Value in %

Purpose: Access to Positiion of LiveControl object.

Example: PositionDelta -5,0,0 // move to the left on 5%

##### PositionIndex AxisIndex, Value

Parameters: Axis Index means: 0 is X, 1 is Y, 2 is Z. Value is value of position, in %, as usual :-)

Purpose: Access to Position of LiveControl object.

Example: PositionDelta 2, 1 // move by Z axis on 1%

##### AngleX angle

Parameters: Angle in degrees

Purpose: Access to Rotation of LiveControl object.

Example: AngleX 45

##### AngleY angle

Parameters: Angle in degrees

Purpose: Access to Rotation of LiveControl object.

Example: AngleY 0

##### AngleZ angle

Parameters: Angle in degrees

Purpose: Access to Rotation of LiveControl object.

Example: AngleZ 180

Angle X, Y, Z

Parameters: X,Y and Z are angle in degrees. Directly define a value of rotation angles

Purpose: Access to Rotation of LiveControl object.

Example: Angle 0, 0, 90

AngleDelta X, Y, Z

Parameters: X,Y and Z are deltas of angle in degrees.

Purpose: Access to Rotation of LiveControl object.

Example: AngleDelta 0, 0, 5 // increment Z rotation angle

RotoSpeedX Value

Parameters: Value - speed. Degrees per second.

Purpose: Access to Rotation of LiveControl object.

Example: RotoSpeedX 0

RotoSpeedY Value

Parameters: Value - speed. Degrees per second.

Purpose: Access to Rotation of LiveControl object.

Example: RotoSpeedY 0

RotoSpeedZ Value

Parameters: Value - speed. Degrees per second.

Purpose: Access to Rotation of LiveControl object.

Example: RotoSpeedX 0

RotoSpeed X, Y, Z

Parameters: X,Y and Z are rotation speed for corresponding axis

Purpose: Access to Rotation of LiveControl object.

Example: RotoSpeed 0, 0, 0 // turn off rotation

RotoSpeedDelta X, Y, Z

Parameters: X,Y and Z are deltas of rotation speed.

Purpose: Access to Rotation of LiveControl object.

Example: RotoSpeedDelta 0,0, -1 // decrement of rotation speed

Brightness Value

Parameters: Brightness, 0..100%

Purpose: Access to Brightness of LiveControl object.

Example: Brightness 50 // half dimmed image

BrightnessDelta Value

Parameters: delta-version of brightnes control

Purpose: Access to Brightness of LiveControl object.

Example: BrightnessDelta +1 // positive increment

VisiblePoints Value

Parameters: percentage of visible points, 0%..100%.

Purpose: Access to VisiblePoints of LiveControl object.

Example: VisiblePoints 100

VisiblePointsDelta Value

Parameters: delta-version of brightnes control

Purpose: Access to VisiblePoints of LiveControl object.

Example: VisiblePointsDelta 0

ColorSlider Value

Parameters: Value range is 0..255.

Purpose: Access to Color Slider of LiveControl object.

Example: ColorSlider 0

ColorSliderDelta Value

Parameters: Value is delta to be added to ColorSlider

Purpose: Access to Color Slider of LiveControl object.

Example: ColorSliderDelta 5

AnimationSpeed Value

Parameters: Value range is 25..200

Purpose: Access to AnimationSpeed Slider of LiveControl object.

Example: AnimationSpeed 100 // default value

AnimationSpeedDelta Value

Parameters: Value is delta to be added to AnimationSpeed

Purpose: Access to AnimationSpeed Slider of LiveControl object.

Example: AnimationSpeedDelta -10

ScanRate Value

Parameters: Value range is 25..200

Purpose: Access to ScanRate Slider of LiveControl object.

Example: ScanRate 100 // default state

ScanRateDelta Value

Parameters: Value is delta to be added to ScanRate

Purpose: Access to ScanRate Slider of LiveControl object.

Example: ScanRateDelta 10

RGBA Red, Green, Blue, Alpha

RGBA Red, Green, Blue

RGBA Index, Value

If 4 parameters: Red, Green, Blue are color channels, values 0..255. Alpha is

transparency control, range 0..255

If 3 parameters: Red, Green, Blue are color channels, values 0..255. Same as four parameters, but alpha channel stay unchanged

If 2 parameters then Index define what parameter to change, and Value define the value of corresponding channel.

Index values are

- 0 - Red
- 1 - Green
- 2 - Blue
- 3 - Alpha

Purpose: Direct color control of of LiveControl object. RGBA is additional and independent layer to ColorSlider parameter

Example: RGBA 255, 255, 0, 128 // makes image yellow-shaded (on 50%)

RGBADelta Red, Green, Blue, Alpha

RGBADelta Red, Green, Blue

RGBADelta Index, Value

If 4 parameters: Delta (relative change) by Red, Green, Blue and Alpha channels

If 3 parameters: Delta (relative change) by Red, Green, Blue and Alpha channels

If 2 parameters then Index define what parameter to change, and Value define the delta of value of corresponding channel.

Index values are

- 0 - Red
- 1 - Green
- 2 - Blue
- 3 - Alpha

Example: RGBADelta 0, 0, 0, -16 decrease alpha channel value

ResetAllRoto

Parameters: none

Purpose: reset all rotation to zero, and clear accumulator

Example: ResetAllRoto

ResetLiveControl

Parameters: none

Purpose: reset all sparameters of LiveControl object to default

Example: ResetLiveControl

==== Live Control - UI surface ====



Live Control tab contain a sliders like a Size, Color, etc. Each such slider has two button that scroll the slider to minimum or to maximum value. What the button does - define a speed of motion. As soon as slider hit the boundary, motion will stop. Speed means a shift of slider during one iteration. Speed can be positive, or negative. Value zero means stop the motion now. In total, we have 11 functions, each

ClickScrollZoom speed.  
ClickScrollSize speed.  
ClickScrollFade speed  
ClickScrollVPoints speed  
ClickScrollScanRate speed  
ClickScrollColor speed  
ClickScrollAniSpeed speed  
ClickScrollR speed  
ClickScrollG speed  
ClickScrollB speed  
ClickScrollA speed

Each function control corresponding slider in Live Control tab. Note, that this is control of UI slider. This is not a control of some exact LiveControl object.

ClickLCTabMode Index

Parameters: Index represent mode of Live Control tab. (In UI mode controlled by Master,Cue,Zone, and Protrack buttons on toolbar. Values of Index are:

- 1 - Master
- 2 - Cue
- 3 - Zone
- 4 - ProTrack

Purpose: Control of Live Control tab mode

Example: ClickLCTabMode 2 // control currently selected cue in the grid

ClickTCTabMode Index

Parameters: Index represent mode. See constants of ClickLcTabMode above.

Purpose: Control of Time Control tab mode

Example: ClickTCTabMode 1 // control master

ClickFXTabMode Index

Parameters: Index represent mode. See constants of ClickLcTabMode above.

Purpose: Control of FX tab mode

Example: ClickFXTabMode 1 // control master

ClickFXStopAll

Parameters: no arguments

Purpose: Same as click on Stop All button on FX tab (stop all effects in

currently selected Live Control)

Example: ClickFXStopAll

ClickFxVlj Index, State

Parameters: Index of FX line. Indexing from 1. Up to 8 lines. State is optional parameter and represent state of VLJ for this FX line (on or off).

State values are

0 - Off, 1 - On, 2 - Toggle.

Purpose: Enable or disable VLJ for FX line.

Example: ClickFxVlj 2, 0 // disable VLJ for second FX line

==== WaitFor command group ====

Sleep Time

Parameters: Time measured in milliseconds

Purpose: Allow to pause execution to defined time

Example 1: Sleep 100 // this will cause pause in execution on 1/10 of a second.

Example 2:

```
MidiOut 0x90, 0x40, 0x7F
```

```
Sleep(500);
```

```
MidiOut 0x90, 0x40, 0x00
```

```
Sleep(500);
```

```
Restart
```

WaitForMidi Command, Data1, Data2

Parameters: Command, Data1, Data2. MIDI messages contain 3 bytes. 1st known as Command, and has range 0x80h, up to 0xFF. Data1 and Data2 are parameters of command, max value is 0x7F (127 decimal). It is possible to use special value "minus one", (-1), it will mean "any value". As example: WaitForMidi 0x90,-1,-1 this command will wait for any NoteOn message, any note (Data1 is -1), any volume (Data2 is -1).

Purpose: Allow to make reaction on incoming MIDI event.

Example:

```
WaitForMidi 0x90, 0x01, -1
```

```
NextPage
```

```
Restart
```

Note: See SelectMidi command that allow select a MIDI device from what expect the message. SelectMidi control input and output operations

**WaitForArtNet ChannelIndex**

Parameters: ChannelIndex

Purpose: Wait for change of value in incoming ArtNet packet. ChannelIndex values from 1 to 512. Special value "-1" means any channel index

Example: WaitForArtNet 2

**WaitForDmx ChannelIndex**

Parameters: ChannelIndex

Purpose: Wait for change of value in incoming DMX packet. ChannelIndex values from 1 to 512. Special value "-1" means any channel index

Example: WaitForArtDMX 512

**WaitForChannel ChannelIndex**

Parameters: ChannelIndex

Purpose: Wait for change of internal Channels. BEYOND has 256 channels that typically used in effects, shapes, abstracts. ChannelIndex values from 1 to 255. Special value "-1" means any channel index

Example: WaitForChannel 512

**WaitForCueStart PageIndex, CellIndex.**

Parameters: PageIndex, CellIndex.

Purpose: Wait for start of exact Cue. Cue address composes of Page and Cell. BEYOND has up to 64 pages, and 60 cell (cues) per page. So, address is two numbers - page and cell. Special value "-1" means "any"

Example: WaitForCueStart -1, 10

**WaitForCueStop PageIndex, CellIndex.**

Parameters: PageIndex, CellIndex.

Purpose: Wait for stop of exact Cue. Cue address composes of Page and Cell. BEYOND has up to 100 pages, and 60 cell (cues) per page. So, address is two numbers - page and cell. Special value "-1" means "any"

Example: WaitForCueStop -1, 10

**WaitForCellDown CellIndex.**

Parameters: CellIndex.

Purpose: Main storage of cues is a Grid. When we click on the grid cell then we start a cue, at least this is initial, and default action. But, click itself is just a click. There is special "input manager" that transform mouse down, mouse up events into commands to start to stop the cues. Manager takes into account current mode, current page, state of the cue (playing or no) and after this generate a command to start (or stop) the cue. OK, this version allow to wait and react on clicks

Example: WaitForCellDown 1

**WaitForCellUp CellIndex.**

Parameters: CellIndex.

Purpose: OK, this version allow to wait and react on "release" the cell.

Example:

```
WaitForCellUp 1
MidiOut 0x90, 0x40, 127
Sleep 100
MidiOut 0x80, 0x40, 0
Restart
```

```
WaitForTime Hour,Minute, Seconds, Milliseconds
Parameters: Hour - 0..23, Minute - 0..59, Seconds - 0..59 , Milliseconds -
0..999;
Purpose: Wait for "real" time defined by PC clock
Example:
WaitForTime 21,00,0,0 // wait for 9 PM, and then allow code for go forward
```

```
WaitForTimePos Hour,Minute, Seconds, Milliseconds
Parameters: Hour - 0..23, Minute - 0..59, Seconds - 0..59 , Milliseconds -
0..999;
Purpose: wait for time from begining of the script excition. Time is
relative to the script start. "Restart" command clear local script time
Example:
WaitForTime 0,1,45,0 // wait for 1 minute, 45 seconds from teh script start.
```

```
WaitForHotkey no arguments
Parameters: none
Purpose: Each script in Code list has a hotkey that can activate it. Waiting
for hotkey what allow create multiple reaction, or reaction loop by means of
restart command
Example:
WaitForHotkey
DmxOut 1, 255 // set first channel to 255
Sleep 500 // wait a half of second
DmxOut 1, 0 // zero first channel
```

```
WaitForAudioBeat no arguments
Parameters: none
Purpose: what for audio beat, same as does VLJ
```

```
WaitForManualBeat no arguments
Parameters: none
Purpose: what for manual beat
```

```
WaitForTimerBeat no arguments
Parameters: none
Purpose: what for main beat controlable from main toolbar.
```

```
==== Custom Events ====
```

WaitForEvent Name[, Name, Name]

Parameters - at least one string that define name of event. May be used more than one event names.

PulseEvent Name[, Name, Name]

Parameter - at least one name of the event. It will reactive the scripts that suspended by WaitForEvent

==== Workspace Pages, Tabs, Category ====

SelectGrid Index

Index allow to choose what grid will be used for executing commands below. Zero (0) means "recently selected" grid. 1 means main grid that in center of main form. 2 means secondary grid that is on bottom tabs.

SelectTabName "Name"

Select the tab of the grid by specified name. Name is a string. Function work within current category.

SelectTab Index

Select the tab by linear index. Counting starts from 1. Function work within current category.

SelectNextTab

Select the next tab relatively to current. No arguments. Function work within current category.

SelectPrevTab

Select the previous tab relatively to current. No arguments. Function work within current category.

SelectPageName "Name"

Select the page/tab of the grid by specified name. Name is a string. Function work independently on current category.

SelectPage Index

Select the page/tab by linear index. Counting starts from 1. Function work independently on current category.

SelectNextPage

Select the next page/tab relatively to current. No arguments. Function work independently on current category.

SelectPrevPage

Select the previous page/tab relatively to current. No arguments. Function

work independently on current category.

SelectAllCat

No arguments. Select all categories of pages, same as click on "All"

SelectCatName CategoryName

CategoryName - string. Select a category by name. Names of categories are completely user defined, and may vary from workspace to workspace.

SelectCat Index

Select category by index. Counting from 1. -1 mean all, this is analog of SelectAllCat.

SelectNextCat

Select next category relatively to current. No arguments.

SelectPrevCat

Select previous category relatively to current. No arguments.

==== Zones ====

UnselectAllZones

Unselect all projection zones. Analog of "use cue defined routing". No arguments

StoreZoneSelection

Store information about currently selected zones in local buffer of interpreter. Lifetime of strong is limited to lifetime of time of executing this code

ReStoreZoneSelection

Restore previously store zone selection.

SelectZone Index

Select the zone by index. Argument - number. Counting from 1.

UnSelectZone Index

Select the zone by index. Argument - number. Counting from 1.

ToggleSelectZone Index

Toggle zone selection state. Argument - number. Counting from 1.

SelectZoneName ZoneName

Select zone by name. Argument - string.

UnSelectZoneName ZoneName  
Unselect zone by name. Argument - string.

ToggleSelectZoneName ZoneName  
Toggle zone selection state. Argument - string.

==== Cell Navigation ====

Command from this section designed to activate the cues within the page.  
Functionality affected by SelectGrid !!!

FocusCell Col, Row  
Set focused cell by Column and Row. Column range 1..10. Row range 1..6.

FocusCellIndex Index  
Set focused cell by index (1..60)

StartCell  
No arguments. Start focused cell

StopCell  
No arguments. Stop focused cell

ShiftFocus DeltaIndex  
Shift focused cell on DeltaIndex cells forward or backward. Positive value - go forward. Independently on step value the resulting index will be valid range.

MoveFocus DeltaX, DeltaY  
DeltaX - how many cells to go horizontally  
DeltaY - how many cells to go vertically

==== Local Commands ====

Restart  
Parameters: none  
Purpose: start execution from a first line. Use it if you need to start from beginning. Typical use - some WaitFor command at beginning and Restart at the end  
Example: Restart

Exit  
Parameters: none  
Purpose: stop the script execution

## Example: Restart

### Autostart

Parameters: none

Purpose: Automatically start the script execution. Suitable for PangoScript tab and MIDI background scripts.

### StopOnBlackout 0,1 or ON, OFF

Purpose: this option define how the scripeter should react on blackout. By default (at least now), the script execution will not be interrupted. If to will enable this option then the script execution will stop.

### CodeName string

Parameters: String. Allow define a program name in the Code list. This string is also used for identification of Code for StartCode and StopCode functions.

Example: Name "my first code"

### CodeShortcut shortcut-string

Parameter: a string that contain a shortcut in text form. As example:

"Ctrl+A". Delphi has functions ShortcutToText and TextToShortcut. It allow transform. Main idea - allow code contain information about its name and shortcut as a text, inside the code. How to know shortcut text? right now - there is dialog that allow define a shortcut to Code, and you can see how it looks.

### StartCode CodeName

Parameter: string that define code name to start. Could be used only code from the main pool (listbox in Code tab);

Purpose: This allow to actiavte one code from another code, for making a complex reactions. In act, this is analog of subroutine

Example:

```
// First script
WaitForHotkey "F1"
StartCode "Rotate Z"
WaitForHotekey "F1"
StopCode "Rotate Z"
Restart
```

```
// Second script
CodeName "Rotate Z"
WaitForBeat
LCMaster
AngleDelta 0,0, 5
Restart
```

### StopCode CodeName



Parameter: string that define code name to stop.

Purpose: Stop the execution of specified code, a pair for StartCode. (see above)

==== Output ====

SelectMidi DeviceNumber

Parameters: DeviceNumber is from 1 to 4 and correspond to device number of MIDI settings dialog. Special value "-1" accepted for WaitForMIDI command only. MidiOut do not accept this value and will ignore it.

Example:

```
SelectMidi 1
```

```
WaitForMidi 0xC0, 00, ANY
```

See also - GetMidiDeviceIndex. Function return currently selected device number

SetMidiLayer

MidiOut Message, Data1, Data2

Parameters: 3 parameters, standard for MIDI, Message is value in range of 80h up to FFh. Data1 and Data2 from zero to 7Fh.

DmxOut Channel, Value

Parameters: Channel is index of DMX channel, value range 1..512. Value is state of DMX channel, range 0..255

Example: DmxOut 1,255

DmxOutRange

ChannelOut ChannelIndex, Value

Parameters: ChannelIndex is index of internal BEYOND Channel, value range 1..255. Value is state of DMX channel, range 0..1000.

Example: ChannelOut 1,1000

OscOut Address, [Argument]

The first parameter is osc message address. string.

Second and other arguments are optional. Types - string or number.

==== Unsafe commands ====

RunApp File, Parameters, ShowCmd

Purpose: This command use ShellExecute() function inside it. Please check MSDN:  
[http://msdn.microsoft.com/en-us/library/windows/desktop/bb762153\(v=vs.85\).aspx](http://msdn.microsoft.com/en-us/library/windows/desktop/bb762153(v=vs.85).aspx)

Reason of adding this command - ability to run external application from BEYOND. Internally, BEYOND use this code:

```
ShellExecuteW(0, nil, PWideChar(FFile), PWideChar(FParameters), nil, round(FShowCmd))
```

Parameters:

File - string. exe file name including path.

Parameters - string.

ShowCmd - number, see MSDN for details are optional. For more info please check MSDN. Default value is SW\_SHOWNORMAL (1)

Example: RunApp "C:\Windows\notepad.exe", "", 1

IMPORTANT: This command is disabled by default because of security reasons. If you going to use this command, enable it in "Configuration" dialog, "Security" tab.

==== Limiters ====

SetLimiterProfile Index

Parameter - index of profile. There are two profiles, the 1st for "One Cue" mode, and second for "Multi Cue" mode. You should select 1 or 2 before using SetLimiter commands. This also will affect the state of BEYOND and change the active profile. It is recommended to call OneCue, OnePer or MultiCue command after the profile.

SetLimiterPerZone Value

Value specify max number of cues per Zone. The range is 1..30. The range is big, and we recommend to keep the values in reasonable limits

SetLimiterPerGrid Value

Value specify max number of cues per Grid. The range is 1..30.

SetLimiterFlash Value

Value specify max number of cues that can be in Flash mode. The range is 1..30.

SetLimiterHold Value

Value specify max number of cues that can be in Hold mode. The range is 1..30.

SetLimiterBeam Value

Value specify max number of playing Beam cues. The range is 1..30.

SetLimiterDMX Value

Value specify max number of playing Beam cues. The range is 1..30.

SetLimiterShow Value

Value specify max number of playing Show cues. The range is 1..30.

==== Timeline control ====

PlayTimeline

Start playback of current show in timeline editor

StopTimeline

Stop playback of current show in timeline editor

TimelineMarker

Add timeline marker. There are 3 modifications

TimelineMarker (no arguments) - add marker at current position and current color

TimelineMarker Color - addmarker with specified color at current time position

TimelineMarker Color, Time - add marker with specified color at specified time

Time - time in seconds, float point

Color - index, 1..10;

==== QuickDMX Editor ====

SetDmxEditorChannel

==== Play List control ====

PlayListStop

Stop playing of current show

PlayListPlay

Start playing of current show

PlayListFirst

Jump to first show in the list. Work in play and edit modes.

PlayListLast

Jump to last show in the list. Work in play and edit modes.

### PlayListNext

Jump to next show in the list. Work in play and edit modes.

### PlayListPrev

Jump to previous show in the list. Work in play and edit modes.

### PlayListSetPos index

Jump to specified show of the list. Index define a number of show in the list

### PlayListSetTime time

Jump to time position of the show, value defined in seconds. Work only in PLAY mode.

### ==== Debug messages ====

#### qLog string or numeric argument(s)

Purpose: display message in QLog tab. Usefull for debug purposes.

#### Write string or numeric argument(s)

Purpose: create special output window and display message.

#### WriteLn string or numeric argument(s)

Purpose: create special output window and display message.

### ==== Player control ====

#### InvertPlayersTime

No arguments. Invert time direction of all currently playing cues. Works for all dynamic players. Used in corresponding button on Master tab

#### PlayersSetJump (no argument)

No arguments. The first call memorize current player position and second call restore the time of player to that position. See PlayersResetTime that clear this time storage. Works for all dynamic players. Used in corresponding button on Master tab

#### PlayersResetJump

No arguments. Function is an addition for PlayersSetJump, it clear the saved time to zero,. Works for all dynamic players. Used in corresponding button on Master tab

#### PlayersSetLoop

No arguments. One more function of "time fun" groups. First call memorize time

position A, second call memorize time position B, and after that, Player bounce the time within specified A-B range. Third call of this procedure clear the time variables, and player continue normal playback. Works for all dynamic players. Used in corresponding button on Master tab

PlayersDisk SpeedMultiplier, PositionDelta

PlayersDisk provide access to "DJ disk" from Master tab of BEYOND. Disk action based on two things - distance from center that define the slowdown of rotation (speed control) and second is position shift - what actually is time shift delta.

SpeedMultiplier is normalized value within 0..1 range, where 1 is full speed, 0 a full stop

PositionDelta is a shift of time, backward or forward. Value in radians. Each call add this value to time position of the players. Parameter is optional!, there is a special procedure for this if you plan to use it from MIDI.

Works for all dynamic players. Used in corresponding button on Master tab

PlayersDiskShift PositionDelta

Command does the time shift (on delta) of all currently playing cue. It is simple action like  $Time = Time + Delta$ ;

Command made for use with MIDI and action is equal to PlayersDisk command.

==== Property Animation ====

Property animation designed for linear change of property from one state to another during some period of time. Technically, this is sort of micro script, but BEYOND does this job automatically. Internally BEYOND has internal list of the tasks for object property animation. The list is dynamic. The only way to create request for property animation is a script.

Note, the execution of property animation performed right after execution of all script by dedicated thread of BEYOND. The time resolution is ~ 40 "FPS". For animation of laser related properties it might be not perfect because laser projector frame rate may be much higher.

AnimateProp PropertyName, StartValue, FinishValue, DurationMS, FinishEvent  
PropertyName - string that contain complete name of object and its property. The property must be numeric.

StartValue - number. Specify start value of the property during animation

FinishValue - number. Specify final value of the property during animation.

DurationMS - duration of animation in milliseconds

FinishEvent - optional parameter, string. Specify name of Event that will be activated at the end of animation. Action equal to call of PulseEvent() procedure.

Exmaple:

```
AnimapeProp "Master.Brightness", 100, 0, 1000
// command change value of Master brightness from 100% to zero during 1000 ms
(one second)
```

Example2 :

```
AnimapeProp "Master.Brightness", Master.Brightness, 0, 500
// command change value of Master brightness from current value to zero during
500 ms (0.5 second)
```

AnimatePropDelta PropertyName, TotalDelta, DurationMS, FinishEvent  
PropertyName - string that contain complete name of object and its property.  
The property must be numeric.  
TotalDelta- number. Specify how much will change the value of specified  
property  
DurationMS - duration of animation in milliseconds  
FinishEvent - optional parameter, string. Specify name of Event that will be  
activated at the end of animation. Action equal to call of PulseEvent()  
procedure.

Example:

```
AnimatePropDelta "Master.Brightness", -25, 300 // decrease master
brightness on 25% during 0.3 second
```

Example 2:

```
AnimatePropDelta "Master.Color", -32, b2ms(1) // shift color "slider" of
master on 32 during 1 beat
```

DeletePropAni PropertyName, PropertyName, PropertyName,,,,  
Commamd delete existing animation-tasks from the pool. If no one parameter  
specified then command delete ALL tasks. Command can contain one or more names  
of properties.

PropertyName - string that contain complete name of object and its property.  
The property must be numeric.

Example1:

```
DeletePropAni // delete all
```

Example2:

```
DeletePropAni "Master.Brightness"
```

Example3:

```
DeletePropAni "Master.Brightness", "Master.Color",
```

==== MIDI Surface Layer (MSL) ====

BEYOND offer more functions that can be mapped to MIDI sliders/buttons of overage MIDI console has. The solution is map a few function to one slider, and enable only one of them. For making this possible BEYOND introduce conception of "layers". You organize some set of functions grouped into layers, and after that you can change the layer, what give quick access to the groups of functions.

MIDI Surface Layering allow connect multiple BEYOND features to one MIDI command (message). Layering work with Main Grid, Secondary Grid, Surface Buttons, Surface Sliders, FX and Zone selection. Currently available 12 layers. Counting starts from 1 and up to 12. The function of BEYOND may belong to more than one layer. In this case this function stay active in all layers where it enabled. If the function of BEYOND is not enabled in current layer, then it will not react on assigned MIDI message, same as will not generate a feedback messages.

Simplified Layer control.

Each MIDI Mapping object has property Layer. When you write to this property then it change Layer of all tables. Such operation equal to using of 12 commands described below.

Example:

```
Midi1.Layer=1  
Midi2.Layer=10  
Midi3.Layer=5
```

Detailed control.

Each table has own Layer property that you can control independently.

==== Triggers ====

"Trigger" is a special mode for the scripter. The trigger as two part - Definition and Action. The the Definition part you define the type of the trigger, range of values and labels for corresponding sections of code. In the Action part has one or more code sections that will be activated - depending on the definition. Lets talk a bit more about when trigger may be in help and why it done this way.

The simplest and classic example is when DMX come into some range of values, and the fact that the value is in range now it create some reaction. If the is not the same as "if value is in range then we do something". No., It is like - we do it every time as value come into the range. The next time it will happen

when the value will go out of range and back to the range.

No doubt it is possible to make a trigger by means for "standard" PangoScript commands, but it require much more complex script code, more lines, and at the end it will be more slow. The Trigger use a hybrid method. You define what to check and the ranges, and BEYOND software do the idle job for you - BEYOND read the state and compare with ranges, take care about the state and other things. All it done in native code. If you will do it all in PangoScript then it will require much more CPU time. So, this part can be more optimal. What say in PangoScript is a reaction (action). You need to define a section(s) of code that will be activated.

### Trigger definition commands

DefineDmxTrigger ChannelIndex - this command set the scripiter into trigger mode, and define that trigger react on DMX channel number "ChannelIndex "

DefineMidiTrigger Message, Data1 - this command set the scripiter into trigger mode, and define that trigger react on MIDI message. You need to specify the message n

DefineTrigger String-Expression, Caption - this command set the scripiter into trigger mode, and define that trigger depends on expression. The expression is math formula. it has a syntax of string. The dumb exampe: DefineTrigger "2+2". In this example 2+2 is expression. But, according to syntax of this command we put expression inside "..". The Caption is just text string for PangoScript tab

The top level logic of these command is this. The most possible, the triggers will work with MIDI and DMX consoles. The trigger must be fix, and effective, because it will work on a high speed, because we have a trigger specially made for MIDI and DMX. BEYOND precalculate values and do it all in native code. But, not doubt will appear a need in some universal method, and in this case will help universal command DefineTrigger. This command work with expression, it is more slow because BEYOND need to calculate expression all the time, but it is very flexible, and work for all types of input data. You can use objects, variables, functions, expression and so on. It can work with Audio, Kinect or DMX, Universe or GamePad and any mix of this. So, for DefineTrigger we need to supply text of expression to trigger engine, and it is a string.

### Trigger range commands

Here a formal description of commands, examples and logic after that.

InRangeTrigger MinValue, MaxValue, LabelName



The action will be activated when values comes in range between MinValue and MaxValue. When it happen the scripiter does goto to LabelName

MinValue - number, a minimum value of the range

MaxValue - number, a maximum value of the range

LabelName - string that contain label name

InRangeTriggerCmd MinValue, MaxValue, Command

The action will be activated when values comes in range between MinValue and MaxValue. When it happen the scripiter execute Command.

MinValue - number, a minimum value of the range

MaxValue - number, a maximum value of the range

Command- string that contain a PangoScript command

OutOfRangeTrigger MinValue, MaxValue, LabelName

The action will be activated when values comes out of range of MinValue and MaxValue. When it happen the scripiter does goto to LabelName.

MinValue - number, a minimum value of the range

MaxValue - number, a maximum value of the range

LabelName - string that contain label name

OutOfRangeTriggerCmd MinValue, MaxValue, Command

The action will be activated when values goes out of range of MinValue and MaxValue. When it happen the scripiter execute Command.

MinValue - number, a minimum value of the range

MaxValue - number, a maximum value of the range

Command- string that contain a PangoScript command

IncreaseTrigger MinValue, MaxValue, LabelName

The action will be activated when value increase and stay in range of MinValue and MaxValue. When it happen the scripiter does goto to LabelName.

MinValue - number, a minimum value of the range

MaxValue - number, a maximum value of the range

LabelName - string that contain label name

DecreaseTrigger MinValue, MaxValue, LabelName

The action will be activated when value decrease and stay in range of MinValue and MaxValue. When it happen the scripiter does goto to LabelName.

MinValue - number, a minimum value of the range

MaxValue - number, a maximum value of the range

LabelName - string that contain label name

About the logic

The most simple is InRangeTrigger command. When values comes in range, then something happen. We can define a few ranges, and when value comes into the

range then something will happen. What will happen? We considered a few options, and appeared that in simplest case one simple command will be enough. I mean, Blackout, or EnableLaserOutput, or StopAllCue , who knows. In many cases one command will be enough. But, what is not enough? In this case we should do goto to a second of code. In fact, you simply put a name of label, and BEYOND will do a goto (this process is optimized too). So, we have two options - Command or Label for Goto.

There is inverted version of InRangeTrigger - OutOfRange trigger. The only different is goes to be activated when value goes out of range. All the rest is equal. There in Min and Max value, and there version of command for Command and for Label.

The third variation of trigger allow define reaction on the increase or decrease of the value. it work like this: scripser memorize current value, and if the new value is bigger (or smaller) than current state then it active the trigger. Command IncreaseTrigger create a reaction when new value is more than current. Command DecreaseTrigger create a reaction when new value is less than current.

No doubt, we can add more commands, add more functionality to trigger. The range oriented commands is a classic. The increase/decrease has a practical use too.

Rule of 3 words: Type, Range, Interaction

T - type of the trigger - DMX, or MIDI, or universal

R - range, when value in range the we do something

I - interaction, the trigger is only a way to do some action, we need define what it will do.

Example 1: Enable/Disable laser output from MIDI

```
DefineMidiTrigger 0xB0, 0x00, "Enable Laser test"
```

```
InRangeTriggerCmd 0,63,"DisableLaserOutput"
```

```
InRangeTriggerCmd 64,127,"EnableLaserOutput"
```

This trigger react in the MDI slider 0xB0, 0x00, and has values in range of 0..127. When slider in lower half the laser output will be disables, and when in higher half, then output will be disables. Now command bby comamnd:

```
DefineMidiTrigger 0xB0, 0x00, "Enable Laser test"
```

```
DefineMidiTrigger is command
```

```
0xB0, 0x00 - this is slider parameter
```

```
"Enable Laser test" - this is optional parameter - caption of this scripser
```

```
InRangeTriggerCmd 0,63,"DisableLaserOutput"
```

```
InRangeTriggerCmd - command, define the range and command
0,63 - the range
"DisableLaserOutput" - command as string.
```

```
InRangeTriggerCmd 64,127,"EnableLaserOutput"
InRangeTriggerCmd - command that define second range
64,127 - second range
"EnableLaserOutput" - command that will be executed.
```

Example 2: Same as example 1, but with goto

```
DefineMidiTrigger 0xB0, 0x00, "Enable Laser test 2"
InRangeTrigger 0,63, "D1" // D1 is a name of label, see below
InRangeTrigger 64,127, "D2" // D2 is a name of label, see below
exit // we need to exit because we should stop script execution after the
declaration
```

```
D1: // this is label used 1st range
DisplayPreview "Disable" // visual indication in Preview panel
DisableLaserOutput // Command
exit // we should stop script execution, otherwise it will do below
```

```
D2: // this is label used 2nd range
DisplayPreview "Enable" // visual indication in Preview panel
EnableLaserOutput
exit // we should stop script execution. This is good practice to have it.
```

Commentaries for this example. The script itself is bigger, and there are sections for definition and for corresponding scripts. There are two typical mistakes

1. Do not forget to put exit instruction
2. Ensure that label name in code and in definition is the same. Otherwise, it will not work. Label is case sensitive.

And general advice - use DisplayPreview, DisplayPopup or qlog for debug purpose. It might be good idea to create a trigger definition with all jumps, and put inside commands like DisplayPreview only, without real functionality. Once you see that the logic works fine, then put there the rest of code.

Example 3: Slider at first time do Enable Laser, and and second time Disable Laser

This code based on previous, but it use variable. Variable organize a

```
DefineMidiTrigger 0xB0, 0x00, "Enable Laser test 3"  
InRangeTrigger 64,127, "Trick1"  
var counter // declare variable  
counter=0 // initialize variable  
exit
```

Trick1:

```
DisplayPreview Counter // debug action  
if (Counter=0) EnableLaserOutput // action when Count is 0  
if (Counter=1) DisableLaserOutput // action when Count is 1  
Counter=(Counter+1) % 2 // increment counter and divide by modulus 2, so, it  
will be 0,1,0,1,0,1 and so on  
exit // stop this section
```

Example 4: The same as example 4, but with Goto

```
DefineMidiTrigger 0xB0, 0x00, "Enable Laser test 3"  
InRangeTrigger 64,127, "Trick1"  
var counter  
counter=1  
exit
```

Trick1:

```
DisplayPreview Counter  
Counter=(Counter+1) % 2  
if (Counter=0) goto When0  
if (Counter=1) goto When1  
exit
```

When0:

```
EnableLaserOutput  
exit
```

When1:

```
DisableLaserOutput  
exit
```

Well, example, is similar, and show that you can use additional Goto instructions.

Example 5

What I want to demonstrate by this example - BEYOND does a goto when it execute a trigger. It means this. You can do goto by means of script command. But trigger engine use the same goto. Look a the code, comments below

```
DefineMidiTrigger 0xB0, 0x00, "Enable Laser test 3"  
InRangeTrigger 64,127, "Trick1"  
InRangeTrigger 0,63, "StopIt"  
exit
```

```
Trick1:  
DisplayPopup "Yes"  
Sleep 1000  
DisplayPopup "No"  
Sleep 1000  
goto Trick1
```

```
StopIt:  
DisplayPopup "I dont care"  
exit
```

Two ranges, and main action in range of 64..127. The main action is after label Trick1. It has a dead loop. At least, it looks like dead loop. You see message panel with Yes and No and it will work until you move the slider down. It will break this endless loop.

Example 6: Lets try to use expressions... BPM notification

```
DefineTrigger "Master.BPM" // expression...  
InRangeTrigger 0,50,"WhenSlow"  
InRangeTrigger 250,500,"WhenFast"  
exit
```

```
WhenSlow:  
DisplayPopup "Hey, dont sleep"  
exit
```

```
WhenFast:  
DisplayPopup "Hey, too fast!"  
exit
```

This example use simplest expression - read the value of object property - Master.BPM, and depending on the BPM show the message.

Example 7: Out of range.

This example based on previous. The only change is OutOfRangeTrigger. This section will be activate when BPM is too slow or too fast. This is only example without big sense, but it it easy to test, because you can see BPM value on toolbar and have the slider that control it.

```
DefineTrigger "Master.BPM" // expression...  
OutOfRangeTrigger 60,250,"WhenOutOf"  
exit
```

```
WhenOutOf:  
DisplayPopup "Hmm, this is not normal"  
exit
```

Example 8: Starts/Stop timeline

```
DefineMidiTrigger 0xB0, 0x00, "Timeline control"  
InRangeTriggerCmd 0, 63, "StopTimeline"  
InRangeTriggerCmd 64,127, "PlayTimeline"
```

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